

Oregon OSHA – Proposal to adopt federal SIP-IV amendments and Oregon-initiated changes to administrative, general industry, construction, and maritime activity standards.

September 2019

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Federal Register

[May 14, 2019- Standards Improvement Project- Phase IV](#)

DIVISION 1, GENERAL ADMINISTRATIVE

437-001-0700

Recording Workplace Injuries and Illnesses

(1) Purpose. This rule requires employers to record work-related fatalities, injuries, and illnesses.

Note: Recording a work-related injury, illness, or fatality does not assign fault to anybody, does not prove the violation of an OSHA rule, and does not establish the employee's eligibility for workers' compensation or other benefits.

(2) Scope. This standard covers all employers covered by the Oregon Safe Employment Act, except for the exemptions below.

(3) Exemptions.

(a) If your company never had more than ten (10) employees during the last calendar year, including temporary employees, you do not need to keep Oregon OSHA injury and illness records unless the Director informs you in writing that you must keep records. The exemption for size is based on the number of employees in the entire company within the state of Oregon.

(b) If your company had more than ten (10) employees at any time during the last calendar year, you must keep Oregon OSHA injury and illness records unless your business is in a specific low hazard retail, service, finance, insurance, or real estate industry in Table 1. If so,

you do not need to keep Oregon OSHA injury and illness records unless the government asks you to keep the records under 437-001-0700(22).

(c) If one or more of your company's establishments are classified in a nonexempt industry, you must keep Oregon OSHA injury and illness records for all of such establishments unless your company is exempted because of size under 437-001-0700(3)(a). If a company has several business establishments engaged in different classes of business activities, some of the company's establishments may be required to keep records, while others may be exempt.

(4) Alternate or Duplicate Records. If you create records to comply with another government agency's injury and illness recordkeeping requirements, those records meet Oregon OSHA's recordkeeping requirements if Oregon OSHA accepts the other agency's records under a memorandum of understanding with that agency, or if the other agency's records contain the same information as this standard requires you to record. Contact Oregon OSHA for help in determining if your records meet Oregon OSHA's requirements.

Table 1 - Exempt industries

Employers do not need to keep Oregon OSHA injury and illness records for any establishment in the following 2007 North American Industry Classification System (NAICS) codes. Subsequent codes that are added with further revisions of the NAICS codes would apply to this exemption list, unless Oregon OSHA or the Department of Consumer and Business Services asks them in writing to keep these records.

NAICS Code	Industry Description
4412	Other Motor Vehicle Dealers
4431	Electronics and Appliance Stores
4461	Health and Personal Care Stores
4471	Gasoline Stations
4481	Clothing Stores
4482	Shoe Stores
4483	Jewelry, Luggage, and Leather Goods Stores
4511	Sporting Goods, Hobby, and Musical Instrument Stores
4512	Book, Periodical, and Music Stores
4531	Florists
4532	Office Supplies, Stationary, and Gift Stores
4812	Nonscheduled Air Transportation
4861	Pipeline Transportation of Crude Oil
4862	Pipeline Transportation of Natural Gas
4869	Other Pipeline Transportation
4879	Scenic and Sightseeing Transportation, Other
4885	Freight Transportation Arrangement

NAICS Code	Industry Description
5111	Newspaper, Periodical, Book, and Directory Publishers
5112	Software Publishers
5121	Motion Picture and Video Industries
5122	Sound Recording Industries
5151	Radio and Television Broadcasting
5172	Wireless Telecommunications Carriers (except Satellite)
5173	Telecommunications Resellers
5179	Other Telecommunications
5181	Internet Service Providers and Web Search Portals
5182	Data Processing, Hosting, and Related Services
5191	Other Information Services
5211	Monetary Authorities - Central Bank
5221	Depository Credit Intermediation
5222	Nondepository Credit Intermediation
5223	Activities Related to Credit Intermediation
5231	Securities and Commodity Contracts Intermediation and Brokerage
5232	Securities and Commodity Exchanges
5239	Other Financial Investment Activities
5241	Insurance Carriers
5242	Agencies, Brokerages, and Other Insurance Related Activities
5251	Insurance and Employee Benefit Funds
5259	Other Investment Pools and Funds
5312	Offices of Real Estate Agents and Brokers
5331	Lessons of Nonfinancial Intangible Assets (except Copyrighted Works)
5411	Legal Services
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services
5413	Architectural, Engineering, and Related Services
5414	Specialized Design Services
5415	Computer Systems Design and Related Services
5416	Management, Scientific, and Technical Consulting Services
5417	Scientific Research and Development Services
5418	Advertising and Related Services
5511	Management of Companies and Enterprises
5611	Office Administrative Services
5614	Business Support Services
5615	Travel Arrangement and Reservation Services
5616	Investigation and Security Services
6112	Junior Colleges

NAICS Code	Industry Description
6113	Colleges, Universities, and Professional Schools
6114	Business Schools and Computer and Management Training
6115	Technical and Trade Schools
6211	Offices of Physicians
6212	Offices of Dentists
6213	Offices of Other Health Practitioners
6214	Outpatient Care Centers
6215	Medical and Diagnostic Laboratories
6244	Child Day Care Services
7114	Agents and Managers for Artists, Athletes, Entertainers, and Other Public Figures
7115	Independent Artists, Writers, and Performers
7213	Rooming and Boarding Houses
7221	Full-Service Restaurants
7222	Limited-Services Eating Places
7224	Drinking Places (Alcoholic Beverages)
8112	Electronic and Precision Equipment Repair and Maintenance
8114	Personal and Household Goods Repair and Maintenance
8121	Personal Care Services
8122	Death Care Services
8131	Religious Organizations
8132	Grantmaking and Giving Services
8133	Social Advocacy Organizations
8134	Civic and Social Organizations
8139	Business, Professional, Labor, Political, and Similar Organizations

(5) Recording Criteria and Forms.

(a) Each employer required to keep records of fatalities, injuries, and illnesses must record each fatality, injury, and illness that:

(A) Is work-related; and

(B) Is a new case; and

(C) Meets one or more of the general recording criteria of OAR 437-001-0700(8) or the application to specific cases of OAR 437-001-0700(9) through (12).

Table 2 - Related rules

This table indicates which sections of the rule address each topic.	
(i) Determination of work-relatedness.	See 437-001-0700(6)
(ii) Determination of a new case.	See 437-001-0700(7)
(iii) General recording criteria.	See 437-001-0700(8)
(iv) Additional criteria. (Needlestick and sharps injury cases, tuberculosis cases, hearing loss cases, medical removal cases, and musculoskeletal disorder cases)	See 437-001-0700(9) through (12)

The decision tree for recording work-related injuries and illnesses below shows the steps involved in making this determination.

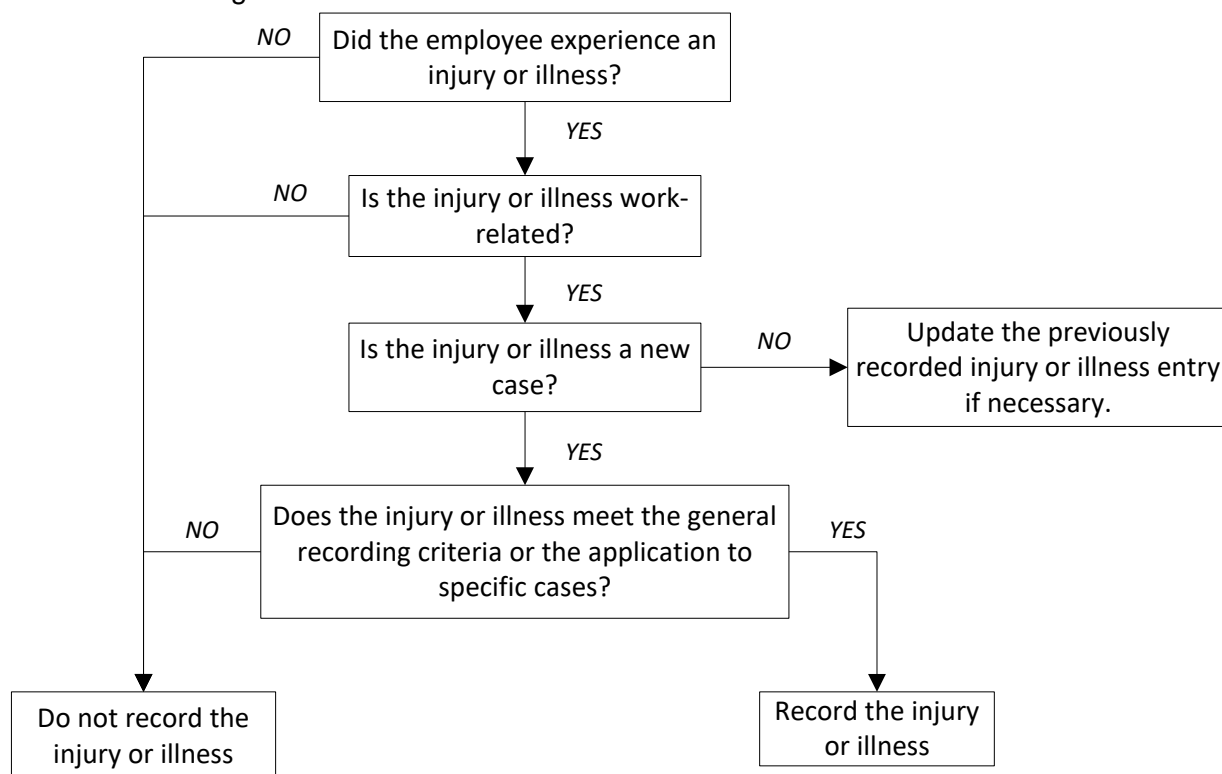


Figure 1

(6) Work-Related. You must consider an injury or illness to be work-related if an event or exposure in the work environment either caused or contributed to the resulting condition or significantly aggravated a pre-existing injury or illness. You must presume work-relatedness for injuries and illnesses resulting from events or exposures occurring in the work environment, unless an exception in Table 3 specifically applies.

(a) Oregon OSHA defines the work environment as the establishment and other locations where one or more employees work or are present as a condition of their employment.

(b) If it is not obvious where the precipitating event occurred you must evaluate the employee's work duties and environment to decide whether events or exposures in the work

environment either caused or contributed to the condition or significantly aggravated a pre-existing condition.

(c) A pre-existing injury or illness is significantly aggravated when an event or exposure in the work environment results in (A) through (D) below. Oregon OSHA considers an injury or illness to be a pre-existing if it resulted solely from a non-work-related event or exposure that occurred outside the work environment.

(A) Death, provided that the pre-existing injury or illness would likely not have resulted in death but for the occupational event or exposure.

(B) Loss of consciousness, provided that the pre-existing injury or illness would likely not have resulted in loss of consciousness but for the occupational event or exposure.

(C) One or more days away from work, or days of restricted work, or days of job transfer that otherwise would not have occurred but for the occupational event or exposure.

(D) Medical treatment in a case where no medical treatment was needed for the injury or illness before the workplace event or exposure, or a change in medical treatment was necessitated by the workplace event or exposure.

(d) An injury or illness occurring in the work environment that falls under one of the following exceptions found in Table 3 is not work-related, and is not recordable.

Table 3 - Work environment exceptions

Do not record injuries and illnesses if . . .

At the time of the injury or illness, the employee was present in the work environment as a member of the general public rather than as an employee.

The injury or illness involves signs or symptoms that surface at work but result solely from a nonwork-related event or exposure that occurs outside the work environment.

The injury or illness results solely from voluntary participation in a wellness program or in a medical, fitness, or recreational activity such as blood donation, physical examination, flu shot, exercise class, racquetball, or baseball.

The injury or illness is solely the result of an employee eating, drinking, or preparing food or drink for personal consumption (whether bought on the employer's premises or brought in). For example, if the employee is injured by choking on a sandwich while in the employer's establishment, the case is not work-related.

Note: If the employee becomes ill by ingesting food contaminated by workplace contaminants (such as lead), or gets food poisoning from food supplied by the employer, the case is work-related.

The injury or illness is solely the result of an employee doing personal tasks (unrelated to their employment) at the establishment outside of the employee's assigned working hours.

The injury or illness is solely the result of personal grooming, self-medication for a nonwork-related condition, or is intentionally self-inflicted.

The injury or illness is caused by a motor vehicle accident and occurs on a company parking lot or company access road while the employee is commuting to or from work.

The illness is the common cold or flu (Note: contagious diseases such as tuberculosis, brucellosis, hepatitis A, or plague are work-related if the employee is infected at work).

The illness is a mental illness. Mental illness is not work-related unless the employee voluntarily provides the employer with an opinion from a physician or other licensed health care professional with appropriate training and experience (psychiatrist, psychologist, psychiatric nurse practitioner, etc.) stating that the employee has a work-related mental illness.

(e) Travel. Injuries or illnesses occurring during travel are work-related if the employee was engaged in work activities in the interest of the employer and it is not one of the exceptions in Table 4 - Travel status exemptions.

Table 4- Travel status exemptions.

(f) Work at home. Injuries and illnesses that occur while an employee works at home,

Do not record injuries or illnesses that occur when the employee is on travel status if they meet one of the exceptions listed below.

If the employee . . .	You may use the following to determine if an injury or illness is work-related.
checked into a hotel or motel for one or more days.	When a traveling employee checks into a hotel, motel, or other temporary residence, they establish a "home away from home." You must evaluate the employee's activities after they check into the hotel, motel, or other temporary residence for their work-relatedness in the same manner as you evaluate the activities of a nontraveling employee. When the employee checks into the temporary residence, they have left the work environment. When the employee begins work each day, they re-enter the work environment. If the employee has established a "home away from home" and is reporting to a fixed worksite each day, you also do not consider injuries or illnesses work-related if they occur while the employee is commuting between the temporary residence and the job location.
took a detour for personal reasons.	Injuries or illnesses are not work-related if they occur while the employee is on a personal detour from a reasonably direct route of travel (e.g., took a side trip for personal reasons).

including work in a home office, is work-related if the injury or illness relates directly to the work rather than to the general home environment or setting.

(g) Former employees. If you are notified that a former employee had a work related injury or illness when in your employment, record the date of the incident on the appropriate OSHA 300 log for the date of the injury. If the date is not known, use the last day of employment.

(7) New Cases. An injury or illness is a "new case" if:

(a) The employee has no previous recorded injury or illness of the same type that affects the same part of the body, or

(b) The employee previously had a recorded injury or illness of the same type that affected the same part of the body but recovered completely (all signs and symptoms disappeared) from the previous injury or illness and an event or exposure in the work environment caused the signs or symptoms to reappear.

(A) For occupational illnesses where the signs or symptoms may recur or continue in the absence of a workplace exposure, record the case only once when it is diagnosed. Examples include occupational cancer, asbestosis, byssinosis, and silicosis.

(B) You are not required to seek the advice of a physician or other licensed health care professional. If you do seek such advice, you must follow their recommendation about whether the case is a new case or a recurrence.

(8) General Recording Criteria. A work-related injury or illness is recordable if it results in any of the following: death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, or loss of consciousness. You must record a case if it involves a significant injury or illness diagnosed by a physician or other licensed health care professional, even if it does not result in death, days away from work, restricted work or job transfer, medical treatment beyond first aid, or loss of consciousness.

Note: Oregon OSHA believes that most significant injuries and illnesses will result in one of the events listed below. However, there are some significant injuries, such as a punctured eardrum or a fractured toe or rib, for which neither medical treatment nor work restrictions may be recommended. In addition, there are some significant progressive diseases, such as byssinosis, silicosis, and some types of cancer, for which medical treatment or work restrictions may not be recommended at the time of diagnosis but are likely to be recommended as the disease progresses. Cancer, chronic irreversible diseases, fractured or cracked bones, and punctured eardrums are generally considered significant injuries and illnesses, and must be recorded at the initial diagnosis even if medical treatment or work restrictions are not recommended, or are postponed, in a particular case.

Table 5 - General recording criteria

Record a work-related injury or illness if it results in one or more of the following:	
(i) Death,	See 437-001-0700(8)(a)
(ii) Days away from work,	See 437-001-0700(8)(b)
(iii) Restricted work or transfer to another job,	See 437-001-0700(8)(c)
(iv) Medical treatment beyond first aid,	See 437-001-0700(8)(d)
(v) Loss of consciousness,	See 437-001-0700(8)(e)
(vi) A significant injury or illness diagnosed by a physician or other licensed health care professional.	See 437-001-0700(8)(f)

(a) Death. You must record an injury or illness that results in death by entering a check mark on the OSHA 300 Log in the space for cases resulting in death.

Note: You must also report any work-related fatality to Oregon OSHA within 8 hours. See 437-001-0704.

(b) Days Away from Work. When an injury or illness involves one or more days away from work, you must record the injury or illness on the OSHA 300 Log with a check mark in the space for cases involving days away and an entry of the number of calendar days away from work in the number of days column. If the employee is out for an extended period of time, you must enter an estimate of the days that the employee will be away, and update the day count when the actual number of days is known.

(A) Begin counting days away on the day after the injury occurred or the illness began.

(B) End the count of days away from work on the date the physician or other licensed health care professional recommends that the employee return to work. This applies regardless of whether the employee returns earlier or later than recommended. If there is no recommendation from the physician or licensed health care professional, enter the actual number of days the employee is off work.

(C) You must count the number of calendar days the employee was unable to work as a result of the injury or illness, regardless of whether or not the employee was scheduled to work on those day(s). Include weekend days, holidays, vacation days or other days off in the total number of days recorded if the employee would not have been able to work on those days because of a work-related injury or illness.

(D) You may stop tracking of the number of calendar days away from work once the total reaches 180 days away from work and/or days of job transfer or restriction. Entering 180 in the total days away column is adequate.

(E) If the employee leaves your company for a reason unrelated to the injury or illness, such as retirement, a plant closing, or to take another job, you may stop counting days away from work or days of restriction/job transfer. If the employee leaves your company because of the injury or illness, you must estimate the total number of days away or days of restriction/job transfer and enter the day count on the 300 Log.

(F) You must enter the number of calendar days away for the injury or illness on the OSHA 300 Log that you prepare for the year in which the incident occurred. If the time off extends into a new year, estimate the number of days for that year and add that amount to the days from the year of occurrence. Do not split the days between years and enter amounts on the logs for two different years. Use this number to calculate the total for the annual summary, and then update the initial log entry later when the day count is known or reaches the 180-day cap.

(c) Restricted Work or Job Transfer. When an injury or illness involves restricted work or job transfer but does not involve death or days away from work, you must record the injury or illness on the OSHA 300 Log by placing a check mark in the space for job transfer or restriction and an entry of the number of restricted or transferred days in the restricted workdays column. Restricted work occurs when, as the result of a work-related injury or illness:

(A) You keep the employee from performing one or more of the routine functions of their job, or from working the full day that they would otherwise work; or

(B) A physician or other licensed health care professional recommends that the employee not perform one or more of the routine functions of their job, or not work the full workday that they would otherwise work.

Note: For recordkeeping purposes, an employee's routine functions are those work activities the employee regularly performs at least once per week.

(C) A recommended work restriction is recordable only if it affects one or more of the employee's routine job functions. To determine whether this is the case, you must evaluate the restriction in light of the routine functions of the injured or ill employee's job.

(D) A partial day of work is recorded as a day of job transfer or restriction for recordkeeping purposes, except for the day on which the injury occurred or the illness began.

(E) Record job transfer and restricted work cases in the same box on the OSHA 300 Log.

(F) Count days of job transfer or restriction in the same way you count days away from work. The only difference is that, if you permanently assign the injured or ill employee to a job modified or permanently changed to eliminate the routine functions the employee was restricted from performing, you may stop the day count when the modification or change is permanent. You must count at least 1-day of restricted work or job transfer for such cases.

(d) Medical Treatment. If a work-related injury or illness results in medical treatment beyond first aid, you must record it on the OSHA 300 Log. If the employee received medical treatment but remained at work without transfer or restriction and the injury or illness did not involve death, one or more days away from work, one or more days of restricted work, or one or more days of job transfer, you enter a check mark in the box for other recordable cases.

Note: You must record the case even if the injured or ill employee does not follow the physician or other licensed health care professional's recommendation.

(A) "Medical treatment" is the management and care of a patient to combat disease or disorder. For this rule, medical treatment does not include:

(i) Visits to a physician or other licensed health care professional solely for observation or counseling;

(ii) The conduct of diagnostic procedures, such as x-rays and blood tests, including the administration of prescription medications solely for diagnostic purposes (e.g., eye drops to dilate pupils); or

(iii) "First aid" as in (B) below.

(B) First aid is any of the conditions listed in Table 6. This is a complete list of all first aid treatments for this standard. These treatments are considered first aid regardless of the professional status of the person providing the treatment.

Table 6- First aid treatment.

(A)	Using a nonprescription medication at nonprescription strength (for medications available in both prescription and nonprescription form, a recommendation by a physician or other licensed health care professional to use a nonprescription medication at prescription strength is medical treatment for recordkeeping purposes);	(H)	Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister;
(B)	Administering tetanus immunizations (other immunizations, such as Hepatitis B vaccine or rabies vaccine, is medical treatment);	(I)	Using eye patches;
(C)	Cleaning, flushing or soaking wounds on the surface of the skin;	(J)	Removing foreign bodies from the eye using only irrigation or a cotton swab;
(D)	Using wound coverings such as bandages, Band-Aids™, gauze pads, etc.; or using butterfly bandages or Steri-Strips™ (other wound closing devices such as sutures, staples, etc. are medical treatment);	(K)	Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means;
(E)	Using hot or cold therapy;	(L)	Using finger guards;
(F)	Using any nonrigid means of support, such as elastic bandages, wraps, nonrigid back belts, etc. (devices with rigid stays or other systems designed to immobilize parts of the body are medical treatment for recordkeeping purposes);	(M)	Using massages (physical therapy or chiropractic treatment are medical treatment for recordkeeping purposes); or
(G)	Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.).	(N)	Drinking fluids for relief of heat stress.

This is a complete list of all first aid treatments for this standard. These treatments are considered first aid regardless of the professional status of the person providing the treatment.

(e) Loss of Consciousness. You must record a work-related injury or illness if the worker becomes unconscious, regardless of the length of time they remain unconscious.

(f) Other Injuries and Illnesses. Work-related cases involving cancer, chronic irreversible disease, a fractured or cracked bone, or a punctured eardrum must always be recorded under the general criteria at the time of occurrence.

(9) Needlestick and Sharps Injury Recording Criteria.

(a) When an injury is diagnosed later as an infectious bloodborne disease, you must update the classification on the 300 log to reflect the new status or classification.

(b) You must record all work-related needlestick injuries and cuts from sharp objects contaminated with another person's blood or other potentially infectious material (as defined by 1910.1030). You must enter the case on the OSHA 300 Log as an injury. To protect the employee's privacy, do not enter the employee's name on the OSHA 300 Log (see the requirements for privacy cases in OAR 437-001-0700(14)).

Note: If you have an exposure incident that is not a needlestick, you must still record it if it results in death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, loss of consciousness, or diagnosis of a significant injury or illness, such as HIV, hepatitis B, or hepatitis C.

(10) Medical Removal Recording Criteria. If another Oregon OSHA standard requires the medical removal of an employee, you must record the case on the OSHA 300 Log.

(a) You must enter each medical removal case on the OSHA 300 Log as either a case involving days away from work or a case involving restricted work activity, depending on how you decide to comply with the medical removal requirement. If the medical removal is the result of a chemical exposure, you must enter the case on the OSHA 300 Log by checking the "poisoning" column.

(b) If the case involves voluntary medical removal before reaching the medical removal levels required by an Oregon OSHA standard, do not record the case on the OSHA 300 Log.

(11) Occupational Hearing Loss Recording Criteria.

(a) Hearing loss must be recorded on the OSHA 300 Log by checking the hearing loss column when:

(A) An annual audiogram reveals a Standard Threshold Shift (STS) in either or both ears; and

(B) The hearing level in the same ear is 25 dB above audiometric zero.

Note: For the ease of the reader the definitions for STS and audiometric zero are provided here.

Standard Threshold Shift (STS) – A change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more in either ear.

Audiometric Zero – The lowest sound pressure level that the average, young adult with normal hearing can hear.

(b) In determining whether an STS has occurred, you may correct for the age of the employee. Use the appropriate table in Appendix A to determine the age adjustment. If the STS is 10 dB or more after the age correction, it still meets the criteria for recordability.

(c) If you retest the employee's hearing within 30 days of the first test, and the retest does not confirm the recordable STS, you are not required to record the hearing loss case on the OSHA 300 Log. If the retest confirms the recordable STS, you must record the hearing loss case within 7 calendar days of the retest. If subsequent audiometric testing performed under the testing requirements of the noise standard (1910.95) indicates that an STS is not persistent, you may erase, delete, or line-out the recorded entry.

(d) If a physician or other licensed health care professional determines, **following the rules set out in OAR 437-001-0700(6)**, that the hearing loss is not work-related or has not been significantly aggravated by occupational noise exposure, the case is not work-related. Do not record it on the OSHA 300 Log.

(12) Tuberculosis Reporting Criteria. If any of your employees has an occupational exposure to anyone with a known case of active tuberculosis (TB), and that employee subsequently develops a tuberculosis infection, as evidenced by a positive skin test or diagnosis by a physician or other licensed health care professional, you must record the case on the OSHA 300 Log by checking the "respiratory condition" column.

(a) Do not record a pre-employment positive skin test because the exposure was not in your workplace.

(b) Line out or erase a recorded case if you prove that:

(A) The worker lives in a household with a person diagnosed with active TB;

(B) The Public Health Department identifies the worker as a contact of an individual with a case of active TB unrelated to the workplace; or

(C) A medical investigation shows that the employee's infection was caused by exposure to TB away from work, or proves that the case was not related to the workplace TB exposure.

(13) Removed.

(14) Forms.

(a) You must use OSHA 300, 300A, and DCBS Form 801, or equivalent forms, for recordable injuries and illnesses. The OSHA 300 form is the Log of Work-Related Injuries and Illnesses, the 300A is the Summary of Work-Related Injuries and Illnesses, and the DCBS Form 801 or equivalent is the Worker's and Employer's Report of Occupational Injury or Disease. The OSHA 300 and 300A Summary forms must be kept on a calendar year basis.

(A) Even if you are exempt from recordkeeping, you must have at each establishment, a copy of DCBS Form 801 or equivalent for each occupational injury or illness that may result in a compensable claim.

(B) You must enter information about your business at the top of the OSHA 300 Log, enter a one or two line description for each recordable injury or illness, and summarize this information on the OSHA 300A Summary form at the end of the year.

(C) You must complete a DCBS Form 801 or equivalent form, for each recordable injury or illness entered on the OSHA 300 Log.

(D) You must enter each recordable injury or illness on the OSHA 300 Log and DCBS Form 801 or equivalent within 7 calendar days of receiving information that a recordable injury or illness has occurred.

(E) An equivalent form is one that has the same information, is as readable and understandable, and is completed using the same instructions as the OSHA form it replaces. Many employers use an insurance form instead of the DCBS Form 801, or supplement an insurance form by adding any additional information required by OSHA.

(F) You may use a computer to keep your records if it can produce equivalent forms when needed.

(G) Privacy Concern Cases. If you have a "privacy concern case," do not enter the employee's name on the OSHA 300 Log. Instead, enter "privacy case" in the space normally used for the employee's name. This will protect the privacy of the injured or ill employee when another employee, a former employee, or an authorized employee representative has access to the OSHA 300 Log. You must keep a separate, confidential list of the case numbers and employee names for your privacy concern cases so you can update the cases and provide the information to the government if asked to do so.

(H) The following injuries or illnesses are privacy concern cases:

(i) An injury or illness to an intimate body part or the reproductive system;

(ii) An injury or illness resulting from a sexual assault;

(iii) Mental illnesses;

(iv) HIV infection, hepatitis, or tuberculosis;

(v) Needlestick injuries and cuts from sharp objects contaminated with another person's blood or other potentially infectious material; and

(vi) Other illnesses, if the employee voluntarily requests that his or her name not be entered on the log.

Note: This is a complete list of all injuries and illnesses that are privacy concern cases.

(I) If you reasonably believe that information describing the privacy concern case may be personally identifiable even though the employee's name is omitted, use discretion in describing the injury or illness on both the OSHA 300 and DCBS 801 Forms. You must enter enough information to identify the cause of the incident and the general severity of the injury or illness, but you do not need to include details of an intimate or private nature. For example, describe a sexual assault case as "injury from assault," or an injury to a reproductive organ could be described as "lower abdominal injury."

(J) If you voluntarily disclose the forms to persons other than government representatives, employees, former employees or authorized representatives, you must remove or hide the employees' names and other personally identifying information, except for the following cases:

(i) To an auditor or consultant hired by the employer to evaluate the safety and health program;

(ii) To the extent necessary for processing a claim for workers' compensation or other insurance benefits; or

(iii) To a public health authority or law enforcement agency for uses and disclosures for which consent, an authorization, or opportunity to agree or object is not required under Department of Health and Human Services Standards for Privacy of Individually Identifiable Health Information, 45 CFR.164.512.

(b) In addition, health care employers as defined in ORS 654.412 must record assaults against employees on the Health Care Assault Log. See OAR 437-001-0706.

(15) Multiple Business Establishments. You must keep a separate OSHA 300 Log for each establishment that you expect to operate for 1-year or longer.

(a) You may keep one OSHA 300 Log that covers all of your short-term establishments. You may also include the short-term establishments' recordable injuries and illnesses on an OSHA 300 Log that covers short-term establishments for individual company divisions or geographic regions.

(b) You may keep the records for an establishment at your headquarters or other central location if you can:

(A) Transmit information about the injuries and illnesses from the establishment to the central location within 7 calendar days of receiving information that a recordable injury or illness has occurred; and

(B) Produce and send the records from the central location to the establishment within the time frames required by OAR 437-001-0700(22) when you are required to provide records to a government representative, employees, former employees or employee representatives.

(c) You must link each employee with one of your establishments, for recordkeeping purposes. You must record the injury and illness on the OSHA 300 Log of the injured or ill

employee's establishment, or on an OSHA 300 Log that covers that employee's short-term establishment.

(d) If the injury or illness occurs at one of your establishments, you must record the injury or illness on the OSHA 300 Log of the establishment where the injury or illness occurred. If the employee is injured or becomes ill and is not at one of your establishments, you must record the case on the OSHA 300 Log at the establishment where the employee normally works.

(16) Covered Employees. You must record on the OSHA 300 Log the recordable injuries and illnesses of all employees on your payroll, whether they are labor, executive, hourly, salary, part-time, seasonal, or migrant workers. You also must record the recordable injuries and illnesses that occur to employees who are not on your payroll if you supervise these employees on a day-to-day basis. If your business is organized as a sole proprietorship or partnership, the owner or partners are not considered employees for recordkeeping purposes.

(a) Record the injuries and illnesses to workers from temporary help agencies or employee leasing services only if you supervise these employees on a day-to-day basis.

(b) If a contractor's employee is under the day-to-day supervision of the contractor, the contractor is responsible for recording the injury or illness. If you supervise the contractor employee's work on a day-to-day basis, you must record the injury or illness.

(c) You and the temporary help service, employee leasing service, personnel supply service, or contractor should coordinate your efforts to make sure that each injury and illness is recorded only once: either on your OSHA 300 Log (if you provide day-to-day supervision) or on the other employer's OSHA 300 Log (if that company provides day-to-day supervision).

(17) Annual Summary and Posting Requirements. At the end of each calendar year, you must:

(a) Review the OSHA 300 Log to verify that the entries are complete and accurate, and correct any deficiencies identified.

(b) Use the OSHA 300A Summary form to create an annual summary of injuries and illnesses recorded on the OSHA 300 Log:

(A) Total the columns on the OSHA 300 Log (if you had no recordable cases, enter zeros for each column total); and

(B) Enter the calendar year covered, the company's name, establishment name, establishment address, annual average number of employees covered by the OSHA 300 Log, and the total hours worked by all employees covered by the OSHA 300 Log.

(C) If you are using an equivalent form other than the OSHA 300A Summary form, the summary you use must also include the employee access and employer penalty statements found on the OSHA 300A Summary form.

(c) Sign or have a representative sign the 300A Summary to certify that the OSHA 300 Log is correct to the best of the signer's knowledge. If the summary is signed by a person other than a company executive, a company executive must also review the OSHA 300 Log in order to be generally familiar with its contents. A company executive is:

(A) An owner of the company when the company is a sole proprietorship or partnership;

(B) An officer of the corporation;

(C) The highest ranking company official working at the establishment; or

(D) The immediate supervisor of the highest ranking company official working at the establishment.

(d) Post a copy of the 300A Summary form in each establishment in a conspicuous place or places where notices to employees are customarily posted. Ensure that the posted annual summary is not altered, defaced or covered by other material.

(e) Post the 300A Summary no later than February 1 of the year following the year covered by the records and keep it posted until April 30.

(f) When you maintain records for all of your establishments at your headquarters or other central location, each 300A Summary form must be specific to each separate establishment.

(18) Paperwork Retention and Updating.

(a) You must save the OSHA 300 Log, the privacy case list (if any), the 300A Summary form, and the DCBS Form 801 or equivalent forms for 5 years following the end of the calendar year that they cover.

(b) During the storage period, you must update your stored OSHA 300 Logs to include newly discovered recordable injuries or illnesses and to show any changes that have occurred in the classification of previously recorded injuries and illnesses. If the description or outcome of a case changes, you must remove or line out the original entry and enter the new information.

Note: For more information on retention of medical and exposure records, see 1910.1020.

(19) Change of Business Ownership. If your business changes ownership, you must record and report work-related injuries and illnesses only for the time you owned the establishment. You must transfer the records to the new owner. The new owner must save all records of the establishment kept by the prior owner, but need not update or correct the records of the prior owner.

(20) Prohibition against discrimination. Oregon Revised Statute 654.062(5) prohibits discrimination against an employee for reporting a work-related fatality, injury or illness. It also protects the employee who files a safety and health complaint, asks for access to this rule, records, or otherwise exercises any rights afforded by law or rule.

(21) Employee Involvement. You must involve your employees and their representatives in the recordkeeping system.

(a) You must establish a reasonable procedure for employees to report work-related injuries and illnesses promptly and accurately. A procedure is not reasonable if it would deter or discourage a reasonable employee from accurately reporting a workplace injury or illness.

(b) You must inform each employee of your procedure for reporting work related injuries and illnesses and tell each employee how they are to report an injury or illness to you.

(c) You must inform employees that they have the right to report work-related injuries and illnesses; and that employers are prohibited from discharging or in any manner discriminating against employees for reporting work-related injuries and illnesses.

(d) You must leave the names on the 300 Log. However, to protect the privacy of injured and ill employees, do not record the employee's name on the OSHA 300 Log for certain "privacy concern cases."

(e) You must provide limited access to your injury and illness records for your employees and their representatives.

(A) Your employees, former employees, their personal representatives, and their authorized collective bargaining representatives have the right to access the OSHA injury and illness records, in accordance with (B) through (E) below.

Note: A personal representative is anybody designated in writing by the employee or former employee, as well as the legal representative of a deceased or legally incapacitated employee.

(B) When an employee, former employee, personal representative, or authorized employee representative asks for copies of your current or stored OSHA 300 Log(s) for an establishment the employee or former employee has worked in, you must give the requester a copy of the relevant OSHA 300 Log(s) by the end of the next business day.

(C) When an employee, former employee, or personal representative asks for a copy of the DCBS Form 801 or equivalent describing an injury or illness to that employee or former employee, you must give the requester a copy of the DCBS Form 801 or equivalent containing that information by the end of the next business day.

(D) When an authorized employee representative asks for copies of the DCBS Form 801 or equivalent for an establishment where the agent represents employees under a collective bargaining agreement, you must give copies of those forms to the authorized employee representative within 7 calendar days. You are only required to give the authorized employee representative information from the releasable part of the DCBS Form 801 indicated in the "Worker" section. You must remove all other information from the copy of the DCBS Form 801 or equivalent form that you give to the authorized employee representative.

(E) You may not charge for these copies the first time. However, if one of the designated persons asks for additional copies, you may assess a reasonable charge for retrieving and copying the records.

(22) Providing Records to Government Representatives. When an authorized government representative asks for the records you keep in compliance with this standard, you must provide copies of the records within 4 business hours. Authorized government representatives are:

(a) A representative of the Oregon Department of Consumer and Business Services.

(b) A representative of the Secretary of Labor conducting an inspection or investigation under the Act.

(c) A representative of the Secretary of Health and Human Services (including the National Institute for Occupational Safety and Health - NIOSH) conducting an investigation under Section 20(b) of the Act.

(23) Requests from the Bureau of Labor Statistics or DCBS. If you receive a Survey of Occupational Injuries and Illnesses Form from the Bureau of Labor Statistics (BLS), or a BLS designee, or a request for data from the Oregon Department of Consumer and Business Services, you must promptly complete the form and return it following the instructions on the survey form.

(24) Electronic submission of injury and illness records to OSHA.

(a) If your establishment had 250 or more employees at any time during the previous calendar year, and you are required to maintain an OSHA 300 log, then you must electronically submit information from the OSHA Form 300A Summary of Work-Related Injuries and Illnesses to OSHA or OSHA's designee. You must submit the information once a year, no later than the date listed in paragraph (24)(g) of the year after the calendar year covered by the forms.

(b) If your establishment had 20 or more employees but fewer than 250 employees at any time during the previous calendar year, and your establishment is classified in an industry listed in Table 7, then you must electronically submit information from OSHA Form 300A Summary of Work-Related Injuries and Illnesses to OSHA or OSHA's designee. You must submit the information once a year, no later than the date listed in paragraph (24)(g) of the year after the calendar year covered by the form.

(c) For each establishments that is subject to these reporting requirements, you must provide the Employer Identification Number (EIN) used by the establishment.

Note: Each individual employed in the establishment at any time during the calendar year counts as one employee, including full-time, part-time, seasonal, and temporary workers.

(d) If you are required to submit information under paragraph (24)(a) or (24)(b) , then you must submit the information once a year, by the date listed in paragraph (24)(g) of the year after the calendar year covered by the form or forms. If you are submitting information

because OSHA notified you to submit information as part of an individual data collection under paragraph (24)(g) , then you must submit the information as often as specified in the notification.

(e) You must submit the information electronically. Federal OSHA will provide a secure website for the electronic submission of information.

(f) If your enterprise or corporate office had ownership of or control over one or more establishments required to submit information under paragraph (24)(a) or (24)(b), then the enterprise or corporate office may collect and electronically submit the information for the establishment(s).

(g) Reporting Dates. Beginning in 2020, establishments that are required to submit under paragraph (24)(a) or (24)(b) of this section will have to submit all of the required information by March 2 of the year after the calendar year covered by the form or forms (for example, by March 2, 2020, for the forms covering 2019).

Table 7 - Designated Industries

Annual Electronic Submission of OSHA Form 300A Summary of Work-Related Injuries and Illnesses by Establishments With 20 or More Employees but Fewer Than 250 Employees in Designated Industries

NAICS	Industry
11	Agriculture, forestry, fishing and hunting
22	Utilities
23	Construction
31-33	Manufacturing
42	Wholesale trade
4413	Automotive parts, accessories, and tire stores
4421	Furniture stores
4422	Home furnishings stores
4441	Building material and supplies dealers
4442	Lawn and garden equipment and supplies stores
4451	Grocery stores
4452	Specialty food stores
4521	Department stores
4529	Other general merchandise stores
4533	Used merchandise stores
4542	Vending machine operators
4543	Direct selling establishments
4811	Scheduled air transportation
4841	General freight trucking
4842	Specialized freight trucking

NAICS	Industry
4851	Urban transit systems
4852	Interurban and rural bus transportation
4853	Taxi and limousine service
4854	School and employee bus transportation
4855	Charter bus industry
4859	Other transit and ground passenger transportation
4871	Scenic and sightseeing transportation, land
4881	Support activities for air transportation
4882	Support activities for rail transportation
4883	Support activities for water transportation
4884	Support activities for road transportation
4889	Other support activities for transportation
4911	Postal service
4921	Couriers and express delivery services
4922	Local messengers and local delivery
4931	Warehousing and storage
5152	Cable and other subscription programming
5311	Lessors of real estate
5321	Automotive equipment rental and leasing
5322	Consumer goods rental
5323	General rental centers
5617	Services to buildings and dwellings
5621	Waste collection
5622	Waste treatment and disposal
5629	Remediation and other waste management services
6219	Other ambulatory health care services
6221	General medical and surgical hospitals
6222	Psychiatric and substance abuse hospitals
6223	Specialty (except psychiatric and substance abuse) hospitals
6231	Nursing care facilities
6232	Residential mental retardation, mental health and substance abuse facilities
6233	Community care facilities for the elderly
6239	Other residential care facilities
6242	Community food and housing, and emergency and other relief services
6243	Vocational rehabilitation services
7111	Performing arts companies
7112	Spectator sports
7121	Museums, historical sites, and similar institutions

NAICS	Industry
7131	Amusement parks and arcades
7132	Gambling industries
7211	Traveler accommodation
7212	RV (recreational vehicle) parks and recreational camps
7213	Rooming and boarding houses
7223	Special food services
8113	Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance
8123	Dry-cleaning and laundry services

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 to 654.295.

Hist: WCB Admin. Order 19-1974, f. 6-5-74, ef. 7-1-74.
WCD Admin. Order, Safety 7-1979, f. 8-20-79, ef. 9-1-79.
WCD Admin. Order, Safety 4-1981, f. 5-22-81, ef. 7-1-81.
APD Admin. Order 7-1988, f. 6-17-88, ef. 7-1-74.
OR-OSHA Admin. Order 11-2001, f. 9/14/01, ef. 1/1/02.
OR-OSHA Admin. Order 2-2002, f. 3/12/02, ef. 3/12/02.
OR-OSHA Admin. Order 7-2002, f. 11/15/02, ef. 11/15/02.
OR-OSHA Admin. Order 6-2003, f. 11/26/03, ef. 11/26/03.
OR-OSHA Admin. Order 7-2006, f. 9/6/06, ef. 9/6/06.
OR-OSHA Admin. Order 11-2007, f. 12/21/07, ef. 1/1/08.
OR-OSHA Admin. Order 8-2008, f. 7/14/08, ef. 7/14/08.
OR-OSHA Admin. Order 2-2015, f. 3/18/15, ef. 1/1/16.
OR-OSHA Admin. Order 6-2016, f.11/10/16. ef. 5/1/17.
OR-OSHA Admin. Order 5-2017, f. 8/1/17, ef. 1/1/18.
OR-OSHA Admin. Order 5-2018, f. 11/29/18, ef. 12/17/18.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

DIVISION 2, GENERAL INDUSTRY

Division 2/A, General

437-002-0005
Adoption by Reference

In addition to, and not in lieu of, any other safety and health codes contained in OAR Chapter 437, the Department adopts by reference the following federal regulations printed as part of the Code of Federal Regulations, 29 CFR 1910 in the Federal Register:

(1) 29 CFR 1910.1, Purpose and scope; published 6/27/74, Federal Register, vol. 39, no. 125, p. 23503.

(2) 29 CFR 1910.2, Definitions; published 6/27/74, Federal Register, vol. 39, no. 125, p. 23503.

(3) 29 CFR 1910.3, Petitions for the issuance, amendment, or repeal of a standard; published 6/27/74, Federal Register, vol. 39, no. 125, p. 23503.

(4) 29 CFR 1910.4, Amendments to this part; published 6/27/74, Federal Register, vol. 39, no. 125, p. 23503.

(5) 29 CFR 1910.5, Applicability of standards; published 6/30/93, FR vol. 58, no. 124, p. 35308.

(6) 29 CFR 1910.6, Incorporation by reference; published ~~[44/48/46]~~5/14/19, FR Vol. ~~[84]~~84, no. ~~[223]~~93, p. ~~[82494]~~21416.

(7) 29 CFR 1910.7, Definition and requirements for a Nationally Recognized Testing Laboratory; published 5/11/88, FR vol. 53, no. 91, p. 16838.

(8) 29 CFR 1910.9, Compliance duties owed to each employee; published 12/12/08, Federal Register, vol. 73, no. 240, pp. 75568-75589.

These standards are on file at the Oregon Occupational Safety and Health Division, Oregon Department of Consumer and Business Services, and the United States Government Printing Office.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stat. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 17-1988, f. 11/10/88, ef. 11/10/88.
OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.
OR-OSHA Admin. Order 8-1999, f. 8/6/99, ef. 8/6/99.
OR-OSHA Admin. Order 4-2005, f. 12/14/05, ef. 12/14/05.
OR-OSHA Admin. Order 4-2007, f. 8/15/07, ef. 8/15/07.
OR-OSHA Admin. Order 7-2008, f. 5/30/08, ef. 5/30/08.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 1-2010, f. 2/19/10, ef. 2/19/10.
OR-OSHA Admin. Order 2-2010, f. 2/25/10, ef. 2/25/10.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order 7-2012, f. 12/14/12, ef. 12/14/12.
OR-OSHA Admin. Order 7-2013, f. 12/12/13, ef. 12/12/13.
OR-OSHA Admin. Order 4-2016, f. 9/7/16, ef. 9/7/16.
OR-OSHA Admin. Order 2-2017, f. 5/16/17, ef. 11/1/17.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.6 Incorporation by Reference

(a)

(1) The standards of agencies of the U.S. Government, and organizations which are not agencies of the U.S. Government which are incorporated by reference in this part, have the same force and effect as other standards in this part. Only the mandatory provisions (i.e., provisions containing the word "shall" or other mandatory language) of standards incorporated by reference are adopted as standards under the Occupational Safety and Health Act.

(2) Any changes in the standards incorporated by reference in this part and an official historic file of such changes are available for inspection in the Docket Office at the national office of the Occupational Safety and Health Administration, U.S. Department of Labor, Washington, DC 20910; telephone: 202-693-2350 (TTY number: 877-889-5627).

(3) The **standards**~~[materials]~~ listed in~~[paragraphs (b) through (w) of]~~ this section are incorporated by reference **into this part with the approval of** ~~[in the corresponding sections noted as they exist on the date of the approval, and a notice of any change in these materials will be published in the Federal Register. These incorporations by reference were approved by]~~ the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. **To enforce any edition other than that specified in this section, OSHA must publish a document in the Federal Register and the material must be available to the public.**

(4) Copies of standards listed in this section and issued by private standards organizations are available for purchase from the issuing organizations at the addresses or through the other contact information listed below for these private standards organizations. In addition, these standards are available for inspection at any Regional Office of the Occupational Safety and Health Administration (OSHA), or at the OSHA Docket Office, U.S. Department of Labor, 200 Constitution Avenue NW., Room N-**3508**~~[2625]~~, Washington, DC 20210; telephone: 202-693-2350 (TTY number: 877-889-5627). They are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of these standards at NARA, telephone: 202-741-6030, or go to **www.archives.gov/federal-register/cfr/ibr-locations.html**.
~~[http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html]~~

(b) The following material is available for purchase from the American Conference of Governmental Industrial Hygienists (ACGIH), 1014 Broadway, Cincinnati, OH 45202:

(1) "Industrial Ventilation: A Manual of Recommended Practice" (22nd ed., 1995), incorporation by reference (IBR) approved for 1910.124(b)(4)(iii).

(2) Threshold Limit Values and Biological Exposure Indices for 1986-87 (1986), IBR approved for 1910.120, PEL definition.

(c) The following material is available for purchase from the American Society of Agricultural Engineers (ASAE), 2950 Niles Road, Post Office Box 229, St. Joseph, MI 49085:

(1) ASAE Emblem for Identifying Slow Moving Vehicles, ASAE S276.2 (1968), IBR approved for 1910.145(d)(10).

(2) (Reserved)

(d) The following material is available for purchase from the Agriculture Ammonia Institute – Rubber Manufacturers (AAI-RMA) Association, 1400 K St. NW, Washington DC 20005:

(1) AAI-RMA Specifications for Anhydrous Ammonia Hose, IBR approved for 1910.111(b)(8)(i).

(2) (Reserved)

(e) Except as noted, copies of the standards listed below in this paragraph are available for purchase from the American National Standards Institute (ANSI), 25 West 43rd Street, 4th Floor, New York, NY 10036; telephone: 212-642-4900; fax: 212-398-0023; Web site: <http://www.ansi.org>.

(1) (Reserved)

(2) (Reserved)

(3) ANSI A11.1-65 (R 70) Practice for Industrial Lighting, IBR approved for 1910.219(c)(5)(iii); 1910.261(a)(3)(i), (c)(10), and (k)(21); and 1910.265(c)(2).

(4) ANSI A11.1-65 Practice for Industrial Lighting, IBR approved for 1910.262(c)(6) and 1910.265(d)(2)(i)(a).

(5) (Reserved)

(6) ANSI A13.1-56 Scheme for the Identification of Piping Systems, IBR approved for 1910.253(d)(4)(ii); 1910.261(a)(3)(iii); 1910.262(c)(7).

(7) ANSI A14.1-68 Safety Code for Portable Wood Ladders, Supplemented by ANSI A14.1a-77, IBR approved for 1910.261(a)(3)(iv) and (c)(3)(i).

(8) ANSI A14.2-56 Safety Code for Portable Metal Ladders, Supplemented by ANSI A14.2a-77, IBR approved for 1910.261(a)(3)(v) and (c)(3)(i).

(9) ANSI A14.3-56 Safety Code for Fixed Ladders, IBR approved for 1910.261(a)(3)(vi) and (c)(3)(i).

(10) ANSI A17.1-65 Safety Code for Elevators, Dumbwaiters and Moving Walks, Including Supplements, A17.1a (1967); A17.1b (1968); A17.1c (1969); A17.1d (1970), IBR approved for 1910.261(a)(3)(vii), (g)(11)(i), and (l)(4).

(11) ANSI A17.2-60 Practice for the Inspection of Elevators, Including Supplements, A17.2a (1965), A17.2b (1967), IBR approved for 1910.261(a)(3)(viii).

(12) ANSI A90.1-69 Safety Standard for Manlifts, IBR approved for 1910.68(b)(3).

- (13) ANSI A92.2-69 Standard for Vehicle Mounted Elevating and Rotating Work Platforms, IBR approved for 1910.67(b)(1), (2), (c)(3), and (4) and 1910.268(s)(1)(v).
- (14) ANSI A120.1-70 Safety Code for Powered Platforms for Exterior Building Maintenance, IBR approved for 1910.66 App. D (b) through (d).
- (15) ANSI B7.1-70 Safety Code for the Use, Care and Protection of Abrasive Wheels, IBR approved for 1910.215(b)(12) and 1910.218(j).
- (16) ANSI B15.1-53 (R 58) Safety Code for Mechanical Power Transmission Apparatus, IBR approved for 1910.68(b)(4) and 1910.261(a)(3)(ix), (b)(1), (e)(3), (e)(9), (f)(4), (j)(5)(iv), (k)(12), and (l)(3).
- (17) ANSI B20.1-57 Safety Code for Conveyors, Cableways, and Related Equipment, IBR approved for 1910.218(j)(3); 1910.261 (a)(3)(x), (b)(1), (c)(15)(iv), (f)(4), and (j)(2); 1910.265(c)(18)(i).
- (18) ANSI B30.2-43 (R 52) Safety Code for Cranes, Derricks, and Hoists, IBR approved for 1910.261(a)(3)(xi), (c)(2)(vi), and (c)(8)(i) and (iv).
- (19) ANSI B30.2.0-67 Safety Code for Overhead and Gantry Cranes, IBR approved for 1910.179(b)(2); 1910.261(a)(3)(xii), (c)(2)(v), and (c)(8)(i) and (iv).
- (20) ANSI B30.5-68 Safety Code for Crawler, Locomotive, and Truck Cranes, IBR approved for 1910.180(b)(2) and 1910.261(a)(3)(xiii).
- (21) ANSI B30.6-69 Safety Code for Derricks, IBR approved for 1910.181(b)(2) and 1910.268(j)(4)(iv)(E) and (H).
- (22) ANSI B31.1-55 Code for Pressure Piping, IBR approved for 1910.261(g)(18)(iii).
- (23) ANSI B31.1-67, IBR approved for 1910.253(d)(1)(i)(A).
- (24) ANSI B31.1a-63 Addenda to ANSI B31.1 (1955), IBR approved for 1910.261(g)(18)(iii).
- (25) ANSI B31.1-67 and Addenda B31.1 (1969) Code for Pressure Piping, IBR approved for 1910.103(b)(1)(iii)(b); 1910.104(b)(5)(ii); 1910.218(d)(4) and (e)(1)(iv); and 1910.261(a)(3)(xiv) and (g)(18)(iii).
- (26) ANSI B31.2-68 Fuel Gas Piping, IBR approved for 1910.261(g)(18)(iii).
- (27) ANSI B31.3-66 Petroleum Refinery Piping, IBR approved for 1910.103(b)(3)(v)(b).
- (28) ANSI B31.5-66 Addenda B31.5a (1968) Refrigeration Piping, IB approved for 1910.103(b)(3)(v)(b) and 1910.111(b)(7)(iii).
- (29) ANSI B56.1-69 Safety Standard for Powered Industrial Trucks, IBR approved for 1910.178(a)(2) and (3) and 1910.261(a)(3)(xv), (b)(6), (m)(2), and (m)(5)(iii).

(30) ANSI B57.1-65 Compressed Gas Cylinder Valve Outlet and Inlet Connections, IBR approved for 1910.253(b)(1)(iii).

(31) (Reserved)

(32) ANSI B175.1-1991, Safety Requirements for Gasoline-Powered Chain Saws 1910.266(e)(2)(i).

(33) (Reserved)

(34) ANSI C33.2-56 Safety Standard for Transformer-Type Arc Welding Machines, IBR approved for 1910.254(b)(1).

(35) (Reserved)

(36) ANSI H23.1-70 Seamless Copper Water Tube Specification, IBR approved for 1910.110(b)(8)(ii) and (13)(ii)(b)(1).

(37) ANSI H38.7-69 Specification for Aluminum Alloy Seamless Pipe and Seamless Extruded Tube, IBR approved for 1910.110(b)(8)(i).

(38) ANSI J6.4-71 Standard Specification for Rubber Insulating Blankets, IBR approved for 1910.268(f)(1) and (n)(11)(v).

(39) ANSI J6.6-71 Standard Specification for Rubber Insulating Gloves, IBR approved for 1910.268(f)(1) and (n)(11)(iv).

(40) ANSI K13.1-67 Identification of Gas Mask Canisters, IBR approved for 1910.261(a)(3)(xvi) and (h)(2)(iii).

(41) ANSI K61.1-60 Safety Requirements for the Storage and Handling of Anhydrous Ammonia, IBR approved for 1910.111(b)(11)(i).

(42) ANSI K61.1-66 Safety Requirements for the Storage and Handling of Anhydrous Ammonia, IBR approved for 1910.111(b)(11)(i).

(43) ANSI O1.1-54 (R 61) Safety Code for Woodworking Machinery, IBR approved for 1910.261(a)(3)(xvii), (e)(7), and (i)(2).

(44) ANSI S1.4-71 (R 76) Specification for Sound Level Meters, IBR approved for 1910.95 Appendixes D and I.

(45) ANSI S1.11-71 (R 76) Specification for Octave, Half-Octave and Third-Octave Band Filter Sets, IBR approved for 1910.95 Appendix D.

(46) ANSI S3.6-69 Specifications for Audiometers, IBR approved for 1910.95(h)(2) and (5)(ii) and Appendix D.

(47) ANSI Z4.1-68 Requirements for Sanitation in Places of Employment, IBR approved for 1910.261(a)(3)(xviii) and (g)(15)(vi).

(48) (Reserved)

(49) ANSI Z9.1-51 Safety Code for Ventilation and Operation of Open Surface Tanks, IBR approved for 1910.261(a)(3)(xix), (g)(18)(v), and (h)(2)(i).

(50) ANSI Z9.1-71 Practices for Ventilation and Operation of Open-Surface Tanks, IBR approved for 1910.124(b)(4)(iv).

(51) ANSI Z9.2-60 Fundamentals Governing the Design and Operation of Local Exhaust Systems, IBR approved for 1910.94(a)(4)(i) introductory text, (a)(6) introductory text, (b)(3)(ix), (b)(4)(i) and (ii), (c)(3)(i) introductory text, (c)(5)(iii)(b), and (c)(7)(iv)(a); 1910.261(a)(3)(xx), (g)(1)(i) and (iii), and (h)(2)(ii).

(52) ANSI Z9.2-79 Fundamentals Governing the Design and Operation of Local Exhaust Systems, IBR approved for 1910.124(b)(4)(i).

(53) ANSI Z12.12-68 Standard for the Prevention of Sulfur Fires and Explosions, IBR Approved for 1910.261(a)(3)(xxi), (d)(1)(i), (f)(2)(iv), and (g)(1)(i).

(54) ANSI Z12.20-62 (R 69) Code for the Prevention of Dust Explosions in Woodworking and Wood Flour Manufacturing Plants, IBR approved for 1910.265(c)(20)(i).

(55) ANSI Z21.30-64 Requirements for Gas Appliances and Gas Piping Installations, IBR approved for 1910.265(c)(15).

(56) ANSI Z24.22-57 Method of Measurement of Real-Ear Attenuation of Ear Protectors at Threshold, IBR approved for 1910.261(a)(3)(xxii).

(57) ANSI Z33.1-61 Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, IBR approved for 1910.94(a)(4)(i); 1910.261 (a)(3)(xxiii) and (f)(5); and 1910.265(c)(20)(i).

(58) ANSI Z33.1-66 Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, IBR approved for 1910.94(a)(2)(ii).

(59) ANSI Z35.1-1968, Specifications for Accident Prevention Signs; IBR approved for Sec. 1910.261(c). Copies available for purchase from the IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 1-877-413-5184; Web site: www.global.ihs.com.

(60) ANSI Z41-1999, American National Standard for Personal Protection -- Protective Footwear; IBR approved for 1910.136(b)(1)(ii). Copies of ANSI Z41-1999 are available for purchase only from the National Safety Council, P.O. Box 558, Itasca, IL 60143-0558; telephone: 1-800-621-7619; fax: 708-285-0797; Web site: <http://www.nsc.org>.

(61) ANSI Z41-1991, American National Standard for Personal Protection -- Protective Footwear; IBR approved for 1910.136(b)(1)(iii). Copies of ANSI Z41-1991 are available for purchase only from the National Safety Council, P.O. Box 558, Itasca, IL 60143-0558; telephone: 1-800-621-7619; fax: 708-285-0797; Web site: <http://www.nsc.org>.

(62) (Reserved)

(63) (Reserved)

(64) ANSI 249.1-67 Safety in Welding and Cutting, IBR Approved for 1910.252 (c)(1)(iv)(A) and (B).

(65) USAS Z53.1-1967 (also referred to as ANSI Z53.1-1967), Safety Color Code for Marking Physical Hazards, ANSI approved October 9, 1967; IBR approved for Sec. 1910.97(a) and 1910.145(d). Copies available for purchase from the IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 1-877-413-5184; Web site: www.global.ihs.com.

(66) ANSI Z535.1-2006 (R2011), Safety Colors, reaffirmed July 19, 2011; IBR approved for 1910.97(a) and 1910.145(d). Copies available for purchase from the:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: 212-642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 877-413-5184; Web site: www.global.ihs.com; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: 877-699-9277; Web site: www.techstreet.com.

(67) ANSI Z535.2-2011, Environmental and Facility Safety Signs, published September 15, 2011; IBR approved for 1910.261(c). Copies available for purchase from the:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: 212-642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 877-413-5184; Web site: www.global.ihs.com; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: 877-699-9277; Web site: www.techstreet.com.

(68) ANSI 254.1-63, Safety Standard for Non-Medical X-Ray and Sealed Gamma Ray Sources, IBR Approved for 1910.252 (d)(1)(vii) and (2)(ii).

(69) ANSI/ISEA Z87.1-2010, Occupational and Educational Personal Eye and Face Protection Devices, Approved April 13, 2010; IBR approved for 1910.133(b). In Oregon, OAR 437-002-0134 applies. Copies are available for purchase from:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: (212) 642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: (877) 413-5184; Web site: <http://global.ihs.com/>; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: (877) 699-9277; Web site: <http://techstreet.com>.

(70) ANSI Z87.1-2003, Occupational and Educational Eye and Face Personal Protection Devices Approved June 19, 2003; IBR approved for 1910.133(b). In Oregon, OAR 437-002-0134 applies. Copies available for purchase from the:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: (212) 642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: (877) 413-5184; Web site: <http://global.ihs.com/>; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: (877) 699-9277; Web site: <http://techstreet.com>.

(71) ANSI Z87.1-1989 (R-1998), Practice for Occupational and Educational Eye and Face Protection, Reaffirmation approved January 4, 1999; IBR approved for 1910.133(b). In Oregon, OAR 437-002-0134 applies. Copies are available for purchase from:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: (212) 642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: (877) 413-5184; Web site: <http://global.ihs.com/>; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: (877) 699-9277; Web site: <http://techstreet.com>.

(72) ANSI Z88.2-1969, Practices for Respiratory Protection; IBR approved for 1910.94(c)(6)(iii)(a), 1910.134(c); and 1910.261(a)(3)(xxvi), (b)(2), (f)(5), (g)(15)(v), (h)(2)(iii), (h)(2)(iv), and (i)(4).

(73) American National Standards Institute (ANSI) Z89.1-2009, American National Standard for Industrial Head Protection, approved January 26, 2009; IBR approved for Sec. 1910.135(b)(1)(i). Copies of ANSI Z89.1-2009 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetysystem.org.

(74) American National Standards Institute (ANSI) Z89.1-2003, American National Standard for Industrial Head Protection; IBR approved for 1910.135(b)(1)(ii). Copies of ANSI Z89.1-2003 are available for purchase only from the International Safety Equipment Association,

1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetysafetyequipment.org.

(75) American National Standards Institute (ANSI) Z89.1-1997, American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements; IBR approved for 1910.135(b)(1)(iii). Copies of ANSI Z89.1-1997 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetysafetyequipment.org.

(76) ANSI Z41.1-1967 Men's Safety Toe Footwear; IBR approved for 1910.261(i)(4).

(77) ANSI Z87.1-1968 Practice of Occupational and Educational Eye and Face Protection; IBR approved for 1910.261(a)(3)(xxv), (d)(1)(ii), (f)(5), (g)(1), (g)(15)(v), (g)(18)(ii), and (i)(4).

(78) ANSI Z89.1-1969 Safety Requirements for Industrial Head Protection; IBR approved for 1910.261(a)(3)(xxvii), (b)(2), (g)(15)(v), and (i)(4).

(79) ANSI Z89.2-1971 Safety Requirements for Industrial Protective Helmets for Electrical Workers, Class B; IBR approved for 1910.268(i)(1).

(f) The following material is available for purchase from the American Petroleum Institute (API), 1220 L Street NW, Washington, DC 20005:

(1) (Reserved)

(2) API 12B (May 1958) Specification for Bolted Production Tanks, 11th Ed., With Supplement No. 1, Mar. 1962, IBR approved for 1910.106(b)(1)(i)(a)(3).

(3) API 12D (Aug. 1957) Specification for Large Welded Production Tanks, 7th Ed., IBR approved for 1910.106(b)(1)(i)(a)(3).

(4) API 12F (Mar. 1961) Specification for Small Welded Production Tanks, 5th Ed., IBR approved for 1910.106(b)(1)(i)(a)(3).

(5) API 620, Fourth Ed. (1970) Including Appendix R, Recommended Rules for Design and Construction of Large Welded Low Pressure Storage Tanks, IBR approved for 1910.103(c)(1)(i)(a); 1910.106(b)(1)(iv)(b)(1); and 1910.111(d)(1)(ii) and (iii).

(6) API 650 (1966) Welded Steel Tanks for Oil Storage, 3rd Ed., IBR approved for 1910.106(b)(1)(iii)(a)(2).

(7) API 1104 (1968) Standard for Welding Pipelines and Related Facilities, IBR approved for 1910.252(d)(1)(v).

(8) API 2000 (1968) Venting Atmospheric and Low Pressure Storage Tanks, IBR approved for 1910.261(b)(2)(iv)(b)(1).

(9) API 2201 (1963) Welding or Hot Tapping on Equipment Containing Flammables, IBR approved for 1910.252(d)(1)(vi).

(g) The following material is available for purchase from the American Society of Mechanical Engineers (ASME), United Engineering Center, 345 East 47th Street, New York, NY 10017:

(1) ASME Boiler and Pressure Vessel Code, Sec. VIII, 1949, 1950, 1952, 1956, 1959, and 1962 Ed., IBR approved for 1910.110(b)(10)(ii) (Table H 26), (d)(2) (Table H-31); (e)(3)(1) (Table H-32), (h)(2) (Table H-34); and 1910.111(b)(2)(vi);

(2) ASME Code for Pressure Vessels, 1968 Ed., IBR approved for 1910.106(i)(3)(i); 1910.110(g)(2)(iii)(b)(2); and 1910.217(b)(12);

(3) ASME Boiler and Pressure Vessel Code, Sec. VIII, 1968, IBR approved for 1910.103; 1910.104(b)(4)(ii); 1910.106(b)(1)(iv)(b)(2) and (i)(3)(ii); 1910.107; 1910.110(b)(11)(i)(b) and (iii)(a)(1); 1910.111(b)(2)(i), (ii), and (iv); and 1910.169(a)(2)(i) and (ii);

(4) ASME Boiler and Pressure Vessel Code, Sec. VIII, Paragraph UG-84, 1968, IBR approved for 1910.104(b)(4)(ii) and (b)(5)(iii);

(5) ASME Boiler and Pressure Vessel Code, Sec. VIII, Unfired Pressure Vessels, Including Addenda (1969), IBR approved for 1910.261; 1910.262; 1910.263(i)(24)(ii);

(6) Code for Unfired Pressure Vessels for Petroleum Liquids and Gases of the API and the ASME, 1951 Ed., IBR approved for 1910.110(b)(3)(iii); and

(7) ASME B56.6-1992 (with addenda), Safety Standard for Rough Terrain Forklift Trucks, IBR approved for 1910.266(f)(4).

(h) Copies of the standards listed below in this paragraph (h) are available for purchase from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959; Telephone: 610-832-9585; Fax: 610-832-9555; Email: service@astm.org; Web site: <http://www.astm.org>. Copies of historical standards or standards that ASTM does not have may be purchased from Information Handling Services, Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112; Telephone: 1-800-854-7179; Email: global@ihs.com; Web sites: <http://global.ihs.com> or <http://www.store.ihs.com>.

(1) ASTM A 47-68, Malleable Iron Castings, IBR approved for 1910.111.

(2) ASTM A 53-69, Welded and Seamless Steel Pipe, IBR approved for 1910.110 and 1910.111.

(3) ASTM A 126-66, Gray Iron Casting for Valves, Flanges and Pipe Fitting, IBR approved for 1910.111.

(4) ASTM A 391-65 (ANSI G61.1-1968), Alloy Steel Chain, IBR approved for 1910.184.

(5) ASTM A 395-68, Ductile Iron for Use at Elevated Temperatures, IBR approved for 1910.111.

- (6) ASTM B 88-66A, Seamless Copper Water Tube, IBR approved for 1910.252.
- (7) ASTM B 88-69, Seamless Copper Water Tube, IBR approved for 1910.110.
- (8) (Reserved)
- (9) ASTM B 210-68, Aluminum-Alloy Drawn Seamless Tubes, IBR approved for 1910.110.
- (10) ASTM B 241-69, Standard Specifications for Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube, IBR approved for 1910.110.
- (11) ASTM D 5-65, Test for Penetration by Bituminous Materials, IBR approved for 1910.106.
- (12) ASTM D 56-70, Test for Flash Point by Tag Closed Tester, IBR approved for 1910.106.
- (13) ASTM D 56-05, Standard Test Method for Flash Point by Tag Closed Cup Tester, Approved May 1, 2005, IBR approved for Appendix B to 1910.1200.
- (14) ASTM D 86-62, Test for Distillation of Petroleum Products, IBR approved for 1910.106 and 1910.119.
- (15) ASTM D 86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure, Approved April 1, 2007, IBR approved for Appendix B to 1910.1200.
- (16) ASTM D 88-56, Test for Saybolt Viscosity, IBR approved for 1910.106.
- (17) ASTM D 93-71, Test for Flash Point by Pensky Martens, IBR approved for 1910.106.
- (18) ASTM D 93-08, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester, Approved Oct. 15, 2008, IBR approved for Appendix B to 1910.1200.
- (19) ASTM D 240-02 (Reapproved 2007), Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, Approved May 1, 2007, IBR approved for Appendix B to 1910.1200.
- (20) ASTM D 323-68, Standard Test Method of Test for Vapor Pressure of Petroleum Products (Reid Method), IBR approved for 1910.106.
- (21) ASTM D 445-65, Test for Viscosity of Transparent and Opaque Liquids, IBR approved for 1910.106.
- (22) ASTM D 1078-05, Standard Test Method for Distillation Range of Volatile Organic Liquids, Approved May 15, 2005, IBR approved for Appendix B to 1910.1200.
- (23) ASTM D 1692-68, Test for Flammability of Plastic Sheeting and Cellular Plastics, IBR approved for 1910.103.

(24) ASTM D 2161-66, Conversion Tables for SUS, IBR approved for 1910.106.

(25) ASTM D 3278-96 (Reapproved 2004) E1, Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus, Approved November 1, 2004, IBR approved for Appendix B to 1910.1200.

(26) ASTM D 3828-07a, Standard Test Methods for Flash Point by Small Scale Closed Cup Tester, Approved July 15, 2007, IBR approved for Appendix B to 1910.1200.

(27) ASTM F-2412-2005, Standard Test Methods for Foot Protection, IBR approved for 1910.136.

(28) ASTM F-2413-2005, Standard Specification for Performance Requirements for Protective Footwear, IBR approved for 1910.136.

(i) The following material is available at the American Thoracic Society (ATS), 25 Broadway, 18th Floor New York, NY 10004; website: www.atsjournals.org/.

(1) Spirometric Reference Values from a Sample of the General U.S. Population. Hankinson JL, Odencrantz JR, Fedan KB. American Journal of Respiratory and Critical Care Medicine, 159:179–187, 1999, IBR approved for § 1910.1043(h).

(2) [Reserved]

(j) The following material is available for purchase from the American Welding Society (AWS), 550 NW LeJeune Road, PO Box 351040, Miami, FL 33135:

(1) (Reserved)

(2) (Reserved)

(3) AWS B3.0-41 Standard Qualification Procedure, IBR approved for 1910.67(c)(5)(i).

(4) AWS D1.0-1966 Code for Welding in Building Construction, IBR approved for 1910.27(b)(6).

(5) AWS D2.0-69 Specifications for Welding Highway and Railway Bridges, IBR approved for 1910.67(c)(5)(iv).

(6) AWS D8.4-61 Recommended Practices for Automotive Welding Design, IBR approved for 1910.67(c)(5)(ii).

(7) AWS D10.9-69 Standard Qualification of Welding Procedures and Welders for Piping and Tubing, IBR approved for 1910.67(c)(5)(iii).

(j)k) The following material is available for purchase from the Department of Commerce:

(1) (Reserved)

(2) Publication “Model Performance Criteria for Structural Fire Fighters’ Helmets,” IBR approved for 1910.156(e)(5)(i).

([k]) The following material is available for purchase from the Compressed Gas Association (CGA), 1235 Jefferson Davis Highway, Arlington, VA 22202:

(1) CGA C-6 (1968) Standards for Visual Inspection of Compressed Gas Cylinders, IBR approved for 1910.101(a).

(2) CGA C-8 (1962) Standard for Requalification of ICC-3HT Cylinders, IBR approved for 1910.101(a).

(3) Note: For acetylene in Oregon, OAR 437-002-2102(1) applies, which adopted the CGA Pamphlet G-1-2009. Copies of CGA Pamphlet G-1-2009 are available for purchase from the: Compressed Gas Association, Inc., 4221 Walney Road, 5th Floor, Chantilly, VA 20151; telephone: 708-788-2700; fax: 703-961-1831; e-mail: cga@cganet.com . A copy of CGA Pamphlet G-1-2009 is available for viewing at Oregon OSHA's Resource Center, 350 Winter Street NE, Salem, OR 97301.

(4) CGA G-7.1 (1966) Commodity Specification, IBR approved for 1910.134(d)(1).

(5) CGA G-8.1 (1964) Standard for the Installation of Nitrous Oxide Systems at Consumer Sites, IBR approved for 1910.105.

(6) CGA P-1 (1965) Safe Handling of Compressed Gases, IBR approved for 1910.101(b).

(7) CGA P-3 (1963) Specifications, Properties, and Recommendations for Packaging, Transportation, Storage and Use of Ammonium Nitrate, IBR approved for 1910.109(i)(1)(ii)(b).

(8) CGA S-1.1 (1963) and 1965 Addenda. Safety Release Device Standards – Cylinders for Compressed Gases, IBR approved for 1910.101(c); 1910.103(c)(1)(iv)(a)(2).

(9) CGA S-1.2 (1963) Safety Release Device Standards, Cargo and Portable Tanks for Compressed Gases, IBR approved for 1910.101(c); 1910.103(c)(1)(iv)(a)(2).

(10) CGA S-1.3 (1959) Safety Release Device Standards – Compressed Gas Storage Containers, IBR approved for 1910.103(c)(1)(iv)(a)(2); 1910.104(b)(6)(iii); and 1910.111(d)(4)(ii)(b).

(11) CGA 1957 Standard Hose Connection Standard, IBR approved for 1910.253(e)(4)(v) and (5)(iii).

(12) CGA and RMA (Rubber Manufacturer's Association) Specification for Rubber Welding Hose (1958), IBR approved for 1910.253(e)(5)(i).

(13) CGA 1958 Regulator Connection Standard, IBR approved for 1910.253(e)(4)(iv) and (6).

([h]) The following material is available for purchase from the Crane Manufacturer's Association of American, Inc. (CMAA), 1 Thomas Circle NW, Washington, DC 20005:

(1) CMAA Specification 1B61, Specifications for Electric Overhead Traveling Cranes, IBR approved for 1910.179(b)(6)(i).

(2) (Reserved)

([~~m~~]n) The following material is available for purchase from the General Services Administration:

(1) GSA Pub. GG-B-0067b, Air Compressed for Breathing Purposes, or Interim Federal Specifications, Apr. 1965, IBR approved for 1910.134(d)(4).

(2) (Reserved)

([~~n~~]o) The following material is available for purchase from the Department of Health and Human Services:

(1) Publication No. 76-120 (1975), List of Personal Hearing Protectors and Attenuation Data, IBR approved for 1910.95 App. B.

(2) (Reserved)

([~~e~~]p) The following material is available for purchase from the Institute of Makers of Explosives (IME), 420 Lexington Avenue, New York, NY 10017:

(1) IME Pamphlet No. 17, 1960, Safety in the Handling and Use of Explosives, IBR approved for 1910.261(a)(4)(iii) and (c)(14)(ii).

(2) (Reserved)

([~~p~~]g) The following material is available from the International Labour Organization (ILO), 4 route des Morillons, CH-1211 Genève 22, Switzerland; telephone: +41 (0) 22 799 6111; fax: +41 (0) 22 798 8685; website: www.ilo.org/.

(1) Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses, Revised Edition 2011, Occupational safety and health series; 22 Rev.2011), IBR approved for § 1910.1001.

(2) [Reserved]

(r)

(1) The following materials are available for purchase from the International Standards Organization (ISO) through ANSI, 25 West 43rd Street, Fourth Floor, New York, NY 10036-7417; Telephone: 212-642-4980; Fax: 212-302-1286; Email: info@ansi.org; Web site: <http://www.ansi.org>.

(2) Documents not available in the ANSI store may be purchased from:

(i) Document Center Inc., 111 Industrial Road, Suite 9, Belmont, 94002; Telephone: 650-591-7600; Fax: 650-591-7617; Email: info@document-center.com; Web site: www.document-center.com.

(ii) DECO--Document Engineering Co., Inc., 15210 Stagg Street, Van Nuys, CA 91405; Telephone: 800-645-7732 or 818-782-1010; Fax: 818-782-2374; Email: doceng@doceng.com; Web site: www.doceng.com.

(iii) Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112; Telephone: 1-800-854-7179 or 303-397-7956; Fax: 303-397-2740; Email: global@ihs.com; Web sites: <http://global.ihs.com> or <http://www.store.ihs.com>;

(iv) ILI Infodisk, Inc., 610 Winters Avenue, Paramus, NJ 07652; Telephone: 201-986-1131; Fax: 201-986-7886; Email: sales@ili-info.com; Web site: www.ili-info.com.

(v) Techstreet, a business of Thomson Reuters, 3916 Ranchero Drive, Ann Arbor, MI 48108; Telephone: 800-699-9277 or 734-780-8000; Fax: 734-780-2046; Email: techstreet.service@thomsonreuters.com; Web site: www.Techstreet.com.

(3) ISO 10156:1996 (E), Gases and Gas Mixtures--Determination of Fire Potential and Oxidizing Ability for the Selection of Cylinder Valve Outlets, Second Edition, Feb. 15, 1996, IBR approved for Appendix B to 1910.1200.

(4) ISO 10156-2:2005 (E), Gas cylinders--Gases and Gas Mixtures--Part 2: Determination of Oxidizing Ability of Toxic and Corrosive Gases and Gas Mixtures, First Edition, Aug. 1, 2005, IBR approved for Appendix B to 1910.1200.

(5) ISO 13943:2000 (E/F), Fire Safety--Vocabulary, First Edition, April, 15, 2000, IBR approved for Appendix B to 1910.1200.

(s) The following material is available for purchase from the National Electrical Manufacturer's Association (NEMA):

(1) NEMA EW-1 (1962) Requirements for Electric Arc Welding Apparatus, IBR approved for 1910.254(b)(1).

(2) (Reserved)

([e]s) The following material is available for purchase from the National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02269; Telephone: 800-344-3555 or 617-770-3000; Fax: 1-800-593-6372 or 1-508-895-8301; Email: custserv@nfpa.org; Web site: <http://www.nfpa.org>.

(1) NFPA 30 (1969) Flammable and Combustible Liquids Code, IBR approved for 1910.178(f)(1).

(2) NFPA 32-1970 Standard for Dry Cleaning Plants, IBR approved for 1910.106(j)(6)(i).

- (3) NFPA 33-1969 Standard for Spray Finishing Using Flammable and Combustible Material, IBR approved for 1910.94(c)(2).
- (4) NFPA 34-1966 Standard for Dip Tanks Containing Flammable or Combustible Liquids, IBR approved for 1910.124(b)(4)(iv).
- (5) NFPA 34-1995 Standard for Dip Tanks Containing Flammable or Combustible Liquids, IBR approved for 1910.124(b)(4)(ii).
- (6) NFPA 35-1970 Standard for the Manufacture of Organic Coatings, IBR approved for 1910.106(j)(6)(ii).
- (7) NFPA 36-1967 Standard for Solvent Extraction Plants, IBR approved for 1910.106(j)(6)(iii).
- (8) NFPA 37-1970 Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, IBR approved for 1910.106(j)(6)(iv) and 1910.110(b)(20)(iv)(c) and (e)(11).
- (9) NFPA 51B-1962 Standard for Fire Protection in Use of Cutting and Welding Processes, IBR approved for 1910.252(a)(1) introductory text.
- (10) NFPA 54-1969 Standard for the Installation of Gas Appliances and Gas Piping, IBR approved for 1910.110(b)(20)(iv)(a).
- (11) NFPA 54A-1969 Standard for the Installation of Gas Piping and Gas Equipment on Industrial Premises and Certain Other Premises, IBR approved for 1910.110(b)(20)(iv)(b).
- (12) NFPA 58-1969 Standard for the Storage and Handling of Liquefied Petroleum Gases (ANSI Z106.1-1970), IBR approved for 1910.110(b)(3)(iv) and (i)(3)(i) and (ii); and 1910.178(f)(2).
- (13) NFPA 59-1968 Standard for the Storage and Handling of Liquefied Petroleum Gases at Utility Gas Plants, IBR approved for 1910.110(b)(3)(iv) and (i)(2)(iv).
- (14) NFPA 62-1967 Standard for the Prevention of Dust Explosions in the Production, Packaging, and Handling of Pulverized Sugar and Cocoa, IBR approved for 1910.263(k)(2)(i).
- (15) NFPA 68-1954 Guide for Explosion Venting, IBR approved for 1910.94(a)(2)(iii).
- (16) (Reserved)
- (17) NFPA 78-1968 Lightning Protection Code, IBR approved for 1910.109(i)(6)(ii).
- (18) NFPA 80-1968 Standard for Fire Doors and Windows, IBR approved for 1910.106(d)(4)(i).

(19) NFPA 80-1970 Standard for the Installation of Fire Doors and Windows, IBR approved for 1910.253(f)(6)(i)(I).

(20) NFPA 86A-1969 Standard for Oven and Furnaces Design, Location and Equipment, IBR approved for 1910.107(j)(1) and (I)(3) and 1910.108(b)(2) and (d)(2).

(21) NFPA 91-1961 Standard for the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying (ANSI Z33.1-61), IBR approved for 1910.107(d)(1).

(22) NFPA 91-1969 Standards for Blower and Exhaust Systems, IBR approved for 1910.108(b)(1).

(23) NFPA 96-1970 Standard for the Installation of Equipment for the Removal of Smoke and Grease Laden Vapors from Commercial Cooking Equipment, IBR approved for 1910.110(b)(20)(iv)(d).

(24) NFPA 101-1970 Code for Life Safety From Fire in Buildings and Structures, IBR approved for 1910.261(a)(4)(ii).

(25) NFPA 101-2009, Life Safety Code, 2009 edition, IBR approved for 1910.34, 1910.35, 1910.36, and 1910.37.

(26) NFPA 203M-1970 Manual on Roof Coverings, IBR approved for 1910.109(i)(1)(iii)(c).

(27) NFPA 251-1969 Standard Methods of Fire Tests of Building Construction and Materials, IBR approved for 1910.106(d)(3)(ii) introductory text and (d)(4)(i).

(28) NFPA 302-1968 Fire Protection Standard for Motor-Craft (Pleasure and Commercial), IBR approved for 1910.265(d)(2)(iv) introductory text.

(29) NFPA 385-1966 Recommended Regulatory Standard for Tank Vehicles for Flammable and Combustible Liquids, IBR approved for 1910.106(g)(1)(i)(e)(1).

(30) NFPA 496-1967 Standard for Purged Enclosures for Electrical Equipment in Hazardous Locations, IBR approved for 1910.103(c)(1)(ix)(e)(1).

(31) NFPA 505-1969 Standard for Type Designations, Areas of Use, Maintenance, and Operation of Powered Industrial Trucks, IBR approved for 1910.110(e)(2)(iv).

(32) NFPA 566-1965 Standard for the Installation of Bulk Oxygen Systems at Consumer Sites, IBR approved for 1910.253(b)(4)(iv) and (c)(2)(v).

(33) NFPA 656-1959 Code for the Prevention of Dust Ignition in Spice Grinding Plants, IBR approved for 1910.263(k)(2)(i).

(34) NFPA 1971-1975 Protective Clothing for Structural Fire Fighting, IBR approved for 1910.156(e)(3)(ii) introductory text.

(35) NFPA 51A (2001) Standard for Acetylene Cylinder Charging Plants, IBR approved for 1910.102(b) and (c). Copies of NFPA 51A-2001 are available for purchase from the: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471; telephone: 1-800-344-35557; e-mail: custserv@nfpa.org.

(36) NFPA 51A (2006) Standard for Acetylene Cylinder Charging Plants, IBR approved for 1910.102(b) and (c). Copies of NFPA 51A-2006 are available for purchase from the: National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471; telephone: 1-800-344-35557; e-mail: custserv@nfpa.org.

(37) NFPA 30B, Code for the Manufacture and Storage of Aerosol Products, 2007 Edition, Approved August 17, 2006, IBR approved for Appendix B to 1910.1200.

(~~f~~t) The following material is available for purchase from the National Food Plant Institute, 1700 K St NW, Washington, DC 20006:

(1) Definition and Test Procedures for Ammonium Nitrate Fertilizer (Nov. 1964), IBR approved for 1910.109 Table H-22, footnote 3.

(2) (Reserved)

(~~s~~u) The following material is available for purchase from the National Institute for Occupational Safety and Health (NIOSH):

(1) Registry of Toxic Effects of Chemical Substances, 1978, IBR approved for 1910.1020(c)(13)(i) and Appendix B.

(2) Development of Criteria for Fire Fighters Gloves; Vol. II, Part II; Test Methods, 1976, IBR approved for 1910.156(e)(4)(i) introductory text.

(3) NIOSH Recommendations for Occupational Safety and Health Standards (Sept. 1987), IBR approved for 1910.120 PEL definition.

(~~t~~v) The following material is available for purchase from the Public Health Service:

(1) U.S. Pharmacopeia, IBR approved for 1910.134(d)(1).

(2) Publication No. 934 (1962), Food Service Sanitation Ordinance and Code, Part V of the Food Service Sanitation Manual, IBR approved for 1910.142(i)(1).

(~~u~~w) The following material is available for purchase from the Society of Automotive Engineers (SAE), 485 Lexington Avenue, New York, NY 10017:

(1) SAE J185, June 1988, Recommended Practice for Access Systems for Off-Road Machines, IBR approved for 1910.266(f)(5)(i).

(2) SAE J231, January 1981, Minimum Performance Criteria for Falling Object Protective Structure (FOPS), IBR approved for 1910.266(f)(3)(ii).

(3) SAE J386, June 1985, Operator Restraint Systems for Off-Road Work Machines, IBR approved for 1910.266(d)(3)(iv).

(4) SAE J397, April 1988, Deflection Limiting Volume – ROPS/FOPS Laboratory Evaluation, IBR approved for 1910.266(f)(3)(iv).

(5) SAE 765 (1961) SAE Recommended Practice: Crane Loading Stability Test Code, IBR approved for 1910.180(c)(1)(iii) and (e)(2)(iii)(a).

(6) SAE J1040, April 1988, Performance Criteria for Rollover Protective Structures (ROPS) for Construction, Earthmoving, Forestry and Mining Machines, IBR approved for 1910.266(f)(3)(ii).

(~~f~~)x) The following material is available for purchase from the Fertilizer Institute, 1015 18th Street NW, Washington, DC 20036:

(1) Standard M-1 (1953, 1955, 1957, 1960, 1961, 1963, 1965, 1966, 1967, 1968), Superseded by ANSI K61.1-1972, IBR approved for 1910.111(b)(1)(i) and (iii).

(2) (Reserved)

(~~w~~)y) The following material is available for purchase from Underwriters Laboratories (UL), 207 East Ohio Street, Chicago, IL 60611:

(1) UL 58-61 Steel Underground Tanks for Flammable and Combustible Liquids, 5th Ed., IBR approved for 1910.106(b)(1)(iii)(a)(1).

(2) UL 80-63 Steel Inside Tanks for Oil-Burner Fuel, IBR approved for 1910.106(b)(1)(iii)(a)(1).

(3) UL 142-68 Steel Aboveground Tanks for Flammable and Combustible Liquids, IBR approved for 1910.106(b)(1)(iii)(a)(1).

(~~x~~)z) The following material is available for purchase from the: International Code Council, Chicago District Office, 4051 W. Flossmoor Rd., Country Club Hills, IL 60478; telephone: 708-799-2300, x3-3801; facsimile: 001-708-799-4981; e-mail: order@iccsafe.org.

(1) IFC-2009, International Fire Code, copyright 2009, IBR approved for 1910.34, 1910.35, 1910.36, and 1910.37.

(2) [Reserved]

(~~y~~)aa)

(~~z~~)bb)

(1) The following document is available for purchase from United Nations Publications, Customer Service, c/o National Book Network, 15200 NBN Way, PO Box 190, Blue Ridge

Summit, PA 17214; telephone: 1-888-254-4286; fax: 1-800-338-4550; email: unpublications@nbnbooks.com. Other distributors of United Nations Publications include:

(i) Bernan, 15200 NBN Way, Blue Ridge Summit, PA 17214; telephone: 1-800-865-3457; fax: 1-800-865-3450; email: customercare@bernan.com; Web site: <http://www.bernan.com>; and

(ii) Renouf Publishing Co. Ltd., 812 Proctor Avenue, Ogdensburg, NY 13669-2205; telephone: 1-888-551-7470; Fax: 1-888-551-7471; email: orders@renoufbooks.com; Web site: <http://www.renoufbooks.com>.

(2) UN ST/SG/AC.10/Rev.4, The UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth Revised Edition, 2003, IBR approved for Appendix B to 1910.1200.

[39 FR 23502, June 27, 1974, as amended at 49 FR 5321, Feb. 10, 1984; 61 FR 9227, March 7, 1996; 64 FR 13908, March 23, 1999; 70 FR 53929, Sept. 13, 2005; 72 FR 7190, Feb. 14, 2007; 72 FR 71068, Dec. 14, 2007; 74 FR 40447, August 11, 2009; 74 FR 46355, Sept. 9, 2009; 76 FR 33606, June 8, 2011; 76 FR 75786, Dec. 5, 2011; 77 FR 17764, March 26, 2012; 77 FR 37598, June 22, 2012; 78 FR 35565-35566, June 13, 2013; 78 FR 66641, November 6, 2013; 81 FR 16090, March 25, 2016; 81 FR 82981, Nov. 18, 2016; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stat. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 17-1988, f. 11/10/88, ef. 11/10/88.
OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.
OR-OSHA Admin. Order 8-1999, f. 8/6/99, ef. 8/6/99.
OR-OSHA Admin. Order 4-2005, f. 12/14/05, ef. 12/14/05.
OR-OSHA Admin. Order 4-2007, f. 8/15/07, ef. 8/15/07.
OR-OSHA Admin. Order 7-2008, f. 5/30/08, ef. 5/30/08.
OR-OSHA Admin. Order 1-2010, f. 2/19/10, ef. 2/19/10.
OR-OSHA Admin. Order 2-2010, f. 2/25/10, ef. 2/25/10.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order 7-2012, f. 12/14/12, ef. 12/14/12.
OR-OSHA Admin. Order 7-2013, f. 12/12/13, ef. 12/12/13.
OR-OSHA Admin. Order 4-2016, f. 9/7/16, ef. 9/7/16.
OR-OSHA Admin. Order 2-2017, f. 5/16/17, ef. 11/1/17.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 2/H, Hazardous Materials

437-002-0100

Adoption by Reference.

In addition to, and not in lieu of, any other safety and health codes contained in OAR Chapter 437, the Department adopts by reference the following federal regulations printed as part of the Code of Federal Regulations, 29 CFR 1910, in the Federal Register:

- (1) 29 CFR 1910.101 Compressed gases (General requirements). Repealed. Oregon OSHA Admin. Order 6-2014, f. 10/28/14, ef. 5/1/15. In Oregon, OAR 437-002-2101 applies.
- (2) 29 CFR 1910.102 Acetylene. Repealed. Oregon OSHA Admin. Order 1-2010, f. 2/19/10, ef. 2/19/10. In Oregon, OAR 437-002-2102 applies.
- (3) 29 CFR 1910.103 Hydrogen, published 12/14/07, FR vol. 72, no. 240, p. 71061.
- (4) 29 CFR 1910.104 Oxygen, published 3/7/96, FR vol. 61, no. 46, p. 9237.
- (5) 29 CFR 1910.105 Nitrous oxide, published 3/7/96, FR vol. 61, no. 46, p. 9237.
- (6) 29 CFR 1910.106 Flammable and combustible liquids, published 3/26/12, FR vol. 77, no. 58, p. 17574.
- (7) 29 CFR 1910.107 Spray finishing using flammable and combustible materials, amended with AO 3-2003, removed 1910.107, and Oregon note added, f. and ef. 4/21/03.
- (8) 29 CFR 1910.108 Reserved. Published 3/23/99, Federal Register, vol. 64, no. 55, p. 13909.
- (9) 29 CFR 1910.109 Explosives and blasting agents, published 6/18/98, FR vol. 63, no. 117, p. 33466.
- (10) 29 CFR 1910.110 Storage and handling of liquefied petroleum gases, published 12/14/07, FR vol. 72, no. 240, p. 71061.
- (11) 29 CFR 1910.111 Storage and handling of anhydrous ammonia, published amended with AO 12-2001, Oregon note added, f. and ef. 10/26/01; 12/14/07, FR vol. 72, no. 240, p. 71061.
- (12) Reserved for 29 CFR 1910.112 (Reserved)
- (13) Reserved for 29 CFR 1910.113 (Reserved)
- (14) 29 CFR 1910.114 Removed. Published 3/7/96, Federal Register, vol. 61, no. 46, p. 9238.
- (15) 29 CFR 1910.115 Removed. Published 3/7/96, Federal Register, vol. 61, no. 46, p. 9238.
- (16) 29 CFR 1910.116 Removed. Published 3/7/96, Federal Register, vol. 61, no. 46, p. 9238.

(17) 29 CFR 1910.119 Process safety management of highly hazardous chemicals, amended [2/8/13]5/14/19, FR vol. [78]84, no. [27]93, p. [9344]21416.

(18) 29 CFR 1910.120 Hazardous waste operations and emergency response, amended [2/8/13]5/14/19, FR vol. [78]84, no. [27]93, p. [9344]21416.

(19) 29 CFR 1910.121 Reserved. Published 3/23/99, Federal Register, vol. 64, no. 55, p. 13909.

(20) 29 CFR 1910.122 Table of contents. Repealed with OR-OSHA Admin. Order 9-2007, f. and ef. 12/3/07.

(21) 29 CFR 1910.123 Dipping and coating operations: Coverage and definitions. Repealed with OR-OSHA Admin. Order 9-2007, f. and ef. 12/3/07.

(22) 29 CFR 1910.124 General requirements for dipping and coating operations. Repealed with OR-OSHA Admin. Order 9-2007, f. and ef. 12/3/07.

(23) 29 CFR 1910.125 Additional requirements for dipping and coating operations that use flammable or combustible liquids. Repealed with OR-OSHA Admin. Order 9-2007, f. and ef. 12/3/07.

(24) 29 CFR 1910.126 Additional requirements for special dipping and coating applications. Repealed with OR-OSHA Admin. Order 9-2007, f. and ef. 12/3/07.

These standards are on file with the Oregon Occupational Safety and Health Division, Oregon Department of Consumer and Business Services, and the United States Government Printing Office.

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 19-1988, f. 11/17/88, ef. 11/17/88 (Hazardous Wastes – Interim).
APD Admin. Order 12-1989, f. 7/14/89, ef. 7/14/90 (Hazardous Wastes – Final).
OR-OSHA Admin. Order 22-1990, f. 9/28/90, ef. 10/1/90 (Hazwaste).
OR-OSHA Admin. Order 2-1992, f. 2/6/92, ef. 5/1/92 (all except Hazwaste).
OR-OSHA Admin. Order 3-1992, f. 2/6/92, ef. 2/6/92 (Hazwaste).
OR-OSHA Admin. Order 8-1992, f. 8/13/92, ef. 11/24/92 (PSM).
OR-OSHA Admin. Order 6-1994, f. 9/30/94, ef. 9/30/94 (PSM).
OR-OSHA Admin. Order 3-1995, f. 2/22/95, ef. 2/22/95 (Haz Wst/Emg Rsp).
OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.
OR-OSHA Admin. Order 8-1999, f. 8/6/99, ef. 8/6/99.
OR-OSHA Admin. Order 12-2001, f. 10/26/01, ef. 10/26/01.
OR-OSHA Admin. Order 4-2002, f. 5/30/02, ef. 5/30/02.
OR-OSHA Admin. Order 3-2003, f. 4/21/03, ef. 4/21/03.
OR-OSHA Admin. Order 4-2004, f. 9/15/04, ef. 9/15/04.
OR-OSHA Admin. Order 4-2005, f. 12/14/05, ef. 12/14/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.

OR-OSHA Admin. Order 9-2007, f. 12/3/07, ef. 12/3/07.
OR-OSHA Admin. Order 7-2008, f. 5/30/08, ef. 5/30/08.
OR-OSHA Admin. Order 1-2010, f. 2/19/10, ef. 2/19/10.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order 6-2012, f. 9/28/12, ef. 4/1/13.
OR-OSHA Admin. Order 4-2013, f. 7/19/13, ef. 7/19/13.
OR-OSHA Admin. Order 6-2014, f. 10/28/14, ef. 5/1/15.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.106

Flammable Liquids.

(a) Definitions. As used in this section:

(1) Aerosol shall mean a material which is dispensed from its container as a mist, spray, or foam by a propellant under pressure.

(2) Atmospheric tank shall mean a storage tank which has been designed to operate at pressures from atmospheric through 0.5 p.s.i.g.

(3) Automotive service station shall mean that portion of property where flammable liquids used as motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles and shall include any facilities available for the sale and service of tires, batteries, and accessories, and for minor automotive maintenance work. Major automotive repairs, painting, body and fender work are excluded.

(4) Basement shall mean a story of a building or structure having one-half or more of its height below ground level and to which access for fire fighting purposes is unduly restricted.

(5) Boiling point shall mean the boiling point of a liquid at a pressure of 14.7 pounds per square inch absolute (p.s.i.a.) (760 mm.). Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for purposes of this section the 10 percent point of a distillation performed in accordance with the Standard Method of Test for Distillation of Petroleum Products, ASTM D-86-62, which is incorporated by reference as specified in §1910.6, may be used as the boiling point of the liquid.

(6) Boilover shall mean the expulsion of crude oil (or certain other liquids) from a burning tank. The light fractions of the crude oil burnoff producing a heat wave in the residue, which on reaching a water strata may result in the expulsion of a portion of the contents of the tank in the form of froth.

(7) Bulk plant shall mean that portion of a property where flammable liquids are received by tank vessel, pipelines, tank car, or tank vehicle, and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, or container.

(8) Chemical plant shall mean a large integrated plant or that portion of such a plant other than a refinery or distillery where flammable liquids are produced by chemical reactions or used in chemical reactions.

(9) Closed container shall mean a container as herein defined, so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

(10) Crude petroleum shall mean hydrocarbon mixtures that have a flashpoint below 150 degrees F. and which have not been processed in a refinery.

(11) Distillery shall mean a plant or that portion of a plant where flammable liquids produced by fermentation are concentrated, and where the concentrated products may also be mixed, stored, or packaged.

(12) Fire area shall mean an area of a building separated from the remainder of the building by construction having a fire resistance of at least 1-hour and having all communicating openings properly protected by an assembly having a fire resistance rating of at least 1-hour.

(13) Flammable aerosol shall mean a flammable aerosol as defined by Appendix B to 1910.1200 – Physical Hazard Criteria. For the purposes of paragraph (d) of this section, such aerosols are considered Category 1 flammable liquids.

(14) Flashpoint means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid, and shall be determined as follows:

(i) For a liquid which has a viscosity of less than 45 SUS at 100 degrees F. (37.8 degrees C.), does not contain suspended solids, and does not have a tendency to form a surface film while under test, the procedure specified in the Standard Method of Test for Flashpoint by Tag Closed Tester (ASTM D-56-70), which is incorporated by reference as specified in 1910.6, or an equivalent test method as defined in Appendix B to §1910.1200 – Physical Hazard Criteria, shall be used.

(ii) For a liquid which has a viscosity of 45 SUS or more at 100 degrees F. (37.8 degrees C.), or contains suspended solids, or has a tendency to form a surface film while under test, the Standard Method of Test for Flashpoint by Pensky Martens Closed Tester (ASTM D-93-71) or an equivalent method as defined in Appendix B to 1910.1200 – Physical Hazard Criteria, shall be used, except that the methods specified in Note 1 to section 1.1 of ASTM D-93-71 may be used for the respective materials specified in the Note. The preceding ASTM standard is incorporated by reference as specified in 1910.6.

(iii) For a liquid that is a mixture of compounds that have different volatilities and flashpoints, its flashpoint shall be determined by using the procedure specified in paragraph (a)(14)(i) or (ii) of this section on the liquid in the form it is shipped.

(iv) Organic peroxides, which undergo auto-accelerating thermal decomposition, are excluded from any of the flashpoint determination methods specified in this subparagraph.

(15) Hotel shall mean buildings or groups of buildings under the same management in which there are sleeping accommodations for hire, primarily used by transients who are lodged with or without meals including but not limited to inns, clubs, motels, and apartment hotels.

(16) Institutional occupancy shall mean the occupancy or use of a building or structure or any portion thereof by persons harbored or detained to receive medical, charitable or other care or treatment, or by persons involuntarily detained.

(17) Liquid shall mean, for the purpose of this section, any material which has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM Test for Penetration for Bituminous Materials, D-5-65, which is incorporated by reference as specified in 1910.6.

(18) Reserved.

(19) Flammable liquid means any liquid having a flashpoint at or below 199.4 degrees F. (93 degrees C.). Flammable liquids are divided into four categories as follows:

(i) Category 1 shall include liquids having flashpoints below 73.4 degrees F. (23 degrees C.) and having a boiling point at or below 95 degrees F. (35 degrees C.).

(ii) Category 2 shall include liquids having flashpoints below 73.4 degrees F. (23 degrees C.) and having a boiling point above 95 degrees F. (35 degrees C.).

(iii) Category 3 shall include liquids having flashpoints at or above 73.4 degrees F. (23 degrees C.) and at or below 140 degrees F. (60 degrees C.). When a Category 3 liquid with a flashpoint at or above 100 degrees F. (37.8 degrees C.) is heated for use to within 30 degrees F. (16.7 degrees C.) of its flashpoint, it shall be handled in accordance with the requirements for a Category 3 liquid with a flashpoint below 100 degrees F. (37.8 degrees C.).

(iv) Category 4 shall include liquids having flashpoints above 140 degrees F. (60 degrees C.) and at or below 199.4 degrees F. (93 degrees C.). When a Category 4 flammable liquid is heated for use to within 30 degrees F. (16.7 degrees C.) of its flashpoint, it shall be handled in accordance with the requirements for a Category 3 liquid with a flashpoint at or above 100 degrees F. (37.8 degrees C.).

(v) When liquid with a flashpoint greater than 199.4 degrees F. (93 degrees C.) is heated for use to within 30 degrees F. (16.7 degrees C.) of its flashpoint, it shall be handled in accordance with the requirements for a Category 4 flammable liquid.

(20) Unstable (reactive) liquid shall mean a liquid which in the pure state or as commercially produced or transported will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shocks, pressure, or temperature.

(21) Low-pressure tank shall mean a storage tank which has been designed to operate at pressures above 0.5 p.s.i.g. but not more than 15 p.s.i.g.

(22) Marine service station shall mean that portion of a property where flammable liquids used as fuels are stored and dispensed from fixed equipment on shore, piers, wharves, or floating docks into the fuel tanks of self-propelled craft, and shall include all facilities used in connection therewith.

(23) Mercantile occupancy shall mean the occupancy or use of a building or structure or any portion thereof for the displaying, selling, or buying of goods, wares, or merchandise.

(24) Office occupancy shall mean the occupancy or use of a building or structure or any portion thereof for the transaction of business, or the rendering or receiving of professional services.

(25) Portable tank shall mean a closed container having a liquid capacity over 60 U.S. gallons and not intended for fixed installation.

(26) Pressure vessel shall mean a storage tank or vessel which has been designed to operate at pressures above 15 p.s.i.g.

(27) Protection for exposure shall mean adequate fire protection for structures on property adjacent to tanks, where there are employees of the establishment.

(28) Refinery shall mean a plant in which flammable liquids are produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources.

(29) Safety can shall mean an approved container, of not more than 5-gallon capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

(30) Vapor pressure shall mean the pressure, measured in pounds per square inch (absolute) exerted by a volatile liquid as determined by the "Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)," American Society for Testing and Materials ASTM D323-68, which is incorporated by reference as specified in 1910.6.

(31) Ventilation as specified in this section is for the prevention of fire and explosion. It is considered adequate if it is sufficient to prevent accumulation of significant quantities of vapor-air mixtures in concentration over one-fourth of the lower flammable limit.

(32) Storage: Flammable liquids shall be stored in a tank or in a container that complies with paragraph (d)(2) of this section.

(33) Barrel shall mean a volume of 42 U.S. gallons.

(34) Container shall mean any can, barrel, or drum.

(35) Approved unless otherwise indicated, approved, or listed by a nationally recognized testing laboratory. Refer to 1910.7 for definition of nationally recognized testing laboratory.

(36) Listed see "approved" in 1910.106(a)(35).

(37) SUS means Saybolt Universal Seconds as determined by the Standard Method of Test for Saybolt Viscosity (ASTM D-88-56), and may be determined by use of the SUS conversion tables specified in ASTM Method D2161-66 following determination of viscosity in accordance with the procedures specified in the Standard Method of Test for Viscosity of Transparent and Opaque Liquids (ASTM D445-65).

(38) Viscous means a viscosity of 45 SUS or more.

(b) Tank storage.

(1) Design and construction of tanks.

(i) Materials.

(A) Tanks shall be built of steel except as provided in (b)(1)(i)(B) through (E) of this section.

(B) Tanks may be built of materials other than steel for installation underground or if required by the properties of the liquid stored. Tanks located aboveground or inside buildings shall be of noncombustible construction.

(C) Tanks built of materials other than steel shall be designed to specifications embodying principles recognized as good engineering design for the material used.

(D) Unlined concrete tanks may be used for storing flammable liquids having a gravity of 40 degrees API or heavier. Concrete tanks with special lining may be used for other services provided the design is in accordance with sound engineering practice.

(E) (Reserved)

(F) Special engineering consideration shall be required if the specific gravity of the liquid to be stored exceeds that of water or if the tanks are designed to contain flammable liquids at a liquid temperature below 0 degrees F.

(ii) Fabrication.

(A) (Reserved)

(B) Metal tanks shall be welded, riveted, and caulked, brazed, or bolted, or constructed by use of a combination of these methods. Filler metal used in brazing shall be nonferrous metal or an alloy having a melting point above 1000 degrees F. and below that of the metal joined.

(iii) Atmospheric tanks.

(A) Atmospheric tanks shall be built in accordance with acceptable good standards of design. Atmospheric tanks may be built in accordance with the following consensus standards that are incorporated by reference as specified in 1910.6:

(1) Underwriters' Laboratories, Inc., Subjects No. 142, Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids, 1968; No. 58, Standard for Steel Underground Tanks for Flammable and Combustible Liquids, Fifth Edition, December 1961; or No. 80, Standard for Steel Inside Tanks for Oil-Burner Fuel, September 1963.

(2) American Petroleum Institute Standards No. 650, Welded Steel Tanks for Oil Storage, Third Edition, 1966.

(3) American Petroleum Institute Standards No. 12B, Specification for Bolted Production Tanks, Eleventh Edition, May 1958, and Supplement 1, March 1962; No. 12D, Specification for Large Welded Production Tanks, Seventh Edition, August 1957; or No. 12F, Specification for Small Welded Production Tanks, Fifth Edition, March 1961. Tanks built in accordance with these standards shall be used only as production tanks for storage of crude petroleum in oil-producing areas.

(B) Tanks designed for underground service not exceeding 2,500 gallons capacity may be used aboveground.

(C) Low-pressure tanks and pressure vessels may be used as atmospheric tanks.

(D) Atmospheric tanks shall not be used for the storage of a flammable liquid at a temperature at or above its boiling point.

(iv) Low pressure tanks.

(A) The normal operating pressure of the tank shall not exceed the design pressure of the tank.

(B) Low-pressure tanks shall be built in accordance with acceptable standards of design. Low-pressure tanks may be built in accordance with the following consensus standards that are incorporated by reference as specified in 1910.6:

(1) American Petroleum Institute Standard No. 620. Recommended Rules for the Design and Construction of Large, Welded, Low-Pressure Storage Tanks, Third Edition, 1966.

(2) The principles of the Code for Unfired Pressure Vessels, Section VIII of the ASME Boiler and Pressure Vessels Code, 1968.

(C) Atmospheric tanks built according to Underwriters' Laboratories, Inc., requirements in subdivision (iii)(A) of and shall be limited to 2.5 p.s.i.g. under emergency venting conditions. This paragraph may be used for operating pressures not exceeding 1 p.s.i.g.

(D) Pressure vessels may be used as low-pressure tanks.

(v) Pressure vessels.

(A) The normal operating pressure of the vessel shall not exceed the design pressure of the vessel.

(B) Pressure vessels shall be built in accordance with the Code for Unfired Pressure Vessels, Section VIII of the ASME Boiler and Pressure Vessel Code 1968.

(vi) Provisions for internal corrosion. When tanks are not designed in accordance with the American Petroleum Institute, American Society of Mechanical Engineers, or the Underwriters' Laboratories, Inc.'s, standards, or if corrosion is anticipated beyond that provided for in the design formulas used, additional metal thickness or suitable protective coatings or linings shall be provided to compensate for the corrosion loss expected during the design life of the tank.

(2) Installation of outside aboveground tanks.

(i) (Reserved)

(ii) Spacing (shell-to-shell) between aboveground tanks.

(A) The distance between any two flammable liquid storage tanks shall not be less than 3 feet.

(B) Except as provided in paragraph (b)(2)(ii)(C) of this section, the distance between any two adjacent tanks shall not be less than $1/6$ the sum of their diameters. When the diameter of one tank is less than $1/2$ the diameter of the adjacent tank, the distance between the two tanks shall not be less than $1/2$ the diameter of the smaller tank.

(C) Where crude petroleum in conjunction with production facilities are located in noncongested areas and have capacities not exceeding 126,000 gallons (3,000 barrels), the distance between such tanks shall not be less than 3 feet.

(D) Where unstable flammable liquids are stored, the distance between such tanks shall not be less than $1/2$ the sum of their diameters.

(E) When tanks are compacted in three or more rows or in an irregular pattern, greater spacing or other means shall be provided so that inside tanks are accessible for firefighting purposes.

(F) The minimum separation between a liquefied petroleum gas container and a flammable liquid storage tank shall be 20 feet, except in the case of flammable liquid tanks operating at pressures exceeding 2.5 p.s.i.g. or equipped with emergency venting which will permit pressures to exceed 2.5 p.s.i.g. in which case the provisions of subdivisions (A) and (B) of this subdivision shall apply. Suitable means shall be taken to prevent the accumulation of flammable liquids under adjacent liquefied petroleum gas containers such as by diversion curbs or grading. When flammable liquid storage tanks are within a diked area, the liquefied petroleum gas containers shall be outside the diked area and at least 10 feet away from the centerline of the wall of the diked area. The foregoing provisions shall not apply when liquefied petroleum gas containers of 125 gallons or less capacity are installed adjacent to fuel oil supply tanks of 550 gallons or less capacity.

(iii) (Reserved)

(iv) Normal venting for aboveground tanks.

(A) Atmospheric storage tanks shall be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

(B) Normal vents shall be sized either in accordance with: (1) The American Petroleum Institute Standard 2000 (1968), Venting Atmospheric and Low-Pressure Storage Tanks, which is incorporated by reference as specified in 1910.6; or (2) other accepted standard; or (3) shall be at least as large as the filling or withdrawal connection, whichever is larger but in no case less than 1 1/4 inch nominal inside diameter.

(C) Low-pressure tanks and pressure vessels shall be adequately vented to prevent development of pressure or vacuum, as a result of filling or emptying and atmospheric temperature changes, from exceeding the design pressure of the tank or vessel. Protection shall also be provided to prevent overpressure from any pump discharging into the tank or vessel when the pump discharge pressure can exceed the design pressure of the tank or vessel.

(D) If any tank or pressure vessel has more than one fill or withdrawal connection and simultaneous filling or withdrawal can be made, the vent size shall be based on the maximum anticipated simultaneous flow.

(E) Unless the vent is designed to limit the internal pressure 2.5 p.s.i. or less, the outlet of vents and vent drains shall be arranged to discharge in such a manner as to prevent localized overheating of any part of the tank in the event vapors from such vents are ignited.

(F)

(1) Tanks and pressure vessels storing Category 1 flammable liquids shall be equipped with venting devices which shall be normally closed except when venting to pressure or vacuum conditions. Tanks and pressure vessels storing Category 2 flammable liquids and Category 3 flammable liquids with a flashpoint below 100 degrees F. (37.8 degrees C.) shall be equipped with venting devices which shall be normally closed except when venting under pressure or vacuum conditions, or with approved flame arresters.

(2) Exemption: Tanks of 3,000 bbls. (barrels) capacity or less containing crude petroleum in crude-producing areas and outside aboveground atmospheric tanks under 1,000 gallons capacity containing other than Category 1 flammable liquids may have open vents. (See paragraph (b)(2)(vi)(B) of this section.)

(G) Flame arresters or venting devices required in paragraph (b)(2)(iv)(F) of this section may be omitted for Category 2 flammable liquids and Category 3 flammable liquids with a flashpoint below 100 degrees F. (37.8 degrees C.) where conditions are such that their use may, in case of obstruction, result in tank damage.

(v) Emergency relief venting for fire exposure for aboveground tanks.

(A) Every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure caused by exposure fires.

(B) In a vertical tank the construction referred to in subdivision (A) of this subdivision may take the form of a floating roof, lifter roof, a weak roof-to-shell seam, or other approved pressure relieving construction. The weak roof-to-shell seam shall be constructed to fail preferential to any other seam.

(C) Where entire dependence for emergency relief is placed upon pressure relieving devices, the total venting capacity of both normal and emergency vents shall be enough to prevent rupture of the shell or bottom of the tank if vertical, or of the shell or heads if horizontal. If unstable liquids are stored, the effects of heat or gas resulting from polymerization, decomposition, condensation, or self-reactivity shall be taken into account. The total capacity of both normal and emergency venting devices shall be not less than that derived from Table H-10 except as provided in subdivision (E) or (F) of this subdivision. Such device may be a self-closing manhole cover, or one using long bolts that permit the cover to lift under internal pressure, or an additional or larger relief valve or valves. The wetted area of the tank shall be calculated on the basis of 55 percent of the total exposed area of a sphere or spheroid, 75 percent of the total exposed area of a horizontal tank and the first 30 feet above grade of the exposed shell area of a vertical tank.

Table H-10 – Wetted Area Versus Cubic Feet Free Air Per Hour (14.7 psia and 60° F.)

Square feet	CFH	Square feet	CFH	Square feet	CFH
20	21,100	160	168,000	900	493,000
30	31,600	180	190,000	1,000	524,000
40	42,100	200	211,000	1,200	557,000
50	52,700	250	239,000	1,400	587,000
60	63,200	300	265,000	1,600	614,000
70	73,700	350	288,000	1,800	639,000
80	84,200	400	312,000	2,000	662,000
90	94,800	500	354,000	2,400	704,000
100	105,000	600	392,000	2,800	742,000
120	126,000	700	428,000	and over	
140	147,000	800	462,000		

(D) For tanks and storage vessels designed for pressure over 1 p.s.i.g., the total rate of venting shall be determined in accordance with Table H-10, except that when the exposed wetted area of the surface is greater than 2,800 square feet, the total rate of venting shall be calculated by the following formula:

$$CFH = 1,107A^{0.82}$$

Where:

CFH = Venting requirement, in cubic feet of free air per hour.

A = Exposed wetted surface, in square feet.

Note: The foregoing formula is based on $Q = 21,000A^{0.82}$.

(E) The total emergency relief venting capacity for any specific stable liquid may be determined by the following formula:

$$V = 1337 \div L \sqrt{M}$$

V = Cubic feet of free air per hour from Table H-10.

L = Latent heat of vaporization of specific liquid in B.t.u. per pound.

M = Molecular weight of specific liquids.

(F) The required airflow rate of subdivision (C) or (E) of this subdivision may be multiplied by the appropriate factor listed in the following schedule when protection is provided as indicated. Only one factor may be used for any one tank.

0.5 for drainage in accordance with subdivision (vii)(B) of this subparagraph for tanks over 200 square feet of wetted area.

0.3 for approved water spray.

0.3 for approved insulation.

0.15 for approved water spray with approved insulation.

(G) The outlet of all vents and vent drains on tanks equipped with emergency venting to permit pressures exceeding 2.5 p.s.i.g. shall be arranged to discharge in such a way as to prevent localized overheating of any part of the tank, in the event vapors from such vents are ignited.

(H) Each commercial tank venting device shall have stamped on it the opening pressure, the pressure at which the valve reaches the full open position, and the flow capacity at the latter pressure, expressed in cubic feet per hour of air at 60 degrees F. and at a pressure of 14.7 p.s.i.a.

(I) The flow capacity of tank venting devices 12 inches and smaller in nominal pipe size shall be determined by actual test of each type and size of vent. These flow tests may be conducted by the manufacturer if certified by a qualified impartial observer, or may be conducted by an outside agency. The flow capacity of tank venting devices larger than 12 inches nominal pipe size, including manhole covers with long bolts or equivalent, may be calculated provided that the opening pressure is actually measured, the rating pressure and corresponding free orifice area are stated, the word "calculated" appears on the nameplate, and the computation is based on a flow coefficient of 0.5 applied to the rated orifice area.

(vi) Vent piping for aboveground tanks.

(A) Vent piping shall be constructed in accordance with paragraph (c) of this section.

(B) Where vent pipe outlets for tanks storing Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F. (37.8 degrees C.), are adjacent

to buildings or public ways, they shall be located so that the vapors are released at a safe point outside of buildings and not less than 12 feet above the adjacent ground level. In order to aid their dispersion, vapors shall be discharged upward or horizontally away from closely adjacent walls. Vent outlets shall be located so that flammable vapors will not be trapped by eaves or other obstructions and shall be at least 5 feet from building openings.

(C) When tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they may be required to handle when manifolded tanks are subject to the same fire exposure.

(vii) Drainage, dikes, and walls for aboveground tanks.

(A) Drainage and diked areas. The area surrounding a tank or a group of tanks shall be provided with drainage as in subdivision (B) of this subdivision, or shall be diked as provided in subdivision (C) of this subdivision, to prevent accidental discharge of liquid from endangering adjoining property or reaching waterways.

(B) Drainage. Where protection of adjoining property or waterways is by means of a natural or man-made drainage system, such systems shall comply with the following:

(1) (Reserved)

(2) The drainage system shall terminate in vacant land or other area or in an impounding basin having a capacity not smaller than that of the largest tank served. This termination area and the route of the drainage system shall be so located that, if the flammable liquids in the drainage system are ignited, the fire will not seriously expose tanks or adjoining property.

(C) Diked areas. Where protection of adjoining property or waterways is accomplished by retaining the liquid around the tank by means of a dike, the volume of the diked area shall comply with the following requirements:

(1) Except as provided in subdivision (2) of this subdivision, the volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area, assuming a full tank. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

(2) For a tank or group of tanks with fixed roofs containing crude petroleum with boilover characteristics, the volumetric capacity of the diked area shall be not less than the capacity of the largest tank served by the enclosure, assuming a full tank. The capacity of the diked enclosure shall be calculated by deducting the volume below the height of the dike of all tanks within the enclosure.

(3) Walls of the diked area shall be of earth, steel, concrete or solid masonry designed to be liquid-tight and to withstand a full hydrostatic head. Earthen walls 3 feet or more in height shall have a flat section at the top not less than 2 feet wide. The slope of an earthen wall shall be consistent with the angle of repose of the material of which the wall is constructed.

(4) The walls of the diked area shall be restricted to an average height of 6 feet above interior grade.

(5) (Reserved)

(6) No loose combustible material, empty or full drum or barrel, shall be permitted within the diked area.

(viii) Tank openings other than vents for aboveground tanks.

(A) (Reserved)

(B) (Reserved)

(C) (Reserved)

(D) Openings for gaging shall be provided with a vapor-tight cap or cover.

(E) For Category 2 flammable liquids and Category 3 flammable liquids with a flashpoint below 100 degrees F. (37.8 degrees C.), other than crude oils, gasolines, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity. A fill pipe entering the top of a tank shall terminate within 6 inches of the bottom of the tank and shall be installed to avoid excessive vibration.

(F) Filling and emptying connections which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. Such connection shall be closed and liquid-tight when not in use. The connection shall be properly identified.

(3) Installation of underground tanks.

(i) Location. Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks or tanks under buildings shall be so located with respect to existing building foundations and supports that the loads carried by the latter cannot be transmitted to the tank. The distance from any part of a tank storing Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), to the nearest wall of any basement or pit shall be not less than 1-foot, and to any property line that may be built upon, not less than 3 feet. The distance from any part of a tank storing Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids to the nearest wall of any basement, pit or property line shall be not less than 1-foot.

(ii) Depth and cover. Underground tanks shall be set on firm foundations and surrounded with at least 6 inches of noncorrosive, inert materials such as clean sand, earth, or gravel well tamped in place. The tank shall be placed in the hole with care since dropping or rolling the tank into the hole can break a weld, puncture or damage the tank, or scrape off the protective coating of coated tanks. Tanks shall be covered with a minimum of 2 feet of earth, or shall be covered with not less than 1-foot of earth, on top of which shall be placed a slab of reinforced concrete not less than 4 inches thick. When underground tanks are, or are

likely to be, subject to traffic, they shall be protected against damage from vehicles passing over them by at least 3 feet of earth cover, or 18 inches of well-tamped earth, plus 6 inches of reinforced concrete or 8 inches of asphaltic concrete. When asphaltic or reinforced concrete paving is used as part of the protection, it shall extend at least 1-foot horizontally beyond the outline of the tank in all directions.

(iii) Corrosion protection. Corrosion protection for the tank and its piping shall be provided by one or more of the following methods:

- (A) Use of protective coatings or wrappings;
- (B) Cathodic protection; or,
- (C) Corrosion resistant materials of construction.

(iv) Vents.

(A) Location and arrangement of vents for Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C). Vent pipes from tanks storing Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be so located that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 feet above the adjacent ground level. Vent pipes shall discharge only upward in order to disperse vapors. Vent pipes 2 inches or less in nominal inside diameter shall not be obstructed by devices that will cause excessive back pressure. Vent pipe outlets shall be so located that flammable vapors will not enter building openings, or be trapped under eaves or other obstructions. If the vent pipe is less than 10 feet in length, or greater than 2 inches in nominal inside diameter, the outlet shall be provided with a vacuum and pressure relief device or there shall be an approved flame arrester located in the vent line at the outlet or within the approved distance from the outlet.

(B) Size of vents. Each tank shall be vented through piping adequate in size to prevent blow-back of vapor or liquid at the fill opening while the tank is being filled. Vent pipes shall be not less than 1 1/4-inch nominal inside diameter.

Table H-11 – Vent Line Diameters

Maximum flow GPM	Pipe length ¹		
	50 feet	100 feet	200 feet
	Inches	Inches	Inches
100.....	1 1/4	1 1/4	1 1/4
200.....	1 1/4	1 1/4	1 1/4
300.....	1 1/4	1 1/4	1 1/2
400.....	1 1/4	1 1/2	2
500.....	1 1/2	1 1/2	2
600.....	1 1/2	2	2
700.....	2	2	2
800.....	2	2	3
900.....	2	2	3
1,000.....	2	2	3

¹ Vent lines of 50 feet, 100 feet, and 200 feet of pipe plus 7 ells.

(C) Location and arrangement of vents for Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids. Vent pipes from tanks storing Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids shall terminate outside of the building and higher than the fill pipe opening. Vent outlets shall be above normal snow level. They may be fitted with return bends, coarse screens or other devices to minimize ingress of foreign material.

(D) Vent piping shall be constructed in accordance with paragraph (C) of this section. Vent pipes shall be so laid as to drain toward the tank without sags or traps in which liquid can collect. They shall be located so that they will not be subjected to physical damage. The tank end of the vent pipe shall enter the tank through the top.

(E) When tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they may be required to handle when manifolded tanks are filled simultaneously.

(v) Tank openings other than vents.

(A) Connections for all tank openings shall be vapor or liquid-tight.

(B) Openings for manual gaging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. If inside a building, each such opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

(C) Fill and discharge lines shall enter tanks only through the top. Fill lines shall be sloped toward the tank.

(D) For Category 2 flammable liquids and Category 3 flammable liquids with a flashpoint below 100 degrees F. (37.8 degrees C.), other than crude oils, gasolines, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within 6 inches of the bottom of the tank.

(E) Filling and emptying connections which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. Such connection shall be closed and liquid-tight when not in use. The connection shall be properly identified.

(4) Installation of tanks inside of buildings.

(i) Location. Tanks shall not be permitted inside of buildings except as provided in paragraphs (e), (g), (h), or (i) of this section.

(ii) Vents. Vents for tanks inside of buildings shall be as provided in subparagraphs (2)(iv), (v), (vi)(B), and (3)(iv) of this paragraph, except that emergency venting by the use of weak

roof seams on tanks shall not be permitted. Vents shall discharge vapors outside the buildings.

(iii) Vent piping. Vent piping shall be constructed in accordance with paragraph (c) of this section.

(iv) Tank openings other than vents.

(A) Connections for all tank openings shall be vapor or liquid-tight. Vents are covered in subdivision (ii) of this subparagraph.

(B) Each connection to a tank inside of buildings through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank. Such valves, when external, and their connections to the tank shall be of steel except when the chemical characteristics of the liquid stored are incompatible with steel. When materials other than steel are necessary, they shall be suitable for the pressures, structural stresses, and temperatures involved, including fire exposures.

(C) Flammable liquid tanks located inside of buildings, except in one-story buildings designed and protected for flammable liquid storage, shall be provided with an automatic-closing heat-actuated valve on each withdrawal connection below the liquid level, except for connections used for emergency disposal, to prevent continued flow in the event of fire in the vicinity of the tank. This function may be incorporated in the valve required in (B) of this subdivision, and if a separate valve, shall be located adjacent to the valve required in (b) of this subdivision.

(D) Openings for manual gaging, if independent of the fill pipe (see (F) of this subdivision), shall be provided with a vapor-tight cap or cover. Each such opening shall be protected against liquid overflow and possible vapor release by means of a spring-loaded check valve or other approved device.

(E) For Category 2 flammable liquids and Category 3 flammable liquids with a flashpoint below 100 degrees F (37.7 degrees C) other than crude oils, gasoline, and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity by terminating within 6 inches of the bottom of the tank.

(F) The fill pipe inside of the tank shall be installed to avoid excessive vibration of the pipe.

(G) The inlet of the fill pipe shall be located outside of buildings at a location free from any source of ignition and not less than 5 feet away from any building opening. The inlet of the fill pipe shall be closed and liquid-tight when not in use. The fill connection shall be properly identified.

(H) Tanks inside buildings shall be equipped with a device, or other means shall be provided, to prevent overflow into the building.

(5) Supports, foundations, and anchorage for all tank locations.

(i) General. Tank supports shall be installed on firm foundations. Tank supports shall be of concrete, masonry, or protected steel. Single wood timber supports (not cribbing) laid horizontally may be used for outside aboveground tanks if not more than 12 inches high at their lowest point.

(ii) Fire resistance. Steel supports or exposed piling shall be protected by materials having a fire resistance rating of not less than 2 hours, except that steel saddles need not be protected if less than 12 inches high at their lowest point. Water spray protection or its equivalent may be used in lieu of fire-resistive materials to protect supports.

(iii) Spheres. The design of the supporting structure for tanks such as spheres shall receive special engineering consideration.

(iv) Load distribution. Every tank shall be so supported as to prevent the excessive concentration of loads on the supporting portion of the shell.

(v) Foundations. Tanks shall rest on the ground or on foundations made of concrete, masonry, piling, or steel. Tank foundations shall be designed to minimize the possibility of uneven settling of the tank and to minimize corrosion in any part of the tank resting on the foundation.

(vi) Flood areas. Where a tank is located in an area that may be subjected to flooding, the applicable precautions outlined in this subdivision shall be observed.

(A) No aboveground vertical storage tank containing a flammable liquid shall be located so that the allowable liquid level within the tank is below the established maximum flood stage, unless the tank is provided with a guiding structure such as described in (M), (N), and (O) of this subdivision.

(B) Independent water supply facilities shall be provided at locations where there is no ample and dependable public water supply available for loading partially empty tanks with water.

(C) In addition to the preceding requirements, each tank so located that more than 70 percent, but less than 100 percent, of its allowable liquid storage capacity will be submerged at the established maximum flood stage, shall be safeguarded by one of the following methods: Tank shall be raised, or its height shall be increased, until its top extends above the maximum flood stage a distance equivalent to 30 percent or more of its allowable liquid storage capacity: Provided, however, That the submerged part of the tank shall not exceed 2 1/2 times the diameter. Or, as an alternative to the foregoing, adequate noncombustible structural guides, designed to permit the tank to float vertically without loss of product, shall be provided.

(D) Each horizontal tank so located that more than 70 percent of its storage capacity will be submerged at the established flood stage, shall be anchored, attached to a foundation of concrete or of steel and concrete, of sufficient weight to provide adequate load for the tank when filled with flammable liquid and submerged by floodwaters to the established flood stage, or adequately secured by other means.

(E) (Reserved)

(F) At locations where there is no ample and dependable water supply, or where filling of underground tanks with liquids is impracticable because of the character of their contents, their use, or for other reasons, each tank shall be safeguarded against movement when empty and submerged by high ground water or floodwaters by anchoring, weighting with concrete or other approved solid loading material, or securing by other means. Each such tank shall be so constructed and installed that it will safely resist external pressures due to high ground water or floodwaters.

(G) At locations where there is an ample and dependable water supply available, underground tanks containing flammable liquids, so installed that more than 70 percent of their storage capacity will be submerged at the maximum flood stage, shall be so anchored, weighted, or secured by other means, as to prevent movement of such tanks when filled with flammable liquids, and submerged by floodwaters to the established flood stage.

(H) Pipe connections below the allowable liquid level in a tank shall be provided with valves or cocks located as closely as practicable to the tank shell. Such valves and their connections to tanks shall be of steel or other material suitable for use with the liquid being stored. Cast iron shall not be permitted.

(I) At locations where an independent water supply is required, it shall be entirely independent of public power and water supply. Independent source of water shall be available when floodwaters reach a level not less than 10 feet below the bottom of the lowest tank on a property.

(J) The self-contained power and pumping unit shall be so located or so designed that pumping into tanks may be carried on continuously throughout the rise in floodwaters from a level 10 feet below the lowest tank to the level of the potential flood stage.

(K) Capacity of the pumping unit shall be such that the rate of rise of water in all tanks shall be equivalent to the established potential average rate of rise of floodwaters at any stage.

(L) Each independent pumping unit shall be tested periodically to ensure that it is in satisfactory operating condition.

(M) Structural guides for holding floating tanks above their foundations shall be so designed that there will be no resistance to the free rise of a tank, and shall be constructed of noncombustible material.

(N) The strength of the structure shall be adequate to resist lateral movement of a tank subject to a horizontal force in any direction equivalent to not less than 25 pounds per square foot acting on the projected vertical cross-sectional area of the tank.

(O) Where tanks are situated on exposed points or bends in a shoreline where swift currents in floodwaters will be present, the structures shall be designed to withstand a unit force of not less than 50 pounds per square foot.

(P) The filling of a tank to be protected by water loading shall be started as soon as floodwaters reach a dangerous flood stage. The rate of filling shall be at least equal to the rate of rise of the floodwaters (or the established average potential rate of rise).

(Q) Sufficient fuel to operate the water pumps shall be available at all times to ensure adequate power to fill all tankage with water.

(R) All valves on connecting pipelines shall be closed and locked in closed position when water loading has been completed.

(S) Where structural guides are provided for the protection of floating tanks, all rigid connections between tanks and pipelines shall be disconnected and blanked off or blinded before the floodwaters reach the bottom of the tank, unless control valves and their connections to the tank are of a type designed to prevent breakage between the valve and the tank shell.

(T) All valves attached to tanks other than those used in connection with water loading operations shall be closed and locked.

(U) If a tank is equipped with a swing line, the swing pipe shall be raised to and secured at its highest position.

(V) Inspections. The Assistant Secretary or his designated representative shall make periodic inspections of all plants where the storage of flammable liquids is such as to require compliance with the foregoing requirements, in order to assure the following:

(1) That all flammable liquid storage tanks are in compliance with these requirements and so maintained.

(2) That detailed printed instructions of what to do in flood emergencies are properly posted.

(3) That station operators and other employees depended upon to carry out such instructions are thoroughly informed as to the location and operation of such valves and other equipment necessary to effect these requirements.

(vii) Earthquake areas. In areas subject to earthquakes, the tank supports and connections shall be designed to resist damage as a result of such shocks.

(6) Sources of ignition. In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition may include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical, and mechanical), spontaneous ignition, chemical and physical-chemical reactions, and radiant heat.

(7) Testing.

(i) General. All tanks, whether shop built or field erected, shall be strength tested before they are placed in service in accordance with the applicable paragraphs of the code under which they were built. The American Society of Mechanical Engineers (ASME) code stamp,

American Petroleum Institute (API) monogram, or the label of the Underwriters' Laboratories, Inc., on a tank shall be evidence of compliance with this strength test. Tanks not marked in accordance with the above codes shall be strength tested before they are placed in service in accordance with good engineering principles and reference shall be made to the sections on testing in the codes listed in subparagraphs (1)(iii)(A), (iv)(B), or (v)(B) of this paragraph.

(ii) Strength. When the vertical length of the fill and vent pipes is such that when filled with liquid the static head imposed upon the bottom of the tank exceeds 10 pounds per square inch, the tank and related piping shall be tested hydrostatically to a pressure equal to the static head thus imposed.

(iii) Tightness. In addition to the strength test called for in subdivisions (i) and (ii) of this subparagraph, all tanks and connections shall be tested for tightness. Except for underground tanks, this tightness test shall be made at operating pressure with air, inert gas, or water prior to placing the tank in service. In the case of field-erected tanks the strength test may be considered to be the test for tank tightness. Underground tanks and piping, before being covered, enclosed, or placed in use, shall be tested for tightness hydrostatically, or with air pressure at not less than 3 pounds per square inch and not more than 5 pounds per square inch.

(iv) Repairs. All leaks or deformations shall be corrected in an acceptable manner before the tank is placed in service. Mechanical caulking is not permitted for correcting leaks in welded tanks except pinhole leaks in the roof.

(v) Derated operations. Tanks to be operated at pressures below their design pressure may be tested by the applicable provisions of subdivision (i) or (ii) of this subparagraph, based upon the pressure developed under full emergency venting of the tank.

(c) Piping, valves, and fittings.

(1) General.

(i) Design. The design (including selection of materials) fabrication, assembly, test, and inspection of piping systems containing flammable liquids shall be suitable for the expected working pressures and structural stresses. Conformity with the applicable provisions of Pressure Piping, ANSI B31 series and the provisions of this paragraph, shall be considered prima facie evidence of compliance with the foregoing provisions.

(ii) Exceptions. This paragraph does not apply to any of the following:

(A) Tubing or casing on any oil or gas wells and any piping connected directly thereto.

(B) Motor vehicle, aircraft, boat, or portable or stationary engines.

(C) Piping within the scope of any applicable boiler and pressures vessel code.

(iii) Definitions. As used in this paragraph, piping systems consist of pipe, tubing, flanges, bolting, gaskets, valves, fittings, the pressure containing parts of other components such as

expansion joints and strainers, and devices which serve such purposes as mixing, separating, snubbing, distributing, metering, or controlling flow.

(2) Materials for piping, valves, and fittings.

(i) Required materials. Materials for piping, valves, or fittings shall be steel, nodular iron, or malleable iron, except as provided in paragraph (c)(2)(ii), (iii) and (iv) of this section.

(ii) Exceptions. Materials other than steel, nodular iron, or malleable iron may be used underground, or if required by the properties of the flammable liquid handled. Material other than steel, nodular iron, or malleable iron shall be designed to specifications embodying principles recognized as good engineering practices for the material used.

(iii) Linings. Piping, valves, and fittings may have combustible or noncombustible linings.

(iv) Low-melting materials. When low-melting point materials such as aluminum and brass or materials that soften on fire exposure such as plastics, or nonductile materials such as cast iron, are necessary, special consideration shall be given to their behavior on fire exposure. If such materials are used in aboveground piping systems or inside buildings, they shall be suitably protected against fire exposure or so located that any spill resulting from the failure of these materials could not unduly expose persons, important buildings or structures or can be readily controlled by remote valves.

(3) Pipe joints. Joints shall be made liquid-tight. Welded or screwed joints or approved connectors shall be used. Threaded joints and connections shall be made up tight with a suitable lubricant or piping compound. Pipe joints dependent upon the friction characteristics of combustible materials for mechanical continuity of piping shall not be used inside buildings. They may be used outside of buildings above or below ground. If used aboveground, the piping shall either be secured to prevent disengagement at the fitting or the piping system shall be so designed that any spill resulting from such disengagement could not unduly expose persons, important buildings or structures, and could be readily controlled by remote valves.

(4) Supports. Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, or contraction.

(5) Protection against corrosion. All piping for flammable liquids, both aboveground and underground, where subject to external corrosion, shall be painted or otherwise protected.

(6) Valves. Piping systems shall contain a sufficient number of valves to operate the system properly and to protect the plant. Piping systems in connection with pumps shall contain a sufficient number of valves to control properly the flow of liquid in normal operation and in the event of physical damage. Each connection to pipelines, by which equipment such as tankcars or tank vehicles discharge liquids by means of pumps into storage tanks, shall be provided with a check valve for automatic protection against backflow if the piping arrangement is such that backflow from the system is possible.

(7) Testing. All piping before being covered, enclosed, or placed in use shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 5 pounds per square inch gage at the highest point of the system. This test shall be maintained for a sufficient time to complete visual inspection of all joints and connections, but for at least 10 minutes.

(d) Container and portable tank storage.

(1) Scope.

(i) General. This paragraph shall apply only to the storage of flammable liquids in drums or other containers (including flammable aerosols) not exceeding 60 gallons individual capacity and those portable tanks not exceeding 660 gallons individual capacity.

(ii) Exceptions. This paragraph shall not apply to the following:

(A) Storage of containers in bulk plants, service stations, refineries, chemical plants, and distilleries;

(B) Category 1, 2, or 3 flammable liquids in the fuel tanks of a motor vehicle, aircraft, boat, or portable or stationary engine;

(C) Flammable paints, oils, varnishes, and similar mixtures used for painting or maintenance when not kept for a period in excess of 30 days;

(D) Beverages when packaged in individual containers not exceeding 1-gallon in size.

(2) Design, construction, and capacity of containers.

(i) General. Only approved containers and portable tanks shall be used. Metal containers and portable tanks meeting the requirements of and containing products authorized by Chapter I, Title 49 of the Code of Federal Regulations (regulations issued by the Hazardous Materials Regulations Board, Department of Transportation), shall be deemed to be acceptable.

(ii) Emergency venting. Each portable tank shall be provided with one or more devices installed in the top with sufficient emergency venting capacity to limit internal pressure under fire exposure conditions to 10 p.s.i.g., or 30 percent of the bursting pressure of the tank, whichever is greater. The total venting capacity shall be not less than that specified in paragraphs (b)(2)(v)(C) or (E) of this section. At least one pressure-activated vent having a minimum capacity of 6,000 cubic feet of free air (14.7 p.s.i.a. and 60 degrees F.) shall be used. It shall be set to open at not less than 5 p.s.i.g. If fusible vents are used, they shall be actuated by elements that operate at a temperature not exceeding 300 degrees F.

(iii) Size. Flammable liquid containers shall be in accordance with Table H-12, except that glass or plastic containers of no more than 1-gallon capacity may be used for a Category 1 or 2 flammable liquid if:

(A)

(1) Such liquid either would be rendered unfit for its intended use by contact with metal or would excessively corrode a metal container so as to create a leakage hazard; and

(2) The user's process either would require more than 1-pint of a Category 1 flammable liquid or more than 1-quart of a Category 2 flammable liquid of a single assay lot to be used at one time, or would require the maintenance of an analytical standard liquid of a quality which is not met by the specified standards of liquids available, and the quantity of the analytical standard liquid required to be used in any one control process exceeds 1/16 the capacity of the container allowed under Table H-12 for the class of liquid; or

(B) The containers are intended for direct export outside the United States.

Table H-12 – Maximum Allowable Size of Containers and Portable Tanks for Flammable Liquids

Container type	Category 1	Category 2	Category 3	Category 4
Glass or approved plastic.....	1 pt	1 qt	1 gal	1 gal
Metal (other than DOT drums).....	1 gal	5 gal	5 gal	5 gal
Safety cans.....	2 gal	5 gal	5 gal	5 gal
Metal drums (DOT specifications)..	60 gal	60 gal	60 gal	60 gal
Approved portable tanks.....	660 gal	660 gal	660 gal	660 gal

NOTE: Container exemptions: Medicines, beverages, foodstuffs, cosmetics, and other common consumer items, when packaged according to commonly accepted practices, shall be exempt from the requirements of §1910.106(d)(2)(i) and (ii).

(3) Design, construction, and capacity of storage cabinets.

(i) Maximum capacity. Not more than 60 gallons of Category 1, 2, or 3 flammable liquids, nor more than 120 gallons of Category 4 flammable liquids may be stored in a storage cabinet.

(ii) Fire resistance. Storage cabinets shall be designed and constructed to limit the internal temperature to not more than 325 degrees F. when subjected to a 10-minute fire test using the standard time-temperature curve as set forth in Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1969, which is incorporated by reference as specified in 1910.6. All joints and seams shall remain tight and the door shall remain securely closed during the fire test. Cabinets shall be labeled in conspicuous lettering, "Flammable – Keep Fire Away."

(A) Metal cabinets constructed in the following manner shall be deemed to be in compliance. The bottom, top, door, and sides of cabinet shall be at least No. 18 gage sheet iron and double walled with 1 1/2-inch air space. Joints shall be riveted, welded or made tight by some equally effective means. The door shall be provided with a three-point lock, and the door sill shall be raised at least 2 inches above the bottom of the cabinet.

(B) Wooden cabinets constructed in the following manner shall be deemed in compliance. The bottom, sides, and top shall be constructed of an approved grade of plywood at least 1-inch in thickness, which shall not break down or delaminate under fire conditions. All joints shall be rabbetted and shall be fastened in two directions with flathead wood screws. When more than one door is used, there shall be a rabbetted overlap of not less than 1-inch.

Hinges shall be mounted in such a manner as not to lose their holding capacity due to loosening or burning out of the screws when subjected to the fire test.

(4) Design and construction of inside storage rooms.

(i) Construction. Inside storage rooms shall be constructed to meet the required fire-resistive rating for their use. Such construction shall comply with the test specifications set forth in Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-1969. Where an automatic sprinkler system is provided, the system shall be designed and installed in an acceptable manner. Openings to other rooms or buildings shall be provided with noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor. Openings shall be provided with approved self-closing fire doors. The room shall be liquid-tight where the walls join the floor. A permissible alternate to the sill or ramp is an open-grated trench inside of the room which drains to a safe location. Where other portions of the building or other properties are exposed, windows shall be protected as set forth in the Standard for Fire Doors and Windows, NFPA No. 80-1968, which is incorporated by reference as specified in 1910.6, for Class E or F openings. Wood at least 1-inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, floor overlay, and similar installations.

(ii) Rating and capacity. Storage in inside storage rooms shall comply with Table H-13.

Table H-13 – Storage in Inside Rooms

Fire protection¹ provided	Fire resistance	Maximum size	Total allowable quantities (gals./sq. ft./floor area)
Yes	2 hours	500 sq. ft.	10
No	2 hours	500 sq. ft.	5
Yes	1 hour	150 sq. ft.	4
No	1 hour	150 sq. ft.	2

¹ Fire protection system shall be sprinkler, water spray, carbon dioxide, or other system.

(iii) Wiring. Electrical wiring and equipment located in inside storage rooms used for Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be approved under Subpart S of this part for Class I, Division 2 Hazardous Locations; for Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids shall be approved for general use.

(iv) Ventilation. Every inside storage room shall be provided with either a gravity or a mechanical exhaust ventilation system. Such system shall be designed to provide for a complete change of air within the room at least six times per hour. If a mechanical exhaust system is used, it shall be controlled by a switch located outside of the door. The ventilating equipment and any lighting fixtures shall be operated by the same switch. A pilot light shall be installed adjacent to the switch if Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C) are dispensed within the room. Where gravity ventilation is provided, the fresh air intake, as well as the exhaust outlet from the room, shall be on the exterior of the building in which the room is located.

(v) Storage in inside storage rooms. In every inside storage room there shall be maintained one clear aisle at least 3 feet wide. Containers over 30 gallons capacity shall not be stacked one upon the other. Dispensing shall be by approved pump or self-closing faucet only.

(5) Storage inside building.

(i) Egress. Flammable liquids, including stock for sale, shall not be stored so as to limit use of exits, stairways, or areas normally used for the safe egress of people.

(ii) Containers. The storage of flammable liquids in containers or portable tanks shall comply with subdivisions (iii) through (v) of this subparagraph.

(iii) Office occupancies. Storage shall be prohibited except that which is required for maintenance and operation of building and operation of equipment. Such storage shall be kept in closed metal containers stored in a storage cabinet or in safety cans or in an inside storage room not having a door that opens into that portion of the building used by the public.

(iv) Mercantile occupancies and other retail stores.

(A) (Reserved)

(B) (Reserved)

(C) (Reserved)

(D) (Reserved)

(E) Leaking containers shall be removed to a storage room or taken to a safe location outside the building and the contents transferred to an undamaged container.

(v) General purpose public warehouses. Storage shall be in accordance with Table H-14 or H-15 and in buildings or in portions of such buildings cut off by standard firewalls. Material creating no fire exposure hazard to the flammable liquids may be stored in the same area.

Table H-14 – Indoor Container Storage

Category liquid	Storage level	Gallons	
		Protected storage maximum per pile	Unprotected storage maximum per pile
1	Ground and upper floors	2,750 (50)	660 (12)
	Basement	Not permitted	Not permitted
2	Ground and upper floors	5,500 (100)	1,375 (25)
	Basement	Not permitted	Not permitted
3 FP<100 F	Ground and upper floors	16,500 (300)	4,125 (75)
	Basement	Not permitted	Not permitted
3 FP≥100 F	Ground and upper floors	16,500 (300)	4,125 (75)
	Basement	5,500 (100)	Not permitted

4	Ground and upper floors	55,000 (1,000)	13,750 (250)
	Basement	8,250 (450)	Not permitted

Note 1: When 2 or more categories of materials are stored in a single pile, the maximum gallonage permitted in that pile shall be the smallest of the 2 or more separate maximum gallonages.

Note 2: Aisles shall be provided so that no container is more than 12 feet from an aisle. Main aisles shall be at least 3 feet wide and side aisles at least 4 feet wide.

Note 3: Each pile shall be separated from each other by at least 4 feet.

Note 4: FP means flashpoint.

(Numbers in parentheses indicate corresponding number of 55-gallon drums.)

Table H-15 – Indoor Portable Tank Storage

Category liquid	Storage level	Gallons	
		Protected storage maximum per pile	Unprotected storage maximum per pile
1	Ground and upper floors	Not permitted	Not permitted
	Basement	Not permitted	Not permitted
2	Ground and upper floors	20,000	2,000
	Basement	Not permitted	Not permitted
3 FP<100 F	Ground and upper floors	40,000	5,500
	Basement	Not permitted	Not permitted
3 FP≥100 F	Ground and upper floors	40,000	5,500
	Basement	20,000	Not permitted
4	Ground and upper floors	60,000	22,000
	Basement	20,000	Not permitted

Note 1: When 1 or more categories of materials are stored in a single pile, the maximum gallonage permitted in that pile shall be the smallest of the 2 or more separate maximum gallonages.

Note 2: Aisles shall be provided so that no portable tank is more than 12 feet from an aisle. Main aisles shall be at least 8 feet wide and side aisles at least 4 feet wide.

Note 3: Each pile shall be separated from each other by at least 4 feet.

Note 4: FP means flashpoint.

(vi) Flammable liquid warehouses or storage buildings.

(A) If the storage building is located 50 feet or less from a building or line of adjoining property that may be built upon, the exposing wall shall be a blank wall having a fire-resistance rating of at least 2 hours.

(B) The total quantity of liquids within a building shall not be restricted, but the arrangement of storage shall comply with Table H-14 or H-15.

(C) Containers in piles shall be separated by pallets or dunnage where necessary to provide stability and to prevent excessive stress on container walls.

(D) Portable tanks stored over one tier high shall be designed to nest securely, without dunnage, and adequate materials handling equipment shall be available to handle tanks safely at the upper tier level.

(E) No pile shall be closer than 3 feet to the nearest beam, chord, girder, or other obstruction, and shall be 3 feet below sprinkler deflectors or discharge orifices of water spray, or other overhead fire protection systems.

(F) Aisles of at least 3 feet wide shall be provided where necessary for reasons of access to doors, windows or standpipe connections.

(6) Storage outside buildings.

(i) General. Storage outside buildings shall be in accordance with Table H-16 or H 17, and subdivisions (ii) and (iv) of this subparagraph.

Table H-16 – Outdoor Container Storage

1 – Category	2 – Maximum per pile	3 – Distance between piles	4 – Distance to property line that can be built upon	5 – Distance to street, alley, public way
	gallons	feet	feet	feet
1	1,100	5	20	10
2	2,200	5	20	10
3 FP<100 F	4,400	5	20	10
3 FP≥100 F	8,800	5	10	5
4	22,000	5	10	5

Note 1: When 2 or more categories of materials are stored in a single pile, the maximum gallonage in that pile shall be the smallest of the 2 or more separate gallonages.

Note 2: Within 200 feet of each container, there shall be a 12-foot wide access way to permit approach of fire control apparatus.

Note 3: The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 shall be doubled.

Note 4: When total quantity stored does not exceed 50 percent of maximum per pile, the distances in columns 4 and 5 may be reduced 50 percent, but not less than 3 feet.

Note 5: FP means flashpoint.

(ii) Maximum storage. A maximum of 1,100 gallons of flammable liquids may be located adjacent to buildings located on the same premises and under the same management provided the provisions of subdivisions (A) and (B) of this subdivision are complied with.

(A) (Reserved)

(B) Where quantity stored exceeds 1,100 gallons, or provisions of subdivision (A) of this subdivision cannot be met, a minimum distance of 10 feet between buildings and nearest container of flammable liquid shall be maintained.

(iii) Spill containment. The storage area shall be graded in a manner to divert possible spills away from buildings or other exposures or shall be surrounded by a curb at least 6 inches high. When curbs are used, provisions shall be made for draining of accumulations of ground or rainwater or spills of flammable liquids. Drains shall terminate at a safe location and shall be accessible to operation under fire conditions.

(iv) Security. The storage area shall be protected against tampering or trespassers where necessary and shall be kept free of weeds, debris and other combustible material not necessary to the storage.

(7) Fire control.

(i) Extinguishers. Suitable fire control devices, such as small hose or portable fire extinguishers, shall be available at locations where flammable liquids are stored.

Table H-17 – Outdoor Portable Tank Storage

1 –	2 – Maximum per pile	3 – Distance between piles	4 – Distance to property line that can be built upon	5 – Distance to street, alley, public way
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Category	gallons	feet	feet	feet
1	2,200	5	20	10
2	4,400	5	20	10
3 FP<100 F	8,800	5	20	10
3 FP≥100 F	17,600	5	10	5
4	44,000	5	10	5

Note 1: When 2 or more categories of materials are stored in a single pile, the maximum gallonage in that pile shall be the smallest of the 2 or more separate gallonages.

Note 2: Within 200 feet of each container, there shall be a 12-foot wide access way to permit approach of fire control apparatus.

Note 3: The distances listed apply to properties that have protection for exposures as defined. If there are exposures, and such protection for exposures does not exist, the distances in column 4 shall be doubled.

Note 4: When total quantity stored does not exceed 50 percent of maximum per pile, the distances in columns 4 and 5 may be reduced 50 percent, but not less than 3 feet.

Note 5: FP means flashpoint.

(A) At least one portable fire extinguisher having a rating of not less than 12-B units shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage.

(B) At least one portable fire extinguisher having a rating of not less than 12-B units must be located not less than 10 feet, nor more than 25 feet, from any Category 1, 2 or 3 flammable liquid storage area located outside of a storage room but inside a building.

(ii) Sprinklers. When sprinklers are provided, they shall be installed in accordance with 1910.159.

(iii) Open flames and smoking. Open flames and smoking shall not be permitted in flammable liquid storage areas.

(iv) Water reactive materials. Materials which will react with water shall not be stored in the same room with flammable liquids.

(e) Industrial plants.

(1) Scope.

(i) Application. This paragraph shall apply to those industrial plants where:

(A) The use of flammable liquids is incidental to the principal business, or

(B) Where flammable liquids are handled or used only in unit physical operations such as mixing, drying, evaporating, filtering, distillation, and similar operations which do not involve chemical reaction. This paragraph shall not apply to chemical plants, refineries or distilleries.

(ii) Exceptions. Where portions of such plants involve chemical reactions such as oxidation, reduction, halogenation, hydrogenation, alkylation, polymerization, and other chemical processes, those portions of the plant shall be in accordance with paragraph (h) of this section.

(2) Incidental storage or use of flammable liquids.

(i) Application. This subparagraph shall be applicable to those portions of an industrial plant where the use and handling of flammable liquids is only incidental to the principal business, such as automobile assembly, construction of electronic equipment, furniture manufacturing, or other similar activities.

(ii) Containers. Flammable liquids shall be stored in tanks or closed containers.

(A) Except as provided in subdivisions (B) and (C) of this subdivision, all storage shall comply with paragraph (d)(3) or (4) of this section.

(B) The quantity of liquid that may be located outside of an inside storage room or storage cabinet in a building or in any one fire area of a building shall not exceed:

(1) 25 gallons of Category 1 flammable liquids in containers

(2) 120 gallons of Category 2, 3, or 4 flammable liquids in containers

(3) 660 gallons of Category 2, 3, or 4 flammable liquids in a single portable tank.

(C) Where large quantities of flammable liquids are necessary, storage may be in tanks which shall comply with the applicable requirements of paragraph (b) of this section.

(iii) Separation and protection. Areas in which flammable liquids are transferred from one tank or container to another container shall be separated from other operations in the building by adequate distance or by construction having adequate fire resistance. Drainage or other means shall be provided to control spills. Adequate natural or mechanical ventilation shall be provided.

(iv) Handling liquids at point of final use.

(A) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be kept in covered containers when not actually in use.

(B) Where flammable liquids are used or handled, except in closed containers, means shall be provided to dispose promptly and safely of leakage or spills.

(C) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), may be used only where there are no open flames or other sources of ignition within the possible path of vapor travel.

(D) Flammable liquids shall be drawn from or transferred into vessels, containers, or portable tanks within a building only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container or portable tanks by gravity through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks shall be prohibited.

(3) Unit physical operations.

(i) Application. This subparagraph shall be applicable in those portions of industrial plants where flammable liquids are handled or used in unit physical operations such as mixing, drying, evaporating, filtering, distillation, and similar operations which do not involve chemical change. Examples are plants compounding cosmetics, pharmaceuticals, solvents, cleaning fluids, insecticides, and similar types of activities.

(ii) Location. Industrial plants shall be located so that each building or unit of equipment is accessible from at least one side for fire-fighting and fire control purposes. Buildings shall be located with respect to lines of adjoining property which may be built upon as set forth in paragraph (h)(2)(i) and (ii) of this section except that the blank wall referred to in paragraph (h)(2)(ii) of this section shall have a fire resistance rating of at least 2 hours.

(iii) Chemical processes. Areas where unstable liquids are handled or small scale unit chemical processes are carried on shall be separated from the remainder of the plant by a fire wall of 2-hour minimum fire resistance rating.

(iv) Drainage.

(A) Emergency drainage systems shall be provided to direct flammable liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage systems to control the spread of fire; see paragraph (b)(2)(vii)(B) of this section.

(B) Emergency drainage systems, if connected to public sewers or discharged into public waterways, shall be equipped with traps or separator.

(v) Ventilation.

(A) Areas as defined in paragraph (e)(3)(i) of this section using Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be ventilated at a rate of not less than 1 cubic foot per minute per square foot of solid floor area. This shall be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building. Provision shall be made for introduction of makeup air in such a manner as not to short circuit the ventilation. Ventilation shall be arranged to include all floor areas or pits where flammable vapors may collect.

(B) Equipment used in a building and the ventilation of the building shall be designed so as to limit flammable vapor-air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), to the air. Examples of such equipment are dispensing stations, open centrifuges, plate and frame filters, open vacuum filters, and surfaces of open equipment.

(vi) Storage and handling. The storage, transfer, and handling of liquid shall comply with paragraph (h)(4) of this section.

(4) Tank vehicle and tank car loading and unloading.

(i) Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property

which may be built upon by a distance of 25 feet for Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), and 15 feet for Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids, measured from the nearest position of any fill stem. Buildings for pumps or shelters for personnel may be a part of the facility. Operations of the facility shall comply with the appropriate portions of paragraph (f)(3) of this section.

(ii) (Reserved)

(5) Fire control.

(i) Portable and special equipment. Portable fire extinguishment and control equipment shall be provided in such quantities and types as are needed for the special hazards of operation and storage.

(ii) Water supply. Water shall be available in volume and at adequate pressure to supply water hose streams, foam-producing equipment, automatic sprinklers, or water spray systems as the need is indicated by the special hazards of operation, dispensing and storage.

(iii) Special extinguishers. Special extinguishing equipment such as that utilizing foam, inert gas, or dry chemical shall be provided as the need is indicated by the special hazards of operation dispensing and storage.

(iv) Special hazards. Where the need is indicated by special hazards of operation, flammable liquid processing equipment, major piping, and supporting steel shall be protected by approved water spray systems, deluge systems, approved fire-resistant coatings, insulation, or any combination of these.

(v) Maintenance. All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition, and they will serve their purpose in time of emergency.

(6) Sources of ignition.

(i) General. Adequate precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

(ii) Grounding. Category 1 or 2 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be dispensed into containers unless the nozzle and container are electrically interconnected. Where the metallic floorplate on which the container stands while filling is electrically connected to the fill stem or where the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section shall be deemed to have been complied with.

(7) Electrical.

(i) Equipment.

(A) All electrical wiring and equipment shall be installed according to the requirements of Subpart S of this part.

(B) Locations where flammable vapor-air mixtures may exist under normal operations shall be classified Class I, Division 1 according to the requirements of Subpart S of this part. For those pieces of equipment installed in accordance with subparagraph (3)(v)(B) of this paragraph, the Division 1 area shall extend 5 feet in all directions from all points of vapor liberation. All areas within pits shall be classified Division 1 if any part of the pit is within a Division 1 or 2 classified area, unless the pit is provided with mechanical ventilation.

(C) Locations where flammable vapor-air mixtures may exist under abnormal conditions and for a distance beyond Division 1 locations shall be classified Division 2 according to the requirements of Subpart S of this part. These locations include an area within 20 feet horizontally, 3 feet vertically beyond a Division 1 area, and up to 3 feet above floor or grade level within 25 feet, if indoors, or 10 feet if outdoors, from any pump, bleeder, withdrawal fitting, meter, or similar device handling Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C). Pits provided with adequate mechanical ventilation within a Division 1 or 2 area shall be classified Division 2. If only Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids are handled, then ordinary electrical equipment is satisfactory though care shall be used in locating electrical apparatus to prevent hot metal from falling into open equipment.

(D) Where the provisions of subdivisions (A), (B), and (C), of this subdivision require the installation of electrical equipment suitable for Class I, Division 1 or Division 2 locations, ordinary electrical equipment including switch-gear may be used if installed in a room or enclosure which is maintained under positive pressure with respect to the hazardous area. Ventilation makeup air shall be uncontaminated by flammable vapors.

(8) Repairs to equipment. Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in responsible charge. The individual in responsible charge shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

(9) Housekeeping.

(i) General. Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable liquids. Spills shall be cleaned up promptly.

(ii) Access. Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of flammable liquid storage, use, or any unit physical operation.

(iii) Waste and residue. Combustible waste material and residues in a building or unit operating area shall be kept to a minimum, stored in covered metal receptacles and disposed of daily.

(iv) Clear zone. Ground area around buildings and unit operating areas shall be kept free of weeds, trash, or other unnecessary combustible materials.

(f) Bulk plants.

(1) Storage.

(i) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C). Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be stored in closed containers, or in storage tanks aboveground outside of buildings, or underground in accordance with paragraph (b) of this section.

(ii) Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids. Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids shall be stored in containers, or in tanks within buildings or aboveground outside of buildings, or underground in accordance with paragraph (b) of this section.

(iii) Piling containers. Containers of flammable liquids when piled one upon the other shall be separated by dunnage sufficient to provide stability and to prevent excessive stress on container walls. The height of the pile shall be consistent with the stability and strength of containers.

(2) Buildings.

(i) Exits. Rooms in which flammable liquids are stored or handled by pumps shall have exit facilities arranged to prevent occupants from being trapped in the event of fire.

(ii) Heating. Rooms in which Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are stored or handled shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

(iii) Ventilation.

(A) Ventilation shall be provided for all rooms, buildings, or enclosures in which Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are pumped or dispensed. Design of ventilation systems shall take into account the relatively high specific gravity of the vapors. Ventilation may be provided by adequate openings in outside walls at floor level unobstructed except by louvers or coarse screens. Where natural ventilation is inadequate, mechanical ventilation shall be provided.

(B) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

(C) Containers of Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be drawn from or filled within buildings unless provision is made to prevent the accumulation of flammable vapors in hazardous concentrations. Where mechanical ventilation is required, it shall be kept in operation while flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C) are being handled.

(3) Loading and unloading facilities.

(i) Separation. Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings or nearest line of adjoining property that may be built upon by a distance of 25 feet for Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C) and 15 feet for Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids measured from the nearest position of any fill spout. Buildings for pumps or shelters for personnel may be a part of the facility.

(ii) Category restriction. Equipment such as piping, pumps, and meters used for the transfer of Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C) between storage tanks and the fill stem of the loading rack shall not be used for the transfer of Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids.

(iii) Valves. Valves used for the final control for filling tank vehicles shall be of the self-closing type and manually held open except where automatic means are provided for shutting off the flow when the vehicle is full or after filling of a preset amount.

(iv) Static protection.

(A) Bonding facilities for protection against static sparks during the loading of tank vehicles through open domes shall be provided:

(1) Where Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are loaded, or

(2) Where Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids are loaded into vehicles which may contain vapors from previous cargoes of Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C).

(B) Protection as required in (A) of this subdivision (iv) shall consist of a metallic bond wire permanently electrically connected to the fill stem or to some part of the rack structure in electrical contact with the fill stem. The free end of such wire shall be provided with a clamp

or equivalent device for convenient attachment to some metallic part in electrical contact with the cargo tank of the tank vehicle.

(C) Such bonding connection shall be made fast to the vehicle or tank before dome covers are raised and shall remain in place until filling is completed and all dome covers have been closed and secured.

(D) Bonding as specified in (A), (B), and (C) of this subdivision is not required:

(1) Where vehicles are loaded exclusively with products not having a static accumulating tendency, such as asphalt, most crude oils, residual oils, and water soluble liquids;

(2) Where no Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are handled at the loading facility and the tank vehicles loaded are used exclusively for Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids; and

(3) Where vehicles are loaded or unloaded through closed bottom or top connections.

(E) Filling through open domes into the tanks of tank vehicles or tank cars, that contain vapor-air mixtures within the flammable range or where the liquid being filled can form such a mixture, shall be by means of a downspout which extends near the bottom of the tank. This precaution is not required when loading liquids which are nonaccumulators of static charges.

(v) Stray currents. Tank car loading facilities where Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are loaded through open domes shall be protected against stray currents by bonding the pipe to at least one rail and to the rack structure if of metal. Multiple lines entering the rack area shall be electrically bonded together. In addition, in areas where excessive stray currents are known to exist, all pipe entering the rack area shall be provided with insulating sections to electrically isolate the rack piping from the pipelines. No bonding between the tank car and the rack or piping is required during either loading or unloading of Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids.

(vi) Container filling facilities. Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be dispensed into containers unless the nozzle and container are electrically interconnected. Where the metallic floorplate on which the container stands while filling is electrically connected to the fill stem or where the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section shall be deemed to have been complied with.

(4) Wharves.

(i) Definition, application. The term wharf shall mean any wharf, pier, bulkhead, or other structure over or contiguous to navigable water used in conjunction with a bulk plant, the primary function of which is the transfer of flammable liquid cargo in bulk between the bulk plant and any tank vessel, ship, barge, lighter boat, or other mobile floating craft; and this

subparagraph shall apply to all such installations except Marine Service Stations as covered in paragraph (g) of this section.

(ii) (Reserved)

(iii) (Reserved)

(iv) Design and construction. Substructure and deck shall be substantially designed for the use intended. Deck may employ any material which will afford the desired combination of flexibility, resistance to shock, durability, strength, and fire resistance. Heavy timber construction is acceptable.

(v) (Reserved)

(vi) Pumps. Loading pumps capable of building up pressures in excess of the safe working pressure of cargo hose or loading arms shall be provided with bypasses, relief valves, or other arrangement to protect the loading facilities against excessive pressure. Relief devices shall be tested at not more than yearly intervals to determine that they function satisfactorily at the pressure at which they are set.

(vii) Hoses and couplings. All pressure hoses and couplings shall be inspected at intervals appropriate to the service. The hose and couplings shall be tested with the hose extended and using the "in-service maximum operating pressures." Any hose showing material deteriorations, signs of leakage, or weakness in its carcass or at the couplings shall be withdrawn from service and repaired or discarded.

(viii) Piping and fittings. Piping, valves, and fittings shall be in accordance with paragraph (c) of this section, with the following exceptions and additions:

(A) Flexibility of piping shall be assured by appropriate layout and arrangement of piping supports so that motion of the wharf structure resulting from wave action, currents, tides, or the mooring of vessels will not subject the pipe to repeated strain beyond the elastic limit.

(B) Pipe joints depending upon the friction characteristics of combustible materials or grooving of pipe ends for mechanical continuity of piping shall not be used.

(C) Swivel joints may be used in piping to which hoses are connected, and for articulated swivel-joint transfer systems, provided that the design is such that the mechanical strength of the joint will not be impaired if the packing material should fail, as by exposure to fire.

(D) Piping systems shall contain a sufficient number of valves to operate the system properly and to control the flow of liquid in normal operation and in the event of physical damage.

(E) In addition to the requirements of paragraph (f)(4)(viii)(D) of this section, each line conveying Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), leading to a wharf shall be provided with a readily accessible block valve located on shore near the approach to the wharf and outside

of any diked area. Where more than one line is involved, the valves shall be grouped in one location.

(F) Means of easy access shall be provided for cargo line valves located below the wharf deck.

(G) Pipelines on flammable liquids wharves shall be adequately bonded and grounded. If excessive stray currents are encountered, insulating joints shall be installed. Bonding and grounding connections on all pipelines shall be located on wharfside of hose-riser insulating flanges, if used, and shall be accessible for inspection.

(H) Hose or articulated swivel-joint pipe connections used for cargo transfer shall be capable of accommodating the combined effects of change in draft and maximum tidal range, and mooring lines shall be kept adjusted to prevent the surge of the vessel from placing stress on the cargo transfer system.

(I) Hose shall be supported so as to avoid kinking and damage from chafing.

(ix) Fire protection. Suitable portable fire extinguishers with a rating of not less than 12-BC shall be located within 75 feet of those portions of the facility where fires are likely to occur, such as hose connections, pumps, and separator tanks.

(A) Where piped water is available, ready-connected fire hose in size appropriate for the water supply shall be provided so that manifolds where connections are made and broken can be reached by at least one hose stream.

(B) Material shall not be placed on wharves in such a manner as to obstruct access to firefighting equipment, or important pipeline control valves.

(C) Where the wharf is accessible to vehicle traffic, an unobstructed roadway to the shore end of the wharf shall be maintained for access of firefighting apparatus.

(x) Operations control. Loading or discharging shall not commence until the wharf superintendent and officer in charge of the tank vessel agree that the tank vessel is properly moored and all connections are properly made. Mechanical work shall not be performed on the wharf during cargo transfer, except under special authorization based on a review of the area involved, methods to be employed, and precautions necessary.

(5) Electrical equipment.

(i) Application. This paragraph (f)(5)(i) shall apply to areas where Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), stored or handled. For areas where only Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids are stored or handled, the electrical equipment may be installed in accordance with the provisions of Subpart S of this part, for ordinary locations.

(ii) Conformance. All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with Subpart S of this part.

(iii) Classification. So far as it applies Table H-18 shall be used to delineate and classify hazardous areas for the purpose of installation of electrical equipment under normal circumstances. In Table H-18 a classified area shall not extend beyond an unpierced wall, roof, or other solid partition. The area classifications listed shall be based on the premise that the installation meets the applicable requirements of this section in all respects.

(6) Sources of ignition. Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be handled, drawn, or dispensed where flammable vapors may reach a source of ignition. Smoking shall be prohibited except in designated localities. "No Smoking" signs shall be conspicuously posted where hazard from flammable liquid vapors is normally present.

(7) Drainage and waste disposal. Provision shall be made to prevent flammable liquids which may be spilled at loading or unloading points from entering public sewers and drainage systems, or natural waterways. Connection to such sewers, drains, or waterways by which flammable liquids might enter shall be provided with separator boxes or other approved means whereby such entry is precluded. Crankcase drainings and flammable liquids shall not be dumped into sewers, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

(8) Fire control. Suitable fire-control devices, such as small hose or portable fire extinguishers, shall be available to locations where fires are likely to occur. Additional fire-control equipment may be required where a tank of more than 50,000 gallons individual capacity contains Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), and where an unusual exposure hazard exists from surrounding property. Such additional fire-control equipment shall be sufficient to extinguish a fire in the largest tank. The design and amount of such equipment shall be in accordance with approved engineering standards.

(g) Service stations.

(1) Storage and handling.

(i) General provisions.

(A) Liquids shall be stored in approved closed containers not exceeding 60 gallons capacity, in tanks located underground, in tanks in special enclosures as described in paragraph (g)(1)(i) of this section, or in aboveground tanks as provided for in paragraphs (g)(4)(ii), (B), (C) and (D) of this section.

(B) Aboveground tanks, located in an adjoining bulk plant, may be connected by piping to service station underground tanks if, in addition to valves at aboveground tanks, a valve is also installed within control of service station personnel.

(C) Apparatus dispensing Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), into the fuel tanks of motor vehicles of the public shall not be located at a bulk plant unless separated by a fence or similar barrier from the area in which bulk operations are conducted.

(D) (Reserved)

(E) The provisions of paragraph (g)(1)(i)(A) of this section shall not prohibit the dispensing of flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C) in the open from a tank vehicle to a motor vehicle. Such dispensing shall be permitted provided:

(1) The tank vehicle complies with the requirements covered in the Standard on Tank Vehicles for Flammable Liquids, NFPA 385-1966.

(2) The dispensing is done on premises not open to the public.

(3) (Reserved)

(4) The dispensing hose does not exceed 50 feet in length.

(5) The dispensing nozzle is a listed automatic-closing type without a latch-open device.

Table H-18 – Electrical Equipment Hazardous Areas – Bulk Plants

Location	Class I Group D division	Extent of classified area
Tank vehicle and tank car: ¹		
Loading through open dome	1	Within 3 feet of edge of dome, extending in all directions.
	2	Area between 3 feet and 5 feet from edge of dome, extending in all directions.
Loading through bottom connections with atmospheric venting	1	Within 3 feet of point of venting to atmosphere extending in all directions.
	2	Area between 3 feet and 5 feet from point of venting to atmosphere, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of loading connection.
Loading through closed dome with atmospheric venting	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet from open end of vent, extending in all directions. Also within 3 feet of edge of dome, extending in all directions.
Loading through closed dome with vapor recovery	2	Within 3 feet of point of connection of both fill and vapor lines, extending in all directions.
Bottom loading with vapor recovery or any bottom unloading	2	Within 3 feet of point of connections extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of connection.
Drum and container filling: Outdoors, or indoors with adequate ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent or fill opening, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
Tank – Aboveground: Shell, ends, or roof and dike area	2	Within 10 feet from shell, ends, or roof of tank. Area inside dikes to level of top of dike.
Vent	1	Within 5 feet of open end of vent, extending in all directions.

	2	Area between 5 feet and 10 feet from open end of vent, extending in all directions.
Floating roof	1	Area above the roof and within the shell.

(Continued on next page)

Table H-18 – Electrical Equipment Hazardous Areas – Bulk Plants (Continued)

Location	Class I Group D division	Extent of classified area
Pits:		
Without mechanical ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classification area.
With mechanical ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
Containing valves, fittings or piping, and Not within a Division 1 or 2 classified area.	2	Entire pit.
Pumps, bleeders, withdrawal fittings, meters and similar devices:		
Indoors	2	Within 5 feet of any edge of such devices, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoors	2	Within 3 feet of any edge of such devices, extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of such devices.
Storage and repair garage for tank vehicles	1	All pits or spaces below floor level.
	2	Area up to 18 inches above floor or grade level for entire storage or repair garage.
Drainage ditches, separators, impounding basins	2	Area up to 18 inches above ditch, separator or basin. Also up to 18 inches above grade within 15 feet horizontally from any edge.
Garages for other than tank vehicles	(²)	If there is any opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classification at the point of the opening.
Outdoor drum storage	(²)	
Indoor warehousing where there is no flammable liquid transfer	(²)	If there is any opening to these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exist.
Office and rest rooms	(²)	

¹ When classifying the extent of the area, consideration shall be given to the fact that tank cars or tank vehicles may be spotted at varying points. Therefore, the extremities of the loading or unloading positions shall be used.

² Ordinary.

(F) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

(G) (Reserved)

(ii) Special enclosures.

(A) When installation of tanks in accordance with paragraph (b)(3) of this section is impractical because of property or building limitations, tanks for flammable liquids may be installed in buildings if properly enclosed.

(B) The enclosure shall be substantially liquid and vapor-tight without backfill. Sides, top, and bottom of the enclosure shall be of reinforced concrete at least 6 inches thick, with openings for inspection through the top only. Tank connections shall be so piped or closed that neither vapors nor liquid can escape into the enclosed space. Means shall be provided whereby portable equipment may be employed to discharge to the outside any liquid or vapors which might accumulate should leakage occur.

(iii) Inside buildings.

(A) Except where stored in tanks as provided in paragraph (g)(1)(ii) of this section, no Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be stored within any service station building except in closed containers of aggregate capacity not exceeding 60 gallons. One container not exceeding 60 gallons capacity equipped with an approved pump is permitted.

(B) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), may be transferred from one container to another in lubrication or service rooms of a service station building provided the electrical installation complies with Table H-19 and provided that any heating equipment complies with subparagraph (g)(6) of this paragraph.

(C) Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids may be stored and dispensed inside service station buildings from tanks of not more than 120 gallons capacity each.

(iv) (Reserved)

(v) Dispensing into portable containers. No delivery of any Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be made into portable containers unless the container is constructed of metal, has a tight closure with screwed or spring cover, and is fitted with a spout or so designed that the contents can be poured without spilling.

(2) (Reserved)

(3) Dispensing systems.

(i) Location. Dispensing devices at automotive service stations shall be so located that all parts of the vehicle being served will be on the premises of the service station.

(ii) Inside location. Approved dispensing units may be located inside of buildings. The dispensing area shall be separated from other areas in an approved manner. The dispensing unit and its piping shall be mounted either on a concrete island or protected against collision damage by suitable means and shall be located in a position where it cannot be struck by a vehicle descending a ramp or other slope out of control. The

dispensing area shall be provided with an approved mechanical or gravity ventilation system. When dispensing units are located below grade, only approved mechanical ventilation shall be used and the entire dispensing area shall be protected by an approved automatic sprinkler system. Ventilating systems shall be electrically interlocked with gasoline dispensing units so that the dispensing units cannot be operated unless the ventilating fan motors are energized.

(iii) Emergency power cutoff. A clearly identified and easily accessible switch(es) or a circuit breaker(s) shall be provided at a location remote from dispensing devices, including remote pumping systems, to shut off the power to all dispensing devices in the event of an emergency.

(iv) Dispensing units.

(A) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be transferred from tanks by means of fixed pumps so designed and equipped as to allow control of the flow and to prevent leakage or accidental discharge.

(B)

(1) Only listed devices may be used for dispensing Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C). No such device may be used if it shows evidence of having been dismantled.

(2) Every dispensing device for Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), installed after December 31, 1978, shall contain evidence of listing so placed that any attempt to dismantle the device will result in damage to such evidence, visible without disassembly or dismounting of the nozzle.

(C) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be dispensed by pressure from drums, barrels, and similar containers. Approved pumps taking suction through the top of the container or approved self-closing faucets shall be used.

(D) The dispensing units, except those attached to containers, shall be mounted either on a concrete island or protected against collision damage by suitable means.

(v) Remote pumping systems.

(A) This paragraph (g)(3)(v) shall apply to systems for dispensing Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), where such liquids are transferred from storage to individual or multiple dispensing units by pumps located elsewhere than at the dispensing units.

(B) Pumps shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure. Pumps installed above grade, outside of buildings, shall be located not less than 10 feet from lines of adjoining property which may be built upon, and not less than 5 feet from any building opening. When an outside pump

location is impractical, pumps may be installed inside of buildings, as provided for dispensers in subdivision (ii) of this subparagraph, or in pits as provided in subdivision (C) of this subdivision. Pumps shall be substantially anchored and protected against physical damage by vehicles.

(C) Pits for subsurface pumps or piping manifolds of submersible pumps shall withstand the external forces to which they may be subjected without damage to the pump, tank, or piping. The pit shall be no larger than necessary for inspection and maintenance and shall be provided with a fitted cover.

(D) A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket on the dispensing unit and the switch on this dispensing unit is manually actuated. This control shall also stop the pump when all nozzles have been returned to their brackets.

(E) An approved impact valve, incorporating a fusible link, designed to close automatically in the event of severe impact or fire exposure shall be properly installed in the dispensing supply line at the base of each individual dispensing device.

(F) Testing. After the completion of the installation, including any paving, that section of the pressure piping system between the pump discharge and the connection for the dispensing facility shall be tested for at least 30 minutes at the maximum operating pressure of the system. Such tests shall be repeated at 5 year intervals thereafter.

(vi) Delivery nozzles.

(A) A listed manual or automatic-closing type hose nozzle valve shall be provided on dispensers used for the dispensing of Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C).

(B) Manual-closing type valves shall be held open manually during dispensing. Automatic-closing type valves may be used in conjunction with an approved latch-open device.

(4) Marine service stations.

(i) Dispensing.

(A) The dispensing area shall be located away from other structures so as to provide room for safe ingress and egress of craft to be fueled. Dispensing units shall in all cases be at least 20 feet from any activity involving fixed sources of ignition.

(B) Dispensing shall be by approved dispensing units with or without integral pumps and may be located on open piers, wharves, or floating docks or on shore or on piers of the solid fill type.

(C) Dispensing nozzles shall be automatic-closing without a hold-open latch.

(ii) Tanks and pumps.

(A) Tanks, and pumps not integral with the dispensing unit, shall be on shore or on a pier of the solid fill type, except as provided in paragraphs (g)(4)(ii)(B) and (C) of this section.

(B) Where shore location would require excessively long supply lines to dispensers, tanks may be installed on a pier provided that applicable portions of paragraph (b) of this section relative to spacing, diking, and piping are complied with and the quantity so stored does not exceed 1,100 gallons aggregate capacity.

Table H-19 – Electrical Equipment Hazardous Areas – Service Stations

Location	Class I Group D division	Extent of classified area
Underground tank: Fill opening	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose fill connection and within a horizontal radius of 5 feet from a tight fill connection.
Vent – Discharging upward	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
Dispenser: Pits	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
Dispenser enclosure	1	The area 4 feet vertically above base within the enclosure and 18 inches horizontally in all directions.
Outdoor	2	Up to 18 inches above grade level within 20 feet horizontally of any edge of enclosure.

(Continued on next page)

Table H-19 – Electrical Equipment Hazardous Areas – Service Stations (Continued)

Location	Class I Group D division	Extent of classified area
Indoor: With mechanical ventilation	2	Up to 18 inches above grade or floor level within 20 feet horizontally of any edge of enclosure.
With gravity ventilation	2	Up to 18 inches above grade or floor level within 25 feet horizontally of any edge of enclosure.
Remote pump – Outdoor	1	Any pit, box or space below grade level if any part is within a horizontal distance of 10 feet from any edge of pump.
	2	Within 3 feet of any edge of pump, extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of pump.
Remote pump – Indoor	1	Entire area within any pit.
	2	Within 5 feet of any edge of pump, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of pump.
Lubrication or service room	1	Entire area within any pit.
	2	Area up to 18 inches above floor or grade level within entire lubrication room.

Dispenser for liquids with a flashpoint below 100 degrees F (37.8 degrees C) ⁽¹⁾	2	Within 3 feet of any fill or dispensing point, extending in all directions.
Special enclosure inside building per §1910.106 (f)(1)(ii)		
	1	Entire enclosure.
Sales, storage and rest rooms	(2)	If there is any opening to these rooms within the extent of a Division 1 area, the entire room shall be classified as Division 1.

¹ Category 1 or 2 flammable liquids, or for Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C).

² Ordinary.

(C) Shore tanks supplying marine service stations may be located aboveground, where rock ledges or high water table make underground tanks impractical.

(D) Where tanks are at an elevation which would produce gravity head on the dispensing unit, the tank outlet shall be equipped with a pressure control valve positioned adjacent to and outside the tank block valve specified in paragraph (b)(2)(ix)(B) of this section, so adjusted that liquid cannot flow by gravity from the tank in case of piping or hose failure.

(iii) Piping.

(A) Piping between shore tanks and dispensing units shall be as described in paragraph (C) of this section, except that, where dispensing is from a floating structure, suitable lengths of oil-resistant flexible hose may be employed between the shore piping and the piping on the floating structure as made necessary by change in water level or shoreline.

(B) A readily accessible valve to shut off the supply from shore shall be provided in each pipeline at or near the approach to the pier and at the shore end of each pipeline adjacent to the point where flexible hose is attached.

(C) Piping shall be located so as to be protected from physical damage.

(D) Piping handling Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall be grounded to control stray currents.

(5) Electrical equipment.

(i) Application. This subparagraph (g)(5) shall apply to areas where Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are stored or handled. For areas where Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids are stored or handled the electrical equipment may be installed in accordance with the provisions of Subpart S of this part, for ordinary locations.

(ii) All electrical equipment and wiring shall be of a type specified by and shall be installed in accordance with Subpart S of this part.

(iii) So far as it applies. Table H-19 shall be used to delineate and classify hazardous areas for the purpose of installation of electrical equipment under normal circumstances. A classified area shall not extend beyond an unpierced wall, roof, or other solid partition.

(iv) The area classifications listed shall be based on the assumption that the installation meets the applicable requirements of this section in all respects.

(6) Heating equipment.

(i) Conformance. Heating equipment shall be installed as provided in paragraphs (g)(6)(ii) through (v) of this section.

(ii) Application. Heating equipment may be installed in the conventional manner in an area except as provided in paragraph (g)(6)(iii), (iv), or (v) of this section.

(iii) Special room. Heating equipment may be installed in a special room separated from an area classified by Table H-19 by walls having a fire resistance rating of at least 1-hour and without any openings in the walls within 8 feet of the floor into an area classified in Table H-19. This room shall not be used for combustible storage and all air for combustion purposes shall come from outside the building.

(iv) Work areas. Heating equipment using gas or oil fuel may be installed in the lubrication, sales, or service room where there is no dispensing or transferring of Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), provided the bottom of the combustion chamber is at least 18 inches above the floor and the heating equipment is protected from physical damage by vehicles. Heating equipment using gas or oil fuel listed for use in garages may be installed in the lubrication or service room where Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are dispensed provided the equipment is installed at least 8 feet above the floor.

(v) Electric heat. Electrical heating equipment shall conform to paragraph (g)(5) of this section.

(7) Drainage and waste disposal. Provision shall be made in the area where Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), are dispensed to prevent spilled liquids from flowing into the interior of service station buildings. Such provision may be by grading driveways, raising door sills, or other equally effective means. Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers but shall be stored in tanks or drums outside of any building until removed from the premises.

(8) Sources of ignition. In addition to the previous restrictions of this paragraph, the following shall apply: There shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids. Conspicuous and legible signs prohibiting smoking shall be posted within sight of the customer being served. The motors of all equipment being fueled shall be shut off during the fueling operation.

(9) Fire control. Each service station shall be provided with at least one fire extinguisher having a minimum approved classification of 6 B, C, located so that an extinguisher, will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service room.

(h) Processing plants.

(1) Scope. This paragraph shall apply to those plants or buildings which contain chemical operations such as oxidation, reduction, halogenation, hydrogenation, alkylation, polymerization, and other chemical processes but shall not apply to chemical plants, refineries or distilleries.

(2) Location.

(i) Classification. The location of each processing vessel shall be based upon its flammable liquid capacity.

(ii) (Reserved)

(3) Processing building.

(i) Construction.

(A) Processing buildings shall be of fire-resistance or noncombustible construction, except heavy timber construction with load-bearing walls may be permitted for plants utilizing only stable Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids. Except as provided in paragraph (h)(2)(ii) of this section or in the case of explosion resistant walls used in conjunction with explosion relieving facilities, see paragraph (h)(3)(iv) of this section, load-bearing walls are prohibited. Buildings shall be without basements or covered pits.

(B) Areas shall have adequate exit facilities arranged to prevent occupants from being trapped in the event of fire. Exits shall not be exposed by the drainage facilities described in paragraph (h)(3)(ii) of this section.

(ii) Drainage.

(A) Emergency drainage systems shall be provided to direct flammable liquid leakage and fire protection water to a safe location. This may require curbs, scuppers, or special drainage systems to control the spread of fire, see paragraph (b)(2)(vii)(B) of this section.

(B) Emergency drainage systems, if connected to public sewers or discharged into public waterways, shall be equipped with traps or separators.

(iii) Ventilation.

(A) Enclosed processing buildings shall be ventilated at a rate of not less than 1 cubic foot per minute per square foot of solid floor area. This shall be accomplished by natural or mechanical ventilation with discharge or exhaust to a safe location outside of the building.

Provisions shall be made for introduction of makeup air in such a manner as not to short circuit the ventilation. Ventilation shall be arranged to include all floor areas or pits where flammable vapors may collect.

(B) Equipment used in a building and the ventilation of the building shall be designed so as to limit flammable vapor-air mixtures under normal operating conditions to the interior of equipment, and to not more than 5 feet from equipment which exposes Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), to the air. Examples of such equipment are dispensing stations, open centrifuges, plate and frame filters, open vacuum filters, and surfaces of open equipment.

(iv) Explosion relief. Areas where Category 1 or unstable liquids are processed shall have explosion venting through one or more of the following methods:

(A) Open air construction.

(B) Lightweight walls and roof.

(C) Lightweight wall panels and roof hatches.

(D) Windows of explosion venting type.

(4) Liquid handling.

(i) Storage.

(A) The storage of flammable liquids in tanks shall be in accordance with the applicable provisions of paragraph (b) of this section.

(B) If the storage of flammable liquids in outside aboveground or underground tanks is not practical because of temperature or production considerations, tanks may be permitted inside of buildings or structures in accordance with the applicable provisions of paragraph (b) of this section.

(C) Storage tanks inside of buildings shall be permitted only in areas at or above grade which have adequate drainage and are separated from the processing area by construction having a fire resistance rating of at least 2 hours.

(D) The storage of flammable liquids in containers shall be in accordance with the applicable provisions of paragraph (d) of this section.

(ii) Piping, valves, and fittings.

(A) Piping, valves, and fittings shall be in accordance with paragraph (c) of this section.

(B) Approved flexible connectors may be used where vibration exists or where frequent movement is necessary. Approved hose may be used at transfer stations.

(C) Piping containing flammable liquids shall be identified.

(iii) Transfer.

(A) The transfer of large quantities of flammable liquids shall be through piping by means of pumps or water displacement. Except as required in process equipment, gravity flow shall not be used. The use of compressed air as a transferring medium is prohibited.

(B) Positive displacement pumps shall be provided with pressure relief discharging back to the tank or to pump suction.

(iv) Equipment.

(A) Equipment shall be designed and arranged to prevent the unintentional escape of liquids and vapors and to minimize the quantity escaping in the event of accidental release.

(B) Where the vapor space of equipment is usually within the flammable range, the probability of explosion damage to the equipment can be limited by inerting, by providing an explosion suppression system, or by designing the equipment to contain the peak explosion pressure which may be modified by explosion relief. Where the special hazards of operation, sources of ignition, or exposures indicate a need, consideration shall be given to providing protection by one or more of the above means.

(5) Tank vehicle and tank car loading and unloading. Tank vehicle and tank car loading or unloading facilities shall be separated from aboveground tanks, warehouses, other plant buildings, or nearest line of adjoining property which may be built upon by a distance of 25 feet for Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), and 15 feet for Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) and Category 4 flammable liquids measured from the nearest position of any fill stem. Buildings for pumps or shelters for personnel may be a part of the facility. Operations of the facility shall comply with the appropriate portions of paragraph (f)(3) of this section.

(6) Fire control.

(i) Portable extinguishers. Approved portable fire extinguishers of appropriate size, type, and number shall be provided.

(ii) Other controls. Where the special hazards of operation or exposure indicate a need, the following fire control provision shall be provided.

(A) A reliable water supply shall be available in pressure and quantity adequate to meet the probable fire demands.

(B) Hydrants shall be provided in accordance with accepted good practice.

(C) Hose connected to a source of water shall be installed so that all vessels, pumps, and other equipment containing flammable liquids can be reached with at least one hose stream. Nozzles that are capable of discharging a water spray shall be provided.

(D) Processing plants shall be protected by an approved automatic sprinkler system or equivalent extinguishing system. If special extinguishing systems including but not limited to those employing foam, carbon dioxide, or dry chemical are provided, approved equipment shall be used and installed in an approved manner.

(iii) Alarm systems. An approved means for prompt notification of fire to those within the plant and any public fire department available shall be provided. It may be advisable to connect the plant system with the public system where public fire alarm system is available.

(iv) Maintenance. All plant fire protection facilities shall be adequately maintained and periodically inspected and tested to make sure they are always in satisfactory operating condition and that they will serve their purpose in time of emergency.

(7) Sources of ignition.

(i) General.

(A) Precautions shall be taken to prevent the ignition of flammable vapors. Sources of ignition include but are not limited to open flames; lightning; smoking; cutting and welding; hot surfaces; frictional heat; static, electrical, and mechanical sparks; spontaneous ignition, including heat-producing chemical reactions; and radiant heat.

(B) Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C), shall not be dispensed into containers unless the nozzle and container are electrically interconnected. Where the metallic floorplate on which the container stands while filling is electrically connected to the fill stem or where the fill stem is bonded to the container during filling operations by means of a bond wire, the provisions of this section shall be deemed to have been complied with.

(ii) Maintenance and repair.

(A) When necessary to do maintenance work in a flammable liquid processing area, the work shall be authorized by a responsible representative of the employer.

(B) Hot work, such as welding or cutting operations, use of spark-producing power tools, and chipping operations shall be permitted only under supervision of an individual in responsible charge who shall make an inspection of the area to be sure that it is safe for the work to be done and that safe procedures will be followed for the work specified.

(iii) Electrical.

(A) All electrical wiring and equipment shall be installed in accordance with Subpart S of this part.

(B) Locations where flammable vapor-air mixtures may exist under normal operations shall be classified Class I, Division 1 according to the requirements of Subpart S of this part. For those pieces of equipment installed in accordance with paragraph (h)(3)(iii)(B) of this section, the Division 1 area shall extend 5 feet in all directions from all points of vapor

liberation. All areas within pits shall be classified Division 1 if any part of the pit is within a Division 1 or 2 classified area, unless the pit is provided with mechanical ventilation.

(C) Locations where flammable vapor-air mixtures may exist under abnormal conditions and for a distance beyond Division 1 locations shall be classified Division 2 according to the requirements of Subpart S of this part. These locations include an area within 20 feet horizontally, 3 feet vertically beyond a Division 1 area, and up to 3 feet above floor or grade level within 25 feet, if indoors, or 10 feet if outdoors, from any pump, bleeder, withdrawal fitting, meter, or similar device handling Category 1 or 2 flammable liquids, or Category 3 flammable liquids with a flashpoint below 100 degrees F (37.8 degrees C). Pits provided with adequate mechanical ventilation within a Division 1 or 2 area shall be classified Division 2. If Category 3 flammable liquids with a flashpoint at or above 100 degrees F (37.8 degrees C) or Category 4 flammable liquids only are handled, then ordinary electrical equipment is satisfactory though care shall be used in locating electrical apparatus to prevent hot metal from falling into open equipment.

(D) Where the provisions of paragraphs (h)(7)(iii)(A), (B), and (C) of this section require the installation of explosion-proof equipment, ordinary electrical equipment including switchgear may be used if installed in a room or enclosure which is maintained under positive pressure with respect to the hazardous area. Ventilation makeup air shall be uncontaminated by flammable vapors.

(8) Housekeeping.

(i) General. Maintenance and operating practices shall be in accordance with established procedures which will tend to control leakage and prevent the accidental escape of flammable liquids. Spills shall be cleaned up promptly.

(ii) Access. Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear on any part of the processing equipment.

(iii) Waste and residues. Combustible waste material and residues in a building or operating area shall be kept to a minimum, stored in closed metal waste cans, and disposed of daily.

(iv) Clear zone. Ground area around buildings and operating areas shall be kept free of tall grass, weeds, trash, or other combustible materials.

(i) Refineries, chemical plants, and distilleries.

(1) Storage tanks. Flammable liquids shall be stored in tanks, in containers, or in portable tanks. Tanks shall be installed in accordance with paragraph (b) of this section. Tanks for the storage of flammable liquids in tank farms and in locations other than process areas shall be located in accordance with paragraph (b)(2)(i) and (ii) of this section.

(2) Wharves. Wharves handling flammable liquids shall be in accordance with paragraph (f)(4) of this section.

(3) Fired and unfired pressure vessels.

(i) Fired vessels. Fired pressure vessels shall be constructed in accordance with the Code for Fired Pressure Vessels, Section I of the ASME Boiler and Pressure Vessel Code – 1968.

(ii) Unfired vessels shall be constructed in accordance with the Code for Unfired Pressure Vessels, Section VIII of the ASME Boiler and Pressure Vessel Code – 1968.

(4) Location of process units. Process units shall be located so that they are accessible from at least one side for the purpose of fire control.

(5) Fire control.

(i) Portable equipment. Portable fire extinguishment and control equipment shall be provided in such quantities and types as are needed for the special hazards of operation and storage.

(ii) Water supply. Water shall be available in volume and at adequate pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems as the need is indicated by the special hazards of operation and storage.

(iii) Special equipment. Special extinguishing equipment such as that utilizing foam, inert gas, or dry chemical shall be provided as the need is indicated by the special hazards of operation and storage.

(j) Scope. This section applies to the handling, storage, and use of flammable liquids with a flashpoint at or below 199.4 degrees F (93 degrees C) unless otherwise noted. This section does not apply to:

(1) Bulk transportation of flammable liquids;

(2) Storage, handling, and use of fuel oil tanks and containers connected with oil burning equipment;

(3) Storage of flammable liquids on farms;

(4) Liquids without flashpoints that may be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons;

(5) Mists, sprays, or foams, except flammable aerosols covered in paragraph (d) of this section; or

(6) Installations made in accordance with requirements of the following standards, that are incorporated by reference as specified in 1910.6:

(i) National Fire Protection Association Standard for Drycleaning Plants, NFPA No. 32-1970;

(ii) National Fire Protection Association Standard for the Manufacture of Organic Coatings, NFPA No. 35-1970;

(iii) National Fire Protection Association Standard for Solvent Extraction Plants, NFPA No. 36-1967; or

(iv) National Fire Protection Association Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, NFPA No. 37-1970.

[39 FR 23502, June 27, 1974, as amended at 40 FR 3982, Jan. 27, 1975; 40 FR 23743, June 2, 1975; 43 FR 49746, Oct. 24, 1978; 43 FR 51759, Nov. 7, 1978; 47 FR 39164, Sept. 7, 1982; 51 FR 34560, Sept. 29, 1986; 53 FR 12121, Apr. 12, 1988; 55 FR 32015, Aug. 6, 1990; 61 FR 9237, Mar. 7, 1996; 70 FR 53929, Sept. 13, 2005; 77 FR 17765, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).

Stats. Implemented: ORS 654.001 to 654.295.

Hist: OR-OSHA Admin. Order 2-1992, f. 2/6/92, ef. 5/1/92.

OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.

OR-OSHA Admin. Order 4-2005, f. 12/14/05, ef. 12/14/05.

OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix A to 1910.119 - List of Highly Hazardous Chemicals, Toxics and Reactives
(Mandatory)

This Appendix contains a listing of toxic and reactive highly hazardous chemicals which present a potential for a catastrophic event at or above the threshold quantity.

CHEMICAL NAME	CAS*	TQ**
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Acetaldehyde	75-07-0	2500
Acrolein (2-Propenal)	107-02-8	150
Acrylyl Chloride	814-68-6	250
Allyl Chloride	107-05-1	1000
Allylamine	107-11-9	1000
Alkylaluminums	Varies	5000
Ammonia, Anhydrous	7664-41-7	10000
Ammonia solutions (> 44% ammonia by weight)	7664-41-7	15000
Ammonium Perchlorate	7790-98-9	7500
Ammonium Permanganate	7787-36-2	7500
Arsine (also called Arsenic Hydride)	7784-42-1	100
Bis(Chloromethyl) Ether	542-88-1	100
Boron Trichloride	10294-34-5	2500
Boron Trifluoride	7637-07-2	250
Bromine	7726-95-6	1500
Bromine Chloride	13863-41-7	1500
Bromine Pentafluoride	7789-30-2	2500
Bromine Trifluoride	7787-71-5	15000
3-Bromopropyne (also called Propargyl Bromide)	106-96-7	100
Butyl Hydroperoxide (Tertiary)	75-91-2	5000
Butyl Perbenzoate (Tertiary)	614-45-9	7500
Carbonyl Chloride (see Phosgene)	75-44-5	100
Carbonyl Fluoride	353-50-4	2500
Cellulose Nitrate (concentration > 12.6% nitrogen)	9004-70-0	2500
Chlorine	7782-50-5	1500
Chlorine Dioxide	10049-04-4	1000
Chlorine Pentafluoride	13637-63-3	1000
Chlorine Trifluoride	7790-91-2	1000
Chlorodiethylaluminum (also called Diethylaluminum Chloride)	96-10-6	5000
1-Chloro-2,4-Dinitrobenzene	97-00-7	5000
Chloromethyl Methyl Ether	107-30-2	500
Chloropicrin	76-06-2	500
Chloropicrin and Methyl Bromide mixture	None	1500
Chloropicrin and Methyl Chloride mixture	None	1500
Cumene Hydroperoxide	80-15-9	5000
Cyanogen	460-19-5	2500
Cyanogen Chloride	506-77-4	500
Cyanuric Fluoride	675-14-9	100
Diacetyl Peroxide (concentration > 70%)	110-22-5	5000
Diazomethane	334-88-3	500
Dibenzoyl Peroxide	94-36-0	7500
Diborane	19287-45-7	100
Dibutyl Peroxide (Tertiary)	110-05-4	5000
Dichloro Acetylene	7572-29-4	250
Dichlorosilane	4109-96-0	2500
Diethylzinc	557-20-0	10000
Diisopropyl Peroxydicarbonate	105-64-6	7500
Dilaluroyl Peroxide	105-74-8	7500
Dimethyldichlorosilane	75-78-5	1000

CHEMICAL NAME	CAS*	TQ**
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Dimethylhydrazine, 1,1-	57-14-7	1000
Dimethylamine, Anhydrous	124-40-3	2500
2,4-Dinitroaniline	97-02-9	5000
Ethyl Methyl Ketone Peroxide (also Methyl Ethyl Ketone Peroxide; concentration > 60%)	1338-23-4	5000
Ethyl Nitrite	109-95-5	5000
Ethylamine	75-04-7	7500
Ethylene Fluorohydrin	371-62-0	100
Ethylene Oxide	75-21-8	5000
Ethyleneimine	151-56-4	1000
Fluorine	7782-41-4	1000
Formaldehyde (Formalin)	50-00-0	1000
Furan	110-00-9	500
Hexafluoroacetone	684-16-2	5000
Hydrochloric Acid, Anhydrous	7647-01-0	5000
Hydrofluoric Acid, Anhydrous	7664-39-3	1000
Hydrogen Bromide	10035-10-6	5000
Hydrogen Chloride	7647-01-0	5000
Hydrogen Cyanide, Anhydrous	74-90-8	1000
Hydrogen Fluoride	7664-39-3	1000
Hydrogen Peroxide (52% by weight or greater)	7722-84-1	7500
Hydrogen Selenide	7783-07-5	150
Hydrogen Sulfide	7783-06-4	1500
Hydroxylamine	7803-49-8	2500
Iron, Pentacarbonyl	13463-40-6	250
Isopropylamine	75-31-0	5000
Ketene	463-51-4	100
Methacrylaldehyde	78-85-3	1000
Methacryloyl Chloride	920-46-7	150
Methacryloyloxyethyl Isocyanate	30674-80-7	100
Methyl Acrylonitrile	126-98-7	250
Methylamine, Anhydrous	74-89-5	1000
Methyl Bromide	74-83-9	2500
Methyl Chloride	74-87-3	15000
Methyl Chloroformate	79-22-1	500
Methyl Ethyl Ketone Peroxide (concentration > 60%)	1338-23-4	5000
Methyl Fluoroacetate	453-18-9	100
Methyl Fluorosulfate	421-20-5	100
Methyl Hydrazine	60-34-4	100
Methyl Iodide	74-88-4	7500
Methyl Isocyanate	624-83-9	250
Methyl Mercaptan	74-93-1	5000
Methyl Vinyl Ketone	79-19-4	100
Methyltrichlorosilane	75-79-6	500
Nickel Carbonyl (Nickel Tetracarbonyl)	13463-39-3	150
Nitric Acid (94.5% by weight or greater)	7697-37-2	500
Nitric Oxide	10102-43-9	250
Nitroaniline (para Nitroaniline)	100-01-6	5000
Nitromethane	75-52-5	2500
Nitrogen Dioxide	10102-44-0	250
Nitrogen Oxides (NO; NO ₂ ; N ₂ O ₄ ; N ₂ O ₃)	10102-44-0	250
Nitrogen Tetroxide (also called Nitrogen Peroxide)	10544-72-6	250
Nitrogen Trifluoride	7783-54-2	5000
Nitrogen Trioxide	10544-73-7	250

CHEMICAL NAME	CAS*	TQ**
Oleum (65% to 80% by weight; also called Fuming Sulfuric Acid)	8014-95-7	1000
Osmium Tetroxide	20816-12-0	100
Oxygen Difluoride (Fluorine Monoxide)	7783-41-7	100
Ozone	10028-15-6	100
Pentaborane	19624-22-7	100
Peracetic Acid (concentration > 60% Acetic Acid; also called Peroxyacetic Acid)		
Perchloric Acid (concentration > 60% by weight)	79-21-0	1000
Perchloromethyl Mercaptan	7601-90-3	5000
Perchloryl Fluoride	594-42-3	150
Peroxyacetic Acid (concentration > 60% Acetic Acid; also called Peracetic Acid)	7616-94-6	5000
Phosgene (also called Carbonyl Chloride)		
Phosphine (Hydrogen Phosphide)	79-21-0	1000
Phosphorus Oxychloride (also called Phosphoryl Chloride)	75-44-5	100
Phosphorus Trichloride	7803-51-2	100
Phosphoryl Chloride (also called Phosphorus Oxychloride)	10025-87-3	1000
Propargyl Bromide	7719-12-2	1000
Propyl Nitrate	10025-87-3	1000
Sarin	106-96-7	100
Selenium Hexafluoride	627-3-4	2500
Stibine (Antimony Hydride)	107-44-8	100
Sulfur Dioxide (liquid)	7783-79-1	1000
Sulfur Pentafluoride	7803-52-3	500
Sulfur Tetrafluoride	7446-09-5	1000
Sulfur Trioxide (also called Sulfuric Anhydride)	5714-22-7	250
Sulfuric Anhydride (also called Sulfur Trioxide)	7783-60-0	250
Tellurium Hexafluoride	7446-11-9	1000
Tetrafluoroethylene	7446-11-9	1000
Tetrafluorohydrazine	7783-80-4	250
Tetramethyl Lead	116-14-3	5000
Thionyl Chloride	10036-47-2	5000
Trichloro (chloromethyl) Silane	75-74-1	1000
Trichloro (dichlorophenyl) Silane	7719-09-7	250
Trichlorosilane	1558-25-4	100
Trifluorochloroethylene	27137-85-5	2500
Trimethoxysilane	10025-78-2	5000
	79-38-9	10000
	2487-90-3	1500

* Chemical Abstract Service Number.

** Threshold Quantity in Pounds (Amount necessary to be covered by this standard).

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).

Stats Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 8-1992, f. 8/13/92, ef. 11/24/92.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 2/N, Material Handling & Storage

437-002-2224

Vehicle Drivers and Riders

(1) Scope. This rule applies, without regard to vehicle ownership when your employees drive or ride as part of their employment.

NOTE: The Oregon Bureau of Labor and Industries (BOLI) administers rules about using minors as drivers. Please contact the nearest BOLI office for more information.

(2) Driver Qualifications. You must not allow an employee to drive a vehicle on a public highway or road unless they have a valid driver's license appropriate for that type vehicle.

(3) General Safety.

(a) Do not allow employees to drive or ride in any vehicle known to be unsafe.

(b) Require employees to report any safety problems effecting vehicles you own or provide.

(4) Rider Safety – General.

(a) Except as in (5), (6) and (7), do not allow employees to occupy a vehicle in excess of its seating capacity.

(b) Require employees to comply with all applicable seatbelt and traffic safety laws.

(5) Rider Safety in the Bed of Dump Trucks, Pickups and Similar Vehicles. Do not transport workers in the beds of dump trucks, pickups or similar vehicles unless these conditions are met when applicable:

(a) When seating is available, it must be secure to the floor and passengers may not stand.

(b) The bed is secure to the frame. Beds that tilt or slide must be secure from movement.

(c) Dump beds must be secure or the activating lever locked.

(d) The total height of the sides of the transport area must be at least 42 inches. If riders sit on the floor, the height must be at least 24 inches.

(e) There must be a tailgate the same height as the sides or three evenly spaced chains, cables or ropes taut across the back.

(f) Not more than 4 workers may ride on a flatbed without sides or a tailgate and then only when the speed will not be more than 30 mph. There must be two handholds for each rider.

(g) Workers must not ride in space with cargo unless it is secure from movement.

(6) Standing Rider Safety – Buses. Riders must not sit on the floor while the vehicle is moving. Riders may stand if these conditions are met:

(a) There must be an aisle at least 12 inches wide leading to the emergency exit.

(b) There are no seats in or boards across the aisle.

(c) There must be handholds for standing riders.

(d) Not more than one rider per row of seats may stand.

(e) Riders may not sit or stand near the driver and not ahead of the forward-most row of seats.

(f) Workers in transit must not stand for more than one hour or 45 miles, whichever is less. At the end of that period, the standing workers must get a seat or the vehicle must stop for a 15-minute rest allowing the workers to get out.

(7) Fueling.

(a) There must be no smoking or other source of ignition within 25 feet of any refueling operation.

(b) Do not fill any container that is not bonded or grounded while it is inside the vehicle, in the pickup bed or anyplace other than on the ground.

(c) Stop the engine (except diesels) during fueling.

(d) Refueling vehicles with LPG must be outdoors.

(8) Hauling gasoline or flammable liquid.

(a) For buses, vehicles that carry 16 or more, crew trucks, vans and passenger cars, use only DOT or UL approved containers that hold 5 gallons or less and secure them in an area separate from passengers.

(b) For pickups, flatbeds and other vehicles not in (a), there is no container size limit as long it is not in an enclosed passenger area.

(9) Hauling Explosives. When hauling explosives, only the driver and one qualified person may be in the vehicle. Comply with OAR 437-002-1910.109 and 437-002-0109.

(10) Loading or Unloading. When loading or unloading vehicles in a manner that is likely to cause the vehicle to move, set the brakes and chock the wheels.

(11) High Voltage Clearances. When operating a vehicle near overhead lines carrying more than 600v, OAR 437-002-0047 applies for general industry employers and OAR 437-003-0047 applies for Construction employers.

(12) Traffic Control. **Adequate and appropriate traffic control devices must be used**~~[You must require employees to set up appropriate traffic controls]~~ when **vehicles are parked**~~[they stop]~~ on or adjacent to a highway, street, or road in a way that creates a hazard and when traffic cannot adjust safely on its own. The **traffic** control[s] devices' **design and use** must conform to the ~~[Millennium Edition of the (FHWA)]~~ Manual of Uniform Traffic

Control Devices **for Streets and Highways, 2009 Edition, December 2009 (including Revision 1 dated May 2012 and Revision 2 dated May 2012)** (MUTCD), **incorporated by reference in 1926.6**[December 2000].

Note: **The MUTCD is available electronically at mutcd.fhwa.dot.gov, or printed copies are available to purchase from The American Traffic Safety Services Association, 1-800-231-3475, www.atssa.com; the Institute of Transportation Engineers, 202-785-0060, www.ite.org; or the American Association of State Highway and Transportation Officials, 1-800-231-3475, store.transportation.org.** [The Federal Highway Administration (FHWA) does not print copies of the MUTCD, but here is the link to the official 2009 edition with explanatory information and links to previous editions also: http://mutcd.fhwa.dot.gov/kno_2009.htm. Paper copies of the MUTCD are available for purchase from the following organizations: American Traffic Safety Services Association, 15 Riverside Parkway, Suite 100, Fredericksburg, VA 22406-1022, Telephone: 800-272-8772, Fax: 540-368-1717, www.atssa.com; Institute of Transportation Engineers, 1627 Eye Street NW, Suite 600, Washington, DC 20006, Fax: 202-785-0609, www.ite.org; and, American Association of State Highway and Transportation Officials, www.aashto.org; Telephone: 800-525-5562. OR: The MUTCD Part 6, Temporary Traffic Control, is available for review at the Oregon OSHA Resource Center, 350 Winter Street NE, Basement—Room 26, Salem, Oregon 97301-3882, Telephone: 503-378-3272, or toll free in Oregon 800-922-2689.]

Note: If the scope of the operation is three days or less, then employers who follow the most current edition of the Oregon **Department of Transportation's Temporary Traffic Control Handbook are considered to be in compliance with this requirement.** [Temporary Traffic Control Handbook for Operations of 3 Days or Less comply with this requirement. Oregon Department of Transportation has published a new 2011 Temporary Traffic Control Handbook. You can find it online on ODOT's website. http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/2011_OTTCH.pdf.]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-2007, f. 9/26/07, ef. 9/26/07.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

437-002-0360
Adoption by Reference

In addition to, and not in lieu of, any other safety and health codes contained in OAR Chapter 437, the Department adopts by reference the following federal regulations printed as part of the Code of Federal Regulations, 29 CFR 1910, in the Federal Register:

(1) (Reserved) 29 CFR 1910.1000 Air contaminants.

Note: 29 CFR 1910.1000 was repealed on 11/15/93 by OR OSHA. In Oregon, OAR 437-002-0382 applies.

(2) 29 CFR 1910.1001 Asbestos, published [~~2/8/13~~]5/14/19, FR vol. [~~78~~]84, no. [~~27~~]93, p. [~~9344~~]21416.

(3) 29 CFR 1910.1002 Coal tar pitch volatiles, interpretation of term, published 1/21/83, Federal Register, vol. 43, p. 2768.

(4) 29 CFR 1910.1003 13 Carcinogens, published 3/26/12, FR vol. 77, no. 58, p. 17574.

(5) 29 CFR 1910.1004 See 1910.1003, 13 Carcinogens.

(6) Reserved for 29 CFR 1910.1005.

(7) 29 CFR 1910.1006 See 1910.1003, 13 Carcinogens.

(8) 29 CFR 1910.1007 See 1910.1003, 13 Carcinogens.

(9) 29 CFR 1910.1008 See 1910.1003, 13 Carcinogens.

(10) 29 CFR 1910.1009 See 1910.1003, 13 Carcinogens.

(11) 29 CFR 1910.1010 See 1910.1003, 13 Carcinogens.

(12) 29 CFR 1910.1011 See 1910.1003, 13 Carcinogens.

(13) 29 CFR 1910.1012 See 1910.1003, 13 Carcinogens.

(14) 29 CFR 1910.1013 See 1910.1003, 13 Carcinogens.

(15) 29 CFR 1910.1014 See 1910.1003, 13 Carcinogens.

(16) 29 CFR 1910.1015 See 1910.1003, 13 Carcinogens.

(17) 29 CFR 1910.1016 See 1910.1003, 13 Carcinogens.

(18) 29 CFR 1910.1017 Vinyl chloride, published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~47574~~]21416.

(19) 29 CFR 1910.1018 Inorganic arsenic, published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~47574~~]21416.

(20) 29 CFR 1910.1020 Access to Employee Exposure and Medical Records, published 6/8/11, Federal Register, vol. 76, no. 110, p. 33590.

Appendix A Sample Authorization Letter.

Appendix B Availability of NIOSH RTECS.

(21) 29 CFR 1910.1025 Lead, published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~47574~~]21416.

(22) 29 CFR 1910.1026 Chromium (VI), published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(23) 29 CFR 1910.1027 Cadmium, published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(24) 29 CFR 1910.1028 Benzene, and Appendices A, B, C, D, and E, [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(25) 29 CFR 1910.1029 Coke oven emissions, [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(26) 29 CFR 1910.1030 Bloodborne pathogens, published [~~6/8/11~~]5/14/19, Federal Register, vol. [~~76~~]84, no. [~~1440~~]93. P. [~~33590~~]21416.

(27) 29 CFR 1910.1043 Cotton dust, published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(28) 29 CFR 1910.1044 1,2 dibromo-3 chloropropane, published [~~2/8/13~~]5/14/19, FR vol. [~~78~~]84, no. [~~27~~]93, p. [~~9311~~]21416.

(29) 29 CFR 1910.1045 Acrylonitrile, published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(30) 29 CFR 1910.1047 Ethylene oxide, published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(31) 29 CFR 1910.1048 Formaldehyde, and Appendices A, B, C, D and E, published [~~2/8/13~~]5/14/19, FR vol. [~~78~~]84, no. [~~27~~]93, p. [~~9311~~]21416.

(32) 29 CFR 1910.1050 Methylenedianiline (MDA), published [~~3/26/12~~]5/14/19, FR vol. [~~77~~]84, no. [~~58~~]93, p. [~~147574~~]21416.

(33) 29 CFR 1910.1051 1,3-Butadiene, published [~~2/8/13~~]5/14/19, FR vol. [~~78~~]84, no. [~~27~~]93, p. [~~9311~~]21416.

(34) 29 CFR 1910.1052 Methylene Chloride, published [~~2/8/13~~]5/14/19, FR vol. [~~78~~]84, no. [~~27~~]93, p. [~~9311~~]21416.

Note: 29 CFR 1910.1101 Asbestos, was repealed by Federal Register, vol. 57, no. 110, issued 6/8/92, p. 24330.

(35) 29 CFR 1910.1096 Ionizing radiation, published 6/20/96, FR vol. 61, no. 46, p. 31427.

(36) 29 CFR 1910.1200 Hazard communication, published 2/8/13, FR vol. 78, no. 27, p. 9311.

(37) 29 CFR 1910.1201 Retention of DOT Markings, Placards and Labels, published 7/19/94, Federal Register, vol. 59, p. 36700.

(38) 29 CFR 1910.1450 Occupational Exposure to Hazardous Chemicals in Laboratories, published 1/22/13, FR vol. 78, no. 14, p. 4324.

(39) 29 CFR 1910.1499 Removed. Published 3/7/96, Federal Register, vol. 61, no. 46, p. 9245.

(40) 29 CFR 1910.1500 Removed. Published 3/7/96, Federal Register, vol. 61, no. 46, p. 9245.

These standards are available at the Oregon Occupational Safety and Health Division, Oregon Department of Consumer and Business Services, and the United States Government Printing Office.

Statutory/Other Authority: ORS 654.025(2) & 656.726(4)

Statutes/Other Implemented: ORS 654.001 - 654.295

History: APD Admin. Order 13-1988, f. 8/2/88, ef. 8/2/88 (Benzene).

APD Admin. Order 14-1988, f. 9/12/88, ef. 9/12/88 (Formaldehyde).

APD Admin. Order 18-1988, f. 11/17/88, ef. 11/17/88 (Ethylene Oxide).

APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (Asbestos-Temp).

APD Admin. Order 6-1989, f. 4/20/89, ef. 5/1/89 (Non-Asbestiforms-Temp).

APD Admin. Order 9-1989, f. 7/7/89, ef. 7/7/89 (Asbestos & Non-Asbestiforms-

Perm).

APD Admin. Order 11-1989, f. 7/14/89, ef. 8/14/89 (Lead).

APD Admin. Order 13-1989, f. 7/17/89, ef. 7/17/89 (Air Contaminants).

OR-OSHA Admin. Order 1-1990, f. 1/11/90, ef. 1/11/90 (Formaldehyde-Temp).

OR-OSHA Admin. Order 3-1990, f. 1/19/90, ef. 1/19/90 (Asbestos & Non-

Asbestiforms-Temp).

OR-OSHA Admin. Order 6-1990, f. 3/2/90, ef. 3/2/90 (Formaldehyde-Perm).

OR-OSHA Admin. Order 7-1990, f. 3/2/90, ef. 3/2/90 (Asbestos & Non-

Asbestiforms- Perm).

OR-OSHA Admin. Order 9-1990, f. 5/8/90, ef. 8/8/90 (Labs).

OR-OSHA Admin. Order 11-1990, f. 6/7/90, ef. 7/1/90 (Air Contaminants).

OR-OSHA Admin. Order 13-1990, f. 6/28/90, ef. 8/1/90 (Asbestos-Temp).

OR-OSHA Admin. Order 14-1990, f. 6/28/90, ef. 8/1/90 (Lead).

OR-OSHA Admin. Order 19-1990, f. 8/31/90, ef. 8/31/90 (Asbestos-Perm).

OR-OSHA Admin. Order 20-1990, f. 9/18/90, ef. 9/18/90 (Lead).

OR-OSHA Admin. Order 21-1990, f. 9/18/90, ef. 9/18/90 (Air Contaminants).

OR-OSHA Admin. Order 7-1991, f. 4/25/91, ef. 4/25/91 (Air Contaminants, Asbestos, Formaldehyde).

OR-OSHA Admin. Order 13-1991, f. 10/10/91, ef. 10/10/91 (Lead, Formaldehyde).

OR-OSHA Admin. Order 15-1991, f. 12/13/91, ef. 12/13/91 (Asbestos).

OR-OSHA Admin. Order 1-1992, f. 1/22/92, ef. 1/22/92 (Formaldehyde).

OR-OSHA Admin. Order 4-1992, f. 4/16/92, ef. 4/16/92 (Formaldehyde).

OR-OSHA Admin. Order 5-1992, f. 4/24/92, ef. 7/1/92 (Bloodborne Pathogens).

OR-OSHA Admin. Order 6-1992, f. 5/18/92, ef. 5/18/92 (Asbestos).

OR-OSHA Admin. Order 10-1992, f. 9/24/92, ef. 9/24/92 (Lead-temp).

OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92 (Asbestos).
 OR-OSHA Admin. Order 12-1992, f. 10/13/92, ef. 10/13/92 (Formaldehyde).
 OR-OSHA Admin. Order 15-1992, f. 12/30/92, ef. 12/30/92 (Air Contaminants, BBP, Labs).
 OR-OSHA Admin. Order 1-1993, f. 1/22/93, ef. 1/22/93 (Cadmium, MDA).
 OR-OSHA Admin. Order 6-1993, f. 5/17/93, ef. 5/17/93 (Air Contaminants-Temp).
 OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93 (remainder of 2/Z).
 OR-OSHA Admin. Order 17-1993, f. 11/15/93, ef. 11/15/93 (Air Contaminants-Perm).

OR-OSHA Admin. Order 4-1995, f. 3/29/95, ef. 3/29/95 (Asbestos).
 OR-OSHA Admin. Order 8-1995, f. 8/25/95, ef. 8/25/95 (Asbestos).
 OR-OSHA Admin. Order 4-1996, f. 9/13/96, ef. 9/13/96 (Lead).
 OR-OSHA Admin. Order 6-1996, f. 11/29/96, ef. 11/29/96 (Asbestos).
 OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.
 OR-OSHA Admin. Order 6-1997, f. 5/2/97, ef. 5/2/97.
 OR-OSHA Admin. Order 8-1997, f. 11/14/97, ef. 11/14/97 (Methylene Chloride).
 OR-OSHA Admin. Order 1-1998, f. 2/13/98, ef. 2/13/98 (Methylene Chloride).
 OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
 OR-OSHA Admin. Order 1-1999, f. 3/22/99, ef. 3/22/99.
 OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.
 OR-OSHA Admin. Order 6-2001, f. 5/15/01, ef. 5/15/01 (Cotton Dust).
 OR-OSHA Admin. Order 10-2001, f. 9/14/01, ef. 10/18/01 (Bloodborne Pathogens).
 OR-OSHA Admin. Order 12-2001, f. 10/26/01, ef. 10/26/01 (Methylene Chloride).
 OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
 OR-OSHA Admin. Order 4-2006, f. 4/24/06, ef. 4/24/06.
 OR-OSHA Admin. Order 6-2006, f. 8/30/06, ef. 8/30/06.
 OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
 OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
 OR-OSHA Admin. Order 3-2010, f. 6/10/10, ef. 6/15/10.
 OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
 OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
 OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
 OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
 OR-OSHA Admin. Order 3-2013, f. 7/18/13, ef. 7/18/13.
 OR-OSHA Admin. Order 4-2013, f. 7/19/13, ef. 7/19/13.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 2/Z, Toxic & Hazardous Substances

1910.1001
 Asbestos.

(a) Scope and application.

(1) This section applies to all occupational exposures to asbestos in all industries covered by the Occupational Safety and Health Act, except as provided in paragraph (a)(2) and (3) of this section.

(2) This section does not apply to construction work as defined in 29 CFR 1910.12(b). (Exposure to asbestos in construction work is covered by 29 CFR 1926.1101.)

(3) This section does not apply to ship repairing, shipbuilding and shipbreaking employments and related employments as defined in 29 CFR 1915.4. (Exposure to asbestos in these employments is covered by 29 CFR 1915.1001).

(b) Definitions.

Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

Asbestos-containing material (ACM) means any material containing more than 1% asbestos.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person authorized by the employer and required by work duties to be present in regulated areas.

Building/facility owner is the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this standard take place.

Certified industrial hygienist (CIH) means one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Employee exposure means that exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

Fiber means a particulate form of asbestos 5 micrometers or longer, with a length-to-diameter ratio of at least 3 to 1.

High-efficiency particulate air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of 0.3 micrometer diameter mono-disperse particles.

Homogeneous area means an area of surfacing material or thermal system insulation that is uniform in color and texture.

Industrial hygienist means a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

PACM means "presumed asbestos containing material."

Presumed asbestos containing material means thermal system insulation and surfacing material found in buildings constructed no later than 1980. The designation of a material as "PACM" may be rebutted pursuant to paragraph (j)(8) of this section.

Regulated area means an area established by the employer to demarcate areas where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed, the permissible exposure limit.

Surfacing ACM means surfacing material which contains more than 1% asbestos.

Surfacing material means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).

Thermal System Insulation (TSI) means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

Thermal System Insulation ACM means thermal system insulation which contains more than 1% asbestos.

(c) Permissible exposure limits (PELS).

(1) Time-weighted average limit (TWA). The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8)-hour time-weighted average (TWA) as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

(2) Excursion limit. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

(d) Exposure monitoring.

(1) General.

(i) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.

(ii) Representative 8-hour TWA employee exposures shall be determined on the basis of one or more samples representing full-shift exposures for each shift for each employee in each job classification in each work area. Representative 30-minute short-term employee exposures shall be determined on the basis of one or more samples representing 30-minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

(2) Initial monitoring.

(i) Each employer who has a workplace or work operation covered by this standard, except as provided for in paragraphs (d)(2)(ii) and (d)(2)(iii) of this section, shall perform initial monitoring of employees who are, or may reasonably be expected to be exposed to airborne concentrations at or above the TWA permissible exposure limit and/or excursion limit.

(ii) Where the employer has monitored after March 31, 1992, for the TWA permissible exposure limit and/or the excursion limit, and the monitoring satisfies all other requirements of this section, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (d)(2)(i) of this section.

(iii) Where the employer has relied upon objective data that demonstrates that asbestos is not capable of being released in airborne concentrations at or above the TWA permissible exposure limit and/or excursion limit under the expected conditions of processing, use, or handling, then no initial monitoring is required.

(3) Monitoring frequency (periodic monitoring) and patterns. After the initial determinations required by paragraph (d)(2)(i) of this section, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than six months for employees whose exposures may reasonably be foreseen to exceed the TWA permissible exposure limit and/or excursion limit.

(4) Changes in monitoring frequency. If either the initial or the periodic monitoring required by paragraphs (d)(2) and (d)(3) of this section statistically indicates that employee exposures are below the TWA permissible exposure limit and/or excursion limit, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(5) Additional monitoring. Notwithstanding the provisions of paragraphs (d)(2)(ii) and (d)(4) of this section, the employer shall institute the exposure monitoring required under paragraphs (d)(2)(i) and (d)(3) of this section whenever there has been a change in the production, process, control equipment, personnel, or work practices that may result in new or additional exposures above the TWA permissible exposure limit and/or excursion limit or when the employer has any reason to suspect that a change may result in new or additional exposures above the PEL and/or excursion limit.

(6) Method of monitoring.

(i) All samples taken to satisfy the monitoring requirements of paragraph (d) of this section shall be personal samples collected following the procedures specified in Appendix A.

(ii) All samples taken to satisfy the monitoring requirements of paragraph (d) of this section shall be evaluated using the OSHA Reference Method (ORM) specified in Appendix A of this section, or an equivalent counting method.

(iii) If an equivalent method to the ORM is used, the employer shall ensure that the method meets the following criteria:

(A) Replicate exposure data used to establish equivalency are collected in side-by-side field and laboratory comparisons; and

(B) The comparison indicates that 90% of the samples collected in the range 0.5 to 2.0 times the permissible limit have an accuracy range of plus or minus 25 percent of the ORM results at a 95% confidence level as demonstrated by a statistically valid protocol; and

(C) The equivalent method is documented and the results of the comparison testing are maintained.

(iv) To satisfy the monitoring requirements of paragraph (d) of this section, employers must use the results of monitoring analysis performed by laboratories which have instituted quality assurance programs that include the elements as prescribed in Appendix A of this section.

(7) Employee notification of monitoring results.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under the standard, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to affected employees.

(ii) The written notification required by paragraph (d)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce employee exposure to or below the TWA and/or excursion limit, wherever monitoring results indicated that the TWA and/or excursion limit has been exceeded.

(e) Regulated Areas.

(1) Establishment. The employer shall establish regulated areas wherever airborne concentrations of asbestos and/or PACM are in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(2) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in any manner that minimizes the number of persons who will be exposed to asbestos.

(3) Access. Access to regulated areas shall be limited to authorized persons or to persons authorized by the Act or regulations issued pursuant thereto.

(4) Provision of respirators. Each person entering a regulated area shall be supplied with and required to use a respirator, selected in accordance with paragraph (g)(2) of this section.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated areas.

(f) Methods of compliance.

(1) Engineering controls and work practices.

(i) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to or below the TWA and/or excursion limit, prescribed in paragraph (c) of this section, except to the extent that such controls are not feasible.

(ii) Wherever the feasible engineering controls and work practices that can be instituted are not sufficient to reduce employee exposure to or below the TWA and/or excursion limit prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (g) of this section.

(iii) For the following operations, wherever feasible engineering controls and work practices that can be instituted are not sufficient to reduce the employee exposure to or below the TWA and/or excursion limit, prescribed in paragraph (c) of this section, the employer shall use them to reduce employee exposure to or below 0.5 fibers per cubic centimeter of air (as an eight-hour time-weighted average) or 2.5 fibers/cc for 30 minutes (short-term exposure) and shall supplement them by the use of any combination of respiratory protection that complies with the requirements of paragraph (g) of this section, work practices and feasible engineering controls that will reduce employee exposure to or below the TWA and to or below the excursion limit prescribed in paragraph (c) of this section: Coupling cutoff in primary asbestos cement pipe manufacturing; sanding in primary and secondary asbestos cement sheet manufacturing; grinding in primary and secondary friction product manufacturing; carding and spinning in dry textile processes; and grinding and sanding in primary plastics manufacturing.

(iv) Local exhaust ventilation. Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with good practices such as those found in the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1979.

(v) Particular tools. All hand-operated and power-operated tools which would produce or release fibers of asbestos, such as, but not limited to saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems which comply with paragraph (f)(1)(iv) of this section.

(vi) Wet methods. Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers so as to expose employees to levels in excess of the TWA and/or excursion limit, prescribed in paragraph (c) of this section, unless the usefulness of the product would be diminished thereby.

(vii) (Reserved)

(viii) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos, shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne fibers.

(ix) Compressed air. Compressed air shall not be used to remove asbestos or materials containing asbestos unless the compressed air is used in conjunction with a ventilation system which effectively captures the dust cloud created by the compressed air.

(x) Flooring. Sanding of asbestos-containing flooring material is prohibited.

(2) Compliance program.

(i) Where the TWA and/or excursion limit is exceeded, the employer shall establish and implement a written program to reduce employee exposure to or below the TWA and to or below the excursion limit by means of engineering and work practice controls as required by paragraph (f)(1) of this section, and by the use of respiratory protection where required or permitted under this section.

(ii) Such programs shall be reviewed and updated as necessary to reflect significant changes in the status of the employer's compliance program.

(iii) Written programs shall be submitted upon request for examination and copying to the Assistant Secretary, the Director, affected employees and designated employee representatives.

(iv) The employer shall not use employee rotation as a means of compliance with the TWA and/or excursion limit.

(3) Specific compliance methods for brake and clutch repair:

(i) Engineering controls and work practices for brake and clutch repair and service. During automotive brake and clutch inspection, disassembly, repair and assembly operations, the employer shall institute engineering controls and work practices to reduce employee exposure to materials containing asbestos using a negative pressure enclosure/HEPA vacuum system method or low pressure/wet cleaning method, which meets the detailed requirements set out in Appendix F to this section. The employer may also comply using an equivalent method which follows written procedures which the employer demonstrates can achieve results equivalent to Method A in Appendix F to this section. For facilities in which no more than 5 pair of brakes or 5 clutches are inspected, disassembled, repaired, or assembled per week, the method set forth in paragraph [D] of Appendix F to this section may be used.

(ii) The employer may also comply by using an equivalent method which follows written procedures, which the employer demonstrates can achieve equivalent exposure reductions as do the two "preferred methods." Such demonstration must include monitoring data conducted under workplace conditions closely resembling the process, type of asbestos containing materials, control method, work practices and environmental conditions which the equivalent method will be used, or objective data, which document that under all reasonably foreseeable conditions of brake and clutch repair applications, the method results in exposures which are equivalent to the methods set out in Appendix F to this section.

(g) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Work operations, such as maintenance and repair activities, for which engineering and work-practice controls are not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the TWA and/or excursion limit.

(iv) Emergencies.

(2) Respirator program.

Oregon OSHA repealed 1910.1001(g)(2)(i). In Oregon, OAR 437-002-1001 applies.

437-002-1001 Asbestos Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d)(except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1001 Asbestos, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Asbestos rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) Employers must provide an employee with a tight-fitting, powered air-purifying respirator (PAPR) instead of negative pressure respirator selected according to paragraph (g)(3) of this standard when the employee chooses to use a PAPR and it provides adequate protection to the employee.

(iii) No employee must be assigned to tasks requiring the use of respirators if, based on their most recent medical examination, the examining physician determines that the employee will be unable to function normally using a respirator, or that the safety or health of the employee or other employees will be impaired by the use of a respirator. Such employees must be assigned to another job or given the opportunity to transfer to a different position, the duties of which they can perform. If such a transfer position is available, the position must be with the same employer, in the same geographical area, and with the same seniority, status, and rate of pay the employee had just prior to such transfer.

(3) Respirator selection. Employers must:

(i) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134; however, employers must not select or use filtering facepiece respirators for protection against asbestos fibers.

(ii) Provide HEPA filters for powered and non-powered air-purifying respirators.

(h) Protective work clothing and equipment.

(1) Provision and use. If an employee is exposed to asbestos above the TWA and/or excursion limit, or where the possibility of eye irritation exists, the employer shall provide at no cost to the employee and ensure that the employee uses appropriate protective work clothing and equipment such as, but not limited to:

(i) Coveralls or similar full-body work clothing;

(ii) Gloves, head coverings, and foot coverings; and

(iii) Face shields, vented goggles, or other appropriate protective equipment which complies with OAR 437-002-0134(8).

(2) Removal and storage.

(i) The employer shall ensure that employees remove work clothing contaminated with asbestos only in change rooms provided in accordance with paragraph (i)(1) of this section.

(ii) The employer shall ensure that no employee takes contaminated work clothing out of the change room, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(iii) Contaminated work clothing shall be placed and stored in closed containers which prevent dispersion of the asbestos outside the container.

(iv) The employer shall ensure that containers of contaminated protective devices or work clothing, which are to be taken out of change rooms or the workplace for cleaning, maintenance or disposal, bear labels in accordance with paragraph (j) of this section.

(3) Cleaning and replacement.

(i) The employer shall clean, launder, repair, or replace protective clothing and equipment required by this paragraph to maintain their effectiveness. The employer shall provide clean protective clothing and equipment at least weekly to each affected employee.

(ii) The employer shall prohibit the removal of asbestos from protective clothing and equipment by blowing or shaking.

(iii) Laundering of contaminated clothing shall be done so as to prevent the release of airborne fibers of asbestos in excess of the permissible exposure limits prescribed in paragraph (c) of this section.

(iv) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in paragraph (h)(3)(iii) of this section to effectively prevent the release of airborne fibers of asbestos in excess of the permissible exposure limit.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with asbestos of the potentially harmful effects of exposure to asbestos.

(vi) The employer shall ensure that contaminated clothing is transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with paragraph (j) of this section.

(i) Hygiene facilities and practices.

(1) Change rooms.

(i) The employer shall provide clean change rooms for employees who work in areas where their airborne exposure to asbestos is above the TWA and/or excursion limit.

(ii) The employer shall ensure that change rooms are in accordance with 1910.141(e) of this part, and are equipped with two separate lockers or storage facilities, so separated as to prevent contamination of the employee's street clothes from his protective work clothing and equipment.

(2) Showers.

(i) The employer shall ensure that employees who work in areas where their airborne exposure is above the TWA and/or excursion limit, shower at the end of the work shift.

(ii) The employer shall provide shower facilities which comply with 1910.141(d)(3) of this part.

(iii) The employer shall ensure that employees who are required to shower pursuant to paragraph (i)(2)(i) of this section do not leave the workplace wearing any clothing or equipment worn during the work shift.

(3) Lunchrooms.

(i) The employer shall provide lunchroom facilities for employees who work in areas where their airborne exposure is above the TWA and/or excursion limit.

(ii) The employer shall ensure that lunchroom facilities have a positive pressure, filtered air supply, and are readily accessible to employees.

(iii) The employer shall ensure that employees who work in areas where their airborne exposure is above the PEL and/or excursion limit wash their hands and faces prior to eating, drinking, or smoking.

(iv) The employer shall ensure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface asbestos fibers have been removed from the clothing or equipment by vacuuming or other method that removes dust without causing the asbestos to become airborne.

(4) Smoking in work areas. The employer shall ensure that employees do not smoke in work areas where they are occupationally exposed to asbestos because of activities in that work area.

(j) Communication of hazards to employees.

Introduction. This section applies to the communication of information concerning asbestos hazards in general industry to facilitate compliance with this standard. Asbestos exposure in general industry occurs in a wide variety of industrial and commercial settings. Employees who manufacture asbestos-containing products may be exposed to asbestos fibers. Employees who repair and replace automotive brakes and clutches may be exposed to asbestos fibers. In addition, employees engaged in housekeeping activities in industrial facilities with asbestos product manufacturing operations, and in public and commercial buildings with installed asbestos containing materials may be exposed to asbestos fibers. Most of these workers are covered by this general industry standard, with the exception of state or local governmental employees in non-state plan states. It should be noted that employees who perform housekeeping activities during and after construction activities are covered by the asbestos construction standard, 29 CFR 1926.1101, formerly 1926.58. However, housekeeping employees, regardless of industry designation, should know whether building components they maintain may expose them to asbestos. The same hazard communication provisions will protect employees who perform housekeeping operations in all three asbestos standards; general industry, construction, and shipyard employment. As noted in the construction standard, building owners are often the only and/or best source of information concerning the presence of previously installed asbestos containing building materials. Therefore they, along with employers of potentially exposed employees, are assigned specific information conveying and retention duties under this section.

(1) Hazard communication – general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for asbestos.

(ii) In classifying the hazards of asbestos at least the following hazards are to be addressed:

Cancer and lung effects.

(iii) Employers shall include asbestos in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of asbestos and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (j)(7) of this section.

(2) Installed Asbestos Containing Material. Employers and building owners are required to treat installed TSI and sprayed on and troweled-on surfacing materials as ACM in buildings

constructed no later than 1980 for purposes of this standard. These materials are designated "presumed ACM or PACM", and are defined in paragraph (b) of this section. Asphalt and vinyl flooring material installed no later than 1980 also must be treated as asbestos-containing. The employer or building owner may demonstrate that PACM and flooring material do not contain asbestos by complying with paragraph (j)(8)(iii) of this section.

(3) Duties of employers and building and facility owners.

(i) Building and facility owners shall determine the presence, location, and quantity of ACM and/or PACM at the work site. Employers and building and facility owners shall exercise due diligence in complying with these requirements to inform employers and employees about the presence and location of ACM and PACM.

(ii) Building and facility owners shall maintain records of all information required to be provided pursuant to this section and/or otherwise known to the building owner concerning the presence, location and quantity of ACM and PACM in the building/facility. Such records shall be kept for the duration of ownership and shall be transferred to successive owners.

(iii) Building and facility owners shall inform employers of employees, and employers shall inform employees who will perform housekeeping activities in areas which contain ACM and/or PACM of the presence and location of ACM and/or PACM in such areas which may be contacted during such activities.

(4) Warning signs.

(i) Posting. Warning signs shall be provided and displayed at each regulated area. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area.

(ii) Sign specifications.

(A) The warning signs required by paragraph (j)(4)(i) of this section shall bear the following information:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

(B) In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORY PROTECTION AND PROTECTIVE
CLOTHING IN THIS AREA

(C) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (j)(4)(ii)(A) of this section:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE
HAZARD
AUTHORIZED PERSONNEL ONLY

(D) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (j)(4)(ii)(B) of this section:

RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

(iii) The employer shall ensure that employees working in and contiguous to regulated areas comprehend the warning signs required to be posted by paragraph (j)(4)(i) of this section. Means to ensure employee comprehension may include the use of foreign languages, pictographs and graphics.

(iv) At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain ACM and/or PACM, the building owner shall post signs which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed. The employer shall ensure, to the extent feasible, that employees who come in contact with these signs can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

(5) Warning labels.

(i) Labeling. Labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, or to their containers. When a building owner or employer identifies previously installed ACM and/or PACM, labels or signs shall be affixed or posted so that employees will be notified of what materials contain ACM and/or PACM. The employer shall attach such labels in areas where they will clearly be noticed by employees who are likely to be exposed, such as at the entrance to mechanical room/areas. Signs required by paragraph (j) of this section may be posted in lieu of labels so long as they contain the information required for labeling.

(ii) Label specifications. In addition to the requirements of paragraph (j)(1), the employer shall ensure that labels of bags or containers of protective clothing and equipment, scrap, waste, and debris containing asbestos fibers include the following information:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

(iii) Prior to June 1, 2015, employers may include the following information on raw materials, mixtures or labels of bags or containers of protective clothing and equipment, scrap, waste,

and debris containing asbestos fibers in lieu of the labeling requirements in paragraphs (j)(1)(i) and (j)(5)(ii) of this section:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

(6) The provisions for labels and for safety data sheets required by paragraph (j) of this section do not apply where:

(i) Asbestos fibers have been modified by a bonding agent, coating, binder, or other material provided that the manufacturer can demonstrate that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of fibers of asbestos in excess of the TWA permissible exposure level and/or excursion limit will be released or

(ii) Asbestos is present in a product in concentrations less than 1.0%.

(7) Employee information and training.

(i) The employer shall train each employee who is exposed to airborne concentrations of asbestos at or above the PEL and/or excursion limit in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

(ii) Training shall be provided prior to or at the time of initial assignment and at least annually thereafter.

(iii) The training program shall be conducted in a manner which the employee is able to understand. The employer shall ensure that each employee is informed of the following:

(A) The health effects associated with asbestos exposure;

(B) The relationship between smoking and exposure to asbestos in producing lung cancer:

(C) The quantity, location, manner of use, release, and storage of asbestos and the specific nature of operations which could result in exposure to asbestos;

(D) The engineering controls and work practices associated with the employee's job assignment;

(E) The specific procedures implemented to protect employees from exposure to asbestos such as appropriate work practices, emergency and clean-up procedures, and personal protective equipment to be used;

(F) The purpose, proper use, and limitations of respirators and protective clothing, if appropriate;

(G) The purpose and a description of the medical surveillance program required by paragraph (l) of this section;

(H) The content of this standard, including appendices;

(I) The names, addresses and phone numbers of public health organizations which provide information, materials, and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in Appendix I to this section, to comply with this requirement;

(J) The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

(iv) The employer shall also provide, at no cost to employees who perform housekeeping operations in an area which contains ACM or PACM, an asbestos awareness training course, which shall at a minimum contain the following elements: health effects of asbestos, locations of ACM and PACM in the building/facility, recognition of ACM and PACM damage and deterioration, requirements in this standard relating to housekeeping, and proper response to fiber release episodes, to all employees who perform housekeeping work in areas where ACM and/or PACM is present. Each such employee shall be so trained at least once a year.

(v) Access to information and training materials.

(A) The employer shall make a copy of this standard and its appendices readily available without cost to all affected employees.

(B) The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the training program to the Assistant Secretary and the Director.

(C) The employer shall inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, the employer shall distribute such material, consisting of NIH Publication No. 89-1647, or equivalent self-help material, which is approved or published by a public health organization listed in Appendix I to this section.

(8) Criteria to rebut the designation of installed material as PACM.

(i) At any time, an employer and/or building owner may demonstrate, for purposes of this standard, that PACM does not contain asbestos. Building owners and/or employers are not required to communicate information about the presence of building material for which such a demonstration pursuant to the requirements of paragraph (j)(8)(ii) of this section has been made. However, in all such cases, the information, data and analysis supporting the determination that PACM does not contain asbestos, shall be retained pursuant to paragraph (m) of this section.

(ii) An employer or owner may demonstrate that PACM does not contain asbestos by the following:

(A) Having a completed inspection conducted pursuant to the requirements of AHERA (40 CFR 763, Subpart E) which demonstrates that no ACM is present in the material; or

(B) Performing tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests shall include analysis of bulk samples collected in the manner described in 40 CFR 763.86. The tests, evaluation and sample collection shall be conducted by an accredited inspector or by a CIH. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the Round Robin for bulk samples administered by the American Industrial Hygiene Association (AIHA) or an equivalent nationally-recognized round robin testing program.

(iii) The employer and/or building owner may demonstrate that flooring material including associated mastic and backing does not contain asbestos, by a determination of an industrial hygienist based upon recognized analytical techniques showing that the material is not ACM.

(k) Housekeeping.

(1) All surfaces shall be maintained as free as practicable of ACM waste and debris and accompanying dust.

(2) All spills and sudden releases of material containing asbestos shall be cleaned up as soon as possible.

(3) Surfaces contaminated with asbestos may not be cleaned by the use of compressed air.

(4) Vacuuming. HEPA-filtered vacuuming equipment shall be used for vacuuming asbestos-containing waste and debris. The equipment shall be used and emptied in a manner which minimizes the reentry of asbestos into the workplace.

(5) Shoveling, dry sweeping and dry clean-up of asbestos may be used only where vacuuming and/or wet cleaning are not feasible.

(6) Waste disposal. Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with asbestos consigned for disposal, shall be collected, recycled and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(7) Care of asbestos-containing flooring material.

(i) Sanding of asbestos-containing floor material is prohibited.

(ii) Stripping of finishes shall be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods.

(iii) Burnishing or dry buffing may be performed only on asbestos-containing flooring which has sufficient finish so that the pad cannot contact the asbestos-containing material.

(8) Waste and debris and accompanying dust in an area containing accessible ACM and/or PACM or visibly deteriorated ACM, shall not be dusted or swept dry, or vacuumed without using a HEPA filter.

(l) Medical surveillance.

(1) General.

(i) Employees covered. The employer shall institute a medical surveillance program for all employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the TWA and/or excursion limit.

(ii) Examination by a physician.

(A) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee and at a reasonable time and place.

(B) Persons other than licensed physicians, who administer the pulmonary function testing required by this section, shall complete a training course in spirometry sponsored by an appropriate academic or professional institution.

(2) Pre-placement examinations.

(i) Before an employee is assigned to an occupation exposed to airborne concentrations of asbestos fibers at or above the TWA and/or excursion limit, a pre-placement medical examination shall be provided or made available by the employer.

(ii) Such examination shall include, as a minimum, a medical and work history; a complete physical examination of all systems with emphasis on the respiratory system, the cardiovascular system and digestive tract; completion of the respiratory disease standardized questionnaire in Appendix D to this section, Part 1; a ~~chest roentgenogram (posterior-anterior) 14 x 17 inch[es]~~ **or other reasonably-sized standard film or digital posterior-anterior chest X-ray**; pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV₁); and any additional tests deemed appropriate by the examining physician. ~~[Interpretation and c]~~ **Classification of all chest X-rays** ~~[roentgenograms]~~ shall be conducted in accordance with Appendix E to this section.

(3) Periodic examinations.

(i) Periodic medical examinations shall be made available annually.

(ii) The scope of the medical examination shall be in conformance with the protocol established in paragraph (l)(2)(ii) of this section, except that the frequency of chest **X-rays** ~~[roentgenograms]~~ shall be conducted in accordance with Table 1 **to this section**, and

the abbreviated standardized questionnaire contained in Part 2 of Appendix D to this section shall be administered to the employee.

Table 1 – Frequency of Chest Roentgenograms

Years since first exposure	Age of employee		
	15 to 35	35+ to 45	45+
0 to 10	Every 5 years	Every 5 years	Every 5 years
10+	Every 5 years	Every 2 years	Every 1 year

(4) Termination of employment examinations.

(i) The employer shall provide, or make available, a termination of employment medical examination for any employee who has been exposed to airborne concentrations of fibers of asbestos at or above the TWA and/or excursion limit.

(ii) The medical examination shall be in accordance with the requirements of the periodic examinations stipulated in paragraph (l)(3) of this section, and shall be given within 30 calendar days before or after the date of termination of employment.

(5) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with any of the preceding paragraphs (l)(2) through (l)(4) of this section within the past 1 year period. A pre-employment medical examination which was required as a condition of employment by the employer, may not be used by that employer to meet the requirements of this paragraph, unless the cost of such examination is borne by the employer.

(6) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and Appendices D and E.

(ii) A description of the affected employee's duties as they relate to the employee's exposure.

(iii) The employee's representative exposure level or anticipated exposure level.

(iv) A description of any personal protective and respiratory equipment used or to be used.

(v) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

(7) Physician's written opinion.

(i) The employer shall obtain a written signed opinion from the examining physician. This written opinion shall contain the results of the medical examination and shall include:

(A) The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;

(B) Any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators;

(C) A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions resulting from asbestos exposure that require further explanation or treatment; and

(D) A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

(ii) The employer shall instruct the physician not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos.

(iii) The employer shall provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

(m) Recordkeeping.

(1) Exposure measurements.

NOTE: The employer may utilize the services of competent organizations such as industry trade associations and employee associations to maintain the records required by this section.

(i) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to asbestos as prescribed in paragraph (d) of this section.

(ii) This record shall include at least the following information:

(A) The date of measurement;

(B) The operation involving exposure to asbestos which is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of respiratory protective devices worn, if any; and

(F) Name[, ~~social security number~~] and exposure of the employees whose exposure are represented.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.1020.

(2) Objective data for exempted operations.

(i) Where the processing, use, or handling of products made from or containing asbestos is exempted from other requirements of this section under paragraph (d)(2)(iii) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) The record shall include at least the following:

(A) The product qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of asbestos;

(D) A description of the operation exempted and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(3) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by paragraph (l)(1)(i) of this section, in accordance with 29 CFR 1910.1020.

(ii) The record shall include at least the following information:

(A) The name~~[and social security number]~~ of the employee;

(B) Physician's written opinions;

(C) Any employee medical complaints related to exposure to asbestos; and

(D) A copy of the information provided to the physician as required by paragraph (l)(6) of this section.

(iii) The employer shall ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.1020.

(4) Training. The employer shall maintain all employee training records for one (1) year beyond the last date of employment of that employee.

(5) Availability.

(i) The employer, upon written request, shall make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying.

(ii) The employer, upon request shall make any exposure records required by paragraph (m)(1) of this section available for examination and copying to affected employees, former employees, designated representatives and the Assistant Secretary, in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(iii) The employer, upon request, shall make employee medical records required by paragraph (m)(3) of this section available for examination and copying to the subject employee, to anyone having the specific written consent of the subject employee, and the Assistant Secretary, in accordance with 29 CFR 1910.1020.

(6) Transfer of records. The employer shall comply with the requirements concerning transfer of records set forth in 29 CFR 1910.1020(h).

(n) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to asbestos conducted in accordance with paragraph (d) of this section.

(2) Observation procedures. When observation of the monitoring of employee exposure to asbestos requires entry into an area where the use of protective clothing or equipment is required, the observer shall be provided with and be required to use such clothing and equipment and shall comply with all other applicable safety and health procedures.

(o) Appendices.

(1) Appendices A, C, D, E, and F to this section are incorporated as part of this section and the contents of these Appendices are mandatory.

(2) Appendices B, G, H, I, and J to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).

Stats. Implemented: ORS 654.001 to 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (temp).
APD Admin. Order 9-1989, f. 7/7/89, ef. 7/7/89 (perm).
OR-OSHA Admin. Order 3-1990, f. 1/19/90, ef. 1/19/90 (temp).
OR-OSHA Admin. Order 7-1990, f. 3/2/90, ef. 3/2/90 (perm).
OR-OSHA Admin. Order 13-1990, f. 6/28/90, ef. 8/1/90 (temp).
OR-OSHA Admin. Order 19-1990, f. 8/31/90, ef. 8/31/90 (perm).
OR-OSHA Admin. Order 7-1991, f. 4/25/91, ef. 4/25/91.
OR-OSHA Admin. Order 15-1991, f. 12/13/91, ef. 12/13/91.
OR-OSHA Admin. Order 6-1992, f. 5/18/92, ef. 5/18/92.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix D to 1910.1001 – Medical Questionnaires – Mandatory

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above the permissible exposure limit, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements.

Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

Part 1 – Initial Medical Questionnaire

1. NAME _____

[2. SOCIAL SECURITY No. _____
 1 2 3 4 5 6 7 8 9)

[3]2. CLOCK NUMBER

[4]3. PRESENT OCCUPATION _____

[5]4. PLANT_____

[6]5. ADDRESS

[7]6. _____
(Zip Code)

[8]7. TELEPHONE NUMBER _____

[9]8. INTERVIEWER _____

[10]9. DATE _____

[11]10. Date of Birth _____
Month Day Year

[12]11. Place of Birth _____

[13]12. Sex 1. Male _____ 2. Female _____

[14]13. What is your marital status? 1. Single _____ 4. Separated/
2. Married _____ Divorced _____
3. Widowed _____

[15]14. Race (Check all that apply.)
1. White _____ 4. Hispanic or Latino _____
2. Black or African American _____ 5. American Indian or Alaska Native _____
3. Asian _____ 6. Native Hawaiian
or Other Pacific Islander _____

[16]15. What is the highest grade completed in school? _____
(For example, 12 years is completion of high school)

OCCUPATIONAL HISTORY

[17]16

__A. Have you ever worked full time (30 hours per week or more) for 6 months or more?
1. Yes _____ 2. No _____

IF YES TO [17]16A:

B. Have you ever worked for a year or more in any dusty job?
1. Yes _____ 2. No _____ 3. Does Not Apply _____

Specify job/industry _____ Total Years Worked _____

Was dust exposure: 1. Mild _____ 2. Moderate _____ 3. Severe _____

C. Have you ever been exposed to gas or chemical fumes in your work?
1. Yes _____ 2. No _____

Specify job/industry _____ Total Years Worked _____

Was exposure: 1. Mild ____ 2. Moderate ____ 3. Severe ____

D. What has been your usual occupation or job—the one you have worked at the longest?

1. Job occupation _____

2. Number of years employed in this occupation _____

3. Position/job title _____

4. Business, field or industry _____

(Record on lines the years in which you have worked in any of these industries, e.g. 1960-1969)

Have you ever worked:

	YES	NO
E. In a mine?	<input type="checkbox"/>	<input type="checkbox"/>
F. In a quarry?	<input type="checkbox"/>	<input type="checkbox"/>
G. In a foundry?	<input type="checkbox"/>	<input type="checkbox"/>
H. In a pottery?	<input type="checkbox"/>	<input type="checkbox"/>
I. In a cotton, flax or hemp mill?	<input type="checkbox"/>	<input type="checkbox"/>
J. With asbestos?	<input type="checkbox"/>	<input type="checkbox"/>

[48]17.

PAST MEDICAL HISTORY

	YES	NO
A. Do you consider yourself to be in good health?	<input type="checkbox"/>	<input type="checkbox"/>
If "NO" state reason _____		
B. Have you any defect of vision?	<input type="checkbox"/>	<input type="checkbox"/>
If "YES" state nature of defect _____		
C. Have you any hearing defect?	<input type="checkbox"/>	<input type="checkbox"/>

If "YES" state nature of defect _____

D. Are you suffering from or have you ever suffered from:

- | | | |
|-----------------------------------------------|--------------------------|--------------------------|
| a. Epilepsy (or fits, seizures, convulsions)? | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Rheumatic fever? | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Kidney disease? | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Bladder disease? | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Diabetes? | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Jaundice? | <input type="checkbox"/> | <input type="checkbox"/> |

[49]**18. CHEST COLDS AND CHEST ILLNESSES**

[49]**18A.** If you get a cold, does it usually go to your chest?

(Usually means more than 1/2 the time)

1. Yes ____ 2. No ____ 3. Don't get colds ____

[20]**19A.** During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes ____ 2. No ____

IF YES TO [20]**19A:**

B. Did you produce phlegm with any of these chest illnesses?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. In the last 3 years, how many such illnesses with (increased) phlegm did you have which lasted a week or more?

No such illnesses ____ Number of illnesses ____

[24]**20.** Did you have any lung trouble before the age of 16?

1. Yes ____ 2. No ____

[22]**21.** Have you ever had any of the following:

1A. Attacks of bronchitis? 1. Yes ____ 2. No ____

IF YES TO 1A:

B. Was it confirmed by a doctor? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. At what age was your first attack? Age in Years ____ Does Not Apply ____

2A. Pneumonia (include bronchopneumonia)? 1. Yes ____ 2. No ____

IF YES TO 2A:

B. Was it confirmed by a doctor? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. At what age did you first have it? Age in Years ____ Does Not Apply ____

3A. Hay Fever? 1. Yes ____ 2. No ____

IF YES TO 3A:

B. Was it confirmed by a doctor? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. At what age did it start? Age in Years ____ Does Not Apply ____

[23]**22A.** Have you ever had chronic bronchitis? 1. Yes ____ 2. No ____

IF YES TO [23]**22A:**

B. Do you still have it? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. Was it confirmed by a doctor? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. At what age did it start? Age in Years ____ Does Not Apply ____

[24]**23A.** Have you ever had emphysema? 1. Yes ____ 2. No ____

IF YES TO [24]**23A:**

B. Do you still have it? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. Was it confirmed by a doctor? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. At what age did it start? Age in Years ____ Does Not Apply ____

[25]**24A.** Have you ever had asthma? 1. Yes ____ 2. No ____

IF YES TO [25]**24A:**

B. Do you still have it? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. Was it confirmed by a doctor? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. At what age did it start? Age in Years _____ Does Not Apply _____

E. If you no longer have it, at what age did it stop?
Age stopped _____ Does Not Apply _____

[26]~~26~~25. Have you ever had:

A. Any other chest illness? 1. Yes _____ 2. No _____

If yes, please specify _____

B. Any chest operations? 1. Yes _____ 2. No _____

If yes, please specify _____

C. Any chest injuries? 1. Yes _____ 2. No _____

If yes, please specify _____

[27]~~26~~26A. Has a doctor ever told you that you had heart trouble?

1. Yes _____ 2. No _____

IF YES TO [27]~~26~~26A:

B. Have you ever had treatment for heart trouble in the past 10 years?

1. Yes _____ 2. No _____ 3. Does Not Apply _____

[28]~~27~~27A. Has a doctor ever told you that you had high blood pressure?

1. Yes _____ 2. No _____

IF YES TO [28]~~27~~27A:

B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes _____ 2. No _____ 3. Does Not Apply _____

[29]~~28~~28. When did you last have your chest X-rayed?(Year) _____

[30]~~29~~29. Where did you last have your chest X-rayed (if known)? _____

What was the outcome? _____

FAMILY HISTORY

[34]~~30~~**30**. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:

	FATHER			MOTHER		
	1. Yes	2. No	3. Don't Know	1. Yes	2. No	3. Don't Know
A. Chronic Bronchitis?	_____	_____	_____	_____	_____	_____
B. Emphysema?	_____	_____	_____	_____	_____	_____
C. Asthma?	_____	_____	_____	_____	_____	_____
D. Lung cancer?	_____	_____	_____	_____	_____	_____
E. Other chest conditions	_____	_____	_____	_____	_____	_____
F. Is parent currently alive?	_____	_____	_____	_____	_____	_____
G. Please Specify	_____ Age if Living _____ Age at Death _____ Don't Know			_____ Age if Living _____ Age at Death _____ Don't Know		
H. Please specify cause of death	_____			_____		

[32]~~31~~**31**A. Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.) [If no, skip to question [32]~~31~~**31**C.]

1. Yes _____ 2. No _____

B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week?
1. Yes _____ 2. No _____

C. Do you usually cough at all on getting up or first thing in the morning?
1. Yes _____ 2. No _____

D. Do you usually cough at all during the rest of the day or at night?
1. Yes _____ 2. No _____

IF YES TO ANY OF ABOVE ([32]~~31~~**31**A, B, C, or D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO EPISODES OF COUGH AND PHLEGM

E. Do you usually cough like this on most days for 3 consecutive months or more during the year?
1. Yes _____ 2. No _____ 3. Does Not Apply _____

F. For how many years have you had the cough?
Number of years _____ Does not apply _____

[33]32A. Do you usually bring up phlegm from your chest? (Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.) (If no, skip to 33C) 1. Yes ____ 2. No ____

B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week? 1. Yes ____ 2. No ____

C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes ____ 2. No ____

D. Do you usually bring up phlegm at all during the rest of the day or at night? 1. Yes ____ 2. No ____

IF YES TO ANY OF THE ABOVE (33A, B, C, or D), ANSWER THE FOLLOWING: IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO [34]33A.

E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

F. For how many years have you had trouble with phlegm?
Number of years ____ Does not apply ____

EPISODES OF COUGH AND PHLEGM

[34]33A. Have you had periods or episodes of (increased*) cough and phlegm lasting for 3 weeks or more each year? *(For persons who usually have cough and/or phlegm) 1. Yes ____ 2. No ____

If YES TO [34]33A

B. For how long have you had at least 1 such episode per year?
Number of years ____ Does not apply ____

WHEEZING

[35]34A. Does your chest ever sound wheezy or whistling

1. When you have a cold?	1. Yes ____	2. No ____
2. Occasionally apart from colds?	1. Yes ____	2. No ____
3. Most days or nights?	1. Yes ____	2. No ____

IF YES TO 1, 2, or 3 in [35]34A

B. For how many years has this been present?
Number of years ____ Does not apply ____

[36]35A. Have you ever had an attack of wheezing that has made you feel short of breath?

1. Yes ____ 2. No ____

IF YES TO [36]35A

B. How old were you when you had your first such attack?

Age in Years ____ Does Not Apply ____

C. Have you had 2 or more such episodes?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. Have you ever required medicine or treatment for the(se) attack(s)?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

BREATHLESSNESS

[37]36. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 39A.

Nature of condition(s) _____

[38]37A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill? 1. Yes ____ 2. No ____

IF YES TO [38]37A

B. Do you have to walk slower than people of your age on the level because of breathlessness?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. Do you ever have to stop for breath when walking at your own pace on the level?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

TOBACCO SMOKING

[39]38A. Have you ever smoked cigarettes? (No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.)

1. Yes ____ 2. No ____

IF YES TO [39]**38A**

B. Do you now smoke cigarettes (as of one month ago)

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. How old were you when you first started regular cigarette smoking?

Age in Years ____ Does Not Apply ____

D. If you have stopped smoking cigarettes completely, how old were you when you stopped? Age stopped ____ Check if still smoking ____ Does not apply ____

E. How many cigarettes do you smoke per day now?

Cigarettes per day ____ Does not apply ____

F. On the average of the entire time you smoked, how many cigarettes did you smoke per day? Cigarettes per day ____ Does not apply ____

G. Do or did you inhale the cigarette smoke?

- | | |
|------------------------|--------------------|
| 1. Does not apply ____ | 4. Moderately ____ |
| 2. Not at all ____ | 5. Deeply ____ |
| 3. Slightly ____ | |

[40]**39A**. Have you ever smoked a pipe regularly? (Yes means more than 12 oz. of tobacco in a lifetime.) 1. Yes ____ 2. No ____

IF YES TO 40A:

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

B. 1. How old were you when you started to smoke a pipe regularly? Age ____

2. If you have stopped smoking a pipe completely, how old were you when you stopped? Age stopped ____ Check if still smoking ____ Does not apply ____

C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week?

____ oz. per week (a standard pouch of tobacco contains 1-1/2 oz.)

____ Does not apply

D. How much pipe tobacco are you smoking now?

oz. per week ____

Not currently smoking a pipe ____

E. Do you or did you inhale the pipe smoke?

- | | |
|-----------------------|---------------------|
| 1. Never smoked _____ | 4. Moderately _____ |
| 2. Not at all _____ | 5. Deeply _____ |
| 3. Slightly _____ | |

[44]~~40~~A. Have you ever smoked cigars regularly? (Yes means more than 1 cigar a week for a year) 1. Yes ____ 2. No ____

IF YES TO [44]~~40~~A

FOR PERSONS WHO HAVE EVER SMOKED CIGARS

B. 1. How old were you when you started smoking cigars regularly? Age ____

2. If you have stopped smoking cigars completely, how old were you when you stopped? Age stopped ____ Check if still smoking ____ Does not apply ____

C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week? Cigars per week ____ Does not apply ____

D. How many cigars are you smoking per week now? Cigars per week ____ Check if not smoking cigars currently ____

E. Do or did you inhale the cigar smoke?

- | | |
|-----------------------|---------------------|
| 1. Never smoked _____ | 4. Moderately _____ |
| 2. Not at all _____ | 5. Deeply _____ |
| 3. Slightly _____ | |

Date _____ Signature _____

Part 2 – Periodic Medical Questionnaire

1. NAME _____

[2. SOCIAL SECURITY No. _____

 1 2 3 4 5 6 7 8 9

[3] 2. CLOCK NUMBER

[4]3. PRESENT OCCUPATION _____

[5]4. PLANT _____

[6]5. ADDRESS _____

[7]6. _____
(Zip Code)

[8]7. TELEPHONE NUMBER _____

[9] **8. INTERVIEWER** _____

[10]9. DATE _____

[44]**10.** What is your marital status? 1. Single _____ 4. Separated/
2. Married _____ Divorced _____
3. Widowed _____

11. OCCUPATIONAL HISTORY

[12]11A. In the past year, did you work full time (30 hours per week or more) for 6 months or more?

1. Yes _____ 2. No _____

IF YES TO 12A

[42]**11B.** In the past year, did you work in a dusty job?
1. Yes _____ 2. No _____ 3. Does Not Apply _____

~~12~~11C. Was dust exposure: 1. Mild ____ 2. Moderate ____ 3. Severe ____

[42]**11D**. In the past year, were you exposed to gas or chemical fumes in your work?
1. Yes _____ 2. No _____

[42]11E. Was exposure: 1. Mild ____ 2. Moderate ____ 3. Severe ____

[42]11F. In the past year, what was your: 1. Job/occupation? _____

2. Position/job title? _____

[43]12. RECENT MEDICAL HISTORY

[43]12A. Do you consider yourself to be in good health? Yes ____ No ____

If NO, state reason

[43]12B. In the past year, have you developed:	<u>Yes</u>	<u>No</u>
Epilepsy?	_____	_____
Rheumatic fever?	_____	_____
Kidney disease?	_____	_____
Bladder disease?	_____	_____
Diabetes?	_____	_____
Jaundice?	_____	_____
Cancer?	_____	_____

[44]13. CHEST COLDS AND CHEST ILLNESSES

[44]13A. If you get a cold, does it usually go to your chest?
(Usually means more than 1/2 the time) 1. Yes ____ 2. No ____ 3. Don't get colds ____

[45]14A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed? 1. Yes ____ 2. No ____ 3. Does Not Apply ____

IF YES TO [20]14A:

14 B. Did you produce phlegm with any of these chest illnesses?
1. Yes ____ 2. No ____ 3. Does Not Apply ____

14C. In the last year, how many such illnesses with (increased) phlegm did you have which lasted a week or more?

No such illnesses ____ Number of illnesses ____

[46]15. RESPIRATORY SYSTEM

In the past year have you had: Yes or No Further Comment on Positive Answers

Asthma _____

Bronchitis _____

Yes or No

Further Comment on Positive

Hay Fever _____

Other Allergies _____

Pneumonia _____

Tuberculosis _____

Chest Surgery _____

Other Lung Problems _____

Heart Disease _____

Do you have:

Yes or No

Further Comment on Positive Answers

Frequent colds _____

Chronic cough _____

Shortness of breath when walking
or climbing one flight of stairs _____

Do you:

Wheeze _____

Cough up phlegm _____

Smoke cigarettes _____ Packs per day _____ How many years _____

Date _____ Signature _____

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (Asbestos-temp).
APD Admin. Order 9-1989, f. 7/7/89, ef. 7/7/89 (Asbestos-perm).
OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92.
OR-OSHA Admin. Order 4-1995, f. 3/29/95, ef. 3/29/95.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix E to 1910.1001 – Interpretation and Classification of Chest **X-Rays**~~[Roentgenograms]~~ – Mandatory

(a) Chest **X-rays**~~[roentgenograms]~~ shall be ~~interpreted and~~ classified in accordance with **the Guidelines for the use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011) (incorporated by reference, see § 1910.6), and recorded on a classification**~~[a professionally accepted Classification system and recorded on an interpretation]~~ form following the format of the CDC/NIOSH (M) 2.8 form. As a minimum, the content within the bold lines of this form (items 1 through 4) shall be included. This form is not to be submitted to NIOSH.

(b) All **X-rays**~~[Roentgenograms]~~ shall be~~[interpreted and]~~ classified only by a B-reader, a board eligible/certified radiologist, or an experienced physician with known expertise in pneumoconioses.

(c) Whenever classifying chest X-ray film, the physician~~[All interpreters, whenever interpreting chest roentgenograms made under this section,]~~ shall have immediately available for reference a complete set of the ILO **standard format radiographs provided for use with the Guidelines for the use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011).**~~[U/C International Classification of Radiographs for Pneumoconioses, 1980.]~~

(d) Whenever classifying digitally-acquired chest X-rays, the physician shall have immediately available for reference a complete set of ILO standard digital chest radiographic images provided for use with the Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011). Classification of digitally-acquired chest X-rays shall be based on the viewing of images displayed as electronic copies and shall not be based on the viewing of hard copy printed transparencies of images.

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (Asbestos-temp).
APD Admin. Order 9-1989, f. 7/7/89, ef. 7/7/89 (Asbestos-perm).
OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix H to 1910.1001 – Medical Surveillance Guidelines for Asbestos – Non-mandatory

I. Route of Entry Inhalation, Ingestion

II. Toxicology

Clinical evidence of the adverse effects associated with exposure to asbestos is present in the form of several well-conducted epidemiological studies of occupationally exposed workers, family contacts of workers, and persons living near asbestos mines. These studies have shown a definite association between exposure to asbestos and an increased incidence of lung cancer, pleural and peritoneal mesothelioma, gastrointestinal cancer, and asbestosis. The latter is a disabling fibrotic lung disease that is caused only by exposure to asbestos. Exposure to asbestos has also been associated with an increased incidence of esophageal, kidney, laryngeal, pharyngeal, and buccal cavity cancers. As with other known chronic occupational diseases, disease associated with asbestos generally appears about 20 years following the first occurrence of exposure: There are no known acute effects associated with exposure to asbestos.

Epidemiological studies indicate that the risk of lung cancer among exposed workers who smoke cigarettes is greatly increased over the risk of lung cancer among non-exposed smokers or exposed nonsmokers. These studies suggest that cessation of smoking will reduce the risk of lung cancer for a person exposed to asbestos but will not reduce it to the same level of risk as that existing for an exposed worker who has never smoked.

III. Signs and Symptoms of Exposure-Related Disease

The signs and symptoms of lung cancer or gastrointestinal cancer induced by exposure to asbestos are not unique, except that a chest X-ray of an exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis, **and may also show asbestosis (i.e., small irregular parenchymal opacities)**. Symptoms characteristic of mesothelioma include shortness of breath, pain in the walls of the chest, or abdominal pain. Mesothelioma has a much longer latency period compared with lung cancer (40 years versus 15-20 years), and mesothelioma is therefore more likely to be found among workers who were first exposed to asbestos at an early age. Mesothelioma is **a[always] fatal disease**.

Asbestosis is pulmonary fibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is based on a history of exposure to asbestos, the presence of characteristic radiologic **abnormalities[changes]**, end-inspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening are observed on X rays taken during the early stages of the disease. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

IV. Surveillance and Preventive Considerations

As noted ~~[above]~~ **in section III of this appendix**, exposure to asbestos has been linked to an increased risk of lung cancer, mesothelioma, gastrointestinal cancer, and asbestosis

among occupationally exposed workers. Adequate screening tests to determine an employee's potential for developing serious chronic diseases, such as cancer, from exposure to asbestos do not presently exist. However, some tests, particularly chest X-rays and pulmonary function tests, may indicate that an employee has been overexposed to asbestos increasing his or her risk of developing exposure-related chronic diseases. It is important for the physician to become familiar with the operating conditions in which occupational exposure to asbestos is likely to occur. This is particularly important in evaluating medical and work histories and in conducting physical examinations. When an active employee has been identified as having been over-exposed to asbestos measures taken by the employer to eliminate or mitigate further exposure should also lower the risk of serious long-term consequences.

The employer is required to institute a medical surveillance program for all employees who are or will be exposed to asbestos at or above the permissible exposure limit (0.1 fiber per cubic centimeter of air). All examinations and procedures must be performed by or under the supervision of a licensed physician, at a reasonable time and place, and at no cost to the employee.

Although broad latitude is given to the physician in prescribing specific tests to be included in the medical surveillance program, OSHA requires inclusion of the following elements in the routine examination:

- (i) Medical and work histories with special emphasis directed to symptoms of the respiratory system, cardiovascular system, and digestive tract.
- (ii) Completion of the respiratory disease questionnaire contained in Appendix D.
- (iii) A physical examination including a chest **X-ray**~~[roentgenogram]~~ and pulmonary function test that includes measurement of the employee's forced vital capacity (FVC) and forced expiratory volume at one second (FEV1).
- (iv) Any laboratory or other test that the examining physician deems by sound medical practice to be necessary.

The employer is required to make the prescribed tests available at least annually to those employees covered; more often than specified if recommended by the examining physician; and upon termination of employment.

The employer is required to provide the physician with the following information: A copy of this standard and **all** appendices; a description of the employee's duties as they relate to asbestos exposure; the employee's representative level of exposure to asbestos; a description of any personal protective and respiratory equipment used; and information from previous medical examinations of the affected employee that is not otherwise available to the physician. Making this information available to the physician will aid in the evaluation of the employee's health in relation to assigned duties and fitness to wear personal protective equipment, if required.

The employer is required to obtain a written opinion from the examining physician containing the results of the medical examination; the physician's opinion as to whether the employee

has any detected medical conditions that would place the employee at an increased risk of exposure-related disease; any recommended limitations on the employee or on the use of personal protective equipment; and a statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions related to asbestos exposure that require further explanation or treatment. This written opinion must not reveal specific findings or diagnoses unrelated to exposure to asbestos and a copy of the opinion must be provided to the affected employee.

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (Asbestos-temp).
APD Admin. Order 9-1989, f. 7/7/89, ef. 7/7/89 (Asbestos-perm).
OR-OSHA Admin. Order 3-1990, f. 1/19/90, ef. 1/19/90 (temp).
OR-OSHA Admin. Order 7-1990, f. 3/2/90, ef. 3/2/90 (perm).
OR-OSHA Admin. Order 7-1991, f. 4/25/91, ef. 4/25/91.
OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92.
OR-OSHA Admin. Order 4-1995, f. 3/29/95, ef. 3/29/95.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1017

Vinyl Chloride.

(a) Scope and application.

(1) This section includes requirements for the control of employee exposure to vinyl chloride (chloroethene), Chemical Abstracts Service Registry No. 75014.

(2) This section applies to the manufacture, reaction, packaging, repackaging, storage, handling or use of vinyl chloride or polyvinyl chloride, but does not apply to the handling or use of fabricated products made of polyvinyl chloride.

(3) This section applies to the transportation of vinyl chloride or polyvinyl chloride except to the extent that the Department of Transportation may regulate the hazards covered by this section.

(b) Definitions.

(1) Action level means a concentration of vinyl chloride of 0.5 ppm averaged over an 8-hour work day.

(2) Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or his designee.

(3) Authorized person means any person specifically authorized by the employer whose duties require him to enter a regulated area or any person entering such an area as a designated representative of employees for the purpose of exercising an opportunity to observe monitoring and measuring procedures.

(4) Director means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or his designee.

(5) Emergency means any occurrence such as, but not limited to, equipment failure, or operation of a relief device which is likely to, or does, result in massive release of vinyl chloride.

(6) Fabricated product means a product made wholly or partly from polyvinyl chloride, and which does not require further processing at temperatures, and for times, sufficient to cause mass melting of the polyvinyl chloride resulting in the release of vinyl chloride.

(7) Hazardous operation means any operation, procedure, or activity where a release of either vinyl chloride liquid or gas might be expected as a consequence of the operation or because of an accident in the operation, which would result in an employee exposure in excess of the permissible exposure limit.

(8) OSHA Area Director means the Director for the Occupational Safety and Health Administration Area Office having jurisdiction over the geographic area in which the employer's establishment is located.

(9) Polyvinyl chloride means polyvinyl chloride homopolymer or copolymer before such is converted to a fabricated product.

(10) Vinyl chloride means vinyl chloride monomer.

(c) Permissible exposure limit.

(1) No employee may be exposed to vinyl chloride at concentrations greater than 1 ppm averaged over any 8-hour period, and

(2) No employee may be exposed to vinyl chloride at concentrations greater than 5 ppm averaged over any period not exceeding 15 minutes.

(3) No employee may be exposed to vinyl chloride by direct contact with liquid vinyl chloride.

(d) Monitoring.

(1) A program of initial monitoring and measurement shall be undertaken in each establishment to determine if there is any employee exposed, without regard to the use of respirators, in excess of the action level.

(2) Where a determination conducted under paragraph (d)(1) of this section shows any employee exposures, without regard to the use of respirators, in excess of the action level, a program for determining exposures for each such employee shall be established. Such a program:

(i) Must be repeated at least quarterly for any employee is exposed, without regard to the use of respirators, in excess of the permissible exposure limit.

(ii) Must be repeated not less than every 6 months for any employee is exposed, without regard to the use of respirators, in excess of the action level.

(iii) May be discontinued for any employee only when at least two consecutive monitoring determinations, made not less than 5 working days apart, show exposures for that employee at or below the action level.

(3) Whenever there has been a production, process or control change which may result in an increase in the release of vinyl chloride, or the employer has any other reason to suspect that any employee may be exposed in excess of the action level, a determination of employee exposure under paragraph (d)(1) of this section shall be performed.

(4) The method of monitoring and measurement shall have an accuracy (with a confidence level of 95 percent) of not less than plus or minus 50 percent from 0.25 through 0.5 ppm, plus or minus 35 percent from over 0.5 ppm through 1.0 ppm, and plus or minus 25 percent over 1.0 ppm. (Methods meeting these accuracy requirements are available in the "NIOSH Manual of Analytical Methods").

(5) Employees or their designated representatives shall be afforded reasonable opportunity to observe the monitoring and measuring required by this paragraph.

(e) Regulated area.

(1) A regulated area shall be established where:

(i) Vinyl chloride or polyvinyl chloride is manufactured, reacted, repackaged, stored, handled or used; and

(ii) Vinyl chloride concentrations are in excess of the permissible exposure limit.

(2) Access to regulated areas shall be limited to authorized persons.

(f) Methods of compliance. Employee exposures to vinyl chloride shall be controlled to at or below the permissible exposure limit provided in paragraph (c) of this section by engineering, work practice, and personal protective controls as follows:

(1) Feasible engineering and work practice controls shall immediately be used to reduce exposures to at or below the permissible exposure limit.

(2) Wherever feasible engineering and work practice controls which can be instituted immediately are not sufficient to reduce exposures to at or below the permissible exposure limit, they shall nonetheless be used to reduce exposures to the lowest practicable level, and shall be supplemented by respiratory protection in accordance with paragraph (g) of this section. A program shall be established and implemented to reduce exposures to at or below the permissible exposure limit, or to the greatest extent feasible, solely by means of engineering and work practice controls, as soon as feasible.

(3) Written plans for such a program shall be developed and furnished upon request for examination and copying to authorized representatives of the Assistant Secretary and the Director. Such plans must be updated at least annually.

(g) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph.

Oregon OSHA repealed 1910.1017(g)(2). In Oregon, OAR 437-002-1017 applies.

437-002-1017 Vinyl Chloride Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii), and (d)(3)(iii)(B)(1) and (2)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1017, Vinyl Chloride, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Vinyl Chloride rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide an organic vapor cartridge that has a service life of at least 1-hour when using a chemical cartridge respirator at vinyl chloride concentrations up to 10 ppm.

(C) Select a canister that has a service life of at least 4 hours when using a powered air-purifying respirator having a hood, helmet, or full or half facepiece, or a gas mask with a front- or back-mounted canister, at vinyl chloride concentrations up to 25 ppm.

(ii) When air-purifying respirators are used:

(A) Air-purifying canisters or cartridges must be replaced prior to the expiration of their service life or the end of the shift in which they are first used, whichever occurs first.

(B) A continuous-monitoring and alarm system must be provided when concentrations of vinyl chloride could reasonably exceed the allowable concentrations for the devices in use.

Such a system must be used to alert employees when vinyl chloride concentrations exceed the allowable concentrations for the devices in use.

(h) Hazardous operations.

(1) Employees engaged in hazardous operations, including entry of vessels to clean polyvinyl chloride residue from vessel walls, shall be provided and required to wear and use;

(i) Respiratory protection in accordance with paragraphs (c) and (g) of this section; and

(ii) Protective garments to prevent skin contact with liquid vinyl chloride or with polyvinyl chloride residue from vessel walls. The protective garments shall be selected for the operation and its possible exposure conditions.

(2) Protective garments shall be provided clean and dry for each use.

(i) Emergency situations. A written operational plan for emergency situations shall be developed for each facility storing, handling, or otherwise using vinyl chloride as a liquid or compressed gas. Appropriate portions of the plan shall be implemented in the event of an emergency. The plan shall specifically provide that:

(1) Employees engaged in hazardous operations or correcting situations of existing hazardous releases shall be equipped as required in paragraph (h) of this section;

(2) Other employees not so equipped shall evacuate the area and not return until conditions are controlled by the methods required in paragraph (f) of this section and the emergency is abated.

(j) Training. Each employee engaged in vinyl chloride or polyvinyl chloride operations shall be provided training in a program relating to the hazards of vinyl chloride and precautions for its safe use.

(1) The program shall include:

(i) The nature of the health hazard from chronic exposure to vinyl chloride including specifically the carcinogenic hazard;

(ii) The specific nature of operations which could result in exposure to vinyl chloride in excess of the permissible limit and necessary protective steps;

(iii) The purpose for, proper use, and limitations of respiratory protective devices;

(iv) The fire hazard and acute toxicity of vinyl chloride, and the necessary protective steps;

(v) The purpose for and a description of the monitoring program;

(vi) The purpose for, and a description of, the medical surveillance program;

(vii) Emergency procedures;

(viii) Specific information to aid the employee in recognition of conditions which may result in the release of vinyl chloride; and

(ix) A review of this standard at the employee's first training and indoctrination program, and annually thereafter.

(2) All materials relating to the program shall be provided upon request to the Assistant Secretary and the Director.

(k) Medical surveillance. A program of medical surveillance shall be instituted for each employee exposed, without regard to the use of respirators, to vinyl chloride in excess of the action level. The program shall provide each such employee with an opportunity for examinations and tests in accordance with this paragraph. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee.

(1) At the time of initial assignment, or upon institution of medical surveillance;

(i) A general physical examination shall be performed, with specific attention to detecting enlargement of liver, spleen or kidneys, or dysfunction in these organs, and for abnormalities in skin, connective tissues and the pulmonary system (See Appendix A).

(ii) A medical history shall be taken, including the following topics:

(A) Alcohol intake;

(B) Past history of hepatitis;

(C) Work history and past exposure to potential hepatotoxic agents, including drugs and chemicals;

(D) Past history of blood transfusions; and

(E) Past history of hospitalizations.

(iii) A serum specimen shall be obtained and determinations made of:

(A) Total bilirubin;

(B) Alkaline phosphatase;

(C) Serum glutamic oxalacetic transaminase (SGOT);

(D) Serum glutamic pyruvic transaminase (SGPT); and

(E) Gamma glutamyl transpeptidase.

(2) Examinations must be provided in accordance with this paragraph at least annually:

(i) Every 6 months for each employee who has been employed in vinyl chloride or polyvinyl chloride manufacturing for 10 years or longer; and

(ii) Annually for all other employees.

(3) Each employee exposed to an emergency shall be afforded appropriate medical surveillance.

(4) A statement of each employee's suitability for continued exposure to vinyl chloride including use of protective equipment and respirators, shall be obtained from the examining physician promptly after any examination. A copy of the physician's statement shall be provided each employee.

(5) If any employee's health would be materially impaired by continued exposure, such employee shall be withdrawn from possible contact with vinyl chloride.

(6) Laboratory analyses for all biological specimens included in medical examinations shall be performed by accredited laboratories.

(7) If the examining physician determines that alternative medical examinations to those required by paragraph (k)(1) of this section will provide at least equal assurance of detecting medical conditions pertinent to the exposure to vinyl chloride, the employer may accept such alternative examinations as meeting the requirements of paragraph (k)(1) of this section, if the employer obtains a statement from the examining physician setting forth the alternative examinations and the rationale for substitution. This statement shall be available upon request for examination and copying to authorized representatives of the Assistant Secretary and the Director.

(l) Communication of hazards.

(1) Hazard communication—general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for vinyl chloride and polyvinyl chloride.

(ii) In classifying the hazards of vinyl chloride at least the following hazards are to be addressed: Cancer; central nervous system effects; liver effects; blood effects; and flammability.

(iii) Employers shall include vinyl chloride in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of vinyl chloride and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (j) of this section.

(2) Signs.

(i) The employer shall post entrances to regulated areas with legible signs bearing the legend:

DANGER
VINYL CHLORIDE
MAY CAUSE CANCER
AUTHORIZED PERSONNEL ONLY

(ii) The employer shall post signs at areas containing hazardous operations or where emergencies currently exist. The signs shall be legible and bear the legend:

DANGER
VINYL CHLORIDE
MAY CAUSE CANCER
WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(iii) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (l)(2)(i) of this section:

CANCER-SUSPECT AGENT AREA
AUTHORIZED PERSONNEL ONLY

(iv) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (l)(2)(ii) of this section:

CANCER-SUSPECT AGENT IN THIS AREA
PROTECTIVE EQUIPMENT REQUIRED
AUTHORIZED PERSONNEL ONLY

(3) Labels.

(i) In addition to the other requirements in this paragraph (l), the employer shall ensure that labels for containers of polyvinyl chloride resin waste from reactors or other waste contaminated with vinyl chloride are legible and include the following information:

CONTAMINATED WITH VINYL CHLORIDE
MAY CAUSE CANCER

(ii) Prior to June 1, 2015, employers may include the following information on labels of containers of polyvinyl chloride resin waste from reactors or other waste contaminated with vinyl chloride in lieu of the labeling requirements in paragraphs (l)(3)(i) of this section:

CONTAMINATED WITH VINYL CHLORIDE
CANCER-SUSPECT AGENT

(4) Prior to June 1, 2015, employers may include the following information for containers of polyvinyl chloride in lieu of the labeling requirements in paragraphs (l)(1)(i) of this section:

POLYVINYL CHLORIDE (OR TRADE NAME)
Contains
VINYL CHLORIDE
VINYL CHLORIDE IS A CANCER-SUSPECT AGENT

(5) Containers of vinyl chloride shall be legibly labeled either:

(i) Prior to June 1, 2015, employers may include either the following information in either paragraph (I)(5)(i) or (I)(5)(ii) of this section on containers of vinyl chloride in lieu of the labeling requirements in paragraph (I)(1)(i) of this section:

VINYL CHLORIDE
EXTREMELY FLAMMABLE GAS UNDER PRESSURE
CANCER-SUSPECT AGENT

(ii) In accordance with 49 CFR Parts 170-189, with the additional legend applied near the label or placard:

CANCER-SUSPECT AGENT

(6) No statement shall appear on or near any required sign, label, or instruction which contradicts or detracts from the effect of any required warning, information, or instruction.

(m) Records.

(1) All records maintained in accordance with this section shall include the name ~~[and social security number]~~ of each employee where relevant.

(2) Records of required monitoring and measuring and medical records shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i). These records shall be provided upon request to the Director. Authorized personnel rosters shall also be provided upon request to the Assistant Secretary and the Director.

(i) Monitoring and measuring records shall:

(A) State the date of such monitoring and measuring and the concentrations determined and identify the instruments and methods used;

(B) Include any additional information necessary to determine individual employee exposures where such exposures are determined by means other than individual monitoring of employees; and

(C) Be maintained for not less than 30 years.

(ii) [Reserved]

(iii) Medical records shall be maintained for the duration of the employment of each employee plus 20 years, or 30 years, whichever is longer.

(n) Employee notification of monitoring results. The employee must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results and the steps being taken to reduce exposures within the permissible exposure limit either individually in writing or by posting the results in an appropriate location that is accessible to affected employees.

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1018

Inorganic Arsenic.

(a) Scope and application. This section applies to all occupational exposures to inorganic arsenic except that this section does not apply to employee exposures in agriculture or resulting from pesticide application, the treatment of wood with preservatives or the utilization of arsenically preserved wood.

(b) Definitions.

Action level means a concentration of inorganic arsenic of 5 micrograms per cubic meter of air (5 µg/m³) averaged over any eight (8) hour period.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (e) of this section.

Director means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Inorganic arsenic means copper acetoarsenite and all inorganic compounds containing arsenic except arsine, measured as arsenic (As).

(c) Permissible exposure limit. The employer shall assure that no employee is exposed to inorganic arsenic at concentrations greater than 10 micrograms per cubic meter of air (10 µg/m³), averaged over any 8-hour period.

(d) Reserved.

(e) Exposure monitoring.

(1) General.

(i) Determinations of airborne exposure levels shall be made from air samples that are representative of each employee's exposure to inorganic arsenic over an eight (8) hour period.

(ii) For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(iii) The employer shall collect full shift (for at least 7 continuous hours) personal samples including at least one sample for each shift for each job classification in each work area.

(2) Initial monitoring. Each employer who has a workplace or work operation covered by this standard shall monitor each such workplace and work operation to accurately determine the airborne concentration of inorganic arsenic to which employees may be exposed.

(3) Frequency.

(i) If the initial monitoring reveals employee exposure to be below the action level the measurements need not be repeated except as otherwise provided in paragraph (e)(4) of this section.

(ii) If the initial monitoring, required by this section, or subsequent monitoring reveals employee exposure to be above the permissible exposure limit, the employer shall repeat monitoring at least quarterly.

(iii) If the initial monitoring, required by this section, or subsequent monitoring reveals employee exposure to be above the action level and below the permissible exposure limit the employer shall repeat monitoring at least every six months.

(iv) The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least seven (7) days apart, are below the action level at which time the employer may discontinue monitoring for that employee until such time as any of the events in paragraph (e)(4) of this section occur.

(4) Additional monitoring. Whenever there has been a production, process, control or personal change which may result in new or additional exposure to inorganic arsenic, or whenever the employer has any other reason to suspect a change which may result in new or additional exposures to inorganic arsenic, additional monitoring which complies with paragraph (e) of this section shall be conducted.

(5) Employee notification.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to affected employees.

(ii) Whenever the results indicate that the representative employee exposure exceeds the permissible exposure limit, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action taken to reduce exposure to or below the permissible exposure limit.

(6) Accuracy of measurement.

(i) The employer shall use a method of monitoring and measurement which has an accuracy (with a confidence level of 95 percent) of not less than plus or minus 25 percent for concentrations of inorganic arsenic greater than or equal to 10 µg/m³.

(ii) The employer shall use a method of monitoring and measurement which has an accuracy (with confidence level of 95 percent) of not less than plus or minus 35 percent for concentrations of inorganic arsenic greater than 5 µg/m³ but less than 10 µg/m³.

(f) Regulated area.

(1) Establishment. The employer shall establish regulated areas where worker exposures to inorganic arsenic, without regard to the use of respirators, are in excess of the permissible limit.

(2) Demarcation. Regulated areas shall be demarcated and segregated from the rest of the workplace in any manner that minimizes the number of persons who will be exposed to inorganic arsenic.

(3) Access. Access to regulated areas shall be limited to authorized persons or to persons otherwise authorized by the Act or regulations issued pursuant thereto to enter such areas.

(4) Provision of respirators. All persons entering a regulated area shall be supplied with a respirator, selected in accordance with paragraph (h)(2) of this section.

(5) Prohibited activities. The employer shall assure that in regulated areas, food or beverages are not consumed, smoking products, chewing tobacco and gum are not used and cosmetics are not applied, except that these activities may be conducted in the lunchrooms, change rooms and showers required under paragraph (m) of this section. Drinking water may be consumed in the regulated area.

(g) Methods of compliance.

(1) Controls.

(i) The employer shall institute at the earliest possible time but not later than December 31, 1979, engineering and work practice controls to reduce exposures to or below the permissible exposure limit, except to the extent that the employer can establish that such controls are not feasible.

(ii) Where engineering and work practice controls are not sufficient to reduce exposures to or below the permissible exposure limit, they shall nonetheless be used to reduce exposures to the lowest levels achievable by these controls and shall be supplemented by the use of respirators in accordance with paragraph (h) of this section and other necessary personal protective equipment. Employee rotation is not required as a control strategy before respiratory protection is instituted.

(2) Compliance Program.

(i) The employer shall establish and implement a written program to reduce exposures to or below the permissible exposure limit by means of engineering and work practice controls.

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each operation in which inorganic arsenic is emitted; e.g. machinery used, material processed, controls in place, crew size, operating procedures and maintenance practices;

(B) Engineering plans and studies used to determine methods selected for controlling exposure to inorganic arsenic;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Monitoring data;

(E) A detailed schedule for implementation of the engineering controls and work practices that cannot be implemented immediately and for the adaption and implementation of any additional engineering and work practices necessary to meet the permissible exposure limit;

(F) Whenever the employer will not achieve the permissible exposure limit with engineering controls and work practices by December 31, 1979, the employer shall include in the compliance plan an analysis of the effectiveness of the various controls, shall install engineering controls and institute work practices on the quickest schedule feasible, and shall include in the compliance plan and implement a program to minimize the discomfort and maximize the effectiveness of respirator use; and

(G) Other relevant information.

(iii) Written plans for such a program shall be submitted upon request to the Assistant Secretary and the Director, and shall be available at the worksite for examination and copying by the Assistant Secretary, Director, any affected employee or authorized employee representatives.

(iv) The plans required by this paragraph must be revised and updated at least annually to reflect the current status of the program.

(h) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering or work-practice controls.

(ii) Work operations, such as maintenance and repair activities, for which the employer establishes that engineering and work-practice controls are not feasible.

(iii) Work operations for which engineering and work-practice controls are not yet sufficient to reduce employee exposures to or below the permissible exposure limit.

(iv) Emergencies.

Oregon OSHA repealed 1910.1018(h)(2)(i). In Oregon, OAR 437-002-1018 applies.

437-002-1018 Inorganic Arsenic Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1018 Inorganic Arsenic, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Inorganic Arsenic rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

(ii) If an employee exhibits breathing difficulty during fit testing or respirator use, they must be examined by a physician trained in pulmonary medicine to determine whether they can use a respirator while performing the required duty.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Ensure that employees do not use half mask respirators for protection against arsenic trichloride because it is absorbed rapidly through the skin.

(C) Provide HEPA filters for powered and non-powered air-purifying respirators.

(D) Select for employee use:

(1) Air-purifying respirators that have a combination HEPA filter with an appropriate gas-sorbent cartridge or canister when the employee's exposure exceeds the permissible exposure level for inorganic arsenic and the relevant limit for other gases.

(2) Front-or back-mounted gas masks equipped with HEPA filters and acid gas canisters or any full facepiece supplied-air respirators when the inorganic arsenic concentration is at or below 500 mg/m³; and half mask air-purifying respirators equipped with HEPA filters and acid gas cartridges when the inorganic arsenic concentration is at or below 100 µg/m³.

(ii) Employees required to use respirators may choose, and the employer must provide, a powered air-purifying respirator if it will provide proper protection. In addition, the employer must provide a combination dust and acid-gas respirator to employees who are exposed to gases over the relevant exposure limits.

(i) [Reserved]

(j) Protective work clothing and equipment.

(1) Provision and use. Where the possibility of skin or eye irritation from inorganic arsenic exists, and for all workers working in regulated areas, the employer shall provide at no cost to the employee and assure that employees use appropriate and clean protective work clothing and equipment such as, but not limited to:

(i) Coveralls or similar full-body work clothing;

(ii) Gloves, and shoes or coverlets;

(iii) Face shields or vented goggles when necessary to prevent eye irritation, which comply with the requirements of OAR 437-002-0134(8)(b) through (e).

(iv) Impervious clothing for employees subject to exposure to arsenic trichloride.

(2) Cleaning and replacement.

(i) The employer shall provide the protective clothing required in paragraph (j)(1) of this section in a freshly laundered and dry condition at least weekly, and daily if the employee works in areas where exposures are over 100 µg/m³ of inorganic arsenic or in areas where more frequent washing is needed to prevent skin irritation.

(ii) The employer shall clean, launder, or dispose of protective clothing required by paragraph (j)(1) of this section.

(iii) The employer shall repair or replace the protective clothing and equipment as needed to maintain their effectiveness.

(iv) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change rooms prescribed in paragraph (m)(1) of this section.

(v) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the change room which prevents dispersion of inorganic arsenic outside the container.

(vi) The employer shall inform in writing any person who cleans or launders clothing required by this section, of the potentially harmful effects including the carcinogenic effects of exposure to inorganic arsenic.

(vii) Labels on contaminated protective clothing and equipment.

(A) The employer shall ensure that the containers of contaminated protective clothing and equipment in the workplace or which are to be removed from the workplace are labeled and that the labels include the following information:

DANGER: CONTAMINATED WITH INORGANIC ARSENIC. MAY CAUSE CANCER. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF INORGANIC ARSENIC CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE OR FEDERAL REGULATIONS.

(B) Prior to June 1, 2015, employers may include the following information on containers of protective clothing and equipment in lieu of the labeling requirements in paragraphs (j)(2)(vii) of this section:

CAUTION: Clothing contaminated with inorganic arsenic; do not remove dust by blowing or shaking. Dispose of inorganic arsenic contaminated wash water in accordance with applicable local, State or Federal regulations.

(viii) The employer shall prohibit the removal of inorganic arsenic from protective clothing or equipment by blowing or shaking.

(k) Housekeeping.

(1) Surfaces. All surfaces shall be maintained as free as practicable of accumulations of inorganic arsenic.

(2) Cleaning floors. Floors and other accessible surfaces contaminated with inorganic arsenic may not be cleaned by the use of compressed air, and shoveling and brushing may be used only where vacuuming or other relevant methods have been tried and found not to be effective.

(3) Vacuuming. Where vacuuming methods are selected, the vacuums shall be used and emptied in a manner to minimize the reentry of inorganic arsenic into the workplace.

(4) Housekeeping plan. A written housekeeping and maintenance plan shall be kept which shall list appropriate frequencies for carrying out housekeeping operations, and for cleaning

and maintaining dust collection equipment. The plan shall be available for inspection by the Assistant Secretary.

(5) Maintenance of equipment. Periodic cleaning of dust collection and ventilation equipment and checks of their effectiveness shall be carried out to maintain the effectiveness of the system and a notation kept of the last check of effectiveness and cleaning or maintenance.

(l) [Reserved]

(m) Hygiene facilities and practices.

(1) Change rooms. The employer shall provide for employees working in regulated areas or subject to the possibility of skin or eye irritation from inorganic arsenic, clean change rooms equipped with storage facilities for street clothes and separate storage facilities for protective clothing and equipment in accordance with 29 CFR 1910.141(e).

(2) Showers.

(i) The employer shall assure that employees working in regulated areas or subject to the possibility of skin or eye irritation from inorganic arsenic shower at the end of the work shift.

(ii) The employer shall provide shower facilities in accordance with 1910.141(d)(3).

(3) Lunchrooms.

(i) The employer shall provide for employees working in regulated areas, lunchroom facilities which have a temperature controlled, positive pressure, filtered air supply, and which are readily accessible to employees working in regulated areas.

(ii) The employer shall assure that employees working in the regulated area or subject to the possibility of skin or eye irritation from exposure to inorganic arsenic wash their hands and face prior to eating.

(4) Lavatories. The employer shall provide lavatory facilities which comply with 1910.141(d)(1) and (2).

(5) Vacuuming clothes. The employer shall provide facilities for employees working in areas where exposure, without regard to the use of respirators, exceeds 100 µg/m³ to vacuum their protective clothing and clean or change shoes worn in such areas before entering change rooms, lunchrooms or shower rooms required by paragraph (j) of this section and shall assure that such employees use such facilities.

(6) Avoidance of skin irritation. The employer shall assure that no employee is exposed to skin or eye contact with arsenic trichloride, or to skin or eye contact with liquid or particulate inorganic arsenic which is likely to cause skin or eye irritation.

(n) Medical surveillance.

(1) General.

(i) Employees covered. The employer shall institute a medical surveillance program for the following employees:

(A) All employees who are or will be exposed above the action level, without regard to the use of respirators, at least 30 days per year; and

(B) All employees who have been exposed above the action level, without regard to respirator use, for 30 days or more per year for a total of 10 years or more of combined employment with the employer or predecessor employers prior to or after the effective date of this standard. The determination of exposures prior to the effective date of this standard shall be based upon prior exposure records, comparison with the first measurements taken after the effective date of this standard, or comparison with records of exposures in areas with similar processes, extent of engineering controls utilized and materials used by that employer.

(ii) Examination by physician. The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee, without loss of pay and at a reasonable time and place.

(2) Initial examinations. By December 1, 1978, for employees initially covered by the medical provisions of this section, or thereafter at the time of initial assignment to an area where the employee is likely to be exposed over the action level at least 30 days per year, the employer shall provide each affected employee an opportunity for a medical examination, including at least the following elements:

(i) A work history and a medical history which shall include a smoking history and the presence and degree of respiratory symptoms such as breathlessness, cough, sputum production and wheezing.

(ii) A medical examination which shall include at least the following:

(A) A standard **film or digital** posterior-anterior chest X-ray;

(B) A nasal and skin examination; and

(C) Other examinations which the physician believes appropriate because of the employees exposure to inorganic arsenic or because of required respirator use.

(3) Periodic examinations.

(i) Examinations must be provided in accordance with ~~[this]~~ paragraphs **(n)(2)(i) and (n)(2)(ii)(B) and (C) of this section** at least annually.

(ii) Whenever a covered employee has not taken the examinations specified in paragraphs (n)(2)(i) and (n)(2)(ii)(**B**) and (**C**) of this section within six (6) months preceding the termination of employment, the employer shall provide such examinations to the employee upon termination of employment.

(4) Additional examinations. If the employee for any reason develops signs or symptoms commonly associated with exposure to inorganic arsenic the employer shall provide an appropriate examination and emergency medical treatment.

(5) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and its appendices;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's representative exposure level or anticipated exposure level;

(iv) A description of any personal protective equipment used or to be used; and

(v) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

(6) Physician's written opinion.

(i) The employer shall obtain a written opinion from the examining physician which shall include:

(A) The results of the medical examination and tests performed;

(B) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to inorganic arsenic;

(C) Any recommended limitations upon the employee's exposure to inorganic arsenic or upon the use of protective clothing or equipment such as respirators; and

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further explanation or treatment.

(ii) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure.

(iii) The employer shall provide a copy of the written opinion to the affected employee.

(o) Employee information and training.

(1) Training program.

(i) The employer shall train each employee who is subject to exposure to inorganic arsenic above the action level without regard to respirator use, or for whom there is the possibility of skin or eye irritation from inorganic arsenic, in accordance with the requirements of this

section. The employer shall institute a training program and ensure employee participation in the program.

(ii) The training program shall be provided by October 1, 1978, for employees covered by this provision, at the time of initial assignment for those subsequently covered by this provision, and at least annually for other covered employees thereafter; and the employer shall assure that each employee is informed of the following:

(A) The information contained in Appendix A;

(B) The quantity, location, manner of use, storage, sources of exposure, and the specific nature of operations which could result in exposure to inorganic arsenic as well as any necessary protective steps;

(C) The purpose, proper use, and limitation of respirators;

(D) The purpose and a description of the medical surveillance program as required by paragraph (n) of this section;

(E) The engineering controls and work practices associated with the employee's job assignment; and

(F) A review of this standard.

(2) Access to training materials.

(i) The employer shall make readily available to all affected employees a copy of this standard and its appendices.

(ii) The employer shall provide; upon request, all materials relating to the employee information and training program to the Assistant Secretary and the Director.

(p) Communication of hazards

(1) Hazard communication—General.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for inorganic arsenic.

(ii) In classifying the hazards of inorganic arsenic at least the following hazards are to be addressed: Cancer; liver effects; skin effects; respiratory irritation; nervous system effects; and acute toxicity effects.

(iii) Employers shall include inorganic arsenic in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of inorganic arsenic and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (o) of this section.

(iv) The employer shall ensure that no statement appears on or near any sign or label required by this paragraph (p) which contradicts or detracts from the meaning of the required sign or label.

(2) Signs.

(i) The employer shall post signs demarcating regulated areas bearing the legend:

DANGER
INORGANIC ARSENIC
MAY CAUSE CANCER
DO NOT EAT, DRINK OR SMOKE
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(ii) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (p)(2)(i) of this section:

DANGER
INORGANIC ARSENIC
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY
NO SMOKING OR EATING
RESPIRATOR REQUIRED

(iii) The employer shall ensure that signs required by this paragraph (p) are illuminated and cleaned as necessary so that the legend is readily visible.

(3)

(i) Prior to June 1, 2015, in lieu of the labeling requirements in paragraphs (p)(1)(i) of this section, employers may apply precautionary labels to all shipping and storage containers of inorganic arsenic, and to all products containing inorganic arsenic, bearing the following legend:

DANGER
CONTAINS INORGANIC ARSENIC
CANCER HAZARD
HARMFUL IF INHALED OR SWALLOWED
USE ONLY WITH ADEQUATE VENTILATION OR RESPIRATORY PROTECTION

(ii) Labels are not required when the inorganic arsenic in the product is bound in such a manner so as to make unlikely the possibility of airborne exposure to inorganic arsenic. (Possible examples of products not requiring labels are semiconductors, light emitting diodes and glass.)

(q) Recordkeeping.

(1) Exposure monitoring.

(i) The employer shall establish and maintain an accurate record of all monitoring required by paragraph (e) of this section.

(ii) This record shall include:

(A) The date(s), number, duration location, and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;

(B) A description of the sampling and analytical methods used and evidence of their accuracy;

(C) The type of respiratory protective devices worn, if any;

(D) Name[, ~~social security number,~~] and job classification of the employees monitored and of all other employees whose exposure the measurement is intended to represent; and

(E) The environmental variables that could affect the measurement of the employee's exposure.

(iii) The employer shall maintain these monitoring records for at least 40 years or for the duration of employment plus 20 years, whichever, is longer.

(2) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by paragraph (n) of this section.

(ii) This record shall include:

(A) The name[, ~~social security number,~~] and description of duties of the employee;

(B) A copy of the physician's written opinions;

(C) Results of any exposure monitoring done for that employee and the representative exposure levels supplied to the physician; and

(D) Any employee medical complaints related to exposure to inorganic arsenic.

(iii) The employer shall in addition keep, or assure that the examining physician keeps, the following medical records;

(A) A copy of the medical examination results including medical and work history required under paragraph (n) of this section;

(B) A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information;

(C) The initial X-ray;

(D) The X-rays for the most recent 5 years; and

(E) Any X-rays with a demonstrated abnormality and all subsequent X-rays.

(iv) The employer shall maintain or assure that the physician maintains those medical records for at least 40 years, or for the duration of employment plus 20 years whichever is longer.

(3) Availability.

(i) The employer shall make available upon request all records required to be maintained by paragraph (q) of this section to the Assistant Secretary and the Director for examination and copying.

(ii) Records required by this paragraph shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(4) Transfer of records.

(i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by this section.

(ii) The employer shall also comply with any additional requirements involving the transfer of records set in 29 CFR 1910.1020(h).

(r) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to inorganic arsenic conducted pursuant to paragraph (e) of this section.

(2) Observation procedures.

(i) Whenever observation of the monitoring of employee exposure to inorganic arsenic requires entry into an area where the use of respirators, protective clothing, or equipment is required, the employer shall provide the observer with and assure the use of such respirators, clothing, and such equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring, observers shall be entitled to;

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the monitoring of inorganic arsenic performed at the place of exposure; and

(C) Record the results obtained or receive copies of the results when returned by the laboratory.

(s) Appendices. The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix A – Inorganic Arsenic Substance Information Sheet

I. Substance Identification

A. Substance. Inorganic Arsenic.

B. Definition. Copper acetoarsenite, arsenic and all inorganic compounds containing arsenic except arsine, measured as arsenic (As).

C. Permissible Exposure Limit. 10 micrograms per cubic meter of air as determined as an average over an 8-hour period. No employee may be exposed to any skin or eye contact with arsenic trichloride or to skin or eye contact likely to cause skin or eye irritation.

D. Regulated Areas. Only employees authorized by your employer should enter a regulated area.

II. Health Hazard Data

A. Comments. The health hazard of inorganic arsenic is high.

B. Ways in which the chemical affects your body. Exposure to airborne concentrations of inorganic arsenic may cause lung cancer, and can be a skin irritant. Inorganic arsenic may also affect your body if swallowed. One compound in particular, arsenic trichloride, is especially dangerous because it can be absorbed readily through the skin. Because

inorganic arsenic is a poison, you should wash your hands thoroughly prior to eating or smoking.

III. Protective Clothing and Equipment

A. Respirators. Respirators will be provided by your employer at no cost to you for routine use if your employer is in the process of implementing engineering and work practice controls or where engineering and work practice controls are not feasible or insufficient. You must wear respirators for non-routine activities or in emergency situations where you are likely to be exposed to levels of inorganic arsenic in excess of the permissible exposure limit. Since how well your respirator fits your face is very important, your employer is required to conduct fit tests to make sure the respirator seals properly when you wear it. These tests are simple and rapid and will be explained to you during training sessions.

B. Protective clothing. If you work in a regulated area, your employer is required to provide at no cost to you, and you must wear, appropriate, clean, protective clothing and equipment. The purpose of this equipment is to prevent you from bringing to your home arsenic-contaminated dust and to protect your body from repeated skin contact with inorganic arsenic likely to cause skin irritation. This clothing should include such items as coveralls or similar full-body clothing, gloves, shoes or coverlets, and aprons. Protective equipment should include face shields or vented goggles, where eye irritation may occur.

IV. Hygiene Facilities and Practices

You must not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the regulated area, except that drinking water is permitted. If you work in a regulated area your employer is required to provide lunchrooms and other areas for these purposes.

If you work in a regulated area, your employer is required to provide showers, washing facilities, and change rooms. You must wash your face, and hands before eating and must shower at the end of the work shift. Do not take used protective clothing out of change rooms without your employer's permission. Your employer is required to provide for laundering or cleaning of your protective clothing.

V. Signs and Labels

Your employer is required to post warning signs and labels for your protection. Signs must be posted in regulated areas. The signs must warn that a cancer hazard is present, that only authorized employees may enter the area, and that no smoking or eating is allowed, and that respirators must be worn.

VI. Medical Examinations

If your exposure to arsenic is over the Action Level (5 $\mu\text{g}/\text{m}^3$) – (including all persons working in regulated areas) at least 30 days per year, or you have been exposed to arsenic for more than 10 years over the Action Level, your employer is required to provide you with a medical examination. The examination shall be every 6 months for employees over 45 years old or with more than 10 years exposure over the Action Level and annually for other covered employees. The medical examination must include a medical history; a chest x-ray **during initial**

examination only); skin examination and a nasal examination. The examining physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion. The physician must not tell your employer any conditions he detects unrelated to occupational exposure to arsenic but must tell you those conditions.

VII. Observation of Monitoring

Your employer is required to monitor your exposure to arsenic and you or your representatives are entitled to observe the monitoring procedure. You are entitled to receive an explanation of the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you must also be provided with and must wear the protective clothing and equipment.

VIII. Access to Records

You or your representative are entitled to records of your exposure to inorganic arsenic and your medical examination records if you request your employer to provide them.

IX. Training and Notification

Additional information on all of these items plus training as to hazards of exposure to inorganic arsenic and the engineering and work practice controls associated with your job will also be provided by your employer. If you are exposed over the permissible exposure limit, your employer must inform you of that fact and the actions he is taking to reduce your exposures.

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.

OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix C to 1910.1018— Medical Surveillance Guidelines

I. General

Medical examinations are to be provided for all employees exposed to levels of inorganic arsenic above the action level (5 µg/m³) for at least 30 days per year (which would include among others, all employees, who work in regulated areas). Examinations are also to be provided to all employees who have had 10 years or more exposure above the action level for more than 30 days per year while working for the present or predecessor employer though they may no longer be exposed above the level.

An initial medical examination is to be provided to all such employees by December 1, 1978. In addition, an initial medical examination is to be provided to all employees who are first assigned to areas in which worker exposure will probably exceed 5 µg/m³ (after **August 1,**

~~1978~~~~[the effective date of this standard])~~ at the time of initial assignment. In addition to its immediate diagnostic usefulness, the initial examination will provide a baseline for comparing future test results. The initial examination must include as a minimum the following elements:

- (1) A work and medical history, including a smoking history, and presence and degree of respiratory symptoms such as breathlessness, cough, sputum production, and wheezing;
- (2) A 14" by 17" **or other reasonably-sized standard film or digital** posterior-anterior chest X-ray;
- (3) A nasal and skin examination; and
- (4) Other examinations which the physician believes appropriate because of the employee's exposure to inorganic arsenic or because of required respirator use.

Periodic examinations are also to be provided to the employees listed above. The periodic examinations shall be given annually for those covered employees 45 years of age or less with fewer than 10 years employment in areas where employee exposure exceeds the action level (5 µg/m³). Periodic examinations need not include sputum cytology **or chest X-ray** and only an updated medical history is required.

Periodic examinations for other covered employees, shall be provided every six (6) months. These examinations shall include all tests required in the initial examination, except **the chest X-ray and**~~, that~~ the medical history need only be updated.

The examination contents are minimum requirements. Additional tests such as lateral and oblique X-rays or pulmonary function tests may be useful. For workers exposed to three arsenicals which are associated with lymphatic cancer, copper acetoarsenite, potassium arsenite, or sodium arsenite the examination should also include palpation of superficial lymph nodes and complete blood count.

II. Non-Carcinogenic Effects

The OSHA standard is based on minimizing risk of exposed workers dying of lung cancer from exposure to inorganic arsenic. It will also minimize skin cancer from such exposures.

The following three sections quoted from "Occupational Diseases: A Guide to Their Recognition", Revised Edition, June 1977, National Institute for Occupational Safety and Health is included to provide information on the non-neoplastic effects of exposure to inorganic arsenic. Such effects should not occur if the OSHA standards are followed.

A. Local. Trivalent arsenic compounds are corrosive to the skin. Brief contact has no effect but prolonged contact results in a local hyperemia and later vesicular or pustular eruption. The moist mucous membranes are most sensitive to the irritant action. Conjunctiva, moist and macerated areas of skin, the eyelids, the angles of the ears, nose, mouth, and respiratory mucosa are also vulnerable to the irritant effects. The wrists are common sites of dermatitis, as are the genitalia if personal hygiene is poor. Perforations of the nasal septum may occur. Arsenic trioxide and pentoxide are capable of producing skin sensitization and

contact dermatitis. Arsenic is also capable of producing keratoses, especially of the palms and soles.

B. Systemic. The acute toxic effects of arsenic are generally seen following ingestion of inorganic arsenical compounds. This rarely occurs in an industrial setting. Symptoms develop within 1/2 to 4 hours following ingestion and are usually characterized by constriction of the throat followed by dysphagia, epigastric pain, vomiting, and watery diarrhea. Blood may appear in vomitus and stools. If the amount ingested is sufficiently high, shock may develop due to severe fluid loss, and death may ensue in 24 hours. If the acute effects are survived, exfoliative dermatitis and peripheral neuritis may develop.

Cases of acute arsenical poisoning due to inhalation are exceedingly rare in industry. When it does occur, respiratory tract symptoms - cough, chest pain, dyspnea - giddiness, headache, and extreme general weakness precede gastrointestinal symptoms. The acute toxic symptoms of trivalent arsenical poisoning are due to severe inflammation of the mucous membranes and greatly increased permeability of the blood capillaries.

Chronic arsenical poisoning due to ingestion is rare and generally confined to patients taking prescribed medications. However, it can be a concomitant of inhaled inorganic arsenic from swallowed sputum and improper eating habits. Symptoms are weight loss, nausea and diarrhea alternating with constipation, pigmentation and eruption of the skin, loss of hair, and peripheral neuritis. Chronic hepatitis and cirrhosis have been described. Polyneuritis may be the salient feature, but more frequently there are numbness and parasthenias of "glove and stocking" distribution. The skin lesions are usually melanotic and keratotic and may occasionally take the form of an intradermal cancer of the squamous cell type, but without infiltrative properties. Horizontal white lines (striations) on the fingernails and toenails are commonly seen in chronic arsenical poisoning and are considered to be a diagnostic accompaniment of arsenical polyneuritis.

Inhalation of inorganic arsenic compounds is the most common cause of chronic poisoning in the industrial situation. This condition is divided into three phases based on signs and symptoms.

First Phase: The worker complains of weakness, loss of appetite, some nausea, occasional vomiting, a sense of heaviness in the stomach, and some diarrhea.

Second Phase: The worker complains of conjunctivitis, a catarrhal state of the mucous membranes of the nose, larynx, and respiratory passage. Coryza, hoarseness, and mild tracheobronchitis may occur. Perforation of the nasal septum is common, and is probably the most typical lesion of the upper respiratory tract in occupational exposure to arsenical dust. Skin lesions, eczematoid and allergic in type, are common.

Third Phase: The worker complains of symptoms of peripheral neuritis, initially of hands and feet, which is essentially sensory. In more severe cases, motor paralysis occurs; the first muscles affected are usually the toe extensors and the peronei. In only the most severe cases will paralysis of flexor muscles of the feet or of the extensor muscles of hands occur. Liver damage from chronic arsenical poisoning is still debated, and as yet the question is unanswered. In cases of chronic and acute arsenical poisoning, toxic effects to the myocardium have been reported based on EKG changes. These findings, however, are now

largely discounted and the EKG changes are ascribed to electrolyte disturbances concomitant with arsenicalism. Inhalation of arsenic trioxide and other inorganic arsenical dusts does not give rise to radiological evidence or pneumoconiosis. Arsenic does have a depressant effect upon the bone marrow, with disturbances of both erythropoiesis and myelopoiesis.

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[39 FR 23502, June 27, 1974, as amended at 43 FR 19624, May 5, 1978; 43 FR 28472, June 30, 1978; 45 FR 35282, May 23, 1980; 54 FR 24334, June 7, 1989; 58 FR 35310, June 30, 1993; 61 FR 5508, Feb. 13, 1996; 61 FR 9245, Mar. 7, 1996; 63 FR 1286, Jan. 8, 1998; 63 FR 33468, June 18, 1998; 70 FR 1141, Jan. 5, 2005; 71 FR 16672, 16673, Apr. 3, 2006; 71 FR 50189, Aug. 24, 2006; 73 FR 75585, Dec. 12, 2008; 76 FR 33608, June 8, 2011; 77 FR 17780, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.

OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.

OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1025

Lead.

Note: 1910.1025(a)(1) and (2) were not adopted. In Oregon, OAR 437-002-0371 applies:

437-002-0371 Scope and Application.

29 CFR 1910.1025 applies to all occupational exposures to lead, except Construction (see 1926.62 in Division 3, Construction).

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 26-1990, f. 11/16/90, ef. 11/16/90.

OR-OSHA Admin. Order 6-1994, f. 9/30/94, ef. 9/30/94.

(b) Definitions.

Action level means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 µg/m³) averaged over an 8-hour period.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Director means the Director, National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health, Education, and Welfare, or designee.

Lead means metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.

(c) Permissible exposure limit (PEL).

(1) The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 µg/m³) averaged over an 8-hour period.

(2) If an employee is exposed to lead for more than 8 hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula:

Maximum permissible limit (in µg/m³) = 400 ÷ hours worked in the day.

(3) When respirators are used to supplement engineering and work practice controls to comply with the PEL and all the requirements of paragraph (f) have been met, employee exposure, for the purpose of determining whether the employer has complied with the PEL, may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

(d) Exposure monitoring.

(1) General.

(i) For the purposes of paragraph (d), employee exposure is that exposure which would occur if the employee were not using a respirator.

(ii) With the exception of monitoring under paragraph (d)(3), the employer shall collect full shift (for at least 7 continuous hours) personal samples including at least one sample for each shift for each job classification in each work area.

(iii) Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.

(2) Initial determination. Each employer who has a workplace or work operation covered by this standard shall determine if any employee may be exposed to lead at or above the action level.

(3) Basis of initial determination.

(i) The employer shall monitor employee exposures and shall base initial determinations on the employee exposure monitoring results and any of the following, relevant considerations:

(A) Any information, observations, or calculations which would indicate employee exposure to lead;

(B) Any previous measurements of airborne lead; and

(C) Any employee complaints of symptoms which may be attributable to exposure to lead.

(ii) Monitoring for the initial determination may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

(iii) Measurements of airborne lead made in the preceding 12 months may be used to satisfy the requirement to monitor under paragraph (d)(3)(i) if the sampling and analytical methods used meet the accuracy and confidence levels of paragraph (d)(9) of this section.

(4) Positive initial determination and initial monitoring.

(i) Where a determination conducted under paragraphs (d)(2) and (3) of this section shows the possibility of any employee exposure at or above the action level, the employer shall conduct monitoring which is representative of the exposure for each employee in the workplace who is exposed to lead.

(ii) Measurements of airborne lead made in the preceding 12 months may be used to satisfy this requirement if the sampling and analytical methods used meet the accuracy and confidence levels of paragraph (d)(9) of this section.

(5) Negative initial determination. Where a determination, conducted under paragraphs (d)(2) and (3) of this section is made that no employee is exposed to airborne concentrations of lead at or above the action level, the employer shall make a written record of such determination. The record shall include at least the information specified in paragraph (d)(3) of this section and shall also include the date of determination, location within the worksite, and the name ~~[and social security number]~~ of each employee monitored.

(6) Frequency.

(i) If the initial monitoring reveals employee exposure to be below the action level the measurements need not be repeated except as otherwise provided in paragraph (d)(7) of this section.

(ii) If the initial determination or subsequent monitoring reveals employee exposure to be at or above the action level but below the permissible exposure limit the employer shall repeat monitoring in accordance with this paragraph at least every 6 months. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level at which time the employer may discontinue monitoring for that employee except as otherwise provided in paragraph (d)(7) of this section.

(iii) If the initial monitoring reveals that employee exposure is above the permissible exposure limit the employer shall repeat monitoring quarterly. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the PEL but at or above the action level at which time the employer shall repeat monitoring for that employee at the frequency specified in paragraph (d)(6)(ii), except as otherwise provided in paragraph (d)(7) of this section.

(7) Additional monitoring. Whenever there has been a production, process, control or personnel change which may result in new or additional exposure to lead, or whenever the employer has any other reason to suspect a change which may result in new or additional exposures to lead, additional monitoring in accordance with this paragraph shall be conducted.

(8) Employee notification.

(i) The employee must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to affected employees.

(ii) Whenever the results indicate that the representative employee exposure, without regard to respirators, exceeds the permissible exposure limit, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action taken or to be taken to reduce exposure to or below the permissible exposure limit.

(9) Accuracy of measurement. The employer shall use a method of monitoring and analysis which has an accuracy (to a confidence level of 95%) of not less than plus or minus 20 percent for airborne concentrations of lead equal to or greater than 30 µg/m³.

(e) Methods of compliance.

(1) Engineering and work practice controls.

(i) Where any employee is exposed to lead above the permissible exposure limit for more than 30 days per year, the employer shall implement engineering and work practice controls (including administrative controls) to reduce and maintain employee exposure to lead in accordance with the implementation schedule in Table I below, except to the extent that the employer can demonstrate that such controls are not feasible. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest feasible level and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (f) of this section.

(ii) Where any employee is exposed to lead above the permissible exposure limit, but for 30 days or less per year, the employer shall implement engineering controls to reduce exposures to 200 µg/m³, but thereafter may implement any combination of engineering, work practice (including administrative controls), and respiratory controls to reduce and maintain employee exposure to lead to or below 50 µg/m³.

Table I – Implementation Schedule	
Industry	Compliance Dates (50 µg/m³)¹
Lead chemicals, secondary copper smelting	July 19, 1996
Nonferrous foundries	July 19, 1996 ²
Brass and bronze ingot manufacture	6 years ³

¹ Calculated by counting from the date the Stay on implementation of paragraph (e)(1) was lifted by the U.S. Court of Appeals for the District of Columbia, the number of years specified in the 1978 lead standard and subsequent amendments for compliance with the PEL of 50 µg/m³ for exposure to airborne concentrations of lead levels for the particular industry.

² Large nonferrous foundries (20 or more employees) are required to achieve the PEL of 50 µg/m³ by means of engineering and work practice controls. Small nonferrous foundries (fewer than 20 employees) are required to achieve an 8-hour TWA of 75 µg/m³ by such controls.

³ Expressed as the number of years from the date on which the Court lifts the stay on the implementation of paragraph (e)(1) for this industry for employers to achieve a lead in air concentration of 75 µg/m³. Compliance with paragraph (e) in this industry is determined by a compliance directive that incorporates elements from the settlement agreement between OSHA and representatives of the industry.

(2) Respiratory protection. Where engineering and work practice controls do not reduce employee exposure to or below the 50 µg/m³ permissible exposure limit, the employer shall supplement these controls with respirators in accordance with paragraph (f).

(3) Compliance program.

(i) Each employer shall establish and implement a written compliance program to reduce exposures to or below the permissible exposure limit, and interim levels if applicable, solely by means of engineering and work practice controls in accordance with the implementation schedule in paragraph (e)(1).

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each operation in which lead is emitted; e.g. machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices;

(B) A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to lead;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Air monitoring data which documents the source of lead emissions;

(E) A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;

(F) A work practice program which includes items required under paragraphs (g), (h) and (i) of this regulation;

(G) An administrative control schedule required by paragraph (e)(6), if applicable;

(H) Other relevant information.

(iii) Written programs shall be submitted upon request to the Assistant Secretary and the Director, and shall be available at the worksite for examination and copying by the Assistant Secretary, Director, any affected employee or authorized employee representatives.

(iv) Written programs must be revised and updated at least annually to reflect the current status of the program.

(4) Mechanical ventilation.

(i) When ventilation is used to control exposure, measurements which demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure shall be made at least every 3 months. Measurements of the system's effectiveness in controlling exposure shall be made within 5 days of any change in production, process, or control which might result in a change in employee exposure to lead.

(ii) Recirculation of air. If air from exhaust ventilation is recirculated into the workplace, the employer shall assure that:

(A) The system has a high efficiency filter with reliable back-up filter; and

(B) Controls to monitor the concentration of lead in the return air and to bypass the recirculation system automatically if it fails are installed, operating, and maintained.

(5) Administrative controls. If administrative controls are used as a means of reducing employees TWA exposure to lead, the employer shall establish and implement a job rotation schedule which includes:

(i) Name or identification number of each affected employee;

(ii) Duration and exposure levels at each job or work station where each affected employee is located; and

(iii) Any other information which may be useful in assessing the reliability of administrative controls to reduce exposure to lead.

(f) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

- (i) Periods necessary to install or implement engineering or work-practice controls.
- (ii) Work operations for which engineering and work-practice controls are not sufficient to reduce employee exposures to or below the permissible exposure limit;
- (iii) Periods when an employee requests a respirator.

(2) Respirator program.

Oregon OSHA repealed 1910.1025(f)(2)(i). In Oregon, OAR 437-002-1025 applies.

437-002-1025 Lead Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1025 Lead, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Lead rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) If an employee has breathing difficulty during fit testing or respirator use, the employer must provide the employee with a medical examination in accordance with paragraph (j)(3)(i)(C) of this section to determine whether or not the employee can use a respirator while performing the required duty.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide employees with full facepiece respirators instead of half mask respirators for protection against lead aerosols that cause eye or skin irritation at the use concentrations.

(C) Provide HEPA filters for powered and non-powered air-purifying respirators.

(ii) Employers must provide employees with a powered air-purifying respirator (PAPR) instead of a negative pressure respirator selected according to paragraph (f)(3)(i) of this

standard when an employee chooses to use a PAPR and it provides adequate protection to the employee as specified by paragraph (f)(3)(i) of this standard.

(g) Protective work clothing and equipment.

(1) Provision and use. If an employee is exposed to lead above the PEL, without regard to the use of respirators or where the possibility of skin or eye irritation exists, the employer shall provide at no cost to the employee and assure that the employee uses appropriate protective work clothing and equipment such as, but not limited to:

(i) Coveralls or similar full-body work clothing;

(ii) Gloves, hats, and shoes or disposable shoe coverlets; and

(iii) Face shields, vented goggles, or other appropriate protective equipment which complies with OAR 437-002-0134(8).

(2) Cleaning and replacement.

(i) The employer shall provide the protective clothing required in paragraph (g)(1) of this section in a clean and dry condition at least weekly, and daily to employees whose exposure levels without regard to a respirator are over 200 µg/m³ of lead as an 8-hour TWA.

(ii) The employer shall provide for the cleaning, laundering, or disposal of protective clothing and equipment required by paragraph (g)(1) of this section.

(iii) The employer shall repair or replace required protective clothing and equipment as needed to maintain their effectiveness.

(iv) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change rooms provided for that purpose as prescribed in paragraph (i)(2) of this section.

(v) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the changeroom which prevents dispersion of lead outside the container.

(vi) The employer shall inform in writing any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to lead.

(vii) Labeling of contaminated protective clothing and equipment.

(A) The employer shall ensure that labels of bags or containers of contaminated protective clothing and equipment include the following information:

**DANGER: CLOTHING AND EQUIPMENT CONTAMINATED WITH LEAD.
MAY DAMAGE FERTILITY OR THE UNBORN CHILD. CAUSES DAMAGE TO
THE CENTRAL NERVOUS SYSTEM. DO NOT EAT, DRINK OR SMOKE WHEN
HANDLING. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE**

OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH
APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

(B) Prior to June 1, 2015, employers may include the following information on bags or containers of contaminated protective clothing and equipment in lieu of the labeling requirements in paragraphs (g)(2)(vii)(A) of this section:

CAUTION: CLOTHING CONTAMINATED WITH LEAD. DO NOT REMOVE DUST
BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER
IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

(viii) The employer shall prohibit the removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air.

(h) Housekeeping.

(1) Surfaces. All surfaces shall be maintained as free as practicable of accumulations of lead.

(2) Cleaning floors.

(i) Floors and other surfaces where lead accumulates may not be cleaned by the use of compressed air.

(ii) Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found not to be effective.

(3) Vacuuming. Where vacuuming methods are selected, the vacuums shall be used and emptied in a manner which minimizes the reentry of lead into the workplace.

(i) Hygiene facilities and practices.

(1) The employer shall assure that in areas where employees are exposed to lead above the PEL, without regard to the use of respirators, food or beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, except in change rooms, lunchrooms, and showers required under paragraphs (i)(2) through (i)(4) of this section.

(2) Change rooms.

(i) The employer shall provide clean change rooms for employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators.

(ii) The employer shall assure that change rooms are equipped with separate storage facilities for protective work clothing and equipment and for street clothes which prevent cross-contamination.

(3) Showers.

(i) The employer shall assure that employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators, shower at the end of the work shift.

(ii) The employer shall provide shower facilities in accordance with 1910.141(d)(3) of this part.

(iii) The employer shall assure that employees who are required to shower pursuant to paragraph (i)(3)(i) do not leave the workplace wearing any clothing or equipment worn during the work shift.

(4) Lunchrooms.

(i) The employer shall provide lunchroom facilities for employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators.

(ii) The employer shall assure that lunchroom facilities have a temperature controlled, positive pressure, filtered air supply, and are readily accessible to employees.

(iii) The employer shall assure that employees who work in areas where their airborne exposure to lead is above the PEL without regard to the use of a respirator wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

(iv) The employer shall assure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface lead dust has been removed by vacuuming, downdraft booth, or other cleaning method.

(5) Lavatories. The employer shall provide an adequate number of lavatory facilities which comply with 1910.141(d)(1) and (2) of this part.

(j) Medical surveillance.

(1) General.

(i) The employer shall institute a medical surveillance program for all employees who are or may be exposed at or above the action level for more than 30 days per year.

(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician.

(iii) The employer shall provide the required medical surveillance including multiple physician review under paragraph (j)(3)(iii) without cost to employees and at a reasonable time and place.

(2) Biological monitoring.

(i) Blood lead and ZPP level sampling and analysis. The employer shall make available biological monitoring in the form of blood sampling and analysis for lead and zinc

protoporphyrin levels to each employee covered under paragraph (j)(1)(i) of this section on the following schedule:

(A) At least every 6 months to each employee covered under paragraph (j)(1)(i) of this section;

(B) At least every two months for each employee whose last blood sampling and analysis indicated a blood lead level at or above 40 µg/100 g of whole blood. This frequency shall continue until two consecutive blood samples and analyses indicate a blood lead level below 40 µg/100 g of whole blood; and

(C) At least monthly during the removal period of each employee removed from exposure to lead due to an elevated blood lead level.

(ii) Follow-up blood sampling tests. Whenever the results of a blood lead level test indicate that an employee's blood lead level is at or above the numerical criterion for medical removal under paragraph (k)(1)(i)(A) of this section, the employer shall provide a second (follow-up) blood sampling test within two weeks after the employer receives the results of the first blood sampling test.

(iii) Accuracy of blood lead level sampling and analysis. Blood lead level sampling and analysis provided pursuant to this section shall have an accuracy (to a confidence level of 95 percent) within plus or minus 15 percent or 6 µg/100ml, whichever is greater, and shall be conducted by a laboratory licensed by the Center for Disease Control, United States Department of Health, Education and Welfare (CDC) or which has received a satisfactory grade in blood lead proficiency testing from CDC in the prior twelve months.

(iv) Employee notification. Within five working days after the receipt of biological monitoring results, the employer shall notify in writing each employee whose blood lead level is at or above 40 µg/100 g:

(A) Of that employee's blood lead level; and

(B) That the standard requires temporary medical removal with Medical Removal Protection benefits when an employee's blood lead level is at or above the numerical criterion for medical removal under paragraph (k)(1)(i) of this section.

(3) Medical examinations and consultations.

(i) Frequency. The employer shall make available medical examinations and consultations to each employee covered under paragraph (j)(1)(i) of this section on the following schedule:

(A) At least annually for each employee for whom a blood sampling test conducted at any time during the preceding 12 months indicated a blood lead level at or above 40 µg/100 g;

(B) Prior to assignment for each employee being assigned for the first time to an area in which airborne concentrations of lead are at or above the action level;

(C) As soon as possible, upon notification by an employee either that the employee has developed signs or symptoms commonly associated with lead intoxication, that the employee desires medical advice concerning the effects of current or past exposure to lead on the employee's ability to procreate a healthy child, or that the employee has demonstrated difficulty in breathing during a respirator fitting test or during use; and

(D) As medically appropriate for each employee either removed from exposure to lead due to a risk of sustaining material impairment to health, or otherwise limited pursuant to a final medical determination.

(ii) Content. Medical examinations made available pursuant to paragraph (j)(3)(i)(A) through (B) of this section shall include the following elements:

(A) A detailed work history and a medical history, with particular attention to past lead exposure (occupational and non-occupational), personal habits (smoking, hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and neurological problems;

(B) A thorough physical examination, with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, and neurological systems. Pulmonary status should be evaluated if respiratory protection will be used;

(C) A blood pressure measurement;

(D) A blood sample and analysis which determines:

(1) Blood lead level;

(2) Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology;

(3) Zinc protoporphyrin;

(4) Blood urea nitrogen; and,

(5) Serum creatinine;

(E) A routine urinalysis with microscopic examination; and

(F) Any laboratory or other test which the examining physician deems necessary by sound medical practice. The content of medical examinations made available pursuant to paragraph (j)(3)(i)(C) through (D) of this section shall be determined by an examining physician and, if requested by an employee, shall include pregnancy testing or laboratory evaluation of male fertility.

(iii) Multiple physician review mechanism.

(A) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under this section, the employee may designate a second physician:

- (1) To review any findings, determinations or recommendations of the initial physician; and
- (2) To conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(B) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within fifteen (15) days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

- (1) The employee informing the employer that he or she intends to seek a second medical opinion, and
- (2) The employee initiating steps to make an appointment with a second physician.

(C) If the findings, determinations or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(D) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee through their respective physicians shall designate a third physician:

- (1) To review any findings, determinations or recommendations of the prior physicians; and
- (2) To conduct such examinations, consultations, laboratory tests and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(E) The employer shall act consistent with the findings, determinations and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.

(iv) Information provided to examining and consulting physicians.

(A) The employer shall provide an initial physician conducting a medical examination or consultation under this section with the following information:

- (1) A copy of this regulation for lead including all Appendices;
- (2) A description of the affected employee's duties as they relate to the employee's exposure;

(3) The employee's exposure level or anticipated exposure level to lead and to any other toxic substance (if applicable);

(4) A description of any personal protective equipment used or to be used;

(5) Prior blood lead determinations; and

(6) All prior written medical opinions concerning the employee in the employer's possession or control.

(B) The employer shall provide the foregoing information to a second or third physician conducting a medical examination or consultation under this section upon request either by the second or third physician, or by the employee.

(v) Written medical opinions.

(A) The employer shall obtain and furnish the employee with a copy of a written medical opinion from each examining or consulting physician which contains the following information:

(1) The physician's opinion as to whether the employee has any detected medical condition which would place the employee at increased risk of material impairment of the employee's health from exposure to lead;

(2) Any recommended special protective measures to be provided to the employee, or limitations to be placed upon the employee's exposure to lead;

(3) Any recommended limitation upon the employee's use of respirators, including a determination of whether the employee can wear a powered air purifying respirator if a physician determines that the employee cannot wear a negative pressure respirator; and

(4) The results of the blood lead determinations.

(B) The employer shall instruct each examining and consulting physician to:

(1) Not reveal either in the written opinion, or in any other means of communication with the employer, findings, including laboratory results, or diagnoses unrelated to an employee's occupational exposure to lead; and

(2) Advise the employee of any medical condition, occupational or non-occupational, which dictates further medical examination or treatment.

(vi) Alternate Physician Determination Mechanisms. The employer and an employee or authorized employee representative may agree upon the use of any expeditious alternate physician determination mechanism in lieu of the multiple physician review mechanism provided by this paragraph so long as the alternate mechanism otherwise satisfies the requirements contained in this paragraph.

(4) Chelation.

(i) The employer shall assure that any person whom he retains, employs, supervises or controls does not engage in prophylactic chelation of any employee at any time.

(ii) If therapeutic or diagnostic chelation is to be performed by any person in paragraph (j)(4)(i), the employer shall assure that it be done under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring and that the employee is notified in writing prior to its occurrence.

(k) Medical Removal Protection.

(1) Temporary medical removal and return of an employee.

(i) Temporary removal due to elevated blood lead levels.

(A) The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to this section indicate that the employee's blood lead level is at or above 60 µg/100 g of whole blood; and,

(B) The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that the average of the last three blood sampling tests conducted pursuant to this section (or the average of all blood sampling tests conducted over the previous six (6) months, whichever is longer) indicates that the employee's blood lead level is at or above 50 µg/100 g of whole blood; provided, however, that an employee need not be removed if the last blood sampling test indicates a blood lead level at or below 40 µg/100 g of whole blood.

(ii) Temporary removal due to a final medical determination.

(A) The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

(B) For the purposes of this section, the phrase "final medical determination" shall mean the outcome of the multiple physician review mechanism or alternate medical determination mechanism used pursuant to the medical surveillance provisions of this section.

(C) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to lead, the employer shall implement and act consistent with the recommendation.

(iii) Return of the employee to former job status.

(A) The employer shall return an employee to his or her former job status:

(1) For an employee removed due to a blood lead level at or above 60 µg/ 100 g, or due to an average blood lead level at or above 50 µg/100 g, when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 40 µg/100 g of whole blood;

(2) For an employee removed due to a final medical determination, when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

(B) For the purposes of this section, the requirement that an employer return an employee to his or her former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(iv) Removal of other employee special protective measure or limitations. The employer shall remove any limitations placed on an employee or end any special protective measures provided to an employee pursuant to a final medical determination when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(v) Employer options pending a final medical determination. Where the multiple physician review mechanism, or alternate medical determination mechanism used pursuant to the medical surveillance provisions of this section, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(A) Removal. The employer may remove the employee from exposure to lead, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

(B) Return. The employer may return the employee to his or her former job status, end any special protective measures provided to the employee, and remove any limitations placed upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions. If

(1) the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician or

(2) the employee has been on removal status for the preceding eighteen months due to an elevated blood lead level, then the employer shall await a final medical determination.

(2) Medical removal protection benefits.

(i) Provision of medical removal protection benefits. The employer shall provide to an employee up to eighteen (18) months of medical removal protection benefits on each occasion that an employee is removed from exposure to lead or otherwise limited pursuant to this section.

(ii) Definition of medical removal protection benefits. For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the earnings, seniority and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to lead or otherwise limited.

(iii) Follow-up medical surveillance during the period of employee removal or limitation. During the period of time that an employee is removed from normal exposure to lead or otherwise limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this section.

(iv) Workers' compensation claims. If a removed employee files a claim for workers' compensation payments for a lead-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for workers' compensation payments received by the employee for treatment related expenses.

(v) Other credits. The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from employment with another employer made possible by virtue of the employee's removal.

(vi) Employees whose blood lead levels do not adequately decline within 18 months of removal. The employer shall take the following measures with respect to any employee removed from exposure to lead due to an elevated blood lead level whose blood lead level has not declined within the past eighteen (18) months of removal so that the employee has been returned to his or her former job status:

(A) The employer shall make available to the employee a medical examination pursuant to this section to obtain a final medical determination with respect to the employee;

(B) The employer shall assure that the final medical determination obtained indicates whether or not the employee may be returned to his or her former job status, and if not, what steps should be taken to protect the employee's health;

(C) Where the final medical determination has not yet been obtained, or once obtained indicates that the employee may not yet be returned to his or her former job status, the employer shall continue to provide medical removal protection benefits to the employee until either the employee is returned to former job status, or a final medical determination is made that the employee is incapable of ever safely returning to his or her former job status.

(D) Where the employer acts pursuant to a final medical determination which permits the return of the employee to his or her former job status despite what would otherwise be an unacceptable blood lead level, later questions concerning removing the employee again shall be decided by a final medical determination. The employer need not automatically

remove such an employee pursuant to the blood lead level removal criteria provided by this section.

(vii) Voluntary Removal or Restriction of An Employee. Where an employer, although not required by this section to do so, removes an employee from exposure to lead or otherwise places limitations on an employee due to the effects of lead exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by paragraph (k)(2)(i) of this section.

(l) Employee information and training.

(1) Training program.

(i) Each employer who has a workplace in which there is a potential exposure to airborne lead at any level shall inform employees of the content of Appendices A and B of this regulation.

(ii) The employer shall train each employee who is subject to exposure to lead at or above the action level, or for whom the possibility of skin or eye irritation exists, in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

(iii) The employer shall provide initial training by 180 days from the effective date for those employees covered by paragraph (l)(1)(ii) on the standard's effective date and prior to the time of initial job assignment for those employees subsequently covered by this paragraph.

(iv) The training program shall be repeated at least annually for each employee.

(v) The employer shall assure that each employee is informed of the following:

(A) The content of this standard and its appendices;

(B) The specific nature of the operations which could result in exposure to lead above the action level;

(C) The purpose, proper selection, fitting, use, and limitations of respirators;

(D) The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive effects on both males and females);

(E) The engineering controls and work practices associated with the employee's job assignment;

(F) The contents of any compliance plan in effect; and

(G) Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician;

(2) Access to information and training materials.

(i) The employer shall make readily available to all affected employees a copy of this standard and its appendices.

(ii) The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the Director.

(iii) In addition to the information required by paragraph (l)(1)(v), the employer shall include as part of the training program, and shall distribute to employees, any materials pertaining to the Occupational Safety and Health Act, the regulations issued pursuant to that Act, and this lead standard, which are made available to the employer by the Assistant Secretary.

(m) Communication of hazards.

(1) Hazard communication—general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for lead.

(ii) In classifying the hazards of lead at least the following hazards are to be addressed: Reproductive/developmental toxicity; central nervous system effects; kidney effects; blood effects; and acute toxicity effects.

(iii) Employers shall include lead in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of lead and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (l) of this section.

(2) Signs.

(i) The employer shall post the following warning signs in each work area where the PEL is exceeded:

DANGER
LEAD
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM
DO NOT EAT, DRINK OR SMOKE IN THIS AREA

(ii) The employer shall ensure that no statement appears on or near any sign required by this paragraph (m)(2) which contradicts or detracts from the meaning of the required sign.

(iii) The employer shall ensure that signs required by this paragraph (m)(2) are illuminated and cleaned as necessary so that the legend is readily visible.

(iv) The employer may use signs required by other statutes, regulations, or ordinances in addition to, or in combination with, signs required by this paragraph (m)(2).

(v) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (m)(2)(ii) of this section:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

(n) Recordkeeping.

(1) Exposure monitoring.

(i) The employer shall establish and maintain an accurate record of all monitoring required in paragraph (d) of this section.

(ii) This record shall include:

(A) The date(s), number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;

(B) A description of the sampling and analytical methods used and evidence of their accuracy;

(C) The type of respiratory protective devices worn, if any;

(D) Name~~[-social security number,]~~ and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent; and

(E) The environmental variables that could affect the measurement of employee exposure.

(iii) The employer shall maintain these monitoring records for at least 40 years or for the duration of employment plus 20 years, whichever is longer.

(2) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by paragraph (j) of this section.

(ii) This record shall include:

(A) The name~~[-social security number,]~~ and description of the duties of the employee;

(B) A copy of the physician's written opinions;

(C) Results of any airborne exposure monitoring done for that employee and the representative exposure levels supplied to the physician; and

(D) Any employee medical complaints related to exposure to lead.

(iii) The employer shall keep, or assure that the examining physician keeps, the following medical records:

(A) A copy of the medical examination results including medical and work history required under paragraph (j) of this section;

(B) A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information;

(C) A copy of the results of biological monitoring.

(iv) The employer shall maintain or assure that the physician maintains those medical records for at least 40 years, or for the duration of employment plus 20 years, whichever is longer.

(3) Medical removals.

(i) The employer shall establish and maintain an accurate record for each employee removed from current exposure to lead pursuant to paragraph (k) of this section.

(ii) Each record shall include:

(A) The name~~[and social security number]~~ of the employee;

(B) The date on each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to his or her former job status;

(C) A brief explanation of how each removal was or is being accomplished; and

(D) A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

(iii) The employer shall maintain each medical removal record for at least the duration of an employee's employment.

(4) Availability.

(i) The employer shall make available upon request all records required to be maintained by paragraph (n) of this section to the Assistant Secretary and the Director for examination and copying.

(ii) Environmental monitoring, medical removal, and medical records required by this paragraph shall be provided upon request to employees, designated representatives, and

the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (2) through (i). Medical removal records shall be provided in the same manner as environmental monitoring records.

(5) Transfer of records.

(i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by paragraph (n) of this section.

(ii) The employer shall also comply with any additional requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(o) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to lead conducted pursuant to paragraph (d) of this section.

(2) Observation procedures.

(i) Whenever observation of the monitoring of employee exposure to lead requires entry into an area where the use of respirators, protective clothing or equipment is required, the employer shall provide the observer with and assure the use of such respirators, clothing and such equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring, observers shall be entitled to:

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the monitoring of lead performed at the place of exposure; and

(C) Record the results obtained or receive copies of the results when returned by the laboratory.

(p) Appendices. The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 11-1989, f. 7/14/89, ef. 8/14/89.

OR-OSHA Admin. Order 14-1990, f. 6/28/90, ef. 8/1/90.

OR-OSHA Admin. Order 20-1990, f. 9/18/90, ef. 9/18/90.

OR-OSHA Admin. Order 26-1990, f. 11/16/90, ef. 11/16/90.

OR-OSHA Admin. Order 10-1992, f. 9/24/92, ef. 9/24/92 (temp).

OR-OSHA Admin. Order 14-1992, f. 12/7/92, ef. 12/7/92 (perm).
OR-OSHA Admin. Order 4-1996, f. 9/13/96, ef. 9/13/96.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix B to 1910.1025 – Employee Standard Summary

This appendix summarizes key provisions of the standard that you as a worker should become familiar with.

I. Permissible Exposure Limit (PEL) – Paragraph (c)

The standard sets a permissible exposure limit (PEL) of fifty micrograms of lead per cubic meter of air (50 µg/m³), averaged over an 8-hour workday. This is the highest level of lead in air to which you may be permissibly exposed over an 8-hour workday. Since it is an 8-hour average it permits short exposures above the PEL so long as for each 8-hour work day your average exposure does not exceed the PEL.

This standard recognizes that your daily exposure to lead can extend beyond a typical 8-hour workday as the result of overtime or other alterations in your work schedule. To deal with this, the standard contains a formula which reduces your permissible exposure when you are exposed more than 8 hours. For example, if you are exposed to lead for 10 hours a day, the maximum permitted average exposure would be 40 µg/m³.

II. Exposure Monitoring – Paragraph (d)

If lead is present in the workplace where you work in any quantity, your employer is required to make an initial determination of whether the action level is met or exceeded for any employee. This initial determination must include instrument monitoring of the air for the presence of lead and must cover the exposure of a representative number of employees who are reasonably believed to have the highest exposure levels. If your employer has conducted appropriate air sampling for lead in the past year he may use these results. If there have been any employee complaints of symptoms which may be attributable to exposure to lead or if there is any other information or observations which would indicate employee exposure to lead, this must also be considered as part of the initial determination. This initial determination must have been completed by March 31, 1979. If this initial determination shows that a reasonable possibility exists that any employee may be exposed, without regard to respirators, over the action level (30 µg/m³) your employer must set up an air monitoring program to determine the exposure level of every employee exposed to lead at your workplace.

In carrying out this air monitoring program, your employer is not required to monitor the exposure of every employee, but he must monitor a representative number of employees and job types. Enough sampling must be done to enable each employee's exposure level to be reasonably represented by at least one full shift (at least 7 hours) air sample. In addition, these air samples must be taken under conditions which represent each employee's regular, daily exposure to lead. All initial exposure monitoring must have been completed by May 30, 1979.

If you are exposed to lead and air sampling is performed, your employer is required to quickly notify you in writing of air monitoring results which represent your exposure. If the results indicate your exposure exceeds the PEL (without regard to your use of respirators), then your employer must also notify you of this in writing, and provide you with a description of the corrective action that will be taken to reduce your exposure.

Your exposure must be rechecked by monitoring every six months if your exposure is over the action level but below the PEL. Air monitoring must be repeated every 3 months if you are exposed over the PEL. Your employer may discontinue monitoring for you if 2 consecutive measurements, taken at least two weeks apart, are below the action level. However, whenever there is a production, process, control, or personnel change at your workplace which may result in new or additional exposure to lead, or whenever there is any other reason to suspect a change which may result in new or additional exposure to lead, your employer must perform additional monitoring.

III. Methods of Compliance – Paragraph (e)

Your employer is required to assure that no employee is exposed to lead in excess of the PEL. The standard establishes a priority of methods to be used to meet the PEL.

IV. Respiratory Protection – Paragraph (f)

Your employer is required to provide and assure your use of respirators when your exposure to lead is not controlled below the PEL by other means. The employer must pay the cost of the respirator. Whenever you request one, your employer is also required to provide you a respirator even if your air exposure level does not exceed the PEL. You might desire a respirator when, for example, you have received medical advice that your lead absorption should be decreased. Or, you may intend to have children in the near future, and want to reduce the level of lead in your body to minimize adverse reproductive effects. While respirators are the least satisfactory means of controlling your exposure, they are capable of providing significant protection if properly chosen, fitted, worn, cleaned, maintained, and replaced when they stop providing adequate protection.

Your employer is required to select respirators from the seven types listed in Table II of the Respiratory Protection section of the standard (1910.1025(f)). Any respirator chosen must be approved by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 42 CFR part 84. This respirator selection table will enable your employer to choose a type of respirator that will give you a proper amount of protection based on your airborne lead exposure. Your employer may select a type of respirator that provides greater protection than that required by the standard; that is, one recommended for a higher concentration of lead than is present in your workplace. For example, a powered air-

purifying respirator (PAPR) is much more protective than a typical negative pressure respirator, and may also be more comfortable to wear. A PAPR has a filter, cartridge, or canister to clean the air, and a power source that continuously blows filtered air into your breathing zone. Your employer might make a PAPR available to you to ease the burden of having to wear a respirator for long periods of time. The standard provides that you can obtain a PAPR upon request.

Your employer must also start a Respiratory Protection Program. This program must include written procedures for the proper selection, use, cleaning, storage, and maintenance of respirators.

Your employer must ensure that your respirator facepiece fits properly. Proper fit of a respirator facepiece is critical to your protection from airborne lead. Obtaining a proper fit on each employee may require your employer to make available several different types of respirator masks. To ensure that your respirator fits properly and that facepiece leakage is minimal, your employer must give you either a qualitative or quantitative fit test as specified in Appendix A of the Respiratory Protection standard located at 29 CFR 1910.134.

You must also receive from your employer proper training in the use of respirators. Your employer is required to teach you how to wear a respirator, to know why it is needed, and to understand its limitations.

The standard provides that if your respirator uses filter elements, you must be given an opportunity to change the filter elements whenever an increase in breathing resistance is detected. You also must be permitted to periodically leave your work area to wash your face and respirator facepiece whenever necessary to prevent skin irritation. If you ever have difficulty in breathing during a fit test or while using a respirator, your employer must make a medical examination available to you to determine whether you can safely wear a respirator. The result of this examination may be to give you a positive pressure respirator (which reduces breathing resistance) or to provide alternative means of protection.

NOTE: Consult paragraph (f) and OAR 437-002-1025 for the current respiratory protection requirements in Oregon.

V. Protective Work Clothing and Equipment – Paragraph (g)

If you are exposed to lead above the PEL, or if you are exposed to lead compounds such as lead arsenate or lead azide which can cause skin and eye irritation, your employer must provide you with protective work clothing and equipment appropriate for the hazard. If work clothing is provided, it must be provided in a clean and dry condition at least weekly, and daily if your airborne exposure to lead is greater than 200 µg/m³. Appropriate protective work clothing and equipment can include coveralls or similar full-body work clothing, gloves, hats, shoes or disposable shoe coverlets, and face shields or vented goggles. Your employer is required to provide all such equipment at no cost to you. He is responsible for providing repairs and replacement as necessary, and also is responsible for the cleaning, laundering or disposal of protective clothing and equipment. Contaminated work clothing or equipment must be removed in change rooms and not worn home or you will extend your exposure and expose your family since lead from your clothing can accumulate in your house, car, etc. Contaminated clothing which is to be cleaned, laundered or disposed of

must be placed in closed containers in the change room. At no time may lead be removed from protective clothing or equipment by any means which disperses lead into the workroom air.

VI. Housekeeping – Paragraph (h)

Your employer must establish a housekeeping program sufficient to maintain all surfaces as free as practicable of accumulations of lead dust. Vacuuming is the preferred method of meeting this requirement, and the use of compressed air to clean floors and other surfaces is absolutely prohibited. Dry or wet sweeping, shoveling, or brushing may not be used except where vacuuming or other equally effective methods have been tried and do not work. Vacuums must be used and emptied in a manner which minimizes the reentry of lead into the workplace.

VII. Hygiene Facilities and Practices – Paragraph (i)

The standard requires that change rooms, showers, and filtered air lunchrooms be constructed and made available to workers exposed to lead above the PEL. When the PEL is exceeded, the employer must assure that food and beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, except in these facilities. Change rooms, showers, and lunchrooms must be used by workers exposed in excess of the PEL. After showering, no clothing or equipment worn during the shift may be worn home, and this includes shoes and underwear. Your own clothing worn during the shift should be carried home and cleaned carefully so that it does not contaminate your home. Lunchrooms may not be entered with protective clothing or equipment unless surface dust has been removed by vacuuming, downdraft booth, or other cleaning method. Finally, workers exposed above the PEL must wash both their hands and faces prior to eating, drinking, smoking or applying cosmetics. All of the facilities and hygiene practices just discussed are essential to minimize additional sources of lead absorption from inhalation or ingestion of lead that may accumulate on you, your clothes, or your possessions. Strict compliance with these provisions can virtually eliminate several sources of lead exposure which significantly contribute to excessive lead absorption.

VIII. Medical Surveillance – Paragraph (j)

The medical surveillance program is part of the standard's comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard which is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have affectively protected you as an individual. Compliance with the standard's provision will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers (1) who have high body burdens of lead acquired over past years, (2) who have additional uncontrolled sources of non-occupational lead exposure, (3) who exhibit unusual variations in lead absorption rates, or (4) who have specific non-work related medical conditions which could be aggravated by lead exposure (e.g., renal disease, anemia). In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those

failures. Medical surveillance will also be important to protect your reproductive ability – regardless of whether you are a man or woman.

All medical surveillance required by the standard must be performed by or under the supervision of a licensed physician. The employer must provide required medical surveillance without cost to employees and at a reasonable time and place. The standard's medical surveillance program has two parts – periodic biological monitoring and medical examinations.

Your employer's obligation to offer you medical surveillance is triggered by the results of the air monitoring program. Medical surveillance must be made available to all employees who are exposed in excess of the action level for more than 30 days a year. The initial phase of the medical surveillance program, which includes blood lead level tests and medical examinations, must be completed for all covered employees no later than August 28, 1979. Priority within this first round of medical surveillance must be given to employees whom the employer believes to be at greatest risk from continued exposure (for example, those with the longest prior exposure to lead, or those with the highest current exposure). Thereafter, the employer must periodically make medical surveillance – both biological monitoring and medical examinations – available to all covered employees.

Biological monitoring under the standard consists of blood lead level (PbB) and zinc protoporphyrin tests at least every 6 months after the initial PbB test. A zinc protoporphyrin (ZPP) test is a very useful blood test which measures an effect of lead on your body. If a worker's PbB is at or above 40 µg/100g the monitoring frequency must be increased from every 6 months to at least every 2 months and not reduced until two consecutive PbBs indicate a blood lead level below 40 µg/100g. Each time your PbB is determined to be at or above 40 µg/100g, your employer must notify you of this in writing within five working days of his receipt of the test results. The employer must also inform you that the standard requires temporary medical removal with economic protection when your PbB is at or above certain criteria. (See Discussion of Medical Removal Protection – Paragraph (k).) During the first year of the standard, this removal criterion is 80 µg/100g. Anytime your PbB exceeds 80 µg/100g your employer must make available to you a prompt follow-up PbB test to ascertain your PbB. If the two tests both exceed 80 µg/100g and you are temporarily removed, then your employer must make successive PbB tests available to you on a monthly basis during the period of your removal.

Medical examinations beyond the initial one must be made available on an annual basis if your blood lead level is at or above 40 µg/100g at any time during the preceding year. The initial examination will provide information to establish a baseline to which subsequent data can be compared. An initial medical examination must also be made available (prior to assignment) for each employee being assigned for the first time to an area where the airborne concentration of lead equals or exceeds the action level. In addition, a medical examination or consultation must be made available as soon as possible if you notify your employer that you are experiencing signs or symptoms commonly associated with lead poisoning or that you have difficulty breathing while wearing a respirator or during a respirator fit test. You must also be provided a medical examination or consultation if you notify your employer that you desire medical advice concerning the effects of current or past exposure to lead on your ability to procreate a healthy child.

Finally, appropriate follow-up medical examinations or consultations may also be provided for employees who have been temporarily removed from exposure under the medical removal protection provisions of the standard. (See Part IX, below.)

The standard specifies the minimum content of pre-assignment and annual medical examinations. The content of other types of medical examinations and consultations is left up to the sound discretion of the examining physician. Pre-assignment and annual medical examinations must include (1) a detailed work history and medical history, (2) a thorough physical examination, and (3) a series of laboratory tests designed to check your blood chemistry and your kidney function. In addition, at any time upon your request, a laboratory evaluation of male fertility will be made (microscopic examination of a sperm sample), or a pregnancy test will be given.

The standard does not require that you participate in any of the medical procedures, tests, etc. which your employer is required to make available to you. Medical surveillance can, however, play a very important role in protecting your health. You are strongly encouraged, therefore, to participate in a meaningful fashion. The standard contains a multiple physician review mechanism which would give you a chance to have a physician of your choice directly participate in the medical surveillance program. If you were dissatisfied with an examination by a physician chosen by your employer, you could select a second physician to conduct an independent analysis. The two doctors would attempt to resolve any differences of opinion, and select a third physician to resolve any firm dispute. Generally your employer will choose the physician who conducts medical surveillance under the lead standard – unless you and your employer can agree on the choice of a physician or physicians. Some companies and unions have agreed in advance, for example, to use certain independent medical laboratories or panels of physicians. Any of these arrangements are acceptable so long as required medical surveillance is made available to workers.

The standard requires your employer to provide certain information to a physician to aid in his or her examination of you. This information includes (1) the standard and its appendices, (2) a description of your duties as they relate to lead exposure, (3) your exposure level, (4) a description of personal protective equipment you wear, (5) prior blood lead level results, and (6) prior written medical opinions concerning you that the employer has. After a medical examination or consultation the physician must prepare a written report which must contain (1) the physician's opinion as to whether you have any medical condition which places you at increased risk of material impairment to health from exposure to lead, (2) any recommended special protective measures to be provided to you, (3) any blood lead level determinations, and (4) any recommended limitation on your use of respirators. This last element must include a determination of whether you can wear a powered air purifying respirator (PAPR) if you are found unable to wear a negative pressure respirator.

The medical surveillance program of the lead standard may at some point in time serve to notify certain workers that they have acquired a disease or other adverse medical condition as a result of occupational lead exposure. If this is true, these workers might have legal rights to compensation from public agencies, their employers, firms that supply hazardous products to their employers, or other persons. Some states have laws, including worker compensation laws, that disallow a worker who learns of a job-related health impairment to sue, unless the worker sues within a short period of time after learning of the impairment. (This period of time may be a matter of months or years.) An attorney can be consulted

about these possibilities. It should be stressed that OSHA is in no way trying to either encourage or discourage claims or lawsuits. However, since results of the standard's medical surveillance program can significantly affect the legal remedies of a worker who has acquired a job-related disease or impairment, it is proper for OSHA to make you aware of this.

The medical surveillance section of the standard also contains provisions dealing with chelation. Chelation is the use of certain drugs (administered in pill form or injected into the body) to reduce the amount of lead absorbed in body tissues. Experience accumulated by the medical and scientific communities has largely confirmed the effectiveness of this type of therapy for the treatment of very severe lead poisoning. On the other hand, it has also been established that there can be a long list of extremely harmful side effects associated with the use of chelating agents. The medical community has balanced the advantages and disadvantages resulting from the use of chelating agents in various circumstances and has established when the use of these agents is acceptable. The standard includes these accepted limitations due to a history of abuse of chelation therapy by some lead companies. The most widely used chelating agents are calcium disodium EDTA, (Ca Na₂ EDTA), Calcium Disodium Versenate (Versenate), and d-penicillamine (pencillamine or Cupramine).

The standard prohibits "prophylactic chelation" of any employee by any person the employer retains, supervises or controls. "Prophylactic chelation" is the routine use of chelating or similarly acting drugs to prevent elevated blood levels in workers who are occupationally exposed to lead, or the use of these drugs to routinely lower blood lead levels to predesignated concentrations believed to be 'safe'. It should be emphasized that where an employer takes a worker who has no symptoms of lead poisoning and has chelation carried out by a physician (either inside or outside of a hospital) solely to reduce the worker's blood lead level, that will generally be considered prophylactic chelation. The use of a hospital and a physician does not mean that prophylactic chelation is not being performed. Routine chelation to prevent increased or reduce current blood lead levels is unacceptable whatever the setting.

The standard allows the use of "therapeutic" or "diagnostic" chelation if administered under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Therapeutic chelation responds to severe lead poisoning where there are marked symptoms. Diagnostic chelation involved giving a patient a dose of the drug then collecting all urine excreted for some period of time as an aid to the diagnosis of lead poisoning.

In cases where the examining physician determines that chelation is appropriate, you must be notified in writing of this fact before such treatment. This will inform you of a potentially harmful treatment, and allow you to obtain a second opinion.

IX. Medical Removal Protection – Paragraph (k)

Excessive lead absorption subjects you to increased risk of disease. Medical removal protection (MRP) is a means of protecting you when, for whatever reasons, other methods, such as engineering controls, work practices, and respirators, have failed to provide the protection you need. MRP involves the temporary removal of a worker from his or her regular job to a place of significantly lower exposure without any loss of earnings, seniority,

or other employment rights or benefits. The purpose of this program is to cease further lead absorption and allow your body to naturally excrete lead which has previously been absorbed. Temporary medical removal can result from an elevated blood lead level, or a medical opinion. Up to 18 months of protection is provided as a result of either form of removal. The vast majority of removed workers, however, will return to their former jobs long before this eighteen month period expires. The standard contains special provisions to deal with the extraordinary but possible case where a longterm worker's blood lead level does not adequately decline during eighteen months of removal.

During the first year of the standard, if your blood lead level is 80 µg/100g or above you must be removed from any exposure where your air lead level without a respirator would be 100 µg/m³ or above. If you are removed from your normal job you may not be returned until your blood lead level declines to at least 60 µg/100g. These criteria for removal and return will change according to the following schedule:

	Removal blood lead (µg/100 g)	Air lead (µg/m³)	Return blood lead (µg/100 g)
After Mar. 1, 1980	70 and above	50 and above	At or below 50.
After Mar. 1, 1981	60 and above	30 and above	At or below 40.
After Mar. 1, 1983	50 and above averaged over six months.	30 and above	Do.

You may also be removed from exposure even if your blood lead levels are below these criteria if a final medical determination indicates that you temporarily need reduced lead exposure for medical reasons. If the physician who is implementing your employers medical program makes a final written opinion recommending your removal or other special protective measures, your employer must implement the physician's recommendation. If you are removed in this manner, you may only be returned when the doctor indicates that it is safe for you to do so.

The standard does not give specific instructions dealing with what an employer must do with a removed worker. Your job assignment upon removal is a matter for you, your employer and your union (if any) to work out consistent with existing procedures for job assignments. Each removal must be accomplished in a manner consistent with existing collective bargaining relationships. Your employer is given broad discretion to implement temporary removals so long as no attempt is made to override existing agreements. Similarly, a removed worker is provided no right to veto an employer's choice which satisfies the standard.

In most cases, employers will likely transfer removed employees to other jobs with sufficiently low lead exposure. Alternatively, a worker's hours may be reduced so that the time weighted average exposure is reduced, or he or she may be temporarily laid off if no other alternative is feasible.

In all of these situation, MRP benefits must be provided during the period of removal – i.e., you continue to receive the same earnings, seniority, and other rights and benefits you would have had if you had not been removed. Earnings includes more than just your base wage; it includes overtime, shift differentials, incentives, and other compensation you would have earned if you had not been removed. During the period of removal you must also be provided with appropriate follow-up medical surveillance. If you were removed because your

blood lead level was too high, you must be provided with a monthly blood test. If a medical opinion caused your removal, you must be provided medical tests or examinations that the doctor believes to be appropriate. If you do not participate in this follow up medical surveillance, you may lose your eligibility for MRP benefits.

When you are medically eligible to return to your former job, your employer must return you to your "former job status." This means that you are entitled to the position, wages, benefits, etc., you would have had if you had not been removed. If you would still be in your old job if no removal had occurred that is where you go back. If not, you are returned consistent with whatever job assignment discretion your employer would have had if no removal had occurred. MRP only seeks to maintain your rights, not expand them or diminish them.

If you are removed under MRP and you are also eligible for worker compensation or other compensation for lost wages, your employer's MRP benefits obligation is reduced by the amount that you actually receive from these other sources. This is also true if you obtain other employment during the time you are laid off with MRP benefits.

The standard also covers situations where an employer voluntarily removes a worker from exposure to lead due to the effects of lead on the employee's medical condition, even though the standard does not require removal. In these situations MRP benefits must still be provided as though the standard required removal. Finally, it is important to note that in all cases where removal is required, respirators cannot be used as a substitute. Respirators may be used before removal becomes necessary, but not as an alternative to a transfer to a low exposure job, or to a lay-off with MRP benefits.

X. Employee Information and Training – Paragraph (l)

Your employer is required to provide an information and training program for all employees exposed to lead at or above the action level or who may suffer skin or eye irritation from lead. This program must inform these employees of the specific hazards associated with their work environment, protective measures which can be taken, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. In addition your employer must make readily available to all employees, including those exposed below the action level, a copy of the standard and its appendices and must distribute to all employees any materials provided to the employer by the Occupational Safety and Health Administration (OSHA).

Your employer is required to complete this training program for all employees by August 28, 1979. After this date, all new employees must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level. This training program must also be provided at least annually thereafter.

XI. Signs – Paragraph (m)

The standard requires that the following warning sign be posted in work areas when the exposure to lead exceeds the PEL:

DANGER
LEAD

MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM
DO NOT EAT, DRINK OR SMOKE IN THIS AREA

However, prior to June 1, 2016, employers may use the following legend in lieu of that specified above:

WARNING
LEAD WORK AREA
NO SMOKING OR EATING

XII. Recordkeeping – Paragraph (n)

Your employer is required to keep all records of exposure monitoring for airborne lead. These records must include the name and job classification of employees measured, details of the sampling and analytic techniques, the results of this sampling, and the type of respiratory protection being worn by the person sampled. Your employer is also required to keep all records of biological monitoring and medical examination results. These must include the names of the employees, the physician's written opinion, and a copy of the results of the examination. All of the above kinds of records must be kept for 40 years, or for at least 20 years after your termination of employment, whichever is longer.

Recordkeeping is also required if you are temporarily removed from your job under the medical removal protection program. This record must include your name~~[-and social security number]~~, the date of your removal and return, how the removal was or is being accomplished, and whether or not the reason for the removal was an elevated blood lead level. Your employer is required to keep each medical removal record only for as long as the duration of an employee's employment.

The standard requires that if you request to see or copy environmental monitoring, blood lead level monitoring, or medical removal records, they must be made available to you or to a representative that you authorize. Your union also has access to these records. Medical records other than PbB's must also be provided upon request to you, to your physician or to any other person whom you may specifically designate. Your union does not have access to your personal medical records unless you authorize their access.

XIII. Observations of Monitoring – Paragraph (o)

When air monitoring for lead is performed at your workplace as required by this standard, your employer must allow you or someone you designate to act as an observer of the monitoring. Observers are entitled to an explanation of the measurement procedure, and to record the results obtained. Since results will not normally be available at the time of the monitoring, observers are entitled to record or receive the results of the monitoring when returned by the laboratory. Your employer is required to provide the observer with any personal protective devices required to be worn by employees working in the area that is being monitored. The employer must require the observer to wear all such equipment and to comply with all other applicable safety and health procedures.

XIV. For Additional Information

A. Copies of the Standard and explanatory material may be obtained by writing or calling the OSHA Docket Office, Department of Labor, Room N2634, 200 Constitution Avenue NW, Washington, D.C. 20210. Telephone: (202) 219-7894.

1. The standard and summary of the statement of reasons (preamble), Federal Register, Volume 43, pp. 52952-53014, November 14, 1978.
2. The full statement of reasons (preamble) Federal Register, vol. 43, pp. 54354-54509, November 21, 1978.
3. Partial Administrative Stay and Corrections to the standard, (44 FR 5446-5448) January 26, 1979.
4. Notice of the Partial Judicial Stay (44 FR 14554-14555) March 13, 1979.
5. Corrections to the preamble, Federal Register, vol. 44, pp. 20680-20681, April 6, 1979.
6. Additional correction to the preamble concerning the construction industry, Federal Register, vol. 44, p. 50338, August 28, 1979.
7. Appendices to the standard (Appendices A, B, C), Federal Register, Vol. 44, pp. 60980-60995, October 23, 1979.
8. Corrections to appendices, Federal Register, Vol. 44, 68828, November 30, 1979.
9. Revision to the standard and an additional appendix (Appendix D, Federal Register, Vol. 47, pp. 51117-51119, November 12, 1982.
10. Notice of reopening of lead rulemaking for nine remand industry sectors, Federal Register, vol. 53, pp. 11511-11513, April 7, 1988.
11. Statement of reasons, Federal Register, vol. 54, pp. 29142-29275, July 11, 1989.
12. Statement of reasons, Federal Register, vol. 55, pp. 3146-3167, January 30, 1990.
13. Correction to Appendix B, Federal Register, vol. 55, pp. 4998-4999, February 13, 1991.
14. Correction to appendices, Federal Register, vol. 56, p. 24686, May 31, 1991.

B. Additional information about the standard, its enforcement, and your employer's compliance can be obtained from the nearest OSHA Area Office listed in your telephone directory under United States Government/Department of Labor.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 11-1989, f. 7/14/89, ef. 8/14/89.
OR-OSHA Admin. Order 14-1990, f. 6/28/90, ef. 8/1/90.

OR-OSHA Admin. Order 13-1991, f. 10/10/91, ef. 10/10/91.
OR-OSHA Admin. Order 4-1996, f. 9/13/96, ef. 9/13/96.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1026

Chromium (VI).

(a) Scope.

(1) This standard applies to occupational exposures to chromium (VI) in all forms and compounds in general industry, except:

NOTE: Oregon OSHA did not adopt 1910.1026(a)(2). Federal OSHA does not regulate the use of pesticides because the Environmental Protection Agency (EPA) regulates these exposures through the Worker Protection Standard (WPS). However, since Oregon OSHA enforces the WPS, this exemption does not apply in Oregon.

(3) Exposures to Portland cement; or

(4) Where the employer has objective data demonstrating that a material containing chromium or a specific process, operation, or activity involving chromium cannot release dusts, fumes, or mists of chromium (VI) in concentrations at or above 0.5 µg/m³ as an 8 hour time-weighted average (TWA) under any expected conditions of use.

(b) Definitions. For the purposes of this section the following definitions apply:

Action level means a concentration of airborne chromium (VI) of 2.5 micrograms per cubic meter of air (2.5 µg/m³) calculated as an 8-hour time-weighted average (TWA).

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Chromium (VI) [hexavalent chromium or Cr(VI)] means chromium with a valence of positive six, in any form and in any compound.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence that results, or is likely to result, in an uncontrolled release of chromium (VI). If an incidental release of chromium (VI) can be controlled at the time of release by employees in the immediate release area, or by maintenance personnel, it is not an emergency.

Employee exposure means the exposure to airborne chromium (VI) that would occur if the employee were not using a respirator.

High-efficiency particulate air [HEPA] filter means a filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter or larger.

Historical monitoring data means data from chromium (VI) monitoring conducted prior to May 30, 2006, obtained during work operations conducted under workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Objective data means information such as air monitoring data from industry-wide surveys or calculations based on the composition or chemical and physical properties of a substance demonstrating the employee exposure to chromium (VI) associated with a particular product or material or a specific process, operation, or activity. The data must reflect workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Physician or other licensed health care professional [PLHCP] is an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by paragraph (k) of this section.

Regulated area means an area, demarcated by the employer, where an employee's exposure to airborne concentrations of chromium (VI) exceeds, or can reasonably be expected to exceed, the PEL.

This section means this 1910.1026 chromium (VI) standard.

(c) Permissible exposure limit (PEL). The employer shall ensure that no employee is exposed to an airborne concentration of chromium (VI) in excess of 5 micrograms per cubic meter of air (5 µg/m³), calculated as an 8-hour time-weighted average (TWA).

(d) Exposure determination.

(1) General. Each employer who has a workplace or work operation covered by this section shall determine the 8-hour TWA exposure for each employee exposed to chromium (VI). This determination shall be made in accordance with either paragraph (d)(2) or paragraph (d)(3) of this section.

(2) Scheduled monitoring option.

(i) The employer shall perform initial monitoring to determine the 8-hour TWA exposure for each employee on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area. Where an employer does representative sampling instead of sampling all employees in order to meet this requirement, the employer shall sample the employee(s) expected to have the highest chromium (VI) exposures.

(ii) If initial monitoring indicates that employee exposures are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(iii) If monitoring reveals employee exposures to be at or above the action level, the employer shall perform periodic monitoring at least every six months.

(iv) If monitoring reveals employee exposures to be above the PEL, the employer shall perform periodic monitoring at least every three months.

(v) If periodic monitoring indicates that employee exposures are below the action level, and the result is confirmed by the result of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(vi) The employer shall perform additional monitoring when there has been any change in the production process, raw materials, equipment, personnel, work practices, or control methods that may result in new or additional exposures to chromium (VI), or when the employer has any reason to believe that new or additional exposures have occurred.

(3) Performance-oriented option. The employer shall determine the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data, historical monitoring data, or objective data sufficient to accurately characterize employee exposure to chromium (VI).

(4) Employee notification of determination results.

(i) Within 15 work days after making an exposure determination in accordance with paragraph (d)(2) or paragraph (d)(3) of this section, the employer shall individually notify each affected employee in writing of the results of that determination or post the results in an appropriate location accessible to all affected employees.

(ii) Whenever the exposure determination indicates that employee exposure is above the PEL, the employer shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.

(5) Accuracy of measurement. Where air monitoring is performed to comply with the requirements of this section, the employer shall use a method of monitoring and analysis that can measure chromium (VI) to within an accuracy of plus or minus 25 percent (+/- 25%) and can produce accurate measurements to within a statistical confidence level of 95 percent for airborne concentrations at or above the action level.

(6) Observation of monitoring.

(i) Where air monitoring is performed to comply with the requirements of this section, the employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to chromium (VI).

(ii) When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with clothing and equipment and shall assure that the observer uses such clothing and equipment and complies with all other applicable safety and health procedures.

(e) Regulated areas.

(1) Establishment. The employer shall establish a regulated area wherever an employee's exposure to airborne concentrations of chromium (VI) is, or can reasonably be expected to be, in excess of the PEL.

(2) Demarcation. The employer shall ensure that regulated areas are demarcated from the rest of the workplace in a manner that adequately establishes and alerts employees of the boundaries of the regulated area.

(3) Access. The employer shall limit access to regulated areas to:

(i) Persons authorized by the employer and required by work duties to be present in the regulated area;

(ii) Any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring procedures under paragraph (d) of this section; or

(iii) Any person authorized by the Occupational Safety and Health Act or regulations issued under it to be in a regulated area.

(f) Methods of compliance.

(1) Engineering and work practice controls.

(i) Except as permitted in paragraph (f)(1)(ii) and paragraph (f)(1)(iii) of this section, the employer shall use engineering and work practice controls to reduce and maintain employee exposure to chromium (VI) to or below the PEL unless the employer can demonstrate that such controls are not feasible. Wherever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer shall use them to reduce employee exposure to the lowest levels achievable, and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (g) of this section.

(ii) Where painting of aircraft or large aircraft parts is performed in the aerospace industry, the employer shall use engineering and work practice controls to reduce and maintain employee exposure to chromium (VI) to or below 25 µg/m³ unless the employer can demonstrate that such controls are not feasible. The employer shall supplement such engineering and work practice controls with the use of respiratory protection that complies with the requirements of paragraph (g) of this section to achieve the PEL.

(iii) Where the employer can demonstrate that a process or task does not result in any employee exposure to chromium (VI) above the PEL for 30 or more days per year (12

consecutive months), the requirement to implement engineering and work practice controls to achieve the PEL does not apply to that process or task.

(2) Prohibition of rotation. The employer shall not rotate employees to different jobs to achieve compliance with the PEL.

(g) Respiratory protection.

(1) General. Where respiratory protection is required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respiratory protection is required during:

(i) Periods necessary to install or implement feasible engineering and work practice controls;

(ii) Work operations, such as maintenance and repair activities, for which engineering and work practice controls are not feasible;

(iii) Work operations for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL;

(iv) Work operations where employees are exposed above the PEL for fewer than 30 days per year, and the employer has elected not to implement engineering and work practice controls to achieve the PEL; or

(v) Emergencies.

(2) Respiratory protection program. Where respirator use is required by this section, the employer shall institute a respiratory protection program in accordance with 29 CFR 1910.134, which covers each employee required to use a respirator.

(h) Protective work clothing and equipment.

(1) Provision and use. Where a hazard is present or is likely to be present from skin or eye contact with chromium (VI), the employer shall provide appropriate personal protective clothing and equipment at no cost to employees, and shall ensure that employees use such clothing and equipment.

(2) Removal and storage.

(i) The employer shall ensure that employees remove all protective clothing and equipment contaminated with chromium (VI) at the end of the work shift or at the completion of their tasks involving chromium (VI) exposure, whichever comes first.

(ii) The employer shall ensure that no employee removes chromium (VI)-contaminated protective clothing or equipment from the workplace, except for those employees whose job it is to launder, clean, maintain, or dispose of such clothing or equipment.

(iii) When contaminated protective clothing or equipment is removed for laundering, cleaning, maintenance, or disposal, the employer shall ensure that it is stored and transported in sealed, impermeable bags or other closed, impermeable containers.

(iv) The employer shall ensure that bags or containers of contaminated protective clothing or equipment that are removed from change rooms for laundering, cleaning, maintenance, or disposal are labeled in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200.

(3) Cleaning and replacement.

(i) The employer shall clean, launder, repair and replace all protective clothing and equipment required by this section as needed to maintain its effectiveness.

(ii) The employer shall prohibit the removal of chromium (VI) from protective clothing and equipment by blowing, shaking, or any other means that disperses chromium (VI) into the air or onto an employee's body.

(iii) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with chromium (VI) of the potentially harmful effects of exposure to chromium (VI) and that the clothing and equipment should be laundered or cleaned in a manner that minimizes skin or eye contact with chromium (VI) and effectively prevents the release of airborne chromium (VI) in excess of the PEL.

(i) Hygiene areas and practices.

(1) General. Where protective clothing and equipment is required, the employer shall provide change rooms in conformance with 29 CFR 1910.141. Where skin contact with chromium (VI) occurs, the employer shall provide washing facilities in conformance with 29 CFR 1910.141. Eating and drinking areas provided by the employer shall also be in conformance with 1910.141.

(2) Change rooms. The employer shall assure that change rooms are equipped with separate storage facilities for protective clothing and equipment and for street clothes, and that these facilities prevent cross-contamination.

(3) Washing facilities.

(i) The employer shall provide readily accessible washing facilities capable of removing chromium (VI) from the skin, and shall ensure that affected employees use these facilities when necessary.

(ii) The employer shall ensure that employees who have skin contact with chromium (VI) wash their hands and faces at the end of the work shift and prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics, or using the toilet.

(4) Eating and drinking areas.

(i) Whenever the employer allows employees to consume food or beverages at a worksite where chromium (VI) is present, the employer shall ensure that eating and drinking areas and surfaces are maintained as free as practicable of chromium (VI).

(ii) The employer shall ensure that employees do not enter eating and drinking areas with protective work clothing or equipment unless surface chromium (VI) has been removed from the clothing and equipment by methods that do not disperse chromium (VI) into the air or onto an employee's body.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, or in areas where skin or eye contact with chromium (VI) occurs; or carry the products associated with these activities, or store such products in these areas.

(j) Housekeeping.

(1) General. The employer shall ensure that:

(i) All surfaces are maintained as free as practicable of accumulations of chromium (VI).

(ii) All spills and releases of chromium (VI) containing material are cleaned up promptly.

(2) Cleaning methods.

(i) The employer shall ensure that surfaces contaminated with chromium (VI) are cleaned by HEPA-filter vacuuming or other methods that minimize the likelihood of exposure to chromium (VI).

(ii) Dry shoveling, dry sweeping, and dry brushing may be used only where HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure to chromium (VI) have been tried and found not to be effective.

(iii) The employer shall not allow compressed air to be used to remove chromium (VI) from any surface unless:

(A) The compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air; or

(B) No alternative method is feasible.

(iv) The employer shall ensure that cleaning equipment is handled in a manner that minimizes the reentry of chromium (VI) into the workplace.

(3) Disposal. The employer shall ensure that:

(i) Waste, scrap, debris, and any other materials contaminated with chromium (VI) and consigned for disposal are collected and disposed of in sealed, impermeable bags or other closed, impermeable containers.

(ii) Bags or containers of waste, scrap, debris, and any other materials contaminated with chromium (VI) that are consigned for disposal are labeled in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200.

(k) Medical surveillance.

(1) General.

(i) The employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for all employees:

(A) Who are or may be occupationally exposed to chromium (VI) at or above the action level for 30 or more days a year;

(B) Experiencing signs or symptoms of the adverse health effects associated with chromium (VI) exposure; or

(C) Exposed in an emergency.

(ii) The employer shall assure that all medical examinations and procedures required by this section are performed by or under the supervision of a PLHCP.

(2) Frequency. The employer shall provide a medical examination:

(i) Within 30 days after initial assignment, unless the employee has received a chromium (VI) related medical examination that meets the requirements of this paragraph within the last twelve months;

(ii) Annually;

(iii) Within 30 days after a PLHCP's written medical opinion recommends an additional examination;

(iv) Whenever an employee shows signs or symptoms of the adverse health effects associated with chromium (VI) exposure;

(v) Within 30 days after exposure during an emergency which results in an uncontrolled release of chromium (VI); or

(vi) At the termination of employment, unless the last examination that satisfied the requirements of paragraph (k) of this section was less than six months prior to the date of termination.

(3) Contents of examination. A medical examination consists of:

(i) A medical and work history, with emphasis on: Past, present, and anticipated future exposure to chromium (VI); any history of respiratory system dysfunction; any history of asthma, dermatitis, skin ulceration, or nasal septum perforation; and smoking status and history;

(ii) A physical examination of the skin and respiratory tract; and

(iii) Any additional tests deemed appropriate by the examining PLHCP.

(4) Information provided to the PLHCP. The employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the following information:

(i) A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to chromium (VI);

(ii) The employee's former, current, and anticipated levels of occupational exposure to chromium (VI);

(iii) A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used that equipment; and

(iv) Information from records of employment-related medical examinations previously provided to the affected employee, currently within the control of the employer.

(5) PLHCP's written medical opinion.

(i) The employer shall obtain a written medical opinion from the PLHCP, within 30 days for each medical examination performed on each employee, which contains:

(A) The PLHCP's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to chromium (VI);

(B) Any recommended limitations upon the employee's exposure to chromium (VI) or upon the use of personal protective equipment such as respirators;

(C) A statement that the PLHCP has explained to the employee the results of the medical examination, including any medical conditions related to chromium (VI) exposure that require further evaluation or treatment, and any special provisions for use of protective clothing or equipment.

(ii) The PLHCP shall not reveal to the employer specific findings or diagnoses unrelated to occupational exposure to chromium (VI).

(iii) The employer shall provide a copy of the PLHCP's written medical opinion to the examined employee within two weeks after receiving it.

(I) Communication of chromium (VI) hazards to employees.

(1) Hazard communication – general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for chromium (VI).

(ii) In classifying the hazards of chromium (VI) at least the following hazards are to be addressed: Cancer, eye irritation, and skin sensitization.

(iii) Employers shall include chromium (VI) in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of chromium (VI) and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (l)(2) of this section.

(2) Employee information and training.

(i) The employer shall ensure that each employee can demonstrate knowledge of at least the following:

(A) The contents of this section; and

(B) The purpose and a description of the medical surveillance program required by paragraph (k) of this section.

(ii) The employer shall make a copy of this section readily available without cost to all affected employees.

(m) Recordkeeping.

(1) Air monitoring data.

(i) The employer shall maintain an accurate record of all air monitoring conducted to comply with the requirements of this section.

(ii) This record shall include at least the following information:

(A) The date of measurement for each sample taken;

(B) The operation involving exposure to chromium (VI) that is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and the results of samples taken;

(E) Type of personal protective equipment, such as respirators worn; and

(F) Name~~[-, social security number,]~~ and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

(iii) The employer shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

(2) Historical monitoring data.

(i) Where the employer has relied on historical monitoring data to determine exposure to chromium (VI), the employer shall establish and maintain an accurate record of the historical monitoring data relied upon.

(ii) The record shall include information that reflects the following conditions:

(A) The data were collected using methods that meet the accuracy requirements of paragraph (d)(5) of this section;

(B) The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which exposure is being determined;

(C) The characteristics of the chromium (VI) containing material being handled when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined;

(D) Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exception.

(iii) The employer shall ensure that historical exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

(3) Objective data.

(i) The employer shall maintain an accurate record of all objective data relied upon to comply with the requirements of this section.

(ii) This record shall include at least the following information:

(A) The chromium containing material in question;

(B) The source of the objective data;

(C) The testing protocol and results of testing, or analysis of the material for the release of chromium (VI);

(D) A description of the process, operation, or activity and how the data support the determination; and

(E) Other data relevant to the process, operation, activity, material, or employee exposures.

(iii) The employer shall ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020.

(4) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee covered by medical surveillance under paragraph (k) of this section.

(ii) The record shall include the following information about the employee:

(A) Name~~[-and social security number]~~;

(B) A copy of the PLHCP's written opinions;

(C) A copy of the information provided to the PLHCP as required by paragraph (k)(4) of this section.

(iii) The employer shall ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020.

(n) Dates.

(1) For employers with 20 or more employees, all obligations of this section, except engineering controls required by paragraph (f) of this section, commence November 27, 2006.

(2) For employers with 19 or fewer employees, all obligations of this section, except engineering controls required by paragraph (f) of this section, commence May 30, 2007.

(3) For all employers, engineering controls required by paragraph (f) of this section shall be implemented no later than May 31, 2010.

[71 FR 10374, Feb. 28, 2006, as amended at 71 FR 63242, Oct. 30, 2006; 73 FR 75585, Dec. 12, 2008; 75 FR 12686, Mar. 17, 2010; 77 FR 17781, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-2006, f. 8/30/06, ef. 8/30/06 (Chromium (VI)).

OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.

OR-OSHA Admin. Order 3-2010, f. 6/10/10, ef. 6/15/10.

OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1027

Cadmium.

(a) Scope. This standard applies to all occupational exposures to cadmium and cadmium compounds, in all forms, and in all industries covered by the Occupational Safety and Health Act, except the construction-related industries, which are covered under 29 CFR 1926.63.

(b) Definitions.

Action level (AL) is defined as an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air (2.5 µg/m³), calculated as an 8-hour time-weighted average (TWA).

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person authorized by the employer and required by work duties to be present in regulated areas or any person authorized by the OSH Act or regulations issued under it to be in regulated areas.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Employee exposure and similar language referring to the air cadmium level to which an employee is exposed means the exposure to airborne cadmium that would occur if the employee were not using respiratory protective equipment.

Final medical determination is the written medical opinion of the employee's health status by the examining physician under paragraphs (l)(3)-(12) of this section or, if multiple physician review under paragraph (l)(13) of this section or the alternative physician determination under paragraph (l)(14) of this section is invoked, it is the final, written medical finding, recommendation or determination that emerges from that process.

High-efficiency particulate air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of monodispersed particles of 0.3 micrometers in diameter.

Regulated area means an area demarcated by the employer where an employee's exposure to airborne concentrations of cadmium exceeds, or can reasonably be expected to exceed the permissible exposure limit (PEL).

This section means this cadmium standard.

(c) Permissible Exposure Limit (PEL). The employer shall assure that no employee is exposed to an airborne concentration of cadmium in excess of five micrograms per cubic meter of air (5 µg/m³), calculated as an eight-hour time-weighted average exposure (TWA).

(d) Exposure monitoring.

(1) General.

(i) Each employer who has a workplace or work operation covered by this section shall determine if any employee may be exposed to cadmium at or above the action level.

(ii) Determinations of employee exposure shall be made from breathing zone air samples that reflect the monitored employee's regular, daily 8-hour TWA exposure to cadmium.

(iii) Eight-hour TWA exposures shall be determined for each employee on the basis of one or more personal breathing zone air samples reflecting full shift exposure on each shift, for each job classification, in each work area. Where several employees perform the same job tasks, in the same job classification, on the same shift, in the same work area, and the length, duration, and level of cadmium exposures are similar, an employer may sample a representative fraction of the employees instead of all employees in order to meet this requirement. In representative sampling, the employer shall sample the employee(s) expected to have the highest cadmium exposures.

(2) Specific.

(i) Initial monitoring. Except as provided for in paragraphs (d)(2)(ii) and (d)(2)(iii) of this section, the employer shall monitor employee exposures and shall base initial determinations on the monitoring results.

(ii) Where the employer has monitored after September 14, 1991, under conditions that in all important aspects closely resemble those currently prevailing and where that monitoring satisfies all other requirements of this section, including the accuracy and confidence levels of paragraph (d)(6) of this section, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (d)(2)(i) of this section.

(iii) Where the employer has objective data, as defined in paragraph (n)(2) of this section, demonstrating that employee exposure to cadmium will not exceed the action level under the expected conditions of processing, use, or handling, the employer may rely upon such data instead of implementing initial monitoring.

(3) Monitoring Frequency (periodic monitoring).

(i) If the initial monitoring or periodic monitoring reveals employee exposures to be at or above the action level, the employer shall monitor at a frequency and pattern needed to represent the levels of exposure of employees and where exposures are above the PEL to assure the adequacy of respiratory selection and the effectiveness of engineering and work practice controls. However, such exposure monitoring shall be performed at least every six months. The employer, at a minimum, shall continue these semi-annual measurements unless and until the conditions set out in paragraph (d)(3)(ii) of this section are met.

(ii) If the initial monitoring or the periodic monitoring indicates that employee exposures are below the action level and that result is confirmed by the results of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(4) Additional Monitoring. The employer also shall institute the exposure monitoring required under paragraphs (d)(2)(i) and (d)(3) of this section whenever there has been a change in the raw materials, equipment, personnel, work practices, or finished products that may result in additional employees being exposed to cadmium at or above the action level or in employees already exposed to cadmium at or above the action level being exposed above the PEL, or whenever the employer has any reason to suspect that any other change might result in such further exposure.

(5) Employee Notification of Monitoring Results.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Wherever monitoring results indicate that employee exposure exceeds the PEL, the employer shall include in the written notice a statement that the PEL has been exceeded and a description of the corrective action being taken by the employer to reduce employee exposure to or below the PEL.

(6) Accuracy of measurement. The employer shall use a method of monitoring and analysis that has an accuracy of not less than plus or minus 25 percent ($\pm 25\%$), with a confidence level of 95 percent, for airborne concentrations of cadmium at or above the action level, the permissible exposure limit (PEL), and the separate engineering control air limit (SECAL).

(e) Regulated areas.

(1) Establishment. The employer shall establish a regulated area wherever an employee's exposure to airborne concentrations of cadmium is, or can reasonably be expected to be in excess of the permissible exposure limit (PEL).

(2) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees of the boundaries of the regulated area.

(3) Access. Access to regulated areas shall be limited to authorized persons.

(4) Provision of respirators. Each person entering a regulated area shall be supplied with and required to use a respirator, selected in accordance with paragraph (g)(2) of this section.

(5) Prohibited activities. The employer shall assure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, carry the products associated with these activities into regulated areas, or store such products in those areas.

(f) Methods of compliance.

(1) Compliance hierarchy.

(i) Except as specified in paragraphs (f)(1)(ii), (iii) and (iv) of this section the employer shall implement engineering and work practice controls to reduce and maintain employee exposure to cadmium at or below the PEL, except to the extent that the employer can demonstrate that such controls are not feasible.

(ii) Except as specified in paragraphs (f)(1)(iii) and (iv) of this section, in industries where a separate engineering control air limit (SECAL) has been specified for particular processes (See Table 1 in this paragraph (f)(1)(ii)), the employer shall implement engineering and work

practice controls to reduce and maintain employee exposure at or below the SECAL, except to the extent that the employer can demonstrate that such controls are not feasible.

Table 1 – Separate Engineering Control Airborne Limits (SECALs) for Processes in Selected Industries

Industry	Process	SECAL (µg/m3)
Nickel Cadmium Battery	Plate making, plate preparation	50
	All other processes	15
Zinc/Cadmium refining*	Cadmium refining, casting, melting, oxide production, sinter plant	50
Pigment manufacture	Calcine, crushing, milling, blending	50
	All other processes	15
Stabilizers*	Cadmium oxide charging, crushing, drying, blending	50
Lead smelting*	Sinter plant, blast furnace, baghouse, yard area	50
Plating*	Mechanical plating	15

* Processes in these industries that are not specified in this table must achieve the PEL using engineering controls and work practices as required in (f)(1)(i).

(iii) The requirement to implement engineering and work practice controls to achieve the PEL or, where applicable, the SECAL does not apply where the employer demonstrates the following:

(A) The employee is only intermittently exposed; and

(B) The employee is not exposed above the PEL on 30 or more days per year (12 consecutive months).

(iv) Wherever engineering and work practice controls are required and are not sufficient to reduce employee exposure to or below the PEL or, where applicable, the SECAL, the employer nonetheless shall implement such controls to reduce exposures to the lowest levels achievable. The employer shall supplement such controls with respiratory protection that complies with the requirements of paragraph (g) of this section and the PEL.

(v) The employer shall not use employee rotation as a method of compliance.

(2) Compliance program.

(i) Where the PEL is exceeded, the employer shall establish and implement a written compliance program to reduce employee exposure to or below the PEL by means of engineering and work practice controls, as required by paragraph (f)(1) of this section. To the extent that engineering and work practice controls cannot reduce exposures to or below the PEL, the employer shall include in the written compliance program the use of appropriate respiratory protection to achieve compliance with the PEL.

(ii) Written compliance programs shall include at least the following:

(A) A description of each operation in which cadmium is emitted; e.g., machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices;

(B) A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to cadmium, as well as, where necessary, the use of appropriate respiratory protection to achieve the PEL;

(C) A report of the technology considered in meeting the PEL;

(D) Air monitoring data that document the sources of cadmium emissions;

(E) A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;

(F) A work practice program that includes items required under paragraphs (h), (i), and (j) of this section;

(G) A written plan for emergency situations, as specified in paragraph (h) of this section; and

(H) Other relevant information.

(iii) The written compliance programs shall be reviewed and updated at least annually, or more often if necessary, to reflect significant changes in the employer's compliance status.

(iv) Written compliance programs shall be provided upon request for examination and copying to affected employees, designated employee representatives as well as to the Assistant Secretary, and the Director.

(3) Mechanical ventilation.

(i) When ventilation is used to control exposure, measurements that demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure shall be made as necessary to maintain its effectiveness.

(ii) Measurements of the system's effectiveness in controlling exposure shall be made as necessary within five working days of any change in production, process, or control that might result in a significant increase in employee exposure to cadmium.

(iii) Recirculation of air. If air from exhaust ventilation is recirculated into the workplace, the system shall have a high efficiency filter and be monitored to assure effectiveness.

(iv) Procedures shall be developed and implemented to minimize employee exposure to cadmium when maintenance of ventilation systems and changing of filters is being conducted.

(g) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls when employee exposure levels exceed the PEL.

(ii) Maintenance and repair activities, and brief or intermittent operations, for which employee exposures exceed the PEL and engineering and work-practice controls are not feasible or are not required.

(iii) Activities in regulated areas specified in paragraph (e) of this section.

(iv) Work operations for which the employer has implemented all feasible engineering and work-practice controls and such controls are not sufficient to reduce employee exposures to or below the PEL.

(v) Work operations for which an employee is exposed to cadmium at or above the action level, and the employee requests a respirator.

(vi) Work operations for which an employee is exposed to cadmium above the PEL and engineering controls are not required by paragraph (f)(1)(ii) of this section.

(vii) Emergencies.

(2) Respirator program.

Oregon OSHA repealed 1910.1027(g)(2)(i). In Oregon, OAR 437-002-1027 applies.

437-002-1027 Cadmium Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1027 Cadmium, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Cadmium rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) No employees must use a respirator if, based on their most recent medical examination, the examining physician determines that they will be unable to continue to function normally while using a respirator. If the physician determines that the employee must be limited in, or removed from, their current job because of their inability to use a respirator, the limitation or removal must be in accordance with paragraphs (l)(11) and (12) of this section.

(iii) If an employee has breathing difficulty during fit testing or respirator use, the employer must provide the employee with a medical examination in accordance with paragraph (l)(6)(ii) of this section to determine if the employee can use a respirator while performing the required duties.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide employees with full facepiece respirators when they experience eye irritation.

(C) Provide HEPA filters for powered and non-powered air-purifying respirators.

(ii) The employer must provide an employee with a powered air-purifying respirator instead of a negative-pressure respirator when an employee who is entitled to a respirator chooses to use this type of respirator and such a respirator provides adequate protection to the employee.

(h) Emergency situations. The employer shall develop and implement a written plan for dealing with emergency situations involving substantial releases of airborne cadmium. The plan shall include provisions for the use of appropriate respirators and personal protective equipment. In addition, employees not essential to correcting the emergency situation shall be restricted from the area and normal operations halted in that area until the emergency is abated.

(i) Protective work clothing and equipment.

(1) Provision and use. If an employee is exposed to airborne cadmium above the PEL or where skin or eye irritation is associated with cadmium exposure at any level, the employer shall provide at no cost to the employee, and assure that the employee uses, appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments. Protective work clothing and equipment includes, but is not limited to:

(i) Coveralls or similar full-body work clothing;

(ii) Gloves, head coverings, and boots or foot coverings; and

(iii) Face shields, vented goggles, or other appropriate protective equipment that complies with OAR 437-002-0134(8).

(2) Removal and storage.

(i) The employer shall assure that employees remove all protective clothing and equipment contaminated with cadmium at the completion of the work shift and do so only in change rooms provided in accordance with paragraph (j)(1) of this section.

(ii) The employer shall assure that no employee takes cadmium-contaminated protective clothing or equipment from the workplace, except for employees authorized to do so for purposes of laundering, cleaning, maintaining, or disposing of cadmium contaminated protective clothing and equipment at an appropriate location or facility away from the workplace.

(iii) The employer shall assure that contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, is placed and stored in sealed, impermeable bags or other closed, impermeable containers that are designed to prevent dispersion of cadmium dust.

(iv) The employer shall assure that bags or containers of contaminated protective clothing and equipment that are to be taken out of the change rooms or the workplace for laundering, cleaning, maintenance or disposal shall bear labels in accordance with paragraph (m)(3) of this section.

(3) Cleaning, replacement, and disposal.

(i) The employer shall provide the protective clothing and equipment required by paragraph (i)(1) of this section in a clean and dry condition as often as necessary to maintain its effectiveness, but in any event at least weekly. The employer is responsible for cleaning and laundering the protective clothing and equipment required by this paragraph to maintain its effectiveness and is also responsible for disposing of such clothing and equipment.

(ii) The employer also is responsible for repairing or replacing required protective clothing and equipment as needed to maintain its effectiveness. When rips or tears are detected while an employee is working they shall be immediately mended, or the worksuit shall be immediately replaced.

(iii) The employer shall prohibit the removal of cadmium from protective clothing and equipment by blowing, shaking, or any other means that disperses cadmium into the air.

(iv) The employer shall assure that any laundering of contaminated clothing or cleaning of contaminated equipment in the workplace is done in a manner that prevents the release of airborne cadmium in excess of the permissible exposure limit prescribed in paragraph (c) of this section.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with cadmium of the potentially harmful effects of exposure to cadmium and that the clothing and equipment should be laundered or cleaned in a manner to effectively prevent the release of airborne cadmium in excess of the PEL.

(j) Hygiene areas and practices.

(1) General. For employees whose airborne exposure to cadmium is above the PEL, the employer shall provide clean change rooms, handwashing facilities, showers, and lunchroom facilities that comply with 29 CFR 1910.141.

(2) Change rooms. The employer shall assure that change rooms are equipped with separate storage facilities for street clothes and for protective clothing and equipment, which are designed to prevent dispersion of cadmium and contamination of the employee's street clothes.

(3) Showers and handwashing facilities.

(i) The employer shall assure that employees who are exposed to cadmium above the PEL shower during the end of the work shift.

(ii) The employer shall assure that employees whose airborne exposure to cadmium is above the PEL wash their hands and faces prior to eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.

(4) Lunchroom facilities.

(i) The employer shall assure that the lunchroom facilities are readily accessible to employees, that tables for eating are maintained free of cadmium, and that no employee in a lunchroom facility is exposed at any time to cadmium at or above a concentration of 2.5 µg/m³.

(ii) The employer shall assure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface cadmium has been removed from the clothing and equipment by HEPA vacuuming or some other method that removes cadmium dust without dispersing it.

(k) Housekeeping.

(1) All surfaces shall be maintained as free as practicable of accumulations of cadmium.

(2) All spills and sudden releases of material containing cadmium shall be cleaned up as soon as possible.

(3) Surfaces contaminated with cadmium shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of cadmium becoming airborne.

(4) HEPA-filtered vacuuming equipment or equally effective filtration methods shall be used for vacuuming. The equipment shall be used and emptied in a manner that minimizes the reentry of cadmium into the workplace.

(5) Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other methods that minimize the likelihood of cadmium becoming airborne have been tried and found not to be effective.

(6) Compressed air shall not be used to remove cadmium from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air.

(7) Waste, scrap, debris, bags, containers, personal protective equipment, and clothing contaminated with cadmium and consigned for disposal shall be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers shall be labeled in accordance with paragraph (m) of this section.

(l) Medical surveillance.

(1) General.

(i) Scope.

(A) Currently exposed – The employer shall institute a medical surveillance program for all employees who are or may be exposed to cadmium at or above the action level unless the employer demonstrates that the employee is not, and will not be, exposed at or above the action level on 30 or more days per year (twelve consecutive months); and,

(B) Previously exposed – The employer shall also institute a medical surveillance program for all employees who prior to the effective date of this section might previously have been exposed to cadmium at or above the action level by the employer, unless the employer demonstrates that the employee did not prior to the effective date of this section work for the employer in jobs with exposure to cadmium for an aggregated total of more than 60 months.

(ii) To determine an employee's fitness for using a respirator, the employer shall provide the limited medical examination specified in paragraph (l)(6) of this section.

(iii) The employer shall assure that all medical examinations and procedures required by this standard are performed by or under the supervision of a licensed physician, who has read and is familiar with the health effects section of Appendix A to this section, the regulatory text of this section, the protocol for sample handling and laboratory selection in Appendix F to this section, and the questionnaire of Appendix D to this section. These examinations and procedures shall be provided without cost to the employee and at a time and place that is reasonable and convenient to employees.

(iv) The employer shall assure that the collecting and handling of biological samples of cadmium in urine (CdU), cadmium in blood (CdB), and beta-2 microglobulin in urine (β 2-M) taken from employees under this section is done in a manner that assures their reliability and that analysis of biological samples of cadmium in urine (CdU), cadmium in blood (CdB), and beta-2 microglobulin in urine (β 2-M) taken from employees under this section is performed in laboratories with demonstrated proficiency for that particular analyte. (See Appendix F to this section.)

(2) Initial examination.

(i) The employer shall provide an initial (preplacement) examination to all employees covered by the medical surveillance program required in paragraph (l)(1)(i) of this section. The examination shall be provided to those employees within 30 days after initial assignment to a job with exposure to cadmium or no later than 90 days after the effective date of this section, whichever date is later.

(ii) The initial (preplacement) medical examination shall include:

(A) A detailed medical and work history, with emphasis on: Past, present, and anticipated future exposure to cadmium; any history of renal, cardiovascular, respiratory, hematopoietic, reproductive, and/or musculoskeletal system dysfunction; current usage of medication with potential nephrotoxic side-effects; and smoking history and current status; and

(B) Biological monitoring that includes the following tests:

(1) Cadmium in urine (CdU), standardized to grams of creatinine (g/Cr);

(2) Beta-2 microglobulin in urine (β 2-M), standardized to grams of creatinine (g/Cr), with pH specified, as described in Appendix F to this section; and

(3) Cadmium in blood (CdB), standardized to liters of whole blood (lwb).

(iii) Recent Examination: An initial examination is not required to be provided if adequate records show that the employee has been examined in accordance with the requirements of paragraph (I)(2)(ii) of this section within the past 12 months. In that case, such records shall be maintained as part of the employee's medical record and the prior exam shall be treated as if it were an initial examination for the purposes of paragraphs (I)(3) and (4) of this section.

(3) Actions triggered by initial biological monitoring:

(i) If the results of the initial biological monitoring tests show the employee's CdU level to be at or below 3 μ g/g Cr, β 2-M level to be at or below 300 μ g/g Cr and CdB level to be at or below 5 μ g/lwb, then:

(A) For currently exposed employees, who are subject to medical surveillance under paragraph (I)(1)(i)(A) of this section, the employer shall provide the minimum level of periodic medical surveillance in accordance with the requirements in paragraph (I)(4)(i) of this section; and

(B) For previously exposed employees, who are subject to medical surveillance under paragraph (I)(1)(i)(B) of this section, the employer shall provide biological monitoring for CdU, β 2-M, and CdB one year after the initial biological monitoring and then the employer shall comply with the requirements of paragraph (I)(4)(v) of this section.

(ii) For all employees who are subject to medical surveillance under paragraph (I)(1)(i) of this section, if the results of the initial biological monitoring tests show the level of CdU to exceed 3 μ g/g Cr, the level of β 2-M to exceed 300 μ g/g Cr, or the level of CdB to exceed 5 μ g/lwb, the employer shall:

(A) Within two weeks after receipt of biological monitoring results, reassess the employee's occupational exposure to cadmium as follows:

(1) Reassess the employee's work practices and personal hygiene;

- (2) Reevaluate the employee's respirator use, if any, and the respirator program;
- (3) Review the hygiene facilities;
- (4) Reevaluate the maintenance and effectiveness of the relevant engineering controls;
- (5) Assess the employee's smoking history and status;

(B) Within 30 days after the exposure reassessment, specified in paragraph (I)(3)(ii)(A) of this section, take reasonable steps to correct any deficiencies found in the reassessment that may be responsible for the employee's excess exposure to cadmium; and,

(C) Within 90 days after receipt of biological monitoring results, provide a full medical examination to the employee in accordance with the requirements of paragraph (I)(4)(ii) of this section. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. If the physician determines that medical removal is not necessary, then until the employee's CdU level falls to or below 3 µg/g Cr, β2-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(1) Provide biological monitoring in accordance with paragraph (I)(2)(ii)(B) of this section on a semi-annual basis; and

(2) Provide annual medical examinations in accordance with paragraph (I)(4)(ii) of this section.

(iii) For all employees who are subject to medical surveillance under paragraph (I)(1)(i) of this section, if the results of the initial biological monitoring tests show the level of CdU to be in excess of 15 µg/g Cr, or the level of CdB to be in excess of 15 µg/lwb, or the level of β2-M to be in excess of 1,500 µg/g Cr, the employer shall comply with the requirements of paragraphs (I)(3)(ii)(A)-(B) of this section. Within 90 days after receipt of biological monitoring results, the employer shall provide a full medical examination to the employee in accordance with the requirements of paragraph (I)(4)(ii) of this section. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. However, if the initial biological monitoring results and the biological monitoring results obtained during the medical examination both show that: CdU exceeds 15 µg/g Cr; or CdB exceeds 15 µg/lwb; or β2-M exceeds 1500 µg/g Cr, and in addition CdU exceeds 3 µg/g Cr or CdB exceeds 5 µg/liter of whole blood, then the physician shall medically remove the employee from exposure to cadmium at or above the action level. If the second set of biological monitoring results obtained during the medical examination does not show that a mandatory removal trigger level has been exceeded, then the employee is not required to be removed by the mandatory provisions of this paragraph. If the employee is not required to be removed by the mandatory provisions of this paragraph or by the physician's determination, then until the employee's CdU level falls to or below 3 µg/g Cr, β2-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(A) Periodically reassess the employee's occupational exposure to cadmium;

(B) Provide biological monitoring in accordance with paragraph (I)(2)(ii)(B) of this section on a quarterly basis; and

(C) Provide semiannual medical examinations in accordance with paragraph (I)(4)(ii) of this section.

(iv) For all employees to whom medical surveillance is provided, beginning on January 1, 1999, and in lieu of paragraphs (I)(3)(i)-(iii) of this section:

(A) If the results of the initial biological monitoring tests show the employee's CdU level to be at or below 3 µg/g Cr, β2-M level to be at or below 300 µg/g Cr and CdB level to be at or below 5 µg/lwb, then for currently exposed employees, the employer shall comply with the requirements of paragraph (I)(3)(i)(A) of this section, and for previously exposed employees, the employer shall comply with the requirements of paragraph (I)(3)(i)(B) of this section;

(B) If the results of the initial biological monitoring tests show the level of CdU to exceed 3 µg/g Cr, the level of β2-M to exceed 300 µg/g Cr, or the level of CdB to exceed 5 µg/lwb, the employer shall comply with the requirements of paragraphs (I)(3)(ii)(A)-(C) of this section; and,

(C) If the results of the initial biological monitoring tests show the level of CdU to be in excess of 7 µg/g Cr, or the level of CdB to be in excess of 10 µg/lwb, or the level of β2-M to be in excess of 750 µg/g Cr, the employer shall: Comply with the requirements of paragraphs (I)(3)(ii)(A)-(B) of this section; and, within 90 days after receipt of biological monitoring results, provide a full medical examination to the employee in accordance with the requirements of paragraph (I)(4)(ii) of this section. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. However, if the initial biological monitoring results and the biological monitoring results obtained during the medical examination both show that: CdU exceeds 7 µg/g Cr; or CdB exceeds 10 µg/lwb; or β2-M exceeds 750 µg/g Cr, and in addition CdU exceeds 3 µg/g Cr or CdB exceeds 5 µg/liter of whole blood, then the physician shall medically remove the employee from exposure to cadmium at or above the action level. If the second set of biological monitoring results obtained during the medical examination does not show that a mandatory removal trigger level has been exceeded, then the employee is not required to be removed by the mandatory provisions of this paragraph. If the employee is not required to be removed by the mandatory provisions of this paragraph or by the physician's determination, then until the employee's CdU level falls to or below 3 µg/g Cr, β2-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall: periodically reassess the employee's occupational exposure to cadmium; provide biological monitoring in accordance with paragraph (I)(2)(ii)(B) of this section on a quarterly basis; and provide semiannual medical examinations in accordance with paragraph (I)(4)(ii) of this section.

(4) Periodic medical surveillance.

(i) For each employee who is covered under paragraph (I)(1)(i)(A) of this section, the employer shall provide at least the minimum level of periodic medical surveillance, which consists of periodic medical examinations and periodic biological monitoring. A periodic medical examination shall be provided within one year after the initial examination required

by paragraph (l)(2) of this section and thereafter at least biennially. Biological sampling shall be provided at least annually, either as part of a periodic medical examination or separately as periodic biological monitoring.

(ii) The periodic medical examination shall include:

(A) A detailed medical and work history, or update thereof, with emphasis on: Past, present and anticipated future exposure to cadmium; smoking history and current status; reproductive history; current use of medications with potential nephrotoxic side-effects; any history of renal, cardiovascular, respiratory, hematopoietic, and/or musculoskeletal system dysfunction; and as part of the medical and work history, for employees who wear respirators, questions 3-11 and 25-32 in Appendix D to this section;

(B) A complete physical examination with emphasis on: Blood pressure, the respiratory system, and the urinary system;

(C) A 14 inch by 17 inch, or other[a] reasonably-**sized** standard **film or digital**[sized] posterior-anterior chest X-ray (after the initial X-ray, the frequency of chest X-rays is to be determined by the examining physician);

(D) Pulmonary function tests, including forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1);

(E) Biological monitoring, as required in paragraph (l)(2)(ii)(B) of this section;

(F) Blood analysis, in addition to the analysis required under paragraph (l)(2)(ii)(B) of this section, including blood urea nitrogen, complete blood count, and serum creatinine;

(G) Urinalysis, in addition to the analysis required under paragraph (l)(2)(ii)(B) of this section, including the determination of albumin, glucose, and total and low molecular weight proteins;

(H) For males over 40 years old, prostate palpation, or other at least as effective diagnostic test(s); and

(I) Any additional tests deemed appropriate by the examining physician.

(iii) Periodic biological monitoring shall be provided in accordance with paragraph (l)(2)(ii)(B) of this section.

(iv) If the results of periodic biological monitoring or the results of biological monitoring performed as part of the periodic medical examination show the level of the employee's CdU, β 2-M, or CdB to be in excess of the levels specified in paragraphs (l)(3)(ii) or (iii); or, beginning on January 1, 1999, in excess of the levels specified in paragraphs (l)(3)(ii) or (iv) of this section, the employer shall take the appropriate actions specified in paragraphs (l)(3)(ii)-(iv) of this section.

(v) For previously exposed employees under paragraph (l)(1)(i)(B) of this section:

(A) If the employee's levels of CdU did not exceed 3 µg/g Cr, CdB did not exceed 5 µg/lwb, and β2-M did not exceed 300 µg/g Cr in the initial biological monitoring tests, and if the results of the followup biological monitoring required by paragraph (I)(3)(i)(B) of this section one year after the initial examination confirm the previous results, the employer may discontinue all periodic medical surveillance for that employee.

(B) If the initial biological monitoring results for CdU, CdB, or β2-M were in excess of the levels specified in paragraph (I)(3)(i) of this section, but subsequent biological monitoring results required by paragraph (I)(3)(ii)(iv) of this section show that the employee's CdU levels no longer exceed 3 µg/g Cr, CdB levels no longer exceed 5 µg/lwb, and β2-M levels no longer exceed 300 µg/g Cr, the employer shall provide biological monitoring for CdU, CdB, and β2-M one year after these most recent biological monitoring results. If the results of the followup biological monitoring, specified in this paragraph, confirm the previous results, the employer may discontinue all periodic medical surveillance for that employee.

(C) However, if the results of the follow-up tests specified in paragraph (I)(4)(v)(A) or (B) of this section indicate that the level of the employee's CdU, β2-M, or CdB exceeds these same levels, the employer is required to provide annual medical examinations in accordance with the provisions of paragraph (I)(4)(ii) of this section until the results of biological monitoring are consistently below these levels or the examining physician determines in a written medical opinion that further medical surveillance is not required to protect the employee's health.

(vi) A routine, biennial medical examination is not required to be provided in accordance with paragraphs (I)(3)(i) and (I)(4) of this section if adequate medical records show that the employee has been examined in accordance with the requirements of paragraph (I)(4)(ii) of this section within the past 12 months. In that case, such records shall be maintained by the employer as part of the employee's medical record, and the next routine, periodic medical examination shall be made available to the employee within two years of the previous examination.

(5) Actions triggered by medical examinations.

(i) If the results of a medical examination carried out in accordance with this section indicate any laboratory or clinical finding consistent with cadmium toxicity that does not require employer action under paragraph (I)(2), (3) or (4) of this section, the employer, within 30 days, shall reassess the employee's occupational exposure to cadmium and take the following corrective action until the physician determines they are no longer necessary:

(A) Periodically reassess: The employee's work practices and personal hygiene; the employee's respirator use, if any; the employee's smoking history and status; the respiratory protection program; the hygiene facilities; and the maintenance and effectiveness of the relevant engineering controls;

(B) Within 30 days after the reassessment, take all reasonable steps to correct the deficiencies found in the reassessment that may be responsible for the employee's excess exposure to cadmium;

(C) Provide semiannual medical reexaminations to evaluate the abnormal clinical sign(s) of cadmium toxicity until the results are normal or the employee is medically removed; and

(D) Where the results of tests for total proteins in urine are abnormal, provide a more detailed medical evaluation of the toxic effects of cadmium on the employee's renal system.

(6) Examination for respirator use.

(i) To determine an employee's fitness for respirator use, the employer shall provide a medical examination that includes the elements specified in paragraph (I)(6)(i)(A)-(D) of this section. This examination shall be provided prior to the employee's being assigned to a job that requires the use of a respirator or no later than 90 days after this section goes into effect, whichever date is later, to any employee without a medical examination within the preceding 12 months that satisfies the requirements of this paragraph.

(A) A detailed medical and work history, or update thereof, with emphasis on: Past exposure to cadmium; smoking history and current status; any history of renal, cardiovascular, respiratory, hematopoietic, and/or musculoskeletal system dysfunction; a description of the job for which the respirator is required; and questions 3-11 and 25-32 in Appendix D to this section;

(B) A blood pressure test;

(C) Biological monitoring of the employee's levels of CdU, CdB and β 2-M in accordance with the requirements of paragraph (I)(2)(ii)(B) of this section, unless such results already have been obtained within the previous 12 months; and

(D) Any other test or procedure that the examining physician deems appropriate.

(ii) After reviewing all the information obtained from the medical examination required in paragraph (I)(6)(i) of this section, the physician shall determine whether the employee is fit to wear a respirator.

(iii) Whenever an employee has exhibited difficulty in breathing during a respirator fit test or during use of a respirator, the employer, as soon as possible, shall provide the employee with a periodic medical examination in accordance with paragraph (I)(4)(ii) of this section to determine the employee's fitness to wear a respirator.

(iv) Where the results of the examination required under paragraph (I)(6)(i), (ii), or (iii) of this section are abnormal, medical limitation or prohibition of respirator use shall be considered. If the employee is allowed to wear a respirator, the employee's ability to continue to do so shall be periodically evaluated by a physician.

(7) Emergency examinations.

(i) In addition to the medical surveillance required in paragraphs (I)(2)-(6) of this section, the employer shall provide a medical examination as soon as possible to any employee who may have been acutely exposed to cadmium because of an emergency.

(ii) The examination shall include the requirements of paragraph (I)(4)(ii) of this section, with emphasis on the respiratory system, other organ systems considered appropriate by the examining physician, and symptoms of acute overexposure, as identified in paragraphs II(B)(1)-(2) and IV of Appendix A to this section.

(8) Termination of employment examination.

(i) At termination of employment, the employer shall provide a medical examination in accordance with paragraph (I)(4)(ii) of this section, including a chest X-ray, to any employee to whom at any prior time the employer was required to provide medical surveillance under paragraphs (I)(1)(i) or (I)(7) of this section. However, if the last examination satisfied the requirements of paragraph (I)(4)(ii) of this section and was less than six months prior to the date of termination, no further examination is required unless otherwise specified in paragraphs (I)(3) or (I)(5) of this section;

(ii) However, for employees covered by paragraph (I)(1)(i)(B) of this section, if the employer has discontinued all periodic medical surveillance under paragraph (I)(4)(v) of this section, no termination of employment medical examination is required.

(9) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and appendices;

(ii) A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to cadmium;

(iii) The employee's former, current, and anticipated future levels of occupational exposure to cadmium;

(iv) A description of any personal protective equipment, including respirators, used or to be used by the employee, including when and for how long the employee has used that equipment; and

(v) Relevant results of previous biological monitoring and medical examinations.

(10) Physician's written medical opinion.

(i) The employer shall promptly obtain a written medical opinion from the examining physician for each medical examination performed on each employee. This written opinion shall contain:

(A) The physician's diagnosis for the employee;

(B) The physician's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to cadmium, including any indications of potential cadmium toxicity;

(C) The results of any biological or other testing or related evaluations that directly assess the employee's absorption of cadmium;

(D) Any recommended removal from, or limitation on the activities or duties of the employee or on the employee's use of personal protective equipment, such as respirators;

(E) A statement that the physician has clearly and carefully explained to the employee the results of the medical examination, including all biological monitoring results and any medical conditions related to cadmium exposure that require further evaluation or treatment, and any limitation on the employee's diet or use of medications.

(ii) The employer promptly shall obtain a copy of the results of any biological monitoring provided by an employer to an employee independently of a medical examination under paragraphs (I)(2) and (I)(4) of this section, and, in lieu of a written medical opinion, an explanation sheet explaining those results.

(iii) The employer shall instruct the physician not to reveal orally or in the written medical opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to cadmium.

(11) Medical Removal Protection (MRP).

(i) General.

(A) The employer shall temporarily remove an employee from work where there is excess exposure to cadmium on each occasion that medical removal is required under paragraph (I)(3), (I)(4), or (I)(6) of this section and on each occasion that a physician determines in a written medical opinion that the employee should be removed from such exposure. The physician's determination may be based on biological monitoring results, inability to wear a respirator, evidence of illness, other signs or symptoms of cadmium-related dysfunction or disease, or any other reason deemed medically sufficient by the physician.

(B) The employer shall medically remove an employee in accordance with paragraph (I)(11) of this section regardless of whether at the time of removal a job is available into which the removed employee may be transferred.

(C) Whenever an employee is medically removed under paragraph (I)(11) of this section, the employer shall transfer the removed employee to a job where the exposure to cadmium is within the permissible levels specified in that paragraph as soon as one becomes available.

(D) For any employee who is medically removed under the provisions of paragraph (I)(11)(i) of this section, the employer shall provide follow-up biological monitoring in accordance with (I)(2)(ii)(B) of this section at least every three months and follow-up medical examinations semi-annually at least every six months until in a written medical opinion the examining physician determines that either the employee may be returned to his/her former job status as specified under paragraph (I)(11)(iv)-(v) of this section or the employee must be permanently removed from excess cadmium exposure.

(E) The employer may not return an employee who has been medically removed for any reason to his/her former job status until a physician determines in a written medical opinion that continued medical removal is no longer necessary to protect the employee's health.

(ii) Where an employee is found unfit to wear a respirator under paragraph (I)(6)(ii) of this section, the employer shall remove the employee from work where exposure to cadmium is above the PEL.

(iii) Where removal is based on any reason other than the employee's inability to wear a respirator, the employer shall remove the employee from work where exposure to cadmium is at or above the action level.

(iv) Except as specified in paragraph (I)(11)(v) of this section, no employee who was removed because his/her level of CdU, CdB and/or β 2-M exceeded the medical removal trigger levels in paragraph (I)(3) or (I)(4) of this section may be returned to work with exposure to cadmium at or above the action level until the employee's levels of CdU fall to or below 3 μ g/g Cr, CdB falls to or below 5 μ g/lwb, and β 2-M falls to or below 300 μ g/g Cr.

(v) However, when in the examining physician's opinion continued exposure to cadmium will not pose an increased risk to the employee's health and there are special circumstances that make continued medical removal an inappropriate remedy, the physician shall fully discuss these matters with the employee, and then in a written determination may return a worker to his/her former job status despite what would otherwise be unacceptably high biological monitoring results. Thereafter, the returned employee shall continue to be provided with medical surveillance as if he/she were still on medical removal until the employee's levels of CdU fall to or below 3 μ g/g Cr, CdB falls to or below 5 μ g/lwb, and β 2-M falls to or below 300 μ g/g Cr.

(vi) Where an employer, although not required by paragraph (I)(11)(i)-(iii) of this section to do so, removes an employee from exposure to cadmium or otherwise places limitations on an employee due to the effects of cadmium exposure on the employee's medical condition, the employer shall provide the same medical removal protection benefits to that employee under paragraph (I)(12) of this section as would have been provided had the removal been required under paragraph (I)(11)(i)-(iii) of this section.

(12) Medical Removal Protection Benefits (MRPB).

(i) The employer shall provide MRPB for up to a maximum of 18 months to an employee each time and while the employee is temporarily medically removed under paragraph (I)(11) of this section.

(ii) For purposes of this section, the requirement that the employer provide MRPB means that the employer shall maintain the total normal earnings, seniority, and all other employee rights and benefits of the removed employee, including the employee's right to his/her former job status, as if the employee had not been removed from the employee's job or otherwise medically limited.

(iii) Where, after 18 months on medical removal because of elevated biological monitoring results, the employee's monitoring results have not declined to a low enough level to permit the employee to be returned to his/her former job status:

(A) The employer shall make available to the employee a medical examination pursuant to this section in order to obtain a final medical determination as to whether the employee may be returned to his/her former job status or must be permanently removed from excess cadmium exposure; and

(B) The employer shall assure that the final medical determination indicates whether the employee may be returned to his/her former job status and what steps, if any, should be taken to protect the employee's health.

(iv) The employer may condition the provision of MRPB upon the employee's participation in medical surveillance provided in accordance with this section.

(13) Multiple physician review.

(i) If the employer selects the initial physician to conduct any medical examination or consultation provided to an employee under this section, the employee may designate a second physician to:

(A) Review any findings, determinations, or recommendations of the initial physician; and

(B) Conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(ii) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician provided by the employer conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, multiple physician review upon the employee doing the following within fifteen (15) days after receipt of this notice, or receipt of the initial physician's written opinion, whichever is later:

(A) Informing the employer that he or she intends to seek a medical opinion; and

(B) Initiating steps to make an appointment with a second physician.

(iii) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(iv) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee, through their respective physicians, shall designate a third physician to:

(A) Review any findings, determinations, or recommendations of the other two physicians; and

(B) Conduct such examinations, consultations, laboratory tests, and discussions with the other two physicians as the third physician deems necessary to resolve the disagreement among them.

(v) The employer shall act consistently with the findings, determinations, and recommendations of the third physician, unless the employer and the employee reach an agreement that is consistent with the recommendations of at least one of the other two physicians.

(14) Alternate physician determination. The employer and an employee or designated employee representative may agree upon the use of any alternate form of physician determination in lieu of the multiple physician review provided by paragraph (l)(13) of this section, so long as the alternative is expeditious and at least as protective of the employee.

(15) Information the employer must provide the employee.

(i) The employer shall provide a copy of the physician's written medical opinion to the examined employee within two weeks after receipt thereof.

(ii) The employer shall provide the employee with a copy of the employee's biological monitoring results and an explanation sheet explaining the results within two weeks after receipt thereof.

(iii) Within 30 days after a request by an employee, the employer shall provide the employee with the information the employer is required to provide the examining physician under paragraph (l)(9) of this section.

(16) Reporting. In addition to other medical events that are required to be reported on the OSHA Form No. 200, the employer shall report any abnormal condition or disorder caused by occupational exposure to cadmium associated with employment as specified in Chapter (V)(E) of the Reporting Guidelines for Occupational Injuries and Illnesses.

(m) Communication of cadmium hazards to employees.

(1) Hazard communication – general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for cadmium.

(ii) In classifying the hazards of cadmium at least the following hazards are to be addressed: Cancer; lung effects; kidney effects; and acute toxicity effects.

(iii) Employers shall include cadmium in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of cadmium and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (m)(4) of this section.

(2) Warning signs.

(i) Warning signs shall be provided and displayed in regulated areas. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area.

(ii) Warning signs required by paragraph (m)(2)(i) of this section shall bear the following legend:

DANGER
CADMIUM
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS AND KIDNEYS
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(iii) The employer shall ensure that signs required by this paragraph (m)(2) are illuminated, cleaned, and maintained as necessary so that the legend is readily visible.

(iv) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (m)(2)(ii) of this section:

DANGER
CADMIUM
CANCER HAZARD
CAN CAUSE LUNG AND KIDNEY DISEASE
AUTHORIZED PERSONNEL ONLY
RESPIRATORS REQUIRED IN THIS AREA

(3) Warning labels.

(i) Shipping and storage containers containing cadmium or cadmium compounds shall bear appropriate warning labels, as specified in paragraph (m)(1) of this section.

(ii) The warning labels for containers of contaminated protective clothing, equipment, waste, scrap, or debris shall include at least the following information:

DANGER
CONTAINS CADMIUM
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS AND KIDNEYS
AVOID CREATING DUST

(iii) Prior to June 1, 2015, employers may include the following information on shipping and storage containers containing cadmium, cadmium compounds, or cadmium contaminated clothing, equipment, waste, scrap, or debris in lieu of the labeling requirements specified in paragraphs (m)(1)(i) and (m)(3)(ii) of this section:

DANGER
CONTAINS CADMIUM
CANCER HAZARD

AVOID CREATING DUST
CAN CAUSE LUNG AND KIDNEY DISEASE

(iv) Where feasible, installed cadmium products shall have a visible label or other indication that cadmium is present.

(4) Employee information and training.

(i) The employer shall train each employee who is potentially exposed to cadmium in accordance with the requirements of this section. The employer shall institute a training program, ensure employee participation in the program, and maintain a record of the contents of such program.

(ii) Training shall be provided prior to or at the time of initial assignment to a job involving potential exposure to cadmium and at least annually thereafter.

(iii) The employer shall make the training program understandable to the employee and shall assure that each employee is informed of the following:

(A) The health hazards associated with cadmium exposure, with special attention to the information incorporated in Appendix A to this section;

(B) The quantity, location, manner of use, release, and storage of cadmium in the workplace and the specific nature of operations that could result in exposure to cadmium, especially exposures above the PEL;

(C) The engineering controls and work practices associated with the employee's job assignment;

(D) The measures employees can take to protect themselves from exposure to cadmium, including modification of such habits as smoking and personal hygiene, and specific procedures the employer has implemented to protect employees from exposure to cadmium such as appropriate work practices, emergency procedures, and the provision of personal protective equipment;

(E) The purpose, proper selection, fitting, proper use, and limitations of respirators and protective clothing;

(F) The purpose and a description of the medical surveillance program required by paragraph (I) of this section;

(G) The contents of this section and its appendices; and

(H) The employee's rights of access to records under 1910.1020(e) and (g).

(iv) Additional access to information and training program and materials.

(A) The employer shall make a copy of this section and its appendices readily available without cost to all affected employees and shall provide a copy if requested.

(B) The employer shall provide to the Assistant Secretary or the Director, upon request, all materials relating to the employee information and the training program.

(n) Recordkeeping.

(1) Exposure monitoring.

(i) The employer shall establish and keep an accurate record of all air monitoring for cadmium in the workplace.

(ii) This record shall include at least the following information:

(A) The monitoring date, duration, and results in terms of an 8-hour TWA of each sample taken;

(B) The name~~[-social security number,]~~ and job classification of the employees monitored and of all other employees whose exposures the monitoring is intended to represent;

(C) A description of the sampling and analytical methods used and evidence of their accuracy;

(D) The type of respiratory protective device, if any, worn by the monitored employee;

(E) A notation of any other conditions that might have affected the monitoring results.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.1020.

(2) Objective data for exemption from requirement for initial monitoring.

(i) For purposes of this section, objective data are information demonstrating that a particular product or material containing cadmium or a specific process, operation, or activity involving cadmium cannot release dust or fumes in concentrations at or above the action level even under the worst-case release conditions. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of cadmium-containing products or materials. The data the employer uses from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

(ii) The employer shall establish and maintain a record of the objective data for at least 30 years.

(3) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee covered by medical surveillance under paragraph (l)(1)(i) of this section.

(ii) The record shall include at least the following information about the employee:

(A) Name~~[-social security number,]~~ and description of the duties;

(B) A copy of the physician's written opinions and an explanation sheet for biological monitoring results;

(C) A copy of the medical history, and the results of any physical examination and all test results that are required to be provided by this section, including biological tests, X-rays, pulmonary function tests, etc., or that have been obtained to further evaluate any condition that might be related to cadmium exposure;

(D) The employee's medical symptoms that might be related to exposure to cadmium; and

(E) A copy of the information provided to the physician as required by paragraph (l)(9)(ii)-(v) of this section.

(iii) The employer shall assure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.1020.

(4) Availability.

(i) Except as otherwise provided for in this section, access to all records required to be maintained by paragraphs (n)(1) through (3) of this section shall be in accordance with the provisions of 29 CFR 1910.1020.

(ii) Within 15 days after a request, the employer shall make an employee's medical records required to be kept by paragraph (n)(3) of this section available for examination and copying to the subject employee, to designated representatives, to anyone having the specific written consent of the subject employee, and after the employee's death or incapacitation, to the employee's family members.

(5) Transfer of records. Whenever an employer ceases to do business and there is no successor employer to receive and retain records for the prescribed period or the employer intends to dispose of any records required to be preserved for at least 30 years, the employer shall comply with the requirements concerning transfer of records set forth in 29 CFR 1910.1020(h).

(o) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to cadmium.

(2) Observation procedures. When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with that clothing and equipment and shall assure that the observer uses such clothing and equipment and complies with all other applicable safety and health procedures.

(p) Dates.

(1) Effective date. This section shall become effective December 14, 1992.

NOTE: In Oregon, the effective date for the Cadmium Standard is January 22, 1993 (upon adoption by OR-OSHA). All other start-up dates mentioned below stand as calculated from the federal effective date of December 14, 1992.

(2) Start-up dates. All obligations of this section commence on the effective date except as follows:

(i) Exposure monitoring. Except for small businesses (nineteen (19) or fewer employees), initial monitoring required by paragraph (d)(2) of this section shall be completed as soon as possible and in any event no later than 60 days after the effective date of this standard. For small businesses, initial monitoring required by paragraph (d)(2) of this section shall be completed as soon as possible and in any event no later than 120 days after the effective date of this standard.

(ii) Regulated areas. Except for small business, defined under paragraph (p)(2)(i) of this section, regulated areas required to be established by paragraph (e) of this section shall be set up as soon as possible after the results of exposure monitoring are known and in any event no later than 90 days after the effective date of this section. For small businesses, regulated areas required to be established by paragraph (e) of this section shall be set up as soon as possible after the results of exposure monitoring are known and in any event no later than 150 days after the effective date of this section.

(iii) Respiratory protection. Except for small businesses, defined under paragraph (p)(2)(i) of this section, respiratory protection required by paragraph (g) of this section shall be provided as soon as possible and in any event no later than 90 days after the effective date of this section. For small businesses, respiratory protection required by paragraph (g) of this section shall be provided as soon as possible and in any event no later than 150 days after the effective date of this section.

(iv) Compliance program. Written compliance programs required by paragraph (f)(2) of this section shall be completed and available for inspection and copying as soon as possible and in any event no later than 1 year after the effective date of this section.

(v) Methods of compliance. The engineering controls required by paragraph (f)(1) of this section shall be implemented as soon as possible and in any event no later than two (2) years after the effective date of this section. Work practice controls shall be implemented as soon as possible. Work practice controls that are directly related to engineering controls to be implemented in accordance with the compliance plan shall be implemented as soon as possible after such engineering controls are implemented.

(vi) Hygiene and lunchroom facilities.

(A) Handwashing facilities, permanent or temporary, shall be provided in accordance with 29 CFR 1910.141(d)(1) and (2) as soon as possible and in any event no later than 60 days after the effective date of this section.

(B) Change rooms, showers, and lunchroom facilities shall be completed as soon as possible and in any event no later than 1 year after the effective date of this section.

(vii) Employee information and training. Except for small businesses, defined under paragraph (p)(2)(i) of this section, employee information and training required by paragraph (m)(4) of this section shall be provided as soon as possible and in any event no later than 90 days after the effective date of this standard. For small businesses, employee information and training required by paragraph (m)(4) of this standard shall be provided as soon as possible and in any event no later than 180 days after the effective date of this standard.

(viii) Medical surveillance. Except for small businesses, defined under paragraph (p)(2)(i) of this section, initial medical examinations required by paragraph (l) of this section shall be provided as soon as possible and in any event no later than 90 days after the effective date of this standard. For small businesses, initial medical examinations required by paragraph (l) of this section shall be provided as soon as possible and in any event no later than 180 days after the effective date of this standard.

(q) Appendices. Except where portions of appendices A, B, D, E, and F to this section are expressly incorporated in requirements of this section, these appendices are purely informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin Order 1-1993, f. 1/22/93, ef. 1/22/93.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix D to 1910.1027 – Occupational Health History Interview With Reference to Cadmium Exposure

Directions

(To be read by employee and signed prior to the interview)

Please answer the questions you will be asked as completely and carefully as you can. These questions are asked of everyone who works with cadmium. You will also be asked to give blood and urine samples. The doctor will give your employer a written opinion on whether you are physically capable of working with cadmium. Legally, the doctor cannot share

personal information you may tell him/her with your employer. The following information is considered strictly confidential. The results of the tests will go to you, your doctor and your employer. You will also receive an information sheet explaining the results of any biological monitoring or physical examinations performed.

If you are just being hired, the results of this interview and examination will be used to:

- (1) Establish your health status and see if working with cadmium might be expected to cause unusual problems,
- (2) Determine your health status today and see if there are changes over time,
- (3) See if you can wear a respirator safely.

If you are not a new hire:

OSHA says that everyone who works with cadmium can have periodic medical examinations performed by a doctor. The reasons for this are:

- (a) If there are changes in your health, either because of cadmium or some other reason, to find them early,
- (b) to prevent kidney damage.

Please sign below.

I have read these directions and understand them:

Employee signature

Date

Thank you for answering these questions. (Suggested Format)

Name _____

Age _____

[~~Social Security #~~]

Company _____

Job _____

Type of Preplacement Exam:

[] Periodic

[] Termination

[] Initial

[] Other

Blood Pressure _____

Pulse Rate _____

1. How long have you worked at the job listed above?

[] Not yet hired

[] Number of months

[] Number of years

2. Job Duties etc.

3. Have you ever been told by a doctor that you had bronchitis?

[] Yes

[] No

If yes, how long ago?

[] Number of months

[] Number of years

4. Have you ever been told by a doctor that you had emphysema?

[] Yes

[] No

If yes, how long ago?

[] Number of years

[] Number of months

5. Have you ever been told by a doctor that you had other lung problems?

☐ Yes

☐ No

If yes, please describe type of lung problems and when you had these problems

6. In the past year, have you had a cough?

☐ Yes

☐ No

If yes, did you cough up sputum?

☐ Yes

☐ No

If yes, how long did the cough with sputum production last?

☐ Less than 3 months

☐ 3 months or longer

If yes, for how many years have you had episodes of cough with sputum production lasting this long?

☐ Less than one

☐ 1

☐ 2

☐ Longer than 2

7. Have you ever smoked cigarettes?

☐ Yes

☐ No

8. Do you now smoke cigarettes?

☐ Yes

☐ No

9. If you smoke or have smoked cigarettes, for how many years have you smoked, or did you smoke?

☐ Less than 1 year

☐ Number of years

What is or was the greatest number of packs per day that you have smoked?

☐ Number of packs

If you quit smoking cigarettes, how many years ago did you quit?

☐ Less than 1 year

[] Number of years

How many packs a day do you now smoke?

☐ Number of packs per day

- 10.** Have you ever been told by a doctor that you had a kidney or urinary tract disease or disorder?

☐ Yes

☐ No

- 11.** Have you ever had any of these disorders?

Kidney stones ☐ Yes ☐ No

Protein in urine ☐ Yes ☐ No

Blood in urine ☐ Yes ☐ No

Difficulty urinating ☐ Yes ☐ No

Other kidney/Urinary disorders ☐ Yes ☐ No

Please describe problems, age, treatment, and follow up for any kidney or urinary problems you have had:

- 12.** Have you ever been told by a doctor or other health care provider who took your blood pressure that your blood pressure was high?

☐ Yes

☐ No

- 13.** Have you ever been advised to take any blood pressure medication?

☐ Yes

☐ No

- 14.** Are you presently taking any blood pressure medication?

☐ Yes

☐ No

- 15.** Are you presently taking any other medication?

☐ Yes

☐ No

- 16.** Please list any blood pressure or other medications and describe how long you have been taking each one:

Medicine	How long Taken

- 17.** Have you ever been told by a doctor that you have diabetes? (sugar in your blood or urine)
☐ Yes
☐ No

If yes, do you presently see a doctor about your diabetes?

- ☐ Yes
☐ No

If yes, how do you control your blood sugar?

- ☐ Diet alone
☐ Diet plus oral medicine
☐ Diet plus insulin (injection)

- 18.** Have you ever been told by a doctor that you had:
Anemia ☐ Yes ☐ No
A low blood count? ☐ Yes ☐ No

- 19.** Do you presently feel that you tire or run out of energy sooner than normal or sooner than other people your age?
☐ Yes
☐ No

If yes, for how long have you felt that you tire easily?

- ☐ Less than 1 year
☐ Number of years

- 20.** Have you given blood within the last year?
☐ Yes
☐ No

If yes, how many times?

☐ Number of times

How long ago was the last time you gave blood?

☐ Less than 1 month

☐ Number of months

21. Within the last year have you had any injuries with heavy bleeding?

☐ Yes

☐ No

If yes, how long ago?

☐ Less than 1 month

☐ Number of months

Describe: _____

22. Have you recently had any surgery?

☐ Yes

☐ No

If yes, please describe: _____

23. Have you seen any blood lately in your stool or after a bowel movement?

☐ Yes

☐ No

24. Have you ever had a test for blood in your stool?

☐ Yes

☐ No

If yes, did the test show any blood in the stool?

☐ Yes

☐ No

What further evaluation and treatment were done?

The following questions pertain to the ability to wear a respirator. Additional information for the physician can be found in The Respiratory Protective Devices Manual.

- 25.** Have you ever been told by a doctor that you have asthma?
- ☐ Yes
☐ No

If yes, are you presently taking any medication for asthma? Mark all that apply.

- ☐ Shots
☐ Pills
☐ Inhaler

- 26.** Have you ever had a heart attack?
- ☐ Yes
☐ No

If yes, how long ago?

- ☐ Number of years
☐ Number of months

- 27.** Have you ever had pains in your chest?
- ☐ Yes
☐ No

If yes, when did it usually happen?

- ☐ While resting
☐ While working
☐ While exercising
☐ Activity didn't matter

- 28.** Have you ever had a thyroid problem?
- ☐ Yes
☐ No

- 29.** Have you ever had a seizure or fits?
- ☐ Yes
☐ No

- 30.** Have you ever had a stroke (cerebrovascular accident)?

- ☐ Yes
☐ No

31. Have you ever had a ruptured eardrum or a serious hearing problem?

- ☐ Yes
☐ No

32. Do you now have a claustrophobia, meaning fear of crowded or closed in spaces or any psychological problems that would make it hard for you to wear a respirator?

- ☐ Yes
☐ No

The following questions pertain to reproductive history.

33. Have you or your partner had a problem conceiving a child?

- ☐ Yes
☐ No

If yes, specify:

- ☐ Self
☐ Present mate
☐ Previous mate

34. Have you or your partner consulted a physician for a fertility or other reproductive problem?

- ☐ Yes
☐ No

If yes, specify who consulted the physician:

- ☐ Self
☐ Spouse/partner
☐ Self and partner

If yes, specify diagnosis made: _____

35. Have you or your partner ever conceived a child resulting in a miscarriage, still birth or **a child with malformations or birth defects**~~[deformed offspring]~~?

- ☐ Yes
☐ No

If yes, specify:

☐ Miscarriage

☐ Still birth

☐ ~~[Deformed offspring]~~ **Malformations or birth defects**

If outcome was a ~~[deformed offspring]~~ child with malformations or birth defects, please specify type: _____

36. Was this outcome a result of a pregnancy of:

☐ Yours with present partner

☐ Yours with a previous partner

37. Did the timing of any abnormal pregnancy outcome coincide with present employment?

☐ Yes

☐ No

List dates of occurrences: _____

38. What is the occupation of your spouse or partner?

For Women Only

39. Do you have menstrual periods?

☐ Yes

☐ No

Have you had menstrual irregularities?

☐ Yes

☐ No

If yes, specify type: _____

If yes, what was the approximated date this problem began? _____

Approximate date problem stopped? _____

For Men Only

40. Have you ever been diagnosed by a physician as having prostate gland problem(s)?

[] Yes

[] No

If yes, please describe type of problem(s) and what was done to evaluate and treat the problem(s): _____

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin Order 1-1993, f. 1/22/93, ef. 1/22/93.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1028

Benzene.

(a) Scope and application.

(1) This section applies to all occupational exposures to benzene. Chemical Abstracts Service Registry No. 71-43-2, except as provided in paragraphs (a)(2) and (a)(3) of this section.

(2) This section does not apply to:

(i) The storage, transportation, distribution, dispensing, sale or use of gasoline, motor fuels, or other fuels containing benzene subsequent to its final discharge from bulk wholesale storage facilities, except that operations where gasoline or motor fuels are dispensed for more than 4 hours per day in an indoor location are covered by this section.

(ii) Loading and unloading operations at bulk wholesale storage facilities which use vapor control systems for all loading and unloading operations, except for the provisions of 29 CFR 1910.1200 as incorporated into this section and the emergency provisions of paragraphs (g) and (i)(4) of this section.

(iii) The storage, transportation, distribution or sale of benzene or liquid mixtures containing more than 0.1 percent benzene in intact containers or in transportation pipelines while sealed in such a manner as to contain benzene vapors or liquid, except for the provisions of 29 CFR 1910.1200 as incorporated into this section and the emergency provisions of paragraphs (g) and (i)(4) of this section.

(iv) Containers and pipelines carrying mixtures with less than 0.1 percent benzene and natural gas processing plants processing gas with less than 0.1 percent benzene.

(v) Work operations where the only exposure to benzene is from liquid mixtures containing 0.5 percent or less of benzene by volume, or the vapors released from such liquids until September 12, 1988; work operations where the only exposure to benzene is from liquid mixtures containing 0.3 percent or less of benzene by volume or the vapors released from such liquids from September 12, 1988, to September 12, 1989; and work operations where the only exposure to benzene is from liquid mixtures containing 0.1 percent or less of benzene by volume or the vapors released from such liquids after September 12, 1989; except that tire building machine operators using solvents with more than 0.1 percent benzene are covered by paragraph (i) of this section.

(vi) Oil and gas drilling, production and servicing operations.

(vii) Coke oven batteries.

(3) The cleaning and repair of barges and tankers which have contained benzene are excluded from paragraph (f) methods of compliance, paragraph (e)(1) exposure monitoring – general, and paragraph (e)(6) accuracy of monitoring. Engineering and work practice controls shall be used to keep exposures below 10 ppm unless it is proven to be not feasible.

(b) Definitions.

Action level means an airborne concentration of benzene of 0.5 ppm calculated as an 8 hour time-weighted average.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (l) of this section, or any other person authorized by the Act or regulations issued under the Act.

Benzene (C₆H₆) (CAS Registry No. 71-43-2) means liquefied or gaseous benzene. It includes benzene contained in liquid mixtures and the benzene vapors released by these liquids. It does not include trace amounts of unreacted benzene contained in solid materials.

Bulk wholesale storage facility means a bulk terminal or bulk plant where fuel is stored prior to its delivery to wholesale customers.

Container means any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, or the like, but does not include piping systems.

Day means any part of a calendar day.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which may or does result in an unexpected significant release of benzene.

Employee exposure means exposure to airborne benzene which would occur if the employee were not using respiratory protective equipment.

Regulated area means any area where airborne concentrations of benzene exceed or can reasonably be expected to exceed, the permissible exposure limits, either the 8-hour time weighted average exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes.

Vapor control system means any equipment used for containing the total vapors displaced during the loading of gasoline, motor fuel or other fuel tank trucks and the displacing of these vapors through a vapor processing system or balancing the vapor with the storage tank. This equipment also includes systems containing the vapors displaced from the storage tank during the unloading of the tank truck which balance the vapors back to the tank truck.

(c) Permissible exposure limits (PELs).

(1) Time-weighted average limit (TWA). The employer shall assure that no employee is exposed to an airborne concentration of benzene in excess of one part of benzene per million parts of air (1 ppm) as an 8-hour time-weighted average.

(2) Short-term exposure limit (STEL). The employer shall assure that no employee is exposed to an airborne concentration of benzene in excess of five (5) ppm as averaged over any 15 minute period.

(d) Regulated areas.

(1) The employer shall establish a regulated area wherever the airborne concentration of benzene exceeds or can reasonably be expected to exceed the permissible exposure limits,

either the 8-hour time weighted average exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes.

(2) Access to regulated areas shall be limited to authorized persons.

(3) Regulated areas shall be determined from the rest of the workplace in any manner that minimizes the number of employees exposed to benzene within the regulated area.

(e) Exposure monitoring.

(1) General.

(i) Determinations of employee exposure shall be made from breathing zone air samples that are representative of each employee's average exposure to airborne benzene.

(ii) Representative 8-hour TWA employee exposures shall be determined on the basis of one sample or samples representing the full shift exposure for each job classification in each work area.

(iii) Determinations of compliance with the STEL shall be made from 15 minute employee breathing zone samples measured at operations where there is reason to believe exposures are high, such as where tanks are opened, filled, unloaded or gauged; where containers or process equipment are opened and where benzene is used for cleaning or as a solvent in an uncontrolled situation. The employer may use objective data, such as measurements from brief period measuring devices, to determine where STEL monitoring is needed.

(iv) Except for initial monitoring as required under paragraph (e)(2) of this section, where the employer can document that one shift will consistently have higher employee exposures for an operation, the employer shall only be required to determine representative employee exposure for that operation during the shift on which the highest exposure is expected.

(2) Initial monitoring.

(i) Each employer who has a place of employment covered under paragraph (a)(1) of this section shall monitor each of these workplaces and work operations to determine accurately the airborne concentrations of benzene to which employees may be exposed.

(ii) The initial monitoring required under paragraph (e)(2)(i) of this section shall be completed by 60 days after the effective date of this standard or within 30 days of the introduction of benzene into the workplace. Where the employer has monitored within one year prior to the effective date of this standard and the monitoring satisfies all other requirements of this section, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (e)(2)(i) of this section.

(3) Periodic monitoring and monitoring frequency.

(i) If the monitoring required by paragraph (e)(2)(i) of this section reveals employee exposure at or above the action level but at or below the TWA, the employer shall repeat such monitoring for each such employee at least every year.

(ii) If the monitoring required by paragraph (e)(2)(i) of this section reveals employee exposure above the TWA, the employer shall repeat such monitoring for each such employee at least every six (6) months.

(iii) The employer may alter the monitoring schedule from every six months to annually for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to the TWA or below, but is at or above the action level.

(iv) Monitoring for the STEL shall be repeated as necessary to evaluate exposures of employees subject to short term exposures.

(4) Termination of monitoring.

(i) If the initial monitoring required by paragraph (e)(2)(i) of this section reveals employee exposure to be below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (e)(5) of this section.

(ii) If the periodic monitoring required by paragraph (e)(3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (e)(5).

(5) Additional monitoring.

(i) The employer shall institute the exposure monitoring required under paragraphs (e)(2) and (e)(3) of this section when there has been a change in the production, process, control equipment, personnel or work practices which may result in new or additional exposures to benzene, or when the employer has any reason to suspect a change which may result in new or additional exposures.

(ii) Whenever spills, leaks, ruptures or other breakdowns occur that may lead to employee exposure, the employer shall monitor (using area or personal sampling) after the cleanup of the spill or repair of the leak, rupture or other breakdown to ensure that exposures have returned to the level that existed prior to the incident.

(6) Accuracy of monitoring. Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of benzene.

(7) Employee notification of monitoring results.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Whenever the PELs are exceeded, the written notification required by paragraph (e)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce the

employee exposure to or below the PEL, or shall refer to a document available to the employee which states the corrective actions to be taken.

(f) Methods of compliance.

(1) Engineering controls and work practices.

(i) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to benzene at or below the permissible exposure limits, except to the extent that the employer can establish that these controls are not feasible or where the provisions of paragraph (f)(1)(iii) or (g)(1) of this section apply.

(ii) Wherever the feasible engineering controls and work practices which can be instituted are not sufficient to reduce employee exposure to or below the PELs, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

(iii) Where the employer can document that benzene is used in a workplace less than a total of 30 days per year, the employer shall use engineering controls, work practice controls or respiratory protection or any combination of these controls to reduce employee exposure to benzene to or below the PELs, except that employers shall use engineering and work practice controls, if feasible, to reduce exposure to or below 10 ppm as an 8-hour TWA.

(2) Compliance program.

(i) When any exposures are over the PEL, the employer shall establish and implement a written program to reduce employee exposure to or below the PEL primarily by means of engineering and work practice controls, as required by paragraph (f)(1) of this section.

(ii) The written program shall include a schedule for development and implementation of the engineering and work practice controls. These plans shall be reviewed and revised as appropriate based on the most recent exposure monitoring data, to reflect the current status of the program.

(iii) Written compliance programs shall be furnished upon request for examination and copying to the Assistant Secretary, the Director, affected employees and designated employee representatives.

(g) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Work operations for which the employer establishes that compliance with either the TWA or STEL through the use of engineering and work-practice controls is not feasible; for

example, some maintenance and repair activities, vessel cleaning, or other operations for which engineering and work-practice controls are infeasible because exposures are intermittent and limited in duration.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient, or are not required under paragraph (f)(1)(iii) of this section, to reduce employee exposure to or below the PELs.

(iv) Emergencies.

(2) Respirator program.

Oregon OSHA repealed 1910.1028(g)(2)(i). In Oregon, OAR 437-002-1028 applies.

437-002-1028 Benzene Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii), and (d)(3)(iii)(B)(1) and (2)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1028 Benzene, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Benzene rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) For air-purifying respirators, the employer must replace the air-purifying element at the expiration of its service life or at the beginning of each shift in which such elements are used, whichever comes first.

(iii) If NIOSH approves an air-purifying element with an end-of-service-life indicator for benzene, such an element may be used until the indicator shows no further useful life.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide employees with any organic vapor gas mask or any self-contained breathing apparatus with a full facepiece to use for escape.

(C) Use an organic vapor cartridge or canister with powered and non-powered air-purifying respirators, and a chin-style canister with full facepiece gas masks.

(D) Ensure that canisters used with non-powered air-purifying respirators have a minimum service life of four hours when tested at 150 ppm benzene at a flow rate of 64 liters per

minute (LPM), a temperature of 25 degrees C, and a relative humidity of 85 percent; for canisters used with tight-fitting or loose-fitting powered air-purifying respirators, the flow rates for testing must be 115 LPM and 170 LPM, respectively.

(ii) Any employees who cannot use a negative-pressure respirator must be allowed to use a respirator with less breathing resistance, such as a powered air-purifying respirator or supplied-air respirator.

(h) Protective clothing and equipment. Personal protective clothing and equipment shall be worn where appropriate to prevent eye contact and limit dermal exposure to liquid benzene. Protective clothing and equipment shall be provided by the employer at no cost to the employee and the employer shall assure its use where appropriate. Eye and face protection shall meet the requirements of OAR 437-002-0134(8).

(i) Medical surveillance.

(1) General.

(i) The employer shall make available a medical surveillance program for employees who are or may be exposed to benzene at or above the action level 30 or more days per year; for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year; for employees who have been exposed to more than 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by their current employer; and for employees involved in the tire building operations called tire building machine operators, who use solvents containing greater than 0.1 percent benzene.

(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician and that all laboratory tests are conducted by an accredited laboratory.

(iii) The employer shall assure that persons other than licensed physicians who administer the pulmonary function testing required by this section shall complete a training course in spirometry sponsored by an appropriate governmental, academic or professional institution.

(iv) The employer shall assure that all examinations and procedures are provided without cost to the employee and at a reasonable time and place.

(2) Initial examination.

(i) Within 60 days of the effective date of this standard, or before the time of initial assignment, the employer shall provide each employee covered by paragraph (i)(1)(i) of this section with a medical examination including the following elements:

(A) A detailed occupational history which includes:

(1) Past work exposure to benzene or any other hematological toxins,

(2) A family history of blood dyscrasias including hematological neoplasms;

(3) A history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements;

(4) A history of renal or liver dysfunction;

(5) A history of medicinal drugs routinely taken;

(6) A history of previous exposure to ionizing radiation and

(7) Exposure to marrow toxins outside of the current work situation.

(B) A complete physical examination.

(C) Laboratory tests. A complete blood count including a leukocyte count with differential, a quantitative thrombocyte count, hematocrit, hemoglobin, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC). The results of these tests shall be reviewed by the examining physician.

(D) Additional tests as necessary in the opinion of the examining physician, based on alterations to the components of the blood or other signs which may be related to benzene exposure; and

(E) For all workers required to wear respirators for at least 30 days a year, the physical examination shall pay special attention to the cardiopulmonary system and shall include a pulmonary function test.

(ii) No initial medical examination is required to satisfy the requirements of paragraph (i)(2)(i) of this section if adequate records show that the employee has been examined in accordance with the procedures of paragraph (i)(2)(i) of this section within the twelve months prior to the effective date of this standard.

(3) Periodic examinations.

(i) The employer shall provide each employee covered under paragraph (i)(1)(i) of this section with a medical examination annually following the previous examination. These periodic examinations shall include at least the following elements:

(A) A brief history regarding any new exposure to potential marrow toxins, changes in medicinal drug use, and the appearance of physical signs relating to blood disorders:

(B) A complete blood count including a leukocyte count with differential, quantitative thrombocyte count, hemoglobin, hematocrit, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC); and

(C) Appropriate additional tests as necessary, in the opinion of the examining physician, in consequence of alterations in the components of the blood or other signs which may be related to benzene exposure.

(ii) Where the employee develops signs and symptoms commonly associated with toxic exposure to benzene, the employer shall provide the employee with an additional medical examination which shall include those elements considered appropriate by the examining physician.

(iii) For persons required to use respirators for at least 30 days a year, a pulmonary function test shall be performed every three (3) years. A specific evaluation of the cardiopulmonary system shall be made at the time of the pulmonary function test.

(4) Emergency examinations.

(i) In addition to the surveillance required by (i)(1)(i), if an employee is exposed to benzene in an emergency situation, the employer shall have the employee provide a urine sample at the end of the employee's shift and have a urinary phenol test performed on the sample within 72 hours. The urine specific gravity shall be corrected to 1.024.

(ii) If the result of the urinary phenol test is below 75 mg phenol/L of urine, no further testing is required.

(iii) If the result of the urinary phenol test is equal to or greater than 75 mg phenol/L of urine, the employer shall provide the employee with a complete blood count including an erythrocyte count, leukocyte count with differential and thrombocyte count at monthly intervals for a duration of three (3) months following the emergency exposure.

(iv) If any of the conditions specified in paragraph (i)(5)(i) of this section exists, then the further requirements of paragraph (i)(5) of this section shall be met and the employer shall, in addition, provide the employees with periodic examinations if directed by the physician.

(5) Additional examinations and referrals.

(i) Where the results of the complete blood count required for the initial and periodic examinations indicate any of the following abnormal conditions exist, then the blood count shall be repeated within 2 weeks.

(A) The hemoglobin level or the hematocrit falls below the normal limit (outside the 95% confidence interval (C.I.)) as determined by the laboratory for the particular geographic area and/or these indices show a persistent downward trend from the individual's pre-exposure norms; provided these findings cannot be explained by other medical reasons.

(B) The thrombocyte (platelet) count varies more than 20 percent below the employee's most recent values or falls outside the normal limit (95% C.I.) as determined by the laboratory.

(C) The leukocyte count is below 4,000 per mm³ or there is an abnormal differential count.

(ii) If the abnormality persists, the examining physician shall refer the employee to a hematologist or an internist for further evaluation unless the physician has good reason to

believe such referral is unnecessary. (See Appendix C for examples of conditions where a referral may be unnecessary.)

(iii) The employer shall provide the hematologist or internist with the information required to be provided to the physician under paragraph (i)(6) of this section and the medical record required to be maintained by paragraph (k)(2)(ii) of this section.

(iv) The hematologist's or internist's evaluation shall include a determination as to the need for additional tests, and the employer shall assure that these tests are provided.

(6) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this regulation and its appendices;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's actual or representative exposure level:

(iv) A description of any personal protective equipment used or to be used; and

(v) Information from previous employment-related medical examinations of the affected employee which is not otherwise available to the examining physician.

(7) Physician's written opinions.

(i) For each examination under this section, the employer shall obtain and provide the employee with a copy of the examining physician's written opinion within 15 days of the examination. The written opinion shall be limited to the following information:

(A) The occupationally pertinent results of the medical examination and tests;

(B) The physician's opinion concerning whether the employee has any detected medical conditions which would place the employee's health at greater than normal risk of material impairment from exposure to benzene;

(C) The physician's recommended limitations upon the employee's exposure to benzene or upon the employee's use of protective clothing or equipment and respirators.

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions resulting from benzene exposure which require further explanation or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific records, findings and diagnoses that have no bearing on the employee's ability to work in a benzene-exposed workplace.

(8) Medical removal plan.

(i) When a physician makes a referral to a hematologist/internist as required under paragraph (i)(5)(ii) of this section, the employee shall be removed from areas where exposures may exceed the action level until such time as the physician makes a determination under paragraph (i)(8)(ii) of this section.

(ii) Following the examination and evaluation by the hematologist/internist, a decision to remove an employee from areas where benzene exposure is above the action level or to allow the employee to return to areas where benzene exposure is above the action level shall be made by the physician in consultation with the hematologist/internist. This decision shall be communicated in writing to the employer and employee. In the case of removal, the physician shall state the required probable duration of removal from occupational exposure to benzene above the action level and the requirements for future medical examinations to review the decision.

(iii) For any employee who is removed pursuant to paragraph (i)(8)(ii) of this section, the employer shall provide a follow-up examination. The physician, in consultation with the hematologist/internist, shall make a decision within 6 months of the date the employee was removed as to whether the employee shall be returned to the usual job or whether the employee should be removed permanently.

(iv) Whenever an employee is temporarily removed from benzene exposure pursuant to paragraph (i)(8)(i) or (i)(8)(ii) of this section, the employer shall transfer the employee to a comparable job for which the employee is qualified (or can be trained for in a short period) and where benzene exposures are as low as possible, but in no event higher than the action level. The employer shall maintain the employee's current wage rate, seniority and other benefits. If there is no such job available, the employer shall provide medical removal protection benefits until such a job becomes available or for 6 months, whichever comes first.

(v) Whenever an employee is removed permanently from benzene exposure based on a physician's recommendation pursuant to paragraph (i)(8)(iii) of this section, the employee shall be given the opportunity to transfer to another position which is available or later becomes available for which the employee is qualified (or can be trained for in a short period) and where benzene exposures are as low as possible but in no event higher than the action level. The employer shall assure that such employee suffers no reduction in current wage rate, seniority or other benefits as a result of the transfer.

(9) Medical removal protection benefits.

(i) The employer shall provide to an employee 6 months of medical removal protection benefits immediately following each occasion an employee is removed from exposure to benzene because of hematological findings pursuant to paragraphs (i)(8)(i) and (ii) of this section, unless the employee has been transferred to a comparable job where benzene exposures are below the action level.

(ii) For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the current wage rate, seniority and other benefits of an employee as though the employee had not been removed.

(iii) The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or from employment with another employer made possible by virtue of the employee's removal.

(j) Communication of hazards.

(1) Hazard communication – general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for benzene.

(ii) In classifying the hazards of benzene at least the following hazards are to be addressed: Cancer; central nervous system effects; blood effects; aspiration; skin, eye, and respiratory tract irritation; and flammability.

(iii) Employers shall include benzene in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of benzene and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (j)(3) of this section.

(2) Warning signs and labels.

(i) The employer shall post signs at entrances to regulated areas. The signs shall bear the following legend:

DANGER
BENZENE
MAY CAUSE CANCER
HIGHLY FLAMMABLE LIQUID AND VAPOR
DO NOT SMOKE
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(ii) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (j)(2)(i) of this section:

DANGER
BENZENE
CANCER HAZARD
FLAMMABLE--NO SMOKING
AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

(iii) The employer shall ensure that labels or other appropriate forms of warning are provided for containers of benzene within the workplace. There is no requirement to label pipes. The

labels shall comply with the requirements of paragraph (j)(1) of this section and 1910.1200(f).

(iv) Prior to June 1, 2015, employers shall include the following legend or similar language on the labels or other appropriate forms of warning:

DANGER
CONTAINS BENZENE
CANCER HAZARD

(3) Information and training.

(i) The employer shall provide employees with information and training at the time of their initial assignment to a work area where benzene is present. If exposures are above the action level, employees shall be provided with information and training at least annually thereafter.

(ii) The training program shall be in accordance with the requirements of 29 CFR 1910.1200(h)(1) and (2), and shall include specific information on benzene for each category of information included in that section.

(iii) In addition to the information required under 29 CFR 1910.1200, the employer shall:

(A) Provide employees with an explanation of the contents of this section, including Appendices A and B, and indicate to them where the standard is available; and

(B) Describe the medical surveillance program required under paragraph (i) of this section, and explain the information contained in Appendix C.

(k) Recordkeeping.

(1) Exposure measurements.

(i) The employer shall establish and maintain an accurate record of all measurements required by paragraph (e) of this section, in accordance with 29 CFR 1910.1020.

(ii) This record shall include:

(A) The dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposures;

(B) A description of the sampling and analytical methods used;

(C) A description of the type of respiratory protective devices worn, if any; and

(D) The name~~[-, social security number,]~~ job classification and exposure levels of the employee monitored and all other employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for at least 30 years, in accordance with 29 CFR 1910.1020.

(2) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance required by paragraph (i) of this section, in accordance with 29 CFR 1910.1020.

(ii) This record shall include:

(A) The name~~[and social security number]~~ of the employee;

(B) The employer's copy of the physician's written opinion on the initial, periodic and special examinations, including results of medical examinations and all tests, opinions and recommendations;

(C) Any employee medical complaints related to exposure to benzene;

(D) A copy of the information provided to the physician as required by paragraphs (i)(6)(ii) through (v) of this section; and

(E) A copy of the employee's medical and work history related to exposure to benzene or any other hematologic toxins.

(iii) The employer shall maintain this record for at least the duration of employment plus 30 years, in accordance with 29 CFR 1910.1020.

(3) Availability.

(i) The employer shall assure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director for examination and copying.

(ii) Employee exposure monitoring records required by this paragraph shall be provided upon request for examination and copying to employees, employee representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(iii) Employee medical records required by this paragraph shall be provided upon request for examination and copying, to the subject employee, to anyone having the specific written consent of the subject employee, and to the Assistant Secretary in accordance with 29 CFR 1910.1020.

(4) Transfer of records. The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(l) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees, or their designated representatives, an opportunity to observe the measuring or monitoring of employee exposure to benzene conducted pursuant to paragraph (e) of this section.

(2) Observation procedures. When observation of the measuring or monitoring of employee exposure to benzene requires entry into areas where the use of protective clothing and equipment or respirators is required, the employer shall provide the observer with personal protective clothing and equipment or respirators required to be worn by employees working in the area, assure the use of such clothing and equipment or respirators, and require the observer to comply with all other applicable safety and health procedures.

(m) Reserved.

(n) Appendices. The information contained in Appendices A, B, C, and D is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[52 FR 34562, Sept. 11, 1987, as amended at 54 FR 24334, June 7, 1989; 61 FR 5508, Feb. 13, 1996; 63 FR 1289, Jan. 8, 1998; 63 FR 20099, Apr. 23, 1998; 70 FR 1142, Jan. 5, 2005; 71 FR 16673, Apr. 3, 2006; 71 FR 50189, Aug. 24, 2006; 73 FR 75585, Dec. 12, 2008; 76 FR 33608, June 8, 2011; 77 FR 17781, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Authority: ORS 654.025(2) and 656.726(4).

Stats Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 13-1988, f. 8/2/88, ef. 8/2/88.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1029

Coke Oven Emissions.

(a) Scope and application. This section applies to the control of employee exposure to coke oven emissions, except that this section shall not apply to working conditions with regard to which other Federal agencies exercise statutory authority to prescribe or enforce standards affecting occupational safety and health.

(b) Definitions. For the purpose of this section:

Authorized person means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the opportunity to observe monitoring and measuring procedures under paragraph (n) of this section.

Beehive oven means a coke oven in which the products of carbonization other than coke are not recovered, but are released into the ambient air.

Coke oven means a retort in which coke is produced by the destructive distillation or carbonization of coal.

Coke oven battery means a structure containing a number of slot-type coke ovens.

Coke oven emissions means the benzene-soluble fraction of total particulate matter present during the destructive distillation or carbonization of coal for the production of coke.

Director means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or his or her designee.

Emergency means any occurrence such as, but not limited to, equipment failure which is likely to, or does, result in any massive release of coke oven emissions.

Existing coke oven battery means a battery in operation or under construction on January 20, 1977, and which is not a rehabilitated coke oven battery.

Green plush means coke which when removed from the oven results in emissions due to the presence of unvolatilized coal.

Pipeline charging means any apparatus used to introduce coal into an oven which uses a pipe or duct permanently mounted onto an oven and through which coal is charged.

Rehabilitated coke oven battery means a battery which is rebuilt, overhauled, renovated, or restored such as from the pad up, after January 20, 1977.

Secretary means the Secretary of Labor, U.S. Department of Labor, or his or her designee.

Sequential charging means a procedure, usually automatically timed, by which a predetermined volume of coal in each larry car hopper is introduced into an oven such that no more than two hoppers commence or finish discharging simultaneously although, at some point, all hoppers are discharging simultaneously.

Stage charging means a procedure by which a predetermined volume of coal in each larry car hopper is introduced into an oven such that no more than two hoppers are discharging simultaneously.

(c) Permissible exposure limit. The employer shall assure that no employee in the regulated area is exposed to coke oven emissions at concentrations greater than 150 micrograms per cubic meter of air (150 µg/m³), averaged over any 8-hour period.

(d) Regulated areas.

(1) The employer shall establish regulated areas and shall limit access to them to authorized persons.

(2) The employer shall establish the following as regulated areas:

(i) The coke oven battery including topside and its machinery, pushside and its machinery, coke side and its machinery, and the battery ends; the wharf; and the screening station;

(ii) The beehive oven and its machinery.

(e) Exposure monitoring and measurement.

(1) Monitoring program.

(i) Each employer who has a place of employment where coke oven emissions are present shall monitor employees employed in the regulated area to measure their exposure to coke oven emissions.

(ii) The employer shall obtain measurements which are representative of each employee's exposure to coke oven emissions over an eight-hour period. All measurements shall determine exposure without regard to the use of respiratory protection.

(iii) The employer shall collect fullshift (for at least seven continuous hours) personal samples, including at least one sample during each shift for each battery and each job classification within the regulated areas including at least the following job classifications:

(A) Lidman;

(B) Tar chaser;

(C) Larry car operator;

(D) Luterman;

(E) Machine operator, coke side;

(F) Benchman, coke side;

(G) Benchman, pusher side;

(H) Heater;

(I) Quenching car operator;

(J) Pusher machine operator;

(K) Screening station operator;

(L) Wharfman;

(M) Oven patcher;

(N) Oven repairman;

(O) Spellman; and

(P) Maintenance personnel.

(iv) The employer shall repeat the monitoring and measurements required by this paragraph (e)(1) at least every three months.

(2) Redetermination. Whenever there has been a production, process, or control change which may result in new or additional exposure to coke oven emissions, or whenever the employer has any other reason to suspect an increase in employee exposure, the employer shall repeat the monitoring and measurements required by paragraph (e)(1) of this section for those employees affected by such change or increase.

(3) Employee notification.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Whenever such results indicate that the representative employee exposure exceeds the permissible exposure limit, the employer shall, in such notification, inform each employee of that fact and of the corrective action being taken to reduce exposure to or below the permissible exposure limit.

(4) Accuracy of measurement. The employer shall use a method of monitoring and measurement which has an accuracy (with a confidence level of 95%) of not less than plus or minus 35% for concentrations of coke oven emissions greater than or equal to 150 $\mu\text{g}/\text{m}^3$.

(f) Methods of compliance. The employer shall control employee exposure to coke oven emissions by the use of engineering controls, work practices and respiratory protection as follows:

(1) Priority of compliance methods.

(i) Existing coke oven batteries.

(A) The employer shall institute the engineering and work practice controls listed in paragraphs (f)(2), (f)(3) and (f)(4) of this section in existing coke oven batteries at the earliest possible time, but not later than January 20, 1980, except to the extent that the employer can establish that such controls are not feasible. In determining the earliest

possible time for institution of engineering and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineering controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

(B) The engineering and work practice controls required under paragraphs (f)(2), (f)(3) and (f)(4) of this section are minimum requirements generally applicable to all existing coke oven batteries. If, after implementing all controls required by paragraphs (f)(2), (f)(3) and (f)(4) of this section, or after January 20, 1980, whichever is sooner, employee exposures still exceed the permissible exposure limit, employers shall implement any other engineering and work practice controls necessary to reduce exposure to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Whenever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

(ii) New or rehabilitated coke oven batteries.

(A) The employer shall institute the best available engineering and work practice controls on all new or rehabilitated coke oven batteries to reduce and maintain employee exposures at or below the permissible exposure limit, except to the extent that the employer can establish that such controls are not feasible. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

(B) If, after implementing all the engineering and work practice controls required by paragraph (f)(1)(ii)(a) of this section, employee exposures still exceed the permissible exposure limit, the employer shall implement any other engineering and work practice controls necessary to reduce exposure to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

(iii) Beehive ovens.

(A) The employer shall institute engineering and work practice controls on all beehive ovens at the earliest possible time to reduce and maintain employee exposures at or below the permissible exposure limit, except to the extent that the employer can establish that such

controls are not feasible. In determining the earliest possible time for institution of engineering and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineering controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

(B) If, after implementing all engineering and work practice controls required by paragraph (f)(1)(iii)(a) of this section, employee exposures still exceed the permissible exposure limit, the employer shall implement any other engineering and work practice controls necessary to reduce exposures to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Whenever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

(2) Engineering controls.

(i) Charging. The employer shall equip and operate existing coke oven batteries with all of the following engineering controls to control coke oven emissions during charging operations:

(A) One of the following methods of charging:

(1) Stage charging as described in paragraph (f)(3)(i)(b) of this section; or

(2) Sequential charging as described in paragraph (f)(3)(i)(b) of this section except that paragraph (f)(3)(i)(b)(3)(iv) of this section does not apply to sequential charging; or

(3) Pipeline charging or other forms of enclosed charging in accordance with paragraph (f)(2)(i) of this section, except that paragraphs (f)(2)(i)(b), (d), (e), (f) and (h) of this section do not apply;

(B) Drafting from two or more points in the oven being charged, through the use of double collector mains, or a fixed or moveable jumper pipe system to another oven, to effectively remove the gases from the oven to the collector mains;

(C) Aspiration systems designed and operated to provide sufficient negative pressure and flow volume to effectively move the gases evolved during charging into the collector mains, including sufficient steam pressure, and steam jets of sufficient diameter;

(D) Mechanical volumetric controls on each larry car hopper to provide the proper amount of coal to be charged through each charging hole so that the tunnel head will be sufficient to permit the gases to move from the oven into the collector mains;

(E) Devices to facilitate the rapid and continuous flow of coal into the oven being charged, such as stainless steel liners, coal vibrators or pneumatic shells;

(F) Individually operated larry car drop sleeves and slide gates designed and maintained so that the gases are effectively removed from the oven into the collector mains;

(G) Mechanized gooseneck and standpipe cleaners;

(H) Air seals on the pusher machine leveler bars to control air infiltration during charging; and

(I) Roof carbon cutters or a compressed air system or both on the pusher machine rams to remove roof carbon.

(ii) Coking. The employer shall equip and operate existing coke oven batteries with all of the following engineering controls to control coke oven emissions during coking operations;

(A) A pressure control system on each battery to obtain uniform collector main pressure;

(B) Ready access to door repair facilities capable of prompt and efficient repair of doors, door sealing edges and all door parts;

(C) An adequate number of spare doors available for replacement purposes;

(D) Chuck door gaskets to control chuck door emissions until such door is repaired, or replaced; and

(E) Heat shields on door machines.

(3) Work practice controls.

(i) Charging. The employer shall operate existing coke oven batteries with all of the following work practices to control coke oven emissions during the charging operation:

(A) Establishment and implementation of a detailed, written inspection and cleaning procedure for each battery consisting of at least the following elements:

(1) Prompt and effective repair or replacement of all engineering controls;

(2) Inspection and cleaning of goosenecks and standpipes prior to each charge to a specified minimum diameter sufficient to effectively move the evolved gases from the oven to the collector mains;

(3) Inspection for roof carbon build-up prior to each charge and removal of roof carbon as necessary to provide an adequate gas channel so that the gases are effectively moved from the oven into the collector mains;

(4) Inspection of the steam aspiration system prior to each charge so that sufficient pressure and volume is maintained to effectively move the gases from the oven to the collector mains;

(5) Inspection of steam nozzles and liquor sprays prior to each charge and cleaning as necessary so that the steam nozzles and liquor sprays are clean;

(6) Inspection of standpipe caps prior to each charge and cleaning and luting or both as necessary so that the gases are effectively moved from the oven to the collector mains; and

(7) Inspection of charging holes and lids for cracks, warpage and other defects prior to each charge and removal of carbon to prevent emissions, and application of luting material to standpipe and charging hole lids where necessary to obtain a proper seal.

(B) Establishment and implementation of a detailed written charging procedure, designed and operated to eliminate emissions during charging for each battery, consisting of at least the following elements:

(1) Larry car hoppers filled with coal to a predetermined level in accordance with the mechanical volumetric controls required under paragraph (f)(2)(i)(d) of this section so as to maintain a sufficient gas passage in the oven to be charged;

(2) The larry car aligned over the oven to be charged, so that the drop sleeves fit tightly over the charging holes; and

(3) The oven charged in accordance with the following sequence of requirements:

(i) The aspiration system turned on;

(ii) Coal charged through the outermost hoppers, either individually or together depending on the capacity of the aspiration system to collect the gases involved;

(iii) The charging holes used under paragraph (f)(3)(i)(b)(3)(ii) of this section relidded or otherwise sealed off to prevent leakage of coke oven emissions;

(iv) If four hoppers are used, the third hopper discharged and relidded or otherwise sealed off to prevent leakage of coke oven emissions;

(v) The final hopper discharged until the gas channel at the top of the oven is blocked and then the chuck door opened and the coal leveled;

(vi) When the coal from the final hopper is discharged and the leveling operation complete, the charging hole relidded or otherwise sealed off to prevent leakage of coke oven emissions; and

(vii) The aspiration system turned off only after the charging holes have been closed.

(C) Establishment and implementation of a detailed written charging procedure, designed and operated to eliminate emissions during charging of each pipeline or enclosed charged battery.

(ii) Coking. The employer shall operate existing coke oven batteries pursuant to a detailed written procedure established and implemented for the control of coke oven emissions during coking, consisting of at least the following elements:

(A) Checking oven back pressure controls to maintain uniform pressure conditions in the collecting main;

(B) Repair, replacement and adjustment of oven doors and chuck doors and replacement of door jambs so as to provide a continuous metal-to-metal fit;

(C) Cleaning of oven doors, chuck doors and door jambs each coking cycle so as to provide an effective seal;

(D) An inspection system and corrective action program to control door emissions to the maximum extent possible; and

(E) Luting of doors that are sealed by luting each coking cycle and reluting, replacing or adjusting as necessary to control leakage.

(iii) Pushing. The employer shall operate existing coke oven batteries with the following work practices to control coke oven emissions during pushing operations:

(A) Coke and coal spillage quenched as soon as practicable and not shoveled into a heated oven; and

(B) A detailed written procedure for each battery established and implemented for the control of emissions during pushing consisting of the following elements:

(1) Dampering off the ovens and removal of charging hole lids to effectively control coke oven emissions during the push;

(2) Heating of the coal charge uniformly for a sufficient period so as to obtain proper coking including preventing green pushes;

(3) Prevention of green pushes to the maximum extent possible;

(4) Inspection, adjustment and correction of heating flue temperatures and defective flues at least weekly and after any green push, so as to prevent green pushes;

(5) Cleaning of heating flues and related equipment to prevent green pushes, at least weekly and after any green push.

(iv) Maintenance and repair. The employer shall operate existing coke oven batteries pursuant to a detailed written procedure of maintenance and repair established and

implemented for the effective control of coke oven emissions consisting of the following elements:

(A) Regular inspection of all controls, including goosenecks, standpipes, standpipe caps, charging hold lids and castings, jumper pipes and air seals for cracks, misalignment or other defects and prompt implementation of the necessary repairs as soon as possible;

(B) Maintaining the regulated area in a neat, orderly condition free of coal and coke spillage and debris;

(C) Regular inspection of the damper system, aspiration system and collector main for cracks or leakage, and prompt implementation of the necessary repairs;

(D) Regular inspection of the heating system and prompt implementation of the necessary repairs;

(E) Prevention of miscellaneous fugitive topside emissions;

(F) Regular inspection and patching of oven brickwork;

(G) Maintenance of battery equipment and controls in good working order;

(H) Maintenance and repair of coke oven doors, chuck doors, door jambs and seals; and

(I) Repairs instituted and completed as soon as possible, including temporary repair measures instituted and completed where necessary, including but not limited to:

(1) Prevention of miscellaneous fugitive topside emissions; and

(2) Chuck door gaskets, which shall be installed prior to the start of the next coking cycle.

(4) Filtered air.

(i) The employer shall provide positive-pressure, temperature controlled filtered air for larry car, pusher machine, door machine, and quench car cabs.

(ii) The employer shall provide standby pulpits on the battery topside, at the wharf, and at the screening station, equipped with positive-pressure, temperature controlled filtered air.

(5) Emergencies. Whenever an emergency occurs, the next coking cycle may not begin until the cause of the emergency is determined and corrected, unless the employer can establish that it is necessary to initiate the next coking cycle in order to determine the cause of the emergency.

(6) Compliance program.

(i) Each employer shall establish and implement a written program to reduce exposures solely by means of the engineering and work practice controls required in paragraph (f) of this section.

(ii) The written program shall include at least the following:

(A) A description of each coke oven operation by battery, including work force and operating crew, coking time, operating procedures and maintenance practices;

(B) Engineering plans and other studies used to determine the controls for the coke battery;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Monitoring data obtained in accordance with paragraph (e) of this section;

(E) A detailed schedule for the implementation of the engineering and work practice controls required in paragraph (f) of this section; and

(F) Other relevant information.

(iii) If, after implementing all controls required by paragraph (f)(2) through (f)(4) of this section, or after January 20, 1980, whichever is sooner, or after completion of a new or rehabilitated battery the permissible exposure limit is still exceeded, the employer shall develop a detailed written program and schedule for the implementation of any additional engineering controls and work practices necessary to reduce exposure to or below the permissible exposure limit.

(iv) Written plans for such programs shall be submitted, upon request, to the Secretary and the Director, and shall be available at the worksite for examination and copying by the Secretary, the Director, and the authorized employee representative. The plans required under paragraph (f)(6) of this section shall be revised and updated at least annually to reflect the current status of the program.

(7) Training in compliance procedures. The employer shall incorporate all written procedures and schedules required under this paragraph (f) in the information and training program required under paragraph (k) of this section and, where appropriate, post in the regulated area.

(g) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Work operations, such as maintenance and repair activity, for which engineering and work-practice controls are technologically not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the permissible exposure limit.

(iv) Emergencies.

Oregon OSHA repealed 1910.1029(g)(2). In Oregon, OAR 437-002-1029 applies.

437-002-1029 Coke Oven Emissions Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii), and (d)(3)(iii)(B)(1) and (2)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1029 Coke Oven Emissions, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Coke Oven Emissions rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(3) Respirator selection. The employers must select and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134; however, employers may use a filtering facepiece respirator only when it functions as a filter respirator for coke oven emissions particulates.

(h) Protective clothing and equipment.

(1) Provision and use. The employer shall provide and assure the use of appropriate protective clothing and equipment, such as but not limited to:

(i) Flame resistant jacket and pants;

(ii) Flame resistant gloves;

(iii) Face shields or vented goggles which comply with OAR 437-002-0134(8);

(iv) Footwear providing insulation from hot surfaces for footwear;

(v) Safety shoes which comply with OAR 437-002-0134(8); and

(vi) Protective helmets which comply with OAR 437-002-0134(9).

(2) Cleaning and replacement.

(i) The employer shall provide the protective clothing required by paragraphs (h)(1)(i) and (ii) of this section in a clean and dry condition at least weekly.

(ii) The employer shall clean, launder, or dispose of protective clothing required by paragraphs (h)(1)(i) and (ii) of this section.

(iii) The employer shall repair or replace the protective clothing and equipment as needed to maintain their effectiveness.

(iv) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change rooms prescribed in paragraph (i)(1) of this section.

(v) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closable container in the change room.

(vi) The employer shall inform any person who cleans or launders protective clothing required by this section, of the potentially harmful effects of exposure to coke oven emissions.

(i) Hygiene facilities and practices.

(1) Change rooms. The employer shall provide clean change rooms equipped with storage facilities for street clothes and separate storage facilities for protective clothing and equipment whenever employees are required to wear protective clothing and equipment in accordance with paragraph (h)(1) of this section.

(2) Showers.

(i) The employer shall assure that employees working in the regulated area shower at the end of the work shift.

(ii) The employer shall provide shower facilities in accordance with 1910.141(d)(3) of this part.

(3) Lunchrooms. The employer shall provide lunchroom facilities which have a temperature controlled, positive pressure, filtered air supply, and which are readily accessible to employees working in the regulated area.

(4) Lavatories.

(i) The employer shall assure that employees working in the regulated area wash their hands and face prior to eating.

(ii) The employer shall provide lavatory facilities in accordance with 1910.141(d)(1) and (2) of this part.

(5) Prohibition of activities in the regulated area.

(i) The employer shall assure that in the regulated area, food or beverages are not present or consumed, smoking products are not present or used, and cosmetics are not applied, except that these activities may be conducted in the lunchrooms, change rooms and showers required under paragraphs (i)(1) through (i)(3) of this section.

(ii) Drinking water may be consumed in the regulated area.

(j) Medical surveillance.

(1) General requirements.

(i) Each employer shall institute a medical surveillance program for all employees who are employed in a regulated area at least 30 days per year.

(ii) This program shall provide each employee covered under paragraph (j)(1)(i) of this section with an opportunity for medical examinations in accordance with this paragraph (j).

(iii) The employer shall inform any employee who refuses any required medical examination of the possible health consequences of such refusal and shall obtain a signed statement from the employee indicating that the employee understands the risk involved in the refusal to be examined.

(iv) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and are provided without cost to the employee.

(2) Initial examinations. At the time of initial assignment to a regulated area or upon the institution of the medical surveillance program, the employer shall provide a medical examination for employees covered under paragraph (j)(1)(i) of this section including at least the following elements:

(i) A work history and medical history which shall include smoking history and the presence and degree of respiratory symptoms, such as breathlessness, cough, sputum production, and wheezing;

(ii) A **14- by 17-inch or other reasonably-sized** standard **film or digital** posterior-anterior chest X-ray;

(iii) Pulmonary function tests including forced vital capacity (FVC) and forced expiratory volume at one second (FEV 1.0) with recording of type of equipment used;

(iv) Weight;

(v) A skin examination;

(vi) Urinalysis for sugar, albumin, and hematuria; and

(vii) A urinary cytology examination.

(3) Periodic examinations.

(i) The employer shall provide the examinations specified in paragraphs (j)(2)(i) **and (iii)** through (vi) of this section at least annually for employees covered under paragraph (j)(1)(i) of this section.

(ii) The employer must provide the examinations specified in paragraphs (j)(2)(i) **and (iii)** through ~~[(j)(2)]~~(vii) of this section at least annually for employees 45 years of age or older or with five (5) or more years employment in the regulated area.

(iii) Whenever an employee who is 45 years of age or older or with five (5) or more years employment in a regulated area transfers or is transferred from employment in a regulated area, the employer must continue to provide the examinations specified in paragraphs (j)(2)(i) **and (iii)** through ~~[(j)(2)]~~(vii) of this section annually, as long as that employee is employed by the same employer or a successor employer.

(iv) Whenever an employee has not taken the examinations specified in paragraphs (j)(3)(i) through (iii) of this section with the six (6) months preceding the termination of employment the employer shall provide such examinations to the employee upon termination of employment.

(4) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this regulation and its Appendixes;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's exposure level or estimated exposure level;

(iv) A description of any personal protective equipment used or to be used; and

(v) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

(5) Physician's written opinion.

(i) The employer shall obtain a written opinion from the examining physician which shall include:

(A) The results of the medical examinations;

(B) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to coke oven emissions;

(C) Any recommended limitations upon the employee's exposure to coke oven emissions or upon the use of protective clothing or equipment such as respirators; and

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further explanation or treatment.

(ii) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure.

(iii) The employer shall provide a copy of the written opinion to the affected employee.

(k) Employee information and training.

(1) Training program.

(i) The employer shall train each employee who is employed in a regulated area in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

(ii) The training program shall be provided as of January 27, 1977 for employees who are employed in the regulated area at that time or at the time of initial assignment to a regulated area.

(iii) The training program shall be provided at least annually for all employees who are employed in the regulated area, except that training regarding the occupational safety and health hazards associated with exposure to coke oven emissions and the purpose, proper use, and limitations of respiratory protective devices shall be provided at least quarterly until January 20, 1978.

(iv) The training program shall include informing each employee of:

(A) The information contained in the substance information sheet for coke oven emissions (Appendix A);

(B) The purpose, proper use, and limitations of respiratory protective devices required in accordance with paragraph (g) of this section;

(C) The purpose for and a description of the medical surveillance program required by paragraph (j) of this section including information on the occupational safety and health hazards associated with exposure to coke oven emissions;

(D) A review of all written procedures and schedules required under paragraph (f) of this section; and

(E) A review of this standard.

(2) Access to training materials.

(i) The employer shall make a copy of this standard and its appendixes readily available to all employees who are employed in the regulated area.

(ii) The employer shall provide upon request all materials relating to the employee information and training program to the Secretary and the Director.

(l) Communication of hazards.

(1) Hazard communication - general. The employer shall include coke oven emissions in the program established to comply with the Hazard Communication Standard (HCS) (§1910.1200). The employer shall ensure that each employee has access to labels on containers of chemicals and substances associated with coke oven processes and to safety data sheets, and is trained in accordance with the provisions of HCS and paragraph (k) of this section. The employer shall ensure that at least the following hazard is addressed: Cancer.

(2) Signs.

(i) The employer shall post signs in the regulated area bearing the legend:

DANGER
COKE OVEN EMISSIONS
MAY CAUSE CANCER
DO NOT EAT, DRINK OR SMOKE
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(ii) In addition, the employer shall post signs in the areas where the permissible exposure limit is exceeded bearing the legend:

WEAR RESPIRATORY PROTECTION IN THIS AREA

(iii) The employer shall ensure that no statement appears on or near any sign required by this paragraph (l) which contradicts or detracts from the effects of the required sign.

(iv) The employer shall ensure that signs required by this paragraph (l)(2) are illuminated and cleaned as necessary so that the legend is readily visible.

(v) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (l)(2)(i) of this section:

DANGER
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY
NO SMOKING OR EATING

(vi) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (l)(2)(ii) of this section:

DANGER
RESPIRATOR REQUIRED

(3) Labels.

(i) The employer shall ensure that labels of containers of contaminated protective clothing and equipment include the following information:

CONTAMINATED WITH COKE EMISSIONS
MAY CAUSE CANCER
DO NOT REMOVE DUST BY BLOWING OR SHAKING

(ii) Prior to June 1, 2015, employers may include the following information on contaminated protective clothing and equipment in lieu of the labeling requirements in paragraph (l)(3)(i) of this section:

CAUTION
CLOTHING CONTAMINATED WITH COKE EMISSIONS
DO NOT REMOVE DUST BY BLOWING OR SHAKING

(m) Recordkeeping.

(1) Exposure measurements. The employer shall establish and maintain an accurate record of all measurements taken to monitor employee exposure to coke oven emissions required in paragraph (e) of this section.

(i) This record shall include:

(A) Name~~[-social security number,]~~ and job classification of the employees monitored;

(B) The date(s), number, duration and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;

(C) The type of respiratory protective devices worn, if any;

(D) A description of the sampling and analytical methods used and evidence of their accuracy; and

(E) The environmental variables that could affect the measurement of employee exposure.

(ii) The employer shall maintain this record for at least 40 years or for the duration of employment plus 20 years, whichever is longer.

(2) Medical surveillance. The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by paragraph (j) of this section.

(i) The record shall include:

(A) The name~~[-social security number,]~~ and description of duties of the employee;

(B) A copy of the physician's written opinion;

(C) The signed statement of any refusal to take a medical examination under paragraph (j)(1)(ii) of this section; and

(D) Any employee medical complaints related to exposure to coke oven emissions.

(ii) The employer shall keep, or assure that the examining physician keeps, the following medical records:

(A) A copy of the medical examination results including medical and work history required under paragraph (j)(2) of this section;

(B) A description of the laboratory procedures used and a copy of any standards or guidelines used to interpret the test results;

(C) The initial x-ray;

(D) The x-rays for the most recent five (5) years;

(E) Any x-ray with a demonstrated abnormality and all subsequent x-rays;

(F) The initial cytologic examination slide and written description;

(G) The cytologic examination slide and written description for the most recent 10 years; and

(H) Any cytologic examination slides with demonstrated atypia, if such atypia persists for 3 years, and all subsequent slides and written descriptions.

(iii) The employer shall maintain medical records required under paragraph (m)(2) of this section for at least 40 years, or for the duration of employment plus 20 years, whichever is longer.

(3) Availability.

(i) The employer shall make available upon request all records required to be maintained by paragraph (m) of this section to the Secretary and the Director for examination and copying.

(ii) Employee exposure measurement records and employee medical records required by this paragraph shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(4) Transfer of records.

(i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by paragraph (m) of this section.

(ii) The employer shall also comply with any additional requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(n) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their representatives an opportunity to observe any measuring or monitoring of employee exposure to coke oven emissions conducted pursuant to paragraph (e) of this section.

(2) Observation procedures.

(i) Whenever observation of the measuring or monitoring of employee exposure to coke oven emissions requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with and assure the use of such equipment and shall require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the measurement, observers shall be entitled to:

(A) An Explanation of the measurement procedures;

(B) Observe all steps related to the measurement of coke oven emissions performed at the place of exposure; and

(C) Record the results obtained.

(o) Reserved.

(p) Appendices. The information contained in the appendixes to this section is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligation.

[39 FR 23502, June 27, 1974, 41 FR 46784, Oct. 22, 1976, as amended at 42 FR 3304, Jan. 18, 1977; 45 FR 35283, May 23, 1980; 50 FR 37353, 37354, Sept. 13, 1985; 54 FR 24334, June 7, 1989; 61 FR 5508, Feb. 13, 1996; 63 FR 1290, Jan. 8, 1998; 63 FR 33468, June 18, 1998; 70 FR 1142, Jan. 5, 2005; 71 FR 16672, 16673, Apr. 3, 2006; 71 FR 50189, Aug. 24, 2006; 73 FR 75585, Dec. 12, 2008; 76 FR 33608, June 8, 2011; 77 FR 17782, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix A to 1910.1029 – Coke Oven Emissions Substance Information Sheet

I. Substance Identification

A. Substance: Coke Oven Emissions

B. Definition: The benzene-soluble fraction of total particulate matter present during the destructive distillation or carbonization of coal for the production of coke.

C. Permissible Exposure Limit: 150 micrograms per cubic meter of air determined as an average over an 8-hour period.

D. Regulated areas: Only employees authorized by your employer should enter a regulated area. The employer is required to designate the following areas as regulated areas: the coke oven battery, including topside and its machinery, pushside and its machinery, cokeside and its machinery, and the battery ends; the screening station; and the wharf; and the beehive ovens and their machinery.

II. Health Hazard Data

Exposure to coke oven emissions is a cause of lung cancer, and kidney cancer, in humans. Although there have not been an excess number of skin cancer cases in humans, repeated skin contact with coke oven emissions should be avoided.

III. Protective Clothing and Equipment

A. Respirators: Respirators will be provided by your employer for routine use if your employer is in the process of implementing engineering and work practice controls or where engineering and work practice controls are not feasible or insufficient to reduce exposure to or below the PEL. You must wear respirators for non-routine activities or in emergency situations where you are likely to be exposed to levels of coke oven emissions in excess of the permissible exposure limit. Until January 20, 1978, the routine wearing of respirators is voluntary. Until that date, if you choose not to wear a respirator you do not have to do so. You must still have your respirator with you and you must still wear it if you are near visible emissions. Since how well your respirator fits your face is very important, your employer is required to conduct fit tests to make sure the respirator seals properly when you wear it. These tests are simple and rapid and will be explained to you during your training sessions.

B. Protective clothing: Your employer is required to provide, and you must wear, appropriate, clean, protective clothing and equipment to protect your body from repeated skin contact with coke oven emissions and from the heat generated during the coking process. This clothing should include such items as jacket and pants and flame resistant gloves. Protective equipment should include face shield or vented goggles, protective helmets and safety shoes, insulated from hot surfaces where appropriate.

IV. Hygiene Facilities and Practices

You must not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the regulated area, except that drinking water is permitted. Your employer is required to provide lunchrooms and other areas for these purposes.

Your employer is required to provide showers, washing facilities, and change rooms. If you work in a regulated area, you must wash your face, and hands before eating. You must shower at the end of the work shift. Do not take used protective clothing out of the change rooms without your employer's permission. Your employer is required to provide for laundering or cleaning of your protective clothing.

V. Signs and Labels

Your employer is required to post warning signs and labels for your protection. Signs must be posted in regulated areas. The signs must warn that a cancer hazard is present, that only authorized employees may enter the area, and that no smoking or eating is allowed. In regulated areas where coke oven emissions are above the permissible exposure limit, the signs should also warn that respirators must be worn.

VI. Medical Examinations

If you work in a regulated area at least 30 days per year, your employer is required to provide you with a medical examination every year. The **initial** medical examination must include a medical history, a chest x-ray; pulmonary function test; weight comparison; skin examination; a urinalysis, and a urine cytology exam for early detection of urinary cancer. ~~[The urine cytology exam is only included in the initial exam until you are either]~~ **Periodic examinations shall include all tests required in the initial examination, except that (1) the x-ray is to be performed during initial examination only and (2) the urine cytologic test is to be performed only on those employees who** are 45 years or older, or have 5 or more years employment in the regulated area ~~[s when the medical exams including this test, but excepting the x-ray exam, are to be given every six months; under these conditions, you are to be given an x-ray exam at least once a year]~~. The examining physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion.

VII. Observation of Monitoring

Your employer is required to monitor your exposure to coke oven emissions and you are entitled to observe the monitoring procedure. You are entitled to receive an explanation of the measurement procedure, observe the steps taken in the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you must also be provided with and must wear the protective clothing and equipment.

VIII. Access to Records

You or your representative are entitled to records of your exposure to coke oven emissions upon request to your employer. Your medical examination records can be furnished to your physician upon request to your employer.

IX. Training and Education

Additional information on all of these items plus training as to hazards of coke oven emissions and the engineering and work practice controls associated with your job will also be provided by your employer.

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.

OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix B to 1910.1029— Industrial Hygiene and Medical Surveillance Guideline

I. Industrial Hygiene Guidelines

A. Sampling (Benzene-Soluble Fraction Total Particulate Matter).

Samples collected should be full shift (at least 7-hour) samples. Sampling should be done using a personal sampling pump with pulsation damper at a flow rate of 2 liters per minute. Samples should be collected on 0.8 micrometer pore size silver membrane filters (37 mm diameter) preceded by Gelman glass fiber type A-E filters encased in three-piece plastic (polystyrene) field monitor cassettes. The cassette face cap should be on and the plug removed. The rotameter should be checked every hour to ensure that proper flow rates are maintained.

A minimum of three full-shift samples should be collected for each job classification on each battery, at least one from each shift. If disparate results are obtained for particular job classification, sampling should be repeated. It is advisable to sample each shift on more than one day to account for environmental variables (wind, precipitation, etc.) which may affect sampling. Differences in exposures among different work shifts may indicate a need to improve work practices on a particular shift. Sampling results from different shifts for each job classification should not be averaged. Multiple samples from same shift on each battery may be used to calculate an average exposure for a particular job classification.

B. Analysis.

1. All extraction glassware is cleaned with dichromic acid cleaning solution, rinsed with tap water, then dionized water, acetone, and allowed to dry completely. The glassware is rinsed with nanograde benzene before use. The Teflon cups are cleaned with benzene then with acetone.

2. Pre-weigh the 2 ml Teflon cups to one hundredth of a milligram (0.01 mg) on an autobalance AD 2 Tare weight of the cups is about 50 mg.

3. Place the silver membrane filter and glass fiber filter into a 15 ml test tube.

4. Extract with 5 ml of benzene for five minutes in an ultrasonic cleaner.
5. Filter the extract in 15 ml medium glass fritted funnels.
6. Rinse test tube and filters with two 1.5 ml aliquots of benzene and filter through the fritted glass funnel.
7. Collect the extract and two rinses in a 10 ml Kontes graduated evaporative concentrator.
8. Evaporate down to 1 ml while rinsing the sides with benzene.
9. Pipet 0.5 ml into the Teflon cup and evaporate to dryness in a vacuum oven at 40° C for 3 hours.
10. Weigh the Teflon cup and the weight gain is due to the benzene soluble residue in half the Sample.

II. Medical Surveillance Guidelines

A. General.

The minimum requirements for the medical examination for coke oven workers are given in paragraph (j) of the standard. The initial examination is to be provided to all coke oven workers who work at least 30 days in the regulated area. The examination includes a 14" x 17" **or other reasonably-sized standard film or digital** posterior-anterior chest x-ray reading, pulmonary function tests (FVC and FEV₁[-θ]), weight, urinalysis, skin examination, and a urinary cytologic examination. These tests are needed to serve as the baseline for comparing the employee's future test results. Periodic exams include all the elements of the initial exam, except that except that

(1) the x-ray is to be performed during initial examination only and (2) the urine cytologic test is to be performed only on those employees who are 45 years or older or who have worked for 5 or more years in the regulated area~~[-; periodic exams, with the exception of x-rays, are to be performed semi-annually for this group instead of annually; for this group, x-rays will continue to be given at least annually]~~. The examination contents are minimum requirements; additional tests such as lateral and oblique x-rays or additional pulmonary function tests may be performed if deemed necessary.

B. Pulmonary function tests.

Pulmonary function tests should be performed in a manner which minimizes subject and operator bias. There has been shown to be learning effects with regard to the results obtained from certain tests, such as FEV_{1.0}. Best results can be obtained by multiple trials for each subject. The best of three trials or the average of the last three of five trials may be used in obtaining reliable results. The type of equipment used (manufacturer, model, etc.) should be recorded with the results as reliability and accuracy varies and such information may be important in the evaluation of test results. Care should be exercised to obtain the best possible testing equipment.

[41 FR 46784, Oct. 22, 1976, as amended at 42 FR 3304, Jan. 18, 1977; 45 FR 35283, May 23, 1980; 50 FR 37353, 37354, Sept. 13, 1985; **84 FR 21416, May 14, 2019.**]

Stat. Auth: ORS 654.025(2) and 656.726(4)
Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1030

Bloodborne Pathogens.

(a) Scope and Application. This section applies to all occupational exposure to blood or other potentially infectious materials as defined by paragraph (b) of this section.

(b) Definitions. For purposes of this section, the following shall apply:

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

Blood means human blood, human blood components, and products made from human blood.

Bloodborne Pathogens means pathogenic micro-organisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Clinical Laboratory means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

Contaminated means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

Contaminated Laundry means laundry which has been soiled with blood or other potentially infectious materials or may contain sharps.

Contaminated Sharps means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

Decontamination means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.

Engineering Controls means controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the workplace.

Exposure Incident means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

Handwashing Facilities means a facility providing an adequate supply of running potable water, soap, and single use towels or air-drying machines.

Licensed Healthcare Professional is a person whose legally permitted scope of practice allows him or her to independently perform the activities required by paragraph (f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up.

HBV means hepatitis B virus.

HIV means human immunodeficiency virus.

Needleless systems means a device that does not use needles for:

- (1) The collection of bodily fluids or withdrawal of body fluids after initial venous or arterial access is established;
- (2) The administration of medication or fluids; or
- (3) Any other procedure involving the potential for occupational exposure to bloodborne pathogens due to percutaneous injuries from contaminated sharps.

Occupational Exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Other Potentially Infectious Materials means:

- (1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;
- (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and
- (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Parenteral means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

Personal Protective Equipment is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

Production Facility means a facility engaged in industrial-scale, large-volume or high concentration production of HIV or HBV.

Regulated Waste means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

Research Laboratory means a laboratory producing or using research-laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV but not in the volume found in production facilities.

Sharps with engineered sharps injury protections means a nonneedle sharp or a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

Source Individual means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims; clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.

Sterilize means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

Universal Precautions is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Work Practice Controls means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

(c) Exposure Control.

(1) Exposure Control Plan.

(i) Each employer having an employee(s) with occupational exposure as defined by paragraph (b) of this section shall establish a written Exposure Control Plan designed to eliminate or minimize employee exposure.

(ii) The Exposure Control Plan shall contain at least the following elements:

(A) The exposure determination required by paragraph (c)(2),

(B) The schedule and method of implementation for paragraphs (d) Methods of Compliance, (e) HIV and HBV Research Laboratories and Production Facilities, (f) Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up, (g) Communication of Hazards to Employees, and (h) Recordkeeping, of this standard, and

(C) The procedure for the evaluation of circumstances surrounding exposure incidents as required by paragraph (f)(3)(i) of this standard.

(iii) Each employer shall ensure that a copy of the Exposure Control Plan is accessible to employees in accordance with 29 CFR 1910.1020(e).

(iv) The Exposure Control Plan shall be reviewed and updated at least annually and whenever necessary to reflect new or modified tasks and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure. The review and update of such plans shall also:

(A) Reflect changes in technology that eliminate or reduce exposure to bloodborne pathogens; and

(B) Document annually consideration and implementation of appropriate commercially available and effective safer medical devices designed to eliminate or minimize occupational exposure.

NOTE: Oregon OSHA did not adopt 1910.1030(c)(1)(v). In Oregon, 437-002-1030 applies.

(2) Exposure Determination.

(i) Each employer who has an employee(s) with occupational exposure as defined by paragraph (b) of this section shall prepare an exposure determination. This exposure determination shall contain the following:

(A) A list of all job classifications in which all employees in those job classifications have occupational exposure;

(B) A list of job classifications in which some employees have occupational exposure, and

(C) A list of all tasks and procedures or groups of closely related task and procedures in which occupational exposure occurs and that are performed by employees in job classifications listed in accordance with the provisions of paragraph (c)(2)(i)(B) of this standard.

(ii) This exposure determination shall be made without regard to the use of personal protective equipment.

(d) Methods of Compliance.

(1) General. Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

(2) Engineering and Work Practice Controls.

(i) Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be used.

(ii) Engineering controls shall be examined and maintained or replaced on a regular schedule to ensure their effectiveness.

437-002-1030 Additional Oregon Rules for Bloodborne Pathogens.

Every employer with employees that use medical sharps in direct patient care must, at least annually, identify, evaluate, and select engineering and work practice controls, including safer medical devices.

(1) This evaluation must involve non-managerial front-line employees responsible for direct patient care.

(2) This evaluation must be done on a facility-by-facility basis. When a facility has multiple departments with specific equipment and/or work practice concerns, the evaluation must involve employees from those departments.

(3) After a device is evaluated and selected, the employer must make a decision on implementing that device.

(a) If a device is not purchased because of employer or employee concerns, those concerns must be documented. However, if the employer does not purchase a device that had employee support, the employer must also document the employee support, as well as the justification for not purchasing that device.

(b) If a device is purchased without the consent of the employees who evaluated it, the employer must document the employees' concerns, as well as the employers' justification for purchasing that device.

(c) All documentation required by 437-002-1030(3) must be kept as part of the written Exposure Control Plan.

(4) The employer must ensure that all affected employees are informed on the process for selecting safer medical devices.

(5) Employees must be trained in the use of safer medical devices before the employees use those devices.

Stat. Authority: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 10-2001, f. 9/14/01, ef. 10/18/01.

(iii) Employers shall provide handwashing facilities which are readily accessible to employees.

(iv) When provision of handwashing facilities is not feasible, the employer shall provide either an appropriate antiseptic hand cleanser in conjunction with clean cloth/ paper towels or antiseptic towelettes. When antiseptic hand cleansers or towelettes are used, hands shall be washed with soap and running water as soon as feasible.

(v) Employers shall ensure that employees wash their hands immediately or as soon as feasible after removal of gloves or other personal protective equipment.

(vi) Employers shall ensure that employees wash hands and any other skin with soap and water, or flush mucous membranes with water immediately or as soon as feasible following contact of such body areas with blood or other potentially infectious materials.

(vii) Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed except as noted in paragraphs (d)(2)(vii)(A) and (d)(2)(vii)(B) below. Shearing or breaking of contaminated needles is prohibited.

(A) Contaminated needles and other contaminated sharps shall not be bent, recapped or removed unless the employer can demonstrate that no alternative is feasible or that such action is required by a specific medical or dental procedure.

(B) Such bending, recapping or needle removal must be accomplished through the use of a mechanical device or a one-handed technique.

(viii) Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed. These containers shall be:

(A) puncture resistant;

(B) labeled or color-coded in accordance with this standard;

(C) leakproof on the sides and bottom; and

(D) in accordance with the requirements set forth in paragraph (d)(4)(ii)(E) for reusable sharps.

(ix) Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.

(x) Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets or on countertops or benchtops where blood or other potentially infectious materials are present.

(xi) All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.

(xii) Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

(xiii) Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

(A) The container for storage, transport, or shipping shall be labeled or color-coded according to paragraph (g)(1)(i) and closed prior to being stored, transported, or shipped. When a facility utilizes Universal Precautions in the handling of all specimens, the labeling/color-coding of specimens is not necessary provided containers are recognizable as containing specimens. This exemption only applies while such specimens/containers remain within the facility. Labeling or color-coding in accordance with paragraph (g)(1)(i) is required when such specimens/containers leave the facility.

(B) If outside contamination of the primary container occurs, the primary container shall be placed within a second container which prevents leakage during handling, processing, storage, transport, or shipping and is labeled or color-coded according to the requirements of this standard.

(C) If the specimen could puncture the primary container, the primary container shall be placed within a secondary container which is puncture-resistant in addition to the above characteristics.

(xiv) Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary, unless the employer can demonstrate that decontamination of such equipment or portions of such equipment is not feasible.

(A) A readily observable label in accordance with paragraph (g)(1)(i)(H) shall be attached to the equipment stating which portions remain contaminated.

(B) The employer shall ensure that this information is conveyed to all affected employees, the servicing representative, and/or the manufacturer, as appropriate, prior to handling, servicing, or shipping so that appropriate precautions will be taken.

(3) Personal Protective Equipment.

(i) Provision. When there is occupational exposure, the employer shall provide, at no cost to the employee, appropriate personal protective equipment such as, but not limited to, gloves, gowns, laboratory coats, face shields or masks and eye protection, and mouthpieces, resuscitation bags, pocket masks, or other ventilation devices. Personal protective equipment will be considered "appropriate" only if it does not permit blood or other potentially infectious materials to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.

(ii) Use. The employer shall ensure that the employee uses appropriate personal protective equipment unless the employer shows that the employee temporarily and briefly declined to use personal protective equipment when, under rare and extraordinary circumstances, it was the employee's professional judgment that in the specific instance its use would have prevented the delivery of health care or public safety services or would have posed an increased hazard to the safety of the worker or co-worker. When the employee makes this judgement, the circumstances shall be investigated and documented in order to determine whether changes can be instituted to prevent such occurrences in the future.

(iii) Accessibility. The employer shall ensure that appropriate personal protective equipment in the appropriate sizes is readily accessible at the worksite or is issued to employees. Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.

(iv) Cleaning, Laundering, and Disposal. The employer shall clean, launder, and dispose of personal protective equipment required by paragraphs (d) and (e) of this standard, at no cost to the employee.

(v) Repair and Replacement. The employer shall repair or replace personal protective equipment as needed to maintain its effectiveness, at no cost to the employee.

(vi) If a garment(s) is penetrated by blood or other potentially infectious materials, the garment(s) shall be removed immediately or as soon as feasible.

(vii) All personal protective equipment shall be removed prior to leaving the work area.

(viii) When personal protective equipment is removed it shall be placed in an appropriately designated area or container for storage, washing, decontamination or disposal.

(ix) Gloves. Gloves shall be worn when it can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials, mucous membranes, and non-intact skin; when performing vascular access procedures except as specified in paragraph (d)(3)(ix)(D); and when handling or touching contaminated items or surfaces.

(A) Disposable (single use) gloves such as surgical or examination gloves, shall be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

(B) Disposable (single use) gloves shall not be washed or decontaminated for re use.

(C) Utility gloves may be decontaminated for re-use if the integrity of the glove is not compromised. However, they must be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration or when their ability to function as a barrier is compromised.

(D) If an employer in a volunteer blood donation center judges that routine gloving for all phlebotomies is not necessary then the employer shall:

(1) Periodically reevaluate this policy;

(2) Make gloves available to all employees who wish to use them for phlebotomy;

(3) Not discourage the use of gloves for phlebotomy; and

(4) Require that gloves be used for phlebotomy in the following circumstances:

(i) When the employee has cuts, scratches, or other breaks in his or her skin;

(ii) When the employee judges that hand contamination with blood may occur, for example, when performing phlebotomy on an uncooperative source individual; and

(iii) When the employee is receiving training in phlebotomy.

(x) Masks, Eye Protection, and Face Shields. Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields, shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can be reasonably anticipated.

(xi) Gowns, Aprons, and Other Protective Body Clothing. Appropriate protective clothing such as, but not limited to, gowns, aprons, lab coats, clinic jackets, or similar outer garments shall be worn in occupational exposure situations. The type and characteristics will depend upon the task and degree of exposure anticipated.

(xii) Surgical caps or hoods and/or shoe covers or boots shall be worn in instances when gross contamination can reasonably be anticipated (e.g., autopsies, orthopaedic surgery).

(4) Housekeeping.

(i) General. Employers shall ensure that the worksite is maintained in a clean and sanitary condition. The employer shall determine and implement an appropriate written schedule for cleaning and method of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area.

(ii) All equipment and environmental and working surfaces shall be cleaned and decontaminated after contact with blood or other potentially infectious materials.

(A) Contaminated work surfaces shall be decontaminated with an appropriate disinfectant after completion of procedures; immediately or as soon as feasible when surfaces are overtly contaminated or after any spill of blood or other potentially infectious materials; and at the end of the work shift if the surface may have become contaminated since the last cleaning.

(B) Protective coverings, such as plastic wrap, aluminum foil, or imperviously-backed absorbent paper used to cover equipment and environmental surfaces, shall be removed and replaced as soon as feasible when they become overtly contaminated or at the end of the workshift if they may have become contaminated during the shift.

(C) All bins, pails, cans, and similar receptacles intended for reuse which have a reasonable likelihood for becoming contaminated with blood or other potentially infectious materials shall be inspected and decontaminated on a regularly scheduled basis and cleaned and decontaminated immediately or as soon as feasible upon visible contamination.

(D) Broken glassware which may be contaminated shall not be picked up directly with the hands. It shall be cleaned up using mechanical means, such as a brush and dust pan, tongs, or forceps.

(E) Reusable sharps that are contaminated with blood or other potentially infectious materials shall not be stored or processed in a manner that requires employees to reach by hand into the containers where these sharps have been placed.

(iii) Regulated Waste.

(A) Contaminated Sharps Discarding and Containment.

(1) Contaminated sharps shall be discarded immediately or as soon as feasible in containers that are:

(i) Closable;

(ii) Puncture resistant;

(iii) Leakproof on sides and bottom; and

(iv) Labeled or color-coded in accordance with paragraph (g)(1)(i) of this standard.

(2) During use, containers for contaminated sharps shall be:

(i) Easily accessible to personnel and located as close as is feasible to the immediate area where sharps are used or can be reasonably anticipated to be found (e.g., laundries);

(ii) Maintained upright throughout use; and

(iii) Replaced routinely and not be allowed to overfill.

(3) When moving containers of contaminated sharps from the area of use, the containers shall be:

(i) Closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping;

(ii) Placed in a secondary container if leakage is possible. The second container shall be:

(A) Closable;

(B) Constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping; and

(C) Labeled or color-coded according to paragraph (g)(1)(i) of this standard.

(4) Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner which would expose employees to the risk of percutaneous injury.

(B) Other Regulated Waste Containment.

(1) Regulated waste shall be placed in containers which are:

(i) Closable;

(ii) Constructed to contain all contents and prevent leakage of fluids during handling, storage, transport or shipping;

(iii) Labeled or color-coded in accordance with paragraph (g)(1)(i) this standard; and

(iv) Closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

(2) If outside contamination of the regulated waste container occurs, it shall be placed in a second container. The second container shall be:

(i) Closable;

(ii) Constructed to contain all contents and prevent leakage of fluids during handling, storage, transport or shipping;

(iii) Labeled or color-coded in accordance with paragraph (g)(1)(i) of this standard; and

(iv) Closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

(C) Disposal of all regulated waste shall be in accordance with applicable regulations of the United States, States and Territories, and political subdivisions of States and Territories.

(iv) Laundry.

(A) Contaminated laundry shall be handled as little as possible with a minimum of agitation.

(1) Contaminated laundry shall be bagged or containerized at the location where it was used and shall not be sorted or rinsed in the location of use.

(2) Contaminated laundry shall be placed and transported in bags or containers labeled or color-coded in accordance with paragraph (g)(1)(i) of this standard. When a facility utilizes Universal Precautions in the handling of all soiled laundry, alternative labeling or color-coding is sufficient if it permits all employees to recognize the containers as requiring compliance with Universal Precautions.

(3) Whenever contaminated laundry is wet and presents a reasonable likelihood of soak-through of or leakage from the bag or container, the laundry shall be placed and transported in bags or containers which prevent soak-through and/or leakage of fluids to the exterior.

(B) The employer shall ensure that employees who have contact with contaminated laundry wear protective gloves and other appropriate personal protective equipment.

(C) When a facility ships contaminated laundry off-site to a second facility which does not utilize Universal Precautions in the handling of all laundry, the facility generating the contaminated laundry must place such laundry in bags or containers which are labeled or color-coded in accordance with paragraph (g)(1)(i).

(e) HIV and HBV Research Laboratories and Production Facilities.

(1) This paragraph applies to research laboratories and production facilities engaged in the culture, production, concentration, experimentation, and manipulation of HIV and HBV. It does not apply to clinical or diagnostic laboratories engaged solely in the analysis of blood, tissues, or organs. These requirements apply in addition to the other requirements of the standard.

(2) Research laboratories and production facilities shall meet the following criteria:

(i) Standard Microbiological Practices. All regulated waste shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens.

(ii) Special Practices.

(A) Laboratory doors shall be kept closed when work involving HIV or HBV is in progress.

(B) Contaminated materials that are to be decontaminated at a site away from the work area shall be placed in a durable, leakproof, labeled or color-coded container that is closed before being removed from the work area.

(C) Access to the work area shall be limited to authorized persons. Written policies and procedures shall be established whereby only persons who have been advised of the

potential biohazard, who meet any specific entry requirements, and who comply with all entry and exit procedures shall be allowed to enter the work areas and animal rooms.

(D) When other potentially infectious materials or infected animals are present in the work area or containment module, a hazard warning sign incorporating the universal biohazard symbol shall be posted on all access doors. The hazard warning sign shall comply with paragraph (g)(1)(ii) of this standard.

(E) All activities involving other potentially infectious materials shall be conducted in biological safety cabinets or other physical-containment devices within the containment module. No work with these other potentially infectious materials shall be conducted on the open bench.

(F) Laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing shall be used in the work area and animal rooms. Protective clothing shall not be worn outside of the work area and shall be decontaminated before being laundered.

(G) Special care shall be taken to avoid skin contact with other potentially infectious materials. Gloves shall be worn when handling infected animals and when making hand contact with other potentially infectious materials is unavoidable.

(H) Before disposal all waste from work areas and from animal rooms shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens.

(I) Vacuum lines shall be protected with liquid disinfectant traps and high-efficiency particulate air (HEPA) filters or filters of equivalent or superior efficiency and which are checked routinely and maintained or replaced as necessary.

(J) Hypodermic needles and syringes shall be used only for parenteral injection and aspiration of fluids from laboratory animals and diaphragm bottles. Only needle-locking syringes or disposable syringe-needle units (i.e., the needle is integral to the syringe) shall be used for the injection or aspiration of other potentially infectious materials. Extreme caution shall be used when handling needles and syringes. A needle shall not be bent, sheared, replaced in the sheath or guard, or removed from the syringe following use. The needle and syringe shall be promptly placed in a puncture-resistant container and autoclaved or decontaminated before reuse or disposal.

(K) All spills shall be immediately contained and cleaned up by appropriate professional staff or others properly trained and equipped to work with potentially concentrated infectious materials.

(L) A spill or accident that results in an exposure incident shall be immediately reported to the laboratory director or other responsible person.

(M) A biosafety manual shall be prepared or adopted and periodically reviewed and updated at least annually or more often if necessary. Personnel shall be advised of potential hazards, shall be required to read instructions on practices and procedures, and shall be required to follow them.

(iii) Containment Equipment.

(A) Certified biological safety cabinets (Class I, II, or III) or other appropriate combinations of personal protection or physical containment devices, such as special protective clothing, respirators, centrifuge safety cups, sealed centrifuge rotors, and containment caging for animals, shall be used for all activities with other potentially infectious materials that pose a threat of exposure to droplets, splashes, spills, or aerosols.

(B) Biological safety cabinets shall be certified when installed, whenever they are moved and at least annually.

(3) HIV and HBV research laboratories shall meet the following criteria:

(i) Each laboratory shall contain a facility for hand washing and an eye wash facility which is readily available within the work area.

(ii) An autoclave for decontamination of regulated waste shall be available.

(4) HIV and HBV production facilities shall meet the following criteria:

(i) The work areas shall be separated from areas that are open to unrestricted traffic flow within the building. Passage through two sets of doors shall be the basic requirement for entry into the work area from access corridors or other contiguous areas. Physical separation of the high-containment work area from access corridors or other areas or activities may also be provided by a double-doored clothes-change room (showers may be included), airlock, or other access facility that requires passing through two sets of doors before entering the work area.

(ii) The surfaces of doors, walls, floors and ceilings in the work area shall be water resistant so that they can be easily cleaned. Penetrations in these surfaces shall be sealed or capable of being sealed to facilitate decontamination.

(iii) Each work area shall contain a sink for washing hands and a readily available eye wash facility. The sink shall be foot, elbow, or automatically operated and shall be located near the exit door of the work area.

(iv) Access doors to the work area or containment module shall be self-closing.

(v) An autoclave for decontamination of regulated waste shall be available within or as near as possible to the work area.

(vi) A ducted exhaust-air ventilation system shall be provided. This system shall create directional airflow that draws air into the work area through the entry area. The exhaust air shall not be recirculated to any other area of the building, shall be discharged to the outside, and shall be dispersed away from occupied areas and air intakes. The proper direction of the airflow shall be verified (i.e., into the work area).

(5) Training Requirements. Additional training requirements for employees in HIV and HBV research laboratories and HIV and HBV production facilities are specified in paragraph (g)(2)(ix).

(f) Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up.

(1) General.

(i) The employer shall make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident.

(ii) The employer shall ensure that all medical evaluations and procedures including the hepatitis B vaccine and vaccination series and post-exposure evaluation and follow-up, including prophylaxis, are:

(A) Made available at no cost to the employee;

(B) Made available to the employee at a reasonable time and place;

(C) Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional; and

(D) Provided according to recommendations of the U.S. Public Health Service current at the time these evaluations and procedures take place, except as specified by this paragraph (f).

(iii) The employer shall ensure that all laboratory tests are conducted by an accredited laboratory at no cost to the employee.

(2) Hepatitis B Vaccination.

(i) Hepatitis B vaccination shall be made available after the employee has received the training required in paragraph (g)(2)(vii)(I) and within 10 working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

(ii) The employer shall not make participation in a prescreening program a prerequisite for receiving hepatitis B vaccination.

(iii) If the employee initially declines hepatitis B vaccination but at a later date while still covered under the standard decides to accept the vaccination, the employer shall make available hepatitis B vaccination at that time.

(iv) The employer shall assure that employees who decline to accept hepatitis B vaccination offered by the employer sign the statement in Appendix A.

(v) If a routine booster dose(s) of hepatitis B vaccine is recommended by the U.S. Public Health Service at a future date, such booster dose(s) shall be made available in accordance with section (f)(1)(ii).

(3) Post-exposure Evaluation and Follow-up. Following a report of an exposure incident, the employer shall make immediately available to the exposed employee a confidential medical evaluation and follow-up, including at least the following elements:

(i) Documentation of the route(s) of exposure, and the circumstances under which the exposure incident occurred;

(ii) Identification and documentation of the source individual, unless the employer can establish that identification is infeasible or prohibited by state or local law;

(A) The source individual's blood shall be tested as soon as feasible and after consent is obtained in order to determine HBV and HIV infectivity. If consent is not obtained, the employer shall establish that legally required consent cannot be obtained. When the source individual's consent is not required by law, the source individual's blood, if available, shall be tested and the results documented.

(B) When the source individual is already known to be infected with HBV or HIV, testing for the source individual's known HBV or HIV status need not be repeated.

(C) Results of the source individual's testing shall be made available to the exposed employee, and the employee shall be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

(iii) Collection and testing of blood for HBV and HIV serological status;

(A) The exposed employee's blood shall be collected as soon as feasible and tested after consent is obtained.

(B) If the employee consents to baseline blood collection, but does not give consent at that time for HIV serologic testing, the sample shall be preserved for at least 90 days. If, within 90 days of the exposure incident, the employee elects to have the baseline sample tested, such testing shall be done as soon as feasible.

(iv) Post-exposure prophylaxis, when medically indicated, as recommended by the U.S. Public Health Service;

(v) Counseling; and

(vi) Evaluation of reported illnesses.

(4) Information Provided to the Healthcare Professional.

(i) The employer shall ensure that the health-care professional responsible for the employee's Hepatitis B vaccination is provided a copy of this regulation.

(ii) The employer shall ensure that the health-care professional evaluating an employee after an exposure incident is provided the following information:

(A) A copy of this regulation;

(B) A description of the exposed employee's duties as they relate to the exposure incident;

(C) Documentation of the route(s) of exposure and circumstances under which exposure occurred;

(D) Results of the source individual's blood testing, if available; and

(E) All medical records relevant to the appropriate treatment of the employee including vaccination status which are the employer's responsibility to maintain.

(5) Healthcare Professional's Written Opinion. The employer shall obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation.

(i) The healthcare professional's written opinion for Hepatitis B vaccination shall be limited to whether Hepatitis B vaccination is indicated for an employee, and if the employee has received such vaccination.

(ii) The healthcare professional's written opinion for post-exposure evaluation and follow-up shall be limited to the following information:

(A) That the employee has been informed of the results of the evaluation; and

(B) That the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

(iii) All other findings or diagnoses shall remain confidential and shall not be included in the written report.

(6) Medical Recordkeeping. Medical records required by this standard shall be maintained in accordance with paragraph (h)(1) of this section.

(g) Communication of Hazards to Employees.

(1) Labels and Signs.

(i) Labels.

(A) Warning labels shall be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials, except as provided in paragraph (g)(1)(i)(E), (F) and (G).

(B) Labels required by this section shall include the following legend:



BIOHAZARD

(C) These labels shall be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color.

(D) Labels shall be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

(E) Red bags or red containers may be substituted for labels.

(F) Containers of blood, blood components, or blood products that are labeled as to their contents and have been released for transfusion or other clinical use are exempted from the labeling requirements of paragraph (g).

(G) Individual containers of blood or other potentially infectious materials that are placed in a labeled container during storage, transport, shipment or disposal are exempted from the labeling requirement.

(H) Labels required for contaminated equipment shall be in accordance with this paragraph and shall also state which portions of the equipment remain contaminated.

(I) Regulated waste that has been decontaminated need not be labeled or color-coded.

(ii) Signs.

(A) The employer shall post signs at the entrance to work areas specified in paragraph (e), HIV and HBV Research Laboratory and Production Facilities, which shall bear the following legend:



BIOHAZARD

(Name of the Infectious Agent)

(Special requirements for entering the area)

(Name, telephone number of the laboratory director or other responsible person.)

(B) These signs shall be fluorescent orange-red or predominantly so, with lettering and symbols in a contrasting color.

(2) Information and Training.

(i) The employer shall train each employee with occupational exposure in accordance with the requirements of this section. Such training must be provided at no cost to the employee and during working hours. The employer shall institute a training program and ensure employee participation in the program.

(ii) Training shall be provided as follows:

(A) At the time of initial assignment to tasks where occupational exposure may take place;

(B) At least annually thereafter.

(iii) Reserved.

(iv) Annual training for all employees shall be provided within one year of their previous training.

(v) Employers shall provide additional training when changes such as modification of tasks or procedures or institution of new tasks or procedures affect the employee's occupational exposure. The additional training may be limited to addressing the new exposures created.

(vi) Material appropriate in content and vocabulary to educational level, literacy, and language of employees shall be used.

(vii) The training program shall contain at a minimum the following elements:

(A) An accessible copy of the regulatory text of this standard and an explanation of its contents;

(B) A general explanation of the epidemiology and symptoms of bloodborne diseases;

(C) An explanation of the modes of transmission of bloodborne pathogens;

(D) An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan;

(E) An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials;

(F) An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment;

(G) Information on the types, proper use, location, removal, handling, decontamination and disposal of personal protective equipment;

(H) An explanation of the basis for selection of personal protective equipment;

(I) Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge;

(J) Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials;

(K) An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available;

(L) Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident;

(M) An explanation of the signs and labels and/or color coding required by paragraph (g)(1); and

(N) An opportunity for interactive questions and answers with the person conducting the training session.

(viii) The person conducting the training shall be knowledgeable in the subject matter covered by the elements contained in the training program as it relates to the workplace that the training will address.

(ix) Additional Initial Training for Employees in HIV and HBV Laboratories and Production Facilities. Employees in HIV or HBV research laboratories and HIV or HBV production facilities shall receive the following initial training in addition to the above training requirements.

(A) The employer shall assure that employees demonstrate proficiency in standard microbiological practices and techniques and in the practices and operations specific to the facility before being allowed to work with HIV or HBV.

(B) The employer shall assure that employees have prior experience in the handling of human pathogens or tissue cultures before working with HIV or HBV.

(C) The employer shall provide a training program to employees who have no prior experience in handling human pathogens. Initial work activities shall not include the handling of infectious agents. A progression of work activities shall be assigned as techniques are learned and proficiency is developed. The employer shall assure that employees participate in work activities involving infectious agents only after proficiency has been demonstrated.

(h) Recordkeeping.

(1) Medical Records.

(i) The employer shall establish and maintain an accurate record for each employee with occupational exposure, in accordance with 29 CFR 1910.1020.

(ii) This record shall include:

(A) The name~~[-and social security number]~~ of the employee;

(B) A copy of the employee's hepatitis B vaccination status including the dates of all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination as required by paragraph (f)(2);

(C) A copy of all results of examinations, medical testing, and follow-up procedures as required by paragraph (f)(3);

(D) The employer's copy of the health-care professional's written opinion as required by paragraph (f)(5); and

(E) A copy of the information provided to the healthcare professional as required by paragraphs (f)(4)(ii)(B), (C) and (D).

(iii) Confidentiality. The employer shall ensure that employee medical records required by paragraph (h)(1) are:

(A) Kept confidential; and

(B) Not disclosed or reported without the employee's express written consent to any person within or outside the workplace except as required by this section or as may be required by law.

(iv) The employer shall maintain the records required by paragraph (h) for at least the duration of employment plus 30 years in accordance with 29 CFR 1910.1020.

(2) Training Records.

(i) Training records shall include the following information:

(A) The dates of the training sessions;

(B) The contents or a summary of the training sessions;

(C) The names and qualifications of persons conducting the training; and

(D) The names and job titles of all persons attending the training sessions.

(ii) Training records shall be maintained for 3 years from the date on which the training occurred.

(3) Availability.

(i) The employer shall ensure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director for examination and copying.

(ii) Employee training records required by this paragraph shall be provided upon request for examination and copying to employees, to employee representatives, to the Director, and to the Assistant Secretary.

(iii) Employee medical records required by this paragraph shall be provided upon request for examination and copying to the subject employee, to anyone having written consent of the subject employee, to the Director, and to the Assistant Secretary in accordance with 29 CFR 1910.1020.

(4) Transfer of Records. The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(5) Sharps Injury Log.

(i) The employer shall establish and maintain a sharps injury log for the recording of percutaneous injuries from contaminated sharps. The information in the sharps injury log shall be recorded and maintained in such manner as to protect the confidentiality of the injured employee. The sharps injury log shall contain, at a minimum:

(A) The type and brand of device involved in the incident,

(B) The department or work area where the exposure incident occurred, and

(C) An explanation of how the incident occurred.

NOTE: Oregon OSHA did not adopt 1910.1030(h)(5)(ii) and (iii). In Oregon, 437-002-1035 applies.

[56 FR 64175, Dec. 6, 1991, as amended at 57 FR 12717, Apr. 13, 1992; 57 FR 29206, July 1, 1992; 61 FR 5508, Feb. 13, 1996; 66 FR 5325, Jan. 18, 2001; 71 FR 16672, 16673, Apr. 3, 2006; 73 FR 75586, Dec. 12, 2008; 76 FR 33608, June 8, 2011; 76 FR 80740, Dec. 27, 2011; 77 FR 19934, Apr. 3, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Authority: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-1992, f. 4/24/92, ef. 7/1/92.
OR-OSHA Admin. Order 15-1992, f. 12/30/92, ef. 12/30/92.
OR-OSHA Admin. Order 10-2001, f. 9/14/01, ef. 10/18/01.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1043
Cotton Dust.

(a) Scope and application.

(1) This section, in its entirety, applies to the control of employee exposure to cotton dust in all workplaces where employees engage in yarn manufacturing, engage in slashing and weaving operations, or work in waste houses for textile operations.

(2) This section does not apply to the handling or processing of woven or knitted materials; to maritime operations covered by 29 CFR Parts 1915 and 1918; to harvesting or ginning of cotton; or to the construction industry.

(3) Only paragraphs (h) Medical surveillance, (k)(2) through (4) Recordkeeping – Medical Records, and Appendices B, C and D of this section apply in all work places where employees exposed to cotton dust engage in cottonseed processing or waste processing operations.

(4) This section applies to yarn manufacturing and slashing and weaving operations exclusively using washed cotton (as defined by paragraph (n) of this section) only to the extent specified by paragraph (n) of this section.

(5) This section, in its entirety, applies to the control of all employees exposure to the cotton dust generated in the preparation of washed cotton from opening until the cotton is thoroughly wetted.

(6) This section does not apply to knitting, classing or warehousing operations except that employers with these operations, if requested by NIOSH, shall grant NIOSH access to their employees and workplaces for exposure monitoring and medical examinations for purposes of a health study to be performed by NIOSH on a sampling basis.

(b) Definitions. For the purpose of this section:

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee;

Blow down means the general cleaning of a room or a part of a room by the use of compressed air.

Blow off means the use of compressed air for cleaning of short duration and usually for a specific machine or any portion of a machine.

Cotton dust means dust present in the air during the handling or processing of cotton, which may contain a mixture of many substances including ground up plant matter, fiber, bacteria, fungi, soil, pesticides, non-cotton plant matter and other contaminants which may have accumulated with the cotton during the growing, harvesting and subsequent processing or storage periods. Any dust present during the handling and processing of cotton through the

weaving or knitting of fabrics, and dust present in other operations or manufacturing processes using raw or waste cotton fibers or cotton fiber by-products from textile mills are considered cotton dust within this definition. Lubricating oil mist associated with weaving operations is not considered cotton dust.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Equivalent Instrument means a cotton dust sampling device that meets the vertical elutriator equivalency requirements as described in paragraph (d)(1)(iii) of this section.

Lint-free respirable cotton dust means particles of cotton dust of approximately 15 micrometers or less aerodynamic equivalent diameter;

Vertical elutriator cotton dust sampler or vertical elutriator means a dust sampler which has a particle size cut-off at approximately 15 micrometers aerodynamic equivalent diameter when operating at the flow rate of 7.4 ± 0.2 liters of air per minute;

Waste processing means waste recycling (sorting, blending, cleaning and willowing) and garnetting.

Yarn manufacturing means all textile mill operations from opening to, but not including, slashing and weaving.

(c) Permissible exposure limits and action levels.

(1) Permissible exposure limits (PEL).

(i) The employer shall assure that no employee who is exposed to cotton dust in yarn manufacturing and cotton washing operations is exposed to airborne concentrations of lint-free respirable cotton dust greater than 200 $\mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(ii) The employer shall assure that no employee who is exposed to cotton dust in textile mill waste house operations or is exposed in yarn manufacturing to dust from "lower grade washed cotton" as defined in paragraph (n)(5) of this section is exposed to airborne concentrations of lint-free respirable cotton dust greater than 500 $\mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(iii) The employer shall assure that no employee who is exposed to cotton dust in the textile processes known as slashing and weaving is exposed to airborne concentrations of lint-free respirable cotton dust greater than 750 $\mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight hour period, as measured by a vertical elutriator or an equivalent instrument.

(2) Action levels.

(i) The action level for yarn manufacturing and cotton washing operations is an airborne concentration of lint-free respirable cotton dust of 100 µg/m³ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(ii) The action level for waste houses for textile operations is an airborne concentration of lint-free respirable cotton dust of 250 µg/m³ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(iii) The action level for the textile processes known as slashing and weaving is an airborne concentration of lint-free respirable cotton dust of 375 µg/m³ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(d) Exposure monitoring and measurement.

(1) General.

(i) For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(ii) The sampling device to be used shall be either the vertical elutriator cotton dust sampler or an equivalent instrument.

(iii) If an alternative to the vertical elutriator cotton dust sampler is used, the employer shall establish equivalency by reference to an OSHA opinion or by documenting, based on data developed by the employer or supplied by the manufacturer, that the alternative sampling device meets the following criteria:

(A) It collects respirable particulates in the same range as the vertical elutriator (approximately 15 microns);

(B) Replicate exposure data used to establish equivalency are collected in side-by-side field and laboratory comparisons; and

(C) A minimum of 100 samples over the range of 0.5 to 2 times the permissible exposure limit are collected, and 90% of these samples have an accuracy range of plus or minus 25 per cent of the vertical elutriator reading with a 95% confidence level as demonstrated by a statistically valid protocol. (An acceptable protocol for demonstrating equivalency is described in Appendix E of this section.)

(iv) OSHA will issue a written opinion stating that an instrument is equivalent to a vertical elutriator cotton dust sampler if

(A) A manufacturer or employer requests an opinion in writing and supplies the following information:

(1) Sufficient test data to demonstrate that the instrument meets the requirements specified in this paragraph and the protocol specified in Appendix E of this section;

(2) Any other relevant information about the instrument and its testing requested by OSHA; and

(3) A certification by the manufacturer or employer that the information supplied is accurate, and

(B) if OSHA finds, based on information submitted about the instrument, that the instrument meets the requirements for equivalency specified by paragraph (d) of this section.

(2) Initial monitoring. Each employer who has a place of employment within the scope of paragraph (a)(1), (a)(4), or (a)(5) of this section shall conduct monitoring by obtaining measurements which are representative of the exposure of all employees to airborne concentrations of lint-free respirable cotton dust over an eight-hour period. The sampling program shall include at least one determination during each shift for each work area.

(3) Periodic monitoring.

(i) If the initial monitoring required by paragraph (d)(2) of this section or any subsequent monitoring reveals employee exposure to be at or below the permissible exposure limit, the employer shall repeat the monitoring for those employees at least annually.

(ii) If the initial monitoring required by paragraph (d)(2) of this section or any subsequent monitoring reveals employee exposure to be above the PEL, the employer shall repeat the monitoring for those employees at least every six months.

(iii) Whenever there has been a production, process, or control change which may result in new or additional exposure to cotton dust, or whenever the employer has any other reason to suspect an increase in employee exposure, the employer shall repeat the monitoring and measurements for those employees affected by the change or increase.

(4) Employee notification.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Whenever the results indicate that the employee's exposure exceeds the applicable permissible exposure limit specified in paragraph (c) of this section, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action taken to reduce exposure below the permissible exposure limit.

(e) Methods of compliance.

(1) Engineering and work practice controls. The employer shall institute engineering and work practice controls to reduce and maintain employee exposure to cotton dust at or below the permissible exposure limit specified in paragraph (c) of this section, except to the extent that the employer can establish that such controls are not feasible.

(2) Whenever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the permissible exposure limit, the employer shall nonetheless institute these controls to reduce exposure to the lowest feasible level, and shall supplement these controls with the use of respirators which shall comply with the provisions of paragraph (f) of this section.

(3) Compliance program.

(i) Where the most recent exposure monitoring data indicates that any employee is exposed to cotton dust levels greater than the permissible exposure limit, the employer shall establish and implement a written program sufficient to reduce exposures to or below the permissible exposure limit solely by means of engineering controls and work practices as required by paragraph (e)(1) of this section.

(ii) The written program shall include at least the following:

(A) A description of each operation or process resulting in employee exposure to cotton dust at levels greater than the PEL;

(B) Engineering plans and other studies used to determine the controls for each process;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Monitoring data obtained in accordance with paragraph (d) of this section;

(E) A detailed schedule for development and implementation of engineering and work practice controls, including exposure levels projected to be achieved by such controls;

(F) Work practice program; and

(G) Other relevant information.

(iii) The employer's schedule as set forth in the compliance program, shall project completion of the implementation of the compliance program no later than March 27, 1984 or as soon as possible if monitoring after March 27, 1984 reveals exposures over the PEL, except as provided in paragraph (m)(2)(ii)(B) of this section.

(iv) The employer shall complete the steps set forth in his program by the dates in the schedule.

(v) Written programs shall be submitted, upon request, to the Assistant Secretary and the Director, and shall be available at the worksite for examination and copying by the Assistant Secretary, the Director, and any affected employee or their designated representatives.

(vi) The written program required under paragraph (e)(3) of this section shall be revised and updated when necessary to reflect the current status of the program and current exposure levels.

(4) Mechanical ventilation. When mechanical ventilation is used to control exposure, measurements which demonstrate the effectiveness of the system to control exposure, such as capture velocity, duct velocity, or static pressure shall be made at reasonable intervals.

(f) Respiratory protection.

(1) General. For employees who are required to use respirators by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Maintenance and repair activities for which engineering and work-practice controls are not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the permissible exposure limits.

(iv) Work operations specified under paragraph (g)(1) of this section.

(v) Periods for which an employee requests a respirator.

(2) Respirator program.

Oregon OSHA repealed 1910.1043(f)(2)(i). In Oregon, OAR 437-002-1043 applies.

437-002-1043 Cotton Dust Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii), and (d)(3)(iii)(B)(1) and (2)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1043 Cotton Dust, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Cotton Dust rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) Whenever a physician determines that an employee who works in an area in which the cotton-dust concentration exceeds the PEL is unable to use a respirator, including a powered air-purifying respirator, the employee must be given the opportunity to transfer to an available position, or to a position that becomes available later, that has a cotton-dust concentration at or below the PEL. The employer must ensure that such employees retain their current wage rate or other benefits as a result of the transfer.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134; however, employers must not select or use filtering facepieces for protection against cotton dust concentrations greater than five times (5 x) the PEL.:

(B) Provide HEPA filters for powered and non-powered air-purifying respirators used at cotton dust concentrations greater than ten times (10 x) the PEL.

(ii) Employers must provide an employee with a powered air-purifying respirator (PAPR) instead of a non-powered air-purifying respirator selected according to paragraph (f)(3)(i) of this standard when the employee chooses to use a PAPR and it provides adequate protection to the employee as specified by paragraph (f)(3)(i) of this standard.

(g) Work practices. Each employer shall, regardless of the level of employee exposure, immediately establish and implement a written program of work practices which shall minimize cotton dust exposure. The following shall be included where applicable:

(1) Compressed air "blow down" cleaning shall be prohibited where alternative means are feasible. Where compressed air is used for cleaning, the employees performing the "blow down" or "blow off" shall wear suitable respirators. Employees whose presence is not required to perform "blow down" or "blow off" shall be required to leave the area affected by the "blow down" or "blow off" during this cleaning operation.

(2) Cleaning of clothing or floors with compressed air shall be prohibited.

(3) Floor sweeping shall be performed with a vacuum or with methods designed to minimize dispersal of dust.

(4) In areas where employees are exposed to concentrations of cotton dust greater than the permissible exposure limit, cotton and cotton waste shall be stacked, sorted, baled, dumped, removed or otherwise handled by mechanical means, except where the employer can show that it is infeasible to do so. Where infeasible, the method used for handling cotton and cotton waste shall be the method which reduces exposure to the lowest level feasible.

(h) Medical surveillance.

(1) General.

(i) Each employer covered by the standard shall institute a program of medical surveillance for all employees exposed to cotton dust.

(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided without cost to the employee.

(iii) Persons other than licensed physicians, who administer the pulmonary function testing required by this section shall have completed a NIOSH-approved training course in spirometry.

(2) Initial examinations. The employer shall provide medical surveillance to each employee who is or may be exposed to cotton dust. For new employees, this examination shall be provided prior to initial assignment. The medical surveillance shall include at least the following:

(i) A medical history;

(ii) The standardized questionnaire contained in Appendix B; and

(iii) A pulmonary function measurement, including ~~a determination of~~ forced vital capacity (FVC) and forced expiratory volume in one second (FEV1), the **determination of FEV1/FVC ratio shall be made. FVC, FEV1, and FEV1/FVC ratio values shall be compared to appropriate race/ethnicity-specific Lower Limit of Normal (LLN) values and predicted values published in Spirometric Reference Values from a Sample of the General U.S. Population, American Journal of Respiratory and Critical Care Medicine, 159(1): 179–187, January 1999 (commonly known as the NHANES III reference data set incorporated by reference, see § 1910.6). To obtain reference values for Asian-Americans, Spirometric Reference Values FEV1 and FVC predicted and LLN values for Caucasians shall be multiplied by 0.88 to adjust for ethnic differences.** ~~and the percentage that the measured values of FEV1 and FVC differ from the predicted values, using the standard tables in Appendix C.~~ These determinations shall be made for each employee before the employee enters the workplace on the first day of the work week, preceded by at least 35 hours of no exposure to cotton dust. The tests shall be repeated during the shift, no less than 4 and no more than 10 hours after the beginning of the work shift; and, in any event, no more than one hour after cessation of exposure. Such exposure shall be typical of the employee's usual workplace exposure. ~~The predicted FEV1 and FVC for blacks shall be multiplied by 0.85 to adjust for ethnic differences.~~

(iv) Based upon the questionnaire results, each employee shall be graded according to Schilling's byssinosis classification system.

(3) Periodic examinations.

(i) The employer shall provide at least annual medical surveillance for all employees exposed to cotton dust above the action level in yarn manufacturing, slashing and weaving, cotton washing and waste house operations. The employer shall provide medical surveillance at least every two years for all employees exposed to cotton dust at or below the action level, for all employees exposed to cotton dust from washed cotton (except from washed cotton defined in paragraph (n)(3) of this section), and for all employees exposed to cotton dust in cottonseed processing and waste processing operations. Periodic medical surveillance shall include at least an update of the medical history, standardized questionnaire (App. B-111), Schilling byssinosis grade, and the pulmonary function measurements in paragraph (h)(2)(iii) of this section.

(ii) Medical surveillance as required in paragraph (h)(3)(i) of this section shall be provided every six months for all employees in the following categories:

(A) An FEV₁ of greater than the LLN~~[80 percent of the predicted value,]~~ but with an FEV₁ decrement of 5 percent or 200 ml. on a first working day;

(B) An FEV₁ of less than the LLN~~[80 percent of the predicted value];~~ or

(C) Where, in the opinion of the physician, any significant change in questionnaire findings, pulmonary function results, or other diagnostic tests have occurred.

(iii) An employee whose FEV₁ is less than 60 percent of the predicted value shall be referred to a physician for a detailed pulmonary examination.

(iv) A comparison shall be made between the current examination results and those of previous examinations and a determination made by the physician as to whether there has been a significant change.

(4) Information provided to the physician. The employer shall provide the following information to the examination physician:

(i) A copy of this regulation and its Appendices:

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's exposure level or anticipated exposure level;

(iv) A description of any personal protective equipment used or to be used; and

(v) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

(5) Physician's written opinion.

(i) The employer shall obtain and furnish the employee with a copy of a written opinion from the examining physician containing the following:

(A) The results of the medical examination and tests including the FEV₁, FVC, and FEV₁/FVC ratio;

(B) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to cotton dust;

(C) The physician's recommended limitations upon the employee's exposure to cotton dust or upon the employee's use of respirators including a determination of whether an employee can wear a negative pressure respirator, and where the employee cannot, a determination of the employee's ability to wear a powered air purifying respirator; and,

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposure.

(i) Employee education and training.

(1) Training program.

(i) The employer shall train each employee exposed to cotton dust in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

~~[(A) The acute and long term health hazards associated with exposure to cotton dust;~~

~~(B) The names and descriptions of jobs and processes which could result in exposure to cotton dust at or above the PEL;~~

~~(C) The measures, including work practices required by paragraph (g) of this section, necessary to protect the employee from exposures in excess of the permissible exposure limit;~~

~~(D) The purpose, proper use and limitations of respirators required by paragraph (f) of this section;~~

~~(E) The purpose for and a description of the medical surveillance program required by paragraph (h) of this section and other information which will aid exposed employees in understanding the hazards of cotton dust exposure; and~~

~~(F) The contents of this standard and its appendices.]~~

(ii) The training program shall be provided prior to initial assignment and shall be repeated annually for each employee exposed to cotton dust, when job assignments or work processes change and when employee performance indicates a need for retraining.

(2) Access to training materials.

(i) Each employer shall post a copy of this section with its appendices in a public location at the workplace, and shall, upon request, make copies available to employees.

(ii) The employer shall provide all materials relating to the employee training and information program to the Assistant Secretary and the Director upon request.

(j) Signs.

(1) The employer shall post the following warning sign in each work area where the permissible exposure limit for cotton dust is exceeded:

DANGER
COTTON DUST
CAUSES DAMAGE TO LUNGS
(BYSSINOSIS)
WEAR RESPIRATORY PROTECTION IN THIS AREA

(2) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (j)(1) of this section:

WARNING
COTTON DUST WORK AREA
MAY CAUSE ACUTE OR DELAYED
LUNG INJURY
(BYSSINOSIS)
RESPIRATORS
REQUIRED IN THIS AREA

(k) Recordkeeping.

(1) Exposure measurements.

(i) The employer shall establish and maintain an accurate record of all measurements required by paragraph (d) of this section.

(ii) The record shall include:

(A) A log containing the items listed in paragraph IV(a) of Appendix A, and the dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposure;

(B) The type of protective devices worn, if any, and length of time worn; and

(C) The names, ~~social security numbers,~~ job classifications, and exposure levels of employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for at least 20 years.

(2) Medical surveillance.

(i) The employer shall establish and maintain an accurate medical record for each employee subject to medical surveillance required by paragraph (h) of this section.

(ii) The record shall include:

(A) The name ~~and social security number~~ and description of the duties of the employee;

(B) A copy of the medical examination results including the medical history, questionnaire response, results of all tests, and the physician's recommendation;

(C) A copy of the physician's written opinion;

(D) Any employee medical complaints related to exposure to cotton dust;

(E) A copy of this standard and its appendices, except that the employer may keep one copy of the standard and the appendices for all employees, provided that he references the standard and appendices in the medical surveillance record of each employee; and

(F) A copy of the information provided to the physician as required by paragraph (h)(4) of this section.

(iii) The employer shall maintain this record for at least 20 years.

(3) Availability.

(i) The employer shall make all records required to be maintained by paragraph (k) of this section available to the Assistant Secretary and the Director for examination and copying.

(ii) Employee exposure measurement records and employee medical records required by this paragraph shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(4) Transfer of records.

(i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by paragraph (k) of this section.

(ii) The employer shall also comply with any additional requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(l) Observation of monitoring.

(1) The employer shall provide affected employees or their designated representatives an opportunity to observe any measuring or monitoring of employee exposure to cotton dust conducted pursuant to paragraph (d) of this section.

(2) Whenever observation of the measuring or monitoring of employee exposure to cotton dust requires entry into an area where the use of personal protective equipment is required, the employer shall provide the observer with and assure the use of such equipment and shall require the observer to comply with all other applicable safety and health procedures.

(3) Without interfering with the measurement, observers shall be entitled to:

(i) An explanation of the measurement procedures:

(ii) An opportunity to observe all steps related to the measurement of airborne concentrations of cotton dust performed at the place of exposure; and

(iii) An opportunity to record the results obtained.

(m) Washed Cotton.

(1) Exemptions. Cotton, after it has been washed by the processes described in this paragraph, is exempt from all or parts of this section as specified if the requirements of this paragraph are met.

(2) Initial requirements.

(i) In order for an employer to qualify as exempt or partially exempt from this standard for operations using washed cotton, the employer must demonstrate that the cotton was washed in a facility which is open to inspection by the Assistant Secretary and the employer must provide sufficient accurate documentary evidence to demonstrate that the washing methods utilized meet the requirements of this paragraph.

(ii) An employer who handles or processes cotton which has been washed in a facility not under the employer's control and claims an exemption or partial exemption under this paragraph, must obtain from the cotton washer and make available at the worksite, to the Assistant Secretary, to any affected employee, or to their designated representative the following:

(A) A certification by the washer of the cotton of the grade of cotton, the type of washing process, and that the batch meets the requirements of this paragraph;

(B) Sufficient accurate documentation by the washer of the cotton grades and washing process; and

(C) An authorization by the washer that the Assistant Secretary or the Director may inspect the washer's washing facilities and documentation of the process.

(3) Medical and dyed cotton. Medical grade (USP) cotton, cotton that has been scoured, bleached and dyed, and mercerized yarn shall be exempt from all provisions of this standard.

(4) Higher grade washed cotton. The handling or processing of cotton classed as "low middling light spotted or better" (color grade 52 or better and leaf grade code 5 or better according to the 1993 USDA classification system) shall be exempt from all provisions of the standard except the requirements of paragraphs (h) medical surveillance, (k)(2) through (4) recordkeeping – medical records, and Appendices B, C, and D of this section, if they have been washed on one of the following systems:

(i) On a continuous batt system or a rayon rinse system including the following conditions:

(A) With water;

(B) At a temperature of no less than 60 °C;

(C) With a water-to-fiber ratio of no less than 40:1; and

(D) With the bacterial levels in the wash water controlled to limit bacterial contamination of the cotton.

(ii) On a batch kier washing system including the following conditions:

(A) With water;

(B) With cotton fiber mechanically opened and thoroughly prewetted before forming the cake;

(C) For low-temperature processing, at a temperature of no less than 60 °C with a water-to-fiber ratio of no less than 40:1; or, for high-temperature processing, at a temperature of no less than 93 °C with a water-to-fiber ratio of no less than 15:1;

(D) With a minimum of one wash cycle followed by two rinse cycles for each batch, using fresh water in each cycle, and

(E) With bacterial levels in the wash water controlled to limit bacterial contamination of the cotton.

(5) Lower grade washed cotton. The handling and processing of cotton of grades lower than "low middling light spotted," that has been washed as specified in paragraph (n)(4) of this section and has also been bleached, shall be exempt from all provisions of the standard except the requirements of paragraphs (c)(1)(ii) Permissible Exposure Limit, (d) Exposure Monitoring, (h) Medical Surveillance, (k) Recordkeeping, and Appendices B, C and D of this section.

(6) Mixed grades of washed cotton. If more than one grade of washed cotton is being handled or processed together, the requirements of the grade with the most stringent exposure limit, medical and monitoring requirements shall be followed.

(n) Appendices.

(1) Appendices B~~[, C]~~ and D of this section are incorporated as part of this section and the contents of these appendices are mandatory.

(2) Appendix A of this section contains information which is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

(3) Appendix E of this section is a protocol which may be followed in the validation of alternative measuring devices as equivalent to the vertical elutriator cotton dust sampler. Other protocols may be used if it is demonstrated that they are statistically valid, meet the requirements in paragraph (d)(1)(iii) of this section, and are appropriate for demonstrating equivalency.

[43 FR 27394, June 23, 1978; 43 FR 35035, Aug. 8, 1978, as amended at 45 FR 67340, Oct. 10, 1980; 50 FR 51173, Dec. 13, 1985; 51 FR 24325, July 3, 1986; 54 FR 24334, June 7, 1989; 61 FR 5508, Feb. 13, 1996; 63 FR 1290, Jan. 8, 1998; 65 FR 76567, Dec. 7, 2000; 70 FR 1142, Jan. 5, 2005; 71 FR 16672, 16673, Apr. 3, 2006; 71 FR 50189, Aug. 24, 2006; 73 FR 75586, Dec. 12, 2008; 76 FR 33609, June 8, 2011; 77 FR 17782, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 6-2001, f. 5/15/01, ef. 5/15/01.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix B-I – Respiratory Questionnaire

A. Identification Data

PLANT _____ [~~SOCIAL SECURITY NO.~~]

NAME _____ DATE OF INTERVIEW _____
(Surname)

_____ DATE OF BIRTH _____
(First Names)

M F

ADDRESS _____

AGE _____ (8,9)

SEX _____ (10)

RACE (11) (Check all that apply)

1. _____ W
2. _____ B
- lack or African American _____

- [illegible]

Use actual wording of each question.

Put X in appropriate square after each question. When in doubt record 'No.'

When no square, circle appropriate answer.

B. COUGH

(on getting up)⊥

Do you usually cough first thing in the morning? _____ Yes ____ No ____ (31)

(Count a cough with first smoke or on "first going out of doors.")

Exclude clearing throat or a single cough.)

Do you usually cough during the day or at night? _____ Yes ____ No ____ (32)

(Ignore an occasional cough.)

If 'Yes' to either question (31-32):

Do you cough like this on most days for as much as

three months a year? _____ Yes ____ No ____ (33)

Do you cough on any particular day of the week? _____ Yes ____ No ____ (34)

(1) (2) (3) (4) (5) (6) (7)

If 'Yes': Which day? Mon. Tues. Wed. Thur. Fri. Sat. Sun. (35)

C. PHLEGM or alternative word to suit local custom.

(on getting up)⊥

Do you usually bring up any phlegm from your chest first thing in the morning?

(Count phlegm with the first smoke or on "first going out of doors.")

Exclude phlegm from the nose. Count swallowed phlegm.) Yes ____ No ____ (36)

Do you usually bring up any phlegm from your chest during

the day or at night? (Accept twice or more.) _____ Yes ____ No ____ (37)

If 'Yes' to either question (36) or (37):

Do you bring up phlegm like this on most days for as much as

three months each year? _____ Yes ____ No ____ (38)

If 'Yes' to question (33) or (38):

(cough)

(1) ☐ 2 years or less (39)

How long have you had this phlegm?

(Write in number of years.)

(2) ☐ More than 2 years-9 years

(3) ☐ 10-19 years

(4) ☐ 20+ years

⊥ These words are for subjects who work at night

D. CHEST ILLNESSES

In the past three years, have you had a period of (1) ☐ No (40)
(increased) *_[±] cough and phlegm lasting for
3 weeks or more? (2) ☐ Yes, only one period

(3) ☐ Yes, two or more periods

*_[±] For subjects who usually have phlegm

During the past 3 years, have you had any chest illness which
has kept you off work, indoors at home or in bed?
(For as long as one week, flu?) Yes ____ No ____ (41)

If 'Yes' to (41): Did you bring up (more) phlegm than usual in any
of these illnesses? Yes ____ No ____ (42)

If 'Yes' to (42): During the past three years have you had:
Only one such illness with increased phlegm? (1) ☐ (43)
More than one such illness: (2) ☐ (44)
Br. Grade _____

E. TIGHTNESS

Does your chest ever feel tight or your breathing become difficult? Yes ____ No ____ (45)

Is your chest tight or your breathing difficult on any particular day of
the week? (after a week or 10 days away from the mill) Yes ____ No ____ (46)

If 'Yes': Which day? Mon. (3) Tues. (4) Wed. (5) Thur. (6) Fri. (7) Sat. (8) Sun. (47)
(1) (2)
Sometimes Always

If 'Yes' Monday At what time on Monday does your 1 ☐ Before entering the mill (48)
chest feel tight or your breathing 2 ☐ After entering the mill
difficult?

(Ask only if NO to Question (45))

In the past, has your chest ever been tight or your breathing difficult on
any particular day of the week? _____ Yes ____ No ____ (49)

If 'Yes': Which day? Mon. ⁽³⁾ Tues. ⁽⁴⁾ Wed. ⁽⁵⁾ Thur. ⁽⁶⁾ Fri. ⁽⁷⁾ Sat. ⁽⁸⁾ Sun. (50)
⁽¹⁾ Sometimes ⁽²⁾ Always

F. BREATHLESS

If disabled from walking by any condition other than heart or lung disease, put "X" here and leave questions (52-60) unasked. ☐ (51)

Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? _____ Yes ____ No ____ (52)

If 'No', grade is 1. If 'Yes', proceed to next question

Do you get short of breath walking with other people at an ordinary pace on the level? _____ Yes ____ No ____ (53)

If 'No', grade is 2. If 'Yes', proceed to next question

Do you have to stop for breath when walking at your own pace on the level? _____ Yes ____ No ____ (54)

If 'No', grade is 3. If 'Yes', proceed to next question

Are you short of breath on washing or dressing? _____ Yes ____ No ____ (55)

If 'No', grade is 4. If 'Yes', grade is 5.

Dyspnea Grade. _____ (56)

ON MONDAYS

Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? _____ Yes ____ No ____ (57)

If 'No', grade is 1. If 'Yes', proceed to next question

Do you get short of breath walking with other people at an ordinary pace on the level? _____ Yes ____ No ____ (58)

If 'No', grade is 2. If 'Yes', proceed to next question

Do you have to stop for breath when walking at your own pace on the level? _____ Yes ____ No ____ (59)

If 'No', grade is 3. If 'Yes', proceed to next question

Are you short of breath on washing or dressing? _____ Yes ____ No ____ (60)

If 'No', grade is 4. If 'Yes', grade is 5.

B. Grade. _____ (61)

G. OTHER ILLNESSES AND ALLERGY HISTORY

Do you have a heart condition for which you are under a doctor's care? _____ Yes ____ No ____ (62)

Have you ever had asthma? _____ Yes ____ No ____ (63)

If 'Yes', did it begin (1) ☐ Before age 30
(2) ☐ After age 30

If 'Yes' before 30, did you have asthma before ever going to work in a textile mill? _____ Yes ____ No ____ (64)

Have you ever had hay fever or other allergies (other than above)? _____ Yes ____ No ____ (65)

H. TOBACCO SMOKING *

Do you smoke?

Record 'Yes' if regular smoker up to one month ago (Cigarettes, cigar or pipe) _____ Yes ____ No ____ (66)

If 'No' to (6[3]6)

Have you ever smoked? (Cigarettes, cigars, pipe. Record 'No' if subject has never smoked as much as one cigarette a day, or 1 oz. of tobacco a month, for as long as one year.) Yes ____ No ____ (67)

If 'Yes' to (6[3]6) or (6[4]7), what have you smoked and for how many years? (Write in specific number of years in the appropriate square.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Years	(<5)	(5-9)	(10-14)	(15-19)	(20-24)	(25-29)	(30-34)	(35-39)	(>40)	
Cigarettes										(68)
Pipe										(69)
Cigars										(70)

If cigarettes, how many packs per day? (1) ☐ less than 1/2 pack (71)
(Write in number of cigarettes) (2) ☐ 1/2 pack, but less than 1 pack

- (3) ☐ 1 pack, but less than 1-1/2 packs
 (4) ☐ 1-1/2 packs or more

Number of [~~pack~~]years: _____ (72, 73)

If an ex-smoker (cigarettes, cigar or pipe), how long since you stopped? (74)
 (Write in number of years)

- (1) ☐ _____ 0-1 years
 (2) ☐ _____ 1-4 years
 (3) ☐ _____ 5-9 years
 (4) ☐ _____ 10+ years

*Have you changed your smoking habits since last interview? If yes, specify what changes.

I. OCCUPATIONAL HISTORY**

Have you ever worked in A foundry? (As long as one year) Yes ___ No ___ (75)

Stone or mineral mining, quarrying or processing? (As long as one year) Yes ___ No ___ (76)

Asbestos milling or processing? (Ever) Yes ___ No ___ (77)

Other dusts, fumes or smoke? Yes ___ No ___ (78)

If yes, specify

Type of exposure _____

Length of exposure

** Ask only on first interview.

At what age did you first go to work in a textile mill? (Write in specific age in appropriate square.)

(1)	(2)	(3)	(4)	(5)	(6)
<20	20-24	25-29	30-34	35-39	40+

When you first worked in a textile mill, did you work with: (1) ☐ Cotton or cotton blend (79)
 (2) ☐ Synthetic or wool (80)

Appendix B-II – Respiratory Questionnaire for Non-Textile Workers for the Cotton Industry

Identification No.	Interviewer Code
Location	Date of Interview

A. IDENTIFICATION

1. NAME (Last) (First) (Middle Initial)	3. PHONE NUMBER AREA CODE () NO. [4.] SOCIAL SECURITY # (optional-see below)}	
2. CURRENT ADDRESS (Number, Street, or Rural Route, City or Town, County, State, Zip Code)	[5.] 4. BIRTHDATE (Mo., Day, Yr.) [6.] AGE LAST BIRTHDAY [7.] 5. SEX <div style="display: flex; justify-content: space-around; align-items: center;"> 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female </div> [8.] 6. ETHNIC GROUP OR ANCESTRY (Check all that apply) <div style="margin-top: 5px;"> 1. <input type="checkbox"/> White[, not of Hispanic Origin] 2. <input type="checkbox"/> Black <u>or African American</u>[, not of Hispanic Origin] 3. <input type="checkbox"/> <u>Asian</u>[Hispanic] 4. <input type="checkbox"/> <u>Hispanic or Latino</u>[American Indian or Alaskan Native] 5. <input type="checkbox"/> <u>American Indian or Alaskan Native</u> [Asian or Pacific Islander] 6. <input type="checkbox"/> <u>Native Hawaiian or Other Pacific Islander</u>[?] </div>	
[9.] 7. STANDING HEIGHT <div style="border-bottom: 1px solid black; width: 100px; margin: 5px auto;"></div> (in.[cm])	[10.] 8. WEIGHT <div style="border-bottom: 1px solid black; width: 100px; margin: 5px auto;"></div> (lbs)	[11.] 9. WORK SHIFT <div style="display: flex; justify-content: space-around; align-items: center;"> 1st <input type="checkbox"/> 2nd <input type="checkbox"/> 3rd <input type="checkbox"/> </div>

[12.] ~~10. PRESENT WORK AREA~~

Please indicate primary assigned work area and percent of time spent at that site. If at other locations, please indicate and note percent of time for each.

PRIMARY WORK AREA	
SPECIFIC JOB	

1	<input type="checkbox"/>	Garnetting	3	<input type="checkbox"/>	Cotton Warehouse	5	<input type="checkbox"/>	Cotton Classification
2	<input type="checkbox"/>	Cottonseed Oil Mill	4	<input type="checkbox"/>	Utilization	6	<input type="checkbox"/>	Cotton Ginning

B. OCCUPATIONAL HISTORY TABLE

[illegible]

--	--	--	--	--	--	--	--

C. SYMPTOMS

Use actual wording of each question.

Put X in appropriate square after each question **or circle answer.**

When in doubt record 'No.'

COUGH

1. Do you usually cough first thing in the morning? 1 ☐ Yes 2 ☐ No
(on getting up)*
(Count a cough with first smoke or on "first going out of doors." Exclude clearing throat or a single cough.)

2. Do you usually cough during the day or at night? 1 ☐ Yes 2 ☐ No
(Ignore an occasional cough.)

If 'Yes' to either question 1 or 2:

3. Do you cough like this on most days for as 1 ☐ Yes 2 ☐ No 3[9] ☐
NA
much as three months a year?

4. Do you cough on any particular day of the week? 1 ☐ Yes 2 ☐ No

If YES:

5. Which day? Mon. Tues. Wed. Thur. Fri. Sat. Sun.

PHLEGM

6. Do you usually bring up any phlegm from your chest first thing in the morning? (on getting up)* 1 ☐ Yes 2 ☐ No
(Count phlegm with the first smoke or on "first going out of doors." Exclude phlegm from the nose. Count swallowed phlegm.)

7. Do you usually bring up any phlegm from your chest during the day or at night? (Accept twice or more.) 1 ☐ Yes 2 ☐ No

If YES to either question 6 or 7:

8. Do you bring up phlegm like this on most days for as much

as three months each year?

1 ☐ Yes

2 ☐ No

If YES to question 3 or 8:

9. How long have you had this phlegm? (cough)
(Write in number of years.)

(1) ☐ 2 years or less

(2) ☐ More than 2 years - 9 years

(3) ☐ 10-19 years

(4) ☐ 20+ years

* These words are for subjects who work at night

CHEST ILLNESS

10. In the past three years, have you had a period of
(increased) cough and phlegm lasting for 3 weeks
or more?

(1) ☐ No

(2) ☐ Yes, only one period

(3) ☐ Yes, two or more periods

For subjects who usually have phlegm:

11. During the past 3 years have you had any chest illness
which has kept you off work, indoors at home or in bed?
(For as long as one week, flu?)

1 ☐ Yes

2 ☐ No

If YES to 11:

12. Did you bring up (more) phlegm than usual in any of
these illnesses?

1 ☐ Yes

2 ☐ No

If YES to 12: During the past three years have you had:

13. Only one such illness with increased phlegm?

1 ☐ Yes

2 ☐ No

14. More than one such illness:

1 ☐ Yes

2 ☐ No

Br. Grade. _____

TIGHTNESS

15. Does your chest ever feel tight or your breathing
become difficult?

1 ☐ Yes

2 ☐ No

16. Is your chest tight or your breathing difficult on any
particular day of the week? (after a week or 10 days
away from the mill)

1 ☐ Yes

2 ☐ No

17. If YES: Which day? Mon. ⁽¹⁾ Sometimes ⁽³⁾ Tues. ⁽²⁾ Always ⁽⁴⁾ Wed. ⁽⁵⁾ Thur. ⁽⁶⁾ Fri. ⁽⁷⁾ Sat. ⁽⁸⁾ Sun.
- chest feel tight or your breathing difficult? ☐ After entering the mill

(Ask only if NO to Question 15)

19. In the past, has you chest ever been tight or your breathing difficult on any particular day of the week? 1 ☐ Yes 2 ☐ No
20. If YES: Which day? Mon. ⁽¹⁾ Sometimes ⁽³⁾ Tues. ⁽²⁾ Always ⁽⁴⁾ Wed. ⁽⁵⁾ Thur. ⁽⁶⁾ Fri. ⁽⁷⁾ Sat. ⁽⁸⁾ Sun.

BREATHLESSNESS

21. If disabled from walking by any condition other than heart or lung disease, put "X" in the space and leave questions (22-30) unasked. ☐
22. Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? 1 ☐ Yes 2 ☐ No

If NO, grade is 1. If YES, proceed to next question

23. Do you get short of breath walking with other people at an ordinary pace on the level? 1 ☐ Yes 2 ☐ No

If NO, grade is 2. If YES, proceed to next question

24. Do you have to stop for breath when walking at your own pace on the level? 1 ☐ Yes 2 ☐ No

If NO, grade is 3. If YES, proceed to next question

25. Are you short of breath on washing or dressing? 1 ☐ Yes 2 ☐ No

If NO, grade is 4. If YES, grade is 5.

26. Dyspnea Grade._____

ON MONDAYS:

27. Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? 1 ☐ Yes 2 ☐ No

If NO, grade is 1. If YES, proceed to next question

28. Do you get short of breath walking with other people at an ordinary pace on the level? 1 ☐ Yes 2 ☐ No

If NO, grade is 2. If YES, proceed to next question

29. Do you have to stop for breath when walking at your own pace on the level? 1 ☐ Yes 2 ☐ No

If NO, grade is 3. If YES, proceed to next question

30. Are you short of breath on washing or dressing? 1 ☐ Yes 2 ☐ No

If NO, grade is 4. If YES, grade is 5.

31. B. Grade. _____

OTHER ILLNESSES AND ALLERGY HISTORY

32. Do you have a heart condition for which you are under a doctor's care? 1 ☐ Yes 2 ☐ No

33. Have you ever had asthma? 1 ☐ Yes 2 ☐ No

If yes, did it begin: (1) Before age 30 ~
(2) After age 30 ~

34. If yes before 30: did you have asthma before ever going to work in a textile mill? 1 ☐ Yes 2 ☐ No

35. Have you ever had hay fever or other allergies (other than above)? 1 ☐ Yes 2 ☐ No

TOBACCO SMOKING

36. Do you smoke? 1 ☐ Yes 2 ☐ No
Record Yes if regular smoker up to one month ago.
(Cigarettes, cigar or pipe)

If NO to (36[3]).

37. Have you ever smoked? (Cigarettes, cigars, pipe. 1 ☐ Yes 2 ☐ No
Record NO if subject has never smoked as much as
one cigarette a day, or 1 oz. of tobacco a month, for
as long as one year.)

If Yes to (36[3]) or (37[4]): what have you smoked and for how many years? (Write in
specific number of years in the appropriate square)

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Years	(<5)	(5-9)	(10-14)	(15-19)	(20-24)	(25-29)	(30-34)	(35-39)	(>40)
38.	Cigarettes									
39.	Pipe									
40.	Cigars									

41. If cigarettes, how many packs per day?
(Write in number of cigarettes) _____
☐ less than 1/2 pack
☐ 1/2 pack, but less than 1 pack
☐ 1 pack, but less than 1-1/2 packs
☐ 1-1/2 packs or more

42. Number of pack years _____

43. If an ex-smoker (cigarettes, cigar or pipe), how long
since you stopped? (Write in number of years) ☐ 0-1 years
☐ 1-4 years
☐ 5-9 years
☐ 10+ years

OCCUPATIONAL HISTORY

Have you ever worked in:

44. A foundry? (As long as one year) 1 ☐ Yes 2 ☐ No
45. Stone or mineral mining, quarrying or processing?
(As long as one year) 1 ☐ Yes 2 ☐ No
46. Asbestos milling or processing? (Ever) 1 ☐ Yes 2 ☐ No
47. Cotton or cotton blend mill? (For controls only) 1 ☐ Yes 2 ☐ No
48. Other dusts, fumes or smoke? If yes, specify. 1 ☐ Yes 2 ☐ No

Type of exposure _____

Length of exposure _____

Appendix B-III – Abbreviated Respiratory Questionnaire

A. Identification Data

PLANT _____ [~~SOCIAL SECURITY NO.~~ _____]
DAY MONTH YEAR
(figures) (last 2 digits)

NAME _____ DATE OF INTERVIEW _____
(Surname)

(First Names) DATE OF BIRTH _____

ADDRESS _____

AGE _____ (8,9)

SEX _____ (10)
M F

RACE [W _____ N _____ IND. _____ OTHER _____]

(Check all that apply) (11)

1. White

2. Black or African American

3. Asian

4. Hispanic or Latino

5. American Indian or Alaska Native

6. Native Hawaiian or Other Pacific Islander

INTERVIEWER: 1 2 3 4 5 6 7 8 (12)

WORK SHIFT: 1st ____ 2nd ____ 3rd ____ (13)

STANDING HEIGHT _____ (14, 15)

WEIGHT _____ (16, 18)

PRESENT WORK AREA

If working in more than one specified work area, X area where most of the work shift is spent.

If “other,” but spending 25% of the work shift in one of the specified work areas, classify in that work area. If carding department employee, check area within that department where most of the work shift is spent (if in doubt, check “throughout”).

For work areas such as spinning and weaving where many work rooms may be involved, be sure to check the specific work room to which the employee is assigned – if he works in more than one work room within a department classify as 7 (all) for that department.

	Work- room Number	(19) Open	(20) Pick	Area	(21) Card #1	(22) #2	(23) Split	(24) Wind	(25) Twist	(26) Spool	(27) Warp	(28) Slash	(29) Weave	(30) Other
AT RISK (cotton & cotton blend)	1			Cards										
	2			Draw										
	3			Comb										
	4			Rove										
	5			Thru Out										
	6													
	7 (all)													
Control (synthetic & wool)	8													
Ex-Worker (cotton)	9													

Use actual wording of each question. Put X in appropriate square after each question. When in doubt record ‘No.’ When no square, circle appropriate answer.

B. COUGH

(on getting up)⊥

Do you usually cough first thing in the morning? _____ Yes ____ No ____ (31)

(Count a cough with first smoke or on “first going out of doors.”

Exclude clearing throat or a single cough.)

Do you usually cough during the day or at night? _____ Yes ____ No ____ (32)

(Ignore an occasional cough.)

If ‘Yes’ to either question (31-32):

Do you cough like this on most days for as much as
three months a year? _____ Yes ____ No ____ (33)

Do you cough on any particular day of the week? _____ Yes ____ No ____ (34)

(1) (2) (3) (4) (5) (6) (7)

If ‘Yes’: Which day? Mon. Tues. Wed. Thur. Fri. Sat. Sun. (35)

C. PHLEGM or alternative word to suit local custom.

(on getting up)⊥

Do you usually bring up any phlegm from your chest first thing in the morning? (Count phlegm with the first smoke or on "first going out of doors." Exclude phlegm from the nose. Count swallowed phlegm.)

Yes ____ No ____ (36)

Do you usually bring up any phlegm from your chest during the day or at night? (Accept twice or more.) _____

Yes ____ No ____ (37)

If 'Yes' to either question (36) or (37):

Do you bring up phlegm like this on most days for as much as three months each year? _____

Yes ____ No ____ (38)

If 'Yes' to question (33) or (38):

(cough)
How long have you had this phlegm?
(Write in number of years.)

- (1) ☐ 2 years or less
(2) ☐ More than 2 years - 9 years
(3) ☐ 10-19 years
(4) ☐ 20+ years

[±]These words are for subjects who work at night

D. TIGHTNESS

Does your chest ever feel tight or your breathing become difficult?

Yes ____ No ____ (39)

Is your chest tight or your breathing difficult on any particular day of the week? (after a week or 10 days away from the mill)

Yes ____ No ____ (40)

If 'Yes': Which day? Mon. (1) Sometimes (3) Tues. (2) Always (4) Wed. (5) Thurs. (6) Fri. (7) Sat. (8) Sun. (41)

If 'Yes' Monday At what time on Monday does your chest feel tight or your breathing difficult? 1 ☐ Before entering the mill (42)
2 ☐ After entering the mill

(Ask only if NO to Question (45))

In the past, has your chest ever been tight or your breathing difficult on any particular day of the week? _____

Yes ____ No ____ (43)

If 'Yes': Which day? Mon. (1) Sometimes (3) Tues. (2) Always (4) Wed. (5) Thurs. (6) Fri. (7) Sat. (8) Sun. (44)

E. TOBACCO SMOKING *

*Have you changed your smoking habits since last interview?

(45)

If yes, specify what changes.

Appendix C to 1910.1043 **[Reserved]**

~~[Spirometry Prediction Tables for Normal Males and Females]~~

TABLE 2. PREDICTED FEV₁ FOR MALES (KNUDSON, ET AL.: AM. REV. RESPIR. DIS. 1976, 113, 587.)

HT	AGE				25	TABLE 1. PREDICTED FVC FOR MALES (KNUDSON, ET AL.: AM. REV. RESPIR. DIS. 1976, 113, 587.)										59	61	63	65						
	17	19	21	23		25	27	29	31	33	35	37	39	41	43					45	47	49	51	53	55
60.0	2.97	3.05	3.15	3.24	3.05	2.99	2.94	2.88	2.83	2.78	2.72	2.67	2.61	2.56	2.51	2.45	2.40	2.34	2.29	2.23	2.18	2.13	2.07	2.02	1.97
60.5	3.00	3.12	3.21	3.30	3.11	3.06	3.00	2.95	2.90	2.84	2.79	2.73	2.68	2.63	2.57	2.52	2.46	2.41	2.36	2.30	2.25	2.19	2.14	2.09	2.03
61.0	3.03	3.17	3.26	3.35	3.16	3.11	3.07	3.02	2.97	2.91	2.86	2.80	2.75	2.69	2.64	2.59	2.53	2.48	2.42	2.37	2.31	2.26	2.21	2.15	2.09
61.5	3.06	3.21	3.30	3.39	3.20	3.15	3.11	3.06	3.01	2.95	2.90	2.84	2.79	2.73	2.68	2.63	2.57	2.52	2.46	2.41	2.35	2.30	2.24	2.19	2.13
62.0	3.09	3.25	3.34	3.43	3.24	3.19	3.15	3.10	3.05	2.99	2.94	2.88	2.83	2.77	2.72	2.67	2.61	2.56	2.50	2.45	2.39	2.34	2.28	2.23	2.17
62.5	3.12	3.28	3.37	3.46	3.27	3.22	3.18	3.13	3.08	3.02	2.97	2.91	2.86	2.80	2.75	2.70	2.64	2.59	2.53	2.48	2.42	2.37	2.31	2.26	2.20
63.0	3.15	3.31	3.40	3.49	3.30	3.25	3.21	3.16	3.11	3.05	3.00	2.94	2.89	2.83	2.78	2.73	2.67	2.62	2.56	2.51	2.45	2.40	2.34	2.29	2.23
63.5	3.18	3.34	3.43	3.52	3.33	3.28	3.24	3.19	3.14	3.08	3.03	2.97	2.92	2.86	2.81	2.76	2.70	2.65	2.59	2.54	2.48	2.43	2.37	2.32	2.26
64.0	3.21	3.37	3.46	3.55	3.36	3.31	3.27	3.22	3.17	3.11	3.06	3.00	2.95	2.89	2.84	2.79	2.73	2.68	2.62	2.57	2.51	2.46	2.40	2.35	2.29
64.5	3.24	3.40	3.49	3.58	3.39	3.34	3.30	3.25	3.20	3.14	3.09	3.03	2.98	2.92	2.87	2.82	2.76	2.71	2.65	2.60	2.54	2.49	2.43	2.38	2.32
65.0	3.27	3.43	3.52	3.61	3.42	3.37	3.33	3.28	3.23	3.17	3.12	3.06	3.01	2.95	2.90	2.85	2.79	2.74	2.68	2.63	2.57	2.52	2.46	2.41	2.35
65.5	3.30	3.46	3.55	3.64	3.45	3.40	3.36	3.31	3.26	3.20	3.15	3.09	3.04	2.98	2.93	2.88	2.82	2.77	2.71	2.66	2.60	2.55	2.49	2.44	2.38
66.0	3.33	3.49	3.58	3.67	3.48	3.43	3.39	3.34	3.29	3.23	3.18	3.12	3.07	3.01	2.96	2.91	2.85	2.80	2.74	2.69	2.63	2.58	2.52	2.47	2.41
66.5	3.36	3.52	3.61	3.70	3.51	3.46	3.42	3.37	3.32	3.26	3.21	3.15	3.10	3.04	2.99	2.93	2.88	2.82	2.77	2.71	2.66	2.60	2.55	2.49	2.44
67.0	3.39	3.55	3.64	3.73	3.54	3.49	3.45	3.40	3.35	3.29	3.24	3.18	3.13	3.07	3.02	2.96	2.91	2.85	2.80	2.74	2.69	2.63	2.58	2.52	2.47
67.5	3.42	3.58	3.67	3.76	3.57	3.52	3.48	3.43	3.38	3.32	3.27	3.21	3.16	3.10	3.05	2.99	2.94	2.88	2.83	2.77	2.72	2.66	2.61	2.55	2.50
68.0	3.45	3.61	3.70	3.79	3.60	3.55	3.51	3.46	3.41	3.35	3.30	3.24	3.19	3.13	3.08	3.02	2.97	2.91	2.86	2.80	2.75	2.69	2.64	2.58	2.53
68.5	3.48	3.64	3.73	3.82	3.63	3.58	3.54	3.49	3.44	3.38	3.33	3.27	3.22	3.16	3.11	3.05	2.99	2.94	2.88	2.83	2.77	2.72	2.66	2.61	2.55
69.0	3.51	3.67	3.76	3.85	3.66	3.61	3.57	3.52	3.47	3.41	3.36	3.30	3.25	3.19	3.14	3.08	3.03	2.97	2.92	2.86	2.81	2.75	2.70	2.64	2.59
69.5	3.54	3.70	3.79	3.88	3.69	3.64	3.60	3.55	3.50	3.44	3.39	3.33	3.28	3.22	3.17	3.11	3.06	3.00	2.95	2.89	2.84	2.78	2.73	2.67	2.62
70.0	3.57	3.73	3.82	3.91	3.72	3.67	3.63	3.58	3.53	3.47	3.42	3.36	3.31	3.25	3.20	3.14	3.09	3.03	2.98	2.92	2.87	2.81	2.76	2.70	2.65
70.5	3.60	3.76	3.85	3.94	3.75	3.70	3.66	3.61	3.56	3.50	3.45	3.39	3.34	3.28	3.23	3.17	3.12	3.06	3.01	2.95	2.90	2.84	2.79	2.73	2.68
71.0	3.63	3.79	3.88	3.97	3.78	3.73	3.69	3.64	3.59	3.53	3.48	3.42	3.37	3.31	3.26	3.20	3.15	3.09	3.04	2.98	2.93	2.87	2.82	2.76	2.71
71.5	3.66	3.82	3.91	4.00	3.81	3.76	3.72	3.67	3.62	3.56	3.51	3.45	3.40	3.34	3.29	3.23	3.18	3.12	3.07	3.01	2.96	2.90	2.85	2.79	2.74
72.0	3.69	3.85	3.94	4.03	3.84	3.79	3.75	3.70	3.65	3.59	3.54	3.48	3.43	3.37	3.32	3.26	3.21	3.15	3.10	3.04	2.99	2.93	2.88	2.82	2.77
72.5	3.72	3.88	3.97	4.06	3.87	3.82	3.78	3.73	3.68	3.62	3.57	3.51	3.46	3.40	3.35	3.29	3.24	3.18	3.13	3.07	3.02	2.96	2.91	2.85	2.80
73.0	3.75	3.91	4.00	4.09	3.90	3.85	3.81	3.76	3.71	3.65	3.60	3.54	3.49	3.43	3.38	3.32	3.27	3.21	3.16	3.10	3.05	2.99	2.94	2.88	2.83
73.5	3.78	3.94	4.03	4.12	3.93	3.88	3.84	3.79	3.74	3.68	3.63	3.57	3.52	3.46	3.41	3.35	3.30	3.24	3.19	3.13	3.08	3.02	2.97	2.91	2.86
74.0	3.81	3.97	4.06	4.15	3.96	3.91	3.87	3.82	3.77	3.71	3.66	3.60	3.55	3.49	3.44	3.38	3.33	3.27	3.22	3.16	3.11	3.05	3.00	2.94	2.89
74.5	3.84	4.00	4.09	4.18	4.00	3.95	3.91	3.86	3.81	3.75	3.70	3.64	3.59	3.53	3.48	3.42	3.37	3.31	3.26	3.20	3.15	3.09	3.04	2.98	2.93
75.0	3.87	4.03	4.12	4.21	4.03	3.98	3.94	3.89	3.84	3.78	3.73	3.67	3.62	3.56	3.51	3.45	3.40	3.34	3.29	3.23	3.18	3.12	3.07	3.01	2.96
75.5	3.90	4.06	4.15	4.24	4.06	4.01	3.97	3.92	3.87	3.81	3.76	3.70	3.65	3.59	3.54	3.48	3.43	3.37	3.32	3.26	3.21	3.15	3.10	3.04	2.99
76.0	3.93	4.09	4.18	4.27	4.09	4.04	4.00	3.95	3.90	3.84	3.79	3.73	3.68	3.62	3.57	3.51	3.46	3.40	3.35	3.29	3.24	3.18	3.13	3.07	3.02
76.5	3.96	4.12	4.21	4.30	4.12	4.07	4.03	3.98	3.93	3.87	3.82	3.76	3.71	3.65	3.60	3.54	3.49	3.43	3.38	3.32	3.27	3.21	3.16	3.10	3.05
77.0	3.99	4.15	4.24	4.33	4.15	4.10	4.06	4.01	3.96	3.90	3.85	3.79	3.74	3.68	3.63	3.57	3.52	3.46	3.41	3.35	3.30	3.24	3.19	3.13	3.08
77.5	4.02	4.18	4.27	4.36	4.18	4.13	4.09	4.04	3.99	3.93	3.88	3.82	3.77	3.71	3.66	3.60	3.55	3.49	3.44	3.38	3.33	3.27	3.22	3.16	3.11
78.0	4.05	4.21	4.30	4.39	4.21	4.16	4.12	4.07	4.02	3.96	3.91	3.85	3.80	3.74	3.69	3.63	3.58	3.52	3.47	3.41	3.36	3.30	3.25	3.19	3.14
78.5	4.08	4.24	4.33	4.42	4.24	4.19	4.15	4.10	4.05	3.99	3.94	3.88	3.83	3.77	3.72	3.66	3.61	3.55	3.50	3.44	3.39	3.33	3.28	3.22	3.17
79.0	4.11	4.27	4.36	4.45	4.27	4.22	4.18	4.13	4.08	4.02	3.97	3.91	3.86	3.80	3.75	3.69	3.64	3.58	3.53	3.47	3.42	3.36	3.31	3.25	3.20
79.5	4.14	4.30	4.39	4.48	4.30	4.25	4.21	4.16	4.11	4.05	4.00	3.94	3.89	3.83	3.78	3.72	3.67	3.61	3.56	3.50	3.45	3.39	3.34	3.28	3.23
80.0	4.17	4.33	4.42	4.51	4.33	4.28	4.24	4.19	4.14	4.08	4.03	3.97	3.92	3.86	3.81	3.75	3.70	3.64	3.59	3.53	3.48	3.42	3.37	3.31	3.26
80.5	4.20	4.36	4.45	4.54	4.36	4.31	4.27	4.22	4.17	4.11	4.06	4.00	3.95	3.89	3.84	3.78	3.73	3.67	3.62	3.56	3.51	3.45	3.40	3.34	3.29
81.0	4.23	4.39	4.48	4.57	4.39	4.34	4.30	4.25	4.20	4.14	4.09	4.03	3.98	3.92	3.87	3.81	3.76	3.70	3.65	3.59	3.54	3.48	3.43	3.37	3.32
81.5	4.26	4.42	4.51	4.60	4.42	4.37	4.33	4.28	4.23	4.17	4.12	4.06	4.01	3.95	3.90	3.84	3.79	3.73	3.68	3.62	3.57	3.51	3.46	3.40	3.35
82.0	4.29	4.45	4.54	4.63	4.45	4.40	4.36	4.31	4.26	4.20	4.15	4.09	4.04	3.98	3.93	3.87	3.82	3.76	3.71	3.65	3.60	3.54	3.49	3.43	3.38
82.5	4.32	4.48	4.57	4.66	4.48	4.43	4.39	4.34	4.29																

TABLE 3. PREDICTED PVC FOR FEMALES (KNUDSON, ET AL.: AM. REV. RESPIR. DIS. 1976, 113, 587.)

HT	AGE										60														
	17	19	21	23	25	27	29	31	33	35		37	39	41	43	45	47	49	51	53	55	57	59	61	63
52.0	2.45	2.64	2.65	2.61	2.56	2.52	2.47	2.43	2.39	2.34	2.30	2.25	2.21	2.17	2.12	2.08	2.03	1.99	1.95	1.90	1.86	1.81	1.77	1.73	1.68
52.5	2.50	2.68	2.70	2.65	2.61	2.57	2.52	2.48	2.43	2.39	2.35	2.30	2.26	2.21	2.17	2.13	2.08	2.04	1.99	1.95	1.91	1.86	1.82	1.77	1.73
53.0	2.54	2.72	2.74	2.70	2.66	2.62	2.57	2.53	2.48	2.44	2.39	2.35	2.30	2.26	2.22	2.17	2.13	2.08	2.04	2.00	1.95	1.91	1.86	1.82	1.78
53.5	2.58	2.76	2.79	2.75	2.70	2.66	2.62	2.57	2.53	2.49	2.44	2.40	2.35	2.31	2.26	2.22	2.18	2.13	2.09	2.04	2.00	1.95	1.91	1.87	1.83
54.0	2.62	2.81	2.83	2.79	2.75	2.71	2.66	2.62	2.57	2.53	2.49	2.44	2.40	2.35	2.31	2.27	2.22	2.18	2.13	2.09	2.05	2.00	1.96	1.92	1.88
54.5	2.66	2.85	2.87	2.83	2.79	2.75	2.71	2.67	2.62	2.58	2.54	2.49	2.45	2.40	2.36	2.31	2.27	2.23	2.18	2.14	2.09	2.05	2.01	1.96	1.92
55.0	2.71	2.90	2.92	2.88	2.84	2.80	2.76	2.71	2.67	2.62	2.58	2.54	2.49	2.45	2.40	2.36	2.32	2.27	2.23	2.18	2.14	2.10	2.06	2.01	1.96
55.5	2.75	2.94	2.96	2.92	2.88	2.84	2.80	2.75	2.71	2.67	2.63	2.59	2.54	2.49	2.45	2.40	2.36	2.32	2.27	2.23	2.19	2.15	2.10	2.06	2.01
56.0	2.79	2.98	3.00	2.96	2.92	2.88	2.84	2.80	2.75	2.72	2.67	2.63	2.59	2.54	2.50	2.45	2.41	2.37	2.33	2.28	2.24	2.19	2.15	2.11	2.06
56.5	2.83	3.01	3.03	3.00	2.96	2.92	2.88	2.84	2.80	2.77	2.72	2.68	2.64	2.59	2.55	2.46	2.41	2.37	2.33	2.28	2.24	2.19	2.15	2.11	2.06
57.0	2.87	3.05	3.12	3.08	3.03	2.99	2.94	2.90	2.86	2.82	2.77	2.72	2.68	2.64	2.59	2.55	2.46	2.41	2.37	2.33	2.28	2.24	2.20	2.15	2.11
57.5	2.91	3.10	3.17	3.12	3.08	3.04	2.99	2.95	2.90	2.86	2.82	2.77	2.73	2.68	2.64	2.60	2.55	2.51	2.46	2.42	2.38	2.33	2.29	2.24	2.20
58.0	2.96	3.14	3.21	3.17	3.13	3.08	3.04	2.99	2.95	2.91	2.86	2.82	2.77	2.73	2.69	2.64	2.60	2.55	2.51	2.47	2.42	2.38	2.33	2.29	2.25
58.5	3.00	3.18	3.26	3.21	3.17	3.13	3.09	3.04	3.00	2.95	2.91	2.87	2.82	2.78	2.73	2.69	2.65	2.60	2.56	2.51	2.47	2.43	2.38	2.34	2.29
59.0	3.04	3.22	3.31	3.26	3.22	3.18	3.13	3.09	3.04	3.00	2.96	2.91	2.87	2.82	2.78	2.74	2.69	2.65	2.60	2.56	2.52	2.47	2.43	2.38	2.34
59.5	3.08	3.27	3.36	3.31	3.27	3.22	3.18	3.14	3.09	3.05	3.00	2.96	2.92	2.87	2.83	2.78	2.74	2.70	2.65	2.61	2.56	2.52	2.48	2.43	2.39
60.0	3.12	3.31	3.40	3.35	3.31	3.26	3.23	3.18	3.14	3.09	3.05	3.01	2.96	2.92	2.88	2.83	2.79	2.74	2.70	2.65	2.61	2.57	2.52	2.48	2.43
60.5	3.17	3.35	3.45	3.41	3.36	3.32	3.27	3.23	3.19	3.14	3.10	3.05	3.01	2.97	2.92	2.88	2.83	2.79	2.75	2.70	2.66	2.61	2.57	2.52	2.48
61.0	3.21	3.39	3.49	3.45	3.40	3.36	3.31	3.27	3.23	3.18	3.14	3.09	3.05	3.01	2.97	2.92	2.88	2.84	2.79	2.75	2.70	2.66	2.61	2.57	2.52
61.5	3.25	3.43	3.53	3.49	3.44	3.40	3.35	3.31	3.27	3.23	3.19	3.15	3.10	3.06	3.02	2.97	2.93	2.88	2.84	2.79	2.75	2.70	2.66	2.61	2.57
62.0	3.29	3.48	3.58	3.54	3.49	3.45	3.40	3.37	3.33	3.28	3.24	3.19	3.15	3.11	3.06	3.02	2.97	2.93	2.89	2.84	2.79	2.75	2.70	2.67	2.62
62.5	3.33	3.52	3.62	3.58	3.53	3.49	3.44	3.41	3.37	3.33	3.29	3.24	3.20	3.15	3.11	3.07	3.02	2.98	2.93	2.89	2.85	2.80	2.76	2.71	2.67
63.0	3.38	3.56	3.66	3.62	3.57	3.53	3.48	3.45	3.42	3.38	3.33	3.29	3.24	3.20	3.16	3.11	3.07	3.02	2.98	2.94	2.89	2.85	2.80	2.76	2.72
63.5	3.42	3.60	3.70	3.67	3.63	3.59	3.54	3.51	3.47	3.42	3.38	3.34	3.29	3.25	3.20	3.16	3.12	3.07	3.03	2.98	2.94	2.90	2.85	2.81	2.76
64.0	3.46	3.64	3.73	3.70	3.66	3.62	3.57	3.54	3.51	3.47	3.43	3.38	3.34	3.29	3.25	3.21	3.16	3.12	3.07	3.03	2.99	2.94	2.90	2.85	2.81
64.5	3.50	3.69	3.83	3.78	3.74	3.69	3.65	3.61	3.56	3.52	3.47	3.43	3.39	3.34	3.30	3.25	3.21	3.17	3.12	3.08	3.03	2.99	2.95	2.90	2.86
65.0	3.54	3.73	3.87	3.83	3.78	3.74	3.70	3.65	3.61	3.56	3.52	3.48	3.43	3.39	3.34	3.30	3.26	3.21	3.17	3.12	3.08	3.04	2.99	2.95	2.90
65.5	3.59	3.77	3.92	3.88	3.83	3.79	3.74	3.70	3.66	3.61	3.57	3.52	3.48	3.44	3.39	3.35	3.30	3.26	3.21	3.17	3.13	3.08	3.04	2.99	2.95
66.0	3.63	3.81	3.97	3.92	3.88	3.83	3.79	3.75	3.70	3.66	3.61	3.57	3.53	3.48	3.44	3.39	3.35	3.31	3.26	3.22	3.17	3.13	3.08	3.04	2.99
66.5	3.67	3.85	4.01	3.97	3.93	3.88	3.84	3.79	3.75	3.71	3.66	3.62	3.57	3.53	3.48	3.44	3.40	3.35	3.31	3.27	3.22	3.18	3.13	3.09	3.05
67.0	3.71	3.89	4.05	4.01	3.97	3.92	3.88	3.84	3.79	3.75	3.71	3.66	3.62	3.58	3.54	3.49	3.45	3.40	3.36	3.32	3.27	3.23	3.19	3.15	3.10
67.5	3.75	3.94	4.11	4.06	4.02	3.98	3.93	3.89	3.84	3.80	3.76	3.71	3.67	3.62	3.58	3.54	3.49	3.45	3.40	3.36	3.32	3.27	3.23	3.19	3.14
68.0	3.79	3.98	4.15	4.11	4.07	4.02	3.98	3.93	3.89	3.85	3.80	3.76	3.71	3.67	3.63	3.59	3.54	3.49	3.45	3.41	3.36	3.32	3.27	3.23	3.19
68.5	3.84	4.02	4.20	4.16	4.11	4.07	4.03	3.98	3.94	3.89	3.85	3.81	3.76	3.72	3.67	3.63	3.59	3.54	3.50	3.45	3.41	3.37	3.32	3.28	3.23
69.0	3.88	4.06	4.25	4.20	4.16	4.12	4.07	4.03	3.98	3.94	3.90	3.85	3.81	3.76	3.72	3.68	3.63	3.59	3.54	3.50	3.46	3.41	3.37	3.32	3.28
69.5	3.92	4.10	4.30	4.25	4.21	4.16	4.12	4.08	4.03	3.99	3.94	3.90	3.85	3.81	3.76	3.72	3.68	3.64	3.59	3.55	3.50	3.46	3.42	3.37	3.33
70.0	3.96	4.15	4.34	4.30	4.25	4.21	4.17	4.12	4.08	4.04	3.99	3.95	3.90	3.86	3.81	3.77	3.73	3.68	3.64	3.59	3.55	3.51	3.46	3.42	3.37
70.5	4.00	4.19	4.39	4.35	4.30	4.26	4.21	4.17	4.13	4.08	4.04	3.99	3.95	3.91	3.86	3.82	3.77	3.73	3.69	3.64	3.60	3.55	3.51	3.47	3.42
71.0	4.05	4.23	4.44	4.39	4.35	4.30	4.26	4.22	4.17	4.13	4.08	4.04	4.00	3.95	3.91	3.86	3.82	3.78	3.73	3.69	3.64	3.60	3.55	3.51	3.47
71.5	4.09	4.27	4.48	4.44	4.40	4.35	4.31	4.26	4.22	4.18	4.14	4.09	4.05	4.00	3.96	3.91	3.87	3.82	3.78	3.74	3.69	3.64	3.60	3.55	3.52
72.0	4.13	4.31	4.53	4.49	4.44	4.40	4.36	4.31	4.27	4.22	4.18	4.13	4.09	4.05	4.00	3.96	3.91	3.87	3.82	3.78	3.74	3.69	3.65	3.61	3.56
72.5	4.17	4.35	4.57	4.53	4.48	4.44	4.40	4.36	4.32	4.27	4.23	4.19	4.14	4.10	4.05	4.01	3.96	3.92	3.87	3.83	3.79	3.74	3.70	3.66	3.62
73.0	4.21	4.39	4.61	4.57	4.52	4.48	4.44	4.40	4.36	4.32	4.28	4.23	4.19	4.14	4.10	4.05	4.01	3.96	3.92	3.88	3.83	3.79	3.74	3.70	3.66
73.5	4.26	4.44	4.67	4.63	4.59	4.54	4.50	4.45	4.41	4.36	4.32	4.28	4.23	4.19	4.14	4.10	4.05	4.01	3.97	3.92	3.88	3.84	3.79	3.74	3.70
74.0	4.30	4.48	4.72	4.67	4.63	4.59	4.54	4.50	4.45	4.41	4.37	4.32	4.28	4.23	4.19	4.15	4.10	4.06	4.01	3.97	3.93	3.88	3.84	3.79	3.75
74.5	4.34	4.52	4.77	4.72	4.68	4.63	4.59	4.55	4.50	4.46	4.41	4.37	4.33	4.28	4.24	4.19	4.15	4.11	4.06	4.02	3.97	3.93	3.89	3.84	3.80
75.0	4.38	4.57	4.81	4.77	4.72	4.68	4.64	4.59	4.55	4.50	4.46	4.42	4.37	4.33	4.28	4.24	4.20	4.15	4.11	4.06	4.02				

TABLE 4. PREDICTED FEV₁ FOR FEMALES (KNUDSON, ET AL.: AML REV. RESPIR DIS. 1976; 113, 587.)

	AGE																								
HT	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65
52.0	2.31	2.48	2.33	2.29	2.25	2.21	2.16	2.12	2.08	2.04	2.00	1.95	1.91	1.87	1.83	1.79	1.74	1.70	1.66	1.62	1.58	1.53	1.49	1.45	1.41
52.5	2.34	2.51	2.37	2.32	2.28	2.24	2.20	2.16	2.12	2.07	2.03	1.99	1.95	1.90	1.86	1.82	1.78	1.74	1.69	1.65	1.61	1.57	1.53	1.48	1.44
53.0	2.36	2.56	2.40	2.36	2.32	2.27	2.23	2.19	2.15	2.11	2.06	2.02	1.98	1.94	1.90	1.85	1.81	1.77	1.73	1.69	1.64	1.60	1.56	1.52	1.46
53.5	2.38	2.59	2.42	2.38	2.34	2.29	2.25	2.21	2.17	2.13	2.08	2.04	2.00	1.96	1.92	1.88	1.84	1.80	1.76	1.72	1.68	1.64	1.60	1.55	1.50
54.0	2.45	2.62	2.47	2.43	2.38	2.34	2.30	2.26	2.22	2.17	2.13	2.09	2.05	2.01	1.97	1.93	1.89	1.85	1.81	1.77	1.73	1.69	1.65	1.61	1.54
54.5	2.48	2.65	2.50	2.46	2.42	2.38	2.33	2.29	2.25	2.21	2.17	2.12	2.08	2.04	2.00	1.96	1.92	1.88	1.84	1.80	1.76	1.72	1.68	1.63	1.59
55.0	2.51	2.68	2.54	2.49	2.45	2.41	2.37	2.33	2.29	2.24	2.20	2.16	2.12	2.07	2.03	1.99	1.95	1.91	1.86	1.82	1.78	1.74	1.70	1.65	1.61
55.5	2.55	2.72	2.57	2.53	2.49	2.45	2.40	2.36	2.32	2.28	2.24	2.19	2.15	2.11	2.07	2.03	1.98	1.94	1.90	1.86	1.82	1.77	1.73	1.69	1.65
56.0	2.58	2.75	2.61	2.56	2.52	2.48	2.44	2.40	2.35	2.31	2.27	2.23	2.19	2.14	2.10	2.06	2.02	1.98	1.93	1.89	1.85	1.81	1.77	1.72	1.68
56.5	2.62	2.79	2.64	2.60	2.56	2.51	2.47	2.43	2.39	2.35	2.30	2.26	2.22	2.18	2.14	2.09	2.05	2.01	1.97	1.93	1.88	1.84	1.80	1.76	1.72
57.0	2.65	2.82	2.67	2.63	2.59	2.55	2.51	2.46	2.42	2.38	2.34	2.30	2.25	2.21	2.17	2.13	2.09	2.04	2.00	1.96	1.92	1.88	1.83	1.79	1.75
57.5	2.69	2.86	2.71	2.67	2.62	2.58	2.54	2.50	2.46	2.41	2.37	2.33	2.29	2.25	2.20	2.16	2.12	2.08	2.04	1.99	1.95	1.91	1.87	1.83	1.78
58.0	2.72	2.89	2.74	2.70	2.66	2.62	2.57	2.53	2.49	2.45	2.41	2.36	2.32	2.28	2.24	2.20	2.15	2.11	2.07	2.03	1.99	1.94	1.90	1.86	1.82
58.5	2.75	2.92	2.76	2.73	2.69	2.65	2.61	2.57	2.52	2.48	2.44	2.40	2.36	2.32	2.28	2.24	2.19	2.15	2.10	2.06	2.02	1.98	1.94	1.89	1.85
59.0	2.79	2.96	2.81	2.77	2.73	2.69	2.64	2.60	2.56	2.52	2.48	2.43	2.39	2.35	2.31	2.27	2.23	2.18	2.14	2.10	2.06	2.01	1.97	1.93	1.89
59.5	2.82	2.99	2.83	2.80	2.76	2.72	2.68	2.64	2.60	2.56	2.51	2.47	2.43	2.39	2.34	2.30	2.26	2.22	2.17	2.13	2.09	2.05	2.01	1.96	1.92
60.0	2.85	3.02	2.86	2.83	2.79	2.75	2.71	2.67	2.63	2.59	2.55	2.51	2.46	2.42	2.38	2.34	2.30	2.25	2.21	2.17	2.13	2.09	2.05	2.01	1.96
60.5	2.88	3.06	2.91	2.87	2.83	2.79	2.75	2.70	2.66	2.62	2.58	2.54	2.50	2.46	2.41	2.37	2.33	2.28	2.24	2.20	2.16	2.12	2.07	2.03	1.99
61.0	2.93	3.10	2.95	2.91	2.86	2.82	2.78	2.74	2.70	2.65	2.61	2.57	2.53	2.49	2.44	2.40	2.36	2.32	2.28	2.23	2.19	2.15	2.11	2.07	2.02
61.5	2.96	3.13	2.98	2.94	2.90	2.86	2.81	2.77	2.73	2.69	2.65	2.60	2.56	2.52	2.48	2.44	2.39	2.35	2.31	2.27	2.23	2.18	2.14	2.10	2.06
62.0	2.99	3.16	3.02	2.97	2.93	2.89	2.85	2.81	2.76	2.72	2.68	2.64	2.60	2.55	2.51	2.47	2.43	2.39	2.34	2.30	2.26	2.22	2.18	2.13	2.09
62.5	3.03	3.20	3.05	3.01	2.97	2.93	2.88	2.84	2.80	2.76	2.72	2.67	2.63	2.59	2.55	2.51	2.46	2.42	2.38	2.34	2.30	2.25	2.21	2.17	2.13
63.0	3.06	3.23	3.09	3.04	3.00	2.96	2.92	2.88	2.83	2.79	2.75	2.71	2.67	2.62	2.58	2.54	2.50	2.46	2.41	2.37	2.33	2.29	2.25	2.20	2.16
63.5	3.10	3.27	3.12	3.08	3.04	2.99	2.95	2.91	2.87	2.83	2.78	2.74	2.70	2.66	2.62	2.57	2.53	2.49	2.45	2.41	2.36	2.32	2.28	2.24	2.20
64.0	3.13	3.30	3.15	3.11	3.07	3.03	2.99	2.94	2.90	2.86	2.82	2.78	2.73	2.69	2.65	2.61	2.57	2.52	2.48	2.44	2.40	2.36	2.31	2.27	2.23
64.5	3.17	3.34	3.19	3.15	3.10	3.06	3.02	2.98	2.94	2.89	2.85	2.81	2.77	2.73	2.68	2.64	2.60	2.56	2.52	2.47	2.43	2.39	2.35	2.31	2.26
65.0	3.20	3.37	3.22	3.18	3.14	3.10	3.05	3.01	2.97	2.93	2.88	2.84	2.80	2.76	2.72	2.68	2.63	2.59	2.55	2.51	2.47	2.42	2.38	2.34	2.30
65.5	3.23	3.40	3.25	3.21	3.17	3.13	3.09	3.05	3.00	2.96	2.92	2.88	2.84	2.80	2.76	2.72	2.67	2.63	2.59	2.55	2.51	2.46	2.42	2.37	2.33
66.0	3.24	3.41	3.26	3.22	3.18	3.14	3.10	3.06	3.02	2.98	2.94	2.90	2.86	2.82	2.78	2.74	2.70	2.66	2.62	2.58	2.54	2.49	2.45	2.41	2.37
66.5	3.27	3.44	3.29	3.25	3.21	3.17	3.12	3.08	3.04	2.99	2.95	2.91	2.87	2.83	2.79	2.75	2.71	2.67	2.63	2.59	2.55	2.51	2.46	2.42	2.38
67.0	3.30	3.47	3.32	3.28	3.24	3.20	3.15	3.11	3.07	3.02	2.98	2.94	2.90	2.86	2.82	2.78	2.73	2.69	2.65	2.61	2.57	2.53	2.49	2.44	2.40
67.5	3.34	3.51	3.36	3.32	3.28	3.23	3.19	3.15	3.11	3.07	3.02	2.98	2.94	2.90	2.86	2.81	2.77	2.73	2.69	2.65	2.60	2.56	2.52	2.48	2.44
68.0	3.41	3.58	3.43	3.39	3.34	3.30	3.26	3.22	3.18	3.14	3.09	3.05	3.01	2.97	2.92	2.88	2.84	2.80	2.76	2.72	2.68	2.64	2.60	2.55	2.51
68.5	3.44	3.61	3.46	3.42	3.38	3.34	3.29	3.25	3.21	3.17	3.13	3.08	3.04	3.00	2.96	2.92	2.87	2.83	2.79	2.75	2.71	2.66	2.62	2.58	2.54
69.0	3.47	3.64	3.50	3.46	3.41	3.37	3.33	3.29	3.25	3.20	3.16	3.12	3.08	3.04	2.99	2.95	2.91	2.87	2.83	2.79	2.75	2.70	2.66	2.62	2.57
69.5	3.51	3.68	3.53	3.49	3.45	3.41	3.36	3.32	3.28	3.24	3.20	3.15	3.11	3.07	3.03	2.99	2.94	2.90	2.86	2.82	2.78	2.73	2.69	2.65	2.61
70.0	3.54	3.71	3.57	3.52	3.48	3.44	3.40	3.36	3.31	3.27	3.23	3.19	3.15	3.10	3.06	3.02	2.98	2.94	2.89	2.85	2.81	2.77	2.73	2.68	2.64
70.5	3.58	3.75	3.60	3.56	3.52	3.47	3.43	3.39	3.35	3.31	3.26	3.22	3.18	3.14	3.10	3.05	3.01	2.97	2.93	2.89	2.84	2.80	2.76	2.72	2.68
71.0	3.61	3.78	3.63	3.59	3.55	3.51	3.47	3.42	3.38	3.34	3.30	3.26	3.21	3.17	3.13	3.09	3.05	3.00	2.96	2.92	2.88	2.84	2.79	2.75	2.71
71.5	3.65	3.82	3.67	3.63	3.59	3.54	3.50	3.46	3.42	3.37	3.33	3.29	3.25	3.21	3.16	3.12	3.08	3.04	3.00	2.96	2.92	2.87	2.83	2.79	2.74
72.0	3.69	3.86	3.70	3.66	3.62	3.58	3.53	3.49	3.45	3.41	3.37	3.32	3.28	3.24	3.20	3.16	3.11	3.07	3.03	2.99	2.95	2.90	2.86	2.82	2.78
72.5	3.71	3.88	3.72	3.68	3.64	3.60	3.55	3.51	3.47	3.43	3.39	3.35	3.31	3.27	3.23	3.19	3.14	3.10	3.06	3.02	2.98	2.94	2.90	2.86	2.82
73.0	3.75	3.92	3.77	3.73	3.69	3.65	3.60	3.56	3.52	3.48	3.44	3.40	3.36	3.32	3.28	3.24	3.19	3.14	3.10	3.06	3.02	2.97	2.93	2.89	2.85
73.5	3.78	3.95	3.81	3.76	3.72	3.68	3.64	3.60	3.56	3.51	3.47	3.43	3.39	3.34	3.30	3.26	3.22	3.18	3.13	3.09	3.05	3.01	2.97	2.92	2.88
74.0	3.82	3.99	3.84	3.80	3.76	3.71	3.67	3.63	3.59	3.55	3.50	3.46	3.42	3.38	3.34	3.29	3.25	3.21	3.17	3.13	3.08	3.04	3.00	2.96	2.92
74.5	3.85	4.02	3.87	3.83	3.79	3.75	3.71	3.66	3.62	3.58	3.54	3.50	3.45	3.41	3.37	3.33	3.29	3.24	3.20	3.16	3.12	3.08	3.03	2.99	2.95
75.0	3.89	4.06	3.91	3.87	3.82	3.78	3.74	3.70	3.66	3.61	3.57	3.53	3.49	3.45	3.40	3.36	3.32	3.28	3.24	3.19	3.15	3.11	3.07	3.03	2.98
75.5	3.92	4.09	3.94	3.90	3.86	3.82	3.77	3.73	3.69	3.65	3.61	3.56	3.52	3.48	3.44	3.40	3.35	3.31	3.27	3.23	3.19	3.14	3.10	3.06	3.02
76.0	3.95	4.12	3.98	3.94	3.89	3.85	3.81	3.77	3.73	3.68	3.64	3.60	3.56	3.52	3.47	3.43	3.39	3.35	3.31	3.26	3.22	3.18	3.14	3.10	3.05
76.5	3.99	4.16	4.01	3.97	3.93	3.89	3.84	3.80	3.76	3.72	3.68	3.63	3.59	3.55	3.51	3.47	3.42	3.38	3.34						

~~Stat. Auth: ORS 654.025(2) and 656.726(4).~~
~~Stats. Implemented: ORS 654.001 through 654.295.~~
~~Hist: OR OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.~~

Appendix D – Pulmonary Function Standards for Cotton Dust Standard

The spirometric measurements of pulmonary function shall conform to the following minimum standards, and these standards are not intended to preclude additional testing or alternate methods which can be determined to be superior.

I. APPARATUS

a. The instrument shall be accurate to within ± 50 milliliters or within ± 3 percent of reading, whichever is greater.

b.

1. Instruments purchased on or before May 14, 2020 should be capable of measuring vital capacity from 0 to 7 liters BTPS.

2. Instruments purchased after May 14, 2020 should be capable of measuring vital capacity from 0 to 8 liters BTPS.

~~[The instrument should be capable of measuring vital capacity from 0 to 7 liters BTPS.]~~

c. The instrument shall have a low inertia and offer low resistance to airflow such that the resistance to airflow at 12 liters per second must be less than 1.5 cm H₂O/(liter/sec).

d. The zero time point for the purpose of timing the FEV₁ shall be determined by extrapolating the steepest portion of the volume time curve back to the maximal inspiration volume (1, 2, 3, 4) or by an equivalent method.

e.

1. Instruments purchased on or before May 14, 2020 that incorporate measurements of airflow to determine volume shall conform to the same volume accuracy stated in paragraph (a) of this section I when presented with flow rates from at least 0 to 12 liters per second.

2. Instruments purchased after May 14, 2020 that incorporate measurements of airflow to determine volume shall conform to the same volume accuracy stated in paragraph (a) of this section I when presented with flow rates from at least 0 to 14 liters per second.

~~[Instruments incorporating measurements of airflow to determine volume shall conform to the same volume accuracy stated in (a) of this section when presented with flow rates from at least 0 to 12 liters per second.]~~

f. The instrument or user of the instrument must have a means of correcting volumes to body temperature saturated with water vapor (BTPS) under conditions of varying ambient spirometer temperatures and barometric pressures.

g.

1. Instruments purchased on or before May 14, 2020 shall provide a tracing or display of either flow versus volume or volume versus time during the entire forced expiration. A tracing or display is necessary to determine whether the patient has performed the test properly. The tracing must be stored and available for recall and must be of sufficient size that hand measurements may be made within the volume accuracy requirements of paragraph (a) of this section I. If a paper record is made it must have a paper speed of at least 2 cm/sec and a volume sensitivity of at least 10.0 mm of chart per liter of volume.

2. Instruments purchased after May 14, 2020 shall provide during testing a paper tracing or real-time display of flow versus volume and volume versus time for the entire forced expiration. Such a tracing or display is necessary to determine whether the worker has performed the test properly. Flow-volume and volume-time curves must be stored and available for recall. Real-time displays shall have a volume scale of at least 5 mm/L, a time scale of at least 10 mm/s, and a flow scale of at least 2.5 mm/L/s, when both flow-volume and volume-time displays are visible. If hand measurements will be made, paper tracings must be of sufficient size to allow those measurements to be made within the volume accuracy requirements of paragraph (a) of this section I. If a paper record is made it must have a paper speed of at least 2 cm/sec and a volume sensitivity of at least 10.0 mm of chart per liter of volume.

~~[The instrument used shall provide a tracing or display of either flow versus volume or volume versus time during the entire forced expiration. A tracing or display is necessary to determine whether the patient has performed the test properly. The tracing must be stored and available for recall and must be of sufficient size that hand measurements may be made within requirement of paragraph (a) of this section. If a paper record is made it must have a paper speed of at least 2 cm/sec and a volume sensitivity of at least 10.0 mm of chart per liter of volume.]~~

h.

1. Instruments purchased on or before May 14, 2020 shall be capable of accumulating volume for a minimum of 10 seconds and shall not stop accumulating volume before (i) the volume change for a 0.5-second interval is less than 25 milliliters, or (ii) the flow is less than 50 milliliters per second for a 0.5 second interval.

2. Instruments purchased after May 14, 2020 shall be capable of accumulating volume for a minimum of 15 seconds and shall not stop accumulating volume before the volume change for a 1-second interval is less than 25 milliliters.

~~[The instrument shall be capable of accumulating volume for a minimum of 10 seconds and shall not stop accumulating volume before (1) the volume change for a 0.5-second interval is less than 25 milliliters, or (2) the flow is less than 50 milliliters per second for a 0.5-second interval.]~~

i. The forced vital capacity (FVC) and forced expiratory volume in 1 second (FEV1.0) measurements shall comply with the accuracy requirements stated in paragraph (a) of this section. That is, they should be accurately measured to within ± 50 ml or within ± 3 percent of reading, whichever is greater.

j.

1. Instruments purchased on or before May 14, 2020 must be capable of being

calibrated in the field with respect to the FEV1 and FVC. This calibration of the FEV1 and FVC may be either directly or indirectly through volume and time base measurements. The volume calibration source should provide a volume displacement of at least 2 liters and should be accurate to within ± 30 milliliters.

2. Instruments purchased after May 14, 2020 must be capable of having its calibration checked in the field and be recalibrated, if necessary, if the spirometer requires the technician to do so. The volume-calibration syringe shall provide a volume displacement of at least 3 liters and shall be accurate to within ± 0.5 percent of 3 liters (15 milliliters).

~~[The instrument must be capable of being calibrated in the field with respect to the FEV1 and FVC. This calibration of the FEV1 and FVC may be either directly or indirectly through volume and time base measurements. The volume calibration source should provide a volume displacement of at least 2 liters and should be accurate to within ± 30 milliliters.]~~

II. TECHNIQUE FOR MEASUREMENT OF FORCED VITAL CAPACITY MANEUVER

a. Use of a nose clip is recommended but not required. The procedures shall be explained in simple terms to the patient who shall be instructed to loosen any tight clothing and stand in front of the apparatus. The subject may sit, but care should be taken on repeat testing that the same position be used and, if possible, the same spirometer. Particular attention shall be given to insure that the chin is slightly elevated with the neck slightly extended. The patient shall be instructed to make a full inspiration from a normal breathing pattern and then blow into the apparatus, without interruption, as hard, fast, and completely as possible. At least three **and no more than eight** forced expirations shall be carried out. During the maneuvers, the patient shall be observed for compliance with instruction. The expirations shall be checked visually for reproducibility from flow-volume or volume-time tracings or displays. The following efforts shall be judged unacceptable when the patient:

1. Has not reached full inspiration preceding the forced expiration,
2. Has not used maximal effort during the entire forced expiration,
3. Has not continued the expiration for at least **6 seconds and the volume-time curve shows no change in volume (<0.025 L) for at least one** second~~[5 seconds or until an obvious plateau in the volume-time curve has occurred]~~,
4. Has coughed **in the first second** or closed ~~[his]~~**the** glottis,
5. Has an obstructed mouthpiece or a leak around the mouthpiece (obstruction due to tongue being placed in front of mouthpiece, false teeth falling in front of mouthpiece, etc.)
6. Has an unsatisfactory start of expiration, one characterized by excessive hesitation (or false starts), and therefore not allowing back extrapolation of time 0 (extrapolated volume on the **volume-time tracing must be less than 150 milliliters or 5 percent of the FVC, whichever is greater**), and~~[volume-time tracing must be less than 10 percent of the FVC.]~~

7. Has an excessive variability between the three acceptable curves. The variation between the two largest FVC's and FEV1's of the ~~three~~ satisfactory tracings **shall not exceed 150 milliliters and the difference between the two largest FEV1s of the satisfactory tracings shall not exceed 150 milliliters.** ~~[should not exceed 10 percent or ± 100 milliliters, whichever is greater].~~

b. **Calibration checks of the volume accuracy of the instrument for recording FVC and FEV1 shall be performed daily or more frequently if specified by the spirometer manufacturer, using a 3-liter syringe. Calibration checks to ensure that the spirometer is recording 3 liters of injected air to within ± 3.5 percent, or 2.90 to 3.10 liters, shall be conducted. Calibration checks of flow-type spirometers shall include injection of 3 liters air over a range of speeds, with injection times of 0.5 second, 3 seconds, and 6 or more seconds. Checks of volume-type spirometers shall include a single calibration check and a check to verify that the spirometer is not leaking more than 30 milliliters/minute air.**

~~[Periodic and routine recalibration of the instrument or method for recording FVC and FEV1.0 should be performed using a syringe or other volume source of at least 2 liters.]~~

III. INTERPRETATION OF SPIROGRAM

a. The first step in evaluating a spirogram should be to determine whether or not the **worker**~~[patient]~~ has performed the test properly or as described in **section II of this appendix**~~[-II above]~~. From the three satisfactory tracings, the forced vital capacity (FVC) and forced expiratory volume in 1 second (FEV1~~[-0]~~) shall be measured and recorded. The largest observed FVC and largest observed FEV1 shall be used in the analysis regardless of the curve(s) on which they occur.

b. ~~[Reserved.] [The following guidelines are recommended by NIOSH for the evaluation and management of workers exposed to cotton dust. It is important to note that employees who show reductions in FEV1/FVC ratio below .75 or drops in Monday FEV1 of 5 percent or greater on their initial screening exam, should be re-evaluated within a month of the first exam. Those who show consistent decrease in lung function, as shown on the following table, should be managed as recommended.]~~

IV. QUALIFICATIONS OF PERSONNEL ADMINISTERING THE TEST

Technicians who perform pulmonary function testing should have the basic knowledge required to produce meaningful results. Training consisting of approximately 16 hours of formal instruction should cover the following areas.

a. Basic physiology of the forced vital capacity maneuver and the determinants of airflow limitation with emphasis on the relation to reproducibility of results.

b. Instrumentation requirements including calibration procedures, sources of error and their correction.

c. Performance of the testing including subject coaching, recognition of improperly performed maneuvers and corrective actions.

- d. Data quality with emphasis on reproducibility.
- e. Actual use of the equipment under supervised conditions.
- f. Measurement of tracings and calculations of results.

Stat. Auth: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1044
1,2-Dibromo-3-Chloropropane.

(a) Scope and application.

(1) This section applies to occupational exposure to 1,2-dibromo-3-chloropropane (DBCP).

(2) This section does not apply to:

- (i) Exposure to DBCP which results solely from the application and use of DBCP as a pesticide; or
- (ii) The storage, transportation, distribution or sale of DBCP in intact containers sealed in such a manner as to prevent exposure to DBCP vapors or liquid, except for the requirements of paragraphs (i), (n) and (o) of this section.

(b) Definitions.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person required by his duties to be present in regulated areas and authorized to do so by his employer, by this section, or by the Act. "Authorized person" also includes any person entering such areas as a designated representative of employees exercising an opportunity to observe employee exposure monitoring.

DBCP means 1,2-dibromo-3-chloropropane, Chemical Abstracts Service Registry Number 96-12-8, and includes all forms of DBCP.

Director means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence such as, but not limited to equipment failure, rupture of containers, or failure of control equipment which may, or does, result in an unexpected release of DBCP.

OSHA Area Office means the Area Office of the Occupational Safety and Health Administration having jurisdiction over the geographic area where the affected workplace is located.

(c) Permissible exposure limit.

(1) Inhalation. The employer shall assure that no employee is exposed to an airborne concentration of DBCP in excess of 1 part DBCP per billion parts of air (ppb) as an 8 hour time-weighted average.

(2) Dermal and eye exposure. The employer shall assure that no employee is exposed to eye or skin contact with DBCP.

(d) Reserved.

(e) Regulated areas.

(1) The employer shall establish, within each place of employment, regulated areas wherever DBCP concentrations are in excess of the permissible exposure limit.

(2) The employer shall limit access to regulated areas to authorized persons.

(f) Exposure monitoring.

(1) General.

(i) Determinations of airborne exposure levels shall be made from air samples that are representative of each employee's exposure to DBCP over an 8-hour period.

(ii) For the purposes of this paragraph, employee exposure is that exposure which would occur if the employee were not using a respirator.

(2) Initial. Each employer who has a place of employment in which DBCP is present, shall monitor each workplace and work operation to accurately determine the airborne concentrations of DBCP to which employees may be exposed.

(3) Frequency.

(i) If the monitoring required by this section reveals employee exposures to be at or below the permissible exposure limit, the employer must repeat these measurements at least every 6 months.

(ii) If the monitoring required by this section reveals employee exposures to be in excess of the permissible exposure limit, the employer must repeat these measurements for each such employee at least quarterly. The employer must continue quarterly monitoring until at least two consecutive measurements, taken at least seven (7) days apart, are at or below the permissible exposure limit. Thereafter the employer must monitor at least every 6 months.

(4) Additional. Whenever there has been a production, process, control, or personnel change which may result in any new or additional exposure to DBCP, or whenever the employer has any reason to suspect new or additional exposures to DBCP, the employer shall monitor the employees potentially affected by such change for the purpose of redetermining their exposure.

(5) Employee notification.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Whenever the results indicate that employee exposure exceeds the permissible exposure limit, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action being taken to reduce exposure to or below the permissible exposure limit.

(6) Accuracy of measurement. The employer shall use a method of measurement which has an accuracy, to a confidence level of 95 percent, of not less than plus or minus 25 percent for concentrations of DBCP at or above the permissible exposure limit.

(g) Methods of compliance.

(1) Priority of compliance methods. The employer shall institute engineering and work practice controls to reduce and maintain employee exposures to DBCP at or below the permissible exposure limit, except to the extent that the employer establishes that such controls are not feasible. Where feasible engineering and work practice controls are not sufficient to reduce employee exposures to within the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls, and shall supplement them by use of respiratory protection.

(2) Compliance program.

(i) The employer shall establish and implement a written program to reduce employee exposures to DBCP to or below the permissible exposure limit solely by means of engineering and work practice controls as required by paragraph (g)(1) of this section.

(ii) The written program shall include a detailed schedule for development and implementation of the engineering and work practice controls. These plans must be revised at least annually to reflect the current status of the program.

(iii) Written plans for these compliance programs shall be submitted upon request to the Assistant Secretary and the Director, and shall be available at the worksite for examination and copying by the Assistant Secretary, the Director, and any affected employee or designated representative of employees.

(iv) The employer shall institute and maintain at least the controls described in his most recent written compliance program.

(h) Respiratory protection.

(1) General. For employees who are required to use respirators by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Maintenance and repair activities for which engineering and work-practice controls are not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the permissible exposure limit.

(iv) Emergencies.

Oregon OSHA repealed 1910.1044(h)(2). In Oregon, OAR 437-002-1044 applies.

437-002-1044 1,2-Dibromo-3-Chloropropane Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1044 1,2-Dibromo-3-Chloropropane, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these 1,2-Dibromo-3-Chloropropane rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(3) Respirator selection. Employers must:

(i) Select, and provide to employees, the appropriate atmosphere-supplying respirator specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(ii) Provide employees with one of the following respirator options to use for entry into, or escape from, unknown DBCP concentrations:

(A) A combination respirator that includes a supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure or continuous-flow mode, as well as an auxiliary self-contained breathing apparatus (SCBA) operated in a pressure-demand or positive-pressure mode.

(B) An SCBA with a full facepiece operated in a pressure-demand or other positive-pressure mode.

(i) Emergency situations.

(1) Written plans.

(i) A written plan for emergency situations shall be developed for each workplace in which DBCP is present.

(ii) Appropriate portions of the plan shall be implemented in the event of an emergency.

(2) Employees engaged in correcting emergency conditions shall be equipped as required in paragraphs (h) and (j) of this section until the emergency is abated.

(3) Evacuation. Employees not engaged in correcting the emergency shall be removed and restricted from the area and normal operations in the affected area shall not be resumed until the emergency is abated.

(4) Alerting employees. Where there is a possibility of employee exposure to DBCP due to the occurrence of an emergency, a general alarm shall be installed and maintained to promptly alert employees of such occurrences.

(5) Medical surveillance. For any employee exposed to DBCP in an emergency situation, the employer shall provide medical surveillance in accordance with paragraph (m)(6) of this section.

(6) Exposure monitoring.

(i) Following an emergency, the employer shall conduct monitoring which complies with paragraph (f) of this section.

(ii) In workplaces not normally subject to periodic monitoring, the employer may terminate monitoring when two consecutive measurements indicate exposures below the permissible exposure limit.

(j) Protective clothing and equipments.

(1) Provision and use. Where there is any possibility of eye or dermal contact with liquid or solid DBCP, the employer shall provide, at no cost to the employee, and assure that the employee wears impermeable protective clothing and equipment to protect the area of the body which may come in contact with DBCP. Eye and face protection shall meet the requirements of OAR 437-002-0134(8).

(2) Removal and storage.

(i) The employer shall assure that employees remove DBCP contaminated work clothing only in change rooms provided in accordance with paragraph (l)(1) of this section.

(ii) The employer shall assure that employees promptly remove any protective clothing and equipment which becomes contaminated with DBCP-containing liquids and solids. This

clothing shall not be reworn until the DBCP has been removed from the clothing or equipment.

(iii) The employer shall assure that no employee takes DBCP contaminated protective devices and work clothing out of the change room, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(iv) DBCP-contaminated protective devices and work clothing shall be placed and stored in closed containers which prevent dispersion of the DBCP outside the container.

(v) Containers of DBCP-contaminated protective devices or work clothing which are to be taken out of change rooms or the workplace for cleaning, maintenance or disposal, shall bear labels with the following information:

CONTAMINATED WITH 1,2-DIBROMO-3-CHLOROPROPANE (DBCP),
MAY CAUSE CANCER

(3) Cleaning and replacement.

(i) The employer shall clean, launder, repair, or replace protective clothing and equipment required by this paragraph to maintain their effectiveness. The employer shall provide clean protective clothing and equipment at least daily to each affected employee.

(ii) The employer shall inform any person who launders or cleans DBCP-contaminated protective clothing or equipment of the potentially harmful effects of exposure to DBCP.

(iii) The employer shall prohibit the removal of DBCP from protective clothing and equipment by blowing or shaking.

(k) Housekeeping.

(1) Surfaces.

(i) All workplace surfaces shall be maintained free of visible accumulations of DBCP.

(ii) Dry sweeping and the use of compressed air for the cleaning of floors and other surfaces is prohibited where DBCP dusts or liquids are present.

(iii) Where vacuuming methods are selected to clean floors and other surfaces, either portable units or a permanent system may be used.

(A) If a portable unit is selected, the exhaust shall be attached to the general workplace exhaust ventilation system or collected within the vacuum unit, equipped with high efficiency filters or other appropriate means of contaminant removal, so that DBCP is not reintroduced into the workplace air; and

(B) Portable vacuum units used to collect DBCP may not be used for other cleaning purposes and shall be labeled as prescribed by paragraph (j)(2)(v) of this section.

(iv) Cleaning of floors and other surfaces contaminated with DBCP-containing dusts shall not be performed by washing down with a hose, unless a fine spray has first been laid down.

(2) Liquids. Where DBCP is present in a liquid form, or as a resultant vapor, all containers or vessels containing DBCP shall be enclosed to the maximum extent feasible and tightly covered when not in use.

(3) Waste disposal. DBCP waste scrap, debris, containers or equipment, shall be disposed of in sealed bags or other closed containers which prevent dispersion of DBCP outside the container.

(l) Hygiene facilities and practices.

(1) Change rooms. The employer shall provide clean change rooms equipped with storage facilities for street clothes and separate storage facilities for protective clothing and equipment whenever employees are required to wear protective clothing and equipment in accordance with paragraphs (h) and (j) of this section.

(2) Showers.

(i) The employer shall assure that employees working in the regulated area shower at the end of the work shift.

(ii) The employer shall assure that employees whose skin becomes contaminated with DBCP-containing liquids or solids immediately wash or shower to remove any DBCP from the skin.

(iii) The employer shall provide shower facilities in accordance with 29 CFR 1910.141(d)(3).

(3) Lunchrooms. The employer shall provide lunchroom facilities which have a temperature controlled, positive pressure, filtered air supply, and which are readily accessible to employees working in regulated areas.

(4) Lavatories.

(i) The employer shall assure that employees working in the regulated area remove protective clothing and wash their hands and face prior to eating.

(ii) The employer shall provide a sufficient number of lavatory facilities which comply with 29 CFR 1910.141(d)(1) and (2).

(5) Prohibition of activities in regulated areas. The employer shall assure that, in regulated areas, food or beverages are not present or consumed, smoking products and implements are not present or used, and cosmetics are not present or applied.

(m) Medical surveillance.

(1) General.

(i) The employer shall make available a medical surveillance program for employees who work in regulated areas and employees who are subjected to DBCP exposures in an emergency situation.

(ii) All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee.

(2) Frequency and content. At the time of initial assignment, and annually thereafter, the employer shall provide a medical examination for employees who work in regulated areas, which includes at least the following:

(i) A medical and occupational history including reproductive history.

(ii) A physical examination, including examination of the genito-urinary tract, testicle size and body habitus, including a determination of sperm count.

(iii) A serum specimen shall be obtained and the following determinations made by radioimmunoassay techniques utilizing National Institutes of Health (NIH) specific antigen or one of equivalent sensitivity:

(A) Serum follicle stimulating hormone (FSH);

(B) Serum luteinizing hormone (LH); and

(C) Serum total estrogen (females).

(iv) Any other tests deemed appropriate by the examining physician.

(3) Additional examinations. If the employee for any reason develops signs or symptoms commonly associated with exposure to DBCP, the employer shall provide the employee with a medical examination which shall include those elements considered appropriate by the examining physician.

(4) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this regulation and its appendices;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The level of DBCP to which the employee is exposed; and

(iv) A description of any personal protective equipment used or to be used.

(5) Physician's written opinion.

(i) For each examination under this section, the employer shall obtain and provide the employee with a written opinion from the examining physician which shall include:

(A) The results of the medical tests performed;

(B) The physician's opinion as to whether the employee has any detected medical condition which would place the employee at an increased risk of material impairment of health from exposure to DBCP; and

(C) Any recommended limitations upon the employee's exposure to DBCP or upon the use of protective clothing and equipment such as respirators.

(ii) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure.

(6) Emergency situations. If the employee is exposed to DBCP in an emergency situation, the employer shall provide the employee with a sperm count test as soon as practicable, or, if the employee has been vasectomized or is unable to produce a semen specimen, the hormone tests contained in paragraph (m)(2)(iii) of this section. The employer shall provide these same tests three months later.

(n) Employee information and training.

(1) Training program.

(i) The employer shall train each employee who may be exposed to DBCP in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

(ii) The employer shall assure that each employee is informed of the following:

(A) The information contained in Appendix A;

(B) The quantity, location, manner of use, release or storage of DBCP and the specific nature of operations which could result in exposure to DBCP as well as any necessary protective steps;

(C) The purpose, proper use, and limitations of respirators;

(D) The purpose and description of the medical surveillance program required by paragraph (m) of this section; and

(E) A review of this standard, including appendices.

(2) Access to training materials.

(i) The employer shall make a copy of this standard and its appendices readily available to all affected employees.

(ii) The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the Director.

(o) Communication of hazards.

(1) Hazard communication - general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for DBCP.

(ii) In classifying the hazards of DBCP at least the following hazards are to be addressed: Cancer; reproductive effects; liver effects; kidney effects; central nervous system effects; skin, eye and respiratory tract irritation; and acute toxicity effects.

(iii) Employers shall include DBCP in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of DBCP and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (n) of this section.

(iv) The employer shall ensure that no statement appears on or near any sign or label required by this paragraph (o) which contradicts or detracts from the meaning of the required sign or label.

(2) Signs.

(i) The employer shall post signs to clearly indicate all regulated areas. These signs shall bear the legend:

DANGER
1,2-DIBROMO-3-CHLOROPROPANE
MAY CAUSE CANCER
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(ii) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (o)(2) of this section:

DANGER
1,2-Dibromo-3-chloropropane
(Insert appropriate trade or common names)
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATOR REQUIRED

(3) Labels.

(i) Where DBCP or products containing DBCP are sold, distributed or otherwise leave the employer's workplace bearing appropriate labels required by EPA under the regulations in 40 CFR Part 162, the labels required by this paragraph (o)(3) need not be affixed.

(ii) The employer shall ensure that the precautionary labels required by this paragraph (o)(3) are readily visible and legible.

(iii) Prior to June 1, 2015, employers may include the following information on containers of DBCP or products containing DBCP, DBCP-contaminated protective devices or work clothing or DBCP-contaminated portable vacuums in lieu of the labeling requirements in paragraphs (j)(2)(v), (k)(l)(iii)(b) and (o)(1)(i) of this section:

DANGER
1,2-Dibromo-3-chloropropane
CANCER HAZARD

(p) Recordkeeping.

(1) Exposure monitoring.

(i) The employer shall establish and maintain an accurate record of all monitoring required by paragraph (f) of this section.

(ii) This record shall include:

(A) The dates, number, duration and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure;

(B) A description of the sampling and analytical methods used;

(C) Type of respiratory protective devices worn, if any; and

(D) Name, ~~social security number,~~ and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for at least 40 years or the duration of employment plus 20 years, whichever is longer.

(2) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance required by paragraph (m) of this section.

(ii) This record shall include:

(A) The name ~~and social security number~~ of the employee;

(B) A copy of the physician's written opinion;

(C) Any employee medical complaints related to exposure to DBCP;

(D) A copy of the information provided the physician as required by paragraphs (m)(4)(ii) through (m)(4)(iv) of this section; and

(E) A copy of the employee's medical and work history.

(iii) The employer shall maintain this record for at least 40 years or the duration of employment plus 20 years, whichever is longer.

(3) Availability.

(i) The employer shall assure that all records required to be maintained by this section be made available upon request to the Assistant Secretary and the Director for examination and copying.

(ii) Employee exposure monitoring records and employee medical records required by this paragraph shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(4) Transfer of records.

(i) If the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by paragraph (p) of this section for the prescribed period.

(ii) The employer shall also comply with any additional requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(q) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees, or their designated representatives, with an opportunity to observe any monitoring of employee exposure to DBCP required by this section.

(2) Observation procedures.

(i) Whenever observation of the measuring or monitoring of employee exposure to DBCP requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with personal protective clothing or equipment required to be worn by employees working in the area, assure the use of such clothing and equipment, and require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring or measurement, observers shall be entitled to:

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the measurement of airborne concentrations of DBCP performed at the place of exposure; and

(C) Record the results obtained.

(r) Appendices. The information contained in the appendices is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligation.

[43 FR 11527, Mar. 17, 1978, as amended at 45 FR 35283, May 23, 1980; 49 FR 18295, Apr. 30, 1984; 54 FR 24334, June 7, 1989; 58 FR 35310, June 30, 1993; 61 FR 5508, Feb. 13, 1996; 63 FR 1291, Jan. 8, 1998; 70 FR 1142, Jan. 5, 2005; 71 FR 16772, Apr. 3, 2006; 71 FR 50189, Aug. 24, 2006; 73 FR 75586, Dec. 12, 2008; 76 FR 33609, June 8, 2011; 77 FR 17782, Mar. 26, 2012; 78 FR 9313, Feb. 8, 2013; **84 FR 21416, May 14, 2019.**]

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1045

Acrylonitrile.

(a) Scope and application.

(1) This section applies to all occupational exposures to acrylonitrile (AN), Chemical Abstracts Service Registry No. 000107131, except as provided in paragraphs (a)(2) and (a)(3) of this section.

(2) This section does not apply to exposures which result solely from the processing, use, and handling of the following materials:

(i) ABS resins, SAN resins, nitrile barrier resins, solid nitrile elastomers, and acrylic and modacrylic fibers, when these listed materials are in the form of finished polymers, and products fabricated from such finished polymers;

(ii) Materials made from and/or containing AN for which objective data is reasonably relied upon to demonstrate that the material is not capable of releasing AN in airborne concentrations in excess of 1 ppm as an eight (8)-hour time-weighted average, under the expected conditions of processing, use, and handling which will cause the greatest possible release; and

(iii) Solid materials made from and/or containing AN which will not be heated above 170° F during handling, use, or processing.

(3) An employer relying upon exemption under paragraph (a)(2)(ii) shall maintain records of the objective data supporting that exemption, and of the basis of the employer's reliance on the data, as provided in paragraph (q) of this section.

(b) Definitions.

Acrylonitrile or AN means acrylonitrile monomer, chemical formula $\text{CH}_2 = \text{CHCN}$.

Action level means a concentration of AN of 1 ppm as an eight (8)-hour time-weighted average.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the opportunity to observe monitoring procedures under paragraph (r) of this section.

Decontamination means treatment of materials and surfaces by water washdown, ventilation, or other means, to assure that the materials will not expose employees to airborne concentrations of AN above 1 means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment, which results in an unexpected massive release of AN.

Liquid AN means AN monomer in liquid form, and liquid or semi-liquid polymer intermediates, including slurries, suspensions, emulsions, and solutions, produced during the polymerization of AN.

OSHA Area Office means the Area Office of the Occupational Safety and Health Administration having jurisdiction over the geographic area where the affected workplace is located.

(c) Permissible exposure limits.

(1) Inhalation.

(i) Time weighted average limit (TWA). The employer shall assure that no employee is exposed to an airborne concentration of acrylonitrile in excess of two (2) parts acrylonitrile per million parts of air (2 ppm) as an eight (8)-hour time-weighted average.

(ii) Ceiling limit. The employer shall assure that no employee is exposed to an airborne concentration of acrylonitrile in excess of ten (10) ppm as averaged over any fifteen (15)-minute period during the work day.

(2) Dermal and eye exposure. The employer shall assure that no employee is exposed to skin contact or eye contact with liquid AN.

(d) Reserved.

(e) Exposure monitoring.

(1) General.

(i) Determinations of airborne exposure levels shall be made from air samples that are representative of each employee's exposure to AN over an eight (8)-hour period.

(ii) For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(2) Initial monitoring. Each employer who has a place of employment in which AN is present shall monitor each such workplace and work operation to accurately determine the airborne concentrations of AN to which employees may be exposed.

(3) Frequency.

(i) If the monitoring required by this section reveals employee exposure to be below the action level, the employer may discontinue monitoring for that employee.

(ii) If the monitoring required by this section reveals employee exposure to be at or above the action level but at or below the permissible exposure limits, the employer must repeat such monitoring for each such employee at least every 6 months. The employer must continue these measurements every 6 months until at least two consecutive measurements taken at least seven (7) days apart, are below the action level, and thereafter the employer may discontinue monitoring for that employee.

(iii) If the monitoring required by this section reveals employee exposure to be in excess of the permissible exposure limits, the employer must repeat these determinations for each such employee at least quarterly. The employer must continue these quarterly measurements until at least two consecutive measurements, taken at least seven (7) days apart, are at or below the permissible exposure limits, and thereafter the employer shall monitor at least every 6 months.

(4) Additional monitoring. Whenever there has been a production, process, control, or personnel change which may result in new or additional exposures to AN, or whenever the employer has any other reason to suspect a change which may result in new or additional exposures to AN, additional monitoring which complies with this paragraph shall be conducted.

(5) Employee notification.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results

either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Whenever the results indicate that the representative employee exposure exceeds the permissible exposure limits, the employer shall include in the written notice a statement that the permissible exposure limits were exceeded and a description of the corrective action being taken to reduce exposure to or below the permissible exposure limits.

(6) Accuracy of measurement. The method of measurement of employee exposures shall be accurate to a confidence level of 95 percent, to within plus or minus 35 percent for concentrations of AN at or above the permissible exposure limits, and plus or minus 50 percent for concentrations of AN below the permissible exposure limits.

(f) Regulated areas.

(1) The employer shall establish regulated areas where AN concentrations are in excess of the permissible exposure limits.

(2) Regulated areas shall be demarcated and segregated from the rest of the workplace, in any manner that minimizes the number of persons who will be exposed to AN.

(3) Access to regulated areas shall be limited to authorized persons or to persons otherwise authorized by the act or regulations issued pursuant thereto.

(4) The employer shall assure that food or beverages are not present or consumed, tobacco products are not present or used, and cosmetics are not applied in the regulated area.

(g) Methods of compliance.

(1) Engineering and work practice controls.

(i) By November 2, 1980, the employer shall institute engineering and work practice controls to reduce and maintain employee exposures to AN, to or below the permissible exposure limits, except to the extent that the employer establishes that such controls are not feasible.

(ii) Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limits, the employer shall nonetheless use them to reduce exposures to the lowest levels achievable by these controls, and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (h) of this section.

(2) Compliance program.

(i) The employer shall establish and implement a written program to reduce employee exposures to or below the permissible exposure limits solely by means of engineering and work practice controls, as required by paragraph (g)(1) of this section.

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each operation or process resulting in employee exposure to AN above the permissible exposure limits;

(B) An outline of the nature of the engineering controls and work practices to be applied to the operation or process in question;

(C) A report of the technology considered in meeting the permissible exposure limits;

(D) A schedule for implementation of engineering and work practice controls for the operation or process, which shall project completion no later than November 2, 1980; and

(E) Other relevant information.

(iii) The employer shall complete the steps set forth in the compliance program by the dates in the schedule.

(iv) Written plans shall be submitted upon request to the Assistant Secretary and the Director, and shall be available at the worksite for examination and copying by the Assistant Secretary, the Director, or any affected employee or representative.

(v) The plans required by this paragraph must be revised and updated at least annually to reflect the current status of the program.

(h) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Work operations, such as maintenance and repair activities or reactor cleaning, for which the employer establishes that engineering and work-practice controls are not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the permissible exposure limits.

(iv) Emergencies.

(2) Respirator program.

Oregon OSHA repealed 1910.1045(h)(2)(i). In Oregon, OAR 437-002-1045 applies.

437-002-1045 Acrylonitrile Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii), and (d)(3)(iii)(B)(1) and (2)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1045 Acrylonitrile, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Acrylonitrile rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) If air-purifying respirators (chemical-cartridge or chemical-canister types) are used:

(A) The air-purifying canister or cartridge must be replaced prior to the expiration of its service life or at the completion of each shift, whichever occurs first.

(B) A label must be attached to the cartridge or canister to indicate the date and time at which it is first installed on the respirator.

(3) Respirator selection. Employers must:

(i) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(ii) For escape, provide employees with any organic vapor respirator or any self-contained breathing apparatus permitted for use under paragraph (h)(3)(i) of this standard.

(i) Emergency situations.

(1) Written plans.

(i) A written plan for emergency situations shall be developed for each workplace where liquid AN is present. Appropriate portions of the plan shall be implemented in the event of an emergency.

(ii) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped as required in paragraph (h) of this section until the emergency is abated.

(iii) Employees not engaged in correcting the emergency shall be evacuated from the area and shall not be permitted to return until the emergency is abated.

(2) Alerting employees. Where there is the possibility of employee exposure to AN in excess of the ceiling limit, a general alarm shall be installed and used to promptly alert employees of such occurrences.

(j) Protective clothing and equipment.

(1) Provision and use. Where eye or skin contact with liquid AN may occur, the employer shall provide at no cost to the employee, and assure that employees wear, impermeable protective clothing or other equipment to protect any area of the body which may come in contact with liquid AN. The provision of OAR 437-002-0134 shall be complied with.

(2) Cleaning and replacement.

(i) The employer shall clean, launder, maintain, or replace protective clothing and equipment required by this section as needed to maintain their effectiveness.

(ii) The employer shall assure that impermeable protective clothing which contacts or is likely to have contacted liquid AN shall be decontaminated before being removed by the employee.

(iii) The employer shall assure that an employee whose non-impermeable clothing becomes wetted with liquid AN shall immediately remove that clothing and proceed to shower. The clothing shall be decontaminated before it is removed from the regulated area.

(iv) The employer shall assure that no employee removes protective clothing or equipment from the change room, except for those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment of the potentially harmful effects of exposure to AN.

(k) Housekeeping.

(1) All surfaces shall be maintained free of visible accumulations of liquid AN.

(2) For operations involving liquid AN, the employer shall institute a program for detecting leaks and spills of liquid AN, including regular visual inspections.

(3) Where spills of liquid AN are detected, the employer shall assure that surfaces contacted by the liquid AN are decontaminated. Employees not engaged in decontamination activities shall leave the area of the spill, and shall not be permitted in the area until decontamination is completed.

(l) Waste disposal. AN waste, scrap, debris, bags, containers, or equipment shall be decontaminated before being incorporated in the general waste disposal system.

(m) Hygiene facilities and practices.

(1) Where employees are exposed to airborne concentrations of AN above the permissible exposure limits, or where employees are required to wear protective clothing or equipment pursuant to paragraph (j) of this section, the facilities required by 29 CFR 1910.141, including clean change rooms and shower facilities, shall be provided by the employer for the use of those employees, and the employer shall assure that the employees use the facilities provided.

(2) The employer shall assure that employees wearing protective clothing or equipment for protection from skin contact with liquid AN shall shower at the end of the work shift.

(3) The employer shall assure that, in the event of skin or eye exposure to liquid AN, the affected employee shall shower immediately to minimize the danger of skin absorption.

(4) The employer shall assure that employees working in the regulated area wash their hands and faces prior to eating.

(n) Medical surveillance.

(1) General.

(i) The employer shall institute a program of medical surveillance for each employee who is or will be exposed to AN at or above the action level, without regard to the use of respirators. The employer shall provide each such employee with an opportunity for medical examinations and tests in accordance with this paragraph.

(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and that they shall be provided without cost to the employee.

(2) Initial examinations. At the time of initial assignment, or upon institution of the medical surveillance program, the employer shall provide each affected employee an opportunity for a medical examination, including at least the following elements:

(i) A work history and medical history with special attention to skin, respiratory, and gastrointestinal systems, and those nonspecific symptoms, such as headache, nausea, vomiting, dizziness, weakness, or other central nervous system dysfunctions that may be associated with acute or with chronic exposure to AN;

(ii) A complete physical examination giving particular attention to the peripheral and central nervous system, gastrointestinal system, respiratory system, skin, and thyroid;

(iii) A 14- by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray; and

(iv) Further tests of the intestinal tract, including fecal occult blood screening, for all workers 40 years of age or older, and for any other affected employees for whom, in the opinion of the physician, such testing is appropriate.

(3) Periodic examinations.

(i) The employer shall provide the examinations specified in paragraph (n)(2)(i), (ii), and (iv) of this section at least annually for all employees specified in paragraph (n)(1) of this section.

(ii) If an employee has not had the examination specified in paragraph (n)(2)(i), (ii), and (iv) of this section within 6 months preceding termination of employment, the employer shall make such examination available to the employee prior to such termination.

(4) Additional examinations. If the employee for any reason develops signs or symptoms which may be associated with exposure to AN, the employer shall provide an appropriate examination and emergency medical treatment.

(5) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and its appendices;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's representative exposure level;

(iv) The employee's anticipated or estimated exposure level (for pre-placement examinations or in cases of exposure due to an emergency);

(v) A description of any personal protective equipment used or to be used; and

(vi) Information from previous medical examinations of the affected employee, which is not otherwise available to the examining physician.

(6) Physician's written opinion.

(i) The employer shall obtain a written opinion from the examining physician which shall include:

(A) The results of the medical examination and test performed;

(B) The physician's opinion as to whether the employee has any detected medical condition(s) which would place the employee at an increased risk of material impairment of the employee's health from exposure to AN;

(C) Any recommended limitations upon the employee's exposure to AN or upon the use of protective clothing and equipment such as respirators; and

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

(ii) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure to AN.

(iii) The employer shall provide a copy of the written opinion to the affected employee.

(o) Employee information and training.

(1) Training program.

(i) The employer shall train each employee exposed to AN above the action level, each employee whose exposures are maintained below the action level by engineering and work practice controls, and each employee subject to potential skin or eye contact with liquid AN in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

(ii) Training shall be provided at the time of initial assignment, or upon institution of the training program, and at least annually thereafter, and the employer shall assure that each employee is informed of the following:

(A) The information contained in Appendixes A and B;

(B) The quantity, location, manner of use, release, or storage of AN, and the specific nature of operations which could result in exposure to AN, as well as any necessary protective steps;

(C) The purpose, proper use, and limitations of respirators and protective clothing;

(D) The purpose and a description of the medical surveillance program required by paragraph (n) of this section;

(E) The emergency procedures developed, as required by paragraph (i) of this section;

(F) Engineering and work practice controls, their function, and the employee's relationship to these controls; and

(G) A review of this standard.

(2) Access to training materials.

(i) The employer shall make a copy of this standard and its appendixes readily available to all affected employees.

(ii) The employer shall provide, upon request, all materials relating to the employee information and training program to the Assistant Secretary and the Director.

(p) Communication of hazards.

(1) Hazard communication - general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for AN and AN-based materials not exempted under paragraph (a)(2) of this section.

(ii) In classifying the hazards of AN and AN-based materials at least the following hazards are to be addressed: Cancer; central nervous system effects; liver effects; skin sensitization; skin, respiratory, and eye irritation; acute toxicity effects; and flammability.

(iii) Employers shall include AN and AN-based materials in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of AN and AN-based materials and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (o) of this section.

(iv) The employer shall ensure that no statement appears on or near any sign or label required by this paragraph (p) that contradicts or detracts from the required sign or label.

(2) Signs.

(i) The employer shall post signs to clearly indicate all workplaces where AN concentrations exceed the permissible exposure limits. The signs shall bear the following legend:

DANGER
ACRYLONITRILE (AN)
MAY CAUSE CANCER
RESPIRATORY PROTECTION MAY BE REQUIRED IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(ii) The employer shall ensure that signs required by this paragraph (p)(2) are illuminated and cleaned as necessary so that the legend is readily visible.

(iii) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (p)(2)(i) of this section:

DANGER
ACRYLONITRILE (AN)
CANCER HAZARD
RESPIRATORY PROTECTION MAY BE REQUIRED IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(3) Labels.

(i) The employer shall ensure that precautionary labels are in compliance with paragraph (p)(1)(i) of this section and are affixed to all containers of liquid AN and AN-based materials not exempted under paragraph (a)(2) of this section. The employer shall ensure that the labels remain affixed when the materials are sold, distributed, or otherwise leave the employer's workplace.

(ii) Prior to June 1, 2015, employers may include the following information on precautionary labels required by this paragraph (p)(3) in lieu of the labeling requirements in paragraph (p)(1) of this section:

DANGER
CONTAINS ACRYLONITRILE (AN)
CANCER HAZARD

(iii) The employer shall ensure that the precautionary labels required by this paragraph (p)(3) are readily visible and legible.

(q) Recordkeeping.

(1) Objective data for exempted operations.

(i) Where the processing, use, and handling of materials made from or containing AN are exempted pursuant to paragraph (a)(2)(ii) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) This record shall include at least the following information:

(A) The material qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of AN;

(D) A description of the operation exempted and how the data supports the exemption; and

(E) Other data relevant to the operations, materials, and processing covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Exposure monitoring.

(i) The employer shall establish and maintain an accurate record of all monitoring required by paragraph (e) of this section.

(ii) This record shall include:

(A) The dates, number, duration, and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure;

(B) A description of the sampling and analytical methods used and the data relied upon to establish that the methods used meet the accuracy and precision requirements of paragraph (e)(6) of this section;

(C) Type of respiratory protective devices worn, if any; and

(D) Name, ~~[social security number,]~~ and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for at least forty (40) years, or for the duration of employment plus twenty (20) years, whichever is longer.

(3) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by paragraph (n) of this section.

(ii) This record shall include:

(A) A copy of the physician's written opinions;

(B) Any employee medical complaints related to exposure to AN;

(C) A copy of the information provided to the physician as required by paragraph (n)(5) of this section; and

(D) A copy of the employee's medical and work history.

(iii) The employer shall assure that this record be maintained for at least forty (40) years, or for the duration of employment plus twenty (20) years, whichever is longer.

(4) Availability.

(i) The employer shall make all records required to be maintained by this section available, upon request, to the Assistant Secretary and the Director for examination and copying.

(ii) Records required by paragraphs (q)(1) through (q)(3) of this section shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i). Records required by paragraph (q)(1) shall be provided in the same manner as exposure monitoring records.

(5) Transfer of records.

(i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by this section for the prescribed period.

(ii) The employer shall also comply with any additional requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(r) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees, or their designated representatives, an opportunity to observe any monitoring of employee exposure to AN conducted pursuant to paragraph (e) of this section.

(2) Observation procedures.

(i) Whenever observation of the monitoring of employee exposure to AN requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with personal protective clothing and equipment required to be worn by employees working in the area, assure the use of such clothing and equipment, and require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring, observers shall be entitled:

(A) To receive an explanation of the measurement procedures;

(B) To observe all steps related to the measurement of airborne concentrations of AN performed at the place of exposure; and

(C) To record the results obtained.

(s) Reserved.

(t) Appendices. The information contained in the appendices is not intended, by itself, to create any additional obligation not otherwise imposed, or to detract from any obligation.

[43 FR 45809, Oct. 3, 1978, as amended at 45 FR 35283, May 23, 1980; 54 FR 24334, June 7, 1989; 58 FR 35310, June 30, 1993; 61 FR 5508, Feb. 13, 1996; 63 FR 1291, Jan. 8, 1998; 63 FR 20099, Apr. 23, 1998; 70 FR 1142, Jan. 5, 2005; 71 FR 16672, 16673, Apr. 3, 2006; 71 FR 50190, Aug. 24, 2006; 73 FR 75586, Dec. 12, 2008; 76 FR 33609, June 8, 2011; 77 FR 17783, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth: ORS 654.025(2) and 656.726(4)

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 12-1993, f. 8/20/93, ef. 11/1/93.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1047

Ethylene Oxide

(a) Scope and application.

(1) This section applies to all occupational exposures to ethylene oxide (EtO), Chemical Abstracts Service Registry No. 75-21-8, except as provided in paragraph (a)(2) of this section.

(2) This section does not apply to the processing, use, or handling of products containing EtO where objective data are reasonably relied upon that demonstrate that the product is not capable of releasing EtO in airborne concentrations at or above the action level and may not reasonably be foreseen to release EtO in excess of the excursion limit, under the expected conditions of processing, use, or handling that will cause the greatest possible release.

(3) Where products containing EtO are exempted under paragraph (a)(2) of this section, the employer shall maintain records of the objective data supporting that exemption and the basis for the employer's reliance on the data, as provided in paragraph (k)(1) of this section.

(b) Definitions. For the purpose of this section, the following definitions shall apply:

Action level means a concentration of airborne EtO of 0.5 ppm calculated as an eight (8) hour time-weighted average.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (l) of this section, or any other person authorized by the Act or regulations issued under the Act.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that is likely to or does result in an unexpected significant release of EtO.

Employee exposure means exposure to airborne EtO which would occur if the employee were not using respiratory protective equipment.

Ethylene oxide or EtO means the three-membered ring organic compound with chemical formula C_2H_4O .

(c) Permissible exposure limits.

(1) 8-hour time-weighted average (TWA). The employer shall ensure that no employee is exposed to an airborne concentration of EtO in excess of one (1) part EtO per million parts of air (1 ppm) as an 8-hour time-weighted average (8-hour TWA).

(2) Excursion limit. The employer shall ensure that no employee is exposed to an airborne concentration of EtO in excess of 5 parts of EtO per million parts of air (5 ppm) as averaged over a sampling period of fifteen (15) minutes.

(d) Exposure monitoring.

(1) General.

(i) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 15-minute short-term exposures of each employee.

(ii) Representative 8-hour TWA employee exposure shall be determined on the basis of one or more samples representing full-shift exposure for each shift for each job classification in each work area. Representative 15-minute short-term employee exposures shall be determined on the basis of one or more samples representing 15 minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

(iii) Where the employer can document that exposure levels are equivalent for similar operations in different work shifts, the employer need only determine representative employee exposure for that operation during one shift.

(2) Initial monitoring.

(i) Each employer who has a workplace or work operation covered by this standard, except as provided for in paragraph (a)(2) or (d)(2)(ii) of this section, shall perform initial monitoring to determine accurately the airborne concentrations of EtO to which employees may be exposed.

(ii) Where the employer has monitored after June 15, 1983 and the monitoring satisfies all other requirements of this section, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (d)(2)(i) of this section.

(iii) Where the employer has previously monitored for the excursion limit and the monitoring satisfies all other requirements of this sections, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (d)(2)(i) of this section.

(3) Monitoring frequency (periodic monitoring).

(i) If the monitoring required by paragraph (d)(2) of this section reveals employee exposure at or above the action level but at or below the 8-hour TWA, the employer shall repeat such monitoring for each such employee at least every 6 months.

(ii) If the monitoring required by paragraph (d)(2)(i) of this section reveals employee exposure above the 8-hour TWA, the employer shall repeat such monitoring for each such employee at least every 3 months.

(iii) The employer may alter the monitoring schedule from quarterly to semi-annually for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee's exposure has decreased to or below the 8-hour TWA.

(iv) If the monitoring required by paragraph (d)(2)(i) of this section reveals employee exposure above the 15 minute excursion limit, the employer shall repeat such monitoring for each such employee at least every 3 months, and more often as necessary to evaluate exposure the employee's short-term exposures.

(4) Termination of monitoring.

(i) If the initial monitoring required by paragraph (d)(2)(i) of this section reveals employee exposure to be below the action level, the employer may discontinue TWA monitoring for those employees whose exposures are represented by the initial monitoring.

(ii) If the periodic monitoring required by paragraph (d)(3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level, the employer may discontinue TWA monitoring for those employees whose exposures are represented by such monitoring.

(iii) If the initial monitoring required by paragraph (d)(2)(1) of this section reveals employee exposure to be at or below the excursion limit, the employer may discontinue excursion limit monitoring for those employees whose exposures are represented by the initial monitoring.

(iv) If the periodic monitoring required by paragraph (d)(3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are at or below the excursion limit, the employer may discontinue excursion limit monitoring for those employees whose exposures are represented by such monitoring.

(5) Additional monitoring. Notwithstanding the provisions of paragraph (d)(4) of this section, the employer shall institute the exposure monitoring required under paragraphs (d)(2)(i) and (d)(3) of this section whenever there has been a change in the production, process, control equipment, personnel or work practices that may result in new or additional exposures to EtO or when the employer has any reason to suspect that a change may result in new or additional exposures.

(6) Accuracy of monitoring.

(i) Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of EtO at the 1 ppm TWA and to within plus or minus 35 percent for airborne concentrations of EtO at the action level of 0.5 ppm.

(ii) Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 35 percent for airborne concentrations of EtO at the excursion limit.

(7) Employee notification of monitoring results.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) The written notification required by paragraph (d)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce employee exposure to or below the TWA and/or excursion limit, wherever monitoring results indicated that the TWA and/or excursion limit has been exceeded.

(e) Regulated Areas.

(1) The employer shall establish a regulated area wherever occupational exposures to airborne concentrations of EtO may exceed the TWA or wherever the EtO concentration exceeds or can reasonably be expected to exceed the excursion limit.

(2) Access to regulated areas shall be limited to authorized persons.

(3) Regulated areas shall be demarcated in any manner that minimizes the number of employees within the regulated area.

(f) Methods of compliance.

(1) Engineering controls and work practices.

(i) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to or below the TWA and to or below the excursion limit, except to the extent that such controls are not feasible.

(ii) Wherever the feasible engineering controls and work practices that can be instituted are not sufficient to reduce employee exposure to or below the TWA and to or below the excursion limit, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (g) of this section.

(iii) Engineering controls are generally infeasible for the following operations: collection of quality assurance sampling from sterilized materials removal of biological indicators from sterilized materials; loading and unloading of tank cars; changing of ethylene oxide tanks on sterilizers; and vessel cleaning. For these operations, engineering controls are required only where the Assistant Secretary demonstrates that such controls are feasible.

(2) Compliance program.

(i) Where the TWA or excursion limit is exceeded, the employer shall establish and implement a written program to reduce exposure to or below the TWA and to or below the excursion limit by means of engineering and work practice controls, as required by paragraph (f)(1) of this section, and by the use of respiratory protection where required or permitted under this section.

(ii) The compliance program shall include a schedule for periodic leak detection surveys and a written plan for emergency situations, as specified in paragraph (h)(i) of this section.

(iii) Written plans for a program required in paragraph (f)(2) shall be developed and furnished upon request for examination and copying to the Assistant Secretary, the Director,

affected employees and designated employee representatives. Such plans shall be reviewed at least every 12 months, and shall be updated as necessary to reflect significant changes in the status of the employer's compliance program.

(iv) The employer shall not implement a schedule of employee rotation as a means of compliance with the TWA or excursion limit.

(g) Respiratory protection and personal protective equipment.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Work operations, such as maintenance and repair activities and vessel cleaning, for which engineering and work-practice controls are not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the TWA.

(iv) Emergencies.

Oregon OSHA repealed 1910.1047(g)(2). In Oregon, OAR 437-002-1047 applies.

437-002-1047 Ethylene Oxide Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1047 Ethylene Oxide, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Ethylene Oxide rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(3) Respirator selection. Employers must:

(i) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134; however, employers must not select or use half masks of any type because EtO may cause eye irritation or injury.

(ii) Equip each air-purifying, full facepiece respirator with a front-or back-mounted canister approved for protection against ethylene oxide.

(iii) For escape, provide employees with any respirator permitted for use under paragraphs (g)(3)(i) and (ii) of this standard.

(4) Protective clothing and equipment. When employees could have eye or skin contact with EtO or EtO solutions, the employer must select and provide, at no cost to the employee, appropriate protective clothing or other equipment in accordance with OAR 437-002-0134 to protect any area of the employee's body that may come in contact with the EtO or EtO solution, and must ensure that the employee wears the protective clothing and equipment provided.

(h) Emergency situations.

(1) Written plan.

(i) A written plan for emergency situations shall be developed for each workplace where there is a possibility of an emergency. Appropriate portions of the plan shall be implemented in the event of an emergency.

(ii) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped with respiratory protection as required by paragraph (g) of this section until the emergency is abated

(iii) The plan shall include the elements prescribed in 29 CFR 1910.38, "Employee emergency plans and fire prevention plans."

(2) Alerting employees. Where there is the possibility of employee exposure to EtO due to an emergency, means shall be developed to alert potentially affected employees of such occurrences promptly. Affected employees shall be immediately evacuated from the area in the event that an emergency occurs.

(i) Medical surveillance.

(1) General

(i) Employees covered.

(A) The employer shall institute a medical surveillance program for all employees who are or may be exposed to EtO at or above the action level, without regard to the use of respirators, for at least 30 days a year.

(B) The employer shall make available medical examinations and consultations to all employees who have been exposed to EtO in an emergency situation.

(ii) Examination by a physician. The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and are provided without cost to the employee, without loss of pay, and at a reasonable time and place.

(2) Medical examinations and consultations.

(i) Frequency. The employer shall make available medical examinations and consultations to each employee covered under paragraph (i)(1)(i) of this section on the following schedules:

(A) Prior to assignment of the employee to an area where exposure may be at or above the action level for at least 30 days a year.

(B) At least annually each employee exposed at or above the action level for at least 30 days in the past year.

(C) At termination of employment or reassignment to an area where exposure to EtO is not at or above the action level for at least 30 days a year.

(D) As medically appropriate for any employee exposed during an emergency.

(E) As soon as possible, upon notification by an employee either (1) that the employee has developed signs or symptoms indicating possible over-exposure to EtO, or (2) that the employee desires medical advice concerning the effects of current or past exposure to EtO on the employee's ability to produce a healthy child.

(F) If the examining physician determines that any of the examinations should be provided more frequently than specified, the employer shall provide such examinations to affected employees at the frequencies recommended by the physician.

(ii) Content.

(A) Medical examinations made available pursuant to paragraphs (i)(2)(i)(A) through (D) of this section shall include:

(1) A medical and work history with special emphasis directed to symptoms related to the pulmonary, hematologic, neurologic, and reproductive systems and to the eyes and skin.

(2) A physical examination with particular emphasis given to the pulmonary, hematologic, neurologic, and reproductive systems and to the eyes and skin.

(3) A complete blood count to include at least a white cell count (including differential cell count), red cell count, hematocrit, and hemoglobin.

(4) Any laboratory or other test which the examining physician deems necessary by sound medical practice.

(B) The content of medical examinations or consultation made available pursuant to paragraph (i)(2)(i)(E) of this section shall be determined by the examining physician, and shall include pregnancy testing or laboratory evaluation of fertility, if requested by the employee and deemed appropriate by the physician.

(3) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and Appendices A, B, and C.

(ii) A description of the affected employee's duties as they relate to the employee's exposure.

(iii) The employee's representative exposure level or anticipated exposure level.

(iv) A description of any personal protective and respiratory equipment used or to be used.

(v) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

(4) Physician's written opinion.

(i) The employer shall obtain a written opinion from the examining physician. This written opinion shall contain the results of the medical examination and shall include:

(A) The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to EtO;

(B) Any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators; and

(C) A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions resulting from EtO exposure that require further explanation or treatment.

(ii) The employer shall instruct the physician not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to EtO.

(iii) The employer shall provide a copy of the physician's written opinion to the affected employee within 15 days from its receipt.

(j) Communication of hazards.

(1) Hazard communication – general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for EtO.

(ii) In classifying the hazards of EtO at least the following hazards are to be addressed: Cancer; reproductive effects; mutagenicity; central nervous system; skin sensitization; skin, eye and respiratory tract irritation; acute toxicity effects; and flammability.

(iii) Employers shall include EtO in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access

to labels on containers of EtO and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (j)(3) of this section.

(2) Signs and labels.

(i) Signs.

(A) The employer shall post and maintain legible signs demarcating regulated areas and entrances or access ways to regulated areas that bear the following legend:

DANGER
ETHYLENE OXIDE
MAY CAUSE CANCER
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING MAY BE
REQUIRED IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(B) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (j)(2)(i)(A) of this section:

DANGER
ETHYLENE OXIDE
CANCER HAZARD AND REPRODUCTIVE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING MAY BE REQUIRED
TO BE WORN IN THIS AREA

(ii) Labels.

(A) The employer shall ensure that labels are affixed to all containers of EtO whose contents are capable of causing employee exposure at or above the action level or whose contents may reasonably be foreseen to cause employee exposure above the excursion limit, and that the labels remain affixed when the containers of EtO leave the workplace. For the purposes of this paragraph (j)(2)(ii), reaction vessels, storage tanks, and pipes or piping systems are not considered to be containers.

(B) Prior to June 1, 2015, employers may include the following information on containers of EtO in lieu of the labeling requirements in paragraph (j)(1)(i) of this section:

(1)

DANGER
CONTAINS ETHYLENE OXIDE
CANCER HAZARD AND REPRODUCTIVE HAZARD

(2) A warning statement against breathing airborne concentrations of EtO.

(C) The labeling requirements under this section do not apply where EtO is used as a pesticide, as such term is defined in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 136 et seq.), when it is labeled pursuant to that Act and regulations issued under that Act by the Environmental Protection Agency.

(3) Information and training.

(i) The employer shall provide employees who are potentially exposed to EtO at or above the action level or above the excursion limit with information and training on EtO at the time of initial assignment and at least annually thereafter.

(ii) Employees shall be informed of the following:

(D) The requirements of this section with an explanation of its contents, including Appendices A and B;

(E) Any operations in their work area where EtO is present;

(F) The location and availability of the written EtO final rule; and

(G) The medical surveillance program required by paragraph (i) of this section with an explanation of the information in Appendix C.

(iii) Employee training shall include at least:

(A) Methods and observations that may be used to detect the presence or release of EtO in the work area (such as monitoring conducted by the employer, continuous monitoring devices, etc.);

(B) The physical and health hazards of EtO;

(C) The measures employees can take to protect themselves from hazards associated with EtO exposure, including specific procedures the employer has implemented to protect employees from exposure to EtO, such as work practices, emergency procedures, and personal protective equipment to be used; and

(D) The details of the hazard communication program developed by the employer, including an explanation of the labeling system and how employees can obtain and use the appropriate hazard information.

(k) Recordkeeping.

(1) Objective data for exempted operations.

(i) Where the processing, use, or handling of products made from or containing EtO are exempted from other requirements of this section under paragraph (a)(2) of this section, or where objective data have been relied on in lieu of initial monitoring under paragraph (d)(2)(ii) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) This record shall include at least the following information:

(A) The product qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of EtO;

(D) A description of the operation exempted and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Exposure measurements.

(i) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to EtO as prescribed in paragraph (d) of this section.

(ii) This record shall include at least the following information:

(A) The date of measurement;

(B) The operation involving exposure to EtO which is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of protective devices worn, if any; and

(F) Name~~[-, social security number]~~ and exposure of the employees whose exposures are represented.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.1020.

(3) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by paragraph (i)(1)(i) of this section, in accordance with 29 CFR 1910.1020.

(ii) The record shall include at least the following information:

(A) The name ~~[and social security number]~~ of the employee;

(B) Physicians' written opinions;

(C) Any employee medical complaints related to exposure to EtO; and

(D) A copy of the information provided to the physician as required by paragraph (i)(3) of this section.

(iii) The employer shall ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.1020.

(4) Availability.

(i) The employer, upon written request, shall make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying.

(ii) The employer, upon request, shall make any exemption and exposure records required by paragraphs (k)(1) and (2) of this section available for examination and copying to affected employees, former employees, designated representatives and the Assistant Secretary, in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(iii) The employer, upon request, shall make employee medical records required by paragraph (k)(3) of this section available for examination and copying to the subject employee, anyone having the specific written consent of the subject employee, and the Assistant Secretary, in accordance with 29 CFR 1910.1020.

(5) Transfer of records. The employer shall comply with the requirements concerning transfer of records set forth in 29 CFR 1910.1020(h).

(l) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to EtO conducted in accordance with paragraph (d) of this section.

(2) Observation procedures. When observation of the monitoring of employee exposure to EtO requires entry into an area where the use of protective clothing or equipment is required, the observer shall be provided with and be required to use such clothing and equipment and shall comply with all other applicable safety and health procedures.

(m) Reserved.

(n) Appendices. The information contained in the appendices is not intended by itself to create any additional obligations not otherwise imposed or to detract from any existing obligation.

[49 FR 25796, June 22, 1984, as amended at 50 FR 9801, Mar. 12, 1985; 50 FR 41494, Oct. 11, 1985; 51 FR 25053, July 10, 1986; 53 FR 11436, 11437, Apr. 6, 1988; 53 FR 27960, July 26, 1988; 54 FR 24334, June 7, 1989; 61 FR 5508, Feb. 13, 1996; 63 FR 1292, Jan. 8, 1998; 67 FR 67965, Nov. 7, 2002; 70 FR 1143, Jan. 5, 2005; 71 FR 16672, 16673, Apr. 3, 2006; 71 FR 50190, Aug. 24, 2006; 73 FR 75586, Dec. 12, 2008; 76 FR 33609, June 8, 2011; 77 FR 17783, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 18-1988, f. 11/17/88, ef. 11/17/88.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1048

Formaldehyde.

(a) Scope and application. This standard applies to all occupational exposures to formaldehyde, i.e. from formaldehyde gas, its solutions, and materials that release formaldehyde.

(b) Definitions. For purposes of this standard, the following definitions shall apply:

Action level means a concentration of 0.5 part formaldehyde per million parts of air (0.5 ppm) calculated as an eight (8)-hour time-weighted average (TWA) concentration.

Assistant Secretary means the Assistant Secretary of Labor for the Occupational Safety and Health Administration, U.S. Department of Labor, or designee.

Authorized Person means any person required by work duties to be present in regulated areas, or authorized to do so by the employer, by this section, or by the OSH Act of 1970.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency is any occurrence, such as but not limited to equipment failure, rupture of containers, or failure of control equipment that results in an uncontrolled release of a significant amount of formaldehyde.

Employee exposure means the exposure to airborne formaldehyde which would occur without corrections for protection provided by any respirator that is in use.

Formaldehyde means the chemical substance, HCHO, Chemical Abstracts Service Registry No. 50-00-0.

(c) Permissible Exposure Limit (PEL).

(1) TWA: The employer shall assure that no employee is exposed to an airborne concentration of formaldehyde which exceeds 0.75 parts formaldehyde per million parts of air (0.75 ppm) as an 8-hour TWA.

(2) Short Term Exposure Limit (STEL): The employer shall assure that no employee is exposed to an airborne concentration of formaldehyde which exceeds two parts formaldehyde per million parts of air (2 ppm) as a 15-minute STEL.

(d) Exposure monitoring.

(1) General.

(i) Each employer who has a workplace covered by this standard shall monitor employees to determine their exposure to formaldehyde.

(ii) Exception. Where the employer documents, using objective data, that the presence of formaldehyde or formaldehyde-releasing products in the workplace cannot result in airborne concentrations of formaldehyde that would cause any employee to be exposed at or above the action level or the STEL under foreseeable conditions of use, the employer will not be required to measure employee exposure to formaldehyde.

(iii) When an employee's exposure is determined from representative sampling, the measurements used shall be representative of the employee's full shift or short-term exposure to formaldehyde, as appropriate.

(iv) Representative samples for each job classification in each work area shall be taken for each shift unless the employer can document with objective data that exposure levels for a given job classification are equivalent for different work shifts.

(2) Initial monitoring. The employer shall identify all employees who may be exposed at or above the action level or at or above the STEL and accurately determine the exposure of each employee so identified.

(i) Unless the employer chooses to measure the exposure of each employee potentially exposed to formaldehyde, the employer shall develop a representative sampling strategy and measure sufficient exposures within each job classification for each workshift to correctly characterize and not underestimate the exposure of any employee within each exposure group.

(ii) The initial monitoring process shall be repeated each time there is a change in production, equipment, process, personnel, or control measures which may result in new or additional exposure to formaldehyde.

(iii) If the employer receives reports of signs or symptoms of respiratory or dermal conditions associated with formaldehyde exposure, the employer shall promptly monitor the affected employee's exposure.

(3) Periodic monitoring.

(i) The employer shall periodically measure and accurately determine exposure to formaldehyde for employees shown by the initial monitoring to be exposed at or above the action level or at or above the STEL.

(ii) If the last monitoring results reveal employee exposure at or above the action level, the employer shall repeat monitoring of the employees at least every 6 months.

(iii) If the last monitoring results reveal employee exposure at or above the STEL, the employer shall repeat monitoring of the employees at least once a year under worst conditions.

(4) Termination of monitoring. The employer may discontinue periodic monitoring for employees if results from two consecutive sampling periods taken at least 7 days apart show that employee exposure is below the action level and the STEL. The results must be statistically representative and consistent with the employer's knowledge of the job and work operation.

(5) Accuracy of monitoring. Monitoring shall be accurate, at the 95 percent confidence level, to within plus or minus 25 percent for airborne concentrations of formaldehyde at the TWA and the STEL and to within plus or minus 35 percent for airborne concentrations of formaldehyde at the action level.

(6) Employee notification of monitoring results. The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees. If employee exposure is above the PEL, affected employees shall be provided with a description of the corrective actions being taken by the employer to decrease exposure.

(7) Observation of monitoring.

(i) The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to formaldehyde required by this standard.

(ii) When observation of the monitoring of employee exposure to formaldehyde requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the clothing and equipment to the observer, require the observer to use such clothing and equipment, and assure that the observer complies with all other applicable safety and health procedures.

(e) Regulated areas.

(1) Signs.

(i) The employer shall establish regulated areas where the concentration of airborne formaldehyde exceeds either the TWA or the STEL and post all entrances and access ways with signs bearing the following legend:

DANGER
FORMALDEHYDE
MAY CAUSE CANCER
CAUSES SKIN, EYE, AND RESPIRATORY IRRITATION
AUTHORIZED PERSONNEL ONLY

(ii) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (e)(1)(i) of this section:

DANGER
FORMALDEHYDE
IRRITANT AND POTENTIAL CANCER HAZARD
AUTHORIZED PERSONNEL ONLY

(2) The employer shall limit access to regulated areas to authorized persons who have been trained to recognize the hazards of formaldehyde.

(3) An employer at a multi-employer worksite who establishes a regulated area shall communicate the access restrictions and locations of these areas to other employers with work operations at that worksite.

(f) Methods of compliance.

(1) Engineering controls and work practices. The employer shall institute engineering and work practice controls to reduce and maintain employee exposures to formaldehyde at or below the TWA and the STEL.

(2) Exception. Whenever the employer has established that feasible engineering and work practice controls cannot reduce employee exposure to or below either of the PELs, the employer shall apply these controls to reduce employee exposures to the extent feasible and shall supplement them with respirators which satisfy this standard.

(g) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work practice controls.

(ii) Work operations, such as maintenance and repair activities or vessel cleaning, for which the employer establishes that engineering and work practice controls are not feasible.

(iii) Work situations for which feasible engineering and work practice controls are not yet sufficient to reduce employee exposure to or below the PELs.

(iv) Emergencies.

(2) Respirator program.

Oregon OSHA repealed 1910.1048(g)(2)(i). In Oregon, OAR 437-002-1048 applies.

437-002-1048 Formaldehyde Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii), and (d)(3)(iii)(B)(1) and (2)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1048 Formaldehyde, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Formaldehyde rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) When employees use air-purifying respirators with chemical cartridges or canisters that do not contain end-of-service-life indicators approved by the National Institute for Occupational Safety and Health, employers must replace these cartridges or canisters as specified by paragraphs (d)(3)(iii)(B)(1) and (B)(2) of 29 CFR 1910.134, or at the end of the workshift, whichever condition occurs first.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Equip each air-purifying, full facepiece respirator with a canister or cartridge approved for protection against formaldehyde.

(C) For escape, provide employees with one of the following respirator options: A self-contained breathing apparatus operated in the demand or pressure-demand mode; or a full facepiece respirator having a chin-style, or a front-or back-mounted industrial-size, canister or cartridge approved for protection against formaldehyde.

(ii) Employers may substitute an air-purifying, half mask respirator for an air-purifying, full facepiece respirator when they equip the half mask respirator with a cartridge approved for protection against formaldehyde and provide the affected employee with effective gas-proof goggles.

(iii) Employers must provide employees who have difficulty using negative pressure respirators with powered air-purifying respirators permitted for use under paragraph (g)(3)(i)(A) of this standard and that affords adequate protection against formaldehyde exposures.

(h) Protective equipment and clothing. Employers shall comply with the provisions of OAR 437-002-0134. When protective equipment or clothing is provided under these provisions, the employer shall provide these protective devices at no cost to the employee and assure that the employee wears them.

(1) Selection. The employer shall select protective clothing and equipment based upon the form of formaldehyde to be encountered, the conditions of use, and the hazard to be prevented.

(i) All contact of the eyes and skin with liquids containing 1 percent or more formaldehyde shall be prevented by the use of chemical protective clothing made of material impervious to formaldehyde and the use of other personal protective equipment, such as goggles and face shields, as appropriate to the operation.

(ii) Contact with irritating or sensitizing materials shall be prevented to the extent necessary to eliminate the hazard.

(iii) Where a face shield is worn, chemical safety goggles are also required if there is a danger of formaldehyde reaching the area of the eye.

(iv) Full body protection shall be worn for entry into areas where concentrations exceed 100 ppm and for emergency reentry into areas of unknown concentration.

(2) Maintenance of protective equipment and clothing.

(i) The employer shall assure that protective equipment and clothing that has become contaminated with formaldehyde is cleaned or laundered before its reuse.

(ii) When formaldehyde-contaminated clothing and equipment is ventilated, the employer shall establish storage areas so that employee exposure is minimized.

(A) Signs. Storage areas for contaminated clothing and equipment shall have signs bearing the following legend:

DANGER
FORMALDEHYDE-CONTAMINATED [CLOTHING] EQUIPMENT
MAY CAUSE CANCER
CAUSES SKIN, EYE AND RESPIRATORY IRRITATION
DO NOT BREATHE VAPOR
DO NOT GET ON SKIN

(B) Labels. The employer shall ensure containers for contaminated clothing and equipment are labeled consistent with the Hazard Communication Standard, Sec.1910.1200, and shall, as a minimum, include the following:

DANGER
FORMALDEHYDE-CONTAMINATED [CLOTHING] EQUIPMENT
MAY CAUSE CANCER
CAUSES SKIN, EYE, AND RESPIRATORY IRRITATION
DO NOT BREATHE VAPOR
DO NOT GET ON SKIN

(C) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (h)(2)(ii)(A) of this section:

DANGER
FORMALDEHYDE-CONTAMINATED [CLOTHING] EQUIPMENT
AVOID INHALATION AND SKIN CONTACT

(D) Prior to June 1, 2015, employers may include the following information on containers of protective clothing and equipment in lieu of the labeling requirements in paragraphs (h)(2)(ii)(B) of this section:

DANGER
FORMALDEHYDE-CONTAMINATED [CLOTHING] EQUIPMENT
AVOID INHALATION AND SKIN CONTACT

(iii) The employer shall assure that only persons trained to recognize the hazards of formaldehyde remove the contaminated material from the storage area for purposes of cleaning, laundering, or disposal.

(iv) The employer shall assure that no employee takes home equipment or clothing that is contaminated with formaldehyde.

(v) The employer shall repair or replace all required protective clothing and equipment for each affected employee as necessary to assure its effectiveness.

(vi) The employer shall inform any person who launders, cleans, or repairs such clothing or equipment of formaldehyde's potentially harmful effects and of procedures to safely handle the clothing and equipment.

(i) Hygiene protection.

(1) The employer shall provide change rooms, as described in 29 CFR 1910.141 for employees who are required to change from work clothing into protective clothing to prevent skin contact with formaldehyde.

(2) If employees' skin may become splashed with solutions containing 1 percent or greater formaldehyde, for example because of equipment failure or improper work practices, the employer shall provide conveniently located quick drench showers and assure that affected employees use these facilities immediately.

(3) If there is any possibility that an employee's eyes may be splashed with solutions containing 0.1 percent or greater formaldehyde, the employer shall provide acceptable eyewash facilities within the immediate work area for emergency use.

(j) Housekeeping. For operations involving formaldehyde liquids or gas, the employer shall conduct a program to detect leaks and spills, including regular visual inspections.

(1) Preventative maintenance of equipment, including surveys for leaks, shall be undertaken at regular intervals.

(2) In work areas where spillage may occur, the employer shall make provisions to contain the spill, to decontaminate the work area, and to dispose of the waste.

(3) The employer shall assure that all leaks are repaired and spills are cleaned promptly by employees wearing suitable protective equipment and trained in proper methods for cleanup and decontamination.

(4) Formaldehyde-contaminated waste and debris resulting from leaks or spills shall be placed for disposal in sealed containers bearing a label warning of formaldehyde's presence and of the hazards associated with formaldehyde. The employer shall ensure that the labels are in accordance with paragraph (m) of this section.

(k) Emergencies. For each workplace where there is the possibility of an emergency involving formaldehyde, the employer shall assure appropriate procedures are adopted to minimize injury and loss of life. Appropriate procedures shall be implemented in the event of an emergency.

(l) Medical surveillance.

(1) Employees covered.

(i) The employer shall institute medical surveillance programs for all employees exposed to formaldehyde at concentrations at or exceeding the action level or exceeding the STEL.

(ii) The employer shall make medical surveillance available for employees who develop signs and symptoms of overexposure to formaldehyde and for all employees exposed to formaldehyde in emergencies. When determining whether an employee may be experiencing signs and symptoms of possible overexposure to formaldehyde, the employer may rely on the evidence that signs and symptoms associated with formaldehyde exposure will occur only in exceptional circumstances when airborne exposure is less than 0.1 ppm and when formaldehyde is present in materials in concentrations less than 0.1 percent.

(2) Examination by a physician. All medical procedures, including administration of medical disease questionnaires, shall be performed by or under the supervision of a licensed physician and shall be provided without cost to the employee, without loss of pay, and at a reasonable time and place.

(3) Medical disease questionnaire. The employer shall make the following medical surveillance available to employees prior to assignment to a job where formaldehyde exposure is at or above the action level or above the STEL and annually thereafter. The employer shall also make the following medical surveillance available promptly upon determining that an employee is experiencing signs and symptoms indicative of possible overexposure to formaldehyde.

(i) Administration of a medical disease questionnaire, such as in Appendix D, which is designed to elicit information on work history, smoking history, any evidence of eye, nose, or throat irritation; chronic airway problems or hyper-reactive airway disease; allergic skin conditions or dermatitis; and upper or lower respiratory problems.

(ii) A determination by the physician, based on evaluation of the medical disease questionnaire, of whether a medical examination is necessary for employees not required to wear respirators to reduce exposure to formaldehyde.

(4) Medical examinations. Medical examinations shall be given to any employee who the physician feels, based on information in the medical disease questionnaire, may be at increased risk from exposure to formaldehyde and at the time of initial assignment and at least annually thereafter to all employees required to wear a respirator to reduce exposure to formaldehyde. The medical examination shall include:

(i) A physical examination with emphasis on evidence of irritation or sensitization of the skin and respiratory system, shortness of breath, or irritation of the eyes.

(ii) Laboratory examinations for respirator wearers consisting of baseline and annual pulmonary function tests. As a minimum, these tests shall consist of forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and forced expiratory flow (FEF).

(iii) Any other test which the examining physician deems necessary to complete the written opinion.

(iv) Counseling of employees having medical conditions that would be directly or indirectly aggravated by exposure to formaldehyde on the increased risk of impairment of their health.

(5) Examinations for employees exposed in an emergency. The employer shall make medical examinations available as soon as possible to all employees who have been exposed to formaldehyde in an emergency.

(i) The examination shall include a medical and work history with emphasis on any evidence of upper or lower respiratory problems, allergic conditions, skin reaction or hypersensitivity, and any evidence of eye, nose, or throat irritation.

(ii) Other examinations shall consist of those elements considered appropriate by the examining physician.

(6) Information provided to the physician. The employer shall provide the following information to the examining physician:

- (i) A copy of this standard and Appendices A, C, D, and E;
- (ii) A description of the affected employee's job duties as they relate to the employee's exposure to formaldehyde;
- (iii) The representative exposure level for the employee's job assignment;
- (iv) Information concerning any personal protective equipment and respiratory protection used or to be used by the employee; and
- (v) Information from previous medical examinations of the affected employee within the control of the employer.
- (vi) In the event of a nonroutine examination because of an emergency, the employer shall provide to the physician as soon as possible: a description of how the emergency occurred and the exposure the victim may have received.

(7) Physician's written opinion.

(i) For each examination required under this standard, the employer shall obtain a written opinion from the examining physician. This written opinion shall contain the results of the medical examination except that it shall not reveal specific findings or diagnoses unrelated to occupational exposure to formaldehyde. The written opinion shall include:

(A) The physician's opinion as to whether the employee has any medical condition that would place the employee at an increased risk of material impairment of health from exposure to formaldehyde;

(B) Any recommended limitations on the employee's exposure or changes in the use of personal protective equipment, including respirators;

(C) A statement that the employee has been informed by the physician of any medical conditions which would be aggravated by exposure to formaldehyde, whether these conditions may have resulted from past formaldehyde exposure or from exposure in an emergency, and whether there is a need for further examination or treatment.

(ii) The employer shall provide for retention of the results of the medical examination and tests conducted by the physician.

(iii) The employer shall provide a copy of the physician's written opinion to the affected employee within 15 days of its receipt.

(8) Medical removal.

(i) The provisions of paragraph (I)(8) apply when an employee reports significant irritation of the mucosa of the eyes or of the upper airways, respiratory sensitization, dermal irritation, or dermal sensitization attributed to workplace formaldehyde exposure. Medical removal provisions do not apply in the case of dermal irritation or dermal sensitization when the product suspected of causing the dermal condition contains less than 0.05% formaldehyde.

(ii) An employee's report of signs or symptoms of possible overexposure to formaldehyde shall be evaluated by a physician selected by the employer pursuant to paragraph (I)(3). If the physician determines that a medical examination is not necessary under paragraph (I)(3)(ii), there shall be a two-week evaluation and remediation period to permit the employer to ascertain whether the signs or symptoms subside untreated or with the use of creams, gloves, first aid treatment or personal protective equipment. Industrial hygiene measures that limit the employee's exposure to formaldehyde may also be implemented during this period. The employee shall be referred immediately to a physician prior to expiration of the two-week period if the signs or symptoms worsen. Earnings, seniority and benefits may not be altered during the two-week period by virtue of the report.

(iii) If the signs or symptoms have not subsided or been remedied by the end of the two-week period, or earlier if signs or symptoms warrant, the employee shall be examined by a physician selected by the employer. The physician shall presume, absent contrary evidence, that observed dermal irritation or dermal sensitization are not attributable to formaldehyde when products to which the affected employee is exposed contain less than 0.1% formaldehyde.

(iv) Medical examinations shall be conducted in compliance with the requirements of paragraph (I)(5)(i) and (ii). Additional guidelines for conducting medical exams are contained in Appendix C.

(v) If the physician finds that significant irritation of the mucosa of the eyes or of the upper airways, respiratory sensitization, dermal irritation, or dermal sensitization result from workplace formaldehyde exposure and recommends restrictions or removal, the employer shall promptly comply with the restrictions or recommendation of removal. In the event of a recommendation of removal, the employer shall remove the affected employee from the current formaldehyde exposure and if possible, transfer the employee to work having no or significantly less exposure to formaldehyde.

(vi) When an employee is removed pursuant to paragraph (I)(8)(v), the employer shall transfer the employee to comparable work for which the employee is qualified or can be trained in a short period (up to 6 months), where the formaldehyde exposures are as low as possible, but not higher than the action level. The employer shall maintain the employee's current earnings, seniority, and other benefits. If there is no such work available, the employer shall maintain the employee's current earnings, seniority and other benefits until such work becomes available, until the employee is determined to be unable to return to workplace formaldehyde exposure, until the employee is determined to be able to return to the original job status, or for six months, whichever comes first.

(vii) The employer shall arrange for a follow-up medical examination to take place within six months after the employee is removed pursuant to this paragraph. This examination shall determine if the employee can return to the original job status, or if the removal is to be permanent. The physician shall make a decision within six months of the date the employee was removed as to whether the employee can be returned to the original job status, or if the removal is to be permanent.

(viii) An employer's obligation to provide earnings, seniority and other benefits to a removed employee may be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program or from employment with another employer made possible by virtue of the employee's removal.

(ix) In making determinations of the formaldehyde content of materials under this paragraph the employer may rely on objective data.

(9) Multiple physician review.

(i) After the employer selects the initial physician who conducts any medical examination or consultation to determine whether medical removal or restriction is appropriate, the employee may designate a second physician to review any findings, determinations or recommendations of the initial physician and to conduct such examinations, consultations, and laboratory tests as the second physician deems necessary and appropriate to evaluate the effects of formaldehyde exposure and to facilitate this review.

(ii) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation for the purpose of medical removal or restriction.

(iii) The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within fifteen (15) days after receipt of the notification of the right to seek a second medical opinion, or receipt of the initial physician's written opinion, whichever is later;

(A) The employee informs the employer of the intention to seek a second medical opinion, and

(B) The employee initiates steps to make an appointment with a second physician.

(iv) If the findings, determinations or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve the disagreement. If the two physicians are unable to quickly resolve their disagreement, then the employer and the employee through their respective physicians shall designate a third physician who shall be a specialist in the field at issue:

(A) To review the findings, determinations or recommendations of the prior physicians; and

(B) To conduct such examinations, consultations, laboratory tests and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(v) In the alternative, the employer and the employee or authorized employee representative may jointly designate such third physician.

(vi) The employer shall act consistent with the findings, determinations and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.

(m) Communication of hazards.

(1) Hazard communication - general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for formaldehyde.

(ii) In classifying the hazards of formaldehyde at least the following hazards are to be addressed: Cancer; skin and respiratory sensitization; eye, skin and respiratory tract irritation; acute toxicity effects; and flammability.

(iii) Employers shall include formaldehyde in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of formaldehyde and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (n) of this section.

(iv) Paragraphs (m)(1)(i), (m)(1)(ii), and (m)(1)(iii) of this section apply to chemicals associated with formaldehyde gas, all mixtures or solutions composed of greater than 0.1 percent formaldehyde, and materials capable of releasing formaldehyde into the air at concentrations reaching or exceeding 0.1 ppm.

(v) In making the determinations of anticipated levels of formaldehyde release, the employer may rely on objective data indicating the extent of potential formaldehyde release under reasonably foreseeable conditions of use.

(2)

(i) In addition to the requirements in paragraphs (m)(1) through (m)(1)(iv) of this section, for materials listed in paragraph (m)(1)(iv) capable of releasing formaldehyde at levels above 0.5 ppm, labels shall appropriately address all hazards as defined in paragraph (d) of § 1910.1200 and Appendices A and B to § 1910.1200, including cancer and respiratory sensitization, and shall contain the hazard statement "May Cause Cancer."

(ii) As a minimum, for all materials listed in paragraph (m)(1)(i) and (iv) of this section capable of releasing formaldehyde at levels of 0.1 ppm to 0.5 ppm, labels shall identify that the product contains formaldehyde; list the name and address of the responsible party; and state that physical and health hazard information is readily available from the employer and from safety data sheets.

(iii) Prior to June 1, 2015, employers may include the phrase "Potential Cancer Hazard" in lieu of "May Cause Cancer" as specified in paragraph (m)(2)(i) of this section.

(3) Labels.

(i) The employer shall assure that hazard warning labels complying with the requirements of 29 CFR 1910.1200(f) are affixed to all containers of materials listed in paragraph (m)(1)(i), except to the extent that 29 CFR 1910.1200(f) is inconsistent with this paragraph.

(ii) Information on labels. As a minimum, for all materials listed in paragraph (m)(1)(i) capable of releasing formaldehyde at levels of 0.1 ppm to 0.5 ppm, labels shall identify that the product contains formaldehyde; list the name and address of the responsible party; and state that physical and health hazard information is readily available from the employer and from material safety data sheets.

(iii) For materials listed in paragraph (m)(1)(i) capable of releasing formaldehyde at levels above 0.5 ppm, labels shall appropriately address all hazards as defined in 29 CFR 1910.1200 (d) and 29 CFR 1910.1200 Appendices A and B, including respiratory sensitization, and shall contain the words "Potential Cancer Hazard."

(iv) In making the determinations of anticipated levels of formaldehyde release, the employer may rely on objective data indicating the extent of potential formaldehyde release under reasonably foreseeable conditions of use.

(v) Substitute warning labels. The employer may use warning labels required by other statutes, regulations, or ordinances which impart the same information as the warning statements required by this paragraph.

(4) Material safety data sheets.

(i) Any employer who uses formaldehyde-containing materials listed in paragraph (m)(1)(i) shall comply with the requirements of 29 CFR 1910.1200(g) with regard to the development and updating of material safety data sheets.

(ii) Manufacturers, importers, and distributors of formaldehyde-containing materials listed in paragraph (m)(1)(i) shall assure that material safety data sheets and updated information are provided to all employers purchasing such materials at the time of the initial shipment and at the time of the first shipment after a material safety data sheet is updated.

(5) Written hazard communication program. The employer shall develop, implement, and maintain at the workplace, a written hazard communication program for formaldehyde exposures in the workplace, which at a minimum describes how the requirements specified in this paragraph for labels and other forms of warning and material safety data sheets, and paragraph (n) for employee information and training, will be met. Employers in multi-employer workplaces shall comply with the requirements of 29 CFR 1910.1200(e)(2).

(n) Employee information and training.

(1) Participation. The employer shall assure that all employees who are assigned to workplaces where there is exposure to formaldehyde participate in a training program, except that where the employer can show, using objective data, that employees are not exposed to formaldehyde at or above 0.1 ppm, the employer is not required to provide training.

(2) Frequency. Employers shall provide such information and training to employees at the time of initial assignment, and whenever a new exposure to formaldehyde is introduced into the work area. The training shall be repeated at least annually.

(3) Training program. The training program shall be conducted in a manner which the employee is able to understand and shall include:

(i) A discussion of the contents of this regulation and the contents of the Material Safety Data Sheet.

(ii) The purpose for and a description of the medical surveillance program required by this standard, including:

(A) A description of the potential health hazards associated with exposure to formaldehyde and a description of the signs and symptoms of exposure to formaldehyde.

(B) Instructions to immediately report to the employer the development of any adverse signs or symptoms that the employee suspects is attributable to formaldehyde exposure.

(iii) Description of operations in the work area where formaldehyde is present and an explanation of the safe work practices appropriate for limiting exposure to formaldehyde in each job;

(iv) The purpose for, proper use of, and limitations of personal protective clothing and equipment;

(v) Instructions for the handling of spills, emergencies, and clean-up procedures;

(vi) An explanation of the importance of engineering and work practice controls for employee protection and any necessary instruction in the use of these controls; and

(vii) A review of emergency procedures including the specific duties or assignments of each employee in the event of an emergency.

(4) Access to training materials.

(i) The employer shall inform all affected employees of the location of written training materials and shall make these materials readily available, without cost, to the affected employees.

(ii) The employer shall provide, upon request, all training materials relating to the employee training program to the Assistant Secretary and the Director.

(o) Recordkeeping.

(1) Exposure measurements. The employer shall establish and maintain an accurate record of all measurements taken to monitor employee exposure to formaldehyde. This record shall include:

- (i) The date of measurement;
- (ii) The operation being monitored;
- (iii) The methods of sampling and analysis and evidence of their accuracy and precision;
- (iv) The number, durations, time, and results of samples taken;
- (v) The types of protective devices worn; and
- (vi) The names, job classifications, [~~social security numbers,~~] and exposure estimates of the employees whose exposures are represented by the actual monitoring results.

(2) Exposure determinations. Where the employer has determined that no monitoring is required under this standard, the employer shall maintain a record of the objective data relied upon to support the determination that no employee is exposed to formaldehyde at or above the action level.

(3) Medical surveillance. The employer shall establish and maintain an accurate record for each employee subject to medical surveillance under this standard. This record shall include:

- (i) The name [~~and social security number~~] of the employee;
- (ii) The physician's written opinion;
- (iii) A list of any employee health complaints that may be related to exposure to formaldehyde; and
- (iv) A copy of the medical examination results, including medical disease questionnaires and results of any medical tests required by the standard or mandated by the examining physician.

(4) Respirator fit testing.

(i) The employer shall establish and maintain accurate records for employees subject to negative pressure respirator fit testing required by this standard.

(ii) This record shall include:

- (A) A copy of the protocol selected for respirator fit testing.
- (B) A copy of the results of any fit testing performed.
- (C) The size and manufacturer of the types of respirators available for selection.
- (D) The date of the most recent fit testing, the name [~~and social security number~~] of each tested employee, and the respirator type and facepiece selected.

(5) Record retention. The employer shall retain records required by this standard for at least the following periods:

- (i) Exposure records and determinations shall be kept for at least 30 years.
- (ii) Medical records shall be kept for the duration of employment plus 30 years.
- (iii) Respirator fit testing records shall be kept until replaced by a more recent record.

(6) Availability of records.

(i) Upon request, the employer shall make all records maintained as a requirement of this standard available for examination and copying to the Assistant Secretary and the Director.

(ii) The employer shall make employee exposure records, including estimates made from representative monitoring and available upon request for examination, and copying to the subject employee, or former employee, and employee representatives in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(iii) Employee medical records required by this standard shall be provided upon request for examination and copying, to the subject employee or former employee or to anyone having the specific written consent of the subject employee or former employee in accordance 29 CFR 1910.1020(a) through (e) and (g) through (i).

[57 FR 22310, May 27, 1992; 57 FR 27161, June 18, 1992; 61 FR 5508, Feb. 13, 1996; 63 FR 1292, Jan. 8, 1998; 63 FR 20099, Apr. 23, 1998; 70 FR 1143, Jan. 5, 2005; 71 FR 16672, 16673, Apr. 3, 2006; 71 FR 50190, Aug. 24, 2006; 73 FR 75586, Dec. 12, 2008; 77 FR 17784, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 14-1988, f. 9/12/88, ef. 9/12/88.
OR-OSHA Admin. Order 1-1990, f. 1/11/90, ef. 1/11/90 (temp).
OR-OSHA Admin. Order 6-1990, f. 3/2/90, ef. 3/2/90 (perm).
OR-OSHA Admin. Order 12-1992, f. 10/13/92, ef. 10/13/92.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix D to 1910.1048 – Nonmandatory Medical Disease Questionnaire

A. Identification

Plant Name _____

Date _____

Employee Name _____

[S.S. # _____]

Job Title _____

Birthdate: _____

Age: _____

Sex: _____

Height: _____

Weight: _____

B. Medical History

1. Have you ever been in the hospital as a patient? Yes ~ No ~

If yes, what kind of problem were you having?

2. Have you ever had any kind of operation? Yes ~ No ~

If yes, what kind? _____

3. Do you take any kind of medicine regularly? Yes ~ No ~

If yes, what kind? _____

4. Are you allergic to any drugs, foods, or chemicals? Yes ~ No ~

If yes, what kind of allergy is it? _____

What causes the allergy? _____

5. Have you ever been told that you have asthma, hayfever, or sinusitis? Yes ~ No ~

- | | | | | |
|----------------------------------------------------------------------------------------------------|-----|---|----|---|
| 6. Have you ever been told that you have emphysema, bronchitis, or any other respiratory problems? | Yes | ~ | No | ~ |
| 7. Have you ever been told you had hepatitis? | Yes | ~ | No | ~ |
| 8. Have you ever been told that you had cirrhosis? | Yes | ~ | No | ~ |
| 9. Have you ever been told that you had cancer? | Yes | ~ | No | ~ |
| 10. Have you ever had arthritis or joint pain? | Yes | ~ | No | ~ |
| 11. Have you ever been told that you had high blood pressure? | Yes | ~ | No | ~ |
| 12. Have you ever had a heart attack or heart trouble? | Yes | ~ | No | ~ |

B-1. Medical History Update

1. Have you been in the hospital as a patient any time within the past year?
Yes ~ No ~

If so, for what condition? _____

2. Have you been under the care of a physician during the past year? Yes ~ No ~

If so, for what condition? _____

3. Is there any change in your breathing since last year? Yes ~ No ~

Better? _____

Worse? _____

No change? _____

If change, do you know why? _____

4. Is your general health different this year from last year? _____
Yes~_____No_____~

If different, in what way? _____

5. Have you in the past year or are you now taking any medication on a regular basis?
Yes ~ No ~

Name Rx _____

Condition being treated _____

C. Occupational History

1. How long have you worked for your present employer?

2. What jobs have you held with this employer? Include job title and length of time in each job.

3. In each of these jobs, how many hours a day were you exposed to chemicals?

4. What chemicals have you worked with most of the time?

5. Have you ever noticed any type of skin rash you feel was related to your work?

Yes ~ No ~

6. Have you ever noticed that any kind of chemical makes you cough? Yes ~ No ~

Wheeze? Yes ~ No ~

Become short of breath or cause your chest to become tight? Yes ~ No ~

7. Are you exposed to any dust or chemicals at home? Yes ~ No ~

If yes, explain: _____

8. In other jobs, have you ever had exposure to:

Wood dust? Yes ~ No ~

Nickel or chromium? Yes ~ No ~

Silica (foundry, sand blasting)? Yes ~ No ~

Arsenic or asbestos? Yes ~ No ~

Organic solvents? Yes ~ No ~

Urethane foams?

Yes ~ No ~

C-1. Occupational History Update

1. Are you working on the same job this year as you were last year? Yes ~ No ~

If not, how has your job changed? _____

2. What chemicals are you exposed to on your job?

3. How many hours a day are you exposed to chemicals?

4. Have you noticed any skin rash within the past year you feel was related to your work?

Yes ~ No ~

If so, explain circumstances: _____

5. Have you noticed that any chemical makes you cough, be short of breath, or wheeze?

Yes ~ No ~

If so, can you identify it? _____

D. Miscellaneous

1. Do you smoke?

Yes ~ No ~

If so, how much and for how long? _____

Pipe _____

Cigars _____

Cigarettes _____

2. Do you drink alcohol in any form?

Yes ~ No ~

If so, how much, how long, and how often?

3. Do you wear glasses or contact lenses? Yes ~ No ~

4. Do you get any physical exercise other than that required to do your job? Yes ~ No ~

If so, explain: _____

5. Do you have any hobbies or “side jobs” that require you to use chemicals, such as furniture stripping, sand blasting, insulation or manufacture of urethane foam, furniture, etc? Yes ~ No ~

If so, please describe, giving type of business or hobby, chemicals used and length of exposures.

E. Symptoms Questionnaire

1. Do you ever have any shortness of breath? Yes ~ No ~

If yes, do you have to rest after climbing several flights of stairs? Yes ~ No ~

If yes, if you walk on the level with people your own age, do you walk slower than they do? Yes ~ No ~

If yes, if you walk slower than a normal pace, do you have to limit the distance that you walk? Yes ~ No ~

If yes, do you have to stop and rest while bathing or dressing? Yes ~ No ~

2. Do you cough as much as three months out of the year? Yes ~ No ~

If yes, have you had this cough for more than two years? Yes ~ No ~

If yes, do you ever cough anything up from chest? Yes ~ No ~

3. Do you ever have a feeling of smothering, unable to take a deep breath, or tightness in your chest? Yes ~ No ~

If yes, do you notice that this on any particular day of the week? Yes ~ No ~

If yes, what day or the week? _____
[~~Yes~~ ~ ~~No~~ ~]

If yes, do you notice that this occurs at any particular place? Yes ~ No ~

If yes, do you notice that this is worse after you have returned to work after being off for several days? Yes ~ No ~

4. Have you ever noticed any wheezing in your chest? Yes ~ No ~

If yes, is this only with colds or other infections? Yes ~ No ~

Is this caused by exposure to any kind of dust or other material? Yes ~ No ~

If yes, what kind? _____

5. Have you noticed any burning, tearing, or redness of your eyes when you are at work? Yes ~ No ~

If so, explain circumstances: _____

6. Have you noticed any sore or burning throat or itchy or burning nose when you are at work? Yes ~ No ~

If so, explain circumstances: _____

7. Have you noticed any stuffiness or dryness of your nose? Yes ~ No ~

8. Do you ever have swelling of the eyelids or face? Yes ~ No ~

9. Have you ever been jaundiced? Yes ~ No ~

If yes, was this accompanied by any pain? Yes ~ No ~

10. Have you ever had a tendency to bruise easily or bleed excessively? Yes ~ No ~

11. Do you have frequent headaches that are not relieved by aspirin or Tylenol?

Yes ~ No ~

If yes, do they occur at any particular time of the day or week? Yes ~ No ~

If yes, when do they occur? _____

12. Do you have frequent episodes of nervousness or irritability? Yes ~ No ~

13. Do you tend to have trouble concentrating or remembering? Yes ~ No ~

14. Do you ever feel dizzy, light-headed, excessively drowsy or like you have been drugged?

Yes ~ No ~

15. Does your vision ever become blurred? Yes ~ No ~

16. Do you have numbness or tingling of the hands or feet or other parts of your body?

Yes ~ No ~

17. Have you ever had chronic weakness or fatigue? Yes ~ No ~

18. Have you ever had any swelling of your feet or ankles to the point where you could not wear your shoes?

Yes ~ No ~

19. Are you bothered by heartburn or indigestion? Yes ~ No ~

20. Do you ever have itching, dryness, or peeling and scaling of the hands?

Yes ~ No ~

21. Do you ever have a burning sensation in the hands, or reddening of the skin?

Yes ~ No ~

22. Do you ever have cracking or bleeding of the skin on your hands?

Yes ~ No ~

23. Are you under a physician's care? Yes ~ No ~

If yes, for what are you being treated? _____

24. Do you have any physical complaints today? Yes ~ No ~

If yes, explain? _____

25. Do you have other health conditions not covered by these questions? Yes ~ No ~

If yes, explain? _____

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 14-1988, f. 9/12/88, ef. 9/12/88.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1050
Methylenedianiline.

(a) Scope and application.

(1) This section applies to all occupational exposures to MDA, Chemical Abstracts Service Registry No. 101-77-9, except as provided in paragraphs (a)(2) through (a)(7) of this section.

(2) Except as provided in paragraphs (a)(8) and (e)(5) of this section, this section does not apply to the processing, use, and handling of products containing MDA where initial monitoring indicates that the product is not capable of releasing MDA in excess of the action level under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no “dermal exposure to MDA” can occur.

(3) Except as provided in paragraph (a)(8) of this section, this section does not apply to the processing, use, and handling of products containing MDA where objective data are reasonably relied upon which demonstrate the product is not capable of releasing MDA under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no “dermal exposure to MDA” can occur.

(4) This section does not apply to the storage, transportation, distribution or sale of MDA in intact containers sealed in such a manner as to contain the MDA dusts, vapors, or liquids, except for the provisions of 29 CFR 1910.1200 and paragraph (d) of this section.

(5) This section does not apply to the construction industry as defined in 29 CFR 1910.12(b). (Exposure to MDA in the construction industry is covered by 29 CFR 1926.60).

(6) Except as provided in paragraph (a)(8) of this section, this section does not apply to materials in any form which contain less than 0.1% MDA by weight or volume.

(7) Except as provided in paragraph (a)(8) of this section, this section does not apply to “finished articles containing MDA.”

(8) Where products containing MDA are exempted under paragraphs (a)(2) through (a)(7) of this section, the employer shall maintain records of the initial monitoring results or objective data supporting that exemption and the basis for the employer's reliance on the data, as provided in the recordkeeping provision of paragraph (n) of this section.

(b) Definitions. For the purpose of this section, the following definitions shall apply:

Action level means a concentration of airborne MDA of 5 ppb as an eight (8)-hour time-weighted average.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees, for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (o) of this section, or any other person authorized by the Act or regulations issued under the Act.

Container means any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, commercial packaging or the like, but does not include piping systems.

Dermal exposure to MDA occurs where employees are engaged in the handling, application or use of mixtures or materials containing MDA, with any of the following non-airborne forms of MDA:

(i) Liquid, powdered, granular, or flaked mixtures containing MDA in concentrations greater than 0.1% by weight or volume; and

(ii) Materials other than "finished articles" containing MDA in concentrations greater than 0.1% by weight or volume.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which results in an unexpected and potentially hazardous release of MDA.

Employee exposure means exposure to MDA which would occur if the employee were not using respirators or protective work clothing and equipment.

Finished article containing MDA is defined as a manufactured item:

(i) Which is formed to a specific shape or design during manufacture;

(ii) Which has end use function(s) dependent in whole or part upon its shape or design during end use; and

(iii) Where applicable, is an item which is fully cured by virtue of having been subjected to the conditions (temperature, time) necessary to complete the desired chemical reaction.

4,4'-Methylenedianiline or MDA means the chemical, 4,4'-diaminodiphenylmethane, Chemical Abstract Service Registry number 101-77-9, in the form of a vapor, liquid, or solid. The definition also includes the salts of MDA.

Regulated areas means areas where airborne concentrations of MDA exceed or can reasonably be expected to exceed, the permissible exposure limits, or where dermal exposure to MDA can occur.

STEL means short term exposure limit as determined by any 15 minute sample period.

(c) Permissible exposure limits (PEL). The employer shall assure that no employee is exposed to an airborne concentration of MDA in excess of ten parts per billion (10 ppb) as an 8-hour time-weighted average or a STEL of 100 ppb.

(d) Emergency situations.

(1) Written plan.

(i) A written plan for emergency situations shall be developed for each workplace where there is a possibility of an emergency. Appropriate portions of the plan shall be implemented in the event of an emergency.

(ii) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped with the appropriate personal protective equipment and clothing as required in paragraphs (h) and (i) of this section until the emergency is abated.

(iii) The plan shall specifically include provisions for alerting and evacuating affected employees as well as the elements prescribed in 29 CFR 1910.38, "Employee emergency plans and fire prevention plans."

(2) Alerting employees. Where there is the possibility of employee exposure to MDA due to an emergency, means shall be developed to alert promptly those employees who have the potential to be directly exposed. Affected employees not engaged in correcting emergency conditions shall be evacuated immediately in the event that an emergency occurs. Means shall also be developed and implemented for alerting other employees who may be exposed as a result of the emergency.

(e) Exposure monitoring.

(1) General.

(i) Determinations of employee exposure shall be made from breathing zone air samples that are representative of each employee's exposure to airborne MDA over an eight (8) hour period. Determination of employee exposure to the STEL shall be made from breathing zone air samples collected over a 15 minute sampling period.

(ii) Representative employee exposure shall be determined on the basis of one or more samples representing full shift exposure for each shift for each job classification in each work area where exposure to MDA may occur.

(iii) Where the employer can document that exposure levels are equivalent for similar operations in different work shifts, the employer shall only be required to determine representative employee exposure for that operation during one shift.

(2) Initial monitoring. Each employer who has a workplace or work operation covered by this standard shall perform initial monitoring to determine accurately the airborne concentrations of MDA to which employees may be exposed.

(3) Periodic monitoring and monitoring frequency.

(i) If the monitoring required by paragraph (e)(2) of this section reveals employee exposure at or above the action level, but at or below the PELs, the employer shall repeat such representative monitoring for each such employee at least every six (6) months.

(ii) If the monitoring required by paragraph (e)(2) of this section reveals employee exposure above the PELs, the employer shall repeat such monitoring for each such employee at least every three (3) months.

(iii) The employer may alter the monitoring schedule from every three months to every six months for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to below the TWA but above the action level.

(4) Termination of monitoring.

(i) If the initial monitoring required by paragraph (e)(2) of this section reveals employee exposure to be below the action level, the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (e)(5) of this section.

(ii) If the periodic monitoring required by paragraph (e)(3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (e)(5) of this section.

(5) Additional monitoring. The employer shall institute the exposure monitoring required under paragraphs (e)(2) and (e)(3) of this section when there has been a change in production process, chemicals present, control equipment, personnel, or work practices which may result in new or additional exposures to MDA, or when the employer has any reason to suspect a change which may result in new or additional exposures.

(6) Accuracy of monitoring. Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of MDA.

(7) Employee notification of monitoring results.

(i) The employer shall, within 15 working days after the receipt of the results of any monitoring performed under this standard, notify each employee of these results, in writing, either

individually or by posting of results in an appropriate location that is accessible to affected employees.

(ii) The written notification required by paragraph (e)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce the employee exposure to or below the PELs, wherever the PELs are exceeded.

(8) Visual monitoring. The employer shall make routine inspections of employee hands, face and forearms potentially exposed to MDA. Other potential dermal exposures reported by the employee must be referred to the appropriate medical personnel for observation. If the employer determines that the employee has been exposed to MDA the employer shall:

(i) Determine the source of exposure;

(ii) Implement protective measures to correct the hazard; and

(iii) Maintain records of the corrective actions in accordance with paragraph (n) of this section.

(f) Regulated areas.

(1) Establishment.

(i) Airborne exposures. The employer shall establish regulated areas where airborne concentrations of MDA exceed or can reasonably be expected to exceed, the permissible exposure limits.

(ii) Dermal exposures. Where employees are subject to dermal exposure to MDA the employer shall establish those work areas as regulated areas.

(2) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in a manner that minimizes the number of persons potentially exposed.

(3) Access. Access to regulated areas shall be limited to authorized persons.

(4) Personal protective equipment and clothing. Each person entering a regulated area shall be supplied with, and required to use, the appropriate personal protective clothing and equipment in accordance with paragraphs (h) and (i) of this section.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

(g) Methods of compliance.

(1) Engineering controls and work practices.

(i) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to MDA at or below the PELs except to the extent that the employer can establish that these controls are not feasible or where the provisions of paragraph (g)(1)(ii) or (h)(1)(i) through (iv) of this section apply.

(ii) Wherever the feasible engineering controls and work practices which can be instituted are not sufficient to reduce employee exposure to or below the PELs, the employer shall use them

to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protective devices which comply with the requirements of paragraph (h) of this section.

(2) Compliance program.

(i) The employer shall establish and implement a written program to reduce employee exposure to or below the PELs by means of engineering and work practice controls, as required by paragraph (g)(1) of this section, and by use of respiratory protection where permitted under this section. The program shall include a schedule for periodic maintenance (e.g., leak detection) and shall include the written plan for emergency situations as specified in paragraph (d) of this section.

(ii) Upon request this written program shall be furnished for examination and copying to the Assistant Secretary, the Director, affected employees, and designated employee representatives. The employer shall review and, as necessary, update such plans at least once every 12 months to make certain they reflect the current status of the program.

(3) Employee rotation. Employee rotation shall not be permitted as a means of reducing exposure.

(h) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

(ii) Work operations for which the employer establishes that engineering and work-practice controls are not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the PEL.

(iv) Emergencies.

Oregon OSHA repealed 1910.1050(h)(2). In Oregon, OAR 437-002-1050 applies.

437-002-1050 Methylenedianiline Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1050 Methylenedianiline, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Methylenedianiline rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide HEPA filters for powered and non-powered air-purifying respirators.

(C) For escape, provide employees with one of the following respirator options: Any self-contained breathing apparatus with a full facepiece or hood operated in the positive-pressure or continuous-flow mode; or a full facepiece air-purifying respirator.

(D) Provide a combination HEPA filter and organic vapor canister or cartridge with powered or non-powered air-purifying respirators when MDA is in liquid form or used as part of a process requiring heat.

(ii) Any employee who cannot use a negative-pressure respirator must be given the option of using a positive-pressure respirator, or a supplied-air respirator operated in the continuous-flow or pressure-demand mode.

(i) Protective work clothing and equipment.

(1) Provision and use. Where employees are subject to dermal exposure to MDA, where liquids containing MDA can be splashed into the eyes, or where airborne concentrations of MDA are in excess of the PEL, the employer shall provide, at no cost to the employee, and ensure that the employee uses, appropriate protective work clothing and equipment which prevent contact with MDA such as, but not limited to:

(i) Aprons, coveralls or other full-body work clothing;

(ii) Gloves, head coverings, and foot coverings; and

(iii) Face shields, chemical goggles; or

(iv) Other appropriate protective equipment which comply with OAR 437-002-0134(8).

(2) Removal and storage.

(i) The employer shall ensure that, at the end of their work shift, employees remove MDA-contaminated protective work clothing and equipment that is not routinely removed throughout the day in change rooms provided in accordance with the provisions established for change rooms.

(ii) The employer shall ensure that, during their work shift, employees remove all other MDA-contaminated protective work clothing or equipment before leaving a regulated area.

(iii) The employer shall ensure that no employee takes MDA-contaminated work clothing or equipment out of the change room, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(iv) MDA-contaminated work clothing or equipment shall be placed and stored in closed containers which prevent dispersion of the MDA outside the container.

(v) Containers of MDA-contaminated protective work clothing or equipment which are to be taken out of change rooms or the workplace for cleaning, maintenance, or disposal, shall bear labels warning of the hazards of MDA.

(3) Cleaning and replacement.

(i) The employer shall provide the employee with clean protective clothing and equipment. The employer shall ensure that protective work clothing or equipment required by this paragraph is cleaned, laundered, repaired, or replaced at intervals appropriate to maintain its effectiveness.

(ii) The employer shall prohibit the removal of MDA from protective work clothing or equipment by blowing, shaking, or any methods which allow MDA to re-enter the workplace.

(iii) The employer shall ensure that laundering of MDA-contaminated clothing shall be done so as to prevent the release of MDA in the workplace.

(iv) Any employer who gives MDA-contaminated clothing to another person for laundering shall inform such person of the requirement to prevent the release of MDA.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with MDA of the potentially harmful effects of exposure.

(vi) MDA-contaminated clothing shall be transported in properly labeled, sealed, impermeable bags or containers.

(j) Hygiene facilities and practices.

(1) Change rooms.

(i) The employer shall provide clean change rooms for employees, who must wear protective clothing, or who must use protective equipment because of their exposure to MDA.

(ii) Change rooms must be equipped with separate storage for protective clothing and equipment and for street clothes which prevents MDA contamination of street clothes.

(2) Showers.

(i) The employer shall ensure that employees, who work in areas where there is the potential for exposure resulting from airborne MDA (e.g., particulates or vapors) above the action level, shower at the end of the work shift.

(A) Shower facilities required by this paragraph shall comply with 1910.141 (d)(3).

(B) The employer shall ensure that employees who are required to shower pursuant to the provisions contained herein do not leave the workplace wearing any protective clothing or equipment worn during the work shift.

(ii) Where dermal exposure to MDA occurs, the employer shall ensure that materials spilled or deposited on the skin are removed as soon as possible by methods which do not facilitate the dermal absorption of MDA.

(3) Lunch facilities.

(i) Availability and construction.

(A) Whenever food or beverages are consumed at the worksite and employees are exposed to MDA at or above the PEL or are subject to dermal exposure to MDA the employer shall provide readily accessible lunch areas.

(B) Lunch areas located within the workplace and in areas where there is the potential for airborne exposure to MDA at or above the PEL shall have a positive pressure, temperature controlled, filtered air supply.

(C) Lunch areas may not be located in areas within the workplace where the potential for dermal exposure to MDA exists.

(ii) The employer shall ensure that employees who have been subjected to dermal exposure to MDA or who have been exposed to MDA above the PEL wash their hands and faces with soap and water prior to eating, drinking, smoking, or applying cosmetics.

(iii) The employer shall ensure that employees exposed to MDA do not enter lunch facilities with MDA-contaminated protective work clothing or equipment.

(k) Communication of hazards.

(1) Hazard communication – general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for MDA.

(ii) In classifying the hazards of MDA at least the following hazards are to be addressed: Cancer; liver effects; and skin sensitization.

(iii) Employers shall include MDA in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of MDA and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (k)(4) of this section.

(2) Signs and labels.

(i) Signs.

(A) The employer shall post and maintain legible signs demarcating regulated areas and entrances or access ways to regulated areas that bear the following legend:

DANGER
MDA
MAY CAUSE CANCER

CAUSES DAMAGE TO THE LIVER
RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING MAY BE
REQUIRED IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(B) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (k)(2)(i)(A) of this section:

DANGER
MDA
MAY CAUSE CANCER
LIVER TOXIN
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING MAY BE REQUIRED
TO BE WORN IN THIS AREA

(ii) Labels. Prior to June 1, 2015, employers may include the following information workplace labels in lieu of the labeling requirements in paragraph (k)(1) of this section:

(A) For pure MDA:

DANGER
CONTAINS MDA
MAY CAUSE CANCER
LIVER TOXIN

(B) For mixtures containing MDA:

DANGER
CONTAINS MDA
CONTAINS MATERIALS WHICH MAY CAUSE CANCER
LIVER TOXIN

(3) Safety data sheets (SDS). In meeting the obligation to provide safety data sheets, employers shall make appropriate use of the information found in Appendices A and B to 1910.1050.

(4) Information and training.

(i) The employer shall provide employees with information and training on MDA, in accordance with 29 CFR 1910.1200(h), at the time of initial assignment and at least annually thereafter.

(ii) In addition to the information required under 29 CFR 1910.1200, the employer shall:

(A) Provide an explanation of the contents of this section, including appendices A and B, and indicate to employees where a copy of the standard is available;

(B) Describe the medical surveillance program required under paragraph (m) of this section, and explain the information contained in Appendix C; and

(C) Describe the medical removal provision required under paragraph (m) of this section.

(5) Access to training materials.

(i) The employer shall make readily available to all affected employees, without cost, all written materials relating to the employee training program, including a copy of this regulation.

(ii) The employer shall provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.

(l) Housekeeping.

(1) All surfaces shall be maintained as free as practicable of visible accumulations of MDA.

(2) The employer shall institute a program for detecting MDA leaks, spills, and discharges, including regular visual inspections of operations involving liquid or solid MDA.

(3) All leaks shall be repaired and liquid or dust spills cleaned up promptly.

(4) Surfaces contaminated with MDA may not be cleaned by the use of compressed air.

(5) Shoveling, dry sweeping, and other methods of dry clean-up of MDA may be used where HEPA-filtered vacuuming and/or wet cleaning are not feasible or practical.

(6) Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with MDA shall be collected and disposed of in a manner to prevent the re-entry of MDA into the workplace.

(m) Medical surveillance.

(1) General.

(i) The employer shall make available a medical surveillance program for employees exposed to MDA:

(A) Employees exposed at or above the action level for 30 or more days per year;

(B) Employees who are subject to dermal exposure to MDA for 15 or more days per year;

(C) Employees who have been exposed in an emergency situation;

(D) Employees whom the employer, based on results from compliance with paragraph (e)(8) of this section, has reason to believe are being dermally exposed; and

(E) Employees who show signs or symptoms of MDA exposure.

(ii) The employer shall ensure that all medical examinations and procedures are performed by, or under the supervision of, a licensed physician, at a reasonable time and place, and provided without cost to the employee.

(2) Initial examinations.

(i) Within 150 days of the effective date of this standard, or before the time of initial assignment, the employer shall provide each employee covered by paragraph (m)(1)(i) of this section with a medical examination including the following elements:

(A) A detailed history which includes:

(1) Past work exposure to MDA or any other toxic substances;

(2) A history of drugs, alcohol, tobacco, and medication routinely taken (duration and quantity); and

(3) A history of dermatitis, chemical skin sensitization, or previous hepatic disease.

(B) A physical examination which includes all routine physical examination parameters, skin examination, and signs of liver disease.

(C) Laboratory tests including:

(1) Liver function tests and

(2) Urinalysis.

(D) Additional tests as necessary in the opinion of the physician.

(ii) No initial medical examination is required if adequate records show that the employee has been examined in accordance with the requirements of this section within the previous six months prior to the effective date of this standard or prior to the date of initial assignment.

(3) Periodic examinations.

(i) The employer shall provide each employee covered by this section with a medical examination at least annually following the initial examination. These periodic examinations shall include at least the following elements:

(A) A brief history regarding any new exposure to potential liver toxins, changes in drug, tobacco, and alcohol intake, and the appearance of physical signs relating to the liver, and the skin;

(B) The appropriate tests and examinations including liver function tests and skin examinations; and

(C) Appropriate additional tests or examinations as deemed necessary by the physician.

(ii) If in the physicians' opinion the results of liver function tests indicate an abnormality, the employee shall be removed from further MDA exposure in accordance with paragraph (m)(9) of this section. Repeat liver function tests shall be conducted on advice of the physician.

(4) Emergency examinations. If the employer determines that the employee has been exposed to a potentially hazardous amount of MDA in an emergency situation as addressed in paragraph (d) of this section, the employer shall provide medical examinations in accordance with paragraphs (m)(3)(i) and (ii) of this section. If the results of liver function testing indicate an

abnormality, the employee shall be removed in accordance with paragraph (m)(9) of this section. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are normal and on the advice of the physician, no additional testing is required.

(5) Additional examinations. Where the employee develops signs and symptoms associated with exposure to MDA, the employer shall provide the employee with an additional medical examination including a liver function test. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are normal and, on the advice of the physician, no additional testing is required.

(6) Multiple physician review mechanism.

(i) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under this section, and the employee has signs or symptoms of occupational exposure to MDA (which could include an abnormal liver function test), and the employee disagrees with the opinion of the examining physician, and this opinion could affect the employee's job status, the employee may designate an appropriate, mutually acceptable second physician:

(A) To review any findings, determinations, or recommendations of the initial physician; and

(B) To conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(ii) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within fifteen (15) days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

(A) The employee informing the employer that he or she intends to seek a second medical opinion, and

(B) The employee initiating steps to make an appointment with a second physician.

(iii) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(iv) If the two physicians have been unable to resolve quickly their disagreement, then the employer and the employee through their respective physicians shall designate a third physician;

(A) To review any findings, determinations, or recommendations of the prior physicians; and

(B) To conduct such examinations, consultations, laboratory tests, and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(v) The employer shall act consistent with the findings, determinations, and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.

(7) Information provided to the examining and consulting physicians.

(i) The employer shall provide the following information to the examining physician:

(A) A copy of this regulation and its appendices;

(B) A description of the affected employee's duties as they relate to the employee's potential exposure to MDA;

(C) The employee's current actual or representative MDA exposure level;

(D) A description of any personal protective equipment used or to be used; and

(E) Information from previous employment-related medical examinations of the affected employee.

(ii) The employer shall provide the foregoing information to a second physician under this section upon request either by the second physician, or by the employee.

(8) Physician's written opinion

(i) For each examination under this section, the employer shall obtain, and provide the employee with a copy of, the examining physician's written opinion within 15 days of its receipt. The written opinion shall include the following:

(A) The occupationally-pertinent results of the medical examination and tests;

(B) The physician's opinion concerning whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of health from exposure to MDA;

(C) The physician's recommended limitations upon the employee's exposure to MDA or upon the employee's use of protective clothing or equipment and respirators; and

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions resulting from MDA exposure which require further explanation or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.

(9) Medical removal.

(i) Temporary medical removal of an employee.

(A) Temporary removal resulting from occupational exposure. The employee shall be removed from work environments in which exposure to MDA is at or above the action level or where dermal exposure to MDA may occur, following an initial examination (paragraph (m)(2) of this section), periodic examinations (paragraph (m)(3) of this section), an emergency situation paragraph (m)(4) of this section, or an additional examination (paragraph (m)(5) of this section) in the following circumstances:

(1) When the employee exhibits signs and/or symptoms indicative of acute exposure to MDA; or

(2) When the examining physician determines that an employee's abnormal liver function tests are not associated with MDA exposure but that the abnormalities may be exacerbated as a result of occupational exposure to MDA.

(B) Temporary removal due to a final medical determination.

(1) The employer shall remove an employee from work environments in which exposure to MDA is at or above the action level or where dermal exposure to MDA may occur, on each occasion that there is a final medical determination or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(2) For the purposes of this section, the phrase "final medical determination" shall mean the outcome of the physician review mechanism used pursuant to the medical surveillance provisions of this section.

(3) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to MDA, the employer shall implement and act consistent with the recommendation.

(ii) Return of the employee to former job status.

(A) The employer shall return an employee to his or her former job status:

(1) When the employee no longer shows signs or symptoms of exposure to MDA, or upon the advice of the physician.

(2) When a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(B) For the purposes of this section, the requirement that an employer return an employee to his or her former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(iii) Removal of other employee special protective measure or limitations. The employer shall remove any limitations placed on an employee, or end any special protective measures provided to an employee, pursuant to a final medical determination, when a subsequent final

medical determination indicates that the limitations or special protective measures are no longer necessary.

(iv) Employer options pending a final medical determination. Where the physician review mechanism used pursuant to the medical surveillance provisions of this section, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(A) Removal. The employer may remove the employee from exposure to MDA, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

(B) Return. The employer may return the employee to his or her former job status, and end any special protective measures provided to the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions.

(1) If the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician; or

(2) If the employee has been on removal status for the preceding six months as a result of exposure to MDA, then the employer shall await a final medical determination.

(v) Medical removal protection benefits.

(A) Provisions of medical removal protection benefits. The employer shall provide to an employee up to six (6) months of medical removal protection benefits on each occasion that an employee is removed from exposure to MDA or otherwise limited pursuant to this section.

(B) Definition of medical removal protection benefits. For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the earnings, seniority, and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to MDA or otherwise limited.

(C) Follow-up medical surveillance during the period of employee removal or limitations. During the period of time that an employee is removed from normal exposure to MDA or otherwise limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this section.

(D) Workers' compensation claims. If a removed employee files a claim for workers' compensation payments for a MDA-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for workers' compensation payments received by the employee for treatment-related expenses.

(E) Other credits. The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from non-MDA-related employment with any employer made possible by virtue of the employee's removal.

(F) Employees who do not recover within the 6 months of removal. The employer shall take the following measures with respect to any employee removed from exposure to MDA:

(1) The employer shall make available to the employee a medical examination pursuant to this section to obtain a final medical determination with respect to the employee;

(2) The employer shall assure that the final medical determination obtained indicates whether or not the employee may be returned to his or her former job status, and, if not, what steps should be taken to protect the employee's health;

(3) Where the final medical determination has not yet been obtained, or, once obtained indicates that the employee may not yet be returned to his or her former job status, the employer shall continue to provide medical removal protection benefits to the employee until either the employee is returned to former job status, or a final medical determination is made that the employee is incapable of ever safely returning to his or her former job status; and

(4) Where the employer acts pursuant to a final medical determination which permits the return of the employee to his or her former job status, despite what would otherwise be an abnormal liver function test, later questions concerning removing the employee again shall be decided by a final medical determination. The employer need not automatically remove such an employee pursuant to the MDA removal criteria provided by this section.

(vi) Voluntary removal or restriction of an employee. Where an employer, although not required by this section to do so, removes an employee from exposure to MDA or otherwise places limitations on an employee due to the effects of MDA exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by paragraph (m)(9)(v) of this section.

(n) Recordkeeping.

(1) Monitoring data for exempted employers.

(i) Where as a result of the initial monitoring the processing, use, or handling of products made from or containing MDA are exempted from other requirements of this section under paragraph (a)(2) of this section, the employer shall establish and maintain an accurate record of monitoring relied on in support of the exemption.

(ii) This record shall include at least the following information:

(A) The product qualifying for exemption;

(B) The source of the monitoring data (e.g., was monitoring performed by the employer or a private contractor);

(C) The testing protocol, results of testing, and/or analysis of the material for the release of MDA;

(D) A description of the operation exempted and how the data support the exemption (e.g., are the monitoring data representative of the conditions at the affected facility); and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Objective data for exempted employers.

(i) Where the processing, use, or handling of products made from or containing MDA are exempted from other requirements of this section under paragraph (a) of this section, the employer shall establish and maintain an accurate record of objective data relied upon in support of the exemption.

(ii) This record shall include at least the following information:

(A) The product qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of MDA;

(D) A description of the operation exempted and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(3) Exposure measurements.

(i) The employer shall establish and maintain an accurate record of all measurements required by paragraph (e) of this section, in accordance with 29 CFR 1910.1020.

(ii) This record shall include:

(A) The dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposures;

(B) Identification of the sampling and analytical methods used;

(C) A description of the type of respiratory protective devices worn, if any; and

(D) The name, [~~social security number~~,]job classification and exposure levels of the employee monitored and all other employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for at least 30 years, in accordance with 29 CFR 1910.1020.

(4) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance required by paragraph (m) of this section, in accordance with 29 CFR 1910.1020.

(ii) This record shall include:

(A) The name[~~social security number~~] and description of the duties of the employee;

(B) The employer's copy of the physician's written opinion on the initial, periodic, and any special examinations, including results of medical examination and all tests, opinions, and recommendations;

(C) Results of any airborne exposure monitoring done for that employee and the representative exposure levels supplied to the physician; and

(D) Any employee medical complaints related to exposure to MDA;

(iii) The employer shall keep, or assure that the examining physician keeps, the following medical records:

(A) A copy of this standard and its appendices, except that the employer may keep one copy of the standard and its appendices for all employees provided the employer references the standard and its appendices in the medical surveillance record of each employee;

(B) A copy of the information provided to the physician as required by any paragraphs in the regulatory text;

(C) A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to the information;

(D) A copy of the employee's medical and work history related to exposure to MDA; and

(iv) The employer shall maintain this record for at least the duration of employment plus 30 years, in accordance with 29 CFR 1910.1020.

(5) Medical removals.

(i) The employer shall establish and maintain an accurate record for each employee removed from current exposure to MDA pursuant to paragraph (m) of this section.

(ii) Each record shall include:

(A) The name [~~and social security number~~] of the employee;

(B) The date of each occasion that the employee was removed from current exposure to MDA as well as the corresponding date on which the employee was returned to his or her former job status;

(C) A brief explanation of how each removal was or is being accomplished; and

(D) A statement with respect to each removal indicating the reason for the removal.

(iii) The employer shall maintain each medical removal record for at least the duration of an employee's employment plus 30 years.

(6) Availability.

(i) The employer shall assure that records required to be maintained by this section shall be made available, upon request, to the Assistant Secretary and the Director for examination and copying.

(ii) Employee exposure monitoring records required by this section shall be provided upon request for examination and copying to employees, employee representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(iii) Employee medical records required by this section shall be provided upon request for examination and copying, to the subject employee, to anyone having the specific written consent of the subject employee, and to the Assistant Secretary in accordance with 29 CFR 1910.1020.

(7) Transfer of records. The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

(o) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees, or their designated representatives, an opportunity to observe the measuring or monitoring of employee exposure to MDA conducted pursuant to paragraph (e) of this section.

(2) Observation procedures. When observation of the measuring or monitoring of employee exposure to MDA requires entry into areas where the use of protective clothing and equipment or respirators is required, the employer shall provide the observer with personal protective clothing and equipment or respirators required to be worn by employees working in the area, assure the use of such clothing and equipment or respirators, and require the observer to comply with all other applicable safety and health procedures.

(p) Reserved.

(q) Appendices. The information contained in appendices A, B, C and D of this section is not intended, by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

[57 FR 35666, Aug. 10, 1992, as amended at 57 FR 49649, Nov. 3, 1992; 61 FR 5508, Feb. 13, 1996; 63 FR 1293, Jan. 8, 1998; 67 FR 67965, Nov. 7, 2002; 71 FR 16672, 16673, Apr. 3,

2006; 71 FR 50190, Aug. 24, 2006; 73 FR 75586, Dec. 12, 2008; 76 FR 33609, June 8, 2011; 77 FR 17785, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 1-1993, f. 1/22/93, ef. 1/22/93.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1051

1,3-Butadiene.

(a) Scope and application.

(1) This section applies to all occupational exposures to 1,3-Butadiene (BD), Chemical Abstracts Service Registry No. 106-99-0, except as provided in paragraph (a)(2) of this section.

(2)

(i) Except for the recordkeeping provisions in paragraph (m)(1) of this section, this section does not apply to the processing, use, or handling of products containing BD or to other work operations and streams in which BD is present where objective data are reasonably relied upon that demonstrate the work operation or the product or the group of products or operations to which it belongs may not reasonably be foreseen to release BD in airborne concentrations at or above the action level or in excess of the STEL under the expected conditions of processing, use, or handling that will cause the greatest possible release or in any plausible accident.

(ii) This section also does not apply to work operations, products or streams where the only exposure to BD is from liquid mixtures containing 0.1% or less of BD by volume or the vapors released from such liquids, unless objective data become available that show that airborne concentrations generated by such mixtures can exceed the action level or STEL under reasonably predictable conditions of processing, use or handling that will cause the greatest possible release.

(iii) Except for labeling requirements and requirements for emergency response, this section does not apply to the storage, transportation, distribution or sale of BD or liquid mixtures in intact containers or in transportation pipelines sealed in such a manner as to fully contain BD vapors or liquid.

(3) Where products or processes containing BD are exempted under paragraph (a)(2) of this section, the employer shall maintain records of the objective data supporting that exemption and

the basis for the employer's reliance on the data, as provided in paragraph (m)(1) of this section.

(b) Definitions: For the purpose of this section, the following definitions shall apply:

Action level means a concentration of airborne BD of 0.5 ppm calculated as an eight (8) hour time-weighted average.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically designated by the employer, whose duties require entrance into a regulated area, or a person entering such an area as a designated representative of employees to exercise the right to observe monitoring and measuring procedures under paragraph (d)(8) of this section, or a person designated under the Act or regulations issued under the Act to enter a regulated area.

1,3-Butadiene means an organic compound with chemical formula $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH}_2$ that has a molecular weight of approximately 54.15 gm/mole.

Business day means any Monday through Friday, except those days designated as federal, state, local or company specific holidays.

Complete Blood Count (CBC) means laboratory tests performed on whole blood specimens and includes the following: White blood cell count (WBC), hematocrit (Hct), red blood cell count (RBC), hemoglobin (Hgb), differential count of white blood cells, red blood cell morphology, red blood cell indices, and platelet count.

Day means any part of a calendar day.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of BD.

Employee exposure means exposure of a worker to airborne concentrations of BD which would occur if the employee were not using respiratory protective equipment.

Objective data means monitoring data, or mathematical modelling or calculations based on composition, chemical and physical properties of a material, stream or product.

Permissible Exposure Limits, PELs means either the 8 hour Time Weighted Average (8-hr TWA) exposure or the Short-Term Exposure Limit (STEL).

Physician or other licensed health care professional is an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide one or more of the specific health care services required by paragraph (k) of this section.

Regulated area means any area where airborne concentrations of BD exceed or can reasonably be expected to exceed the 8-hour time weighted average (8-hr TWA) exposure of 1 ppm or the short-term exposure limit (STEL) of 5 ppm for 15 minutes.

This section means this 1,3-butadiene standard.

(c) Permissible exposure limits (PELs).

(1) Time-weighted average (TWA) limit. The employer shall ensure that no employee is exposed to an airborne concentration of BD in excess of one (1) part BD per million parts of air (ppm) measured as an eight (8)-hour time-weighted average.

(2) Short-term exposure limit (STEL). The employer shall ensure that no employee is exposed to an airborne concentration of BD in excess of five parts of BD per million parts of air (5 ppm) as determined over a sampling period of fifteen (15) minutes.

(d) Exposure monitoring.

(1) General.

(i) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 15-minute short-term exposures of each employee.

(ii) Representative 8-hour TWA employee exposure shall be determined on the basis of one or more samples representing full-shift exposure for each shift and for each job classification in each work area.

(iii) Representative 15-minute short-term employee exposures shall be determined on the basis of one or more samples representing 15-minute exposures associated with operations that are most likely to produce exposures above the STEL for each shift and for each job classification in each work area.

(iv) Except for the initial monitoring required under paragraph (d)(2) of this section, where the employer can document that exposure levels are equivalent for similar operations on different work shifts, the employer need only determine representative employee exposure for that operation from the shift during which the highest exposure is expected.

(2) Initial monitoring.

(i) Each employer who has a workplace or work operation covered by this section, shall perform initial monitoring to determine accurately the airborne concentrations of BD to which employees may be exposed, or shall rely on objective data pursuant to paragraph (a)(2)(i) of this section to fulfill this requirement. The initial monitoring required under this paragraph shall be completed within 60 days of the introduction of BD into the workplace.

(ii) Where the employer has monitored within two years prior to the effective date of this section and the monitoring satisfies all other requirements of this section, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (d)(2)(i) of this section, provided that the conditions under which the initial monitoring was conducted have not changed in a manner that may result in new or additional exposures.

(3) Periodic monitoring and its frequency.

(i) If the initial monitoring required by paragraph (d)(2) of this section reveals employee exposure to be at or above the action level but at or below both the 8-hour TWA limit and the STEL, the employer shall repeat the representative monitoring required by paragraph (d)(1) of this section every twelve months.

(ii) If the initial monitoring required by paragraph (d)(2) of this section reveals employee exposure to be above the 8-hour TWA limit, the employer shall repeat the representative monitoring required by paragraph (d)(1)(ii) of this section at least every three months until the employer has collected two samples per quarter (each at least 7 days apart) within a two-year period, after which such monitoring must occur at least every six months.

(iii) If the initial monitoring required by paragraph (d)(2) of this section reveals employee exposure to be above the STEL, the employer shall repeat the representative monitoring required by paragraph (d)(1)(iii) of this section at least every three months until the employer has collected two samples per quarter (each at least 7 days apart) within a two-year period, after which such monitoring must occur at least every six months.

(iv) The employer may alter the monitoring schedule from every six months to annually for any required representative monitoring for which two consecutive measurements taken at least 7 days apart indicate that employee exposure has decreased to or below the 8-hour TWA, but is at or above the action level.

(4) Termination of monitoring.

(i) If the initial monitoring required by paragraph (d)(2) of this section reveals employee exposure to be below the action level and at or below the STEL, the employer may discontinue the monitoring for employees whose exposures are represented by the initial monitoring.

(ii) If the periodic monitoring required by paragraph (d)(3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level and at or below the STEL, the employer may discontinue the monitoring for those employees who are represented by such monitoring.

(5) Additional monitoring.

(i) The employer shall institute the exposure monitoring required under paragraph (d) of this section whenever there has been a change in the production, process, control equipment, personnel or work practices that may result in new or additional exposures to BD or when the employer has any reason to suspect that a change may result in new or additional exposures.

(ii) Whenever spills, leaks, ruptures or other breakdowns occur that may lead to employee exposure above the 8-hr TWA limit or above the STEL, the employer shall monitor [using leak source, such as direct reading instruments, area or personal monitoring], after the cleanup of the spill or repair of the leak, rupture or other breakdown, to ensure that exposures have returned to the level that existed prior to the incident.

(6) Accuracy of monitoring. Monitoring shall be accurate, at a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of BD at or above the 1 ppm TWA

limit and to within plus or minus 35 percent for airborne concentrations of BD at or above the action level of 0.5 ppm and below the 1 ppm TWA limit.

(7) Employee notification of monitoring results.

(i) The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) The employer shall, within 15 business days after receipt of any monitoring performed under this section indicating the 8-hour TWA or STEL has been exceeded, provide the affected employees, in writing, with information on the corrective action being taken by the employer to reduce employee exposure to or below the 8-hour TWA or STEL and the schedule for completion of this action.

(8) Observation of monitoring.

(i) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to BD conducted in accordance with paragraph (d) of this section.

(ii) Observation procedures. When observation of the monitoring of employee exposure to BD requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer at no cost with protective clothing and equipment, and shall ensure that the observer uses this equipment and complies with all other applicable safety and health procedures.

(e) Regulated areas.

(1) The employer shall establish a regulated area wherever occupational exposures to airborne concentrations of BD exceed or can reasonably be expected to exceed the permissible exposure limits, either the 8-hr TWA or the STEL.

(2) Access to regulated areas shall be limited to authorized persons.

(3) Regulated areas shall be demarcated from the rest of the workplace in any manner that minimizes the number of employees exposed to BD within the regulated area.

(4) An employer at a multi-employer worksite who establishes a regulated area shall communicate the access restrictions and locations of these areas to other employers with work operations at that worksite whose employees may have access to these areas.

(f) Methods of compliance.

(1) Engineering controls and work practices.

(i) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to or below the PELs, except to the extent that the employer can establish that these controls are not feasible or where paragraph (h)(1)(i) of this section applies.

(ii) Wherever the feasible engineering controls and work practices which can be instituted are not sufficient to reduce employee exposure to or below the 8-hour TWA or STEL, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (h) of this section.

(2) Compliance plan.

(i) Where any exposures are over the PELs, the employer shall establish and implement a written plan to reduce employee exposure to or below the PELs primarily by means of engineering and work practice controls, as required by paragraph (f)(1) of this section, and by the use of respiratory protection where required or permitted under this section. No compliance plan is required if all exposures are under the PELs.

(ii) The written compliance plan shall include a schedule for the development and implementation of the engineering controls and work practice controls including periodic leak detection surveys.

(iii) Copies of the compliance plan required in paragraph (f)(2) of this section shall be furnished upon request for examination and copying to the Assistant Secretary, the Director, affected employees and designated employee representatives. Such plans shall be reviewed at least every 12 months, and shall be updated as necessary to reflect significant changes in the status of the employer's compliance program.

(iv) The employer shall not implement a schedule of employee rotation as a means of compliance with the PELs.

(g) Exposure Goal Program.

(1) For those operations and job classifications where employee exposures are greater than the action level, in addition to compliance with the PELs, the employer shall have an exposure goal program that is intended to limit employee exposures to below the action level during normal operations.

(2) Written plans for the exposure goal program shall be furnished upon request for examination and copying to the Assistant Secretary, the Director, affected employees and designated employee representatives.

(3) Such plans shall be updated as necessary to reflect significant changes in the status of the exposure goal program.

(4) Respirator use is not required in the exposure goal program.

(5) The exposure goal program shall include the following items unless the employer can demonstrate that the item is not feasible, will have no significant effect in reducing employee exposures, or is not necessary to achieve exposures below the action level:

(i) A leak prevention, detection, and repair program.

(ii) A program for maintaining the effectiveness of local exhaust ventilation systems.

- (iii) The use of pump exposure control technology such as, but not limited to, mechanical double-sealed or seal-less pumps.
- (iv) Gauging devices designed to limit employee exposure, such as magnetic gauges on rail cars.
- (v) Unloading devices designed to limit employee exposure, such as a vapor return system.
- (vi) A program to maintain BD concentration below the action level in control rooms by use of engineering controls.
- (h) Respiratory protection.
 - (1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:
 - (i) Periods necessary to install or implement feasible engineering and work-practice controls.
 - (ii) Non-routine work operations that are performed infrequently and for which employee exposures are limited in duration.
 - (iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposures to or below the PELs.
 - (iv) Emergencies.
 - (2) Respirator program.

Oregon OSHA repealed 1910.1051(h)(2)(i). In Oregon, OAR 437-002-1051 applies.

437-002-1051 1,3-Butadiene Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii), and (d)(3)(iii)(B)(1) and (2)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1051 1,3-Butadiene, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these 1,3-Butadiene rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

- (ii) If air-purifying respirators are used, the employer must replace the air-purifying filter elements according to the replacement schedule set for the class of respirators listed in Table 1 of this section, and at the beginning of each work shift.

(iii) Instead of using the replacement schedule listed in Table 1 of this section, the employer may replace cartridges or canisters at 90% of their expiration service life, provided the employer:

(A) Demonstrates that employees will be adequately protected by this procedure.

(B) Uses BD breakthrough data for this purpose that have been derived from tests conducted under worst-case conditions of humidity, temperature, and air-flow rate through the filter element, and the employer also describes the data supporting the cartridge- or canister-change schedule, as well as the basis for using the data in the employer's respirator program.

(iv) A label must be attached to each filter element to indicate the date and time it is first installed on the respirator.

(v) If NIOSH approves an end-of-service-life indicator (ESLI) for an air-purifying filter element, the element may be used until the ESLI shows no further useful service life or until the element is replaced at the beginning of the next work shift, whichever occurs first.

(vi) Regardless of the air-purifying element used, if an employee detects the odor of BD, the employer must replace the air-purifying element immediately.

(3) Respirator selection.

(i) The employer must select appropriate respirators from Table 1 of this section.

(ii) Air-purifying respirators must have filter elements approved by NIOSH for organic vapors or BD.

(iii) When an employee whose job requires the use of a respirator cannot use a negative-pressure respirator, the employer must provide the employee with a respirator that has less breathing resistance than the negative-pressure respirator, such as a powered air-purifying respirator or supplied-air respirator, when the employee is able to use it and if it provides the employee adequate protection.

Table 1. – Minimum Requirements for Respiratory Protection for Airborne BD	
Concentration of airborne BD (ppm) or condition of use	Minimum required respirator
Less than or equal to 5 ppm (5 times PEL).	(a) Air-purifying half mask or full facepiece respirator equipped with approved BD or organic vapor cartridges or canisters. Cartridges or canisters shall be replaced every 4 hours.
Less than or equal to 10 ppm (10 times PEL).	(a) Air-purifying half mask or full facepiece respirator equipped with approved BD or organic vapor cartridges or canisters. Cartridges or canisters shall be replaced every 3 hours.
Less than or equal to 25 ppm (25 times PEL).	(a) Air-purifying full facepiece respirator equipped with approved BD or organic vapor cartridges or canisters. Cartridges or canisters shall be replaced every 2 hours. (b) Any powered air-purifying respirator equipped with approved BD or organic vapor cartridges. PAPR cartridges shall be replaced every 2 hours. (c) Continuous flow supplied air respirator equipped with a hood or helmet.

Less than or equal to 50 ppm (50 times PEL).	<p>(a) Air-purifying full facepiece respirator equipped with approved BD or organic vapor cartridges or canisters. Cartridges or canisters shall be replaced every (1) hour.</p> <p>(b) Powered air-purifying respirator equipped with a tight-fitting facepiece and an approved BD or organic vapor cartridges. PAPR cartridges shall be replaced every (1) hour.</p>
Less than or equal to 1,000 ppm (1,000 times PEL).	<p>(a) Supplied air respirator equipped with a half mask or full facepiece and operated in a pressure demand or other positive pressure mode.</p>
Greater than 1000 ppm unknown concentrations, or firefighting	<p>(a) Self-contained breathing apparatus equipped with a full face-piece and operated in a pressure demand or other positive pressure mode.</p> <p>(b) Any supplied air respirator equipped with a full facepiece and operated in a pressure demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in a pressure demand or other positive pressure mode.</p>
Escape from IDLH conditions	<p>(a) Any positive pressure self-contained breathing apparatus with an appropriate service life.</p> <p>(b) An air-purifying full facepiece respirator equipped with a front or back mounted BD or organic vapor canister.</p>
<p>Notes: Respirators approved for use in higher concentrations are permitted to be used in lower concentrations. Full facepiece is required when eye irritation is anticipated.</p>	

(i) Protective clothing and equipment. Where appropriate to prevent eye contact and limit dermal exposure to BD, the employer shall provide protective clothing and equipment at no cost to the employee and shall ensure its use. Eye and face protection shall meet the requirements of OAR 437-002-0134(8).

(j) Emergency situations. Written plan. A written plan for emergency situations shall be developed, or an existing plan shall be modified, to contain the applicable elements specified in 29 CFR 1910.38, "Employee Emergency Plans and Fire Prevention Plans," and in 29 CFR 1910.120 "Hazardous Waste Operations and Emergency Responses," for each workplace where there is a possibility of an emergency. NOTE: 1910.38 is now OAR 437-002-0042.

(k) Medical screening and surveillance.

(1) Employees covered. The employer shall institute a medical screening and surveillance program as specified in this paragraph for:

(i) Each employee with exposure to BD at concentrations at or above the action level on 30 or more days or for employees who have or may have exposure to BD at or above the PELs on 10 or more days a year;

(ii) Employers (including successor owners) shall continue to provide medical screening and surveillance for employees, even after transfer to a non-BD exposed job and regardless of when the employee is transferred, whose work histories suggest exposure to BD:

(A) At or above the PELs on 30 or more days a year for 10 or more years;

(B) At or above the action level on 60 or more days a year for 10 or more years; or

(C) Above 10 ppm on 30 or more days in any past year; and

(iii) Each employee exposed to BD following an emergency situation.

(2) Program administration.

(i) The employer shall ensure that the health questionnaire, physical examination and medical procedures are provided without cost to the employee, without loss of pay, and at a reasonable time and place.

(ii) Physical examinations, health questionnaires, and medical procedures shall be performed or administered by a physician or other licensed health care professional.

(iii) Laboratory tests shall be conducted by an accredited laboratory.

(3) Frequency of medical screening activities. The employer shall make medical screening available on the following schedule:

(i) For each employee covered under paragraphs (j)(1)(i)-(ii) of this section, a health questionnaire and complete blood count with differential and platelet count (CBC) every year, and a physical examination as specified below:

(A) An initial physical examination that meets the requirements of this rule, if twelve months or more have elapsed since the last physical examination conducted as part of a medical screening program for BD exposure;

(B) Before assumption of duties by the employee in a job with BD exposure;

(C) Every 3 years after the initial physical examination;

(D) At the discretion of the physician or other licensed health care professional reviewing the annual health questionnaire and CBC;

(E) At the time of employee reassignment to an area where exposure to BD is below the action level, if the employee's past exposure history does not meet the criteria of paragraph (j)(1)(ii) of this section for continued coverage in the screening and surveillance program, and if twelve months or more have elapsed since the last physical examination; and

(F) At termination of employment if twelve months or more have elapsed since the last physical examination.

(ii) Following an emergency situation, medical screening shall be conducted as quickly as possible, but not later than 48 hours after the exposure.

(iii) For each employee who must wear a respirator, physical ability to perform the work and use the respirator must be determined as required by 29 CFR 1910.134.

(4) Content of medical screening.

(i) Medical screening for employees covered by paragraphs (j)(1)(i)-(ii) of this section shall include:

(A) A baseline health questionnaire that includes a comprehensive occupational and health history and is updated annually. Particular emphasis shall be placed on the hematopoietic and reticuloendothelial systems, including exposure to chemicals, in addition to BD, that may have an adverse effect on these systems, the presence of signs and symptoms that might be related

to disorders of these systems, and any other information determined by the examining physician or other licensed health care professional to be necessary to evaluate whether the employee is at increased risk of material impairment of health from BD exposure. Health questionnaires shall consist of the sample forms in Appendix C to this section, or be equivalent to those samples;

(B) A complete physical examination, with special emphasis on the liver, spleen, lymph nodes, and skin;

(C) A CBC; and

(D) Any other test which the examining physician or other licensed health care professional deems necessary to evaluate whether the employee may be at increased risk from exposure to BD.

(ii) Medical screening for employees exposed to BD in an emergency situation shall focus on the acute effects of BD exposure and at a minimum include: A CBC within 48 hours of the exposure and then monthly for three months; and a physical examination if the employee reports irritation of the eyes, nose throat, lungs, or skin, blurred vision, coughing, drowsiness, nausea, or headache. Continued employee participation in the medical screening and surveillance program, beyond these minimum requirements, shall be at the discretion of the physician or other licensed health care professional.

(5) Additional medical evaluations and referrals.

(i) Where the results of medical screening indicate abnormalities of the hematopoietic or reticuloendothelial systems, for which a non-occupational cause is not readily apparent, the examining physician or other licensed health care professional shall refer the employee to an appropriate specialist for further evaluation and shall make available to the specialist the results of the medical screening.

(ii) The specialist to whom the employee is referred under this paragraph shall determine the appropriate content for the medical evaluation, e.g., examinations, diagnostic tests and procedures, etc.

(6) Information provided to the physician or other licensed health care professional. The employer shall provide the following information to the examining physician or other licensed health care professional involved in the evaluation:

(i) A copy of this section including its appendices;

(ii) A description of the affected employee's duties as they relate to the employee's BD exposure;

(iii) The employee's actual or representative BD exposure level during employment tenure, including exposure incurred in an emergency situation;

(iv) A description of pertinent personal protective equipment used or to be used; and

(v) Information, when available, from previous employment-related medical evaluations of the affected employee which is not otherwise available to the physician or other licensed health care professional or the specialist.

(7) The written medical opinion.

(i) For each medical evaluation required by this section, the employer shall ensure that the physician or other licensed health care professional produces a written opinion and provides a copy to the employer and the employee within 15 business days of the evaluation. The written opinion shall be limited to the following information:

(A) The occupationally pertinent results of the medical evaluation;

(B) A medical opinion concerning whether the employee has any detected medical conditions which would place the employee's health at increased risk of material impairment from exposure to BD;

(C) Any recommended limitations upon the employee's exposure to BD; and

(D) A statement that the employee has been informed of the results of the medical evaluation and any medical conditions resulting from BD exposure that require further explanation or treatment.

(ii) The written medical opinion provided to the employer shall not reveal specific records, findings, and diagnoses that have no bearing on the employee's ability to work with BD.

Note: However, this provision does not negate the ethical obligation of the physician or other licensed health care professional to transmit any other adverse findings directly to the employee.

(8) Medical surveillance.

(i) The employer shall ensure that information obtained from the medical screening program activities is aggregated (with all personal identifiers removed) and periodically reviewed, to ascertain whether the health of the employee population of that employer is adversely affected by exposure to BD.

(ii) Information learned from medical surveillance activities must be disseminated to covered employees, as defined in paragraph (k)(1) of this section, in a manner that ensures the confidentiality of individual medical information.

(l) Communication of BD hazards to employees.

(1) Hazard communication - general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for BD.

(ii) In classifying the hazards of BD at least the following hazards are to be addressed: Cancer; eye and respiratory tract irritation; central nervous system effects; and flammability.

(iii) Employers shall include BD in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on

containers of BD and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (l)(2) of this section.

(2) Employee information and training.

(i) The employer shall provide all employees exposed to BD with information and training in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200, 29 CFR 1915.1200, and 29 CFR 1926.59.

(ii) The employer shall train each employee who is potentially exposed to BD at or above the action level or the STEL in accordance with the requirements of this section. The employer shall institute a training program, ensure employee participation in the program, and maintain a record of the contents of such program.

(iii) Training shall be provided prior to or at the time of initial assignment to a job potentially involving exposure to BD at or above the action level or STEL and at least annually thereafter.

(iv) The training program shall be conducted in a manner that the employee is able to understand. The employer shall ensure that each employee exposed to BD over the action level or STEL is informed of the following:

(A) The health hazards associated with BD exposure, and the purpose and a description of the medical screening and surveillance program required by this section;

(B) The quantity, location, manner of use, release, and storage of BD and the specific operations that could result in exposure to BD, especially exposures above the PEL or STEL;

(C) The engineering controls and work practices associated with the employee's job assignment, and emergency procedures and personal protective equipment;

(D) The measures employees can take to protect themselves from exposure to BD.

(E) The contents of this standard and its appendices, and

(F) The right of each employee exposed to BD at or above the action level or STEL to obtain:

(1) medical examinations as required by paragraph (j) of this section at no cost to the employee;

(2) the employee's medical records required to be maintained by paragraph (m)(4) of this section; and

(3) all air monitoring results representing the employee's exposure to BD and required to be kept by paragraph (m)(2) of this section.

(3) Access to information and training materials.

(i) The employer shall make a copy of this standard and its appendices readily available without cost to all affected employees and their designated representatives and shall provide a copy if requested.

(ii) The employer shall provide to the Assistant Secretary or the Director, or the designated employee representatives, upon request, all materials relating to the employee information and the training program.

(m) Recordkeeping.

(1) Objective data for exemption from initial monitoring.

(i) Where the processing, use, or handling of products or streams made from or containing BD are exempted from other requirements of this section under paragraph (a)(2) of this section, or where objective data have been relied on in lieu of initial monitoring under paragraph (d)(2)(ii) of this section, the employer shall establish and maintain a record of the objective data reasonably relied upon in support of the exemption.

(ii) This record shall include at least the following information:

(A) The product or activity qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and analysis of the material for the release of BD;

(D) A description of the operation exempted and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Exposure measurements.

(i) The employer shall establish and maintain an accurate record of all measurements taken to monitor employee exposure to BD as prescribed in paragraph (d) of this section.

(ii) The record shall include at least the following information:

(A) The date of measurement;

(B) The operation involving exposure to BD which is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of protective devices worn, if any; and

(F) Name~~[-, social security number]~~ and exposure of the employees whose exposures are represented.

(G) The written corrective action and the schedule for completion of this action required by paragraph (d)(7)(ii) of this section.

(iii) The employer shall maintain this record for at least 30 years in accordance with 29 CFR 1910.1020.

(3) Reserved.

(4) Medical screening and surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical screening and surveillance under this section.

(ii) The record shall include at least the following information:

(A) The name [~~and social security number~~] of the employee;

(B) Physician's or other licensed health care professional's written opinions as described in paragraph (k)(7) of this section;

(C) A copy of the information provided to the physician or other licensed health care professional as required by paragraphs (k)(7)(ii)-(iv) of this section.

(iii) Medical screening and surveillance records shall be maintained for each employee for the duration of employment plus 30 years, in accordance with 29 CFR 1910.1020.

(5) Availability.

(i) The employer, upon written request, shall make all records required to be maintained by this section available for examination and copying to the Assistant Secretary and the Director.

(ii) Access to records required to be maintained by paragraphs (l)(1)-(3) of this section shall be granted in accordance with 29 CFR 1910.1020(e).

(6) Transfer of records. The employer shall transfer medical and exposure records as set forth in 29 CFR 1910.1020(h).

(n) Reserved.

(o) Appendices.

(1) Appendix E to this section is mandatory.

(2) Appendices A, B, C, D, and F to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[61 FR 56831, Nov. 4, 1996, as amended at 63 FR 1294, Jan. 8, 1998; 67 FR 67965, Nov. 7, 2002; 70 FR 1143, Jan. 5, 2005; 71 FR 16672, 16674, Apr. 3, 2006; 73 FR 75587, Dec. 12, 2008; 76 FR 33609, June 8, 2011; 77 FR 17785, Mar. 26, 2012; 78 FR 9313, Feb. 8, 2013; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-1997, f. 5/2/97, ef. 5/2/97.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order 4-2013, f. 7/19/13, ef. 7/19/13.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix F – Medical Questionnaires (Non-Mandatory)

1,3-Butadiene (BD[ϵ]) Initial Health Questionnaire

DIRECTIONS:

You have been asked to answer the questions on this form because you work with BD (butadiene). These questions are about your work, medical history, and health concerns. Please do your best to answer all of the questions. If you need help, please tell the doctor or health care professional who reviews this form.

This form is a confidential medical record. Only information directly related to your health and safety on the job may be given to your employer. Personal health information will not be given to anyone without your consent.

Date: _____

Name: _____ [SSN ____/____/____]
Last First MI

Job Title: _____

Company's Name: _____

Supervisor's Name: _____ Supervisor's Phone No.:() _____

Work History

1. Please list all jobs you have had in the past, starting with the job you have now and moving back in time to your first job. (For more space, write on the back of this page.)

Main Job Duty	Years	Company Name City, State	Chemicals
1			
2			

3			
4			
5			
6			
7			
8			

2. Please describe what you do during a typical work day. Be sure to tell about your work with BD.

3. Please check any of these chemicals that you work with now or have worked with in the past:

benzene	_____	carbon tetrachloride ("carbon tet")	_____
glues	_____	arsine	_____
toluene	_____	carbon disulfide	_____
inks, dyes	_____	lead	_____
other solvents, grease cutters	_____	cement	_____
insecticides (like DDT, lindane, etc.)	_____	petroleum products	_____
paints, varnishes, thinners, strippers	_____	nitrites	_____
dusts	_____		

4. Please check the protective clothing or equipment you use at the job you have now:

gloves	_____	dust mask	_____
coveralls	_____	safety glasses, goggles	_____
respirator	_____		

Please circle your answer of yes or no.

- | | | | |
|----|--------------------------------------------------------------------------------------------|-----|----|
| 5. | Does your protective clothing or equipment fit you properly? | YES | NO |
| 6. | Have you ever made changes in your protective clothing or equipment to make it fit better? | YES | NO |
| 7. | Have you been exposed to BD when you were not wearing protective clothing or equipment? | YES | NO |
| 8. | Where do you eat, drink and/or smoke when you are at work? (Please check all that apply.) | | |

Cafeteria/restaurant/snack bar	_____	Smoking lounge	_____
Break room/employee lounge	_____	At my work station	_____

Please circle your answer.

- | | | | |
|-----|---------------------------------------------------------------------------------------------------------------|-----|----|
| 9. | Have you been exposed to radiation (like x-rays or nuclear material) at the job you have now or at past jobs? | YES | NO |
| 10. | Do you have any hobbies that expose you to dusts or chemicals (including paints, glues, etc.)? | YES | NO |
| 11. | Do you have any second or side jobs? | YES | NO |

_____ If yes, what are your duties there?

12. Were you in the military? YES NO

_____ If yes, what did you do in the military?

Family Health History

1. In the FAMILY MEMBER column, across from the disease name, write which family member, if any, had the disease.

DISEASE	FAMILY MEMBER
Cancer	
Lymphoma	
Sickle Cell Disease or Trait	
Immune Disease	
Leukemia	
Anemia	

2. Please fill in the following information about family health:

<u>Relative</u>	<u>Alive?</u>	<u>Age at death?</u>	<u>Cause of death?</u>
Father			
Mother			
Brother/Sister			
Brother/Sister			
Brother/Sister			

Personal Health History

Birth Date____/____/____ Age____ Sex____ Height____ Weight____

Please circle your answer.

1. Do you smoke any tobacco products? YES NO
2. Have you ever had any kind of surgery or operation? YES NO

_____ If yes, what type of surgery?

3. Have you ever been in the hospital for any other reason? YES NO

_____ If yes, please describe the reason:

4. Do you have any ongoing or current medical problems or conditions? YES NO

_____ If yes, please describe:

5. Do you now have or have you ever had any of the following? Please check all that apply to you.

unexplained fever	_____	bruising easily	_____	chest pain	_____
anemia ("low blood")	_____	Lupus	_____	still birth	_____
HIV/AIDS	_____	weight loss	_____	eye redness	_____
weakness	_____	kidney problems	_____	lumps you can feel	_____
sickle cell	_____	enlarged lymph nodes	_____	child with birth defect	_____
miscarriage	_____	liver disease	_____	autoimmune disease	_____
skin rash	_____	Cancer	_____	overly tired	_____
bloody stools	_____	Infertility	_____	lung problems	_____
leukemia/lymphoma	_____	drinking problems	_____	rheumatoid arthritis	_____
neck mass/swelling	_____	thyroid problems	_____	mononucleosis ("mono")	_____
wheezing	_____	night sweats	_____	nagging cough	_____
yellowing of skin	_____				

Please circle your answer.

6. Do you have any symptoms or health problems that you think may be related to your work with BD? YES NO

_____ If yes, please describe:

7. Have any of your co-workers had similar symptoms or problems?

YES NO DON'T KNOW

_____ If yes, please describe:

8. Do you notice any irritation of your eyes, nose, throat, lungs, or skin when working with BD? YES NO

9. Do you notice any blurred vision, coughing, drowsiness, nausea or headache when working with BD? YES NO

10. Do you take any medications (including birth control or over-the-counter)?

YES NO

_____ If yes, please list:

11. Are you allergic to any medication, food, or chemicals? YES NO

_____ If yes, please list:

12. Do you have any health conditions not covered by this questionnaire that you think are affected by your work with BD? YES NO

If yes, please explain:

13. Did you understand all the questions? YES NO

Signature

1,3-Butadiene (BD) Update Health Questionnaire

DIRECTIONS:

You have been asked to answer the questions on this form because you work with BD (butadiene). These questions ask about changes in your work, medical history, and health concerns since the last time you were evaluated. Please do your best to answer all of the questions. If you need help, please tell the doctor or health care professional who reviews this form.

This form is a confidential medical record. Only information directly related to your health and safety on the job may be given to your employer. Personal health information will not be given to anyone without your consent.

Date: _____

Name: _____ [SSN _____/_____/_____]
Last First MI

Job Title: _____

Company's Name: _____

Supervisor's Name: _____ Supervisor's Phone No.:() _____

Present Work History

1. Please describe any NEW duties that you have at your job: _____

2. Please list any additional job titles you have:

—
—
—

Please circle your answers.

3. chemicals in your work since the last time you were evaluated for exposure to BD?

Are you exposed to any other
YES **NO**

_____ If yes, please list what they are:

4. Does your personal protective equipment and clothing fit you properly? _____

YES NO

5. Have you made changes in this equipment or clothing to make it fit better?

YES NO

6. when you were not wearing protective equipment or clothing?

Have you been exposed to BD
YES **NO**

7. Are you exposed to any NEW chemicals at home or while working on hobbies?

YES NO

_____ If yes, please list what they are:

8. Since your last BD health evaluation, have you started working any new second or side jobs?

_____ If yes, what are your duties there:

Personal Health History

1. What is your current weight? _____ pounds

2. Have you been diagnosed with any new medical conditions or illness since your last evaluation?

YES **NO**

_____ If yes, please tell what they are:

-
-
3. Since your last evaluation, have you been in the hospital for any illnesses, injuries, or surgery? YES NO
- _____ If yes, please describe:
-

4. Do you have any of the following? Please place a check for all that apply to you.

unexplained fever	_____	bruising easily	_____	still birth	_____
anemia ("low blood")	_____	lupus	_____	eye redness	_____
HIV/AIDS	_____	weight loss	_____	lumps you can feel	_____
weakness	_____	kidney problems	_____	child with birth defect	_____
sickle cell	_____	enlarged lymph nodes	_____	autoimmune disease	_____
miscarriage	_____	liver disease	_____	overly tired	_____
skin rash	_____	cancer	_____	lung problems	_____
bloody rash	_____	infertility	_____	rheumatoid arthritis	_____
leukemia/lymphoma	_____	drinking problems	_____	mononucleosis ("mono")	_____
neck mass/swelling	_____	thyroid problems	_____	nagging cough	_____
wheezing	_____	night sweats	_____	yellowing of skin	_____
chest pain	_____				

Please circle your answer.

5. Do you have any symptoms or health problems that you think may be related to your work with BD? YES NO
- _____ If yes, please describe:
-

6. Have any of your co-workers had similar symptoms or problems?
- YES NO DON'T KNOW
- _____ If yes, please describe:
-

7. Do you notice any irritation of your eyes, nose, throat, lungs, or skin when working with BD? YES NO

8. Do you notice any blurred vision, coughing, drowsiness, nausea or headache when working with BD? YES NO

9. Have you been taking any NEW medications (including birth control or over-the-counter)? YES NO

_____ If yes, please list:

10. Have you developed any NEW allergies to medications, foods, or chemicals?

YES NO

_____ If yes, please list:

11. Do you have any health conditions not covered by this questionnaire that you think are affected by your work with BD? YES NO

If yes, please explain:

12. Did you understand all the questions?

YES

NO

Signature

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-1997, f. 5/2/97, ef. 5/2/97.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1910.1052

Methylene Chloride.

This occupational health standard establishes requirements for employers to control occupational exposure to methylene chloride (MC). Employees exposed to MC are at increased risk of developing cancer, adverse effects on the heart, central nervous system and liver, and skin or eye irritation. Exposure may occur through inhalation, by absorption through the skin, or through contact with the skin. MC is a solvent which is used in many different types of work activities, such as paint stripping, polyurethane foam manufacturing, and cleaning and degreasing. Under the requirements of paragraph (d) of this section, each covered employer must make an initial determination of each employee's exposure to MC. If the employer determines that employees are exposed below the action level, the only other provisions of this section that apply are that a record must be made of the determination, the employees must receive information and training under paragraph (l) of this section and, where appropriate, employees must be protected from contact with liquid MC under paragraph (h) of this section.

The provisions of the MC standard are as follows:

(a) Scope and application. This section applies to all occupational exposures to methylene chloride (MC), Chemical Abstracts Service Registry Number 75-09-2, in general industry, construction and shipyard employment.

(b) Definitions. For the purposes of this section, the following definitions shall apply:

Action level means a concentration of airborne MC of 12.5 parts per million (ppm) calculated as an eight (8)-hour time-weighted average (TWA).

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically authorized by the employer and required by work duties to be present in regulated areas, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (d) of this section, or any other person authorized by the OSH Act or regulations issued under the Act.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence, such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment, which results, or is likely to result in an uncontrolled release of MC. If an incidental release of MC can be controlled by employees such as maintenance personnel at the time of release and in accordance with the leak/spill provisions required by paragraph (f) of this section, it is not considered an emergency as defined by this standard.

Employee exposure means exposure to airborne MC which occurs or would occur if the employee were not using respiratory protection.

Methylene chloride (MC) means an organic compound with chemical formula, CH_2Cl_2 . Its Chemical Abstracts Service Registry Number is 75-09-2. Its molecular weight is 84.9 g/mole.

Physician or other licensed health care professional is an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the health care services required by paragraph (j) of this section.

Regulated area means an area, demarcated by the employer, where an employee's exposure to airborne concentrations of MC exceeds or can reasonably be expected to exceed either the 8-hour TWA PEL or the STEL.

Symptom means central nervous system effects such as headaches, disorientation, dizziness, fatigue, and decreased attention span; skin effects such as chapping, erythema, cracked skin, or skin burns; and cardiac effects such as chest pain or shortness of breath.

This section means this methylene chloride standard.

(c) Permissible exposure limits (PELs).

(1) Eight-hour time-weighted average (TWA) PEL. The employer shall ensure that no employee is exposed to an airborne concentration of MC in excess of twenty-five parts of MC per million parts of air (25 ppm) as an 8-hour TWA.

(2) Short-term exposure limit (STEL). The employer shall ensure that no employee is exposed to an airborne concentration of MC in excess of one hundred and twenty-five parts of MC per million parts of air (125 ppm) as determined over a sampling period of fifteen minutes.

(d) Exposure monitoring.

(1) Characterization of employee exposure.

(i) Where MC is present in the workplace, the employer shall determine each employee's exposure by either:

(A) Taking a personal breathing zone air sample of each employee's exposure; or

(B) Taking personal breathing zone air samples that are representative of each employee's exposure.

(ii) Representative samples. The employer may consider personal breathing zone air samples to be representative of employee exposures when they are taken as follows:

(A) 8-hour TWA PEL. The employer has taken one or more personal breathing zone air samples for at least one employee in each job classification in a work area during every work shift, and the employee sampled is expected to have the highest MC exposure.

(B) Short-term exposure limits. The employer has taken one or more personal breathing zone air samples which indicate the highest likely 15-minute exposures during such operations for at least one employee in each job classification in the work area during every work shift, and the employee sampled is expected to have the highest MC exposure.

(C) Exception. Personal breathing zone air samples taken during one work shift may be used to represent employee exposures on other work shifts where the employer can document that the tasks performed and conditions in the workplace are similar across shifts.

(iii) Accuracy of monitoring. The employer shall ensure that the methods used to perform exposure monitoring produce results that are accurate to a confidence level of 95 percent, and are:

(A) Within plus or minus 25 percent for airborne concentrations of MC above the 8-hour TWA PEL or the STEL; or

(B) Within plus or minus 35 percent for airborne concentrations of MC at or above the action level but at or below the 8-hour TWA PEL.

(2) Initial determination. Each employer whose employees are exposed to MC shall perform initial exposure monitoring to determine each affected employee's exposure, except under the following conditions:

(i) Where objective data demonstrate that MC cannot be released in the workplace in airborne concentrations at or above the action level or above the STEL. The objective data shall represent the highest MC exposures likely to occur under reasonably foreseeable conditions of processing, use, or handling. The employer shall document the objective data exemption as specified in paragraph (m) of this section;

(ii) Where the employer has performed exposure monitoring within 12 months prior to April 10, 1997 and that exposure monitoring meets all other requirements of this section, and was conducted under conditions substantially equivalent to existing conditions; or

(iii) Where employees are exposed to MC on fewer than 30 days per year (e.g., on a construction site), and the employer has measurements by direct-reading instruments which give immediate results (such as a detector tube) and which provide sufficient information regarding employee exposures to determine what control measures are necessary to reduce exposures to acceptable levels.

(3) Periodic monitoring. Where the initial determination shows employee exposures at or above the action level or above the STEL, the employer shall establish an exposure monitoring program for periodic monitoring of employee exposure to MC in accordance with Table 1:

Table 1. – Initial Determination Exposure Scenarios and Their Associated Monitoring Frequencies	
Exposure scenario	Required monitoring activity
Below the action level and at or below the STEL	No 8-hour TWA or STEL monitoring required.
Below the action level and above the STEL	No 8-hour TWA monitoring required; monitor STEL exposures every three months.
At or above the action level, at or below the TWA, and at or below the STEL .	Monitor 8-hour TWA exposures every six months.
At or above the action level, at or below the TWA, and above the STEL	Monitor 8-hour TWA exposures every six months and monitor STEL exposures every three months.
Above the TWA and at or below the STEL	Monitor 8-hour TWA exposures every three months. In addition, without regard to the last sentence of the note to paragraph (d)(3), the following employers must monitor STEL exposures every three months until either the date by which they must achieve the 8-hour TWA PEL under paragraph (n) of this section or the date by which they in fact achieve the 8-hour TWA PEL, whichever comes first: employers engaged in polyurethane foam manufacturing; foam fabrication; furniture refinishing; general aviation aircraft stripping; product formulation; use of MC-based adhesives for boat building and repair, recreational vehicle manufacture, van conversion, or upholstery; and use of MC in construction work for restoration and preservation of buildings, painting and paint removal, cabinet making, or floor refinishing and resurfacing.
Above the TWA and above the STEL	Monitor 8-hour TWA exposures and STEL exposures every three months.

[Note to paragraph (d)(3): The employer may decrease the frequency of 8-hour TWA exposure monitoring to every six months when at least two consecutive measurements taken at least seven days apart show exposures to be at or below the 8-hour TWA PEL. The employer may discontinue the periodic 8-hour TWA monitoring for employees where at least two consecutive measurements taken at least seven days apart are below the action level. The employer may discontinue the periodic STEL monitoring for employees where at least two consecutive measurements taken at least seven days apart are at or below the STEL.]

(4) Additional monitoring.

(i) The employer shall perform exposure monitoring when a change in workplace conditions indicates that employee exposure may have increased. Examples of situations that may require additional monitoring include changes in production, process, control equipment, or work practices, or a leak, rupture, or other breakdown.

(ii) Where exposure monitoring is performed due to a spill, leak, rupture or equipment breakdown, the employer shall clean-up the MC and perform the appropriate repairs before monitoring.

(5) Employee notification of monitoring results.

(i) The employer shall, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results in writing, either individually or by posting of results in an appropriate location that is accessible to affected employees.

(ii) Whenever monitoring results indicate that employee exposure is above the 8-hour TWA PEL or the STEL, the employer shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the 8-hour TWA PEL or STEL and the schedule for completion of this action.

(6) Observation of monitoring.

(i) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to MC conducted in accordance with this section.

(ii) Observation procedures. When observation of the monitoring of employee exposure to MC requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide, at no cost to the observer(s), and the observer(s) shall be required to use such clothing and equipment and shall comply with all other applicable safety and health procedures.

(e) Regulated areas.

(1) The employer shall establish a regulated area wherever an employee's exposure to airborne concentrations of MC exceeds or can reasonably be expected to exceed either the 8-hour TWA PEL or the STEL.

(2) The employer shall limit access to regulated areas to authorized persons.

(3) The employer shall supply a respirator, selected in accordance with paragraph (g)(3) of this section, to each person who enters a regulated area and shall require each affected employee to use that respirator whenever MC exposures are likely to exceed the 8-hour TWA PEL or STEL.

[Note to paragraph (e)(3): An employer who has implemented all feasible engineering, work practice and administrative controls (as required in paragraph (f) of this section), and who has established a regulated area (as required by paragraph (e)(1) of this section) where MC exposure can be reliably predicted to exceed the 8-hour TWA PEL or the STEL only on certain days (for example, because of work or process schedule) would need to have affected employees use respirators in that regulated area only on those days.]

(4) The employer shall ensure that, within a regulated area, employees do not engage in non-work activities which may increase dermal or oral MC exposure.

(5) The employer shall ensure that while employees are wearing respirators, they do not engage in activities (such as taking medication or chewing gum or tobacco) which interfere with respirator seal or performance.

(6) The employer shall demarcate regulated areas from the rest of the workplace in any manner that adequately establishes and alerts employees to the boundaries of the area and minimizes the number of authorized employees exposed to MC within the regulated area.

(7) An employer at a multi-employer worksite who establishes a regulated area shall communicate the access restrictions and locations of these areas to all other employers with work operations at that worksite.

(f) Methods of compliance.

(1) Engineering and work practice controls. The employer shall institute and maintain the effectiveness of engineering controls and work practices to reduce employee exposure to or below the PELs except to the extent that the employer can demonstrate that such controls are not feasible. Wherever the feasible engineering controls and work practices which can be instituted are not sufficient to reduce employee exposure to or below the 8-TWA PEL or STEL, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (g) of this section.

(2) Prohibition of rotation. The employer shall not implement a schedule of employee rotation as a means of compliance with the PELs.

(3) Leak and spill detection.

(i) The employer shall implement procedures to detect leaks of MC in the workplace. In work areas where spills may occur, the employer shall make provisions to contain any spills and to safely dispose of any MC-contaminated waste materials.

(ii) The employer shall ensure that all incidental leaks are repaired and that incidental spills are cleaned promptly by employees who use the appropriate personal protective equipment and are trained in proper methods of cleanup.

[Note to paragraph (f)(3)(ii): See Appendix A of this section for examples of procedures that satisfy this requirement. Employers covered by this standard may also be subject to the hazardous waste and emergency response provisions contained in 29 CFR 1910.120 (q).]

(g) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods when an employee's exposure to MC exceeds the 8-hour TWA/PEL, or STEL (for example, when an employee is using MC in a regulated area).

(ii) Periods necessary to install or implement feasible engineering and work-practice controls.

(iii) A few work operations, such as some maintenance operations and repair activities, for which the employer demonstrates that engineering and work-practice controls are infeasible.

(iv) Work operations for which feasible engineering and work-practice controls are not sufficient to reduce employee exposures to or below the PELs.

(v) Emergencies.

(2) Respirator program.

Oregon OSHA repealed 1910.1052(g)(2)(i). In Oregon, OAR 437-002-1052 applies.

437-002-1052 Methylene Chloride Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 2/Z, 1910.1052 Methylene Chloride, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Methylene Chloride rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(ii) Employers who provide employees with gas masks with organic-vapor canisters for the purpose of emergency escape must replace the canisters after any emergency use and before the gas masks are returned to service.

(3) Respirator selection. Employers must:

(i) Select, and provide to employees, the appropriate atmosphere-supplying respirator specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134; however, employers must not select or use half masks of any type because MC may cause eye irritation or damage.

(ii) For emergency escape, provide employees with one of the following respirator options: A self-contained breathing apparatus operated in the continuous-flow or pressure-demand mode; or a gas mask with an organic vapor canister.

(4) Medical evaluation. Before having an employee use a supplied-air respirator in the negative-pressure mode, or a gas mask with an organic-vapor canister for emergency escape, the employer must:

(i) Have a physician or other licensed health-care professional (PLHCP) evaluate the employee's ability to use such respiratory protection.

(ii) Ensure that the PLHCP provides their findings in a written opinion to the employee and the employer.

(h) Protective Work Clothing and Equipment.

(1) Where needed to prevent MC-induced skin or eye irritation, the employer shall provide clean protective clothing and equipment which is resistant to MC, at no cost to the employee, and shall ensure that each affected employee uses it. Eye and face protection shall meet the requirements of OAR 437-002-0134(8) or 29 CFR 1915.153, as applicable.

(2) The employer shall clean, launder, repair and replace all protective clothing and equipment required by this paragraph as needed to maintain their effectiveness.

(3) The employer shall be responsible for the safe disposal of such clothing and equipment.

[Note to paragraph (h)(4): See Appendix A for examples of disposal procedures that will satisfy this requirement.]

(i) Hygiene facilities.

(1) If it is reasonably foreseeable that employees' skin may contact solutions containing 0.1 percent or greater MC (for example, through splashes, spills or improper work practices), the employer shall provide conveniently located washing facilities capable of removing the MC, and shall ensure that affected employees use these facilities as needed.

(2) If it is reasonably foreseeable that an employee's eyes may contact solutions containing 0.1 percent or greater MC (for example through splashes, spills or improper work practices), the employer shall provide appropriate eyewash facilities within the immediate work area for emergency use, and shall ensure that affected employees use those facilities when necessary.

(j) Medical surveillance.

(1) Affected employees. The employer shall make medical surveillance available for employees who are or may be exposed to MC as follows:

(i) At or above the action level on 30 or more days per year, or above the 8-hour TWA PEL or the STEL on 10 or more days per year;

(ii) Above the 8-TWA PEL or STEL for any time period where an employee has been identified by a physician or other licensed health care professional as being at risk from cardiac disease or from some other serious MC-related health condition and such employee requests inclusion in the medical surveillance program;

(iii) During an emergency.

(2) Costs. The employer shall provide all required medical surveillance at no cost to affected employees, without loss of pay and at a reasonable time and place.

(3) Medical personnel. The employer shall ensure that all medical surveillance procedures are performed by a physician or other licensed health care professional, as defined in paragraph (b) of this section.

(4) Frequency of medical surveillance. The employer shall make medical surveillance available to each affected employee as follows:

(i) Initial surveillance. The employer shall provide initial medical surveillance under the schedule provided by paragraph (n)(2)(iii) of this section, or before the time of initial assignment of the employee, whichever is later. The employer need not provide the initial surveillance if medical records show that an affected employee has been provided with medical surveillance that complies with this section within 12 months before April 10, 1997.

(ii) Periodic medical surveillance. The employer shall update the medical and work history for each affected employee annually. The employer shall provide periodic physical examinations, including appropriate laboratory surveillance, as follows:

(A) For employees 45 years of age or older, within 12 months of the initial surveillance or any subsequent medical surveillance; and

(B) For employees younger than 45 years of age, within 36 months of the initial surveillance or any subsequent medical surveillance.

(iii) Termination of employment or reassignment. When an employee leaves the employer's workplace, or is reassigned to an area where exposure to MC is consistently at or below the action level and STEL, medical surveillance shall be made available if six months or more have elapsed since the last medical surveillance.

(iv) Additional surveillance. The employer shall provide additional medical surveillance at frequencies other than those listed above when recommended in the written medical opinion. (For example, the physician or other licensed health care professional may determine an examination is warranted in less than 36 months for employees younger than 45 years of age based upon evaluation of the results of the annual medical and work history.)

(5) Content of medical surveillance.

(i) Medical and work history. The comprehensive medical and work history shall emphasize neurological symptoms, skin conditions, history of hematologic or liver disease, signs or symptoms suggestive of heart disease (angina, coronary artery disease), risk factors for cardiac disease, MC exposures, and work practices and personal protective equipment used during such exposures.

[Note to paragraph (j)(5)(i): See Appendix B of this section for an example of a medical and work history format that would satisfy this requirement.]

(ii) Physical examination. Where physical examinations are provided as required above, the physician or other licensed health care professional shall accord particular attention to the lungs, cardiovascular system (including blood pressure and pulse), liver, nervous system, and skin. The physician or other licensed health care professional shall determine the extent and nature of the physical examination based on the health status of the employee and analysis of the medical and work history.

(iii) Laboratory surveillance. The physician or other licensed health care professional shall determine the extent of any required laboratory surveillance based on the employee's observed health status and the medical and work history.

[Note to paragraph (j)(5)(iii): See Appendix B of this section for information regarding medical tests. Laboratory surveillance may include before- and after-shift carboxy-hemoglobin determinations, resting ECG, hematocrit, liver function tests and cholesterol levels.]

(iv) Other information or reports. The medical surveillance shall also include any other information or reports the physician or other licensed health care professional determines are necessary to assess the employee's health in relation to MC exposure.

(6) Content of emergency medical surveillance. The employer shall ensure that medical surveillance made available when an employee has been exposed to MC in emergency situations includes, at a minimum:

- (i) Appropriate emergency treatment and decontamination of the exposed employee;
- (ii) Comprehensive physical examination with special emphasis on the nervous system, cardiovascular system, lungs, liver and skin, including blood pressure and pulse;
- (iii) Updated medical and work history, as appropriate for the medical condition of the employee; and
- (iv) Laboratory surveillance, as indicated by the employee's health status.

[Note to paragraph (j)(6)(iv): See Appendix B for examples of tests which may be appropriate.]

(7) Additional examinations and referrals. Where the physician or other licensed health care professional determines it is necessary, the scope of the medical examination shall be expanded and the appropriate additional medical surveillance, such as referrals for consultation or examination, shall be provided.

(8) Information provided to the physician or other licensed health care professional. The employer shall provide the following information to a physician or other licensed health care professional who is involved in the diagnosis of MC-induced health effects:

- (i) A copy of this section including its applicable appendices;
 - (ii) A description of the affected employee's past, current and anticipated future duties as they relate to the employee's MC exposure;
 - (iii) The employee's former or current exposure levels or, for employees not yet occupationally exposed to MC, the employee's anticipated exposure levels and the frequency and exposure levels anticipated to be associated with emergencies;
 - (iv) A description of any personal protective equipment, such as respirators, used or to be used; and
 - (v) Information from previous employment-related medical surveillance of the affected employee which is not otherwise available to the physician or other licensed health care professional.
- (9) Written medical opinions.

(i) For each physical examination required by this section, the employer shall ensure that the physician or other licensed health care professional provides to the employer and to the affected employee a written opinion regarding the results of that examination within 15 days of completion of the evaluation of medical and laboratory findings, but not more than 30 days after the examination. The written medical opinion shall be limited to the following information:

(A) The physician or other licensed health care professional's opinion concerning whether exposure to MC may contribute to or aggravate the employee's existing cardiac, hepatic, neurological (including stroke) or dermal disease or whether the employee has any other medical condition(s) that would place the employee's health at increased risk of material impairment from exposure to MC.

(B) Any recommended limitations upon the employee's exposure to MC, including removal from MC exposure, or upon the employee's use of respirators, protective clothing, or other protective equipment.

(C) A statement that the employee has been informed by the physician or other licensed health care professional that MC is a potential occupational carcinogen, of risk factors for heart disease, and the potential for exacerbation of underlying heart disease by exposure to MC through its metabolism to carbon monoxide; and

(D) A statement that the employee has been informed by the physician or other licensed health care professional of the results of the medical examination and any medical conditions resulting from MC exposure which require further explanation or treatment.

(ii) The employer shall instruct the physician or other licensed health care professional not to reveal to the employer, orally or in the written opinion, any specific records, findings, and diagnoses that have no bearing on occupational exposure to MC.

[Note to paragraph (j)(9)(ii): The written medical opinion may also include information and opinions generated to comply with other OSHA health standards.]

(10) Medical Presumption. For purposes of this paragraph (j) of this section, the physician or other licensed health care professional shall presume, unless medical evidence indicates to the contrary, that a medical condition is unlikely to require medical removal from MC exposure if the employee is not exposed to MC above the 8-hour TWA PEL. If the physician or other licensed health care professional recommends removal for an employee exposed below the 8-hour TWA PEL, the physician or other licensed health care professional shall cite specific medical evidence, sufficient to rebut the presumption that exposure below the 8-hour TWA PEL is unlikely to require removal, to support the recommendation. If such evidence is cited by the physician or other licensed health care professional, the employer must remove the employee. If such evidence is not cited by the physician or other licensed health care professional, the employer is not required to remove the employee.

(11) Medical Removal Protection (MRP).

(i) Temporary medical removal and return of an employee.

(A) Except as provided in paragraph (j)(10) of this section, when a medical determination recommends removal because the employee's exposure to MC may contribute to or aggravate

the employee's existing cardiac, hepatic, neurological (including stroke), or skin disease, the employer must provide medical removal protection benefits to the employee and either:

(1) Transfer the employee to comparable work where methylene chloride exposure is below the action level; or

(2) Remove the employee from MC exposure.

(B) If comparable work is not available and the employer is able to demonstrate that removal and the costs of extending MRP benefits to an additional employee, considering feasibility in relation to the size of the employer's business and the other requirements of this standard, make further reliance on MRP an inappropriate remedy, the employer may retain the additional employee in the existing job until transfer or removal becomes appropriate, provided:

(1) The employer ensures that the employee receives additional medical surveillance, including a physical examination at least every 60 days until transfer or removal occurs; and

(2) The employer or PLHCP informs the employee of the risk to the employee's health from continued MC exposure.

(C) The employer shall maintain in effect any job-related protective measures or limitations, other than removal, for as long as a medical determination recommends them to be necessary.

(ii) End of MRP benefits and return of the employee to former job status.

(A) The employer may cease providing MRP benefits at the earliest of the following:

(1) Six months;

(2) Return of the employee to the employee's former job status following receipt of a medical determination concluding that the employee's exposure to MC no longer will aggravate any cardiac, hepatic, neurological (including stroke), or dermal disease;

(3) Receipt of a medical determination concluding that the employee can never return to MC exposure.

(B) For the purposes of this paragraph (j), the requirement that an employer return an employee to the employee's former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(12) Medical Removal Protection Benefits.

(i) For purposes of this paragraph (j), the term medical removal protection benefits means that, for each removal, an employer must maintain for up to six months the earnings, seniority, and other employment rights and benefits of the employee as though the employee had not been removed from MC exposure or transferred to a comparable job.

(ii) During the period of time that an employee is removed from exposure to MC, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this section.

(iii) If a removed employee files a workers' compensation claim for a MC-related disability, the employer shall continue the MRP benefits required by this paragraph until either the claim is resolved or the 6-month period for payment of MRP benefits has passed, whichever occurs first. To the extent the employee is entitled to indemnity payments for earnings lost during the period of removal, the employer's obligation to provide medical removal protection benefits to the employee shall be reduced by the amount of such indemnity payments.

(iv) The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal from either a publicly or an employer-funded compensation program, or receives income from employment with another employer made possible by virtue of the employee's removal.

(13) Voluntary Removal or Restriction of an Employee. Where an employer, although not required by this section to do so, removes an employee from exposure to MC or otherwise places any limitation on an employee due to the effects of MC exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to those required by paragraph (j)(12) of this section.

(14) Multiple Health Care Professional Review Mechanism.

(i) If the employer selects the initial physician or licensed health care professional (PLHCP) to conduct any medical examination or consultation provided to an employee under this paragraph (j)(11), the employer shall notify the employee of the right to seek a second medical opinion each time the employer provides the employee with a copy of the written opinion of that PLHCP.

(ii) If the employee does not agree with the opinion of the employer-selected PLHCP, notifies the employer of that fact, and takes steps to make an appointment with a second PLHCP within 15 days of receiving a copy of the written opinion of the initial PLHCP, the employer shall pay for the PLHCP chosen by the employee to perform at least the following:

(A) Review any findings, determinations or recommendations of the initial PLHCP; and

(B) conduct such examinations, consultations, and laboratory tests as the PLHCP deems necessary to facilitate this review.

(iii) If the findings, determinations or recommendations of the second PLHCP differ from those of the initial PLHCP, then the employer and the employee shall instruct the two health care professionals to resolve the disagreement.

(iv) If the two health care professionals are unable to resolve their disagreement within 15 days, then those two health care professionals shall jointly designate a PLHCP who is a specialist in the field at issue. The employer shall pay for the specialist to perform at least the following:

(A) Review the findings, determinations, and recommendations of the first two PLHCPs; and

(B) Conduct such examinations, consultations, laboratory tests and discussions with the prior PLHCPs as the specialist deems necessary to resolve the disagreements of the prior health care professionals.

(v) The written opinion of the specialist shall be the definitive medical determination. The employer shall act consistent with the definitive medical determination, unless the employer and employee agree that the written opinion of one of the other two PLHCPs shall be the definitive medical determination.

(vi) The employer and the employee or authorized employee representative may agree upon the use of any expeditious alternate health care professional determination mechanism in lieu of the multiple health care professional review mechanism provided by this paragraph so long as the alternate mechanism otherwise satisfies the requirements contained in this paragraph.

(k) Hazard communication.

(1) Hazard communication – general.

(i) Chemical manufacturers, importers, distributors and employers shall comply with all requirements of the Hazard Communication Standard (HCS) (1910.1200) for MC.

(ii) In classifying the hazards of MC at least the following hazards are to be addressed: Cancer, cardiac effects (including elevation of carboxyhemoglobin), central nervous system effects, liver effects, and skin and eye irritation.

(iii) Employers shall include MC in the hazard communication program established to comply with the HCS (1910.1200). Employers shall ensure that each employee has access to labels on containers of MC and to safety data sheets, and is trained in accordance with the requirements of HCS and paragraph (l) of this section.

(2) [Reserved]

(l) Employee information and training.

(1) The employer shall provide information and training for each affected employee prior to or at the time of initial assignment to a job involving potential exposure to MC.

(2) The employer shall ensure that information and training is presented in a manner that is understandable to the employees.

(3) In addition to the information required under the Hazard Communication Standard at 29 CFR 1910.1200, 29 CFR 1915.1200, or 29 CFR 1926.59, as appropriate:

(i) The employer shall inform each affected employee of the requirements of this section and information available in its appendices, as well as how to access or obtain a copy of it in the workplace;

(ii) Wherever an employee's exposure to airborne concentrations of MC exceeds or can reasonably be expected to exceed the action level, the employer shall inform each affected employee of the quantity, location, manner of use, release, and storage of MC and the specific operations in the workplace that could result in exposure to MC, particularly noting where exposures may be above the 8-hour TWA PEL or STEL.

(4) The employer shall train each affected employee as required under the Hazard Communication standard at 29 CFR 1910.1200, 29 CFR 1915.1200, or 29 CFR 1926.59, as appropriate.

(5) The employer shall re-train each affected employee as necessary to ensure that each employee exposed above the action level or the STEL maintains the requisite understanding of the principles of safe use and handling of MC in the workplace.

(6) Whenever there are workplace changes, such as modifications of tasks or procedures or the institution of new tasks or procedures, which increase employee exposure, and where those exposures exceed or can reasonably be expected to exceed the action level, the employer shall update the training as necessary to ensure that each affected employee has the requisite proficiency.

(7) An employer whose employees are exposed to MC at a multi-employer worksite shall notify the other employers with work operations at that site in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200, 29 CFR 1915.1200, or 29 CFR 1926.59, as appropriate.

(8) The employer shall provide to the Assistant Secretary or the Director, upon request, all available materials relating to employee information and training.

(m) Recordkeeping.

(1) Objective data.

(i) Where an employer seeks to demonstrate that initial monitoring is unnecessary through reasonable reliance on objective data showing that any materials in the workplace containing MC will not release MC at levels which exceed the action level or the STEL under foreseeable conditions of exposure, the employer shall establish and maintain an accurate record of the objective data relied upon in support of the exemption.

(ii) This record shall include at least the following information:

(A) The MC-containing material in question;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of MC;

(D) A description of the operation exempted under paragraph (d)(2)(i) of this section and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Exposure measurements.

(i) The employer shall establish and keep an accurate record of all measurements taken to monitor employee exposure to MC as prescribed in paragraph (d) of this section.

(ii) Where the employer has 20 or more employees, this record shall include at least the following information:

(A) The date of measurement for each sample taken;

(B) The operation involving exposure to MC which is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of personal protective equipment, such as respiratory protective devices, worn, if any; and

(F) Name, ~~[social security number,]~~ job classification and exposure of all of the employees represented by monitoring, indicating which employees were actually monitored.

(iii) Where the employer has fewer than 20 employees, the record shall include at least the following information:

(A) The date of measurement for each sample taken;

(B) Number, duration, and results of samples taken; and

(C) Name, ~~[social security number,]~~ job classification and exposure of all of the employees represented by monitoring, indicating which employees were actually monitored.

(iv) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.1020.

(3) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance under paragraph (j) of this section.

(ii) The record shall include at least the following information:

(A) The name~~[, social security number]~~ and description of the duties of the employee;

(B) Written medical opinions; and

(C) Any employee medical conditions related to exposure to MC.

(iii) The employer shall ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.1020.

(4) Availability.

(i) The employer, upon written request, shall make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying in accordance with 29 CFR 1910.1020.

[Note to paragraph (m)(4)(i): All records required to be maintained by this section may be kept in the most administratively convenient form (for example, electronic or computer records would satisfy this requirement).]

(ii) The employer, upon request, shall make any employee exposure and objective data records required by this section available for examination and copying by affected employees, former employees, and designated representatives in accordance with 29 CFR 1910.1020.

(iii) The employer, upon request, shall make employee medical records required to be kept by this section available for examination and copying by the subject employee and by anyone having the specific written consent of the subject employee in accordance with 29 CFR 1910.1020.

(5) Transfer of records. The employer shall comply with the requirements concerning transfer of records set forth in 29 CFR 1910.1020(h).

(n) Reserved.

(o) Appendices. The information contained in the appendices does not, by itself, create any additional obligations not otherwise imposed or detract from any existing obligation.

[Note to paragraph (o): The requirement of 29 CFR 1910.1052(g)(1) to use the respiratory protection whenever an employee's exposure to methylene chloride exceeds or can reasonably be expected to exceed the 8-hour TWA PEL is hereby stayed until August 31, 1998 for employers engaged in polyurethane foam manufacturing; foam fabrication; furniture refinishing; general aviation aircraft stripping; formulation of products containing methylene chloride; boat building and repair; recreational vehicle manufacture; van conversion; upholstery; and use of methylene chloride in construction work for restoration and preservation of buildings, painting and paint removal, cabinet making and/or floor refinishing and resurfacing.

The requirement of 29 CFR 1910.1052(f)(1) to implement engineering controls to achieve the 8 hour TWA PEL and STEL is hereby stayed until December 10, 1998 for employers with more than 100 employees engaged in polyurethane foam manufacturing and for employers with more than 20 employees engaged in foam fabrication; furniture refinishing; general aviation aircraft stripping; formulation of products containing methylene chloride; boat building and repair; recreational vehicle manufacture; van conversion; upholstery; and use of methylene chloride in construction work for restoration and preservation of buildings, painting and paint removal, cabinet making and/or floor refinishing and resurfacing.]

[62 FR 1601, Jan. 10, 1997, as amended at 62 FR 42667, Aug. 8, 1997; 62 FR 54383, Oct. 20, 1997; 62 FR 66277, Dec. 18, 1997; 63 FR 1295, Jan. 8, 1998; 63 FR 20099, Apr. 23, 1998; 63 FR 50729, Sept. 22, 1998; 71 FR 16674, Apr. 3, 2006; 71 FR 50190, Aug. 24, 2006; 73 FR 75587, Dec. 12, 2008; 77 FR 17785, Mar. 26, 2012; 78 FR 9313, Feb. 8, 2013; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-1997, f. 5/2/97, ef. 5/2/97.
OR-OSHA Admin. Order 8-1997, f. 11/14/97, ef. 11/14/97.
OR-OSHA Admin. Order 1-1998, f. 2/13/98, ef. 2/13/98.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-1999, f. 3/22/99, ef. 3/22/99.
OR-OSHA Admin. Order 12-2001, f. 10/26/01, ef. 10/26/01.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix B to 1910.1052 – Medical Surveillance for Methylene Chloride

I. Primary Route of Entry

Inhalation.

II. Toxicology

Methylene Chloride (MC) is primarily an inhalation hazard. The principal acute hazardous effects are the depressant action on the central nervous system, possible cardiac toxicity and possible liver toxicity. The range of CNS effects are from decreased eye/hand coordination and decreased performance in vigilance tasks to narcosis and even death of individuals exposed at very high doses. Cardiac toxicity is due to the metabolism of MC to carbon monoxide, and the effects of carbon monoxide on heart tissue. Carbon monoxide displaces oxygen in the blood, decreases the oxygen available to heart tissue, increasing the risk of damage to the heart, which may result in heart attacks in susceptible individuals. Susceptible individuals include persons with heart disease and those with risk factors for heart disease.

Elevated liver enzymes and irritation to the respiratory passages and eyes have also been reported for both humans and experimental animals exposed to MC vapors.

MC is metabolized to carbon monoxide and carbon dioxide via two separate pathways. Through the first pathway, MC is metabolized to carbon monoxide as an end-product via the P-450 mixed function oxidase pathway located in the microsomal fraction of the cell. This biotransformation of MC to carbon monoxide occurs through the process of microsomal oxidative dechlorination which takes place primarily in the liver. The amount of conversion to carbon monoxide is significant as measured by the concentration of carboxyhemoglobin, up to 12% measured in the blood following occupational exposure of up to 610 ppm. Through the second pathway, MC is metabolized to carbon dioxide as an end product (with formaldehyde and formic acid as metabolic intermediates) via the glutathione dependent enzyme found in the cytosolic fraction of the liver cell. Metabolites along this pathway are believed to be associated with the carcinogenic activity of MC.

MC has been tested for carcinogenicity in several laboratory rodents. These rodent studies indicate that there is clear evidence that MC is carcinogenic to male and female mice and female rats. Based on epidemiologic studies, OSHA has concluded that there is suggestive

evidence of increased cancer risk in MC-related worker populations. The epidemiological evidence is consistent with the finding of excess cancer in the experimental animal studies. NIOSH regards MC as a potential occupational carcinogen and the International Agency for Research Cancer (IARC) classifies MC as an animal carcinogen. OSHA considers MC as a suspected human carcinogen.

III. Medical Signs and Symptoms of Acute Exposure

Skin exposure to liquid MC may cause irritation or skin burns. Liquid MC can also be irritating to the eyes. MC is also absorbed through the skin and may contribute to the MC exposure by inhalation.

At high concentrations in air, MC may cause nausea, vomiting, light-headedness, numbness of the extremities, changes in blood enzyme levels, and breathing problems, leading to bronchitis and pulmonary edema, unconsciousness and even death.

At lower concentrations in air, MC may cause irritation to the skin, eye, and respiratory tract and occasionally headache and nausea. Perhaps the greatest problem from exposure to low concentrations of MC is the CNS effects on coordination and alertness that may cause unsafe operations of machinery and equipment, leading to self-injury or accidents.

Low levels and short duration exposures do not seem to produce permanent disability, but chronic exposures to MC have been demonstrated to produce liver toxicity in animals, and therefore, the evidence is suggestive for liver toxicity in humans after chronic exposure. Chronic exposure to MC may also cause cancer.

IV. Surveillance and Preventive Considerations

As discussed ~~[above]~~ **in sections II and III of this appendix**, MC is classified as a suspect or potential human carcinogen. It is a central nervous system (CNS) depressant and a skin, eye and respiratory tract irritant. At extremely high concentrations, MC has caused liver damage in animals.

MC principally affects the CNS, where it acts as a narcotic. The observation of the symptoms characteristic of CNS depression, along with a physical examination, provides the best detection of early neurological disorders. Since exposure to MC also increases the carboxyhemoglobin level in the blood, ambient carbon monoxide levels would have an additive effect on that carboxyhemoglobin level. Based on such information, a periodic post-shift carboxyhemoglobin test as an index of the presence of carbon monoxide in the blood is recommended, but not required, for medical surveillance.

Based on the animal evidence and three epidemiologic studies previously mentioned, OSHA concludes that MC is a suspect human carcinogen. The medical surveillance program is designed to observe exposed workers on a regular basis. While the medical surveillance program cannot detect MC-induced cancer at a preneoplastic stage, OSHA anticipates that, as in the past, early detection and treatments of cancers leading to enhanced survival rates will continue to evolve.

A. Medical and Occupational History:

The medical and occupational work history plays an important role in the initial evaluation of workers exposed to MC. It is therefore extremely important for the examining physician or other licensed health care professional to evaluate the MC exposed worker carefully and completely and to focus the examination on MC's potentially associated health hazards. The medical evaluation must include an annual detailed work and medical history with special emphasis on cardiac history and neurological symptoms.

An important goal of the medical history is to elicit information from the worker regarding potential signs or symptoms associated with increased levels of carboxyhemoglobin due to the presence of carbon monoxide in the blood. Physicians or other licensed health care professionals should ensure that the smoking history of all MC exposed employees is known. Exposure to MC may cause a significant increase in carboxyhemoglobin level in all exposed persons. However, smokers as well as workers with anemia or heart disease and those concurrently exposed to carbon monoxide are at especially high risk of toxic effects because of an already reduced oxygen carrying capacity of the blood.

A comprehensive or interim medical and work history should also include occurrence of headache, dizziness, fatigue, chest pain, shortness of breath, pain in the limbs, and irritation of the skin and eyes.

In addition, it is important for the physician or other licensed health care professional to become familiar with the operating conditions in which exposure to MC is likely to occur. The physician or other licensed health care professional also must become familiar with the signs and symptoms that may indicate that a worker is receiving otherwise unrecognized and exceptionally high exposure levels of MC.

An example of a medical and work history that would satisfy the requirement for a comprehensive or interim work history is represented by the following:

The following is a list of recommended questions and issues for the self-administered questionnaire for methylene chloride exposure.

Questionnaire For Methylene Chloride Exposure

I. Demographic Information

1. Name

~~[2. Social Security Number]~~

2[3]. Date

3[4]. Date of Birth

4[5]. Age

5[6]. Present occupation

6[7]. Sex

7[8]. Race **(Check all that apply)**

- 1. White**
- 2. Black or African American**
- 3. Asian**
- 4. Hispanic or Latino**
- 5. American Indian or Alaska Native**
- 6. Native Hawaiian or Other Pacific Islander**

II. Occupational History

1. Have you ever worked with methylene chloride, dichloromethane, methylene dichloride, or CH₂Cl₂ (all are different names for the same chemical)? Please list which on the occupational history form if you have not already.

2. If you have worked in any of the following industries and have not listed them on the occupational history form, please do so: [-]

Furniture stripping

Polyurethane foam manufacturing

Chemical manufacturing or formulation

Pharmaceutical manufacturing

Any industry in which you used solvents to clean and degrease equipment or parts

Construction, especially painting and refinishing

Aerosol manufacturing

Any industry in which you used aerosol adhesives

3. If you have not listed hobbies or household projects on the occupational history form, especially furniture refinishing, spray painting, or paint stripping, please do so.

III. Medical History

A. General

1. Do you consider yourself to be in good health? If no, state reason(s).

2. Do you or have you ever had:

a. Persistent thirst

b. Frequent urination (three times or more at night)

c. Dermatitis or irritated skin

d. Non-healing wounds

3. What prescription or non-prescription medications do you take, and for what reasons?
4. Are you allergic to any medications, and what type of reaction do you have?

B. Respiratory

1. Do you have or have you ever had any chest illnesses or diseases? Explain.
2. Do you have or have you ever had any of the following:
 - a. Asthma
 - b. Wheezing
 - c. Shortness of breath
3. Have you ever had an abnormal chest X-ray? If so, when, where, and what were the findings?
4. Have you ever had difficulty using a respirator or breathing apparatus? Explain.
5. Do any chest or lung diseases run in your family? Explain.
6. Have you ever smoked cigarettes, cigars, or a pipe? Age started:
7. Do you now smoke?
8. If you have stopped smoking completely, how old were you when you stopped?
9. On the average of the entire time you smoked, how many packs of cigarettes, cigars, or bowls of tobacco did you smoke per day?

C. Cardiovascular

1. Have you ever been diagnosed with any of the following: Which of the following apply to you now or did apply to you at some time in the past, even if the problem is controlled by medication? Please explain any yes answers (i.e., when problem was diagnosed, length of time on medication).
 - a. High cholesterol or triglyceride level
 - b. Hypertension (high blood pressure)
 - c. Diabetes
 - d. Family history of heart attack, stroke, or blocked arteries
2. Have you ever had chest pain? If so, answer the next five questions.
 - a. What was the quality of the pain (i.e., crushing, stabbing, squeezing)?

- b. Did the pain go anywhere (i.e., into jaw, left arm)?
- c. What brought the pain out?
- d. How long did it last?
- e. What made the pain go away?
- 3. Have you ever had heart disease, a heart attack, stroke, aneurysm, or blocked arteries anywhere in your body? Explain (when, treatment).
- 4. Have you ever had bypass surgery for blocked arteries in your heart or anywhere else? Explain.
- 5. Have you ever had any other procedures done to open up a blocked artery (balloon angioplasty, carotid endarterectomy, clot-dissolving drug)?
- 6. Do you have or have you ever had (explain each):
 - a. Heart murmur
 - b. Irregular heartbeat
 - c. Shortness of breath while lying flat
 - d. Congestive heart failure
 - e. Ankle swelling
 - f. Recurrent pain anywhere below the waist while walking
- 7. Have you ever had an electrocardiogram (EKG)? When?
- 8. Have you ever had an abnormal EKG? If so, when, where, and what were the findings?
- 9. Do any heart diseases, high blood pressure, diabetes, high cholesterol, or high triglycerides run in your family? Explain.

D. Hepatobiliary and Pancreas

- 1. Do you now or have you ever drunk alcoholic beverages?
Age started: _____ Age stopped: _____
- 2. Average numbers per week:
 - a. Beers: _____, ounces in usual container:
 - b. Glasses of wine: _____, ounces per glass:
 - c. Drinks: _____, ounces in usual container:

3. Do you have or have you ever had (explain each):

- a. Hepatitis (infectious, autoimmune, drug-induced, or chemical)
- b. Jaundice
- c. Elevated liver enzymes or elevated bilirubin
- d. Liver disease or cancer

E. Central Nervous System

1. Do you or have you ever had (explain each):

- a. Headache
- b. Dizziness
- c. Fainting
- d. Loss of consciousness
- e. Garbled speech
- f. Lack of balance
- g. Mental/psychiatric illness
- h. Forgetfulness

F. Hematologic

1. Do you have, or have you ever had (explain each):

- a. Anemia
- b. Sickle cell disease or trait
- c. Glucose-6-phosphate dehydrogenase deficiency
- d. Bleeding tendency disorder

2. If not already mentioned previously, have you ever had a reaction to sulfa drugs or to drugs used to prevent or treat malaria? What was the drug? Describe the reaction.

B. Physical Examination

The complete physical examination, when coupled with the medical and occupational history, assists the physician or other licensed health care professional in detecting pre-existing

conditions that might place the employee at increased risk, and establishes a baseline for future health monitoring. These examinations should include:

1. Clinical impressions of the nervous system, cardiovascular function and pulmonary function, with additional tests conducted where indicated or determined by the examining physician or other licensed health care professional to be necessary.
2. An evaluation of the advisability of the worker using a respirator, because the use of certain respirators places an additional burden on the cardiopulmonary system. It is necessary for the attending physician or other licensed health care professional to evaluate the cardiopulmonary function of these workers, in order to inform the employer in a written medical opinion of the worker's ability or fitness to work in an area requiring the use of certain types of respiratory protective equipment. The presence of facial hair or scars that might interfere with the worker's ability to wear certain types of respirators should also be noted during the examination and in the written medical opinion.

Because of the importance of lung function to workers required to wear certain types of respirators to protect themselves from MC exposure, these workers must receive an assessment of pulmonary function before they begin to wear a negative pressure respirator and at least annually thereafter. The recommended pulmonary function tests include measurement of the employee's forced vital capacity (FVC), forced expiratory volume at one second (FEV1), as well as calculation of the ratios of FEV1 to FVC, and the ratios of measured FVC and measured FEV1 to expected respective values corrected for variation due to age, sex, race, and height. Pulmonary function evaluation must be conducted by a physician or other licensed health care professional experienced in pulmonary function tests.

The following is a summary of the elements of a physical exam which would fulfill the requirements under the MC standard:

Physical Exam

I. Skin and appendages

1. Irritated or broken skin
2. Jaundice
3. Clubbing cyanosis, edema
4. Capillary refill time

5. Pallor

II. Head

1. Facial deformities
2. Scars
3. Hair growth

III. Eyes

1. Scleral icterus
2. Corneal arcus
3. Pupillary size and response
4. Fundoscopic exam

IV. Chest

1. Standard exam

V. Heart

1. Standard exam
2. Jugular vein distension
3. Peripheral pulses

VI. Abdomen

1. Liver span

VII. Nervous System

1. Complete standard neurologic exam

VIII. Laboratory

1. Hemoglobin and hematocrit
2. Alanine aminotransferase (ALT, SGPT)
3. Post-shift carboxyhemoglobin

IX. Studies

1. Pulmonary function testing
2. Electrocardiogram

An evaluation of the oxygen carrying capacity of the blood of employees (for example by measured red blood cell volume) is considered useful, especially for workers acutely exposed to MC.

It is also recommended, but not required, that end of shift carboxy-hemoglobin levels be determined periodically, and any level above 3% for non-smokers and above 10% for smokers should prompt an investigation of the worker and his workplace. This test is recommended

because MC is metabolized to CO, which combines strongly with hemoglobin, resulting in a reduced capacity of the blood to transport oxygen in the body. This is of particular concern for cigarette smokers because they already have a diminished hemoglobin capacity due to the presence of CO in cigarette smoke.

C. Additional Examinations and Referrals

1. Examination by a Specialist

When a worker examination reveals unexplained symptoms or signs (i.e. in the physical examination or in the laboratory tests), follow-up medical examinations are necessary to assure that MC exposure is not adversely affecting the worker's health. When the examining physician or other licensed health care professional finds it necessary, additional tests should be included to determine the nature of the medical problem and the underlying cause. Where relevant, the worker should be sent to a specialist for further testing and treatment as deemed necessary. The final rule requires additional investigations to be covered and it also permits physicians or other licensed health care professionals to add appropriate or necessary tests to improve the diagnosis of disease should such tests become available in the future.

2. Emergencies

The examination of workers exposed to MC in an emergency should be directed at the organ systems most likely to be affected. If the worker has received a severe acute exposure, hospitalization may be required to assure proper medical intervention. It is not possible to precisely define "severe," but the physician or other licensed health care professional's judgement should not merely rest on hospitalization. If the worker has suffered significant conjunctival, oral, or nasal irritation, respiratory distress, or discomfort, the physician or other licensed health care professional should instigate appropriate follow-up procedures. These include attention to the eyes, lungs and the neurological system. The frequency of follow-up examinations should be determined by the attending physician or other licensed health care professional. This testing permits the early identification essential to proper medical management of such workers.

D. Employer Obligations

The employer is required to provide the responsible physician or other licensed health care professional and any specialists involved in a diagnosis with the following information: a copy of the MC standard including relevant appendices, a description of the affected employee's duties as they relate to his or her exposure to MC; an estimate of the employee's exposure including duration (e.g., 15hr/wk, three 8-hour shifts/wk, full time); a description of any personal protective equipment used by the employee, including respirators; and the results of any previous medical determinations for the affected employee related to MC exposure to the extent that this information is within the employer's control.

E. Physicians' or Other Licensed Health Care Professionals' Obligations

The standard requires the employer to ensure that the physician or other licensed health care professional provides a written statement to the employee and the employer. This statement should contain the physician's or licensed health care professional's opinion as to whether the employee has any medical condition placing him or her at increased risk of impaired health from exposure to MC or use of respirators, as appropriate. The physician or other licensed health

care professional should also state his or her opinion regarding any restrictions that should be placed on the employee's exposure to MC or upon the use of protective clothing or equipment such as respirators. If the employee wears a respirator as a result of his or her exposure to MC, the physician or other licensed health care professional's opinion should also contain a statement regarding the suitability of the employee to wear the type of respirator assigned. Furthermore, the employee should be informed by the physician or other licensed health care professional about the cancer risk of MC and about risk factors for heart disease, and the potential for exacerbation of underlying heart disease by exposure to MC through its metabolism to carbon monoxide. Finally, the physician or other licensed health care professional should inform the employer that the employee has been told the results of the medical examination and of any medical conditions which require further explanation or treatment. This written opinion must not contain any information on specific findings or diagnosis unrelated to employee's occupational exposures.

The purpose in requiring the examining physician or other licensed health care professional to supply the employer with a written opinion is to provide the employer with a medical basis to assist the employer in placing employees initially, in assuring that their health is not being impaired by exposure to MC, and to assess the employee's ability to use any required protective equipment.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-1997, f. 5/2/97, ef. 5/2/97.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

437-002-1064

Recordkeeping

(1) Air monitoring data.

(a) Make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica, as prescribed in 437-002-1056.

(b) This record must include at least the following information:

(A) The date of measurement for each sample taken;

(B) The task monitored;

(C) Sampling and analytical methods used;

(D) Number, duration, and results of samples taken;

(E) Identity of the laboratory that performed the analysis;

(F) Type of personal protective equipment, such as respirators, worn by the employees monitored; and

(G) Name~~[-social security number,]~~ and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

(c) Ensure that exposure records are maintained and made available in accordance with 1910.1020.

(2) Objective data.

(a) Make and maintain an accurate record of all objective data relied upon to comply with the requirements of this subdivision.

(b) This record must include at least the following information:

(A) The crystalline silica-containing material in question;

(B) The source of the objective data;

(C) The testing protocol and results of testing;

(D) A description of the process, task, or activity on which the objective data were based; and

(E) Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

(c) Ensure that objective data are maintained and made available in accordance with 1910.1020.

(3) Medical surveillance.

(a) Make and maintain an accurate record for each employee covered by medical surveillance under 437-002-1062.

(b) The record must include the following information about the employee:

(A) Name~~[-and social security number]~~;

(B) A copy of the PLHCPs' and specialists' written medical opinions;

(C) A copy of the information provided to the PLHCPs and specialists.

(c) Ensure that medical records are maintained and made available in accordance with 1910.1020.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2016, f. 9/23/16, ef. 7/1/18.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

437-002-2037

Recordkeeping

(1) Air monitoring data.

(a) Make and maintain an accurate record of all exposure measurements taken to assess employee exposure to beryllium, as prescribed in 437-002-2040.

(b) This record must include at least the following information:

(A) The date of measurement for each sample taken;

(B) The task monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of personal protective clothing and equipment, including respirators, worn by the employees monitored; and

(F) Name~~[, social security number,]~~ and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

(c) Ensure that exposure records are maintained and made available in accordance with 1910.1020.

(2) Objective data.

(a) Make and maintain an accurate record of all objective data relied upon to comply with the requirements of this subdivision.

(b) This record must include at least the following information:

(A) The data relied upon;

(B) The beryllium-containing material in question;

(C) The source of the objective data;

(D) A description of the process, task, or activity on which the objective data were based; and

(E) Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

(c) Ensure that objective data are maintained and made available in accordance with 1910.1020.

(3) Medical surveillance.

(a) Make and maintain an accurate record for each employee covered by medical surveillance under 437-002-2034.

(b) The record must include the following information about the employee:

(A) Name~~[and social security number]~~;

(B) A copy of the PLHCPs' and specialists' written medical opinions;

(C) A copy of the information provided to the PLHCPs and specialists.

(c) Ensure that medical records are maintained and made available in accordance with 1910.1020.

(4) Training.

(a) At the completion of any training required by this standard, the employer must prepare a record that indicates the name~~[-social security number,]~~ and job classification of each employee trained, the date the training was completed, and the topic of the training.

(b) This record must be maintained for three years after the completion of training.

(5) Upon request, you must make all records maintained as a requirement of this subdivision available for examination and copying to the Director of the Oregon Department of Consumer and Business Services, or designee, and the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee, each employee, and each employee's designated representative(s) in accordance the Records Access standard 1910.1020).

(6) Comply with the requirements involving transfer of records set forth in the Records Access standard (1910.1020).

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 3-2017, f. 07/07/17, ef. 03/12/18.

OR-OSHA Admin. Order 1-2018, f. 03/12/18, ef. 03/12/18.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

DIVISION 3, CONSTRUCTION

437-003-0001

Adoption by Reference.

In addition to, and not in lieu of, any other safety and health codes contained in OAR Chapter 437, the Department adopts by reference the following federal regulations printed as part of the Code of Federal Regulations, in the Federal Register:

(1) Subdivision A – General.

(a) 29 CFR 1926.1 Purpose and Scope, published 4/6/79, FR vol. 44, p. 20940.

(b) 29 CFR 1926.2 Variances from safety and health standards, published 4/6/79, FR vol. 44, p. 20940.

(c) 29 CFR 1926.3 Inspections – right of entry, published 4/6/79, FR vol. 44, p. 20940.

(d) 29 CFR 1926.4 Rules of practice for administrative adjudications for enforcement of safety and health standards, published 4/6/79, FR vol. 44, p. 20940.

(e) 29 CFR 1926.6 Incorporation by reference, published 3/25/16, FR vol. 81, no. 58, p. 16085, **amended 5/14/19, FR vol. 84, no. 93, p. 21457.**

(2) Subdivision B – General Interpretations.

(a) 29 CFR 1926.10 Scope of subpart, published 4/6/79, FR vol. 44, p. 20940.

(b) 29 CFR 1926.11 Coverage under section 103 of the act distinguished, published 4/6/79, FR vol. 44, p. 20940.

(c) 29 CFR 1926.12 Reorganization plan No. 14 of 1950, published 4/6/79, FR vol. 44, p. 20940.

(d) 29 CFR 1926.13 Interpretation of statutory terms, published 4/6/79, FR vol. 44, p. 20940.

(e) 29 CFR 1926.14 Federal contracts for ‘mixed’ types of performance, published 4/6/79, FR vol. 44, p. 20940.

(f) 29 CFR 1926.15 Relationship to the service contract act; Walsh-Healey Public Contracts Act, published 4/6/79, FR vol. 44, p. 20940.

(g) 29 CFR 1926.16 Rules of construction, published 4/6/79, FR vol. 44, p. 20940.

(3) Subdivision C – General Safety and Health Provisions

(a) 29 CFR 1926.20 General safety and health provisions, published 12/12/08, FR vol. 73, no. 240, pp. 75568-75589.

(b) 29 CFR 1926.21 Safety training and education, published 4/6/79, FR vol. 44, p. 20940; amended with Oregon OSHA AO 6-2012, repealed (b)(6), f. 9/28/12, ef. 4/1/13.

(c) 29 CFR 1926.22 Recording and reporting of injuries (Reserved)

(d) 29 CFR 1926.23 First aid and medical attention, published 4/6/79, FR vol. 44, p. 20940.

(e) 29 CFR 1926.24 Fire protection and prevention, published 4/6/79, FR vol. 44, p. 20940.

(f) 29 CFR 1926.25 Housekeeping, published 4/6/79, FR vol. 44, p. 20940.

(g) 29 CFR 1926.26 Illumination, published 4/6/79, FR vol. 44, p. 20940.

(h) 29 CFR 1926.27 Sanitation, published 4/6/79, FR vol. 44, p. 20940.

(i) 29 CFR 1926.28 Personal protective equipment. REPEALED with Oregon OSHA Admin. Order 2-2013, filed 2/15/13, effective 4/1/13. In Oregon, OAR 437-003-0134 applies.

- (j) 29 CFR 1926.29 Acceptable certifications, published 4/6/79, FR vol. 44, p. 20940.
- (k) 29 CFR 1926.30 Shipbuilding and ship repairing, published 3/7/96, FR vol. 61, no. 46, p. 9249.
- (l) 29 CFR 1926.31 (Reserved).
- (m) 29 CFR 1926.32 Definitions, published 6/30/93, FR vol. 58, no. 124, p. 35078.
- (n) 29 CFR 1926.33 Access to employee exposure and medical records, published 6/20/96, FR vol. 61, no. 46, p. 31427.
- (o) 29 CFR 1926.34 Means of egress, published 6/30/93, Federal Register, vol. 58, no. 124, p. 35083.
- (4) Subdivision D – Occupational Health and Environmental Controls.
 - (a) 29 CFR 1926.50 Medical services and first aid, published 6/18/98, FR vol. 63, no. 117, p. 33469, **amended 5/14/19, FR vol. 84, no. 93, p. 21576.**
 - (b) 29 CFR 1926.51 Sanitation, published 6/30/93, FR vol. 58, no. 124, p. 35084.
 - (c) 29 CFR 1926.52 Occupational noise exposure, published 4/6/79, FR vol. 44, p. 20940.
 - (d) 29 CFR 1926.53 Ionizing radiation, published 4/6/79, FR vol. 44, p. 20940.
 - (e) 29 CFR 1926.54 Nonionizing radiation, published 4/6/79, FR vol. 44, p. 20940.
 - (f) 29 CFR 1926.55 Gases, vapors, fumes, dusts, and mists, [~~published 1/10/97, FR vol. 62, no. 7, p. 1619.~~] **Note: Oregon OSHA did not adopt 1926.55. In Oregon, 437-003-1000 applies.**
 - (g) 29 CFR 1926.56 Illumination, published 4/6/79, FR vol. 44, p. 20940.
 - (h) 29 CFR 1926.57 Ventilation, published 1/8/98, FR vol. 63, no. 5, p. 1295.
 - (i) 29 CFR 1926.58 Reserved, 1926.58, Asbestos, tremolite, anthophyllite and actinolite is redesignated as 1926.1101, Asbestos, and 1926.58 is reserved (8/10/94, FR vol. 59, no. 153, pp. 41131-62).
 - (j) 29 CFR 1926.59 Hazard Communication, published 6/20/96, FR vol. 61, p. 31427.
 - (k) 29 CFR 1926.60 Methylenedianiline (MDA), published [~~42/42/08~~]**5/14/19**, FR vol. [~~73~~]**84**, no. [~~240~~]**93**, p[~~9~~]. [~~75568-75589~~]**21416**.
 - (l) 29 CFR 1926.61 Retention of DOT markings, placards and labels, published 6/20/96, FR vol. 61, p. 31427.
 - (m) 29 CFR 1926.62 Lead, published [~~42/42/08~~]**5/14/19**, FR vol. [~~73~~]**84**, no. [~~240~~]**93**, p[~~9~~]. [~~75568-75589~~]**21416**.

NOTE: Cadmium has been redesignated as 1926.1127.

(n) 29 CFR 1926.64. Process Safety Management of Highly Hazardous Chemicals

Note: Division 2/H, 1910.119, Process Safety Management of Highly Hazardous Chemicals, applies to Construction.

([A]m) 29 CFR 1926.65 Hazardous Waste Operations and Emergency Response

NOTE: Division 2/H, 1910.120, Hazardous Waste Operations and Emergency Response, applies to Construction.

(5) Subdivision E – Personal Protective and Life Saving Equipment.

(a) 29 CFR 1926.95 Criteria for personal protective equipment. REPEALED with Oregon OSHA Admin. Order 2-2013, filed 2/15/13, effective 4/1/13. In Oregon, OAR 437-003-0134 applies.

(b) 29 CFR 1926.97 Electrical protective equipment, published 4/11/14, FR vol. 79, p. 20316.

(c) 29 CFR 1926.100 Head protection. REPEALED with Oregon OSHA Admin. Order 2-2013, filed 2/15/13, effective 4/1/13. In Oregon, OAR 437-003-0134 applies.

(d) 29 CFR 1926.101 Hearing protection. REPEALED with Oregon OSHA Admin. Order 2-2013, filed 2/15/13, effective 4/1/13. In Oregon, OAR 437-003-0134 applies.

(e) 29 CFR 1926.102 Eye and face protection. REPEALED with Oregon OSHA Admin. Order 2-2013, filed 2/15/13, effective 4/1/13. In Oregon, OAR 437-003-0134 applies.

(f) 29 CFR 1926.103 Respiratory protection, published 1/8/98, FR vol. 63, no. 5, p. 1297.

NOTE: 29 CFR 1926.104 Removed, 8/9/94, FR vol. 59, no. 152, p. 40729.

(g) 29 CFR 1926.105 Reserved, 8/9/94, FR vol. 59, no. 152, p. 40729.

(h) 29 CFR 1926.106 Working over or near water, published 4/6/79, FR vol. 44, p. 20940.

(i) 29 CFR 1926.107 Definitions applicable to this subpart, published 8/9/94, FR vol. 59, no. 152, p. 40729.

(6) Subdivision F – Fire Protection and Prevention.

(a) 29 CFR 1926.150 Fire protection, published 4/6/79, FR vol. 44, p. 20940.

(b) 29 CFR 1926.151 Fire prevention, published 7/11/86, FR vol. 51, p. 25318.

(c) 29 CFR 1926.152 Flammable liquids, published 3/26/12, FR vol. 77, no. 58, p. 17574.

(d) 29 CFR 1926.153 Liquefied petroleum gas (LP-Gas), published 6/30/93, FR vol. 58, no. 124, p. 35170.

(e) 29 CFR 1926.154 Temporary heating devices, published 4/6/79, FR vol. 44, p. 20940.

(f) 29 CFR 1926.155 Definitions applicable to this subpart, published 3/26/12, FR vol. 77, no. 58, p. 17574.

(7) Subdivision G – Signs, Signals, and Barricades.

(a) 29 CFR 1926.200 Accident prevention signs and tags, published 6/13/13, FR vol. 78, no. 114, p. 35559; 11/6/13, FR vol. 78, no. 215, p. 66641, **amended 5/14/19, FR vol. 84, no. 93, p. 21576.**

(b) 29 CFR 1926.201 Signaling, REPEALED with OR-OSHA Admin. Order 2-2003, f. 1/30/03, ef. 1/30/03.

(c) 29 CFR 1926.202 Barricades, REPEALED with OR-OSHA Admin. Order 2-2003, f. 1/30/03, ef. 1/30/03.

(d) 29 CFR 1926.203 Definitions applicable to this subpart, published 4/6/79, FR vol. 44, p. 20940; amended with OR-OSHA Admin. Order 2-2003, f. 1/30/03, ef. 1/30/03, **Repealed 5/14/19, FR vol. 84, no. 93, p. 21576.**

(8) Subdivision H – Materials Handling, Storage, Use, and Disposal.

(a) 29 CFR 1926.250 General requirements for storage, published 6/30/93, FR vol. 58, no. 124, p. 35173, **amended 5/14/19, FR vol. 84, no. 93, p. 21576.**

(b) 29 CFR 1926.251 Rigging equipment for material handling, published 6/8/11, FR vol. 74, no. 110, p. 33590.

(c) 29 CFR 1926.252 Disposal of waste materials, published 4/6/79, FR vol. 44, p. 20940.

(9) Subdivision I – Tools – Hand and Power.

(a) 29 CFR 1926.300 General requirements, published 3/7/96, FR vol. 61, no. 46, p. 9250.

(b) 29 CFR 1926.301 Hand tools, published 4/6/79, FR vol. 44, p. 20940.

(c) 29 CFR 1926.302 Power operated hand tools, published 6/30/93, FR vol. 58, no. 124, p. 35175.

(d) 29 CFR 1926.303 Abrasive wheels and tools, published 6/30/93, FR vol. 58, no. 124, p. 35175.

(e) 29 CFR 1926.304 Woodworking tools, published 3/7/96, FR vol. 61, no. 46, p. 9251.

(f) 29 CFR 1926.305 Jacks - lever and ratchet, screw, and hydraulic, published Federal Register vol. 58, no. 124, p. 35176.

(10) Subdivision J – Cutting and Welding.

(a) 29 CFR 1926.350 Gas welding and cutting. Repealed. Oregon OSHA Admin. Order 6-2014, f. 10/28/14, ef. 5/1/15. In Oregon, OAR 437-002-2253 applies.

- (b) 29 CFR 1926.351 Arc welding and cutting, published 7/11/86, FR vol. 51, p. 25318.
- (c) 29 CFR 1926.352 Fire prevention, published 4/6/79, FR vol. 44, p. 20940.
- (d) 29 CFR 1926.353 Ventilation and protection in welding, cutting, and heating, published 6/30/93, FR vol. 58, no. 124, p. 35179.
- (e) 29 CFR 1926.354 Welding, cutting, and heating in way of preservative coatings, published 4/6/79, FR vol. 44, p. 20940.
- (11) Subdivision K – Electrical.
 - (a) 29 CFR 1926.400 Introduction, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.
 - (b) 29 CFR 1926.401 (Reserved)
 - (c) 29 CFR 1926.402 Applicability, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.
 - (d) 29 CFR 1926.403 General requirements, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.
 - (e) 29 CFR 1926.404 Wiring design and protection, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335; amended with AO 5-2002, repeal (b)(1), f. 6/28/02, ef. 10/1/03.
 - (f) 29 CFR 1926.405 Wiring methods, components, and equipment for general use, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.
 - (g) 29 CFR 1926.406 Specific purpose equipment and installations, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.
 - (h) 29 CFR 1926.407 Hazardous (classified) locations, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.
 - (i) 29 CFR 1926.408 Special systems, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.
 - (j) 29 CFR 1926.409 (Reserved)
 - (k) 29 CFR 1926.415 (Reserved)
 - (l) 29 CFR 1926.416 General requirements, published 8/12/96, FR vol. 61, no. 156, p. 41738.
 - (m) 29 CFR 1926.417 Lockout and tagging of circuits, published 8/12/96, FR vol. 61, no. 156, p. 41739.
 - (n) 29 CFR 1926.418 (Reserved)
 - (o) 29 CFR 1926.430 (Reserved)
 - (p) 29 CFR 1926.431 Maintenance of equipment, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.

(q) 29 CFR 1926.432 Environmental deterioration of equipment, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.

(r) 29 CFR 1926.433 - 29 CFR 1926.440 (Reserved)

(s) 29 CFR 1926.441 Battery locations and battery charging, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.

(t) 29 CFR 1926.442 - 29 CFR 1926.448 (Reserved)

(u) 29 CFR 1926.449 Definitions applicable to this subpart, published 7/11/86, FR vol. 51, no. 133, pp. 25294-25335.

(12) Subdivision L – Scaffolding.

(a) 29 CFR 1926.450 Scope, application and definitions applicable to this subpart, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(b) 29 CFR 1926.451 General requirements, published 11/25/96, FR vol. 61, no. 228, p. 59831.

(c) 29 CFR 1926.452 Additional requirements applicable to specific types of scaffolds, published 8/30/96, FR vol. 61, no. 170, p. 46113.

(d) 29 CFR 1926.453 Aerial lifts, published 11/25/96, FR vol. 61, no. 228, p. 59832.

(e) 29 CFR 1926.454 Training, published 8/30/96, FR vol. 61, no. 170, p. 46117.

(f) Appendix A to Subpart L Scaffold Specifications, published 8/30/96, FR vol. 61, no. 170, p. 46117.

(g) Appendix B to Subpart L Criteria for determining the feasibility of providing safe access and fall protection for scaffold erectors and dismantlers (Reserved), published 8/30/96, FR vol. 61, no. 170, p. 46122.

(h) Appendix C to Subpart L List of National Consensus Standards, published 8/30/96, FR vol. 61, no. 170, p. 46122.

(i) Appendix D to Subpart L List of training topics for scaffold erectors and dismantlers, published 8/30/96, FR vol. 61, no. 170, p. 46122.

(j) Appendix E to Subpart L Drawing and illustrations, published 11/25/96, FR vol. 61, no. 228, p. 59832.

(13) Subdivision M – Fall Protection.

(a) 29 CFR 1926.500 Scope, application, and definitions applicable to this subpart, published 4/11/14, FR vol. 79, no. 70, p. 20316; amended with AO 1-2016, f. 3/1/16, ef. 1/1/17.

(b) 29 CFR 1926.501 Duty to have fall protection, repealed with AO 1-2016, f. 3/1/16, ef. 1/1/17. In Oregon 437-003-1501 applies.

- (c) 29 CFR 1926.502 Fall protection systems criteria and practices, published 8/9/94, FR vol. 59, no. 152, p. 40733-40738; amended with AO 6-2002, f. and ef. 7/19/02.
- (d) 29 CFR 1926.503 Training requirements. REPEALED with AO 6-2002, f. and ef. 7/19/02, in Oregon 437-003-0503 applies.
- (e) Appendix A to Subpart M Determining Roof Widths, published 8/9/94, FR vol. 59, no. 152, p. 40738-40742.
- (f) Appendix B to Subpart M Guardrail Systems, published 8/9/94, FR vol. 59, no. 152, p. 40743.
- (g) Appendix C to Subpart M Personal Fall Arrest Systems, published 8/9/94, FR vol. 59, no. 152, p. 40743-40746.
- (h) Appendix D to Subpart M Positioning Device Systems, published 8/9/94, FR vol. 59, no. 152, p. 40746.
- (14) Subdivision N – Helicopters, Hoists, Elevators and Conveyors.
 - (a) 29 CFR 1926.550 (Reserved).
 - (b) 29 CFR 1926.551 Helicopters, published 4/6/79, FR vol. 44, p. 20940.
 - (c) 29 CFR 1926.552 Material hoists, personnel hoists, and elevators, published 4/6/79, FR vol. 44, p. 20940.
 - (d) 29 CFR 1926.553 Base-mounted drum hoist, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
 - (e) 29 CFR 1926.554 Overhead hoists, published 4/6/79, FR vol. 44, p. 20940.
 - (f) 29 CFR 1926.555 Conveyors, published 4/6/79, FR vol. 44, p. 20940.
- (15) Subdivision O – Motor Vehicles, Mechanized Equipment, and Marine Operations.
 - (a) 29 CFR 1926.600 Equipment, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
 - (b) 29 CFR 1926.601 Motor vehicles, REPEALED by OR-OSHA Admin. Order 6-2007, f. 9/26/07, ef. 9/26/07.
 - (c) 29 CFR 1926.602 Material handling equipment, published 12/1/98, FR vol. 63, no. 230, p. 66274; amended by AO 7-2003, f. 12/5/03, ef. 12/5/03.
 - (d) 29 CFR 1926.603 Pile driving equipment, published 4/6/79, FR vol. 44, p. 20940.
 - (e) 29 CFR 1926.604 Site clearing, published 7/22/77, FR vol. 42, p. 37674.
 - (f) 29 CFR 1926.605 Marine operations and equipment, published 4/6/79, FR vol. 44, p. 20940.
 - (g) 29 CFR 1926.606 Definitions applicable to this subpart, published 4/6/79, FR vol. 44, p. 20940.

(16) Subdivision P – Excavations.

- (a) 29 CFR 1926.650 Scope, application, and definitions applicable to this subdivision, published 10/31/89, FR vol. 54, no. 209, pp. 45959-45961.
- (b) 29 CFR 1926.651 General requirements, published 8/9/94, FR vol. 59, no. 152, p. 40730.
- (c) 29 CFR 1926.652 Requirements for protective systems, published 10/31/89, FR vol. 54, no. 209, pp. 45961-45962.
- (d) Appendices A-F to Subdivision P, Excavations, published 10/31/89, FR vol. 54, no. 209, pp. 45962-45991.

(17) Subdivision Q – Concrete and Masonry Construction.

- (a) 29 CFR 1926.700 Scope, application and definitions applicable to this subpart, published 10/18/90, FR vol. 55, no. 202, p. 42326.
- (b) 29 CFR 1926.701 General requirements, published 8/9/94, FR vol. 59, no. 152, p. 40730.
- (c) 29 CFR 1926.702 Requirements for equipment and tools, published 6/16/88, FR vol. 53, p. 22612.
- (d) 29 CFR 1926.703 Requirements for cast-in-place concrete, published 6/16/88, FR vol. 53, p. 22612.
- (e) 29 CFR 1926.704 Requirements for precast concrete, published 10/5/89, FR vol. 54, no. 192, p. 41088.
- (f) 29 CFR 1926.705 Requirements for lift-slab construction operations, published 10/18/90, FR vol. 55, no. 202, p. 42326.
- (g) Appendix A to 1926.705 Lift-slab operations, published 10/18/90, FR vol. 55, no. 202, p. 42326.
- (h) 29 CFR 1926.706 Requirements for masonry construction, published 6/16/88, FR vol. 53, p. 22612; amended with OR-OSHA Admin. Order 1-2003, f. 1/30/03, ef. 4/30/03.

(18) Subdivision R – Steel Erection.

- (a) 29 CFR 1926.750 Scope, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (b) 29 CFR 1926.751 Definitions, published 7/17/01, FR vol. 66, no. 137, p. 37137; amended with AO 6-2002, f. and ef. 7/19/02; amended with AO 8-2003, f. 12/30/03, ef. 1/1/04.
- (c) 29 CFR 1926.752 Site layout, site-specific erection plan and construction sequence, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (d) 29 CFR 1926.753 Hoisting and rigging, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

- (e) 29 CFR 1926.754 Structural steel assembly, published 4/3/06, FR vol. 71, no. 63, p. 16669.
- (f) 29 CFR 1926.755 Column anchorage, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (g) 29 CFR 1926.756 Beams and columns, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (h) 29 CFR 1926.757 Open web steel joists, published 7/17/01, FR vol. 66, no. 137, p. 37137; amended with AO 8-2003, f. 12/30/03, ef. 1/1/04.
- (i) 29 CFR 1926.758 Systems-engineered metal buildings, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (j) 29 CFR 1926.759 Falling object protection, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (k) 29 CFR 1926.760 Fall protection, published 7/17/01, FR vol. 66, no. 137, p. 37137; amended with AO 8-2003, f. 12/30/03, ef. 1/1/04.
- (l) 29 CFR 1926.761 Training, published 12/12/08, FR vol. 73, no. 240, pp. 75568-75589.
- (m) Appendix A to Subpart R Guidelines for establishing the components of a site-specific erection plan: Nonmandatory Guidelines for Complying with §1926.752(e), published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (n) Appendix B to Subpart R Reserved.
- (o) Appendix C to Subpart R Illustrations of bridging terminus points: Nonmandatory Guidelines for Complying with §1926.757(a)(10) and §1926.757(c)(5), published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (p) Appendix D to Subpart R Illustration of the use of control lines to demarcate controlled decking zones (CDZs): Nonmandatory Guidelines for Complying with §1926.760(c)(3), REPEALED with AO 6-2002, f. and ef. 7/19/02; amended with AO 8-2003, f. 12/30/03, ef. 1/1/04.
- (q) Appendix E to Subpart R Training: Nonmandatory Guidelines for Complying with §1926.761, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (r) Appendix F to Subpart R Perimeter columns: Nonmandatory Guidelines for Complying with 1926.756(e) to Protect the Unprotected Side or Edge of a Walking/Working Surface, published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (s) Appendix G to Subpart R Fall protection systems criteria and practices from 1926.502: Nonmandatory Guidelines for Complying with Complying with §1926.760(d), REPEALED with AO 6-2002, f. and ef. 7/19/02; amended with AO 8-2003, f. 12/30/03, ef. 1/1/04.
- (t) Appendix H to Subpart R Double connections: Illustration of a clipped end connection and a staggered connection: Non-Mandatory Guidelines for Complying with Complying with 1926.756(c)(1), published 7/17/01, FR vol. 66, no. 137, p. 37137.
- (19) Subdivision S – Underground Construction, Caissons, Cofferdams, and Compressed Air.

(a) 29 CFR 1926.800 Underground construction, published 4/23/13, FR vol. 78, no. 78, p. 23837, **amended 5/14/19, FR vol. 84, no. 93, p. 21576.**

(b) 29 CFR 1926.801 Caissons, published 4/6/79, FR vol. 44, p. 20940.

(c) 29 CFR 1926.802 Cofferdams, published 4/6/79, FR vol. 44, p. 20940.

(d) 29 CFR 1926.803 Compressed air, published 7/11/86, FR vol. 51, p. 25318.

(e) 29 CFR 1926.804 Definitions applicable to this subpart, published 4/6/79, FR vol. 44, p. 20940.

(f) Appendix A to Subpart S Decompression Tables, published 4/6/79, FR vol. 44, p. 20940.

(20) Subdivision T – Demolition.

(a) 29 CFR 1926.850 Preparatory operations, published 4/6/79, FR vol. 44, p. 20940.

(b) 29 CFR 1926.851 Stairs, passageways, and ladders, published 4/6/79, FR vol. 44, p. 20940.

(c) 29 CFR 1926.852 Chutes, published 4/6/79, FR vol. 44, p. 20940.

(d) 29 CFR 1926.853 Removal of materials through floor openings, published 4/6/79, FR vol. 44, p. 20940.

(e) 29 CFR 1926.854 Removal of walls, masonry sections, and chimneys, published 4/6/79, FR vol. 44, p. 20940.

(f) 29 CFR 1926.855 Manual removal of floors, published 4/6/79, FR vol. 44, p. 20940.

(g) 29 CFR 1926.856 Removal of walls, floors, and materials with equipment, published 4/23/13, FR vol. 78, no. 78, p. 23837.

(h) 29 CFR 1926.857 Storage, published 4/6/79, FR vol. 44, p. 20940.

(i) 29 CFR 1926.858 Removal of steel construction, published 4/23/13, FR vol. 78, no. 78, p. 23837.

(j) 29 CFR 1926.859 Mechanical demolition, published 4/6/79, FR vol. 44, p. 20940.

(k) 29 CFR 1926.860 Selective demolition by explosives, published 4/6/79, FR vol. 44, p. 20940.

(21) Subdivision U – Blasting and Use of Explosives.

(a) 29 CFR 1926.900 General provisions, published 4/6/79, FR vol. 44, p. 20940.

(b) 29 CFR 1926.901 Blaster qualifications, published 4/6/79, FR vol. 44, p. 20940.

(c) 29 CFR 1926.902 Surface transportation of explosives, published 6/30/93, FR vol. 58, no. 124, p. 35311.

(d) 29 CFR 1926.903 Underground transportation of explosives, published 4/6/79, FR vol. 44, p. 20940.

(e) 29 CFR 1926.904 Storage of explosives and blasting agents, published 6/30/93, FR vol. 58, no. 124, p. 35311.

(f) 29 CFR 1926.905 Loading of explosives or blasting agents, published 6/30/93, FR vol. 58, no. 124, p. 35184.

(g) 29 CFR 1926.906 Initiation of explosive charges – electric blasting, published 6/18/98, FR vol. 63, no. 117, p. 33469.

(h) 29 CFR 1926.907 Use of safety fuse, published 4/6/79, FR vol. 44, p. 20940.

(i) 29 CFR 1926.908 Use of detonating cord, published 4/6/79, FR vol. 44, p. 20940.

(j) 29 CFR 1926.909 Firing the blast, published 4/6/79, FR vol. 44, p. 20940.

(k) 29 CFR 1926.910 Inspection after blasting, published 4/6/79, FR vol. 44, p. 20940.

(l) 29 CFR 1926.911 Misfires, published 4/6/79, FR vol. 44, p. 20940.

(m) 29 CFR 1926.912 Underwater blasting, published 4/6/79, FR vol. 44, p. 20940.

(n) 29 CFR 1926.913 Blasting in excavation work under compressed air, published 4/6/79, FR vol. 44, p. 20940.

(o) 29 CFR 1926.914 Definitions applicable to this subpart, published 6/30/93, FR vol. 58, no. 124, p. 35184, 35311.

(22) Subdivision V — POWER TRANSMISSION AND DISTRIBUTION. 29 CFR 1926.950 through 1926.960 are repealed with Oregon OSHA Admin. Order 3-2015, f. 10/9/15, ef. 1/1/16. In Oregon, Division 2/RR applies.

(23) Subdivision W – Rollover Protective Structures: Overhead Protection.

(a) 29 CFR 1926.1000 Rollover protective structures (ROPS) for material handling equipment, published 4/6/79, FR vol. 44, p. 20940, **amended 5/14/19, FR vol. 84, no. 93, p. 21576.**

(b) 29 CFR 1926.1001 Minimum performance criteria for rollover protective structure for designated scrapers, loaders, dozers, graders, and crawler tractors, published 4/6/79, FR vol. 44, p. 20940, **amended 5/14/2019, FR vol. 84, no. 93, p. 21576.**

(c) 29 CFR 1926.1002 Protective frame (ROPS) test procedures and performance requirements for wheel-type agricultural and industrial tractors used in construction, published 7/20/06, FR vol. 71, no. 139, p. 41127, **amended 5/14/2019, FR vol. 84, no. 93, p. 21576.**

(d) 29 CFR 1926.1003 Overhead protection for operators of agricultural and industrial tractors, published 2/28/06, FR vol. 71, no. 39, p. 9909, **amended 5/14/2019, FR vol. 84, no. 93, p. 21576.**

(24) Subdivision X – Stairways and Ladders.

(a) 29 CFR 1926.1050 Scope, application and definitions applicable to this Subdivision, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(b) 29 CFR 1926.1051 General requirements, published 11/14/90, FR vol. 55, no. 220, p. 47688.

(c) 29 CFR 1926.1052 Stairways, published 8/23/91, FR vol. 56, no. 164, pp. 41793-41794.

(d) 29 CFR 1926.1053 Ladders, published 4/11/14, FR vol. 79, no. 70, p. 20316; amended with Oregon OSHA AO 3-2015, f. 10/9/15, ef. 1/1/16.

(e) 29 CFR 1926.1054 (Reserved)

(f) 29 CFR 1926.1055 (Reserved)

(g) 29 CFR 1926.1056 (Reserved)

(h) 29 CFR 1926.1057 (Reserved)

(i) 29 CFR 1926.1058 (Reserved)

(j) 29 CFR 1926.1059 (Reserved)

(k) 29 CFR 1926.1060 Training requirements, published 11/14/90, FR vol. 55, no. 220, p. 47691.

(25) Subdivision Z – Toxic and Hazardous Substances.

(a) 29 CFR 1926.1101 Asbestos, published 2/8/13, FR vol. 78, no. 27, p. 9311, **amended 5/14/2019, FR vol. 84, no. 93, p. 21576.**

(b) 29 CFR 1926.1126 Chromium (VI), published 3/17/10, FR vol. 75, no. 51, pp. 12681-12686, **amended 5/14/19, FR vol. 84, no. 93, p. 21416.**

(c) 29 CFR 1926.1127 Cadmium, published 12/12/08, FR vol. 73, no. 240, pp. 75568-75589, **amended 5/14/19, FR vol. 84, no. 93, p. 21416.**

(d) 29 CFR 1926.1152 Methylene Chloride, published 12/18/97, FR vol. 62, no. 243, p. 66275.

(26) Subdivision AA — (Reserved).

(27) Subdivision BB — (Reserved).

(28) Subdivision CC – Cranes and Derricks in Construction.

(a) 29 CFR 1926.1400 Scope, published 4/11/14, FR vol. 79, no. 70, p. 20316; amended with Oregon OSHA AO 3-2015, f. 10/9/15, ef. 1/1/16.

(b) 29 CFR 1926.1401 Definitions, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

- (c) 29 CFR 1926.1402 Ground conditions, published 8/9/10, FR vol. 75, no. 152. Pp. 47906-48177.
- (d) 29 CFR 1926.1403 Assembly/Disassembly – selection of manufacturer or employer procedures, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (e) 29 CFR 1926.1404 Assembly/Disassembly – general requirements (applies to all assembly and disassembly operations), published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (f) 29 CFR 1926.1405 Disassembly – additional requirements for dismantling of booms and jibs (applies to both the use of manufacturer procedures and employer procedures), published 8/9/10, FR vol. 75, no. 152. Pp. 47906-48177.
- (g) 29 CFR 1926.1406 Assembly/Disassembly – employer procedures – general requirements, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (h) 29 CFR 1926.1407 Power line safety (up to 350 kV) – assembly and disassembly, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (i) 29 CFR 1926.1408 Power line safety (up to 350 kV) – equipment operations, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (j) 29 CFR 1926.1409 Power line safety (over 35 kV), published 8/9/10, FR vol. 75, vol. 152, pp. 47906-48177.
- (k) 29 CFR 1926.1410 Power line safety (all voltages) – equipment operations closer than the Table A zone, published 4/11/14, FR vol. 79, no. 70, p. 20316.
- (l) 29 CFR 1926.1411 Power line safety – while traveling, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (m) 29 CFR 1926.1412 Inspections, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (n) 29 CFR 1926.1413 Wire rope – inspection, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (o) 29 CFR 1926.1414 Wire rope – selection and installation criteria, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (p) 29 CFR 1926.1415 Safety devices, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (q) 29 CFR 1926.1416 Operational aids, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (r) 29 CFR 1926.1417 Operation, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (s) 29 CFR 1926.1418 Authority to stop operation, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

- (t) 29 CFR 1926.1419 Signals – general requirements, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (u) 29 CFR 1926.1420 Signals – radio, telephone or other electronic transmission of signals, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (v) 29 CFR 1926.1421 Signals – voice signals – additional requirements, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (w) 29 CFR 1926.1422 Signals – hand signal chart, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (x) 29 CFR 1926.1423 Fall protection, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (y) 29 CFR 1926.1424 Work area control, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (z) 29 CFR 1926.1425 Keeping clear of the load, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (aa) 29 CFR 1926.1426 Free fall and controlled load lowering, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (bb) 29 CFR 1926.1427 Operator qualification and certification, published 11/9/18, FR vol. 83, no. 218, p. 56198.
- (cc) 29 CFR 1926.1428 Signal person qualifications, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (dd) 29 CFR 1926.1429 Qualifications of maintenance & repair employees, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (ee) 29 CFR 1926.1430 Training, published 11/9/18, FR vol. 83, no. 218, p. 56198.
- (ff) 29 CFR 1926.1431 Hoisting personnel, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (gg) 29 CFR 1926.1432 Multiple-crane/derrick lifts – supplemental requirements, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (hh) 29 CFR 1926.1433 Design, construction and testing, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (ii) 29 CFR 1926.1434 Equipment modifications, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (jj) 29 CFR 1926.1435 Tower cranes, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.
- (kk) 29 CFR 1926.1436 Derricks, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(ll) 29 CFR 1926.1437 Floating cranes/derricks and land cranes/derricks on barges, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(mm) 29 CFR 1926.1438 Overhead & gantry cranes, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(nn) 29 CFR 1926.1439 Dedicated pile drivers, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(oo) 29 CFR 1926.1440 Sideboom cranes, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(pp) 29 CFR 1926.1441 Equipment with a rated hoisting/lifting capacity of 2,000 pounds or less, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(qq) 29 CFR 1926.1442 Severability, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(rr) Appendix A to Subdivision CC of 1926 – Standard Hand Signals, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(ss) Appendix B to Subdivision CC of 1926 – Assembly/Disassembly – Sample Procedures for Minimizing the Risk of Unintended Dangerous Boom Movement, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

(tt) Appendix C to Subdivision CC of 1926 – Operator Certification – Written Examination – Technical Knowledge Criteria, published 8/9/10, FR vol. 75, no. 152, pp. 47906-48177.

These standards are available at the Oregon Occupational Safety and Health Division, Oregon Department of Consumer and Business Services, and the United States Government Printing Office.

Statutory/Other Authority: ORS 654.025(2) & 656.726(4)

Statutes/Other Implemented: ORS 654.001 - 654.295

APD Admin. Order 5-1989, f. 3/31/89, ef. 5/1/89 (temp).

APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89 (perm).

APD Admin. Order 14-1989, f. 7/20/89, ef. 8/1/89 (temp).

APD Admin. Order 15-1989, f. 9/13/89, ef. 9/13/89 (perm).

APD Admin. Order 16-1989 (temp), f. 9/13/89, ef. 9/13/89.

OR-OSHA Admin. Order 2-1989, f. 10/17/89, ef. 10/17/89.

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OR-OSHA Admin. Order 7-1990, f. 3/2/90, ef. 3/2/90 (perm).

OR-OSHA Admin. Order 8-1990, f. 3/30/90, ef. 3/30/90.

OR-OSHA Admin. Order 13-1990, f. 6/28/90, ef. 8/1/90 (temp).

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OR-OSHA Admin. Order 27-1990, f. 12/12/90, ef. 2/1/91.

OR-OSHA Admin. Order 6-1991, f. 3/18/91, ef. 4/15/91.

OR-OSHA Admin. Order 7-1991, f. 4/25/91, ef. 4/25/91.

OR-OSHA Admin. Order 15-1991, f. 12/13/91, ef. 12/13/91.

OR-OSHA Admin. Order 16-1991, f. 12/16/91, ef. 1/1/92.

OR-OSHA Admin. Order 6-1992, f. 5/18/92, ef. 5/18/92.

OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92.
 OR-OSHA Admin. Order 1-1993, f. 1/22/93, ef. 1/22/93.
 OR-OSHA Admin. Order 16-1993, f. 11/1/93, ef. 11/1/93 (Lead).
 OR-OSHA Admin. Order 1-1994, f. 4/27/94, ef. 4/27/94.
 OR-OSHA Admin. Order 4-1994, f. 8/4/94, ef. 8/4/94 (HazCom).
 OR-OSHA Admin. Order 6-1994, f. 9/30/94, ef. 9/30/94.
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 OR-OSHA Admin. Order 3-1995, f. 2/22/95, ef. 2/22/95 (Haz Waste).
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 OR-OSHA Admin. Order 6-1995, f. 4/18/95, ef. 6/1/95 (Fall Protection).
 OR-OSHA Admin. Order 8-1995, f. 8/25/95, ef. 8/25/95 (Asbestos).
 OR-OSHA Admin. Order 5-1996, f. 11/29/96, ef. 11/29/96.
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 OR-OSHA Admin. Order 8-1997, f. 11/14/97, e. 11/14/97 (Methylene Chloride).
 OR-OSHA Admin. Order 1-1998, f. 2/13/98, e. 2/13/98 (Methylene Chloride).
 OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98 (Respiratory Protection).
 OR-OSHA Admin. Order 6-1998, f. 10/15/98, ef. 10/15/98 (Slings 3/H).
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 OR-OSHA Admin. Order 3-2001, f. 2/5/01, ef. 2/5/01 (Fall Protection/Oregon Exceptions).
 OR-OSHA Admin. Order 3-2002, f. 4/15/02, ef. 4/18/02 (Steel Erection).
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 OR-OSHA Admin. Order 1-2003, f. 1/30/03, ef. 4/30/03 (3/Q Masonry Wall Bracing).
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 OR-OSHA Admin. Order 7-2003, f. 12/5/03, ef. 12/5/03 (3/O).
 OR-OSHA Admin. Order 8-2003, f. 12/30/03, ef. 1/1/04 (3/R).
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 OR-OSHA Admin. Order 4-2006, filed 7/24/06, effective 7/24/06.
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 OR-OSHA Admin. Order 5-2008, filed 5/1/08, effective 5/15/08 (3/E PPE).
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 OR-OSHA Admin. Order 3-2010, f. 6/10/10, ef. 6/15/10.
 OR-OSHA Admin. Order 1-2011, f. 2/9/11, ef. 2/9/11.
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 OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
 OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
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OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
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OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 3/A, General

1926.6

Incorporation by reference.

(a) The standards of agencies of the U.S. Government, and organizations which are not agencies of the U.S. Government which are incorporated by reference in this part, have the same force and effect as other standards in this part. Only the mandatory provisions (i.e., provisions containing the word "shall" or other mandatory language) of standards incorporated by reference are adopted as standards under the Occupational Safety and Health Act. ~~[The locations where these standards may be examined are as follows:~~

~~(1) Offices of the Occupational Safety and Health Administration, U.S. Department of Labor, Frances Perkins Building, Washington, DC 20210.~~

~~(2) The Regional and Field Offices of the Occupational Safety and Health Administration, which are listed in the U.S. Government Manual.]~~

(b) The **standards**~~[materials]~~ listed in ~~[paragraphs (g) through (ff) of]~~ this section are incorporated by reference **into this part with the approval of** ~~[in the corresponding sections noted as they exist on the date of the approval, and a notice of any change in these materials will be published in the Federal Register. These incorporations by reference were approved by]the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.~~ **To enforce any edition other than that specified in this section, OSHA must publish a document in the Federal Register and the material must be available to the public.**

(c) Copies of standards listed in this section and issued by private standards organizations are available for purchase from the issuing organizations at the addresses or through the other contact information listed below for these private standards organizations. In addition, these standards are available for inspection ~~[at the National Archives and Records Administration (NARA). For information on the availability of these standards at NARA, telephone: 202-741-6030, or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.~~

~~Also, the standards are available for inspection]~~at any Regional Office of the Occupational Safety and Health Administration (OSHA), or at the OSHA Docket Office, U.S. Department of

Labor, 200 Constitution Avenue, NW., Room N-~~3508~~^[2625], Washington, DC 20210; telephone: 202-693-2350 (TTY number: 877-889-5627). **These standards are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of these standards at NARA, telephone: 202-741-6030, or go to www.archives.gov/federal-register/cfr/ibr-locations.html.**

~~[(d) [Reserved.]]~~

~~[(e) [Reserved.]]~~

~~[(f) [Reserved.]]~~

(d)[g]) The following material is available for purchase from the American Conference of Governmental Industrial Hygienists (ACGIH), 1330 Kemper Meadow Drive, Cincinnati, OH 45240; telephone: 513-742-6163; fax: 513-742-3355; e-mail: mail@acgih.org ; Web site: <http://www.acgih.org>

(1) Threshold Limit Values of Airborne Contaminants for 1970, 1970, IBR approved for 1926.55(a) and Appendix A of 1926.55.

(2) [Reserved]

(e)[h]) The following material is available for purchase from the American National Standards Institute (ANSI), 25 West 43rd Street, Fourth Floor, New York, NY 10036; telephone: 212-642-4900; fax: 212-302-1286; e-mail: info@ansi.org ; Web site: <http://www.ansi.org/>

(1) ANSI A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools, IBR approved for 1926.302(e).

(2) ANSI A10.4-1963, Safety Requirements for Workmen's Hoists, IBR approved for 1926.552(c).

(3) ANSI A10.5-1969, Safety Requirements for Material Hoists, IBR approved for 1926.552(b).

(4) ANSI A11.1-1965 (R1970), Practice for Industrial Lighting, IBR approved for 1926.56(b).

(5) ANSI A17.1-1965, Elevators, Dumbwaiters, Escalators, and Moving Walks, IBR approved for 1926.552(d).

(6) ANSI A17.1a-1967, Elevators, Dumbwaiters, Escalators, and Moving Walks Supplement, IBR approved for 1926.552(d).

(7) ANSI A17.1b-1968, Elevators, Dumbwaiters, Escalators, and Moving Walks Supplement, IBR approved for 1926.552(d).

(8) ANSI A17.1c-1969, Elevators, Dumbwaiters, Escalators, and Moving Walks Supplement, IBR approved for 1926.552(d).

(9) ANSI A17.1d-1970, Elevators, Dumbwaiters, Escalators, and Moving Walks Supplement, IBR approved for 1926.552(d).

(10) ANSI A17.2-1960, Practice for the Inspection of Elevators (Inspector's Manual), IBR approved for 1926.552(d).

- (11) ANSI A17.2a-1965, Practice for the Inspection of Elevators (Inspector's Manual) Supplement, IBR approved for 1926.552(d).
- (12) ANSI A17.2b-1967, Practice for the Inspection of Elevators (Inspector's Manual) Supplement, IBR approved for 1926.552(d).
- (13) ANSI A92.2-1969, Vehicle Mounted Elevating and Rotating Work Platforms, IBR approved for 1926.453(a) and 1926.453(b).
- (14) ANSI B7.1-1970, Safety Code for the Use, Care, and Protection of Abrasive Wheels, IBR approved for 1926.57(g), 1926.303(b), 1926.303(c), and 1926.303(d).
- (15) ANSI B20.1-1957, Safety Code for Conveyors, Cableways, and Related Equipment, IBR approved for 1926.555(a).
- (16) ANSI B56.1-1969, Safety Standards for Powered Industrial Trucks, IBR approved for 1926.602(c).
- (17) [~~Reserved.~~]
[~~(18) Reserved.~~]
[~~(19) Reserved.~~]
[~~(20) Reserved.~~]
[~~(21) Reserved.~~]
[~~(22) Reserved.~~]
- (23) ANSI O1.1-1961, Safety Code for Woodworking Machinery, IBR approved for 1926.304(f).
- (24) ANSI Z35.1-1968, Specifications for Accident Prevention Signs; IBR approved for Sec. 1926.200(b), (c), and 1 (i). Copies available for purchase from the IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 1-877-413-5184; Web site: www.global.ihs.com.
- (25) ANSI Z35.2-1968, Specifications for Accident Prevention Tags, IBR approved for 1926.200(i).
- (26) ANSI Z49.1-1967, Safety in Welding and Cutting, IBR approved for 1926.350(j).
- (27) USA Z53.1-1967 (also referred to as ANSI Z53.1-1967), Safety Color Code for Marking Physical Hazards, ANSI approved October 9, 1967; IBR approved for Sec. 1926.200(c). Copies available for purchase from the IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 1-877-413-5184; Web site: www.global.ihs.com.
- (28) ANSI Z535.1-2006 (R2011), Safety Colors, reaffirmed July 19, 2011; IBR approved for § 1926.200(c). Copies available for purchase from the:
- (i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: 212-642-4980; Web site: <http://webstore.ansi.org/>;
- (ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 877-413-5184; Web site: www.global.ihs.com ; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: 877-699-9277; Web site: www.techstreet.com .

(29) ANSI Z535.2-2011, Environmental and Facility Safety Signs, published September 15, 2011; IBR approved for 1926.200(b), (c), and (i). Copies available for purchase from the:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: 212-642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 877-413-5184; Web site: www.global.ihs.com ; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: 877-699-9277; Web site: www.techstreet.com.

(30) ANSI Z535.5-2011, Safety Tags and Barricade Tapes (for Temporary Hazards), published September 15, 2011, including Errata, November 14, 2011; IBR approved for 1926.200(h) and (i). Copies available for purchase from the:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: 212-642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: 877-413-5184; Web site: www.global.ihs.com ; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: 877-699-9277; Web site: www.techstreet.com.

(31) ANSI/ISEA Z87.1–2010, Occupational and Educational Personal Eye and Face Protection Devices, Approved April 3, 2010; IBR approved for 1926.102(b). Copies are available for purchase from:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: (212) 642–4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: (877) 413–5184; Web site: <http://global.ihs.com>; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: (877) 699–9277; Web site: [http:// techstreet.com](http://techstreet.com).

(32) ANSI Z87.1–2003, Occupational and Educational Personal Eye and Face Protection Devices, Approved June 19, 2003; IBR approved for 1926.102(b). Copies available for purchase from the:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: (212) 642–4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: (877) 413–5184; Web site: <http://global.ihs.com>; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: (877) 699-9277; Web site: <http://techstreet.com>.

(33) ANSI Z87.1-1989 (R-1998), Practice for Occupational and Educational Eye and Face Protection, Reaffirmation approved January 4, 1999; IBR approved for 1926.102(b). Copies are available for purchase from:

(i) American National Standards Institute's e-Standards Store, 25 W 43rd Street, 4th Floor, New York, NY 10036; telephone: (212) 642-4980; Web site: <http://webstore.ansi.org/>;

(ii) IHS Standards Store, 15 Inverness Way East, Englewood, CO 80112; telephone: (877) 413-5184; Web site: <http://global.ihs.com/>; or

(iii) TechStreet Store, 3916 Ranchero Dr., Ann Arbor, MI 48108; telephone: (877) 699-9277; Web site: <http://techstreet.com>. ANSI Z87.1-1968, Practice for Occupational and Educational Eye and Face Protection, IBR approved for 1926.102(a).

(34) American National Standards Institute (ANSI) Z89.1-2009, American National Standard for Industrial Head Protection, approved January 26, 2009; IBR approved for Sec. 1926.100(b)(1)(i). Copies of ANSI Z89.1-2009 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetysite.org.

(35) American National Standards Institute (ANSI) Z89.1-2003, American National Standard for Industrial Head Protection; IBR approved for Sec. 1926.100(b)(1)(ii). Copies of ANSI Z89.1-2003 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetysite.org.

(36) American National Standards Institute (ANSI) Z89.1-1997, American National Standard for Personnel Protection--Protective Headwear for Industrial Workers--Requirements; IBR approved for Sec. 1926.100(b)(1)(iii). Copies of ANSI Z89.1-1997 are available for purchase only from the International Safety Equipment Association, 1901 North Moore Street, Arlington, VA 22209-1762; telephone: 703-525-1695; fax: 703-528-2148; Web site: www.safetysite.org.

(f) The following material is available for purchase from standards resellers such as the Document Center Inc., 111 Industrial Road, Suite 9, Belmont, CA 94002; telephone: 650-591-7600; fax: 650-591-7617; e-mail: info@document-center.com; Web site: <http://www.document-center.com/>:

(1) ANSI B15.1-1953 (R1958), Safety Code for Mechanical Power-Transmission Apparatus, revised 1958, IBR approved for 1926.300(b)(2).

(2) ANSI B30.5-1968, Crawler, Locomotive, and Truck Cranes, approved Dec. 16, 1968, IBR approved for 1926.1433(a).

(i) [Reserved.]

(g) The following material is available for purchase from the American Society for Testing and Materials (ASTM), ASTM International, 100 Barr Harbor Drive, PO Box C700, West

Conshohocken, PA, 19428-2959; telephone: 610-832-9585; fax: 610-832-9555; e-mail: service@astm.org ; Web site: <http://www.astm.org/> :

(1) ASTM A370-1968, Methods and Definitions for Mechanical Testing and Steel Products, IBR approved for 1926.1001(f).

(2) [Reserved.]

(3) ASTM D56-1969, Standard Method of Test for Flash Point by the Tag Closed Tester, IBR approved for 1926.155(i).

(4) ASTM D93-1969, Standard Method of Test for Flash Point by the Pensky Martens Closed Tester, IBR approved for 1926.155(i).

(5) ASTM D323-1958 (R1968), Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method), IBR approved for 1926.155(m).

(h)[l]) The following material is available for purchase from the American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016; telephone: 1-800-843-2763; fax: 973-882-1717; e-mail: infocentral@asme.org ; Web site: <http://www.asme.org/> :

(1) ASME B30.2-2005, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist), issued Dec. 30, 2005 ("ASME B30.2-2005"), IBR approved for 1926.1438(b).

(2) ASME B30.5-2004, Mobile and Locomotive Cranes, issued Sept. 27, 2004 ("ASME B30.5-2004"), IBR approved for 1926.1414(b); 1926.1414(e); 1926.1433(b).

(3) ASME B30.7-2001, Base-Mounted Drum Hoists, issued Jan. 21, 2002 ("ASME B30.7-2001"), IBR approved for 1926.1436(e).

(4) ASME B30.14-2004, Side Boom Tractors, issued Sept. 20, 2004 ("ASME B30.14-2004"), IBR approved for 1926.1440(c).

(5) ASME Boiler and Pressure Vessel Code, Section VIII, 1968, IBR approved for 1926.152(i), 1926.306(a), and 1926.603(a).

(6) ASME Power Boilers, Section I, 1968, IBR approved for 1926.603(a).

(i)[k]) The following material is available for purchase from the American Society of Agricultural and Biological Engineers (ASABE), 2950 Niles Road, St. Joseph, MI 49085; telephone: 269.429.0300; fax: 269.429.3852; e-mail: hq@asabe.org ; Web site: <http://www.asabe.org/> :

(1) ASAE R313.1-1971, Soil Cone Penetrometer, reaffirmed 1975, IBR approved for 1926.1002(e).

(2) [Reserved]

(j)[m]) The following material is available for purchase from the American Welding Society (AWS), 550 N.W. LeJeune Road, Miami, Florida 33126; telephone: 1-800-443-9353; Web site: <http://www.aws.org/> :

(1) AWS D1.1/D1.1M:2002, Structural Welding Code – Steel, 18th ed., ANSI approved Aug. 31, 2001 (“AWS D1.1/D1.1M:2002”), IBR approved for 1926.1436(c).

(2) ANSI/AWS D14.3-94, Specification for Welding Earthmoving and Construction Equipment, ANSI approved Jun. 11, 1993 (“ANSI/AWS D14.3-94”), IBR approved for 1926.1436(c).

(~~k~~[~~n~~]) The following material is available for purchase from the British Standards Institution (BSI), 389 Chiswick High Road, London, W4 4AL, United Kingdom; telephone: +44 20 8996 9001; fax: +44 20 8996 7001; e-mail: cservices@bsigroup.com ; Web site: <http://www.bsigroup.com/> :

(1) BS EN 13000:2004, Cranes – Mobile Cranes, published Jan. 4, 2006 (“BS EN 13000:2004”), IBR approved for 1926.1433(c).

(2) BS EN 14439:2006, Cranes – Safety – Tower Cranes, published Jan. 31, 2007 (“BS EN 14439:2006”), IBR approved for 1926.1433(c).

(~~l~~[~~e~~]) The following material is available for purchase from the Bureau of Reclamation, United States Department of the Interior, 1849 C Street NW, Washington DC 20240; telephone: 202-208-4501; Web site: <http://www.usbr.gov/> :

(1) Safety and Health Regulations for Construction, Part II, Sept. 1971, IBR approved for 1926.1000(f).

(2) [Reserved]

(~~m~~[~~p~~]) The following material is available for purchase from the California Department of Industrial Relations, 455 Golden Gate Avenue, San Francisco CA 94102; telephone: (415) 703-5070; e-mail: info@dir.ca.gov ; Web site: <http://www.dir.ca.gov/> :

(1) Construction Safety Orders, IBR approved for 1926.1000(f).

(2) [Reserved]

(~~q~~) [~~Reserved.~~]

(~~r~~) [~~Reserved.~~]

(~~s~~) [~~Reserved.~~]

(~~t~~) [~~Reserved.~~]

(~~n~~[~~u~~]) NOTE: For traffic control, signaling, and barricades in Oregon, OAR 437-003-0420 Traffic Control, applies.~~], which adopted the Millennium Edition of the (FHWA) Manual of Uniform Traffic Control Devices (MUTCD), December 2000. Please see OAR 437-003-0420 in Division 3/G for further information and availability of the MUTCD.~~**The following material is adopted by reference and available from the Federal Highway Administration, United States Department of Transportation, 1200 New Jersey Avenue SE, Washington, DC 20590; telephone: 202-366-4000; website: www.fhwa.dot.gov/:**

(1) Manual on Uniform Traffic Control Devices for Streets and Highways, 2009 Edition, December 2009 (including Revision 1 dated May 2012 and Revision 2 dated May 2012), (“MUTCD”) IBR approved for 1926.200(g) and 1926.201(a).

(2) [Reserved]

(p[✓]) The following material is available for purchase from the General Services Administration (GSA), 1800 F Street, NW, Washington, DC 20405; telephone: (202) 501-0800; Web site: <http://www.gsa.gov/> :

(1) QQ-P-416, Federal Specification Plating Cadmium (Electrodeposited), IBR approved for 1926.104(e).

(2) [Reserved]

(p[w]) The following material is available for purchase from the Institute of Makers of Explosives (IME), 1120 19th Street NW, Suite 310, Washington, DC 20036; telephone: 202-429-9280; fax: 202-429-9280; e-mail: info@ime.org ; Web site: <http://www.ime.org/> :

(1) IME Pub. No. 2, American Table of Distances for Storage of Explosives, Jun. 5, 1964, IBR approved for 1926.914(a).

(2) IME Pub. No. 20, Radio Frequency Energy – A Potential Hazard in the Use of Electric Blasting Caps, Mar. 1968, IBR approved for 1926.900(k).

(g) The following material is available from the International Labour Organization (ILO), 4 route des Morillons, CH-1211 Genève 22, Switzerland; telephone: +41 (0) 22 799 6111; fax: +41 (0) 22 798 8685; website://www.ilo.org/:

(1) Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses, Revised Edition 2011, Occupational safety and health series; 22 (Rev.2011), IBR approved for 1926.1101.

(2) [Reserved]

(r[x]) The following material is available for purchase from the International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland; telephone: +41 22 749 01 11; fax: +41 22 733 34 30; Web site: <http://www.iso.org/>

(1) ISO 3471:2008(E), Earth-moving machinery—Roll-over protective structures—Laboratory tests and performance requirements, Fourth Edition, Aug. 8, 2008 (“ISO 3471:2008”), IBR approved for 1926.1001(c) and 1926.1002(c).

(2) ISO 5700:2013(E), Tractors for agriculture and forestry—Roll-over protective structures—Static test method and acceptance conditions, Fifth Edition, May 1, 2013 (“ISO 5700:2013”), IBR approved for 1926.1002(c).

(3) ISO 27850:2013(E), Tractors for agriculture and forestry—Falling object protective structures—Test procedures and performance requirements, First Edition, May.01, 2013 (“ISO 27850:2013”), IBR approved for 1926.1003(c).

(4[1]) ISO 11660-1:2008(E), Cranes – Access, guards and restraints – Part 1: General, 2d ed., Feb. 15, 2008 (“ISO 11660-1:2008(E)”), IBR approved for 1926.1423(c).

(5[2]) ISO 11660-2:1994(E), Cranes – Access, guards and restraints – Part 2: Mobile cranes, 1994 (“ISO 11660-2:1994(E)”), IBR approved for 1926.1423(c).

(6[3]) ISO 11660-3:2008(E), Cranes – Access, guards and restraints – Part 3: Tower cranes, 2d ed., Feb. 15, 2008 (“ISO 11660-3:2008(E)”), IBR approved for 1926.1423(c).

(s[y]) The following material is available for purchase from the National Fire Protection Association (NFPA), 1 Batterymarch Park, Quincy, MA 02169; telephone: 617-770-3000; fax: 617-770-0700; Web site: <http://www.nfpa.org/> :

(1) NFPA 10A-1970, Maintenance and Use of Portable Fire Extinguishers, IBR approved for 1926.150(c).

(2) NFPA 13-1969, Standard for the Installation of Sprinkler Systems, IBR approved for 1926.152(d).

(3) NFPA 30-1969, The Flammable and Combustible Liquids Code, IBR approved for 1926.152(c).

(4) NFPA 80-1970, Standard for Fire Doors and Windows, Class E or F Openings, IBR approved for 1926.152(b).

(5) NFPA 251-1969, Standard Methods of Fire Test of Building Construction and Material, IBR approved for 1926.152(b) and 1926.155(f).

(6) NFPA 385-1966, Standard for Tank Vehicles for Flammable and Combustible Liquids, IBR approved for 1926.152(g).

[(z) [Reserved.]]

(t[aa]) The following material is available for purchase from the Power Crane and Shovel Association (PCSA), 6737 W. Washington Street, Suite 2400, Milwaukee, WI 53214; telephone: 1-800-369-2310; fax: 414-272-1170; Web site: <http://www.aem.org/CBC/ProdSpec/PCSA/> :

(1) PCSA Std. No. 1, Mobile Crane and Excavator Standards, 1968, IBR approved for 1926.602(b).

(2) PCSA Std. No. 2, Mobile Hydraulic Crane Standards, 1968 (“PCSA Std. No. 2 (1968)”), IBR approved for 1926.602(b)[,] **and** 1926.1433(a)[,] ~~and 1926.1504(a)~~.

(3) PCSA Std. No. 3, Mobile Hydraulic Excavator Standards, 1969, IBR approved for 1926.602(b).

[(bb) [Reserved.]]

[(cc) [Reserved.]]

(~~u[del]~~) The following material is available for purchase from the Society of Automotive Engineers (SAE), 400 Commonwealth Drive, Warrendale, PA 15096; telephone: 1-877-606-7323; fax: 724-776-0790; Web site: <http://www.sae.org/> :

(1) SAE 1970 Handbook, IBR approved for 1926.602(b).

~~[(2) SAE 1971 Handbook, IBR approved for 1926.1001(h).]~~

(~~2~~[3]) SAE J166-1971, Trucks and Wagons, IBR approved for 1926.602(a).

(3) SAE J167, Protective Frame with Overhead Protection-Test Procedures and Performance Requirements, approved July 1970, IBR approved for 1926.1003(b).

(4) SAE J168[~~1970~~], Protective Enclosures – Test Procedures and Performance Requirements, **approved July 1970**, IBR approved for 1926.1002(~~b~~[a]).

(5) SAE J185 (reaf. May 2003), Access Systems for Off-Road Machines, reaffirmed May 2003 ("SAE J185 (May 1993)"), IBR approved for 1926.1423(c).

(6) SAE J236-1971, Self-Propelled Graders, IBR approved for 1926.602(a).

(7) SAE J237-1971, Front End Loaders and Dozers, IBR approved for 126.602(a).

(8) SAE J319b-1971, Self-Propelled Scrapers, IBR approved for 1926.602(a).

(9) SAE J320a~~1974~~, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers, **revised July 1969 (editorial change July 1970)**, IBR approved for 1926.1001(~~b~~[h]).

(10) SAE J321a-1970, Fenders for Pneumatic-Tired Earthmoving Haulage Equipment, IBR approved for 1926.602(a).

(11) SAE J333a-1970, Operator Protection for Agricultural and Light Industrial Tractors, IBR approved for 1926.602(a).

(12) SAE J334a, Protective Frame Test Procedures and Performance Requirements, revised July 1970, IBR approved for 1926.1002(b).

(~~13~~[42]) SAE J386-1969, Seat Belts for Construction Equipment, IBR approved for 1926.602(a).

(~~14~~[43]) SAE J394~~1974~~, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front End Loaders and Rubber-Tired Dozers, **approved July 1969 (editorial change July 1970)**, IBR approved for 1926.1001(~~b~~[h]).

(~~15~~[44]) SAE J395~~1974~~, Minimum Performance Criteria for Roll-Over Protective Structure for Crawler Tractors and Crawler-Type Loaders, **approved July 1969 (editorial change July 1970)**, IBR approved for 1926.1001(~~b~~[h]).

(~~16~~[45]) SAE J396~~1974~~, Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders, **approved July 1969 (editorial change July 1970)**, IBR approved for 1926.1001(~~b~~[h]).

(~~17~~[16]) SAE J397-~~1969~~, Critical Zone Characteristics and Dimensions for Operators of Construction and Industrial Machinery, **approved July 1969 (editorial change July 1970)**, IBR approved for 1926.1001(~~b~~[f]).

[(~~17~~) SAE J743a-1964, Tractor Mounted Side Boom, 1964 ("SAE J743a-1964"), IBR approved for 1926.1501(a).

(~~18~~) SAE J959-1966, Lifting Crane Wire-Rope Strength Factors, 1966 ("SAE J959-1966"), IBR approved for 1926.1501(a)]

(~~18~~[19]) SAE J987 (rev. Jun. 2003), Lattice Boom Cranes – Method of Test, revised Jun. 2003 ("SAE J987 (Jun. 2003)"), IBR approved for 1926.1433(c).

(~~19~~[20]) SAE J1063 (rev. Nov. 1993), Cantilevered Boom Crane Structures – Method of Test, revised Nov. 1993 ("SAE J1063 (Nov. 1993)"), IBR approved for 1926.1433(c).

(~~y~~[ee]) The following material is available for purchase from the United States Army Corps of Engineers, 441 G Street, NW, Washington, DC 20314; telephone: 202-761-0011; e-mail: hq-publicaffairs@usace.army.mil ; Web site: <http://www.usace.army.mil/>

(1) EM-385-1-1, General Safety Requirements, Mar. 1967, IBR approved for 1926.1000(f).

(2) [Reserved]

[(~~ff~~) The following material is available for purchase from standards resellers such as the Document Center Inc., 111 Industrial Road, Suite 9, Belmont, CA 94002; telephone: 650-591-7600; fax: 650-591-7617; e-mail: info@document-center.com ; Web site: <http://www.document-center.com/>

(1) ANSI B15.1-1953 (R1958), Safety Code for Mechanical Power-Transmission Apparatus, revised 1958, IBR approved for 1926.300(b)(2) and 1926.1501(a).

(2) ANSI B30.2-0-1967, Safety Code for Overhead and Gantry Cranes, approved May 4, 1967, IBR approved for 1926.1501(d).

(3) ANSI B30.5-1968, Crawler, Locomotive, and Truck Cranes, approved Dec. 16, 1968, IBR approved for 1926.1433(a), 1926.1501(a), and 1926.1501(b).

(4) ANSI B30.6-1969, Safety Code for Derricks, approved Dec. 18, 1967, IBR approved for 1926.1501(e).]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 1-2011, f. 2/9/11, ef. 2/9/11.
OR-OSHA Admin. Order 7-2012, f. 12/14/12, ef. 12/14/12.
OR-OSHA Admin. Order 7-2013, f. 12/12/13, ef. 12/12/13.
OR-OSHA Admin. Order 3-2015, f. 10/9/15, ef. 10/9/15.
OR-OSHA Admin. Order 3-2016, f. 9/7/16, ef. 9/7/16.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 3/D Occupational Health and Environmental Controls

1926.50

Medical Services and First Aid.

(a) The employer shall insure the availability of medical personnel for advice and consultation on matters of occupational health.

(b) Provisions shall be made prior to commencement of the project for prompt medical attention in case of serious injury.

(c) In the absence of an infirmary, clinic, hospital, or physician, that is reasonably accessible in terms of time and distance to the worksite, which is available for the treatment of injured employees, a person who has a valid certificate in first aid training from the U.S. Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentary evidence, shall be available at the worksite to render first aid.

(d)

(1) First aid supplies shall be easily accessible when required.

(2) The contents of the first aid kit shall be placed in a weatherproof container with individual sealed packages for each type of item, and shall be checked by the employer before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.

(e) Proper equipment for prompt transportation of the injured person to a physician or hospital, or a communication system for contacting necessary ambulance service, shall be provided.

(f)

(1) In areas where 911 emergency dispatch services are [is] not available, the telephone numbers of the physicians, hospitals, or ambulances shall be conspicuously posted.

(2) In areas where 911 emergency dispatch services are available and an employer uses a communication system for contacting necessary emergency-medical service, the employer must:

(i) Ensure that the communication system is effective in contacting the emergency-medical service; and

(ii)

(A) When using a communication system in an area that does not automatically supply the caller's latitude and longitude information to the 911 emergency dispatcher, the employer must post in a conspicuous location at the worksite either:

(1) The latitude and longitude of the worksite; or

(2) Other location-identification information that communicates effectively to employees the location of the worksite.

(B) The requirement specified in paragraph (f)(2)(ii)(A) of this section does not apply to worksites with readily available telephone land lines that have 911 emergency service that automatically identifies the location of the caller.

(g) Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

[44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979, as amended at 49 FR 18295, Apr. 30, 1984, 44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979, as amended at 49 FR 18295, Apr. 30, 1984; 58 FR 35084, June 30, 1993; 61 FR 5507, Feb. 13, 1996; 63 FR 33450, June 18, 1998[; **84 FR 21575, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (temp).
APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89 (perm).
OR-OSHA Admin. Order 4-1999, f. 4/30/99, ef. 4/30/99.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.60
Methylenedianiline.

(a) Scope and application.

(1) This section applies to all construction work as defined in 29 CFR 1910.12(b), in which there is exposure to MDA, including but not limited to the following:

(i) Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain MDA;

(ii) Installation or the finishing of surfaces with products containing MDA;

(iii) MDA spill/emergency cleanup at construction sites; and

(iv) Transportation, disposal, storage, or containment of MDA or products containing MDA on the site or location at which construction activities are performed.

(2) Except as provided in paragraphs (a)(7) and (f)(5) of this section, this section does not apply to the processing, use, and handling of products containing MDA where initial monitoring indicates that the product is not capable of releasing MDA in excess of the action level under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no “dermal exposure to MDA” can occur.

(3) Except as provided in paragraph (a)(7) of this section, this section does not apply to the processing, use, and handling of products containing MDA where objective data are reasonably relied upon which demonstrate the product is not capable of releasing MDA under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no “dermal exposure to MDA” can occur.

(4) Except as provided in paragraph (a)(7) of this section, this section does not apply to the storage, transportation, distribution or sale of MDA in intact containers sealed in such a manner

as to contain the MDA dusts, vapors, or liquids, except for the provisions of 29 CFR 1910.1200 and paragraph (e) of this section.

(5) Except as provided in paragraph (a)(7) of this section, this section does not apply to materials in any form which contain less than 0.1% MDA by weight or volume.

(6) Except as provided in paragraph (a)(7) of this section, this section does not apply to “finished articles containing MDA.”

(7) Where products containing MDA are exempted under paragraphs (a)(2) through (a)(6) of this section, the employer shall maintain records of the initial monitoring results or objective data supporting that exemption and the basis for the employer’s reliance on the data, as provided in the recordkeeping provision of paragraph (o) of this section.

(b) Definitions. For the purpose of this section, the following definitions shall apply:

Action level means a concentration of airborne MDA of 5 ppb as an eight (8)-hour time-weighted average.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (p) of this section, or any other person authorized by the Act or regulations issued under the Act.

Container means any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, commercial packaging or the like, but does not include piping systems.

Decontamination area means an area outside of but as near as practical to the regulated area, consisting of an equipment storage area, wash area, and clean change area, which is used for the decontamination of workers, materials, and equipment contaminated with MDA.

Dermal exposure to MDA occurs where employees are engaged in the handling, application or use of mixtures or materials containing MDA, with any of the following non-airborne forms of MDA:

(i) Liquid, powdered, granular, or flaked mixtures containing MDA in concentrations greater than 0.1% by weight or volume; and

(ii) Materials other than “finished articles” containing MDA in concentrations greater than 0.1% by weight or volume.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which results in an unexpected and potentially hazardous release of MDA.

Employee exposure means exposure to MDA which would occur if the employee were not using respirators or protective work clothing and equipment.

Finished article containing MDA is defined as a manufactured item:

- (i) Which is formed to a specific shape or design during manufacture;
- (ii) Which has end use function(s) dependent in whole or part upon its shape or design during end use; and
- (iii) Where applicable, is an item which is fully cured by virtue of having been subjected to the conditions (temperature, time) necessary to complete the desired chemical reaction.

Historical monitoring data means monitoring data for construction jobs that meet the following conditions:

- (i) The data upon which judgments are based are scientifically sound and were collected using methods that are sufficiently accurate and precise;
- (ii) The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which initial monitoring will not be performed;
- (iii) The characteristics of the MDA-containing material being handled when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed;
- (iv) Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed; and
- (v) Other data relevant to the operations, materials, processing, or employee exposures covered by the exception are substantially similar. The data must be scientifically sound, the characteristics of the MDA-containing material must be similar and the environmental conditions comparable.

4,4' Methyleneedianiline or MDA means the chemical; 4,4'-diaminodiphenyl-methane, Chemical Abstract Service Registry number 101-77-9, in the form of a vapor, liquid, or solid. The definition also includes the salts of MDA.

Regulated Areas means areas where airborne concentrations of MDA exceed or can reasonably be expected to exceed, the permissible exposure limits, or where "dermal exposure to MDA" can occur.

STEL means short term exposure limit as determined by any 15-minute sample period.

(c) Permissible exposure limits. The employer shall assure that no employee is exposed to an airborne concentration of MDA in excess of ten parts per billion (10 ppb) as an 8-hour time-weighted average and a STEL of one hundred parts per billion (100 ppb).

(d) Communication among employers. On multi-employer worksites, an employer performing work involving the application of MDA or materials containing MDA for which establishment of one or more regulated areas is required shall inform other employers on the site of the nature of the employer's work with MDA and of the existence of, and requirements pertaining to, regulated areas.

(e) Emergency situations.

(1) Written plan.

(i) A written plan for emergency situations shall be developed for each construction operation where there is a possibility of an emergency. The plan shall include procedures where the employer identifies emergency escape routes for his employees at each construction site before the construction operation begins. Appropriate portions of the plan shall be implemented in the event of an emergency.

(ii) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped with the appropriate personal protective equipment and clothing as required in paragraphs (i) and (j) of this section until the emergency is abated.

(iii) The plan shall specifically include provisions for alerting and evacuating affected employees as well as the applicable elements prescribed in 29 CFR 1910.38 and 29 CFR 1910.39, "Emergency action plans" and "Fire prevention plans," respectively.

NOTE: In Oregon, use Division 2/E, 437-002-0042, Emergency Action Plans, and 437-002-0043, Fire Prevention Plan.

(2) Alerting employees. Where there is the possibility of employee exposure to MDA due to an emergency, means shall be developed to promptly alert employees who have the potential to be directly exposed. Affected employees not engaged in correcting emergency conditions shall be evacuated immediately in the event that an emergency occurs. Means shall also be developed for alerting other employees who may be exposed as a result of the emergency.

(f) Exposure monitoring.

(1) General.

(i) Determinations of employee exposure shall be made from breathing zone air samples that are representative of each employee's exposure to airborne MDA over an eight (8) hour period. Determination of employee exposure to the STEL shall be made from breathing zone air samples collected over a 15 minute sampling period.

(ii) Representative employee exposure shall be determined on the basis of one or more samples representing full shift exposure for each shift for each job classification in each work area where exposure to MDA may occur.

(iii) Where the employer can document that exposure levels are equivalent for similar operations in different work shifts, the employer shall only be required to determine representative employee exposure for that operation during one shift.

(2) Initial monitoring. Each employer who has a workplace or work operation covered by this standard shall perform initial monitoring to determine accurately the airborne concentrations of MDA to which employees may be exposed unless:

(i) The employer can demonstrate, on the basis of objective data, that the MDA-containing product or material being handled cannot cause exposures above the standard's action level, even under worst-case release conditions; or

(ii) The employer has historical monitoring or other data demonstrating that exposures on a particular job will be below the action level.

(3) Periodic monitoring and monitoring frequency.

(i) If the monitoring required by paragraph (f)(2) of this section reveals employee exposure at or above the action level, but at or below the PELs, the employer shall repeat such monitoring for each such employee at least every six (6) months.

(ii) If the monitoring required by paragraph (f)(2) of this section reveals employee exposure above the PELs, the employer shall repeat such monitoring for each such employee at least every three (3) months.

(iii) Employers who are conducting MDA operations within a regulated area can forego periodic monitoring if the employees are all wearing supplied-air respirators while working in the regulated area.

(iv) The employer may alter the monitoring schedule from every three months to every six months for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to below the PELs but above the action level.

(4) Termination of monitoring.

(i) If the initial monitoring required by paragraph (f)(2) of this section reveals employee exposure to be below the action level, the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (f)(5) of this section.

(ii) If the periodic monitoring required by paragraph (f)(3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (f)(5) of this section.

(5) Additional monitoring. The employer shall institute the exposure monitoring required under paragraphs (f)(2) and (f)(3) of this section when there has been a change in production process, chemicals present, control equipment, personnel, or work practices which may result in new or additional exposures to MDA, or when the employer has any reason to suspect a change which may result in new or additional exposures.

(6) Accuracy of monitoring. Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of MDA.

(7) Employee notification of monitoring results.

(i) The employer must, as soon as possible but no later than 5 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) The written notification required by paragraph (f)(7)(i) of this section shall contain the corrective action being taken by the employer or any other protective measures which have been implemented to reduce the employee exposure to or below the PELs, wherever the PELs are exceeded.

(8) Visual monitoring. The employer shall make routine inspections of employee hands, face and forearms potentially exposed to MDA. Other potential dermal exposures reported by the employee must be referred to the appropriate medical personnel for observation. If the employer determines that the employee has been exposed to MDA the employer shall:

(i) Determine the source of exposure;

(ii) Implement protective measures to correct the hazard; and

(iii) Maintain records of the corrective actions in accordance with paragraph (o) of this section.

(g) Regulated areas.

(1) Establishment.

(i) Airborne exposures. The employer shall establish regulated areas where airborne concentrations of MDA exceed or can reasonably be expected to exceed, the permissible exposure limits.

(ii) Dermal exposures. Where employees are subject to "dermal exposure to MDA" the employer shall establish those work areas as regulated areas.

(2) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in a manner that minimizes the number of persons potentially exposed.

(3) Access. Access to regulated areas shall be limited to authorized persons.

(4) Personal protective equipment and clothing. Each person entering a regulated area shall be supplied with, and required to use, the appropriate personal protective clothing and equipment in accordance with paragraphs (i) and (j) of this section.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

(h) Methods of compliance.

(1) Engineering controls and work practices and respirators.

(i) The employer shall use one or any combination of the following control methods to achieve compliance with the permissible exposure limits prescribed by paragraph (c) of this section:

- (A) Local exhaust ventilation equipped with HEPA filter dust collection systems;
 - (B) General ventilation systems;
 - (C) Use of work practices; or
 - (D) Other engineering controls such as isolation and enclosure that the Assistant Secretary can show to be feasible.
- (ii) Wherever the feasible engineering controls and work practices “which can be instituted are not sufficient to reduce employee exposure to or below the PELs, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protective devices which comply with the requirements of paragraph (i) of this section.
- (2) Special Provisions. For workers engaged in spray application methods, respiratory protection must be used in addition to feasible engineering controls and work practices to reduce employee exposure to or below the PELs.
- (3) Prohibitions. Compressed air shall not be used to remove MDA, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.
- (4) Employee rotation. The employer shall not use employee rotation as a means of compliance with the exposure limits prescribed in paragraph (c) of this section.
- (5) Compliance program.
- (i) The employer shall establish and implement a written program to reduce employee exposure to or below the PELs by means of engineering and work practice controls, as required by paragraph (h)(1) of this section, and by use of respiratory protection where permitted under this section.
- (ii) Upon request this written program shall be furnished for examination and copying to the Assistant Secretary, the Director, affected employees and designated employee representatives. The employer shall review and, as necessary, update such plans at least once every 12 months to make certain they reflect the current status of the program.
- (i) Respiratory protection.
- (1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:
- (i) Periods necessary to install or implement feasible engineering and work-practice controls.
- (ii) Work operations, such as maintenance and repair activities and spray-application processes, for which engineering and work-practice controls are not feasible.

(iii) Work operations for which feasible engineering and work-practice controls are not yet sufficient to reduce employee exposure to or below the PELs.

(iv) Emergencies.

Oregon OSHA repealed 1926.60(i)(2). In Oregon, OAR 437-003-3060 applies.

437-003-3060 Methylenedianiline Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 3/D, 1926.60 Methylenedianiline, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Methylenedianiline rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide HEPA filters for powered and non-powered air-purifying respirators.

(C) For escape, provide employees with one of the following respirator options: Any self-contained breathing apparatus with a full facepiece or hood operated in the positive-pressure or continuous-flow mode; or a full facepiece air-purifying respirator.

(D) Provide a combination HEPA filter and organic vapor canister or cartridge with air-purifying respirators when MDA is in liquid form or used as part of a process requiring heat.

(ii) An employee who cannot use a negative-pressure respirator must be given the option of using a positive-pressure respirator, or a supplied-air respirator operated in the continuous-flow or pressure-demand mode.

(j) Protective work clothing and equipment.

(1) Provision and use. Where employees are subject to dermal exposure to MDA, where liquids containing MDA can be splashed into the eyes, or where airborne concentrations of MDA are in excess of the PEL, the employer shall provide, at no cost to the employee, and ensure that the employee uses, appropriate protective work clothing and equipment which prevent contact with MDA such as, but not limited to:

(i) Aprons, coveralls or other full-body work clothing;

(ii) Gloves, head coverings, and foot coverings; and

(iii) Face shields, chemical goggles; or

(iv) Other appropriate protective equipment which comply with OAR 437-003-0134(8).

(2) Removal and storage.

(i) The employer shall ensure that, at the end of their work shift, employees remove MDA-contaminated protective work clothing and equipment that is not routinely removed throughout the day in change areas provided in accordance with the provisions in paragraph (k) of this section.

(ii) The employer shall ensure that, during their work shift, employees remove all other MDA-contaminated protective work clothing or equipment before leaving a regulated area.

(iii) The employer shall ensure that no employee takes MDA-contaminated work clothing or equipment out of the decontamination areas, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(iv) MDA-contaminated work clothing or equipment shall be placed and stored and transported in sealed, impermeable bags, or other closed impermeable containers.

(v) Containers of MDA-contaminated protective work clothing or equipment which are to be taken out of decontamination areas or the workplace for cleaning, maintenance, or disposal, shall bear labels warning of the hazards of MDA.

(3) Cleaning and replacement.

(i) The employer shall provide the employee with clean protective clothing and equipment. The employer shall ensure that protective work clothing or equipment required by this paragraph is cleaned, laundered, repaired, or replaced at intervals appropriate to maintain its effectiveness.

(ii) The employer shall prohibit the removal of MDA from protective work clothing or equipment by blowing, shaking, or any methods which allow MDA to re-enter the workplace.

(iii) The employer shall ensure that laundering of MDA-contaminated clothing shall be done so as to prevent the release of MDA in the workplace.

(iv) Any employer who gives MDA-contaminated clothing to another person for laundering shall inform such person of the requirement to prevent the release of MDA.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with MDA of the potentially harmful effects of exposure.

(4) Visual Examination.

(i) The employer shall ensure that employees' work clothing is examined periodically for rips or tears that may occur during performance of work.

(ii) When rips or tears are detected, the protective equipment or clothing shall be repaired and replaced immediately.

(k) Hygiene facilities and practices.

(1) General.

(i) The employer shall provide decontamination areas for employees required to work in regulated areas or required by paragraph (j)(1) of this section to wear protective clothing. Exception: In lieu of the decontamination area requirement specified in paragraph (k)(1)(i) of this section, the employer may permit employees engaged in small scale, short duration operations, to clean their protective clothing or dispose of the protective clothing before such employees leave the area where the work was performed.

(ii) Change areas. The employer shall ensure that change areas are equipped with separate storage facilities for protective clothing and street clothing, in accordance with 29 CFR 1910.141(e).

(iii) Equipment area. The equipment area shall be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective clothing and equipment.

(2) Shower area.

(i) Where feasible, shower facilities shall be provided which comply with 29 CFR 1910.141(d)(3) wherever the possibility of employee exposure to airborne levels of MDA in excess of the permissible exposure limit exists.

(ii) Where dermal exposure to MDA occurs, the employer shall ensure that materials spilled or deposited on the skin are removed as soon as possible by methods which do not facilitate the dermal absorption of MDA.

(3) Lunch Areas.

(i) Whenever food or beverages are consumed at the worksite and employees are exposed to MDA the employer shall provide clean lunch areas where MDA levels are below the action level and where no dermal exposure to MDA can occur.

(ii) The employer shall ensure that employees wash their hands and faces with soap and water prior to eating, drinking, smoking, or applying cosmetics.

(iii) The employer shall ensure that employees do not enter lunch facilities with contaminated protective work clothing or equipment.

(l) Communication of hazards to employees.

(1) Hazard communication. The employer shall include Methylenedianiline (MDA) in the program established to comply with the Hazard Communication Standard (HCS) (§ 1910.1200). The employer shall ensure that each employee has access to labels on containers of MDA and safety data sheets, and is trained in accordance with the provisions of HCS and paragraph (l)(3) of this section. The employer shall ensure that at least the following hazards are addressed: Cancer; liver effects; and skin sensitization.

(2) Signs and labels.

(i) Signs.

(A) The employer shall post and maintain legible signs demarcating regulated areas and entrances or access-ways to regulated areas that bear the following legend:

DANGER
MDA
MAY CAUSE CANCER
CAUSES DAMAGE TO THE LIVER
RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING MAY BE REQUIRED
IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(B) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (l)(2)(i)(A) of this section:

DANGER
MDA
MAY CAUSE CANCER
LIVER TOXIN
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING MAY BE REQUIRED TO BE WORN
IN THIS AREA

(ii) Labels.

(A) The employer shall ensure that labels or other appropriate forms of warning are provided for containers of MDA within the workplace. The labels shall comply with the requirements of 1910.1200(f) and shall include at least the following information for pure MDA and mixtures containing MDA:

DANGER
CONTAINS MDA
MAY CAUSE CANCER
CAUSES DAMAGE TO THE LIVER

(B) Prior to June 1, 2015, employers may include the following information workplace labels in lieu of the labeling requirements in paragraph (l)(2)(ii)(A) of this section:

(1) For Pure MDA:

DANGER
CONTAINS MDA
MAY CAUSE CANCER
LIVER TOXIN

(2) For mixtures containing MDA:

DANGER

CONTAINS MDA
CONTAINS MATERIALS WHICH MAY CAUSE CANCER
LIVER TOXIN

(3) Information and training.

(i) The employer shall provide employees with information and training on MDA, in accordance with 29 CFR 1910.1200(h), at the time of initial assignment and at least annually thereafter.

(ii) In addition to the information required under 29 CFR 1910.1200, the employer shall:

(A) Provide an explanation of the contents of this section, including Appendices A and B of this section, and indicate to employees where a copy of the standard is available;

(B) Describe the medical surveillance program required under paragraph (n) of this section, and explain the information contained in Appendix C of this section; and

(C) Describe the medical removal provision required under paragraph (n) of this section.

(4) Access to training materials.

(i) The employer shall make readily available to all affected employees, without cost, all written materials relating to the employee training program, including a copy of this regulation.

(ii) The employer shall provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.

(m) Housekeeping.

(1) All surfaces shall be maintained as free as practicable of visible accumulations of MDA.

(2) The employer shall institute a program for detecting MDA leaks, spills, and discharges, including regular visual inspections of operations involving liquid or solid MDA.

(3) All leaks shall be repaired and liquid or dust spills cleaned up promptly.

(4) Surfaces contaminated with MDA may not be cleaned by the use of compressed air.

(5) Shoveling, dry sweeping, and other methods of dry clean-up of MDA may be used where HEPA filtered vacuuming and/or wet cleaning are not feasible or practical.

(6) Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with MDA shall be collected and disposed of in a manner to prevent the re-entry of MDA into the workplace.

(n) Medical surveillance.

(1) General.

(i) The employer shall make available a medical surveillance program for employees exposed to MDA under the following circumstances:

- (A) Employees exposed at or above the action level for 30 or more days per year;
- (B) Employees who are subject to dermal exposure to MDA for 15 or more days per year;
- (C) Employees who have been exposed in an emergency situation;
- (D) Employees whom the employer, based on results from compliance with paragraph (f)(8) of this section, has reason to believe are being dermally exposed; and
- (E) Employees who show signs or symptoms of MDA exposure.

(ii) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician at a reasonable time and place, and provided without cost to the employee.

(2) Initial examinations.

(i) Within 150 days of the effective date of this standard, or before the time of initial assignment, the employer shall provide each employee covered by paragraph (n)(1)(i) of this section with a medical examination including the following elements:

(A) A detailed history which includes:

- (1) Past work exposure to MDA or any other toxic substances;
- (2) A history of drugs, alcohol, tobacco, and medication routinely taken (duration and quantity); and
- (3) A history of dermatitis, chemical skin sensitization, or previous hepatic disease.

(B) A physical examination which includes all routine physical examination parameters, skin examination, and examination for signs of liver disease.

(C) Laboratory tests including:

- (1) Liver function tests and
- (2) Urinalysis.

(D) Additional tests as necessary in the opinion of the physician.

(ii) No initial medical examination is required if adequate records show that the employee has been examined in accordance with the requirements of this section within the previous six months prior to the effective date of this standard or prior to the date of initial assignment.

(3) Periodic examinations.

(i) The employer shall provide each employee covered by this section with a medical examination at least annually following the initial examination. These periodic examinations shall include at least the following elements:

(A) A brief history regarding any new exposure to potential liver toxins, changes in drug, tobacco, and alcohol intake, and the appearance of physical signs relating to the liver, and the skin;

(B) The appropriate tests and examinations including liver function tests and skin examinations; and

(C) Appropriate additional tests or examinations as deemed necessary by the physician.

(ii) If in the physician's opinion the results of liver function tests indicate an abnormality, the employee shall be removed from further MDA exposure in accordance with paragraph (n)(9) of this section. Repeat liver function tests shall be conducted on advice of the physician.

(4) Emergency examinations. If the employer determines that the employee has been exposed to a potentially hazardous amount of MDA in an emergency situation under paragraph (e) of this section, the employer shall provide medical examinations in accordance with paragraphs (n)(3)(i) and (ii) of this section. If the results of liver function testing indicate an abnormality, the employee shall be removed in accordance with paragraph (n)(9) of this section. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are normal and on the advice of the physician, no additional testing is required.

(5) Additional examinations. Where the employee develops signs and symptoms associated with exposure to MDA, the employer shall provide the employee with an additional medical examination including liver function tests. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are normal and on the advice of the physician, no additional testing is required.

(6) Multiple physician review mechanism.

(i) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under this section, and the employee has signs or symptoms of occupational exposure to MDA (which could include an abnormal liver function test), and the employee disagrees with the opinion of the examining physician, and this opinion could affect the employee's job status, the employee may designate an appropriate and mutually acceptable second physician:

(A) To review any findings, determinations or recommendations of the initial physician; and

(B) To conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(ii) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within fifteen (15) days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

(A) The employee informing the employer that he or she intends to seek a second medical opinion, and

(B) The employee initiating steps to make an appointment with a second physician.

(iii) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(iv) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee through their respective physicians shall designate a third physician:

(A) To review any findings, determinations, or recommendations of the prior physicians; and

(B) To conduct such examinations, consultations, laboratory tests, and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(v) The employer shall act consistent with the findings, determinations, and recommendations of the second physician, unless the employer and the employee reach a mutually acceptable agreement.

(7) Information provided to the examining physician.

(i) The employer shall provide the following information to the examining physician:

(A) A copy of this regulation and its appendices;

(B) A description of the affected employee's duties as they relate to the employee's potential exposure to MDA;

(C) The employee's current actual or representative MDA exposure level;

(D) A description of any personal protective equipment used or to be used; and

(E) Information from previous employment related medical examinations of the affected employee.

(ii) The employer shall provide the foregoing information to a second physician under this section upon request either by the second physician, or by the employee.

(8) Physician's written opinion.

(i) For each examination under this section, the employer shall obtain, and provide the employee with a copy of, the examining physician's written opinion within 15 days of its receipt. The written opinion shall include the following:

(A) The occupationally pertinent results of the medical examination and tests;

(B) The physician's opinion concerning whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of health from exposure to MDA;

(C) The physician's recommended limitations upon the employee's exposure to MDA or upon the employee's use of protective clothing or equipment and respirators; and

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions resulting from MDA exposure which require further explanation or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.

(9) Medical removal.

(i) Temporary medical removal of an employee.

(A) Temporary removal resulting from occupational exposure. The employee shall be removed from work environments in which exposure to MDA is at or above the action level or where dermal exposure to MDA may occur, following an initial examination (paragraph (n)(2) of this section), periodic examinations (paragraph (n)(3) of this section), an emergency situation (paragraph (n)(4) of this section), or an additional examination (paragraph (n)(5) of this section) in the following circumstances:

(1) When the employee exhibits signs and/or symptoms indicative of acute exposure to MDA; or

(2) When the examining physician determines that an employee's abnormal liver function tests are not associated with MDA exposure but that the abnormalities may be exacerbated as a result of occupational exposure to MDA.

(B) Temporary removal due to a final medical determination.

(1) The employer shall remove an employee from work having an exposure to MDA at or above the action level or where the potential for dermal exposure exists on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(2) For the purposes of this section, the phrase "final medical determination" shall mean the outcome of the physician review mechanism used pursuant to the medical surveillance provisions of this section.

(3) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to MDA, the employer shall implement and act consistent with the recommendation.

(ii) Return of the employee to former job status.

(A) The employer shall return an employee to his or her former job status:

(1) When the employee no longer shows signs or symptoms of exposure to MDA, or upon the advice of the physician.

(2) When a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(B) For the purposes of this section, the requirement that an employer return an employee to his or her former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(iii) Removal of other employee special protective measure or limitations. The employer shall remove any limitations placed on an employee or end any special protective measures provided to an employee pursuant to a final medical determination when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(iv) Employer options pending a final medical determination. Where the physician review mechanism used pursuant to the medical surveillance provisions of this section, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(A) Removal. The employer may remove the employee from exposure to MDA, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of the physician who has reviewed the employee's health status.

(B) Return. The employer may return the employee to his or her former job status, and end any special protective measures provided to the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions:

(1) If the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician; or

(2) The employee has been on removal status for the preceding six months as a result of exposure to MDA, then the employer shall await a final medical determination.

(v) Medical removal protection benefits

(A) Provisions of medical removal protection benefits. The employer shall provide to an employee up to six (6) months of medical removal protection benefits on each occasion that an employee is removed from exposure to MDA or otherwise limited pursuant to this section.

(B) Definition of medical removal protection benefits. For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the earnings, seniority, and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to MDA or otherwise limited.

(C) Follow-up medical surveillance during the period of employee removal or limitations. During the period of time that an employee is removed from normal exposure to MDA or otherwise limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this section.

(D) Workers' compensation claims. If a removed employee files a claim for workers' compensation payments for a MDA-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for workers' compensation payments received by the employee for treatment-related expenses.

(E) Other credits. The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from employment with any employer made possible by virtue of the employee's removal.

(F) Employees who do not recover within the 6 months of removal. The employer shall take the following measures with respect to any employee removed from exposure to MDA:

(1) The employer shall make available to the employee a medical examination pursuant to this section to obtain a final medical determination with respect to the employee;

(2) The employer shall assure that the final medical determination obtained indicates whether or not the employee may be returned to his or her former job status, and, if not, what steps should be taken to protect the employee's health;

(3) Where the final medical determination has not yet been obtained, or once obtained indicates that the employee may not yet be returned to his or her former job status, the employer shall continue to provide medical removal protection benefits to the employee until either the employee is returned to former job status, or a final medical determination is made that the employee is incapable of ever safely returning to his or her former job status; and

(4) Where the employer acts pursuant to a final medical determination which permits the return of the employee to his or her former job status despite what would otherwise be an unacceptable liver function test, later questions concerning removing the employee again shall be decided by a final medical determination. The employer need not automatically remove such an employee pursuant to the MDA removal criteria provided by this section.

(vi) Voluntary removal or restriction of an employee. Where an employer, although not required by this section to do so, removes an employee from exposure to MDA or otherwise places limitations on an employee due to the effects of MDA exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by paragraph (n)(9)(v) of this section.

(o) Recordkeeping.

(1) Objective data for exempted operations.

(i) Where the employer has relied on objective data that demonstrate that products made from or containing MDA are not capable of releasing MDA or do not present a dermal exposure problem under the expected conditions of processing, use, or handling to exempt such operations from the initial monitoring requirements under paragraph (f)(2) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) The record shall include at least the following information:

(A) The product qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of MDA;

(D) A description of the operation exempted and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Historical monitoring data.

(i) Where the employer has relied on historical monitoring data that demonstrate that exposures on a particular job will be below the action level to exempt such operations from the initial monitoring requirements under paragraph (f)(2) of this section, the employer shall establish and maintain an accurate record of historical monitoring data reasonably relied upon in support of the exception.

(ii) The record shall include information that reflect the following conditions:

(A) The data upon which judgments are based are scientifically sound and were collected using methods that are sufficiently accurate and precise;

(B) The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which initial monitoring will not be performed;

(C) The characteristics of the MDA-containing material being handled when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed;

(D) Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exception.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such historical monitoring data.

(3) The employer may utilize the services of competent organizations such as industry trade associations and employee associations to maintain the records required by this section.

(4) Exposure measurements.

(i) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to MDA.

(ii) This record shall include at least the following information:

(A) The date of measurement;

(B) The operation involving exposure to MDA;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of protective devices worn, if any; and

(F) Name~~[, social security number,]~~ and exposure of the employees whose exposures are represented.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.1020.

(5) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by paragraph (n) of this section, in accordance with 29 CFR 1910.1020.

(ii) The record shall include at least the following information:

(A) The name ~~[and social security number]~~ of the employee;

(B) A copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests, and physician's recommendations.

(C) Physician's written opinions;

(D) Any employee medical complaints related to exposure to MDA; and

(E) A copy of the information provided to the physician as required by paragraph (n) of this section.

(iii) The employer shall ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.1020.

(iv) A copy of the employee's medical removal and return to work status.

(6) Training records. The employer shall maintain all employee training records for one (1) year beyond the last date of employment.

(7) Availability.

(i) The employer, upon written request, shall make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying.

(ii) The employer, upon request, shall make any exposure records required by paragraphs (f) and (n) of this section available for examination and copying to affected employees, former employees, designated representatives, and the Assistant Secretary, in accordance with 29 CFR 1910.1020(a) through (e) and (g) through (i).

(iii) The employer, upon request, shall make employee medical records required by paragraphs (n) and (o) of this section available for examination and copying to the subject employee, anyone having the specific written consent of the subject employee, and the Assistant Secretary, in accordance with 29 CFR 1910.1020.

(8) Transfer of records. The employer shall comply with the requirements concerning transfer of records set forth in 29 CFR 1910.1020(h).

(p) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees, or their designated representatives, an opportunity to observe the measuring or monitoring of employee exposure to MDA conducted pursuant to paragraph (f) of this section.

(2) Observation procedures. When observation of the measuring or monitoring of employee exposure to MDA requires entry into areas where the use of protective clothing and equipment or respirators is required, the employer shall provide the observer with personal protective clothing and equipment or respirators required to be worn by employees working in the area, assure the use of such clothing and equipment or respirators, and require the observer to comply with all other applicable safety and health procedures.

(q) Appendices. The information contained in Appendices A, B, C and D of this section is not intended, by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

Stat. Auth.: ORS 654.025(2) and 656.726(4)
Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 1-1993, f. 1/22/93, ef. 1/22/93.
OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.

OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.62
Lead.

(a) Scope. This section applies to all construction work where an employee may be occupationally exposed to lead. All construction work excluded from coverage in the general industry standard for lead by 29 CFR 1910.1025(a)(2) is covered by this standard. Construction work is defined as work for construction, alteration and/or repair, including painting and decorating. It includes but is not limited to the following:

- (1) Demolition or salvage of structures where lead or materials containing lead are present;
 - (2) Removal or encapsulation of materials containing lead;
 - (3) New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;
 - (4) Installation of products containing lead;
 - (5) Lead contamination/emergency cleanup;
 - (6) Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed, and
 - (7) Maintenance operations associated with the construction activities described in this paragraph.
- (b) Definitions.

Action level means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 µg/m³) calculated as an 8-hour time-weighted average (TWA).

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Competent person means one who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

Director means the Director, National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Lead means metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.

This section means this standard.

(c) Permissible exposure limit.

(1) The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 µg/m³) averaged over an 8-hour period.

(2) If an employee is exposed to lead for more than 8 hours in any work day the employees' allowable exposure, as a time weighted average (TWA) for that day, shall be reduced according to the following formula:

Allowable employee exposure (in µg/m³) = 400 divided by hours worked in the day.

(3) When respirators are used to limit employee exposure as required under paragraph (c) of this section and all the requirements of paragraphs (e)(1) and (f) of this section have been met, employee exposure may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

(d) Exposure assessment.

(1) General.

(i) Each employer who has a workplace or operation covered by this standard shall initially determine if any employee may be exposed to lead at or above the action level.

(ii) For the purposes of paragraph (d) of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(iii) With the exception of monitoring under paragraph (d)(3), where monitoring is required under this section, the employer shall collect personal samples representative of a full shift including at least one sample for each job classification in each work area either for each shift or for the shift with the highest exposure level.

(iv) Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.

(2) Protection of employees during assessment of exposure.

(i) With respect to the lead related tasks listed in paragraph (d)(2)(i) of this section, where lead is present, until the employer performs an employee exposure assessment as required in paragraph (d) of this section and documents that the employee performing any of the listed tasks is not exposed above the PEL, the employer shall treat the employee as if the employee were exposed above the PEL, and not in excess of ten (10) times the PEL, and shall implement employee protective measures prescribed in paragraph (d)(2)(v) of this section. The tasks covered by this requirement are:

(A) Where lead containing coatings or paint are present: Manual demolition of structures (e.g., dry wall), manual scraping, manual sanding, heat gun applications, and power tool cleaning with dust collection systems;

(B) Spray painting with lead paint.

(ii) In addition, with regard to tasks not listed in paragraph (d)(2)(i), where the employee has any reason to believe that an employee performing the task may be exposed to lead in excess of the PEL, until the employer performs an employee exposure assessment as required by paragraph (d) of this section and documents that the employee's lead exposure is not above the PEL the employer shall treat the employee as if the employee were exposed above the PEL and shall implement employee protective measures as prescribed in paragraph (d)(2)(v) of this section.

(iii) With respect to the tasks listed in paragraph (d)(2)(iii) of this section, where lead is present, until the employer performs an employee exposure assessment as required in paragraph (d) of this section, and documents that the employee performing any of the listed tasks is not exposed in excess of 500 $\mu\text{g}/\text{m}^3$, the employer shall treat the employee as if the employee were exposed to lead in excess of 500 $\mu\text{g}/\text{m}^3$ and shall implement employee protective measures as prescribed in paragraph (d)(2)(v) of this section. Where the employer does establish that the employee is exposed to levels of lead below 500 $\mu\text{g}/\text{m}^3$, the employer may provide the exposed employee with the appropriate respirator prescribed for such use at such lower exposures, in accordance with Table 1 of this section. The tasks covered by this requirement are:

(A) Using lead containing mortar; lead burning

(B) Where lead containing coatings or paint are present: rivet busting; power tool cleaning without dust collection systems; cleanup activities where dry expendable abrasives are used; and abrasive blasting enclosure movement and removal.

(iv) With respect to the tasks listed in paragraph (d)(2)(iv) of this section, where lead is present, until the employer performs an employee exposure assessment as required in paragraph (d) of this section and documents that the employee performing any of the listed tasks is not exposed to lead in excess of 2,500 $\mu\text{g}/\text{m}^3$ (50 x PEL), the employer shall treat the employee as if the employee were exposed to lead in excess of 2,500 $\mu\text{g}/\text{m}^3$ and shall implement employee protective measures as prescribed in paragraph (d)(2)(v) of this section. Where the employer does establish that the employee is exposed to levels of lead below 2,500 $\mu\text{g}/\text{m}^3$, the employer may provide the exposed employee with the appropriate respirator prescribed for use at such lower exposures, in accordance with Table I of this section. Interim protection as described in this paragraph is required where lead containing coatings or paint are present on structures when performing:

(A) Abrasive blasting,

(B) Welding,

(C) Cutting, and

(D) Torch burning.

(v) Until the employer performs an employee exposure assessment as required under paragraph (d) of this section and determines actual employee exposure, the employer shall

provide to employees performing the tasks described in paragraphs (d)(2)(i), (d)(2)(ii), (d)(2)(iii), and (d)(2)(iv) of this section with interim protection as follows:

- (A) Appropriate respiratory protection in accordance with paragraph (f) of this section.
- (B) Appropriate personal protective clothing and equipment in accordance with paragraph (g) of this section.
- (C) Change areas in accordance with paragraph (i)(2) of this section.
- (D) Hand washing facilities in accordance with paragraph (i)(5) of this section.
- (E) Biological monitoring in accordance with paragraph (j)(1)(i) of this section, to consist of blood sampling and analysis for lead and zinc protoporphyrin levels, and
- (F) Training as required under paragraph (l)(1)(i) of this section regarding 29 CFR 1926.59, Hazard Communication; training as required under paragraph (l)(2)(iii) of this section, regarding use of respirators; and training in accordance with 29 CFR 1926.21, Safety training and education.

(3) Basis of initial determination.

(i) Except as provided under paragraphs (d)(3)(iii) and (d)(3)(iv) of this section the employer shall monitor employee exposures and shall base initial determinations on the employee exposure monitoring results and any of the following, relevant considerations:

(A) Any information, observations, or calculations which would indicate employee exposure to lead;

(B) Any previous measurements of airborne lead; and

(C) Any employee complaints of symptoms which may be attributable to exposure to lead.

(ii) Monitoring for the initial determination where performed may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

(iii) Where the employer has previously monitored for lead exposures, and the data were obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraphs (d)(3)(i) and (d)(6) of this section if the sampling and analytical methods meet the accuracy and confidence levels of paragraph (d)(10) of this section.

(iv) Where the employer has objective data, demonstrating that a particular product or material containing lead or a specific process, operation or activity involving lead cannot result in employee exposure to lead at or above the action level during processing, use, or handling, the employer may rely upon such data instead of implementing initial monitoring.

(A) The employer shall establish and maintain an accurate record documenting the nature and relevancy of objective data as specified in paragraph (n)(4) of this section, where used in assessing employee exposure in lieu of exposure monitoring.

(B) Objective data, as described in paragraph (d)(3)(iv) of this section, is not permitted to be used for exposure assessment in connection with paragraph (d)(2) of this section.

(4) Positive initial determination and initial monitoring.

(i) Where a determination conducted under paragraphs (d)(1), (2) and (3) of this section shows the possibility of any employee exposure at or above the action level the employer shall conduct monitoring which is representative of the exposure for each employee in the workplace who is exposed to lead.

(ii) Where the employer has previously monitored for lead exposure, and the data were obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (d)(4)(i) of this section if the sampling and analytical methods meet the accuracy and confidence levels of paragraph (d)(10) of this section.

(5) Negative initial determination. Where a determination, conducted under paragraphs (d)(1), (2), and (3) of this section is made that no employee is exposed to airborne concentrations of lead at or above the action level the employer shall make a written record of such determination. The record shall include at least the information specified in paragraph (d)(3)(i) of this section and shall also include the date of determination, location within the worksite, and the name ~~and social security number~~ of each employee monitored.

(6) Frequency.

(i) If the initial determination reveals employee exposure to be below the action level further exposure determination need not be repeated except as otherwise provided in paragraph (d)(7) of this section.

(ii) If the initial determination or subsequent determination reveals employee exposure to be at or above the action level but at or below the PEL the employer shall perform monitoring in accordance with this paragraph at least every 6 months. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level at which time the employer may discontinue monitoring for that employee except as otherwise provided in paragraph (d)(7) of this section.

(iii) If the initial determination reveals that employee exposure is above the PEL the employer shall perform monitoring quarterly. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are at or below the PEL but at or above the action level at which time the employer shall repeat monitoring for that employee at the frequency specified in paragraph (d)(6)(ii) of this section, except as otherwise provided in paragraph (d)(7) of this section. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level at which time the employer may discontinue monitoring for that employee except as otherwise provided in paragraph (d)(7) of this section.

(7) Additional exposure assessments. Whenever there has been a change of equipment, process, control, personnel or a new task has been initiated that may result in additional employees being exposed to lead at or above the action level or may result in employees already exposed at or above the action level being exposed above the PEL, the employer shall conduct additional monitoring in accordance with this paragraph.

(8) Employee notification.

(i) The employer must, as soon as possible but no later than 5 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Whenever the results indicate that the representative employee exposure, without regard to respirators, is at or above the PEL the employer shall include in the written notice a statement that the employees exposure was at or above that level and a description of the corrective action taken or to be taken to reduce exposure to below that level.

(9) Accuracy of measurement. The employer shall use a method of monitoring and analysis which has an accuracy (to a confidence level of 95%) of not less than plus or minus 25 percent for airborne concentrations of lead equal to or greater than 30 µg/m³.

(e) Methods of compliance.

(1) Engineering and work practice controls. The employer shall implement engineering and work practice controls, including administrative controls, to reduce and maintain employee exposure to lead to or below the permissible exposure limit to the extent that such controls are feasible. Wherever all feasible engineering and work practices controls that can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limit prescribed in paragraph (c) of this section, the employer shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (f) of this section.

(2) Compliance program.

(i) Prior to commencement of the job each employer shall establish and implement a written compliance program to achieve compliance with paragraph (c) of this section.

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each activity in which lead is emitted; e.g., equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices;

(B) A description of the specific means that will be employed to achieve compliance and, where engineering controls are required engineering plans and studies used to determine methods selected for controlling exposure to lead;

(C) A report of the technology considered in meeting the PEL;

(D) Air monitoring data which documents the source of lead emissions;

(E) A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;

(F) A work practice program which includes items required under paragraphs (g), (h) and (i) of this section and incorporates other relevant work practices such as those specified in paragraph (e)(5) of this section;

(G) An administrative control schedule required by paragraph (e)(4) of this section, if applicable;

(H) A description of arrangements made among contractors on multi-contractor sites with respect to informing affected employees of potential exposure to lead and with respect to responsibility for compliance with this section as set-forth in 1926.16.

(I) Other relevant information.

(iii) The compliance program shall provide for frequent and regular inspections of job sites, materials, and equipment to be made by a competent person.

(iv) Written programs shall be submitted upon request to any affected employee or authorized employee representatives, to the Assistant Secretary and the Director, and shall be available at the worksite for examination and copying by the Assistant Secretary and the Director.

(v) Written programs must be revised and updated at least annually to reflect the current status of the program.

(3) Mechanical ventilation. When ventilation is used to control lead exposure, the employer shall evaluate the mechanical performance of the system in controlling exposure as necessary to maintain its effectiveness.

(4) Administrative controls. If administrative controls are used as a means of reducing employees TWA exposure to lead, the employer shall establish and implement a job rotation schedule which includes:

(i) Name or identification number of each affected employee;

(ii) Duration and exposure levels at each job or work station where each affected employee is located; and

(iii) Any other information which may be useful in assessing the reliability of administrative controls to reduce exposure to lead.

(5) The employer shall ensure that, to the extent relevant, employees follow good work practices such as described in Appendix B of this section.

(f) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

- (i) Periods when an employee's exposure to lead exceeds the PEL.
- (ii) Work operations for which engineering and work-practice controls are not sufficient to reduce employee exposures to or below the PEL.
- (iii) Periods when an employee requests a respirator.
- (iv) Periods when respirators are required to provide interim protection of employees while they perform the operations specified in paragraph (d)(2) of this section.

(2) Respirator program.

Oregon OSHA repealed 1926.62(f)(2)(i). In Oregon, OAR 437-003-0062 applies.

437-003-0062 Lead Respiratory Protection Program.

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 3/D, 1926.62 Lead, to use a respirator.)

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Lead rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

(v) If an employee has breathing difficulty during fit testing or respirator use, the employer must provide the employee with a medical examination in accordance with paragraph (j)(3)(i)(B) of this section to determine whether or not the employee can use a respirator while performing the required duty.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide employees with a full facepiece respirator instead of a half mask respirator for protection against lead aerosols that may cause eye or skin irritation at the use concentrations.

(C) Provide HEPA filters for powered and non-powered air-purifying respirators.

(ii) The employer must provide a powered air-purifying respirator when an employee chooses to use such a respirator and it will provide adequate protection to the employee.

(g) Protective work clothing and equipment.

(1) Provision and use. Where an employee is exposed to lead above the PEL without regard to the use of respirators, where employees are exposed to lead compounds which may cause skin

or eye irritation (e.g., lead arsenate, lead azide), and as interim protection for employees performing tasks as specified in paragraph (d)(2) of this section, the employer shall provide at no cost to the employee and assure that the employee uses appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments such as, but not limited to:

- (i) Coveralls or similar full-body work clothing;
- (ii) Gloves, hats, and shoes or disposable shoe coverlets; and
- (iii) Face shields, vented goggles, or other appropriate protective equipment which complies with OAR 437-003-0134(8).

(2) Cleaning and replacement.

- (i) The employer shall provide the protective clothing required in paragraph (g)(1) of this section in a clean and dry condition at least weekly, and daily to employees whose exposure levels without regard to a respirator are over 200 µg/m³ of lead as an 8-hour TWA.
- (ii) The employer shall provide for the cleaning, laundering, and disposal of protective clothing and equipment required by paragraph (g)(1) of this section.
- (iii) The employer shall repair or replace required protective clothing and equipment as needed to maintain their effectiveness.
- (iv) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change areas provided for that purpose as prescribed in paragraph (i)(2) of this section.
- (v) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the change area which prevents dispersion of lead outside the container.
- (vi) The employer shall inform in writing any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to lead.
- (vii)

(A) The employer shall ensure that the containers of contaminated protective clothing and equipment required by paragraph (g)(2)(v) of this section are labeled as follows:

DANGER: CLOTHING AND EQUIPMENT CONTAMINATED WITH LEAD. MAY DAMAGE FERTILITY OR THE UNBORN CHILD. CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM. DO NOT EAT, DRINK OR SMOKE WHEN HANDLING. DO NOT REMOVE DUST BY BLOWING OR SHAKING. DISPOSE OF LEAD CONTAMINATED WASH WATER IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, OR FEDERAL REGULATIONS.

(B) Prior to June 1, 2015, employers may include the following information on bags or containers of contaminated protective clothing and equipment required by paragraph (g)(2)(v) in lieu of the labeling requirements in paragraph (g)(2)(vii)(A) of this section:

Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with applicable local, state, or federal regulations.

(viii) The employer shall prohibit the removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air.

(h) Housekeeping.

(1) All surfaces shall be maintained as free as practicable of accumulations of lead.

(2) Clean-up of floors and other surfaces where lead accumulates shall wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of lead becoming airborne.

(3) Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found not to be effective.

(4) Where vacuuming methods are selected, the vacuums shall be equipped with HEPA filters and used and emptied in a manner which minimizes the reentry of lead into the workplace.

(5) Compressed air shall not be used to remove lead from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the airborne dust created by the compressed air.

(i) Hygiene facilities and practices.

(1) The employer shall assure that in areas where employees are exposed to lead above the PEL without regard to the use of respirators, food or beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied.

(2) Change areas.

(i) The employer shall provide clean change areas for employees whose airborne exposure to lead is above the PEL, and as interim protection for employees performing tasks as specified in paragraph (d)(2) of this section, without regard to the use of respirators.

(ii) The employer shall assure that change areas are equipped with separate storage facilities for protective work clothing and equipment and for street clothes which prevent cross-contamination.

(iii) The employer shall assure that employees do not leave the workplace wearing any protective clothing or equipment that is required to be worn during the work shift.

(3) Showers.

(i) The employer shall provide shower facilities, where feasible, for use by employees whose airborne exposure to lead is above the PEL.

(ii) The employer shall assure, where shower facilities are available, that employees shower at the end of the work shift and shall provide an adequate supply of cleansing agents and towels for use by affected employees.

(4) Eating facilities.

(i) The employer shall provide lunchroom facilities or eating areas for employees whose airborne exposure to lead is above the PEL, without regard to the use of respirators.

(ii) The employer shall assure that lunchroom facilities or eating areas are as free as practicable from lead contamination and are readily accessible to employees.

(iii) The employer shall assure that employees whose airborne exposure to lead is above the PEL, without regard to the use of a respirator, wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

(iv) The employer shall assure that employees do not enter lunchroom facilities or eating areas with protective work clothing or equipment unless surface lead dust has been removed by vacuuming, downdraft booth, or other cleaning method that limits dispersion of lead dust.

(5) Hand washing facilities.

(i) The employer shall provide adequate handwashing facilities for use by employees exposed to lead in accordance with 29 CFR 1926.51(f).

NOTE: Oregon does not have 1926.51(f). Please refer to OAR 437-002-0141(5) Washing Facilities, in Division 2/J.

(ii) Where showers are not provided the employer shall assure that employees wash their hands and face at the end of the workshift.

(j) Medical surveillance.

(1) General.

(i) The employer shall make available initial medical surveillance to employees occupationally exposed on any day to lead at or above the action level. Initial medical surveillance consists of biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels.

(ii) The employer shall institute a medical surveillance program in accordance with paragraphs (j)(2) and (j)(3) of this section for all employees who are or may be exposed by the employer at or above the action level for more than 30 days in any consecutive 12 months;

(iii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician.

(iv) The employer shall make available the required medical surveillance including multiple physician review under paragraph (j)(3)(iii) without cost to employees and at a reasonable time and place.

(2) Biological monitoring.

(i) Blood lead and ZPP level sampling and analysis. The employer shall make available biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels to each employee covered under paragraphs (j)(1)(i) and (ii) of this section on the following schedule:

(A) For each employee covered under paragraph (j)(1)(ii) of this section, at least every 2 months for the first 6 months and every 6 months thereafter;

(B) For each employee covered under paragraphs (j)(1)(i) or (ii) of this section whose last blood sampling and analysis indicated a blood lead level at or above 40 µg/dl, at least every two months. This frequency shall continue until two consecutive blood samples and analyses indicate a blood lead level below 40µg/dl; and

(C) For each employee who is removed from exposure to lead due to an elevated blood lead level at least monthly during the removal period.

(ii) Follow-up blood sampling tests. Whenever the results of a blood lead level test indicate that an employee's blood lead level is at or above the numerical criterion for medical removal under paragraph (k)(1)(i) of this section, the employer shall provide a second (follow-up) blood sampling test within two weeks after the employer receives the results of the first blood sampling test.

(iii) Accuracy of blood lead level sampling and analysis. Blood lead level sampling and analysis provided pursuant to this section shall have an accuracy (to a confidence level of 95 percent) within plus or minus 15 percent or 6 µg/dl, whichever is greater, and shall be conducted by a laboratory approved by OSHA.

(iv) Employee notification.

(A) Within five working days after the receipt of biological monitoring results, the employer shall notify each employee in writing of his or her blood lead level; and

(B) the employer shall notify each employee whose blood lead level is at or above 40 µg/dl that the standard requires temporary medical removal with Medical Removal Protection benefits when an employee's blood lead level is at or above the numerical criterion for medical removal under paragraph (k)(1)(i) of this section.

(3) Medical examinations and consultations.

(i) Frequency. The employer shall make available medical examinations and consultations to each employee covered under paragraph (j)(1)(ii) of this section on the following schedule:

(A) At least annually for each employee for whom a blood sampling test conducted at any time during the preceding 12 months indicated a blood lead level at or above 40 µg/dl;

(B) As soon as possible, upon notification by an employee either that the employee has developed signs or symptoms commonly associated with lead intoxication, that the employee desires medical advice concerning the effects of current or past exposure to lead on the employee's ability to procreate a healthy child, that the employee is pregnant, or that the

employee has demonstrated difficulty in breathing during a respirator fitting test or during use; and

(C) As medically appropriate for each employee either removed from exposure to lead due to a risk of sustaining material impairment to health, or otherwise limited pursuant to a final medical determination.

(ii) Content. The content of medical examinations made available pursuant to paragraph (j)(3)(i)(B)-(C) of this section shall be determined by an examining physician and, if requested by an employee, shall include pregnancy testing or laboratory evaluation of male fertility. Medical examinations made available pursuant to paragraph (j)(3)(i)(A) of this section shall include the following elements:

(A) A detailed work history and a medical history, with particular attention to past lead exposure (occupational and non-occupational), personal habits (smoking, hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and neurological problems;

(B) A thorough physical examination, with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, and neurological systems. Pulmonary status should be evaluated if respiratory protection will be used;

(C) A blood pressure measurement;

(D) A blood sample and analysis which determines:

(1) Blood lead level;

(2) Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology;

(3) Zinc protoporphyrin;

(4) Blood urea nitrogen; and,

(5) Serum creatinine;

(E) A routine urinalysis with microscopic examination; and

(F) Any laboratory or other test relevant to lead exposure which the examining physician deems necessary by sound medical practice.

(iii) Multiple physician review mechanism.

(A) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under this section, the employee may designate a second physician:

(1) To review any findings, determinations or recommendations of the initial physician; and

(2) To conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(B) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within fifteen (15) days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

(1) The employee informing the employer that he or she intends to seek a second medical opinion, and

(2) The employee initiating steps to make an appointment with a second physician.

(C) If the findings, determinations or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(D) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee through their respective physicians shall designate a third physician:

(1) To review any findings, determinations or recommendations of the prior physicians; and

(2) To conduct such examinations, consultations, laboratory tests and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(E) The employer shall act consistent with the findings, determinations and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.

(iv) Information provided to examining and consulting physicians.

(A) The employer shall provide an initial physician conducting a medical examination or consultation under this section with the following information:

(1) A copy of this regulation for lead including all Appendices;

(2) A description of the affected employee's duties as they relate to the employee's exposure;

(3) The employee's exposure level or anticipated exposure level to lead and to any other toxic substance (if applicable);

(4) A description of any personal protective equipment used or to be used;

(5) Prior blood lead determinations; and

(6) All prior written medical opinions concerning the employee in the employer's possession or control.

(B) The employer shall provide the foregoing information to a second or third physician conducting a medical examination or consultation under this section upon request either by the second or third physician, or by the employee.

(v) Written medical opinions.

(A) The employer shall obtain and furnish the employee with a copy of a written medical opinion from each examining or consulting physician which contains only the following information:

(1) The physician's opinion as to whether the employee has any detected medical condition which would place the employee at increased risk of material impairment of the employee's health from exposure to lead;

(2) Any recommended special protective measures to be provided to the employee, or limitations to be placed upon the employee's exposure to lead;

(3) Any recommended limitation upon the employee's use of respirators, including a determination of whether the employee can wear a powered air purifying respirator if a physician determines that the employee cannot wear a negative pressure respirator; and

(4) The results of the blood lead determinations.

(B) The employer shall instruct each examining and consulting physician to:

(1) Not reveal either in the written opinion or orally, or in any other means of communication with the employer, findings, including laboratory results, or diagnoses unrelated to an employee's occupational exposure to lead; and

(2) Advise the employee of any medical condition, occupational or nonoccupational, which dictates further medical examination or treatment.

(vi) Alternate physician determination mechanisms. The employer and an employee or authorized employee representative may agree upon the use of any alternate physician determination mechanism in lieu of the multiple physician review mechanism provided by paragraph (j)(3)(iii) of this section so long as the alternate mechanism is as expeditious and protective as the requirements contained in this paragraph.

(4) Chelation.

(i) The employer shall assure that any person whom he retains, employs, supervises or controls does not engage in prophylactic chelation of any employee at any time.

(ii) If therapeutic or diagnostic chelation is to be performed by any person in paragraph (j)(4)(i) of this section, the employer shall assure that it be done under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring and that the employee is notified in writing prior to its occurrence.

(k) Medical removal protection.

(1) Temporary medical removal and return of an employee.

(i) Temporary removal due to elevated blood lead level. The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to this section indicate that the employee's blood lead level is at or above 50 µg/dl; and,

(ii) Temporary removal due to a final medical determination.

(A) The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

(B) For the purposes of this section, the phrase "final medical determination" means the written medical opinion on the employees' health status by the examining physician or, where relevant, the outcome of the multiple physician review mechanism or alternate medical determination mechanism used pursuant to the medical surveillance provisions of this section.

(C) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to lead, the employer shall implement and act consistent with the recommendation.

(iii) Return of the employee to former job status.

(A) The employer shall return an employee to his or her former job status:

(1) For an employee removed due to a blood lead level at or above 50 µg/dl when two consecutive blood sampling tests indicate that the employee's blood lead level is below 40 µg/dl;

(2) For an employee removed due to a final medical determination, when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

(B) For the purposes of this section, the requirement that an employer return an employee to his or her former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(iv) Removal of other employee special protective measure or limitations. The employer shall remove any limitations placed on an employee or end any special protective measures provided to an employee pursuant to a final medical determination when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(v) Employer options pending a final medical determination. Where the multiple physician review mechanism, or alternate medical determination mechanism used pursuant to the medical surveillance provisions of this section, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(A) Removal. The employer may remove the employee from exposure to lead, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

(B) Return. The employer may return the employee to his or her former job status, end any special protective measures provided to the employee, and remove any limitations placed upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions.

(1) If the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician or;

(2) If the employee has been on removal status for the preceding eighteen months due to an elevated blood lead level, then the employer shall await a final medical determination.

(2) Medical removal protection benefits.

(i) Provision of medical removal protection benefits. The employer shall provide an employee up to eighteen (18) months of medical removal protection benefits on each occasion that an employee is removed from exposure to lead or otherwise limited pursuant to this section.

(ii) Definition of medical removal protection benefits. For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that, as long as the job the employee was removed from continues, the employer shall maintain the total normal earnings, seniority and other employment rights and benefits of an employee, including the employee's right to his or her former job status as though the employee had not been medically removed from the employee's job or otherwise medically limited.

(iii) Follow-up medical surveillance during the period of employee removal or limitation. During the period of time that an employee is medically removed from his or her job or otherwise medically limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this section.

(iv) Workers' compensation claims. If a removed employee files a claim for workers' compensation payments for a lead-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for workers' compensation payments received by the employee for treatment-related expenses.

(v) Other credits. The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from employment with another employer made possible by virtue of the employee's removal.

(vi) Voluntary removal or restriction of an employee. Where an employer, although not required by this section to do so, removes an employee from exposure to lead or otherwise places limitations on an employee due to the effects of lead exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by paragraph (k)(2)(i) and (ii) of this section.

(l) Employee information and training.

(1) General.

(i) Hazard communication. The employer shall include lead in the program established to comply with the Hazard Communication Standard (HCS) (1910.1200). The employer shall ensure that each employee has access to labels on containers of lead and safety data sheets, and is trained in accordance with the provisions of HCS and paragraph (l) of this section. The employer shall ensure that at least the following hazards are addressed:

(A) Reproductive/developmental toxicity;

(B) Central nervous system effects;

(C) Kidney effects;

(D) Blood effects; and

(E) Acute toxicity effects.

(ii) The employer shall train each employee who is subject to exposure to lead at or above the action level on any day, or who is subject to exposure to lead compounds which may cause skin or eye irritation (e.g., lead arsenate, lead azide), in accordance with the requirements of this section. The employer shall institute a training program and ensure employee participation in the program.

(iii) The employer shall provide the training program as initial training prior to the time of job assignment or prior to the start up date for this requirement, whichever comes last.

(iv) The employer shall also provide the training program at least annually for each employee who is subject to lead exposure at or above the action level on any day.

(2) Training program. The employer shall assure that each employee is trained in the following:

(i) The content of this standard and its appendices;

(ii) The specific nature of the operations which could result in exposure to lead above the action level;

(iii) The purpose, proper selection, fitting, use, and limitations of respirators;

(iv) The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive

effects on both males and females and hazards to the fetus and additional precautions for employees who are pregnant);

(v) The engineering controls and work practices associated with the employee's job assignment including training of employees to follow relevant good work practices described in Appendix B of this section;

(vi) The contents of any compliance plan in effect;

(vii) Instructions to employees that chelating agents should not routinely be used to remove lead from their bodies and should not be used at all except under the direction of a licensed physician; and

(viii) The employee's right of access to records under 29 CFR 1910.1020.

(3) Access to information and training materials.

(i) The employer shall make readily available to all affected employees a copy of this standard and its appendices.

(ii) The employer shall provide, upon request, all materials relating to the employee information and training program to affected employees and their designated representatives, and to the Assistant Secretary and the Director.

(m) Signs.

(1) General.

(i) The employer shall post the following warning signs in each work area where an employee's exposure to lead is above the PEL.

DANGER
LEAD WORK AREA
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM
DO NOT EAT, DRINK OR SMOKE IN THIS AREA

(ii) The employer shall ensure that no statement appears on or near any sign required by this paragraph (m) that contradicts or detracts from the meaning of the required sign.

(iii) The employer shall ensure that signs required by this paragraph (m) are illuminated and cleaned as necessary so that the legend is readily visible.

(iv) The employer may use signs required by other statutes, regulations or ordinances in addition to, or in combination with, signs required by this paragraph (m).

(v) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (m)(1)(i) of this section:

WARNING
LEAD WORK AREA

POISON
NO SMOKING OR EATING

(n) Recordkeeping.

(1) Exposure assessment.

(i) The employer shall establish and maintain an accurate record of all monitoring and other data used in conducting employee exposure assessments as required in paragraph (d) of this section.

(ii) Exposure monitoring records shall include:

(A) The date(s), number, duration, location and results of each of the samples taken if any, including a description of the sampling procedure used to determine representative employee exposure where applicable;

(B) A description of the sampling and analytical methods used and evidence of their accuracy;

(C) The type of respiratory protective devices worn, if any;

(D) Name~~[-social security number,]~~ and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent; and

(E) The environmental variables that could affect the measurement of employee exposure.

(iii) The employer shall maintain monitoring and other exposure assessment records in accordance with the provisions of 29 CFR 1910.1020.

(2) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by paragraph (j) of this section.

(ii) This record shall include:

(A) The name~~[-social security number,]~~ and description of the duties of the employee;

(B) A copy of the physician's written opinions;

(C) Results of any airborne exposure monitoring done on or for that employee and provided to the physician; and

(D) Any employee medical complaints related to exposure to lead.

(iii) The employer shall keep, or assure that the examining physician keeps, the following medical records:

(A) A copy of the medical examination results including medical and work history required under paragraph (j) of this section;

(B) A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information;

(C) A copy of the results of biological monitoring.

(iv) The employer shall maintain or assure that the physician maintains medical records in accordance with the provisions of 29 CFR 1910.1020.

(3) Medical removals.

(i) The employer shall establish and maintain an accurate record for each employee removed from current exposure to lead pursuant to paragraph (k) of this section.

(ii) Each record shall include:

(A) The name~~[-and social security number]~~ of the employee;

(B) The date of each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to his or her former job status;

(C) A brief explanation of how each removal was or is being accomplished; and

(D) A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

(iii) The employer shall maintain each medical removal record for at least the duration of an employee's employment.

(4) Objective data for exemption from requirement for initial monitoring.

(i) For purposes of this section, objective data are information demonstrating that a particular product or material containing lead or a specific process, operation, or activity involving lead cannot release dust or fumes in concentrations at or above the action level under any expected conditions of use. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of lead containing products or materials. The data the employer uses from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

(ii) The employer shall maintain the record of the objective data relied upon for at least 30 years.

(5) Availability. The employer shall make available upon request all records required to be maintained by paragraph (n) of this section to affected employees, former employees, and their designated representatives, and to the Assistant Secretary and the Director for examination and copying.

(6) Transfer of records.

(i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by paragraph (n) of this section.

(ii) The employer shall also comply with any additional requirements involving the transfer of records set forth in 29 CFR 1910.1020(h).

(o) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to lead conducted pursuant to paragraph (d) of this section.

(2) Observation procedures.

(i) Whenever observation of the monitoring of employee exposure to lead requires entry into an area where the use of respirators, protective clothing or equipment is required, the employer shall provide the observer with and assure the use of such respirators, clothing and equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring, observers shall be entitled to:

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the monitoring of lead performed at the place of exposure; and

(C) Record the results obtained or receive copies of the results when returned by the laboratory.

(p) Appendices. The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

[58 FR 26627, May 4, 1993, as amended at 58 FR 34218, June 24, 1993; 61 FR 5510, Feb. 13, 1996; 63 FR 1296, Jan. 8, 1998; 70 FR 1143, Jan. 5, 2005; 71 FR 16674, Apr. 3, 2006; 71 FR 50191, Aug. 24, 2006; 73 FR 75588, Dec. 12, 2008; 76 FR 33611, June 8, 2011; 76 FR 80741, Dec. 27, 2011; 77 FR 17890, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 16-1993, f. 11/1/93, ef. 11/1/93 (Lead).
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix B to 1926.62 Employee Standard Summary

This appendix summarizes key provisions of the interim final standard for lead in construction that you as a worker should become familiar with.

I. Permissible Exposure Limit (PEL) – Paragraph (C)

The standard sets a permissible exposure limit (PEL) of 50 micrograms of lead per cubic meter of air ($50 \mu\text{g}/\text{m}^3$), averaged over an 8-hour workday which is referred to as a time-weighted average (TWA). This is the highest level of lead in air to which you may be permissibly exposed over an 8-hour workday. However, since this is an 8-hour average, short exposures above the PEL are permitted so long as for each 8-hour work day your average exposure does not exceed this level. This interim final standard, however, takes into account the fact that your daily exposure to lead can extend beyond a typical 8-hour workday as the result of overtime or other alterations in your work schedule. To deal with this situation, the standard contains a formula which reduces your permissible exposure when you are exposed more than 8 hours. For example, if you are exposed to lead for 10 hours a day, the maximum permitted average exposure would be $40 \mu\text{g}/\text{m}^3$.

II. Exposure Assessment – Paragraph (D)

If lead is present in your workplace in any quantity, your employer is required to make an initial determination of whether any employee's exposure to lead exceeds the action level ($30 \mu\text{g}/\text{m}^3$ averaged over an 8-hour day). Employee exposure is that exposure which would occur if the employee were not using a respirator. This initial determination requires your employer to monitor workers' exposures unless he or she has objective data which can demonstrate conclusively that no employee will be exposed to lead in excess of the action level. Where objective data is used in lieu of actual monitoring the employer must establish and maintain an accurate record, documenting its relevancy in assessing exposure levels for current job conditions. If such objective data is available, the employer need proceed no further on employee exposure assessment until such time that conditions have changed and the determination is no longer valid.

Objective data may be compiled from various sources, e.g., insurance companies and trade associations and information from suppliers or exposure data collected from similar operations. Objective data may also comprise previously-collected sampling data including area monitoring. If it cannot be determined through using objective data that worker exposure is less than the action level, your employer must conduct monitoring or must rely on relevant previous personal sampling, if available. Where monitoring is required for the initial determination, it may be limited to a representative number of employees who are reasonably expected to have the highest exposure levels. If your employer has conducted appropriate air sampling for lead in the past 12 months, he or she may use these results, provided they are applicable to the same employee tasks and exposure conditions and meet the requirements for accuracy as specified in the standard. As with objective data, if such results are relied upon for the initial determination, your employer must establish and maintain a record as to the relevancy of such data to current job conditions.

If there have been any employee complaints of symptoms which may be attributable to exposure to lead or if there is any other information or observations which would indicate employee exposure to lead, this must also be considered as part of the initial determination. If this initial determination shows that a reasonable possibility exists that any employee may be exposed, without regard to respirators, at or over the action level, your employer must set up an

air monitoring program to determine the exposure level representative of each employee exposed to lead at your workplace. In carrying out this air monitoring program, your employer is not required to monitor the exposure of every employee, but he or she must monitor a representative number of employees and job types. Enough sampling must be done to enable each employee's exposure level to be reasonably represent full shift exposure. In addition, these air samples must be taken under conditions which represent each employee's regular, daily exposure to lead. Sampling performed in the past 12 months may be used to determine exposures at or above the action level if such sampling was conducted during work activities essentially similar to present work conditions.

The standard lists certain tasks which may likely result in exposures to lead in excess of the PEL and, in some cases, exposures in excess of 50 times the PEL. If you are performing any of these tasks, your employer must provide you with appropriate respiratory protection, protective clothing and equipment, change areas, hand washing facilities, biological monitoring, and training until such time that an exposure assessment is conducted which demonstrates that your exposure level is below the PEL. If you are exposed to lead and air sampling is performed, your employer is required to notify you in writing within 5 working days of the air monitoring results which represent your exposure. If the results indicate that your exposure exceeds the PEL (without regard to your use of a respirator), then your employer must also notify you of this in writing, and provide you with a description of the corrective action that has been taken or will be taken to reduce your exposure. Your exposure must be rechecked by monitoring, at least every six months if your exposure is at or over the action level but below the PEL. Your employer may discontinue monitoring for you if 2 consecutive measurements, taken at least 7 days apart, are at or below the action level. Air monitoring must be repeated every 3 months if you are exposed over the PEL. Your employer must continue monitoring for you at this frequency until 2 consecutive measurements, taken at least 7 days apart, are at or below the PEL but at or above the action level, at which time your employer must repeat monitoring of your exposure every six months and may discontinue monitoring only after your exposure drops to or below the action level. However, whenever there is a change of equipment, process, control, or personnel or a new type of job is added at your workplace which may result in new or additional exposure to lead, your employer must perform additional monitoring.

III. Methods of Compliance – Paragraph (E)

Your employer is required to assure that no employee is exposed to lead in excess of the PEL as an 8-hour TWA. The interim final standard for lead in construction requires employers to institute engineering and work practice controls including administrative controls to the extent feasible to reduce employee exposure to lead. Where such controls are feasible but not adequate to reduce exposures below the PEL they must be used nonetheless to reduce exposures to the lowest level that can be accomplished by these means and then supplemented with appropriate respiratory protection.

Your employer is required to develop and implement a written compliance program prior to the commencement of any job where employee exposures may reach the PEL as an 8-hour TWA. The interim final standard identifies the various elements that must be included in the plan. For example, employers are required to include a description of operations in which lead is emitted, detailing other relevant information about the operation such as the type of equipment used, the type of material involved, employee job responsibilities, operating procedures and maintenance practices. In addition, your employer's compliance plan must specify the means that will be used to achieve compliance and, where engineering controls are required, include any engineering

plans or studies that have been used to select the control methods. If administrative controls involving job rotation are used to reduce employee exposure to lead, the job rotation schedule must be included in the compliance plan. The plan must also detail the type of protective clothing and equipment, including respirators, housekeeping and hygiene practices that will be used to protect you from the adverse effects of exposure to lead. The written compliance program must be made available, upon request, to affected employees and their designated representatives, the Assistant Secretary and the Director. Finally, the plan must be reviewed and updated at least every 6 months to assure it reflects the current status in exposure control.

IV. Respiratory Protection – Paragraph (F)

Your employer is required to provide and assure your use of respirators when your exposure to lead is not controlled below the PEL by other means. The employer must pay the cost of the respirator. Whenever you request one, your employer is also required to provide you a respirator even if your air exposure level is not above the PEL. You might desire a respirator when, for example, you have received medical advice that your lead absorption should be decreased. Or, you may intend to have children in the near future, and want to reduce the level of lead in your body to minimize adverse reproductive effects. While respirators are the least satisfactory means of controlling your exposure, they are capable of providing significant protection if properly chosen, fitted, worn, cleaned, maintained, and replaced when they stop providing adequate protection.

Your employer is required to select respirators from the types listed in Table I of the Respiratory Protection section of the standard (Sec. 1926.62(f)). Any respirator chosen must be approved by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 42 CFR part 84. This respirator selection table will enable your employer to choose a type of respirator that will give you a proper amount of protection based on your airborne lead exposure. Your employer may select a type of respirator that provides greater protection than that required by the standard; that is, one recommended for a higher concentration of lead than is present in your workplace. For example, a powered air-purifying respirator (PAPR) is much more protective than a typical negative pressure respirator, and may also be more comfortable to wear. A PAPR has a filter, cartridge, or canister to clean the air, and a power source that continuously blows filtered air into your breathing zone. Your employer might make a PAPR available to you to ease the burden of having to wear a respirator for long periods of time. The standard provides that you can obtain a PAPR upon request.

Your employer must also start a Respiratory Protection Program. This program must include written procedures for the proper selection, use, cleaning, storage, and maintenance of respirators. Your employer must ensure that your respirator facepiece fits properly. Proper fit of a respirator facepiece is critical to your protection from airborne lead. Obtaining a proper fit on each employee may require your employer to make available several different types of respirator masks. To ensure that your respirator fits properly and that facepiece leakage is minimal, your employer must give you either a qualitative or quantitative fit test as specified in Appendix A of the Respiratory Protection standard located at 29 CFR 1910.134. You must also receive from your employer proper training in the use of respirators. Your employer is required to teach you how to wear a respirator, to know why it is needed, and to understand its limitations.

The standard provides that if your respirator uses filter elements, you must be given an opportunity to change the filter elements whenever an increase in breathing resistance is

detected. You also must be permitted to periodically leave your work area to wash your face and respirator facepiece whenever necessary to prevent skin irritation. If you ever have difficulty in breathing during a fit test or while using a respirator, your employer must make a medical examination available to you to determine whether you can safely wear a respirator. The result of this examination may be to give you a positive pressure respirator (which reduces breathing resistance) or to provide alternative means of protection.

V. Protective Work Clothing and Equipment – Paragraph (G)

If you are exposed to lead above the PEL as an 8-hour TWA, without regard to your use of a respirator, or if you are exposed to lead compounds such as lead arsenate or lead azide which can cause skin and eye irritation, your employer must provide you with protective work clothing and equipment appropriate for the hazard. If work clothing is provided, it must be provided in a clean and dry condition at least weekly, and daily if your airborne exposure to lead is greater than 200 µg/m³. Appropriate protective work clothing and equipment can include coveralls or similar full-body work clothing, gloves, hats, shoes or disposable shoe coverlets, and face shields or vented goggles. Your employer is required to provide all such equipment at no cost to you. In addition, your employer is responsible for providing repairs and replacement as necessary, and also is responsible for the cleaning, laundering or disposal of protective clothing and equipment.

The interim final standard requires that your employer assure that you follow good work practices when you are working in areas where your exposure to lead may exceed the PEL. With respect to protective clothing and equipment, where appropriate, the following procedures should be observed prior to beginning work:

1. Change into work clothing and shoe covers in the clean section of the designated changing areas;
2. Use work garments of appropriate protective gear, including respirators before entering the work area; and
3. Store any clothing not worn under protective clothing in the designated changing area.

Workers should follow these procedures upon leaving the work area:

1. HEPA vacuum heavily contaminated protective work clothing while it is still being worn. At no time may lead be removed from protective clothing by any means which result in uncontrolled dispersal of lead into the air;
2. Remove shoe covers and leave them in the work area;
3. Remove protective clothing and gear in the dirty area of the designated changing area. Remove protective coveralls by carefully rolling down the garment to reduce exposure to dust.
4. Remove respirators last; and
5. Wash hands and face.

Workers should follow these procedures upon finishing work for the day (in addition to procedures described above):

1. Where applicable, place disposal coveralls and shoe covers with the abatement waste;
2. Contaminated clothing which is to be cleaned, laundered or disposed of must be placed in closed containers in the change room.
3. Clean protective gear, including respirators, according to standard procedures;
4. Wash hands and face again. If showers are available, take a shower and wash hair. If shower facilities are not available at the work site, shower immediately at home and wash hair.

VI. Housekeeping – Paragraph (H)

Your employer must establish a housekeeping program sufficient to maintain all surfaces as free as practicable of accumulations of lead dust. Vacuuming is the preferred method of meeting this requirement, and the use of compressed air to clean floors and other surfaces is generally prohibited unless removal with compressed air is done in conjunction with ventilation systems designed to contain dispersal of the lead dust. Dry or wet sweeping, shoveling, or brushing may not be used except where vacuuming or other equally effective methods have been tried and do not work. Vacuums must be used equipped with a special filter called a high-efficiency particulate air (HEPA) filter and emptied in a manner which minimizes the reentry of lead into the workplace.

VII. Hygiene Facilities and Practices – Paragraph (I)

The standard requires that hand washing facilities be provided where occupational exposure to lead occurs. In addition, change areas, showers (where feasible), and lunchrooms or eating areas are to be made available to workers exposed to lead above the PEL. Your employer must assure that except in these facilities, food and beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, where airborne exposures are above the PEL. Change rooms provided by your employer must be equipped with separate storage facilities for your protective clothing and equipment and street clothes to avoid cross-contamination. After showering, no required protective clothing or equipment worn during the shift may be worn home. It is important that contaminated clothing or equipment be removed in change areas and not be worn home or you will extend your exposure and expose your family since lead from your clothing can accumulate in your house, car, etc. Lunchrooms or eating areas may not be entered with protective clothing or equipment unless surface dust has been removed by vacuuming, downdraft booth, or other cleaning method. Finally, workers exposed above the PEL must wash both their hands and faces prior to eating, drinking, smoking or applying cosmetics.

All of the facilities and hygiene practices just discussed are essential to minimize additional sources of lead absorption from inhalation or ingestion of lead that may accumulate on you, your clothes, or your possessions. Strict compliance with these provisions can virtually eliminate several sources of lead exposure which significantly contribute to excessive lead absorption.

VIII. Medical Surveillance – Paragraph (J)

The medical surveillance program is part of the standard's comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard which is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have effectively protected you as an individual. Compliance with the standard's provision will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers (1) who have high body burdens of lead acquired over past years, (2) who have additional uncontrolled sources of nonoccupational lead exposure, (3) who exhibit unusual variations in lead absorption rates, or (4) who have specific non-work related medical conditions which could be aggravated by lead exposure (e.g., renal disease, anemia). In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those failures. Medical surveillance will also be important to protect your reproductive ability – regardless of whether you are a man or woman.

All medical surveillance required by the interim final standard must be performed by or under the supervision of a licensed physician. The employer must provide required medical surveillance without cost to employees and at a reasonable time and place. The standard's medical surveillance program has two parts – periodic biological monitoring and medical examinations. Your employer's obligation to offer you medical surveillance is triggered by the results of the air monitoring program. Full medical surveillance must be made available to all employees who are or may be exposed to lead in excess of the action level for more than 30 days a year and whose blood lead level exceeds 40 µg/dl. Initial medical surveillance consisting of blood sampling and analysis for lead and zinc protoporphyrin must be provided to all employees exposed at any time (1 day) above the action level.

Biological monitoring under the standard must be provided at least every 2 months for the first 6 months and every 6 months thereafter until your blood lead level is below 40 µg/dl. A zinc protoporphyrin (ZPP) test is a very useful blood test which measures an adverse metabolic effect of lead on your body and is therefore an indicator of lead toxicity.

If your BLL exceeds 40 µg/dl the monitoring frequency must be increased from every 6 months to at least every 2 months and not reduced until two consecutive BLLs indicate a blood lead level below 40 µg/dl. Each time your BLL is determined to be over 40 µg/dl, your employer must notify you of this in writing within five working days of his or her receipt of the test results. The employer must also inform you that the standard requires temporary medical removal with economic protection when your BLL exceeds 50 µg/dl. (See Discussion of Medical Removal Protection – Paragraph (k).) Anytime your BLL exceeds 50 µg/dl your employer must make available to you within two weeks of receipt of these test results a second follow-up BLL test to confirm your BLL. If the two tests both exceed 50 µg/dl, and you are temporarily removed, then your employer must make successive BLL tests available to you on a monthly basis during the period of your removal.

Medical examinations beyond the initial one must be made available on an annual basis if your blood lead level exceeds 40 µg/dl at any time during the preceding year and you are being exposed above the airborne action level of 30 µg/m³ for 30 or more days per year. The initial examination will provide information to establish a baseline to which subsequent data can be compared. An initial medical examination to consist of blood sampling and analysis for lead and zinc protoporphyrin must also be made available (prior to assignment) for each employee being assigned for the first time to an area where the airborne concentration of lead equals or exceeds

the action level at any time. In addition, a medical examination or consultation must be made available as soon as possible if you notify your employer that you are experiencing signs or symptoms commonly associated with lead poisoning or that you have difficulty breathing while wearing a respirator or during a respirator fit test.

You must also be provided a medical examination or consultation if you notify your employer that you desire medical advice concerning the effects of current or past exposure to lead on your ability to procreate a healthy child.

Finally, appropriate follow-up medical examinations or consultations may also be provided for employees who have been temporarily removed from exposure under the medical removal protection provisions of the standard. (See Part IX, below.) The standard specifies the minimum content of pre-assignment and annual medical examinations. The content of other types of medical examinations and consultations is left up to the sound discretion of the examining physician. Pre-assignment and annual medical examinations must include (1) a detailed work history and medical history; (2) a thorough physical examination, including an evaluation of your pulmonary status if you will be required to use a respirator; (3) a blood pressure measurement; and (4) a series of laboratory tests designed to check your blood chemistry and your kidney function. In addition, at any time upon your request, a laboratory evaluation of male fertility will be made (microscopic examination of a sperm sample), or a pregnancy test will be given.

The standard does not require that you participate in any of the medical procedures, tests, etc., which your employer is required to make available to you. Medical surveillance can, however, play a very important role in protecting your health. You are strongly encouraged, therefore, to participate in a meaningful fashion. The standard contains a multiple physician review mechanism which will give you a chance to have a physician of your choice directly participate in the medical surveillance program. If you are dissatisfied with an examination by a physician chosen by your employer, you can select a second physician to conduct an independent analysis. The two doctors would attempt to resolve any differences of opinion, and select a third physician to resolve any firm dispute. Generally your employer will choose the physician who conducts medical surveillance under the lead standard – unless you and your employer can agree on the choice of a physician or physicians. Some companies and unions have agreed in advance, for example, to use certain independent medical laboratories or panels of physicians. Any of these arrangements are acceptable so long as required medical surveillance is made available to workers.

The standard requires your employer to provide certain information to a physician to aid in his or her examination of you. This information includes (1) the standard and its appendices, (2) a description of your duties as they relate to occupational lead exposure, (3) your exposure level or anticipated exposure level, (4) a description of any personal protective equipment you wear, (5) prior blood lead level results, and (6) prior written medical opinions concerning you that the employer has. After a medical examination or consultation the physician must prepare a written report which must contain (1) the physician's opinion as to whether you have any medical condition which places you at increased risk of material impairment to health from exposure to lead, (2) any recommended special protective measures to be provided to you, (3) any blood lead level determinations, and (4) any recommended limitation on your use of respirators. This last element must include a determination of whether you can wear a powered air purifying respirator (PAPR) if you are found unable to wear a negative pressure respirator.

The medical surveillance program of the interim lead standard may at some point in time serve to notify certain workers that they have acquired a disease or other adverse medical condition

as a result of occupational lead exposure. If this is true, these workers might have legal rights to compensation from public agencies, their employers, firms that supply hazardous products to their employers, or other persons. Some states have laws, including worker compensation laws, that disallow a worker who learns of a job-related health impairment to sue, unless the worker sues within a short period of time after learning of the impairment. (This period of time may be a matter of months or years.) An attorney can be consulted about these possibilities. It should be stressed that OSHA is in no way trying to either encourage or discourage claims or lawsuits. However, since results of the standard's medical surveillance program can significantly affect the legal remedies of a worker who has acquired a job-related disease or impairment, it is proper for OSHA to make you aware of this.

The medical surveillance section of the standard also contains provisions dealing with chelation. Chelation is the use of certain drugs (administered in pill form or injected into the body) to reduce the amount of lead absorbed in body tissues. Experience accumulated by the medical and scientific communities has largely confirmed the effectiveness of this type of therapy for the treatment of very severe lead poisoning. On the other hand, it has also been established that there can be a long list of extremely harmful side effects associated with the use of chelating agents. The medical community has balanced the advantages and disadvantages resulting from the use of chelating agents in various circumstances and has established when the use of these agents is acceptable. The standard includes these accepted limitations due to a history of abuse of chelation therapy by some lead companies. The most widely used chelating agents are calcium disodium EDTA, (Ca Na₂ EDTA), Calcium Disodium Versenate (Versenate), and d-penicillamine (pencillamine or Cupramine).

The standard prohibits "prophylactic chelation" of any employee by any person the employer retains, supervises or controls. "Prophylactic chelation" is the routine use of chelating or similarly acting drugs to prevent elevated blood levels in workers who are occupationally exposed to lead, or the use of these drugs to routinely lower blood lead levels to predesignated concentrations believed to be "safe". It should be emphasized that where an employer takes a worker who has no symptoms of lead poisoning and has chelation carried out by a physician (either inside or outside of a hospital) solely to reduce the worker's blood lead level, that will generally be considered prophylactic chelation. The use of a hospital and a physician does not mean that prophylactic chelation is not being performed. Routine chelation to prevent increased or reduce current blood lead levels is unacceptable whatever the setting.

The standard allows the use of "therapeutic" or "diagnostic" chelation if administered under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Therapeutic chelation responds to severe lead poisoning where there are marked symptoms. Diagnostic chelation involved giving a patient a dose of the drug then collecting all urine excreted for some period of time as an aid to the diagnosis of lead poisoning.

In cases where the examining physician determines that chelation is appropriate, you must be notified in writing of this fact before such treatment. This will inform you of a potentially harmful treatment, and allow you to obtain a second opinion.

IX. Medical Removal Protection – Paragraph (K)

Excessive lead absorption subjects you to increased risk of disease. Medical removal protection (MRP) is a means of protecting you when, for whatever reasons, other methods, such as engineering controls, work practices, and respirators, have failed to provide the protection you

need. MRP involves the temporary removal of a worker from his or her regular job to a place of significantly lower exposure without any loss of earnings, seniority, or other employment rights or benefits. The purpose of this program is to cease further lead absorption and allow your body to naturally excrete lead which has previously been absorbed. Temporary medical removal can result from an elevated blood lead level, or a medical opinion. For up to 18 months, or for as long as the job the employee was removed from lasts, protection is provided as a result of either form of removal. The vast majority of removed workers, however, will return to their former jobs long before this eighteen month period expires.

You may also be removed from exposure even if your blood lead level is below 50 µg/dl if a final medical determination indicates that you temporarily need reduced lead exposure for medical reasons. If the physician who is implementing your employers medical program makes a final written opinion recommending your removal or other special protective measures, your employer must implement the physician's recommendation. If you are removed in this manner, you may only be returned when the doctor indicates that it is safe for you to do so. The standard does not give specific instructions dealing with what an employer must do with a removed worker. Your job assignment upon removal is a matter for you, your employer and your union (if any) to work out consistent with existing procedures for job assignments. Each removal must be accomplished in a manner consistent with existing collective bargaining relationships. Your employer is given broad discretion to implement temporary removals so long as no attempt is made to override existing agreements. Similarly, a removed worker is provided no right to veto an employer's choice which satisfies the standard.

In most cases, employers will likely transfer removed employees to other jobs with sufficiently low lead exposure. Alternatively, a worker's hours may be reduced so that the time weighted average exposure is reduced, or he or she may be temporarily laid off if no other alternative is feasible.

In all of these situation, MRP benefits must be provided during the period of removal – i.e., you continue to receive the same earnings, seniority, and other rights and benefits you would have had if you had not been removed. Earnings includes more than just your base wage; it includes overtime, shift differentials, incentives, and other compensation you would have earned if you had not been removed. During the period of removal you must also be provided with appropriate follow-up medical surveillance. If you were removed because your blood lead level was too high, you must be provided with a monthly blood test. If a medical opinion caused your removal, you must be provided medical tests or examinations that the doctor believes to be appropriate. If you do not participate in this follow up medical surveillance, you may lose your eligibility for MRP benefits.

When you are medically eligible to return to your former job, your employer must return you to your "former job status." This means that you are entitled to the position, wages, benefits, etc., you would have had if you had not been removed. If you would still be in your old job if no removal had occurred that is where you go back. If not, you are returned consistent with whatever job assignment discretion your employer would have had if no removal had occurred. MRP only seeks to maintain your rights, not expand them or diminish them.

If you are removed under MRP and you are also eligible for worker compensation or other compensation for lost wages, your employer's MRP benefits obligation is reduced by the amount that you actually receive from these other sources. This is also true if you obtain other employment during the time you are laid off with MRP benefits. The standard also covers situations where an employer voluntarily removes a worker from exposure to lead due to the

effects of lead on the employee's medical condition, even though the standard does not require removal. In these situations MRP benefits must still be provided as though the standard required removal. Finally, it is important to note that in all cases where removal is required, respirators cannot be used as a substitute. Respirators may be used before removal becomes necessary, but not as an alternative to a transfer to a low exposure job, or to a lay-off with MRP benefits.

X. Employee Information and Training – Paragraph (L)

Your employer is required to provide an information and training program for all employees exposed to lead above the action level or who may suffer skin or eye irritation from lead compounds such as lead arsenate or lead azide. The program must train these employees regarding the specific hazards associated with their work environment, protective measures which can be taken, including the contents of any compliance plan in effect, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. All employees must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level.

This training program must also be provided at least annually thereafter unless further exposure above the action level will not occur.

XI. Signs – Paragraph (M)

The standard requires that the following warning sign be posted in work areas when the exposure to lead is above the PEL:

DANGER
LEAD WORK AREA
MAY DAMAGE FERTILITY OR THE UNBORN CHILD
CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM
DO NOT EAT, DRINK OR SMOKE IN THIS AREA

Prior to June 1, 2016, employers may use the following legend in lieu of that specified above:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

XII. Recordkeeping – Paragraph (N)

Your employer is required to keep all records of exposure monitoring for airborne lead. These records must include the name and job classification of employees measured, details of the sampling and analytical techniques, the results of this sampling, and the type of respiratory protection being worn by the person sampled. Such records are to be retained for at least 30 years. Your employer is also required to keep all records of biological monitoring and medical examination results. These records must include the names of the employees, the physician's written opinion, and a copy of the results of the examination. Medical records must be preserved

and maintained for the duration of employment plus 30 years. However, if the employee's duration of employment is less than one year, the employer need not retain that employee's medical records beyond the period of employment if they are provided to the employee upon termination of employment.

Recordkeeping is also required if you are temporarily removed from your job under the medical removal protection program. This record must include your name~~[-and social security number]~~, the date of your removal and return, how the removal was or is being accomplished, and whether or not the reason for the removal was an elevated blood lead level. Your employer is required to keep each medical removal record only for as long as the duration of an employee's employment.

The standard requires that if you request to see or copy environmental monitoring, blood lead level monitoring, or medical removal records, they must be made available to you or to a representative that you authorize. Your union also has access to these records.

Medical records other than BLL's must also be provided upon request to you, to your physician or to any other person whom you may specifically designate. Your union does not have access to your personal medical records unless you authorize their access.

XIII. Observation of Monitoring – Paragraph (O)

When air monitoring for lead is performed at your workplace as required by this standard, your employer must allow you or someone you designate to act as an observer of the monitoring. Observers are entitled to an explanation of the measurement procedure, and to record the results obtained. Since results will not normally be available at the time of the monitoring, observers are entitled to record or receive the results of the monitoring when returned by the laboratory. Your employer is required to provide the observer with any personal protective devices required to be worn by employees working in the area that is being monitored. The employer must require the observer to wear all such equipment and to comply with all other applicable safety and health procedures.

XIV. For Additional Information

A. A copy of the interim standard for lead in construction can be obtained free of charge by calling or writing the OSHA Office of Publications, room N-3101, United States Department of Labor, Washington, DC 20210: Telephone (202) 219-4667.

B. Additional information about the standard, its enforcement, and your employer's compliance can be obtained from the nearest OSHA Area Office listed in your telephone directory under United States Government/Department of Labor.

Stat. Auth.: ORS 654.025(2) and ORS 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 16-1993, f. 11/1/93, ef. 11/1/93 (Lead).
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, er. 7/24/06.
OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.

OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.64 Process Safety Management of Highly Hazardous Chemicals

Note: Division 2/H, 1910.119, Process Safety Management of Highly Hazardous Chemicals applies to Construction.

1926.65 Hazardous Waste Operations and Emergency Response.

Note: Division 2/H, 1910.120, Hazardous Waste Operations and Emergency Response applies to Construction.

Division 3/G, Signs, Signals, and Barricades

1926.200

Accident Prevention Signs and Tags.

(a) General. Signs and symbols required by this subpart shall be visible at all times when work is being performed, and shall be removed or covered promptly when the hazards no longer exist.

(b) Danger signs.

(1) Danger signs shall be used only where an immediate hazard exists, and shall follow the specifications illustrated in Figure 1 of ANSI Z35.1-1968 or in Figures 1 to 13 of ANSI Z535.2-2011, incorporated by reference in 1926.6.



Figure G-1

(2) Danger signs shall have red as the predominating color for the upper panel; black outline on the borders; and a white lower panel for additional sign wording.

(c) Caution signs.

(1) Caution signs shall be used only to warn against potential hazards or to caution against unsafe practices, and shall follow the specifications illustrated in Figure 4 of ANSI Z35.1-1968 or in Figures 1 to 13 of ANSI Z535.2-2011, incorporated by reference in 1926.6.



Figure G-2

(2) Caution signs shall have yellow as the predominating color; black upper panel and borders: yellow lettering of “caution” on the black panel; and the lower yellow panel for additional sign wording. Black lettering shall be used for additional wording.

(3) The standard color of the background shall be yellow; and the panel, black with yellow letters. Any letters used against the yellow background shall be black. The colors shall be those of opaque glossy samples as specified in Table 1 of ANSI Z53.1-1967 or in Table 1 of ANSI Z535.1-2006(R2011), incorporated by reference in 1926.6.

(d) Exit signs. Exit signs, when required, shall be lettered in legible red letters, not less than 6 inches high, on a white field and the principal stroke of the letters shall be at least three-fourths inch in width.

(e) Safety instruction signs. Safety instruction signs, when used, shall be white with green upper panel with white letters to convey the principal message. Any additional wording on the sign shall be black letters on the white background.

(f) Directional signs. Directional signs, other than automotive traffic signs specified in paragraph (g) of this section, shall be white with a black panel and a white directional symbol. Any additional wording on the sign shall be black letters on the white background.

(g) Traffic **control** signs **and devices**.

(1) **At points of hazards, c**[C]onstruction areas shall be posted with legible traffic **control** signs **and protected by traffic control devices**[at points of hazard].

Note: [~~§1926.200(g)(2) was not adopted by the Department.~~] In Oregon, 437-003-0420 applies **instead of 1926.200(g)(2), 1926.201, 1926.202, and 1926.203.** [-]

(h) Accident prevention tags.

(1) Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc. They shall not be used in place of, or as a substitute for, accident prevention signs.

(2) For accident prevention tags, employers shall follow specifications that are similar to those in Figures 1 to 4 of ANSI Z35.2-1968 or Figures 1 to 8 of ANSI Z535.5-2011, incorporated by reference in 1926.6.

(i) Additional rules. ANSI Z35.1-1968, ANSI Z535.2-2011, ANSI Z35.2-1968, and ANSI Z535.5-2011, incorporated by reference in 1926.6, contain rules in addition to those specifically

prescribed in this subpart. The employer shall comply with ANSI Z35.1-1968 or ANSI Z535.2-2011, and ANSI Z35.2-1968 or Z535.5-2011, with respect to such additional rules.

[44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979, as amended at 58 FR 35173, June 30, 1993; 67 FR 57736, Sept. 12, 2002; 69 FR 18803, Apr. 9, 2004; 78 FR 35567, June 13, 2013; 78 FR 66642, Nov. 6, 2013; **84 FR 21416, May 14, 2019**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.
OR-OSHA Admin. Order 3-2000, f. 2/8/00, ef. 2/8/00.
OR-OSHA Admin. Order 7-2013, f. 12/12/13, ef. 12/12/13.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

[Note: §§1926.201 and 1926.202 were repealed by Oregon OSHA. In Oregon, 437-003-0420 applies.]

437-003-0420
Traffic Control.

NOTE: 1926.201, 1926.202, and 1926.203 were repealed by Oregon OSHA. In Oregon, 437-003-0420 applies.

(1) Adequate and appropriate traffic control[s] **devices, including signs, signals, markings, and other devices** must be provided **and used for the protection of workers** for all operations on or adjacent to a highway, street, or roadway. The traffic controls **devices' design and use** must conform to the [Millennium Edition of the (FHWA)-]Manual of Uniform Traffic Control Devices (MUTCD), **incorporated by reference in 1926.6**[December 2000].

(2) Signaling by flaggers and the use of flaggers, including warning garments worn by flaggers, must conform to the [Millennium Edition of the (FHWA)-]Manual of Uniform Traffic Control Devices (MUTCD), **incorporated by reference in 1926.6**[December 2000].

(3) **The design and use of b[B]arricades for the** protection of employees must conform to the [Millennium Edition of the (FHWA)-]Manual of Uniform Traffic Control Devices (MUTCD), **incorporated by reference in 1926.6**[December 2000].

Note: **The MUTCD is available electronically at mutcd.fhwa.dot.gov, or printed copies are available to purchase from The American Traffic Safety Services Association, 1-800-231-3475, www.atssa.com; the Institute of Transportation Engineers, 202-785-0060, www.ite.org; or the American Association of State Highway and Transportation Officials, 1-800-231-3475, store.transportation.org.** [You may obtain a copy of the Millennium Edition from the following organizations: American Traffic Safety Services Association, 15 Riverside Parkway, Suite 100, Fredericksburg, VA 22406-1022; Telephone: 1-800-231-3475; Fax: (540) 368-1722; www.atssa.com; Institute of Transportation Engineers, 1099 14th Street, NW., Suite 300 West, Washington, DC 20005-3438; Fax: (202) 289-7722; www.ite.org; and American Association of State Highway and Transportation Officials; www.aashto.org; Telephone: 1-800-525-5562.]

[NOTE: Electronic copies of the MUTCD 2000 are available for downloading at <http://muted.fhwa.dot.gov/kno-millennium->]

Note: A copy of the MUTCD [2000] is available **to read in** [for inspection at] the Oregon OSHA Resource Center, 350 Winter Street NE, [Basement – Room 26,] Salem, Oregon 97301 [-3882; Telephone: (503) 378-3272, or toll free in Oregon 1-800-922-2689].

Note: Employers who [are] follow[ing] the most current edition of the Oregon Department of Transportation's [Temporary\[Short-Term\] Traffic Control Handbook](#) **are** [will be] considered to be in compliance with this requirement.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.

OR-OSHA Admin. Order 2-1989, f. 10/17/89, ef. 10/17/89.

OR-OSHA Admin. Order 2-2003, f. 1/30/03, ef. 1/30/03.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

NOTE: 1926.201 and 1926.202 were previously repealed by Oregon OSHA. In Oregon, 437-003-0420 applies, instead.

1926.203 **Repealed** [Definitions Applicable to this Subdivision.]

["Barricade" means an obstruction to deter the passage of persons or vehicles.

"Signs" are the warnings of hazard, temporarily or permanently affixed or placed, at locations where hazards exist.

"Signals" are moving signs, provided by workers, such as flaggers, or by devices, such as flashing lights, to warn of possible or existing hazards.

"Tags" are temporary signs, usually attached to a piece of equipment or part of a structure, to warn of existing or immediate hazards.]

[44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979, as amended at 67 FR 57736, Sept. 12, 2002]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.

OR-OSHA Admin. Order 2-2003, f. 1/30/03, ef. 1/30/03.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 3/H, Materials Handling, Storage, Use and Disposal

1926.250

General Requirements for Storage.

(a) General.

(1) All materials stored in tiers shall be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling or collapse.

(2)

(i) The weight of stored material on ~~[Maximum safe load limits of]~~ floors within buildings and structures, in pounds per square foot, shall ~~be conspicuously posted in all storage areas, except for floor or slab on grade. Maximum safe loads shall~~ **not** ~~be~~ exceed~~ed~~ **maximum safe load limits.**

(ii) Employers shall conspicuously post maximum safe load limits of floors within buildings and structures, in pounds per square foot, in all storage areas, except when the storage area is on a floor or slab on grade. Posting is not required for storage areas in all single-family residential structures and wood-framed multi-family residential structures.

(3) Aisles and passageways shall be kept clear to provide for the free and safe movement of material handling equipment or employees. Such areas shall be kept in good repair.

(4) When a difference in road or working levels exist, means such as ramps, blocking, or grading shall be used to ensure the safe movement of vehicles between the two levels.

(b) Material storage.

(1) Material stored inside buildings under construction shall not be placed within 6 feet of any hoistway or inside floor openings, nor within 10 feet of an exterior wall which does not extend above the top of the material stored.

(2) Each employee required to work on stored material in silos, hoppers, tanks, and similar storage areas shall be equipped with personal fall arrest equipment meeting the requirements of Subpart M of this part.

(3) Noncompatible materials shall be segregated in storage.

(4) Bagged materials shall be stacked by stepping back the layers and cross-keying the bags at least every 10 bags high.

(5) Materials shall not be stored on scaffolds or runways in excess of supplies needed for immediate operations.

(6) Brick stacks shall not be more than 7 feet in height. When a loose brick stack reaches a height of 4 feet, it shall be tapered back 2 inches in every foot of height above the 4-foot level.

(7) When masonry blocks are stacked higher than 6 feet, the stack shall be tapered back one-half block per tier above the 6-foot level.

(8) Lumber:

(i) Used lumber shall have all nails withdrawn before stacking.

(ii) Lumber shall be stacked on level and solidly supported sills.

(iii) Lumber shall be so stacked as to be stable and self-supporting.

(iv) Lumber piles shall not exceed 20 feet in height provided that lumber to be handled manually shall not be stacked more than 16 feet high.

(9) Structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, shall be stacked and blocked so as to prevent spreading or tilting.

(c) Housekeeping. Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire, explosion, or pest harborage. Vegetation control will be exercised when necessary.

(d) Dockboards (bridge plates).

(1) Portable and powered dockboards shall be strong enough to carry the load imposed on them.

(2) Portable dockboards shall be secured in position, either by being anchored or equipped with devices which will prevent their slipping.

(3) Handholds, or other effective means, shall be provided on portable dockboards to permit safe handling.

(4) Positive protection shall be provided to prevent railroad cars from being moved while dockboards or bridge plates are in position.

[44 FR 8577, Feb. 9, 1979; 44 FR 20940, Apr. 6, 1979, as amended at 49 FR 18295, Apr. 30, 1984; 54 FR 24334, June 7, 1989; 58 FR 35173, June 30, 1993; 59 FR 40729, Aug. 9, 1994; 61 FR 5510, Feb. 13, 1996; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(3).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.

OR-OSHA Admin. Order 6-1995, f. 4/18/95, ef. 6/1/95.

OR-OSHA Admin. Order 6-1998, f. 10/15/98, ef. 10/15/98.

OR-OSHA Admin. Order 3-2000, f. 2/8/00, ef. 2/8/00.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 3/O, Motor Vehicles, Mechanized Equipment, and Marine Operations

437-003-3224

Vehicle Drivers and Riders.

(1) Scope. This rule applies, without regard to vehicle ownership when your employees drive or ride as part of their employment.

Note: The Oregon Bureau of Labor and Industries (BOLI) administers rules about using minors as drivers. Please contact the nearest BOLI office for more information.

(2) Driver Qualifications. You must not allow an employee to drive a vehicle on a public highway or road unless they have a valid driver's license appropriate for that type vehicle.

(3) General Safety.

- (a) Do not allow employees to drive or ride in any vehicle known to be unsafe.
- (b) Require employees to report any safety problems effecting vehicles you own or provide.

(4) Rider Safety - General.

- (a) Except as in (5), (6) and (7), do not allow employees to occupy a vehicle in excess of its seating capacity.

- (b) Require employees to comply with all applicable seatbelt and traffic safety laws.

(5) Rider Safety in the Bed of Dump Trucks, Pickups and Similar Vehicles. Do not transport workers in the beds of dump trucks, pickups or similar vehicles unless these conditions are met when applicable:

- (a) When seating is available, it must be secure to the floor and passengers may not stand.
 - (b) The bed is secure to the frame. Beds that tilt or slide must be secure from movement.
 - (c) Dump beds must be secure or the activating lever locked.
 - (d) The total height of the sides of the transport area must be at least 42 inches. If riders sit on the floor, the height must be at least 24 inches.
 - (e) There must be a tailgate the same height as the sides or three evenly spaced chains, cables or ropes taut across the back.
 - (f) Not more than 4 workers may ride on a flatbed without sides or a tailgate and then only when the speed will not be more than 30 mph. There must be two handholds for each rider.
 - (g) Workers must not ride in space with cargo unless it is secure from movement.
- (6) Standing Rider Safety – Buses. Riders must not sit on the floor while the vehicle is moving. Riders may stand if these conditions are met:
- (a) There must be an aisle at least 12 inches wide leading to the emergency exit.
 - (b) There are no seats in or boards across the aisle.
 - (c) There must be handholds for standing riders.
 - (d) Not more than one rider per row of seats may stand.
 - (e) Riders may not sit or stand near the driver and not ahead of the forward-most row of seats.
 - (f) Workers in transit must not stand for more than one hour or 45 miles, whichever is less. At the end of that period, the standing workers must get a seat or the vehicle must stop for a 15-minute rest allowing the workers to get out.

(7) Fueling.

(a) There must be no smoking or other source of ignition within 25 feet of any refueling operation.

(b) Do not fill any container that is not bonded or grounded while it is inside the vehicle in the pickup bed or anyplace other than on the ground.

(c) Stop the engine (except diesels) during fueling.

(d) Refueling vehicles with LPG must be outdoors.

(8) Hauling gasoline or flammable liquid.

(a) For buses, vehicles that carry 16 or more, crew trucks, vans and passenger cars, use only DOT or UL approved containers that hold 5 gallons or less and secure them in an area separate from passengers.

(b) For pickups, flatbeds and other vehicles not in (a), there is no container size limit as long it is not in an enclosed passenger area.

(9) Hauling Explosives. When hauling explosives, only the driver and one qualified person may be in the vehicle. Comply with [OAR 437-002-]1910.109 and 437-002-0109.

(10) Loading or Unloading. When loading or unloading vehicles in a manner that is likely to cause the vehicle to move, set the brakes and chock the wheels.

(11) High Voltage Clearances. When operating a vehicle near overhead lines carrying more than 600v, OAR 437-002-0047 applies for general industry employers and OAR 437-003-0047 applies for Construction employers.

(12) Traffic Control. **Adequate and appropriate traffic control devices must be used**~~[You must require employees to set up appropriate traffic controls]~~ when **vehicles are parked**~~[they stop]~~ on or adjacent to a highway, street, or road in a way that creates a hazard and when traffic cannot adjust safely on its own. The **traffic control[s] devices' design and use** must conform to the ~~[Millennium Edition of the (FHWA)-]Manual of Uniform Traffic Control Devices (MUTCD),~~ **incorporated by reference in 1926.6**~~[December 2000].~~

Note: **The MUTCD is available electronically at mutcd.fhwa.dot.gov, or printed copies are available to purchase from The American Traffic Safety Services Association, 1-800-231-3475, www.atssa.com; the Institute of Transportation Engineers, 202-785-0060, www.ite.org; or the American Association of State Highway and Transportation Officials, 1-800-231-3475, store.transportation.org.**~~[Get a copy of the Millennium Edition from the following organizations: American Traffic Safety Services Association, 15 Riverside Parkway, Suite 100, Fredericksburg, VA 22406-1022; Telephone: 1-800-231-3475; Fax: (540) 368-1722; www.atssa.com; Institute of Transportation Engineers, 1099 14th Street, NW., Suite 300 West, Washington, DC 20005-3438; Fax: (202) 289-7722; www.ite.org; and American Association of State Highway and Transportation Officials; www.aashto.org; Telephone: 1-800-525-5562. OR: Download the MUTCD 2000 at <http://mutcd.fhwa.dot.gov/kno-millennium>. OR: The MUTCD 2000 is available for review at the Oregon OSHA Resource Center, 350 Winter Street NE, Basement - Room 26, Salem, Oregon 97301-3882; Telephone: (503) 378-3272, or toll free in Oregon 1-800-922-2689.]~~

Note: **Employers who follow the most current edition of the Oregon Department of Transportation's Temporary Traffic Control Handbook are considered in compliance with this requirement.**~~[Employers who follow the most current edition of the Oregon Temporary Traffic Control Handbook for Operations of 3 Days or Less comply with this requirement. Oregon Department of Transportation has published a new 2011 Temporary Traffic Control Handbook. You can find it online on ODOT's website:
http://www.oregon.gov/ODOT/HWY/TRAFFIC-ROADWAY/docs/pdf/2011_OTTCH.pdf.]~~

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-2007, f. 9/26/07, ef. 9/26/07.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 3/S, Underground Construction, Caissons, Cofferdams, and Compressed Air

1926.800

Underground Construction.

(a) Scope and application.

(1) This section applies to the construction of underground tunnels, shafts, chambers, and passageways. This section also applies to cut-and-cover excavations which are both physically connected to ongoing underground construction operations within the scope of this section, and covered in such a manner as to create conditions characteristic of underground construction.

(2) This section does not apply to the following:

(i) Excavation and trenching operations covered by Subpart P of this part, such as foundation operations for above-ground structures that are not physically connected to underground construction operations, and surface excavation; nor

(ii) Underground electrical transmission and distribution lines, as addressed in Subpart V of this part.

(b) Access and egress.

(1) The employer shall provide and maintain safe means of access and egress to all work stations.

(2) The employer shall provide access and egress in such a manner that employees are protected from being struck by excavators, haulage machines, trains and other mobile equipment.

(3) The employer shall control access to all openings to prevent unauthorized entry underground. Unused chutes, manways, or other openings shall be tightly covered, bulkheaded, or fenced off, and shall be posted with warning signs indicating "Keep Out" or similar language. Completed or unused sections of the underground facility shall be barricaded.

(c) Check-in/check-out. The employer shall maintain a check-in/check-out procedure that will ensure that above-ground personnel can determine an accurate count of the number of persons underground in the event of an emergency. However, this procedure is not required when the construction of underground facilities designed for human occupancy has been sufficiently completed so that the permanent environmental controls are effective, and when the remaining construction activity will not cause any environmental hazard or structural failure within the facilities.

(d) Safety instruction. All employees shall be instructed in the recognition and avoidance of hazards associated with underground construction activities including, where appropriate, the following subjects:

- (1) Air monitoring;
- (2) Ventilation;
- (3) Illumination;
- (4) Communications;
- (5) Flood control;
- (6) Mechanical equipment;
- (7) Personal protective equipment;
- (8) Explosives;
- (9) Fire prevention and protection; and
- (10) Emergency procedures, including evacuation plans and check-in/check-out systems.

(e) Notification.

(1) Oncoming shifts shall be informed of any hazardous occurrences or conditions that have affected or might affect employee safety, including liberation of gas, equipment failures, earth or rock slides, cave-ins, floodings, fires or explosions.

(2) The employer shall establish and maintain direct communications for coordination of activities with other employers whose operations at the jobsite affect or may affect the safety of employees underground.

(f) Communications.

(1) When natural unassisted voice communication is ineffective, a power-assisted means of voice communication shall be used to provide communication between the work face, the bottom of the shaft, and the surface.

(2) Two effective means of communication, at least one of which shall be voice communication, shall be provided in all shafts which are being developed or used either for personnel access or

for hoisting. Additional requirements for hoist operator communication are contained in paragraph (t)(3)(xiv) of this section.

(3) Powered communication systems shall operate on an independent power supply, and shall be installed so that the use of or disruption of any one phone or signal location will not disrupt the operation of the system from any other location.

(4) Communication systems shall be tested upon initial entry of each shift to the underground, and as often as necessary at later times, to ensure that they are in working order.

(5) Any employee working alone underground in a hazardous location, who is both out of the range of natural unassisted voice communication and not under observation by other persons, shall be provided with an effective means of obtaining assistance in an emergency.

(g) Emergency provisions.

(1) Hoisting capability. When a shaft is used as a means of egress, the employer shall make advance arrangements for power-assisted hoisting capability to be readily available in an emergency, unless the regular hoisting means can continue to function in the event of an electrical power failure at the jobsite. Such hoisting means shall be designed so that the load hoist drum is powered in both directions of rotation and so that the brake is automatically applied upon power release or failure.

(2) Self-rescuers. The employer must provide self-rescuers approved by the National Institute for Occupational Safety and Health under 42 CFR part 84. The respirators must be immediately available to all employees at work stations in underground areas where employees might be trapped by smoke or gas. The selection, issuance, use, and care of respirators must be in accordance with 29 CFR 1926.103.

(3) Designated person. At least one designated person shall be on duty above ground whenever any employee is working underground. This designated person shall be responsible for securing immediate aid and keeping an accurate count of employees underground in case of emergency. The designated person must not be so busy with other responsibilities that the counting function is encumbered.

(4) Emergency lighting. Each employee underground shall have an acceptable portable hand lamp or cap lamp in his or her work area for emergency use, unless natural light or an emergency lighting system provides adequate illumination for escape.

(5) Rescue teams.

(i) On jobsites where 25 or more employees work underground at one time, the employer shall provide (or make arrangements in advance with locally available rescue services to provide) at least two 5-person rescue teams, one on the jobsite or within one-half hour travel time from the entry point, and the other within 2 hours travel time.

(ii) On jobsites where less than 25 employees work underground at one time, the employer shall provide (or make arrangements in advance with locally available rescue services to provide) at least one 5-person rescue team to be either on the jobsite or within one-half hour travel time from the entry point.

(iii) Rescue team members shall be qualified in rescue procedures, the use and limitations of breathing apparatus, and the use of fire-fighting equipment. Qualifications shall be reviewed not less than annually.

(iv) On jobsites where flammable or noxious gases are encountered or anticipated in hazardous quantities, rescue team members shall practice donning and using self-contained breathing apparatus monthly.

(v) The employer shall ensure that rescue teams are familiar with conditions at the jobsite.

(h) Hazardous classifications.

(1) Potentially gassy operations. Underground construction operations shall be classified as potentially gassy if either:

(i) Air monitoring discloses 10 percent or more of the lower explosive limit for methane or other flammable gases measured at 12 inches (304.8 mm) \pm 0.25 inch (6.35 mm) from the roof, face, floor or walls in any underground work area for more than a 24-hour period; or

(ii) The history of the geographical area or geological formation indicates that 10 percent or more of the lower explosive limit for methane or other flammable gases is likely to be encountered in such underground operations.

(2) Gassy operations. Underground construction operations shall be classified as gassy if:

(i) Air monitoring discloses 10 percent or more of the lower explosive limit for methane or other flammable gases measured at 12 inches (304.8 mm) \pm 0.25 inch (6.35 mm) from the roof, face, floor or walls in any underground work area for three consecutive days; or

(ii) There has been an ignition of methane or of other flammable gases emanating from the strata that indicates the presence of such gases; or

(iii) The underground construction operation is both connected to an underground work area which is currently classified as gassy and is also subject to a continuous course of air containing the flammable gas concentration.

(3) Declassification to potentially gassy operations. Underground construction gassy operations may be declassified to Potentially Gassy when air monitoring results remain under 10 percent of the lower explosive limit for methane or other flammable gases for three consecutive days.

(i) Gassy operations – additional requirements.

(1) Only acceptable equipment, maintained in suitable condition, shall be used in gassy operations.

(2) Mobile diesel-powered equipment used in gassy operations shall be either approved in accordance with the requirements of 30 CFR Part 36 (formerly Schedule 31) by MSHA, or shall be demonstrated by the employer to be fully equivalent to such MSHA-approved equipment, and shall be operated in accordance with that part.

(3) Each entrance to a gassy operation shall be prominently posted with signs notifying all entrants of the gassy classification.

(4) Smoking shall be prohibited in all gassy operations and the employer shall be responsible for collecting all personal sources of ignition, such as matches and lighters, from all persons entering a gassy operation.

(5) A fire watch as described in 1926.352(e) shall be maintained when hot work is performed.

(6) Once an operation has met the criteria in paragraph (h)(2) warranting classification as gassy, all operations in the affected area, except the following, shall be discontinued until the operation either is in compliance with all of the gassy operation requirements or has been declassified in accordance with paragraph (h)(3) of this section:

(i) Operations related to the control of the gas concentration;

(ii) Installation of new equipment, or conversion of existing equipment, to comply with this paragraph (i); and

(iii) Installation of above-ground controls for reversing the air flow.

(j) Air quality and monitoring.

(1) General. Air quality limits and control requirements for construction are found in 1926.55, except as modified by this section.

(i)

(A) The employer shall assign a competent person who shall perform all air monitoring required by this section.

(B) Where this paragraph requires monitoring of airborne contaminants “as often as necessary,” the competent person shall make a reasonable determination as to which substances to monitor and how frequently to monitor, considering at least the following factors:

(1) Location of jobsite: Proximity to fuel tanks, sewers, gas lines, old landfills, coal deposits, and swamps;

(2) Geology: Geological studies of the jobsite, particularly involving the soil type and its permeability;

(3) History: Presence of air contaminants in nearby jobsites, changes in levels of substances monitored on the prior shift; and

(4) Work practices and jobsite conditions: The use of diesel engines, use of explosives, use of fuel gas, volume and flow of ventilation, visible atmospheric conditions, decompression of the atmosphere, welding, cutting and hot work, and employees’ physical reactions to working underground.

(ii)

(A) The atmosphere in all underground work areas shall be tested as often as necessary to assure that the atmosphere at normal atmospheric pressure contains at least 19.5 percent oxygen and no more than 22 percent oxygen.

(B) Tests for oxygen content shall be made before tests for air contaminants.

(iii)

(A) The atmosphere in all underground work areas shall be tested quantitatively for carbon monoxide, nitrogen dioxide, hydrogen sulfide, and other toxic gases, dusts, vapors, mists, and fumes as often as necessary to ensure that the permissible exposure limits prescribed in 1926.55 are not exceeded.

(B) The atmosphere in all underground work areas shall be tested quantitatively for methane and other flammable gases as often as necessary to determine:

(1) Whether action is to be taken under paragraphs (j)(1)(vii), (viii), and (ix), of this section; and

(2) Whether an operation is to be classified potentially gassy or gassy under paragraph (h) of this section.

(C) If diesel-engine or gasoline-engine driven ventilating fans or compressors are used, an initial test shall be made of the inlet air of the fan or compressor, with the engines operating, to ensure that the air supply is not contaminated by engine exhaust.

(D) Testing shall be performed as often as necessary to ensure that the ventilation requirements of paragraph (k) of this section are met.

(iv) When rapid excavation machines are used, a continuous flammable gas monitor shall be operated at the face with the sensor(s) placed as high and close to the front of the machine's cutter head as practicable.

(v)

(A) Whenever air monitoring indicates the presence of 5 ppm or more of hydrogen sulfide, a test shall be conducted in the affected underground work area(s), at least at the beginning and midpoint of each shift, until the concentration of hydrogen sulfide has been less than 5 ppm for 3 consecutive days.

(B) Whenever hydrogen sulfide is detected in an amount exceeding 10 ppm, a continuous sampling and indicating hydrogen sulfide monitor shall be used to monitor the affected work area.

(C) Employees shall be informed when a concentration of 10 ppm hydrogen sulfide is exceeded.

(D) The continuous sampling and indicating hydrogen sulfide monitor shall be designed, installed, and maintained to provide a visual and aural alarm when the hydrogen sulfide concentration reaches 20 ppm to signal that additional measures, such as respirator use, increased ventilation, or evacuation, might be necessary to maintain hydrogen sulfide exposure below the permissible exposure limit.

(vi) When the competent person determines, on the basis of air monitoring results or other information, that air contaminants may be present in sufficient quantity to be dangerous to life, the employer shall:

(A) Prominently post a notice at all entrances to the underground jobsite to inform all entrants of the hazardous condition; and

(B) Ensure that the necessary precautions are taken.

(vii) Whenever five percent or more of the lower explosive limit for methane or other flammable gases is detected in any underground work area(s) or in the air return, steps shall be taken to increase ventilation air volume or otherwise control the gas concentration, unless the employer is operating in accordance with the potentially gassy or gassy operation requirements. Such additional ventilation controls may be discontinued when gas concentrations are reduced below five percent of the lower explosive limit, but shall be reinstituted whenever the five percent level is exceeded.

(viii) Whenever 10 percent or more of the lower explosive limit for methane or other flammable gases is detected in the vicinity of welding, cutting, or other hot work, such work shall be suspended until the concentration of such flammable gas is reduced to less than 10 percent of the lower explosive limit.

(ix) Whenever 20 percent or more of the lower explosive limit for methane or other flammable gases is detected in any underground work area(s) or in the air return:

(A) All employees, except those necessary to eliminate the hazard, shall be immediately withdrawn to a safe location above ground; and

(B) Electrical power, except for acceptable pumping and ventilation equipment, shall be cut off to the area endangered by the flammable gas until the concentration of such gas is reduced to less than 20 percent of the lower explosive limit.

(2) Additional monitoring for potentially gassy and gassy operations. Operations which meet the criteria for potentially gassy and gassy operations set forth in paragraph (h) of this section shall be subject to the additional monitoring requirements of this paragraph.

(i) A test for oxygen content shall be conducted in the affected underground work areas and work areas immediately adjacent to such areas at least at the beginning and midpoint of each shift.

(ii) When using rapid excavation machines, continuous automatic flammable gas monitoring equipment shall be used to monitor the air at the heading, on the rib, and in the return air duct. The continuous monitor shall signal the heading, and shut down electric power in the affected underground work area, except for acceptable pumping and ventilation equipment, when 20 percent or more of the lower explosive limit for methane or other flammable gases is encountered.

(iii) A manual flammable gas monitor shall be used as needed, but at least at the beginning and midpoint of each shift, to ensure that the limits prescribed in paragraphs (h) and (j) are not exceeded. In addition, a manual electrical shut down control shall be provided near the heading.

(iv) Local gas tests shall be made prior to and continuously during any welding, cutting, or other hot work.

(v) In underground operations driven by drill-and-blast methods, the air in the affected area shall be tested for flammable gas prior to re-entry after blasting, and continuously when employees are working underground.

(3) Recordkeeping. A record of all air quality tests shall be maintained above ground at the worksite and be made available to the Secretary of Labor upon request. The record shall include the location, date, time, substance and amount monitored. Records of exposures to toxic substances shall be retained in accordance with 1910.1020 of this chapter. All other air quality test records shall be retained until completion of the project.

(k) Ventilation.

(1)

(i) Fresh air shall be supplied to all underground work areas in sufficient quantities to prevent dangerous or harmful accumulation of dusts, fumes, mists, vapors or gases.

(ii) Mechanical ventilation shall be provided in all underground work areas except when the employer can demonstrate that natural ventilation provides the necessary air quality through sufficient air volume and air flow.

(2) A minimum of 200 cubic feet (5.7 m³) of fresh air per minute shall be supplied for each employee underground.

(3) The linear velocity of air flow in the tunnel bore, in shafts, and in all other underground work areas shall be at least 30 feet (9.15 m) per minute where blasting or rock drilling is conducted, or where other conditions likely to produce dust, fumes, mists, vapors, or gases in harmful or explosive quantities are present.

(4) The direction of mechanical air flow shall be reversible.

(5) Following blasting, ventilation systems shall exhaust smoke and fumes to the outside atmosphere before work is resumed in affected areas.

(6) Ventilation doors shall be designed and installed so that they remain closed when in use, regardless of the direction of the air flow.

(7) When ventilation has been reduced to the extent that hazardous levels of methane or flammable gas may have accumulated, a competent person shall test all affected areas after ventilation has been restored and shall determine whether the atmosphere is within flammable limits before any power, other than for acceptable equipment, is restored or work is resumed.

(8) Whenever the ventilation system has been shut down with all employees out of the underground area, only competent persons authorized to test for air contaminants shall be allowed underground until the ventilation has been restored and all affected areas have been tested for air contaminants and declared safe.

(9) When drilling rock or concrete, appropriate dust control measures shall be taken to maintain dust levels within limits set in 1926.55. Such measures may include, but are not limited to, wet drilling, the use of vacuum collectors, and water mix spray systems.

(10)

(i) Internal combustion engines, except diesel-powered engines on mobile equipment, are prohibited underground.

(ii) Mobile diesel-powered equipment used underground in atmospheres other than gassy operations:

(A) S[s]hall comply with~~[be either approved by] MSHA [in accordance with the] provisions [of] in 30 CFR 57.5067[Part 32 (formerly Schedule 24),]; or~~

(B) If purchased on or before July 15, 2019, may alternatively comply with ~~[shall]~~ **MSHA provisions under 30 CFR part 32 (revised as of July 1, 1996) (formerly Schedule 24) or** be demonstrated by the employer to be fully equivalent to such MSHA-approved equipment, and shall be operated in accordance with that ~~p[P]~~art.

(iii) For purposes of this paragraph (d)(10), when an applicable MSHA provision uses the term “mine,” use the phrase “underground construction site.” (Each brake horsepower of a diesel engine requires at least 100 cubic feet (2.8[.]32 m³) of air per minute for suitable operation in addition to the air requirements for personnel. Some engines may require a greater amount of air to ensure that the allowable levels of carbon monoxide, nitric oxide, and nitrogen dioxide are not exceeded.)

(11) Potentially gassy or gassy operations shall have ventilation systems installed which shall:

(i) Be constructed of fire-resistant materials; and

(ii) Have acceptable electrical systems, including fan motors.

(12) Gassy operations shall be provided with controls located above ground for reversing the air flow of ventilation systems.

(13) In potentially gassy or gassy operations, wherever mine-type ventilation systems using an offset main fan installed on the surface are used, they shall be equipped with explosion-doors or a weak-wall having an area at least equivalent to the cross-sectional area of the airway.

(l) Illumination.

(1) Illumination requirements applicable to underground construction operations are found in Table D-3 of 1926.56 of this part.

(2) Only acceptable portable lighting equipment shall be used within 50 feet (15.24 m) of any underground heading during explosives handling.

(m) Fire prevention and control. Fire prevention and protection requirements applicable to underground construction operations are found in Subpart F of this part, except as modified by the following additional standards.

(1) Open flames and fires are prohibited in all underground construction operations except as permitted for welding, cutting and other hot work operations in paragraph (n) of this section.

(2)

(i) Smoking may be allowed only in areas free of fire and explosion hazards.

(ii) Readily visible signs prohibiting smoking and open flames shall be posted in areas having fire or explosion hazards.

(3) The employer may store underground no more than a 24-hour supply of diesel fuel for the underground equipment used at the worksite.

(4) The piping of diesel fuel from the surface to an underground location is permitted only if:

(i) Diesel fuel is contained at the surface in a tank whose maximum capacity is no more than the amount of fuel required to supply for a 24-hour period the equipment serviced by the underground fueling station; and

(ii) The surface tank is connected to the underground fueling station by an acceptable pipe or hose system that is controlled at the surface by a valve, and at the shaft bottom by a hose nozzle; and

(iii) The pipe is empty at all times except when transferring diesel fuel from the surface tank to a piece of equipment in use underground; and

(iv) Hoisting operations in the shaft are suspended during refueling operations if the supply piping in the shaft is not protected from damage.

(5)

(i) Gasoline shall not be carried, stored, or used underground.

(ii) Acetylene, liquefied petroleum gas, and Methylacetylene Propadiene Stabilized gas may be used underground only for welding, cutting and other hot work, and only in accordance with Subpart J of this part, and paragraphs (j), (k), (m), and (n) of this section.

(6) Oil, grease, and diesel fuel stored underground shall be kept in tightly sealed containers in fire-resistant areas at least 300 feet (91.44 m) from underground explosive magazines, and at least 100 feet (30.48 m) from shaft stations and steeply inclined passageways. Storage areas shall be positioned or diked so that the contents of ruptured or overturned containers will not flow from the storage area.

(7) Flammable or combustible materials shall not be stored above ground within 100 feet (30.48 m) of any access opening to any underground operation. Where this is not feasible because of space limitations at the jobsite, such materials may be located within the 100-foot limit, provided that:

(i) They are located as far as practicable from the opening; and

(ii) Either a fire-resistant barrier of not less than one-hour rating is placed between the stored material and the opening, or additional precautions are taken which will protect the materials from ignition sources.

(8) Fire-resistant hydraulic fluids shall be used in hydraulically-actuated underground machinery and equipment unless such equipment is protected by a fire suppression system or by multi-purpose fire extinguisher(s) rated at of sufficient capacity for the type and size of hydraulic equipment involved, but rated at least 4A:40B:C.

(9)

(i) Electrical installations in underground areas where oil, grease, or diesel fuel are stored shall be used only for lighting fixtures.

(ii) Lighting fixtures in storage areas, or within 25 feet (7.62 m) of underground areas where oil, grease, or diesel fuel are stored, shall be approved for Class I, Division 2 locations, in accordance with Subpart K of this part.

(10) Leaks and spills of flammable or combustible fluids shall be cleaned up immediately.

(11) A fire extinguisher of at least 4A:40B:C rating or other equivalent extinguishing means shall be provided at the head pulley and at the tail pulley of underground belt conveyors.

(12) Any structure located underground or within 100 feet (30.48 m) of an opening to the underground shall be constructed of material having a fire-resistance rating of at least one hour.

(n) Welding, cutting, and other hot work. In addition to the requirements of Subpart J of this part, the following requirements shall apply to underground welding, cutting, and other hot work.

(1) No more than the amount of fuel gas and oxygen cylinders necessary to perform welding, cutting, or other hot work during the next 24-hour period shall be permitted underground.

(2) Noncombustible barriers shall be installed below welding, cutting, or other hot work being done in or over a shaft or raise.

(o) Ground support.

(1) Portal areas. Portal openings and access areas shall be guarded by shoring, fencing, head walls, shotcreting or other equivalent protection to ensure safe access of employees and equipment. Adjacent areas shall be scaled or otherwise secured to prevent loose soil, rock, or fractured materials from endangering the portal and access area.

(2) Subsidence areas. The employer shall ensure ground stability in hazardous subsidence areas by shoring, by filling in, or by erecting barricades and posting warning signs to prevent entry.

(3) Underground areas.

(i)

(A) A competent person shall inspect the roof, face, and walls of the work area at the start of each shift and as often as necessary to determine ground stability.

(B) Competent persons conducting such inspections shall be protected from loose ground by location, ground support or equivalent means.

(ii) Ground conditions along haulageways and travelways shall be inspected as frequently as necessary to ensure safe passage.

(iii) Loose ground that might be hazardous to employees shall be taken down, scaled or supported.

(iv)

(A) Torque wrenches shall be used wherever bolts that depend on torsionally applied force are used for ground support.

(B) A competent person shall determine whether rock bolts meet the necessary torque, and shall determine the testing frequency in light of the bolt system, ground conditions and the distance from vibration sources.

(v) Suitable protection shall be provided for employees exposed to the hazard of loose ground while installing ground support systems.

(vi) Support sets shall be installed so that the bottoms have sufficient anchorage to prevent ground pressures from dislodging the support base of the sets. Lateral bracing (collar bracing, tie rods, or spreaders) shall be provided between immediately adjacent sets to ensure added stability.

(vii) Damaged or dislodged ground supports that create a hazardous condition shall be promptly repaired or replaced. When replacing supports, the new supports shall be installed before the damaged supports are removed.

(viii) A shield or other type of support shall be used to maintain a safe travelway for employees working in dead-end areas ahead of any support replacement operation.

(4) Shafts.

(i) Shafts and wells over 5 feet (1.53 m) in depth that employees must enter shall be supported by a steel casing, concrete pipe, timber, solid rock or other suitable material.

(ii)

(A) The full depth of the shaft shall be supported by casing or bracing except where the shaft penetrates into solid rock having characteristics that will not change as a result of exposure. Where the shaft passes through earth into solid rock, or through solid rock into earth, and where there is potential for shear, the casing or bracing shall extend at least 5 feet (1.53 m) into the solid rock. When the shaft terminates in solid rock, the casing or bracing shall extend to the end of the shaft or 5 feet (1.53 m) into the solid rock, whichever is less.

(B) The casing or bracing shall extend 42 inches (1.07 m) plus or minus 3 inches (8 cm) above ground level, except that the minimum casing height may be reduced to 12 inches (0.3 m), provided that a standard railing is installed; that the ground adjacent to the top of the shaft is sloped away from the shaft collar to prevent entry of liquids; and that effective barriers are used to prevent mobile equipment operating near the shaft from jumping over the 12 inch (0.3 m) barrier.

(iii) After blasting operations in shafts, a competent person shall determine if the walls, ladders, timbers, blocking, or wedges have loosened. If so, necessary repairs shall be made before employees other than those assigned to make the repairs are allowed in or below the affected areas.

(p) Blasting. This paragraph applies in addition to the requirements for blasting and explosives operations, including handling of misfires, which are found in Subpart U of this part.

(1) Blasting wires shall be kept clear of electrical lines, pipes, rails, and other conductive material, excluding earth, to prevent explosives initiation or employee exposure to electric current.

(2) Following blasting, an employee shall not enter a work area until the air quality meets the requirements of paragraph (j) of this section.

(q) Drilling.

(1) A competent person shall inspect all drilling and associated equipment prior to each use. Equipment defects affecting safety shall be corrected before the equipment is used.

(2) The drilling area shall be inspected for hazards before the drilling operation is started.

(3) Employees shall not be allowed on a drill mast while the drill bit is in operation or the drill machine is being moved.

(4) When a drill machine is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured and the mast shall be placed in a safe position.

(5) Receptacles or racks shall be provided for storing drill steel located on jumbos.

(6) Employees working below jumbo decks shall be warned whenever drilling is about to begin.

(7) Drills on columns shall be anchored firmly before starting drilling, and shall be retightened as necessary thereafter.

(8)

(i) The employer shall provide mechanical means on the top deck of a jumbo for lifting unwieldy or heavy material.

(ii) When jumbo decks are over 10 feet (3.05 m) in height, the employer shall install stairs wide enough for two persons.

(iii) Jumbo decks more than 10 feet (3.05 m) in height shall be equipped with guardrails on all open sides, excluding access openings of platforms, unless an adjacent surface provides equivalent fall protection.

(iv)

(A) Only employees assisting the operator shall be allowed to ride on jumbos, unless the jumbo meets the requirements of paragraph (r)(6)(ii) of this section.

(B) Jumbos shall be chocked to prevent movement while employees are working on them.

(v)

(A) Walking and working surfaces of jumbos shall be maintained to prevent the hazards of slipping, tripping and falling.

(B) Jumbo decks and stair treads shall be designed to be slip-resistant and secured to prevent accidental displacement.

(9) Scaling bars shall be available at scaling operations and shall be maintained in good condition at all times. Blunted or severely worn bars shall not be used.

(10)

(i) Blasting holes shall not be drilled through blasted rock (muck) or water.

(ii) Employees in a shaft shall be protected either by location or by suitable barrier(s) if powered mechanical loading equipment is used to remove muck containing unfired explosives.

(11) A caution sign reading "Buried Line," or similar wording shall be posted where air lines are buried or otherwise hidden by water or debris.

(r) Haulage.

(1)

(i) A competent person shall inspect haulage equipment before each shift.

(ii) Equipment defects affecting safety and health shall be corrected before the equipment is used.

(2) Powered mobile haulage equipment shall have suitable means of stopping.

(3)

(i) Power mobile haulage equipment, including trains, shall have audible warning devices to warn employees to stay clear. The operator shall sound the warning device before moving the equipment and whenever necessary during travel.

(ii) The operator shall assure that lights which are visible to employees at both ends of any mobile equipment, including a train, are turned on whenever the equipment is operating.

(4) In those cabs where glazing is used, the glass shall be safety glass, or its equivalent, and shall be maintained and cleaned so that vision is not obstructed.

(5) Anti-roll back devices or brakes shall be installed on inclined conveyor drive units to prevent conveyors from inadvertently running in reverse.

(6)

(i)

(A) Employees shall not be permitted to ride a power-driven chain, belt, or bucket conveyor unless the conveyor is specifically designed for the transportation of persons.

(B) Endless belt-type manlifts are prohibited in underground construction.

(C) General requirements also applicable to underground construction for use of conveyors in construction are found in 1926.555 of this part.

(ii) No employee shall ride haulage equipment unless it is equipped with seating for each passenger and protects passengers from being struck, crushed, or caught between other equipment or surfaces. Members of train crews may ride on a locomotive if it is equipped with handholds and nonslip steps or footboards. Requirements applicable to Underground Construction for motor vehicle transportation of employees are found in 1926.601 of this part.

(7) Powered mobile haulage equipment, including trains, shall not be left unattended unless the master switch or motor is turned off; operating controls are in neutral or park position; and the brakes are set, or equivalent precautions are taken to prevent rolling.

(8) Whenever rails serve as a return for a trolley circuit, both rails shall be bonded at every joint and crossbonded every 200 feet (60.96 m).

(9) When dumping cars by hand, the car dumps shall have tiedown chains, bumper blocks, or other locking or holding devices to prevent the cars from overturning.

(10) Rocker-bottom or bottom-dump cars shall be equipped with positive locking devices to prevent unintended dumping.

(11) Equipment to be hauled shall be loaded and secured to prevent sliding or dislodgement.

(12)

(i) Mobile equipment, including rail-mounted equipment, shall be stopped for manual connecting or service work.

(ii) Employees shall not reach between moving cars during coupling operations.

(iii) Couplings shall not be aligned, shifted or cleaned on moving cars or locomotives.

(13)

(i) Safety chains or other connections shall be used in addition to couplers to connect man cars or powder cars whenever the locomotive is uphill of the cars.

(ii) When the grade exceeds one percent and there is a potential for runaway cars, safety chains or other connections shall be used in addition to couplers to connect haulage cars or, as an alternative, the locomotive must be downhill of the train.

(iii) Such safety chains or other connections shall be capable of maintaining connection between cars in the event of either coupler disconnect, failure or breakage.

(14) Parked rail equipment shall be chocked, blocked, or have brakes set to prevent inadvertent movement.

(15) Berms, bumper blocks, safety hooks, or equivalent means shall be provided to prevent overtravel and overturning of haulage equipment at dumping locations.

(16) Bumper blocks or equivalent stopping devices shall be provided at all track dead ends.

(17)

(i) Only small hand tools, lunch pails or similar small items may be transported with employees in man-cars, or on top of a locomotive.

(ii) When small hand tools or other small items are carried on top of a locomotive, the top shall be designed or modified to retain them while traveling.

(18)

(i) Where switching facilities are available, occupied personnel-cars shall be pulled, not pushed. If personnel-cars must be pushed and visibility of the track ahead is hampered, then a qualified person shall be stationed in the lead car to give signals to the locomotive operator.

(ii) Crew trips shall consist of personnel-loads only.

(s) Electrical safety. This paragraph applies in addition to the general requirements for electrical safety which are found in Subpart K of this part.

(1) Electric power lines shall be insulated or located away from water lines, telephone lines, air lines, or other conductive materials so that a damaged circuit will not energize the other systems.

(2) Lighting circuits shall be located so that movement of personnel or equipment will not damage the circuits or disrupt service.

(3) Oil-filled transformers shall not be used underground unless they are located in a fire-resistant enclosure suitably vented to the outside and surrounded by a dike to retain the contents of the transformers in the event of rupture.

(t) Hoisting unique to underground construction. Except as modified by this paragraph (t), employers must: Comply with the requirements of subpart CC of this part, except that the limitation in 1926.1431(a) does not apply to the routine access of employees to an underground

worksite via a shaft; ensure that material hoists comply with 1926.552(a) and (b) of this part; and ensure that personnel hoists comply with the personnel-hoists requirements of Sec. 1926.552(a) and (c) of this part and the elevator requirements of 1926.552(a) and (d) of this part.

(1) General requirements for cranes and hoists.

(i) Materials, tools, and supplies being raised or lowered, whether within a cage or otherwise, shall be secured or stacked in a manner to prevent the load from shifting, snagging or falling into the shaft.

(ii) A warning light suitably located to warn employees at the shaft bottom and subsurface shaft entrances shall flash whenever a load is above the shaft bottom or subsurface entrances, or the load is being moved in the shaft. This paragraph does not apply to fully enclosed hoistways.

(iii) Whenever a hoistway is not fully enclosed and employees are at the shaft bottom, conveyances or equipment shall be stopped at least 15 feet (4.57 m) above the bottom of the shaft and held there until the signalman at the bottom of the shaft directs the operator to continue lowering the load, except that the load may be lowered without stopping if the load or conveyance is within full view of a bottom signalman who is in constant voice communication with the operator.

(iv)

(A) Before maintenance, repairs, or other work is commenced in the shaft served by a cage, skip, or bucket, the operator and other employees in the area shall be informed and given suitable instructions.

(B) A sign warning that work is being done in the shaft shall be installed at the shaft collar, at the operator's station, and at each underground landing.

(v) Any connection between the hoisting rope and the cage or skip shall be compatible with the type of wire rope used for hoisting.

(vi) Spin-type connections, where used, shall be maintained in a clean condition and protected from foreign matter that could affect their operation.

(vii) Cage, skip, and load connections to the hoist rope shall be made so that the force of the hoist pull, vibration, misalignment, release of lift force, or impact will not disengage the connection. Moused or latched openthroat hooks do not meet this requirement.

(viii) When using wire rope wedge sockets, means shall be provided to prevent wedge escapement and to ensure that the wedge is properly seated.

(2) Additional requirements for cranes. Cranes shall be equipped with a limit switch to prevent overtravel at the boom tip. Limit switches are to be used only to limit travel of loads when operational controls malfunction and shall not be used as a substitute for other operational controls.

(3) Additional requirements for hoists.

- (i) Hoists shall be designed so that the load hoist drum is powered in both directions of rotation, and so that brakes are automatically applied upon power release or failure.
- (ii) Control levers shall be of the "deadman type" which return automatically to their center (neutral) position upon release.
- (iii) When a hoist is used for both personnel hoisting and material hoisting, load and speed ratings for personnel and for materials shall be assigned to the equipment.
- (iv) Material hoisting may be performed at speeds higher than the rated speed for personnel hoisting if the hoist and components have been designed for such higher speeds and if shaft conditions permit.
- (v) Employees shall not ride on top of any cage, skip or bucket except when necessary to perform inspection or maintenance of the hoisting system, in which case they shall be protected by a body belt/harness system to prevent falling.
- (vi) Personnel and materials (other than small tools and supplies secured in a manner that will not create a hazard to employees) shall not be hoisted together in the same conveyance. However, if the operator is protected from the shifting of materials, then the operator may ride with materials in cages or skips which are designed to be controlled by an operator within the cage or skip.
- (vii) Line speed shall not exceed the design limitations of the systems.
- (viii) Hoists shall be equipped with landing level indicators at the operator's station. Marking the hoist rope does not satisfy this requirement.
- (ix) Whenever glazing is used in the hoist house, it shall be safety glass, or its equivalent, and be free of distortions and obstructions.
- (x) A fire extinguisher that is rated at least 2A:10B:C (multi-purpose, dry chemical) shall be mounted in each hoist house.
- (xi) Hoist controls shall be arranged so that the operator can perform all operating cycle functions and reach the emergency power cutoff without having to reach beyond the operator's normal operating position.
- (xii) Hoists shall be equipped with limit switches to prevent overtravel at the top and bottom of the hoistway.
- (xiii) Limit switches are to be used only to limit travel of loads when operational controls malfunction and shall not be used as a substitute for other operational controls.
- (xiv) Hoist operators shall be provided with a closed-circuit voice communication system to each landing station, with speaker microphones so located that the operator can communicate with individual landing stations during hoist use.
- (xv) When sinking shafts 75 feet (22.86 m) or less in depth, cages, skips, and buckets that may swing, bump, or snag against shaft sides or other structural protrusions shall be guided by fenders, rails, ropes, or a combination of those means.

(xvi) When sinking shafts more than 75 feet (22.86 m) in depth, all cages, skips, and buckets shall be rope or rail guided to within a rail length from the sinking operation.

(xvii) Cages, skips, and buckets in all completed shafts, or in all shafts being used as completed shafts, shall be rope or rail-guided for the full length of their travel.

(xviii) Wire rope used in load lines of material hoists shall be capable of supporting, without failure, at least five times the maximum intended load or the factor recommended by the rope manufacturer, whichever is greater. Refer to 1926.552(c)(14)(iii) of this part for design factors for wire rope used in personnel hoists. The design factor shall be calculated by dividing the breaking strength of wire rope, as reported in the manufacturer's rating tables, by the total static load, including the weight of the wire rope in the shaft when fully extended.

(xix) A competent person shall visually check all hoisting machinery, equipment, anchorages, and hoisting rope at the beginning of each shift and during hoist use, as necessary.

(xx) Each safety device shall be checked by a competent person at least weekly during hoist use to ensure suitable operation and safe condition.

(xxi) In order to ensure suitable operation and safe condition of all functions and safety devices, each hoist assembly shall be inspected and load-tested to 100 percent of its rated capacity: at the time of installation; after any repairs or alterations affecting its structural integrity; after the operation of any safety device; and annually when in use. The employer shall prepare a certification record which includes the date each inspection and load-test was performed; the signature of the person who performed the inspection and test; and a serial number or other identifier for the hoist that was inspected and tested. The most recent certification record shall be maintained on file until completion of the project.

(xxii) Before hoisting personnel or material, the operator shall perform a test run of any cage or skip whenever it has been out of service for one complete shift, and whenever the assembly or components have been repaired or adjusted.

(xxiii) Unsafe conditions shall be corrected before using the equipment.

(4) Additional requirements for personnel hoists.

(i) Hoist drum systems shall be equipped with at least two means of stopping the load, each of which shall be capable of stopping and holding 150 percent of the hoist's rated line pull. A broken-rope safety, safety catch, or arrestment device is not a permissible means of stopping under this paragraph (t).

(ii) The operator shall remain within sight and sound of the signals at the operator's station.

(iii) All sides of personnel cages shall be enclosed by one-half inch (12.70 mm) wire mesh (not less than No. 14 gauge or equivalent) to a height of not less than 6 feet (1.83 m). However, when the cage or skip is being used as a work platform, its sides may be reduced in height to 42 inches (1.07 m) when the conveyance is not in motion.

(iv) All personnel cages shall be provided with a positive locking door that does not open outward.

(v) All personnel cages shall be provided with a protective canopy. The canopy shall be made of steel plate, at least 3/16-inch (4.763 mm) in thickness, or material of equivalent strength and impact resistance. The canopy shall be sloped to the outside, and so designed that a section may be readily pushed upward to afford emergency egress. The canopy shall cover the top in such a manner as to protect those inside from objects falling in the shaft.

(vi) Personnel platforms operating on guide rails or guide ropes shall be equipped with broken-rope safety devices, safety catches or arrestment devices that will stop and hold 150 percent of the weight of the personnel platform and its maximum rated load.

(vii) During sinking operations in shafts where guides and safeties are not yet used, the travel speed of the personnel platform shall not exceed 200 feet (60.96 m) per minute. Governor controls set for 200 feet (60.96 m) per minute shall be installed in the control system and shall be used during personnel hoisting.

(viii) The personnel platform may travel over the controlled length of the hoistway at rated speeds up to 600 feet (182.88 m) per minute during sinking operations in shafts where guides and safeties are used.

(ix) The personnel platform may travel at rated speeds greater than 600 feet (182.88 m) per minute in completed shafts.

(u) Definitions.

Accept – Any device, equipment, or appliance that is either approved by MSHA and maintained in permissible condition, or is listed or labeled for the class and location under Subpart K of this part.

Rapid Excavation Machine – Tunnel boring machines, shields, roadheaders, or any other similar excavation machine.

[54 FR 23850, June 2, 1989; 58 FR 35311, June 30, 1993, as amended at 61 FR 5510, Feb. 13, 1996; 63 FR 1297, Jan. 8, 1998; 71 FR 16674, Apr. 3, 2006; 75 FR 48135, Aug. 9, 2010; 77 FR 49728, Aug. 17, 2012; 78 FR 23841, Apr. 24, 2013; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.
APD Admin. Order 14-1989, f. 7/20/89, ef. 8/1/89.
APD Admin. Order 15-1989, f. 9/13/89, ef. 9/13/89.
OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 1-2011, f. 2/9/11, ef. 2/9/11.
OR-OSHA Admin. Order 6-2013, f. 10/9/13, ef. 10/9/13.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Division 3W, Rollover Protective Structures; Overhead Protection

1926.1000

Scope~~[Rollover Protective Structures (ROPS) For Material Handling Equipment.]~~

(a) Coverage.

~~[(4)]~~ This section applies to the following types of material handling equipment: To all rubber-tired, self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler tractors, crawler-type loaders, and motor graders, with or without attachments, that are used in construction work. **This subpart also applies to compactors and rubber-tired skid-steer equipment, with or without attachments, manufactured after July 15, 2019, that are used in construction work.** This requirement does not apply to side-boom pipelaying tractors.

~~[(2) The promulgation of specific standards for rollover protective structures for compactors and rubber-tired skid-steer equipment is reserved pending consideration of standards currently being developed.]~~

(b) Equipment manufactured ~~[on or after September 1, 1972]~~**before July 15, 2019.** Material handling machinery described in paragraph (a) of this section **(excluding compactors and rubber-tired skid-steer equipment)** ~~[and]~~ manufactured ~~[on or after September 1, 1972]~~**before July 15, 2019,** shall be equipped with rollover protective structures ~~[which]~~**that** meet the minimum performance standards prescribed in 1926.1001**(b), as applicable.** **Agricultural and industrial tractors used in construction shall be equipped with rollover protective structures that meet the minimum performance standards prescribed in [and]** ~~[and]~~ 1926.1002**(b), as applicable.** **When overhead protection is provided on agricultural and industrial tractors, the overhead protection shall meet the minimum performance standards prescribed in 1926.1003(b), as applicable.**

(c) Equipment manufactured ~~[before September 1, 1972]~~**on or after July 15, 2019.** **Material handling machinery described in paragraph (a) of this section manufactured on or after July 15, 2019, shall be equipped with rollover protective structures that meet the minimum performance standards prescribed in 1926.1001(c). Agricultural and industrial tractors used in construction shall be equipped with rollover protective structures that meet the minimum performance standards prescribed in 1926.1002(c). When overhead protection is provided on agricultural and industrial tractors, the overhead protection shall meet the minimum performance standards prescribed in 1926.1003(c).**

~~[(1) All material handling equipment described in paragraph (a) of this section and manufactured or placed in service (owned or operated by the employer) prior to September 1, 1972, shall be fitted with rollover protective structures no later than the dates listed below:~~

~~(i) Machines manufactured on or after January 1, 1972, shall be fitted no later than April 1, 1973.~~

~~(ii) Machines manufactured between July 1, 1971, and December 31, 1971, shall be fitted no later than July 1, 1973.~~

~~(iii) Machines manufactured between July 1, 1970, and June 30, 1971, shall be fitted no later than January 1, 1974.~~

~~(iv) Machines manufactured between July 1, 1969, and June 30, 1970, shall be fitted no later than July 1, 1974.~~

~~(v) Machines manufactured before July 1, 1969: Reserved pending further study, development, and review.~~

~~(2) Rollover protective structures and supporting attachment shall meet the minimum performance criteria detailed in 1926.1001 and 1926.1002, as applicable or shall be designed, fabricated, and installed in a manner which will support, based on the ultimate strength of the metal, at least two times the weight of the prime mover applied at the point of impact.~~

~~(i) The design objective shall be to minimize the likelihood of a complete overturn and thereby minimize the possibility of the operator being crushed as a result of a rollover or upset.~~

~~(ii) The design shall provide a vertical clearance of at least 52 inches from the work deck to the ROPS at the point of ingress or egress.~~

~~(d) Remounting. ROPS removed for any reason, shall be remounted with equal quality, or better, bolts or welding are required for the original mounting.~~

~~(e) Labeling. Each ROPS shall have the following information permanently affixed to the structure:~~

~~(1) Manufacturer or fabricator's name and address;~~

~~(2) ROPS model number, if any;~~

~~(3) Machine make, model, or series number that the structure is designed to fit.~~

~~(f) Machines meeting certain existing governmental requirements. Any machine in use, equipped with rollover protective structures, shall be deemed in compliance with this section if it meets the rollover protective structure requirements of the State of California, the U.S. Army Corps of Engineers, or the Bureau of Reclamation of the U.S. Department of the Interior in effect on April 5, 1972. The requirements in effect are:~~

~~(1) State of California: Construction Safety Orders, issued by the Department of Industrial Relations pursuant to Division 5, Labor Code, §6312, State of California.~~

~~(2) U.S. Army Corps of Engineers: General Safety Requirements, EM-385-1-1 (March 1967).~~

~~(3) Bureau of Reclamation, U.S. Department of the Interior: Safety and Health Regulations for Construction. Part II (September 1971).]~~

Stat. Auth.: ORS 654.025(2) and 656.726(3).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (temp).

APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89 (perm).

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.1001

Minimum Performance Criteria for Rollover Protective Structures for Designated Scrapers, Loaders, Dozers, Graders, [and] Crawler Tractors, **Compactors, and Rubber-tired Skid Steer Equipment.**

(a) General. This section prescribes minimum performance criteria for rollover protective structures (ROPS) for rubber-tired self-propelled scrapers; rubber-tired front-end loaders and rubber-tired dozers; crawler tractors, and crawler-type loaders, [and] motor graders, **compactors, and rubber-tired skid steer equipment.** [The vehicle and ROPS as a system shall have the structural characteristics prescribed in paragraph (f) of this section for each type of machine described in this paragraph.]

(b) **Equipment manufactured before July 15, 2019. For equipment listed in paragraph (a) of this section (excluding compactors and rubber-tired skid steer equipment)**

manufactured before July 15, 2019, the protective frames shall conform to the following Society of Automotive Engineers Recommended Practices as applicable: SAE J320a, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers; SAE J394, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front End Loaders and Rubber-Tired Dozers; SAE J395, Minimum Performance Criteria for Roll-Over Protective Structure for Crawler Tractors and Crawler-Type Loaders; SAE J396, Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders; and SAE J397, Critical Zone Characteristics and Dimensions for Operators of Construction and Industrial Machinery, as applicable (each incorporated by reference, see § 1926.6), or comply with the consensus standard (ISO 3471:2008) listed in paragraph (c) of this section. [The static laboratory test prescribed herein will determine the adequacy of the structures used to protect the operator under the following conditions:

- (1) For rubber-tired self-propelled scrapers, rubber-tired front-end loaders, and rubber-tired dozers: Operating between 0 and 10 miles per hour over hard clay where rollover would be limited to a maximum roll angle of 360° down a slope of 30° maximum.
- (2) For motor graders: Operating between 0 and 10 miles per hour over hard clay where rollover would be limited to 360° down a slope of 30° maximum.
- (3) For crawler tractors and crawler-type loaders: Operating between 0 and 10 miles per hour over hard clay where rollover would be limited to a maximum roll angle of 360° down a slope of 45°.]

(c) Equipment manufactured on or after July 15, 2019. For equipment listed in paragraph (a) of this section manufactured on or after July 15, 2019, the protective frames shall meet the test and performance requirements of the International Organization for Standardization (ISO) standard ISO 3471:2008 Earth-Moving Machinery—Roll-over protective structures—Laboratory tests and performance requirements (incorporated by reference, see § 1926.6). [Facilities and apparatus.

- (1) The following material is necessary:
 - (i) Material, equipment, and tiedown means adequate to insure that the ROPS and its vehicle frame absorb the applied energy.
 - (ii) Equipment necessary to measure and apply loads to the ROPS. Adequate means to measure deflections and lengths should also be provided.
 - (iii) Recommended, but not mandatory, types of test setups are illustrated in Figure W-1 for all types of equipment to which this section applies; and in Figure W-2 for rubber-tired self-propelled scrapers; Figure W-3 for rubber-tired front-end loaders, rubber-tired dozers, and motor graders; and Figure W-4 for crawler tractors and crawler-type loaders.

(2) Table W-1 contains a listing of the required apparatus for all types of equipment described in paragraph (a) of this section.

Table W-1

Means to Measure	Accuracy
Deflection of ROPS, inches	± 5% of deflection measured
Vehicle weight, pounds	± 5% of the weight measured
Force applied to frame, pounds	± 5% of force measured
Dimensions of critical zone, inches	± 0.5 in.

(d) Vehicle condition. The ROPS to be tested must be attached to the vehicle structure in the same manner as it will be attached during vehicle use. A totally assembled vehicle is not required. However, the vehicle structure and frame which support the ROPS must represent the

actual vehicle installation. All normally detachable windows, panels, or nonstructural fittings shall be removed so that they do not contribute to the strength of the ROPS.

(e) Test procedure. The test procedure shall include the following, in the sequence indicated:

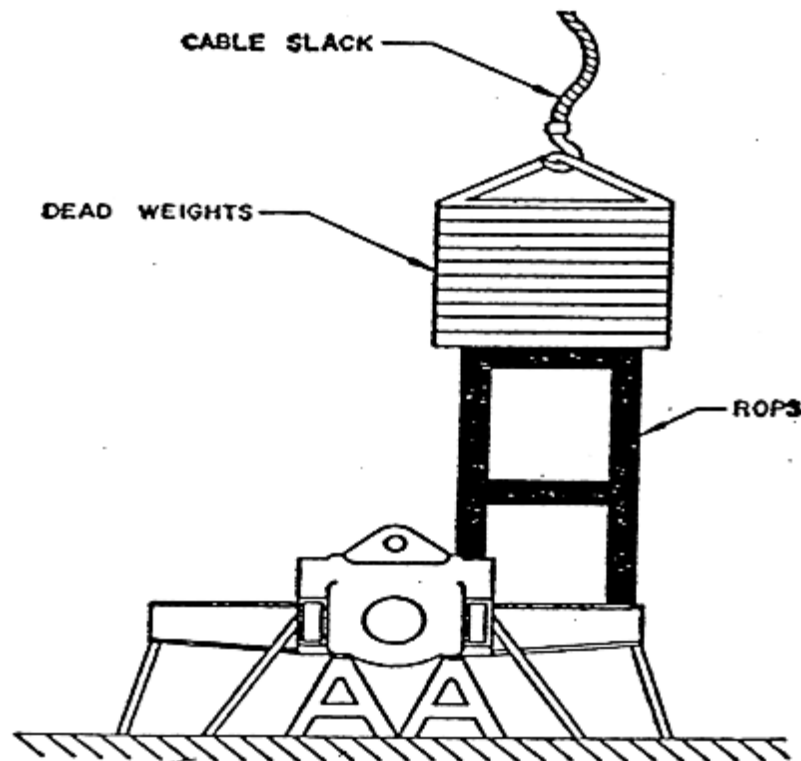
(1) Energy absorbing capabilities of ROPS shall be verified when loaded laterally by incrementally applying a distributed load to the longitudinal outside top member of the ROPS, as shown in Figure W-1, W-2, or W-3, as applicable. The distributed load must be applied so as to result in approximately uniform deflection of the ROPS. The load increments should correspond with approximately 0.5 in. ROPS deflection increment in the direction of the load application, measured at the ROPS top edge. Should the operator's seat be off-center, the load shall be applied on the off-center side. For each applied load increment, the total load (lb.) versus corresponding deflection (in.) shall be plotted, and the area under the load-deflection curve shall be calculated. This area is equal to the energy (in.-lb.) absorbed by the ROPS.

For a typical load-deflection curve and calculation method, see Figure W-5.

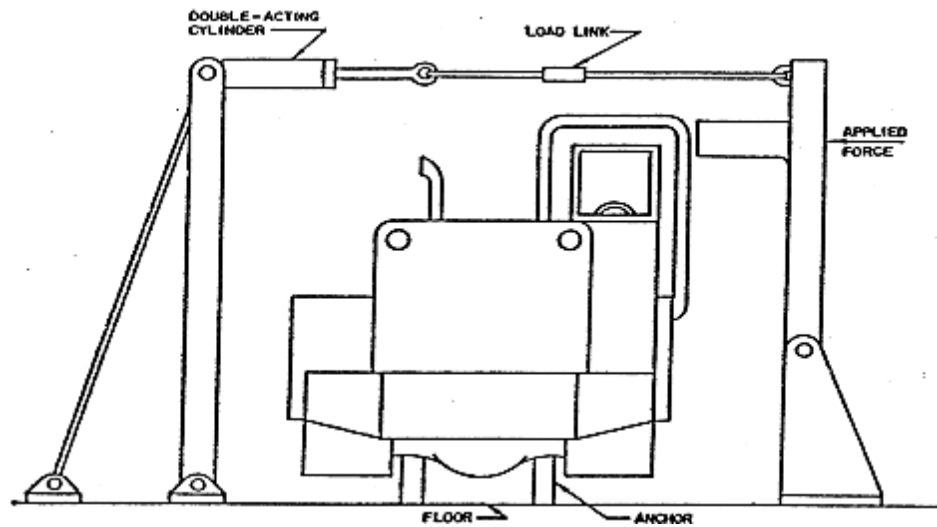
Incremental loading shall be continued until the ROPS has absorbed the amount of energy and the minimum applied load specified under paragraph (f) of this section has been reached or surpassed.

(2) To cover the possibility of the vehicle coming to rest on its top, the support capability shall be verified by applying a distributed vertical load to the top of the ROPS so as to result in approximately uniform deflection (see Figure W-1). The load magnitude is specified in paragraph (f)(2)(iii) of this section.

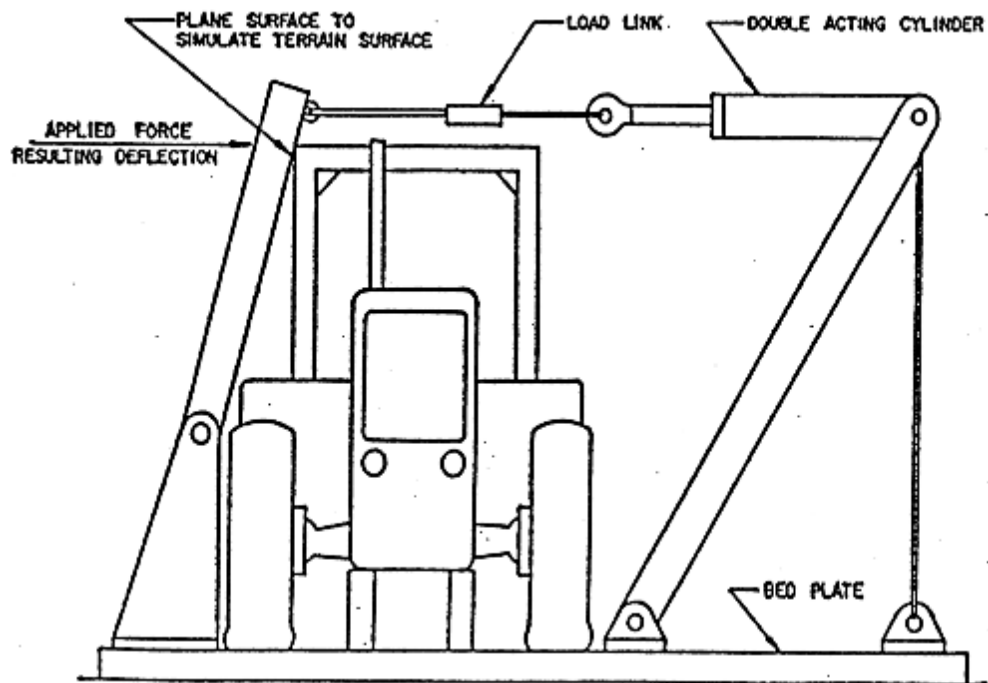
(3) The low temperature impact strength of the material used in the ROPS shall be verified by suitable material tests or material certification (see paragraph (f)(2)(iv) of this section).]



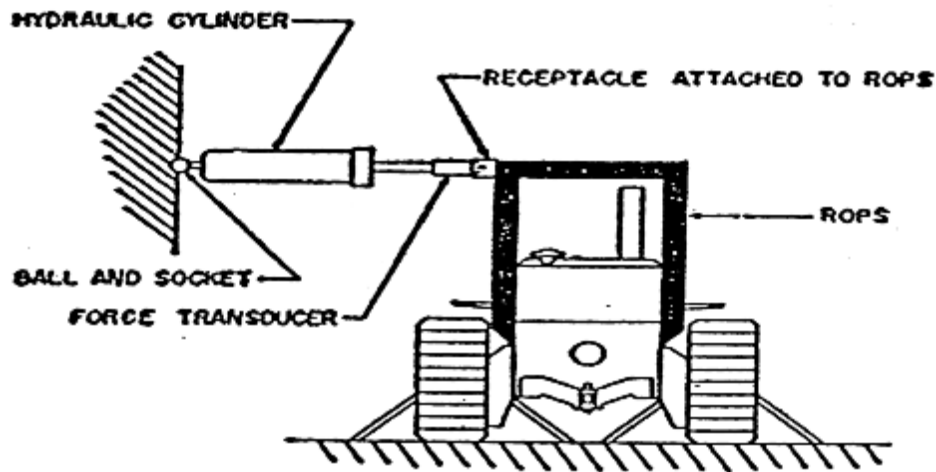
[Figure W-1—Vertical loading setup for all types of equipment described in 1518.1001(a).]



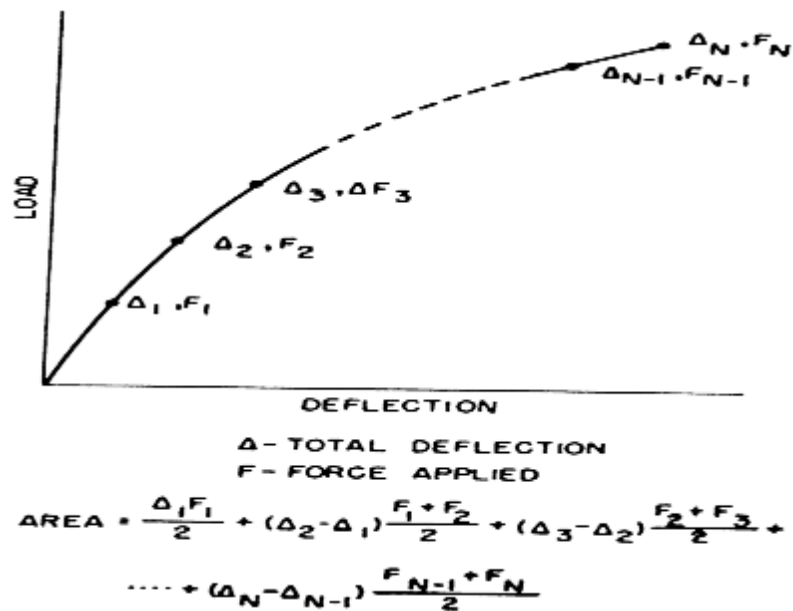
[Figure W-2—Test setup for rubber-tired self-propelled scrapers.]



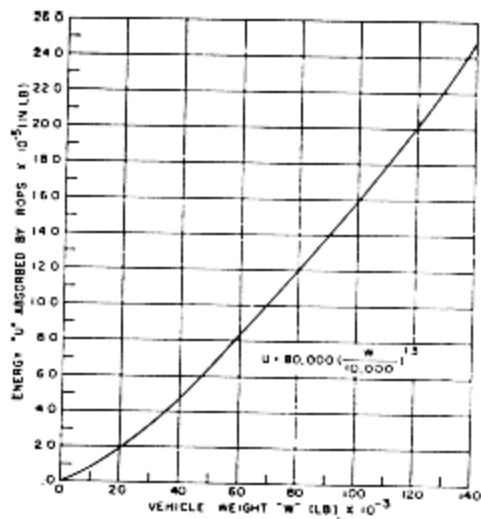
[Figure W-3—Test setup for rubber-tired front-end loaders, rubber-tired dozers, and motor graders.]



[Figure W-4—Side loading setup for crawler tractors and crawler loaders.]



[Figure W-5—Determination of energy area under force deflection curve for all types of ROPS equipment defined in 1926.1001.]



[Figure W-6—Energy absorbed
versus vehicle weight.]

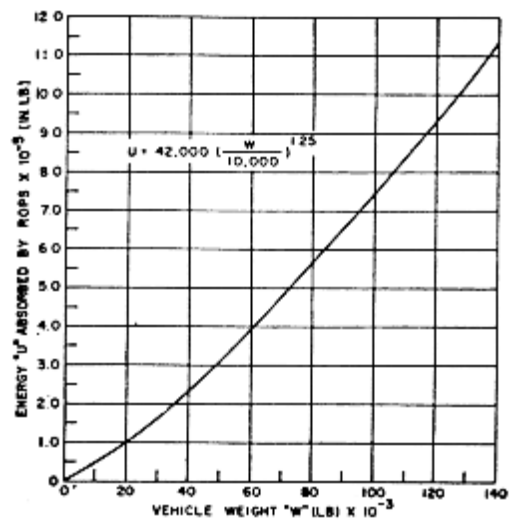
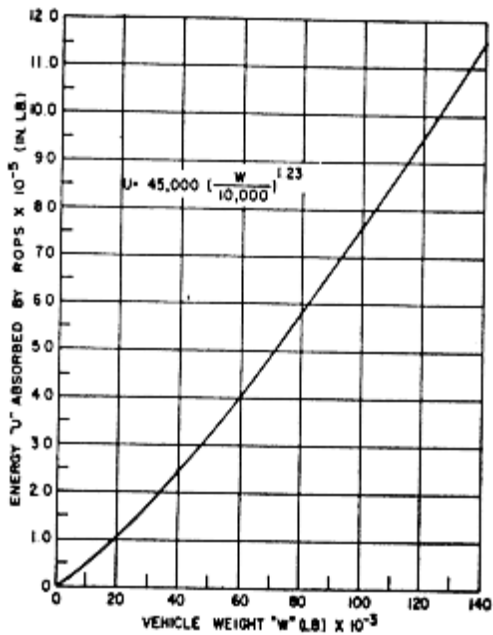


Figure W-7—Energy absorbed
versus vehicle weight.]



[Figure W-8—Energy absorbed
versus vehicle weight.]

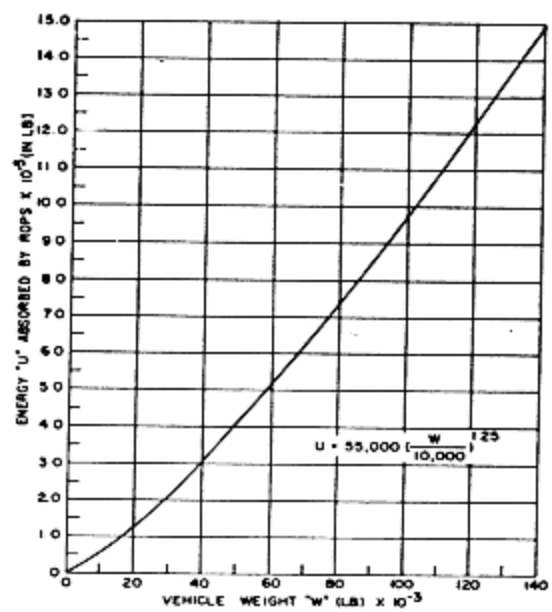
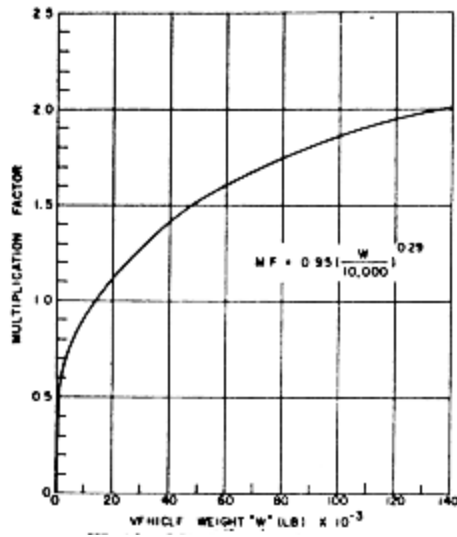
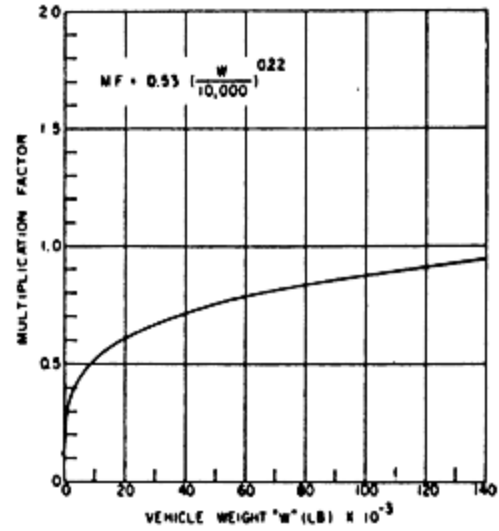


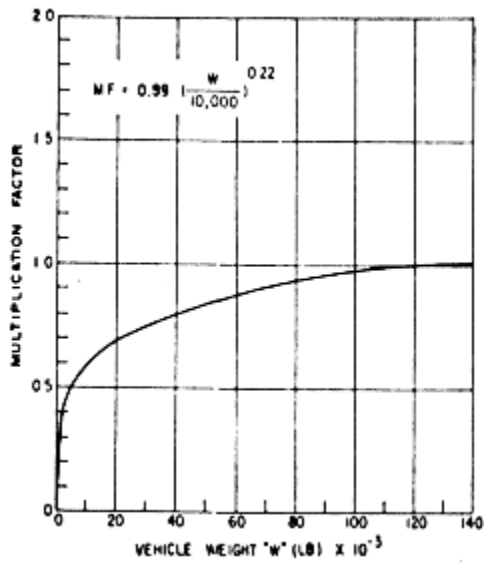
Figure W-9—Energy absorbed
versus vehicle weight.]



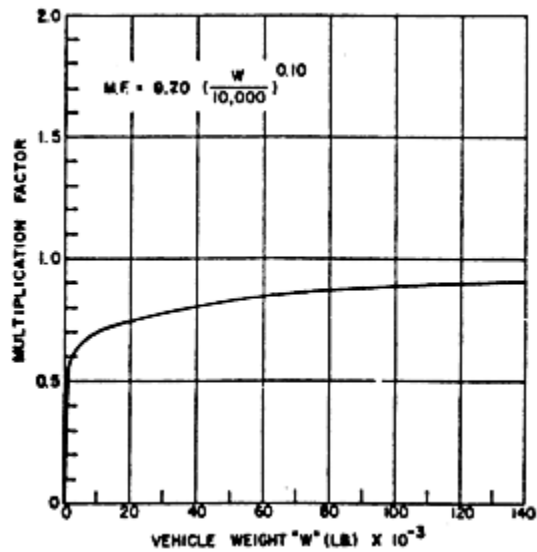
[Figure W-10 — Minimum Horizontal load factor for self-propelled scrapers.]



[Figure W-11 — Minimum Horizontal load factor for rubber-tired loaders and dozers.]



[Figure W-12 — Minimum horizontal load factor for crawler tractors and crawler-type loaders.]



[Figure W-13 — Minimum horizontal load factor for motor graders.]

[(f) Performance requirements.

(1) General performance requirements.

(i) No repairs or straightening of any member shall be carried out between each prescribed test.

~~(ii) During each test, no part of the ROPS shall enter the critical zone as detailed in SAE J397 (1969). Deformation of the ROPS shall not allow the plane of the ground to enter this zone.~~

~~(2) Specific performance requirements.~~

~~(i) The energy requirement for purposes of meeting the requirements of paragraph (e)(1) of this section is to be determined by referring to the plot of the energy versus weight of vehicle (see Figure W-6 for rubber-tired self-propelled scrapers; Figure W-7 for rubber-tired front-end loaders and rubber-tired dozers; Figure W-8 for crawler tractors and crawler-type loaders; and Figure W-9 for motor graders). For purposes of this section, force and weight are measured as pounds (lb.); energy (U) is measured as inch-pounds.~~

~~(ii) The applied load must attain at least a value which is determined by multiplying the vehicle weight by the corresponding factor shown in Figure W-10 for rubber-tired self-propelled scrapers; in Figure W-11 for rubber-tired front-end loaders and rubber-tired dozers; in Figure W-12 for crawler tractors and crawler-type loaders; and in Figure W-13 for motor graders.~~

~~(iii) The load magnitude for purposes of compliance with paragraph (e)(2) of this section is equal to the vehicle weight. The test of load magnitude shall only be made after the requirements of paragraph (f)(2)(i) of this section are met.~~

~~(iv) Material used in the ROPS must have the capability of performing at zero degrees Fahrenheit, or exhibit Charpy V notch impact strength of 8 foot-pounds at minus 20° Fahrenheit. This is a standard Charpy specimen as described in American Society of Testing and Materials A 370, Methods and Definitions for Mechanical Testing of Steel Products (available at each Regional Office of the Occupational Safety and Health Administration). The purpose of this requirement is to reduce the tendency of brittle fracture associated with dynamic loading, low temperature operation, and stress raisers which cannot be entirely avoided on welded structures.~~

~~(g) Definitions. For purposes of this section, "vehicle weight" means the manufacturer's maximum weight of the prime mover for rubber-tired self-propelled scrapers. For other types of equipment to which this section applies, "vehicle weight" means the manufacturer's maximum recommended weight of the vehicle plus the heaviest attachment.~~

~~(h) Source of standard. This standard is derived from, and restates, the following Society of Automotive Engineers Recommended Practices: SAE J320a, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers; SAE J394, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front End Loaders and Rubber-Tired Dozers; SAE J395, Minimum Performance Criteria for Roll-Over Protective Structure for Crawler Tractors and Crawler-Type Loaders; and SAE J396, Minimum Performance Criteria for Roll-Over Protective Structure for Motor Graders. These recommended practices shall be resorted to in the event that questions of interpretation arise. The recommended practices appear in the 1971 SAE Handbook, which may be examined in each of the Regional Offices of the Occupational Safety and Health Administration.]~~

Stat. Auth.: ORS 654.025(2) and 656.726(3).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (temp).

APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89 (perm).

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.1002

Protective Frame (Roll-Over Protective Structures, Known as ROPS) for Wheel-type Agricultural and Industrial Tractors Used in Construction.

(a) General.

~~[(1) The purpose of this section is to]~~ sets forth requirements for frames used to protect operators of wheel-type agricultural and industrial tractors **used in construction work** that will minimize the possibility of operator injury resulting from accidental upsets during normal operation. **See paragraph (e) of this section for definitions of agricultural and industrial tractors.** ~~[With respect to agricultural and industrial tractors, the provisions of 29 CFR 1926.1001 and 1926.1003 for rubber-tired dozers and rubber-tired loaders may be used instead of the requirements of this section.]~~

~~(2) The protective frame that is the subject of this standard is a structure mounted to the tractor that extends above the operator's seat and conforms generally to Figure W-14.~~

~~(3) When an overhead weather shield is attached to the protective frame, it may be in place during testing, provided that it does not contribute to the strength of the protective frame. When such an overhead weather shield is attached, it must meet the requirements of paragraph (i) of this section.~~

~~(4) For overhead protection requirements, see 29 CFR 1926.1003.~~

~~(5) The following provisions address requirements for protective enclosures:~~

~~(i) When protective enclosures are used on wheel-type agricultural and industrial tractors, they shall meet the requirements of Society of Automotive Engineers (SAE) standard J168-1970, Protective Enclosures, Test Procedures, and Performance Requirements, which is incorporated by reference. The incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51.~~

~~(ii) SAE standard J168-1970 appears in the 1971 SAE Handbook, or it may be examined at: any OSHA Regional Office; the OSHA Docket Office, U.S. Department of Labor, 200 Constitution Avenue, NW., Room N-2625, Washington, DC 20210 (telephone: (202) 693-2350 (TTY number: (877) 889-5627)); or the National Archives and Records Administration ("NARA"). (For information on the availability of this material at NARA, telephone (202) 741-6030 or access the NARA Web site at~~

~~http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.)~~

~~Copies may be purchased from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pennsylvania 15096-0001.]~~

(b) Equipment manufactured before July 15, 2019.

For equipment manufactured before July 15, 2019, the protective frames shall meet the test and performance requirements of the Society of Automotive Engineers Standard J334a, Protective Frame Test Procedures and Performance Requirements and J168, Protective enclosures-test procedures and performance requirements, as applicable (incorporated by reference, see § 1926.6), or comply with the consensus standard (ISO 5700:2013) listed in paragraph (c) of this section.

~~[Applicability. The requirements of this section apply to wheel-type agricultural and industrial tractors used in construction work. See paragraph (j) of this section for definitions of agricultural tractors set forth in paragraph (i) of this section.]~~

(c) Equipment manufactured on or after July 15, 2019.

For equipment manufactured on or after July 15, 2019, the protective frames shall meet the test and performance requirements of the International Organization for Standardization (ISO) standard ISO 5700:2013, Tractors for agriculture and forestry—Roll-over protective structures—static test method and acceptance conditions or ISO 3471:2008 Earth-Moving Machinery—Roll-over protective structures— Laboratory tests and performance requirements (incorporated by reference, see § 1926.6).

[Performance requirements.

(1) Either a laboratory test or a field test is required to determine the performance requirements set forth in paragraph (i) of this section.

(2) A laboratory test may be either static or dynamic. The laboratory test must be under conditions of repeatable and controlled loading to permit analysis of the protective frame.

(3) A field upset test, when used, shall be conducted under reasonably controlled conditions, both rearward and sideways to verify the effectiveness of the protective frame under actual dynamic conditions.]

(d) Overhead protection requirements. For overhead protection requirements, see § 1926.1003

[Test procedures -- general.

(1) The tractor used shall be the tractor with the greatest weight on which the protective frame is to be used.

(2) A new protective frame and mounting connections of the same design shall be used for each test procedure.

(3) Instantaneous and permanent frame deformation shall be measured and recorded for each segment of the test.

(4) Dimensions relative to the seat shall be determined with the seat unloaded and adjusted to its highest and most rearward latched position provided for a seated operator.

(5) When the seat is offset, the frame loading shall be on the side with the least space between the centerline of the seat and the upright.

(6) The low-temperature impact strength of the material used in the protective structure shall be verified by suitable material tests or material certifications according to 29 CFR

1926.1001(f)(2)(iv).]

(e)

[Test procedure for vehicle overturn.

(1) Vehicle weight. The weight of the tractor, for purposes of this section, includes the protective frame, all fuels, and other components required for normal use of the tractor. Ballast must be added when necessary to achieve a minimum total weight of 130 lb (59 kg) per maximum power takeoff horsepower at the rated engine speed. The weight of the front end must be at least 33 lb (15 kg) per maximum power takeoff horsepower. In case power takeoff horsepower is unavailable, 95 percent of net engine flywheel horsepower shall be used.

(2) Agricultural tractors shall be tested at the weight set forth in paragraph (e)(1) of this section.

(3) Industrial tractors shall be tested with items of integral or mounted equipment and ballast that are sold as standard equipment or approved by the vehicle manufacturer for use with the vehicle when the protective frame is expected to provide protection for the operator with such equipment installed. The total vehicle weight and front-end weight as tested shall not be less than the weights established in paragraph (e)(1) of this section.

(4) The following provisions address soil bank test conditions.

(i) The test shall be conducted on a dry, firm soil bank as illustrated in Figure W-15. The soil in the impact area shall have an average cone index in the 0-in. to 6-in. (0 mm to 153 mm) layer not less than 150 according to American Society of Agricultural Engineers ("ASAE") recommendation ASAE R313.1-1971 ("Soil cone penetrometer"), as reconfirmed in 1975, which is incorporated by reference. The incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. The path of vehicle travel shall be $12^{\circ} \pm 2^{\circ}$ to the top edge of the bank.

(ii) ASAE recommendation ASAE R313.1-1971, as reconfirmed in 1975, appears in the 1977 Agricultural Engineers Yearbook, or it may be examined at: any OSHA Regional Office; the OSHA Docket Office, U.S. Department of Labor, 200 Constitution Avenue, NW., Room N-2625,

Washington, DC 20210 (telephone: (202) 693-2350 (TTY number: (877) 889-5627)); or the National Archives and Records Administration ("NARA"). (For information on the availability of this material at NARA, telephone (202) 741-6030 or access the NARA Web site at <http://www.archives.gov/federal-register/code-of-federal-regulations/ibr-locations.html>). Copies may be purchased from the American Society of Agricultural Engineers 2950 Niles Road, St. Joseph, MI 49085.

~~(5) The upper edge of the bank shall be equipped with an 18-in. (457-mm) high ramp as described in Figure W-15 to assist in tipping the vehicle.~~

~~(6) The front and rear wheel-tread settings, when adjustable, shall be at the position nearest to halfway between the minimum and maximum settings obtainable on the vehicle. When only two settings are obtainable, the minimum setting shall be used.~~

~~(7) Vehicle overturn test -- sideways and rearward.~~

~~(i) The tractor shall be driven under its own power along the specified path of travel at a minimum speed of 10 mph (16 kph), or maximum vehicle speed when under 10 mph (16 kph), up the ramp as described in paragraph (d)(5) of this section to induce sideways overturn.~~

~~(ii) Rear upset shall be induced by engine power with the tractor operating in gear to obtain 3 to 5 mph (4.8 to 8 kph) at maximum governed engine rpm, preferably by driving forward directly up a minimum slope of two vertical to one horizontal. The engine clutch may be used to aid in inducing the upset.~~

~~(f) Other test procedures. When the field-upset test is not used to determine ROPS performance, either the static test or the dynamic test, contained in paragraph (g) or (h) of this section, shall be made.~~

~~(g) Static test.~~

~~(1) Test conditions.~~

~~(i) The laboratory mounting base shall include that part of the tractor chassis to which the protective frame is attached, including the mounting parts.~~

~~(ii) The protective frame shall be instrumented with the necessary equipment to obtain the required load-deflection data at the locations and directions specified in Figures W-16, W-17, and W-18.~~

~~(iii) The protective frame and mounting connections shall be instrumented with the necessary recording equipment to obtain the required load-deflection data to be used in calculating FSB (see paragraph (j)(3) of this section). The gauges shall be placed on mounting connections before the installation load is applied.~~

~~(2) Test procedure.~~

~~(i) The side-load application shall be at the upper extremity of the frame upright at a 90° angle to the centerline of the vehicle. The side load L shall be applied according to Figure W-16. L and D shall be recorded simultaneously. The test shall be stopped when:~~

~~(A) The strain energy absorbed by the frame is equal to the required input energy (E_{is});~~

~~(B) Deflection of the frame exceeds the allowable deflection; or~~

~~(C) The frame load limit occurs before the allowable deflection is reached in the side load.~~

~~(ii) The L-D diagram (see Figure W-19 for an example) shall be constructed using the data obtained according to paragraph (g)(2)(i) of this section.~~

~~(iii) The modified L_m-D_m diagram shall be constructed according to paragraph (g)(2)(ii) and Figure W-20 of this section. The strain energy absorbed by the frame (E_u) shall then be determined.~~

~~(iv) E_{is}, FER, and FSB shall be calculated.~~

~~(v) The test procedure shall be repeated on the same frame using L (rear input; see Figure W-18) and E_{ir}. Rear-load application shall be distributed uniformly along a maximum projected dimension of 27 in. (686 mm) and a maximum area of 160 sq. in. (1,032 sq. cm) normal to the direction of load application. The load shall be applied to the upper extremity of the frame at the point that is midway between the centerline of the seat and the inside of the frame upright.~~

~~(h) Dynamic test.~~

~~(1) Test conditions.~~

~~(i) The protective frame and tractor shall meet the requirements of paragraphs (e)(2) or (3) of this section, as appropriate.~~

~~(ii) The dynamic loading shall be produced by using a 4,410-lb (2,000-kg) weight acting as a pendulum. The impact face of the weight shall be 27 ±1 in. by 27 ±1 in. (686 ±25 mm by 686 ±25 mm), and shall be constructed so that its center of gravity is within 1.0 in. (25.4 mm) of its geometric center. The weight shall be suspended from a pivot point 18 to 22 ft (5.5 to 6.7 m) above the point of impact on the frame, and shall be conveniently and safely adjustable for height (see Figure W-21).~~

~~(iii) For each phase of testing, the tractor shall be restrained from moving when the dynamic load is applied. The restraining members shall be 0.50- to 0.63-in. (12.5- to 16.0-mm) steel cable, and points for attaching restraining members shall be located an appropriate distance behind the rear axle and in front of the front axle to provide a 15° to 30° angle between the restraining cable and the horizontal. The restraining cables shall either be in the plane in which the center of gravity of the pendulum will swing, or more than one restraining cable shall give a resultant force in this plane (see Figure W-22).~~

~~(iv) The wheel-tread setting shall comply with the requirements of paragraph (e)(6) of this section. The tires shall have no liquid ballast, and shall be inflated to the maximum operating pressure recommended by the tire manufacturer. With the specified tire inflation, the restraining cables shall be tightened to provide tire deflection of 6 to 8 percent of the nominal tire-section width. After the vehicle is restrained properly, a wooden beam that is 6-in. x 6-in. (150 mm x 150 mm) shall be driven tightly against the appropriate wheels and clamped. For the test to the side, an additional wooden beam shall be placed as a prop against the wheel nearest to the operator's station, and shall be secured to the floor so that when it is positioned against the wheel rim, it is at an angle of 25° to 40° to the horizontal. It shall have a length 20 to 25 times its depth, and a width two to three times its depth (see Figures W-22 and W-23).~~

~~(v) Means shall be provided for indicating the maximum instantaneous deflection along the line of impact. A simple friction device is illustrated in Figure W-18.~~

~~(vi) No repair or adjustments may be carried out during the test.~~

~~(vii) When any cables, props, or blocking shift or break during the test, the test shall be repeated.~~

~~(2) Test procedure.~~

~~(i) General. The frame shall be evaluated by imposing dynamic loading to the rear, followed by a load to the side on the same frame. The pendulum dropped from the height (see the definition of "H" in paragraph (j)(3) of this section) imposes the dynamic load. The position of the pendulum shall be so selected that the initial point of impact on the frame shall be in line with the arc of travel of the center of gravity of the pendulum. A quick-release mechanism should be used but, when used, it shall not influence the attitude of the block.~~

~~(ii) Impact at rear. The tractor shall be restrained properly according to paragraphs (h)(1)(iii) and (h)(1)(iv) of this section. The tractor shall be positioned with respect to the pivot point of the pendulum so that the pendulum is 20° from the vertical prior to impact as shown in Figure W-22. The impact shall be applied to the upper extremity of the frame at the point that is midway between the centerline of the frame and the inside of the frame upright of a new frame.~~

~~(iii) Impact at side. The blocking and restraining shall conform to paragraphs (h)(1)(iii) and (h)(1)(iv) of this section. The center point of impact shall be that structural member of the protective frame likely to hit the ground first in a sideways accidental upset. The side impact shall be applied to the side opposite that used for rear impact.~~

~~(i) Performance requirements.~~

~~(1) General.~~

- (i) The frame, overhead weather shield, fenders, or other parts in the operator area may be deformed in these tests, but shall not shatter or leave sharp edges exposed to the operator, or violate the dimensions shown in Figures W-16 and W-17, and specified as follows:
 $D = 2$ in. (51 mm) inside of the frame upright to the vertical centerline of the seat;
 $E = 30$ in. (762 mm);
 $F =$ Not less than 0 in. (0 mm) and not more than 12 in. (305 mm), measured at the centerline of the seat backrest to the crossbar along the line of load application as shown in Figure W-17; and
 $G = 24$ in. (610 mm).
- (ii) The material and design combination used in the protective structure must be such that the structure can meet all prescribed performance tests at 0°F (-18°C) according to 29 CFR 1926.1001(f)(2)(iv).
- (2) Vehicle overturn performance requirements. The requirements of this paragraph (i) must be met in both side and rear overturns.
- (3) Static test performance requirements. Design factors shall be incorporated in each design to withstand an overturn test as specified by this paragraph (i). The structural requirements will be met generally when FER is greater than 1.0 and FSB is greater than K-1 in both side and rear loadings.
- (4) Dynamic test performance requirements. Design factors shall be incorporated in each design to withstand the overturn test specified by this paragraph (i). The structural requirements will be met generally when the dimensions in this paragraph (i) are used during both side and rear loads.
- (j) Definitions applicable to this section.

(1) "Agricultural tractor" means a wheel-type vehicle of more than 20 engine horsepower, used in construction work, that is designed to furnish the power to pull, propel, or drive implements. (SAE standard J333a-1970) "Operator protection for wheel-type agricultural and industrial tractors" defines "agricultural tractor" as a "wheel-type vehicle of more than 20 engine horsepower designed to furnish the power to pull, carry, propel, or drive implements that are designed for agricultural usage." Since this part 1926 applies only to construction work, the SAE definition of "agricultural tractor" is adopted for purposes of this subpart.

(2) "Industrial tractor" means that class of wheel type tractors of more than 20 engine horsepower (other than rubber-tired loaders and dozers described in 29 CFR 1926.1001), used in operations such as landscaping, construction services, loading, digging, grounds keeping, and highway maintenance.

(3) The following symbols, terms, and explanations apply to this section:

E_{is} = Energy input to be absorbed during side loading in ft-lb (E'_{is} in J [joules]);

$E_{is} = 723 + 0.4 W$ ft-lb ($E'_{is} = 100 + 0.12 W'$, J);

E_{ir} = Energy input to be absorbed during rear loading in ft-lb (E'_{ir} in J);

$E_{ir} = 0.47 W$ ft-lb ($E'_{ir} = 0.14 W'$, J);

W = Tractor weight as specified by 29 CFR 1926.1002(e)(1) and (e)(3), in lb (W' , g);

L = Static load, lb (kg);

D = Deflection under L , in. (mm);

$L-D$ = Static load-deflection diagram;

L_m-D_m = Modified static load-deflection diagram (Figure W-20). To account for an increase in strength due to an increase in strain rate, raise L in the plastic range $L \times K$;

K = Increase in yield strength induced by higher rate of loading (1.3 for hot, rolled, low-carbon steel 1010-1030). Low carbon is preferable; however, when higher carbon or other material is used, K must be determined in the laboratory. Refer to Norris, C.H., Hansen, R.J., Holley, M.J.,

Biggs, J.M., Namyet, S., and Minami, J.V., Structural Design for Dynamic Loads, McGraw-Hill, New York, 1959, p. 3;

L_{max} = Maximum observed static load;

Load Limit = Point on a continuous L-D curve at which the observed static load is 0.8 L_{max} (refer to Figure W-19);

E_u = Strain energy absorbed by the frame, ft-lb (J); area under the L_m - D_m curve;

FER = Factor of energy ratio, $FER = E_u/E_s$; also, $FER = E_u/E_{ir}$; P_b = Maximum observed force in mounting connection under a static load, L, lb (kg);

P_u = Ultimate force capacity of mounting connection, lb (kg);

FSB = Design margin for a mounting connection (P_u/P_b)-1; and

H = Vertical height of lift of 4,410-lb (2,000-kg) weight, in. (H' , mm). The weight shall be pulled back so that the height of its center of gravity above the point of impact is defined as follows: $H = 4.92 + 0.00190 W$ ($H' = 125 + 0.107 W'$) (see Figure W-24).

(k) Source of standard. The standard in this section is derived from, and restates, in part, Society of Automotive Engineers ("SAE") standard J334a-1970 ("Protective frame test procedures and performance requirements"). The SAE standard appears in the 1974 SAE Handbook, which may be examined at any OSHA regional office.]

[61 FR 9227, March 7, 1996; 70 FR 76985, Dec. 29, 2005, as amended at 71 FR 41129, July 20, 2006; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 4-1989, f. 3/31/89, ef. 5/1/89 (temp).

APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89 (perm).

OR-OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.

OR-OSHA Admin. Order 5-2006, f. 8/7/06, ef. 1/1/07.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.1003

Overhead Protection for Operators of Agricultural and Industrial Tractors Used in Construction.

(a) General. [~~(1) Purpose. When~~]**This section sets forth requirements for** overhead protection **used to protect operators of** [~~is provided on~~] wheel-type agricultural and industrial tractors **used in construction work that will** [~~the overhead protection shall be designed and installed according to the requirements contained in this section. The provisions of 29 CFR 1926.1001 for rubber-tired dozers and rubber-tired loaders may be used instead of the standards contained in this section. The purpose of this standard is to~~]minimize the possibility of operator injury resulting from overhead hazards such as flying and falling objects, and [~~at the same time to minimize the possibility of operator injury~~]from the cover itself in the event of accidental upset.

[~~(2) Applicability. This standard applies to wheel-type agricultural and industrial tractors used in construction work. (See 29 CFR 1926.1002(b) and (j).) In the case of machines to which 29 CFR 1926.604 (relating to site clearing) also applies, the overhead protection may be either the type of protection provided in 29 CFR 1926.604, or the type of protection provided by this section.~~]

(b) Equipment manufactured before July 15, 2019. When overhead protection is provided on wheel-type agricultural and industrial tractors manufactured before July 15, 2019, the overhead protection shall be designed and installed according to the requirements

contained in the test and performance requirements of Society of Automotive Engineers Standard J167, Protective Frame with Overhead Protection-Test Procedures and Performance Requirements, which pertains to overhead protection requirements (incorporated by reference, see § 1926.6) or comply with the consensus standard (ISO 27850:2013) listed in paragraph (c) of this section. [~~Overhead protection. When overhead protection is installed on wheel-type agricultural or industrial tractors used in construction work, it shall meet the requirements of this paragraph. The overhead protection may be constructed of a solid material. If grid or mesh is used, the largest permissible opening shall be such that the maximum circle which can be inscribed between the elements of the grid or mesh is 1.5 in. (38 mm.) in diameter. The overhead protection shall not be installed in such a way as to become a hazard in the case of upset.~~]

(c) Equipment manufactured on or after July 15, 2019. When overhead protection is provided on wheel-type agricultural and industrial tractors manufactured on or after July 15, 2019, the overhead protection shall be designed and installed according to the requirements contained in the test and performance requirements of the International Organization for Standardization (ISO) standard ISO 27850:2013, Tractors for agriculture and forestry—Falling object protective structures—Test procedures and performance requirements, which pertains to overhead protection requirements (incorporated by reference, see § 1926.6).

~~[Test procedures—general.~~

~~(1) The requirements of 29 CFR 1926.1002(d), (e), and (f) shall be met.~~

~~(2) Static and dynamic rear load application shall be distributed uniformly along a maximum projected dimension of 27 in. (686 mm), and a maximum area of 160 sq. in. (1,032 sq. cm), normal to the direction of load application. The load shall be applied to the upper extremity of the frame at the point that is midway between the centerline of the seat and the inside of the frame upright.~~

~~(3) The static and dynamic side load application shall be distributed uniformly along a maximum projected dimension of 27 in. (686 mm), and a maximum area of 160 sq. in. (1,032 sq. cm), normal to the direction of load application. The direction of load application is the same as in 29 CFR 1926.1002 (g) and (h). To simulate the characteristics of the structure during an upset, the center of load application may be located from a point 24 in. (610 mm) (K) forward to 12 in. (305 mm) (L) rearward of the front of the seat backrest, to best use the structural strength (see Figure W-25).]~~

(d) Site clearing. In the case of machines to which § 1926.604 (relating to site clearing) also applies, the overhead protection may be either the type of protection provided in § 1926.604, or the type of protection provided by this section.

~~[Drop test procedures.~~

~~(1) The same frame shall be subjected to the drop test following either the static or dynamic test.~~

~~(2) A solid steel sphere or material of equivalent spherical dimension weighing 100 lb (45.4 kg) shall be dropped once from a height 10 ft (3.08 m) above the overhead cover.~~

~~(3) The point of impact shall be on the overhead cover at a point within the zone of protection as shown in Figure W-26, which is furthest removed from major structural members.~~

~~(e) Crush test procedure.~~

~~(1) The same frame shall be subjected to the crush test following the drop test and static or dynamic test.~~

~~(2) The test load shall be applied as shown in Figure W-27, with the seat positioned as specified in 29 CFR 1926.1002(d)(4). Loading cylinders shall be mounted pivotally at both ends. Loads applied by each cylinder shall be equal within two percent, and the sum of the loads of the two~~

~~cylinders shall be two times the tractor weight as set forth in 29 CFR 1926.1002(e)(1). The maximum width of the beam illustrated in Figure W-27 shall be 6 in. (152 mm).~~

~~(f) Performance requirements.~~

~~(1) General. The performance requirements set forth in 29 CFR 1926.1002(i)(2), (3), and (4) shall be met.~~

~~(2) Drop test performance requirements.~~

~~(i) Instantaneous deformation due to impact of the sphere shall not enter the protected zone as illustrated in Figures W-25, W-26, and W-28.~~

~~(ii) In addition to the dimensions set forth in 29 CFR 1926.1002(i)(1)(i), the following dimensions apply to Figure W-28:~~

~~H = 17.5 in. (444 mm); and~~

~~J = 2 in. (50.8 mm), measured from the outer periphery of the steering wheel.~~

~~(3) Crush test performance requirements. The protected zone as described in Figure W-28 must not be violated.~~

~~(g) Source of standard. This standard is derived from, and restates, in part, the portions of Society of Automotive Engineers ("SAE") standard J167-1970 ("Protective frame with overhead protection -- test procedures and performance requirements"), which pertain to overhead protection requirements. The SAE standard appears in the 1971 SAE Handbook, which may be examined at any OSHA regional office.]~~

[61 FR 9227, March 7, 1996; 70 FR 76985, Dec. 29, 2005; **84 FR 21578, May 14, 2019**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats, Implemented: ORS 654.001 through 654.295.

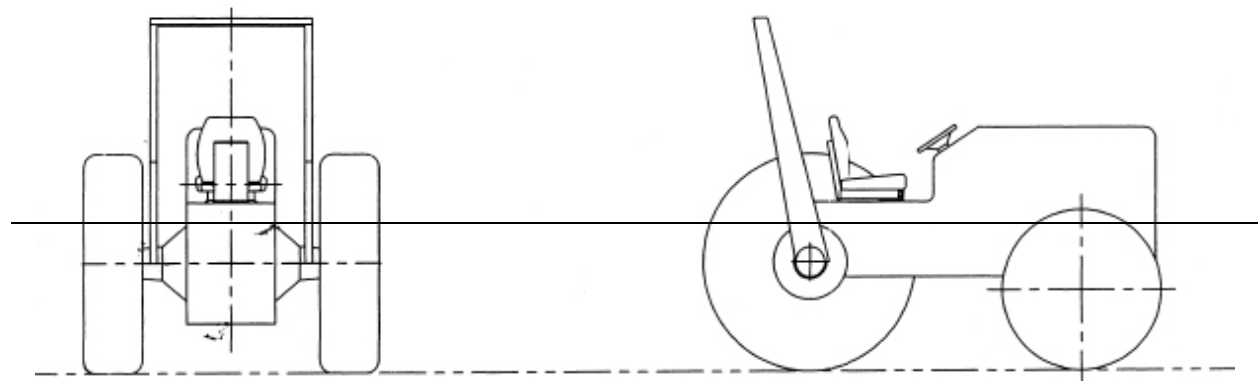
Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.

APD Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.

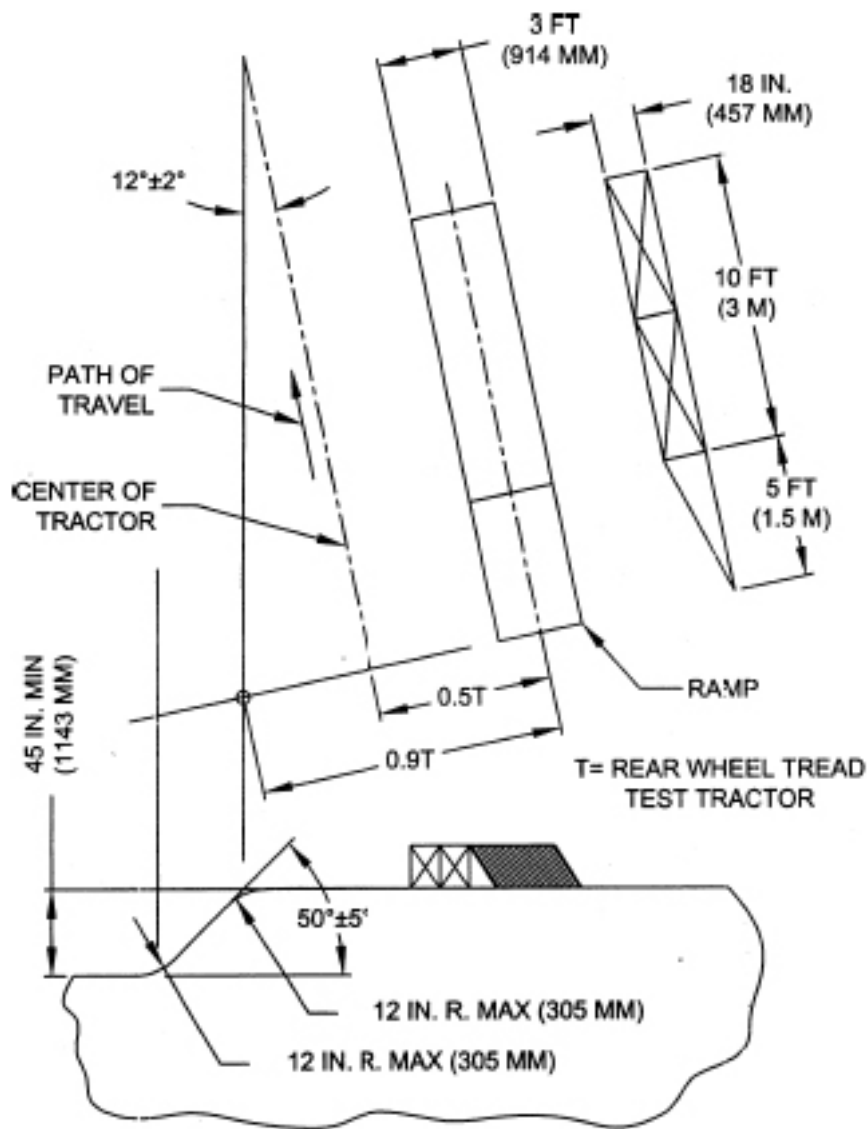
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OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

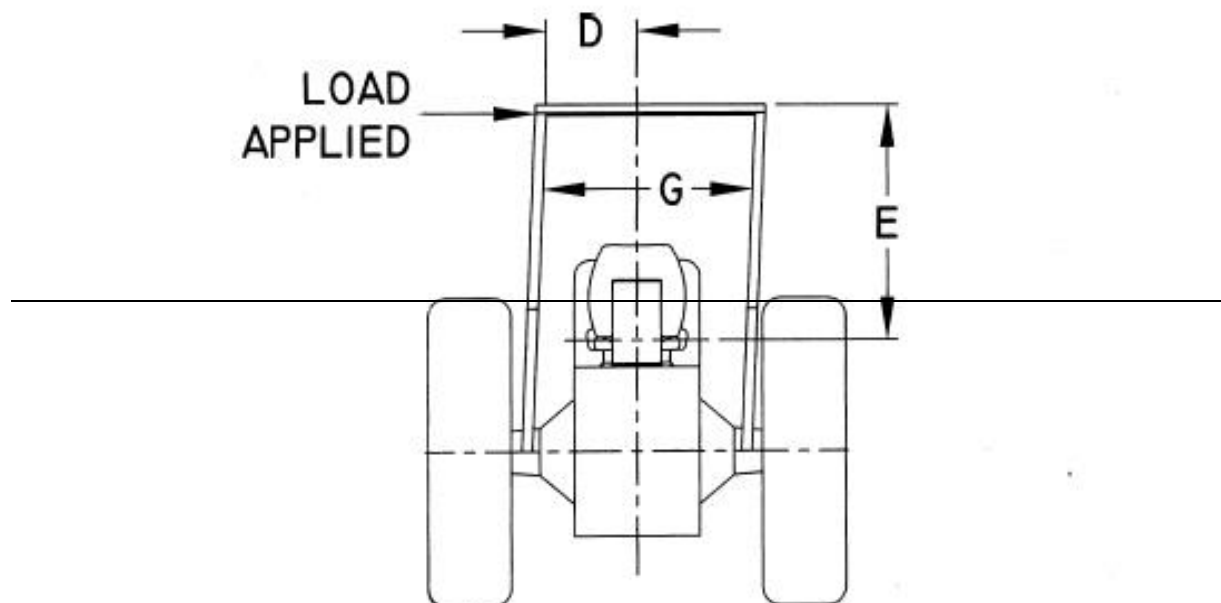
[Appendix A to Subpart W]



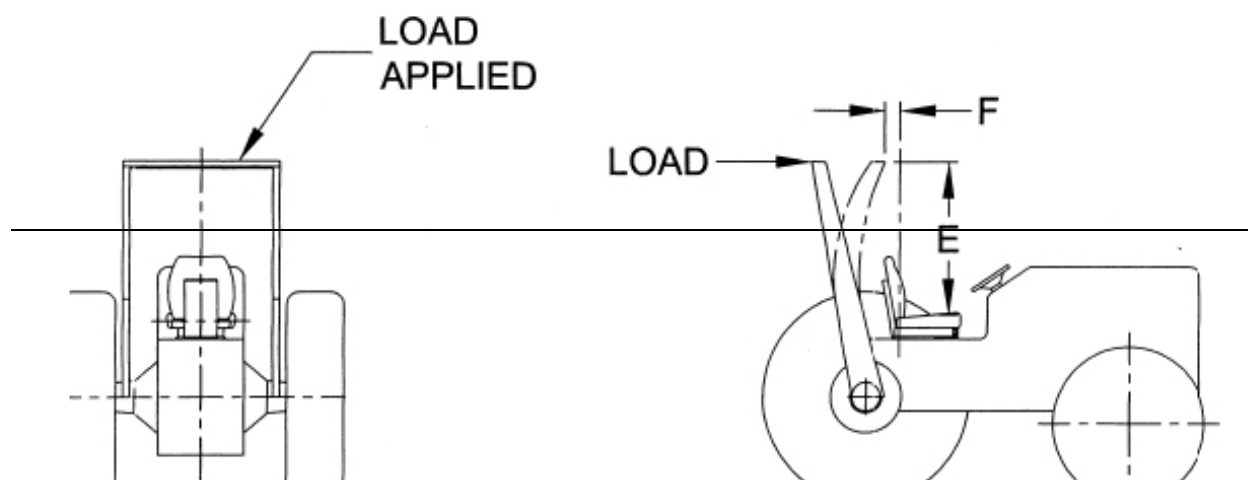
[Figure W-14—Typical Frame Configuration]



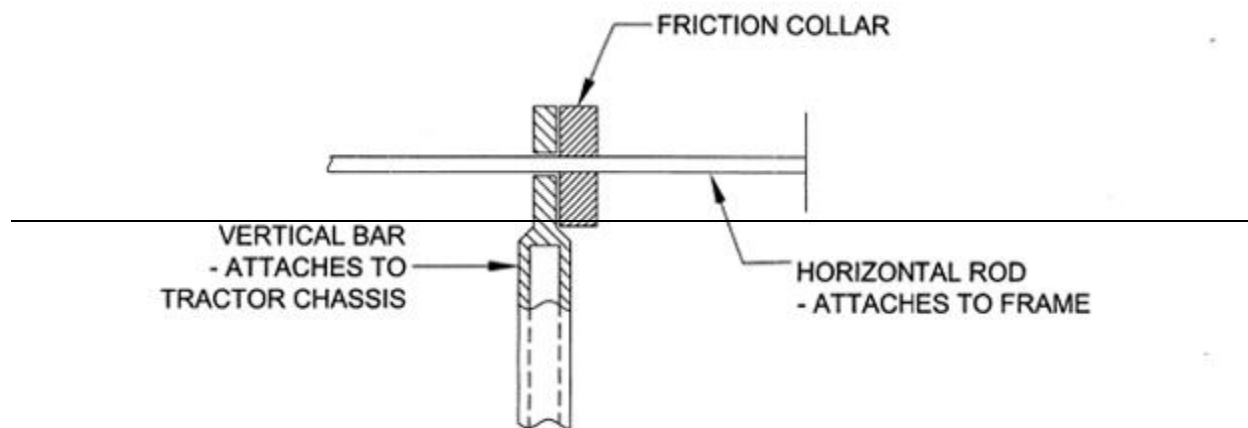
[Figure W-15—Side Overturn Bank and Ramp]



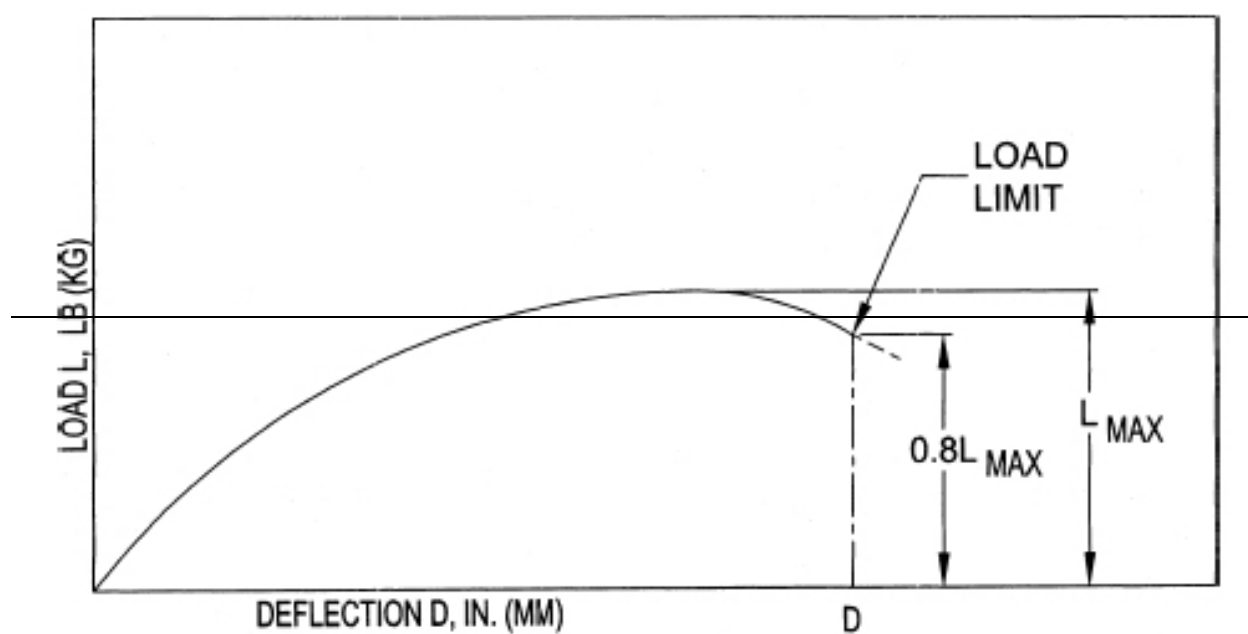
[Figure W-16 Side Load Application]



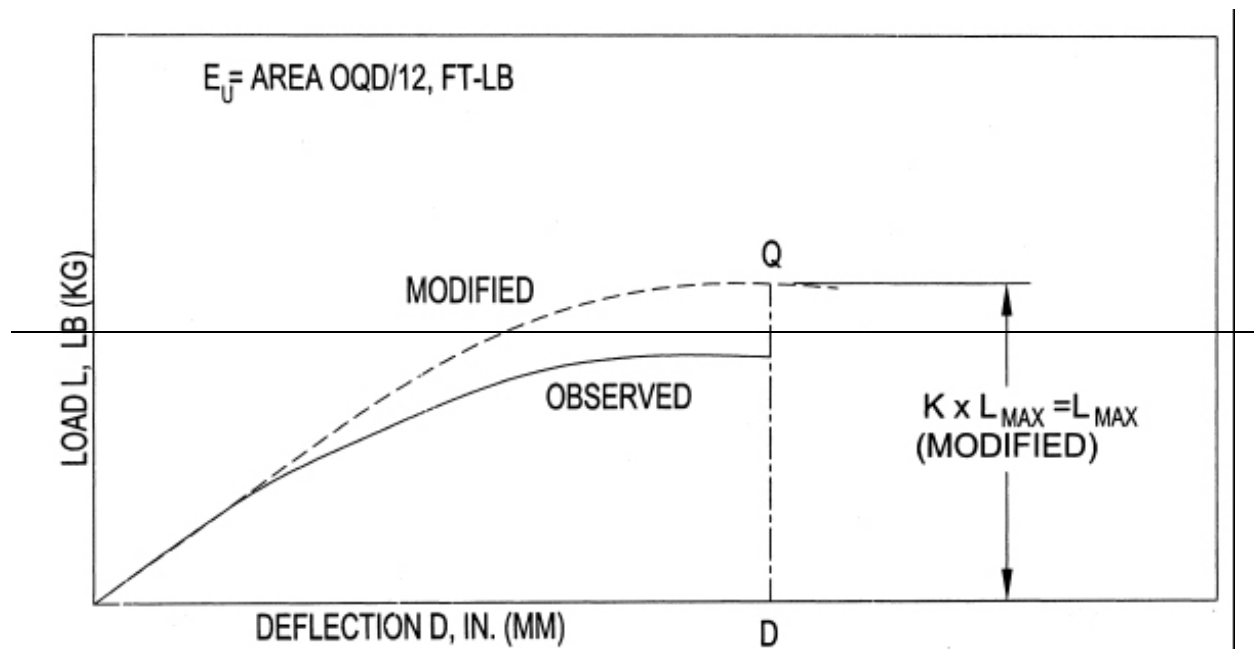
[Figure W-17 Rear Load Application]



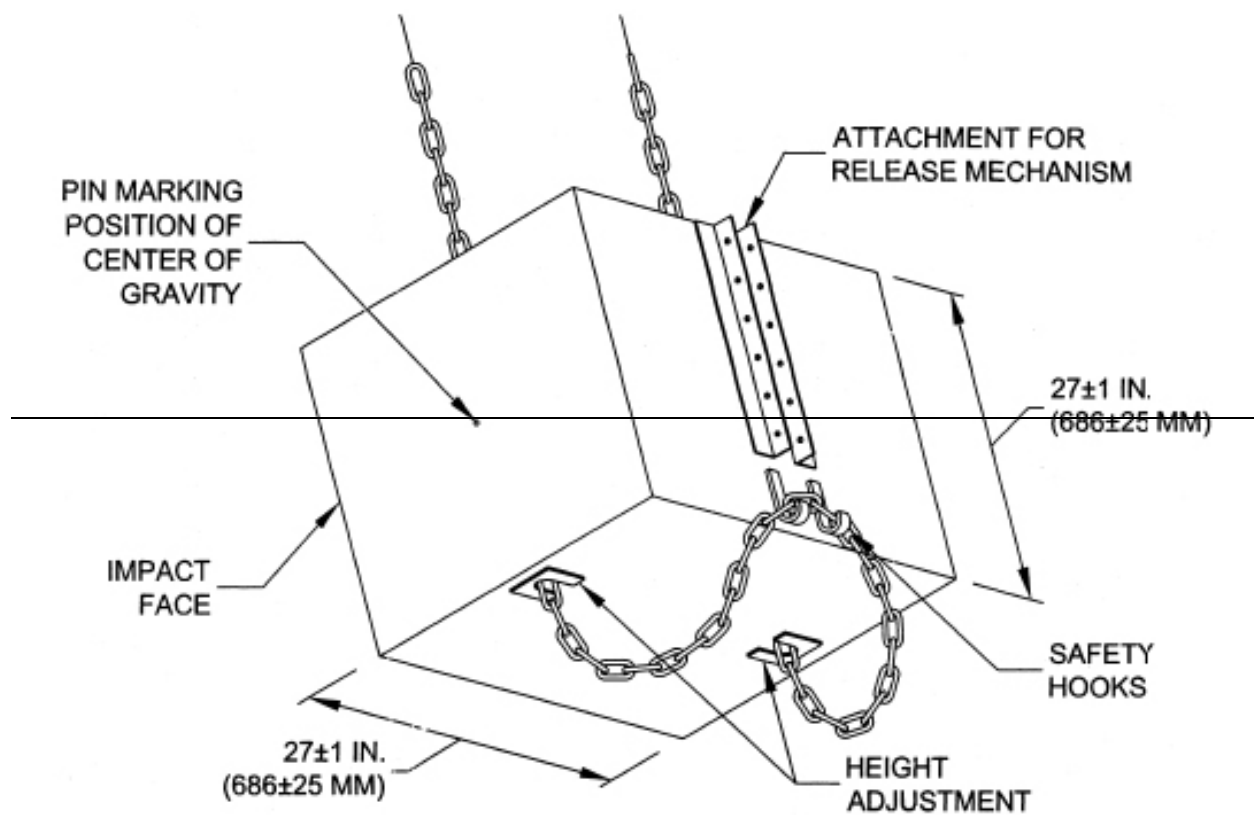
[Figure W-18—Method of Measuring Instantaneous Deflection]



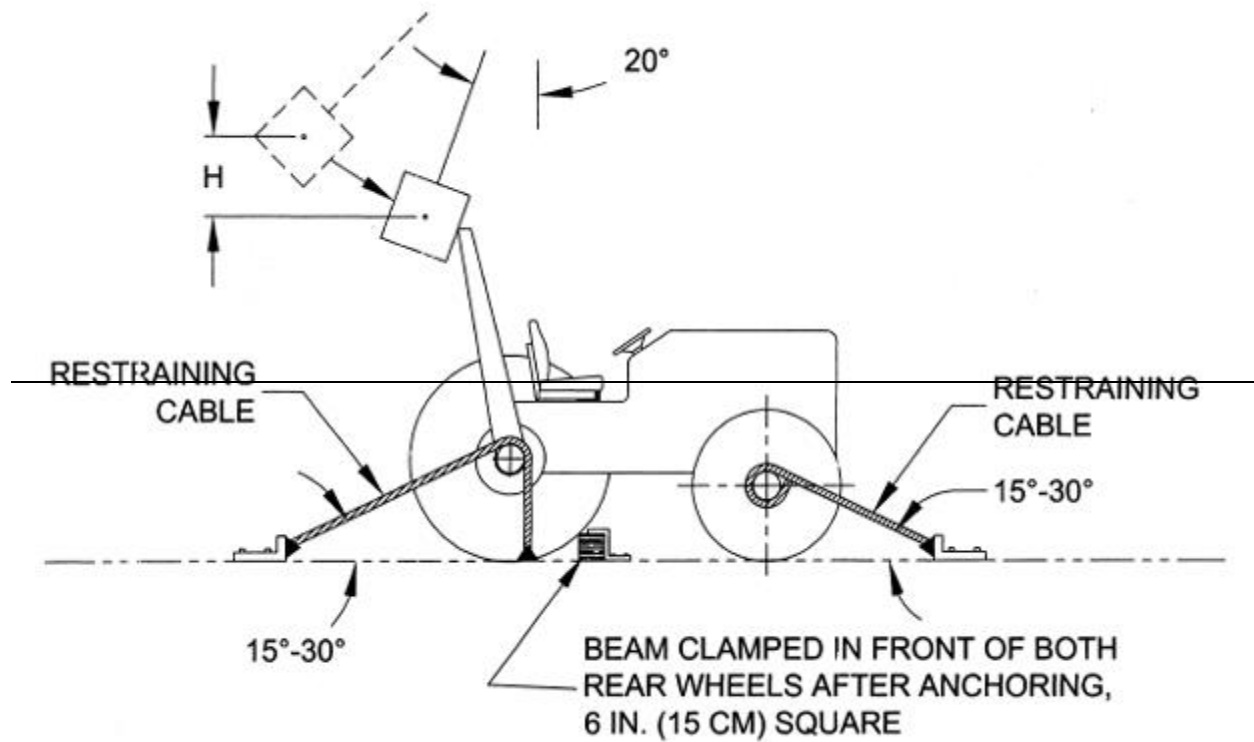
[Figure W-19—Typical L-D Diagram]



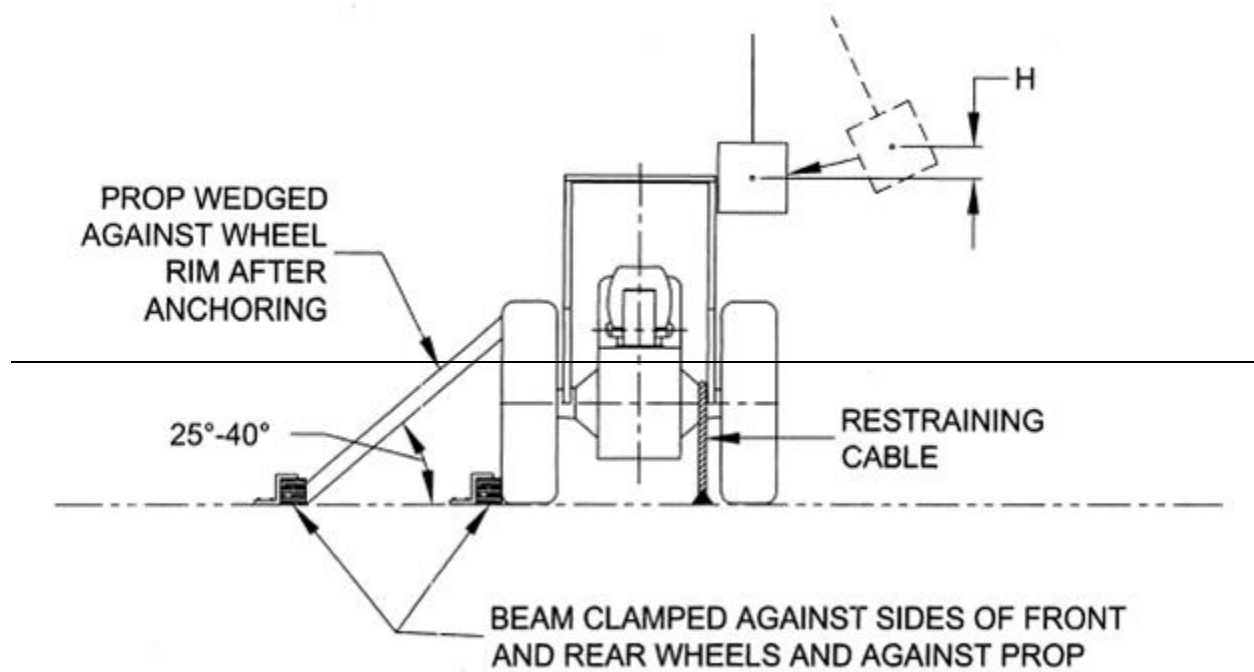
[Figure W-20—Typical Modified L_M - D_M Diagram]



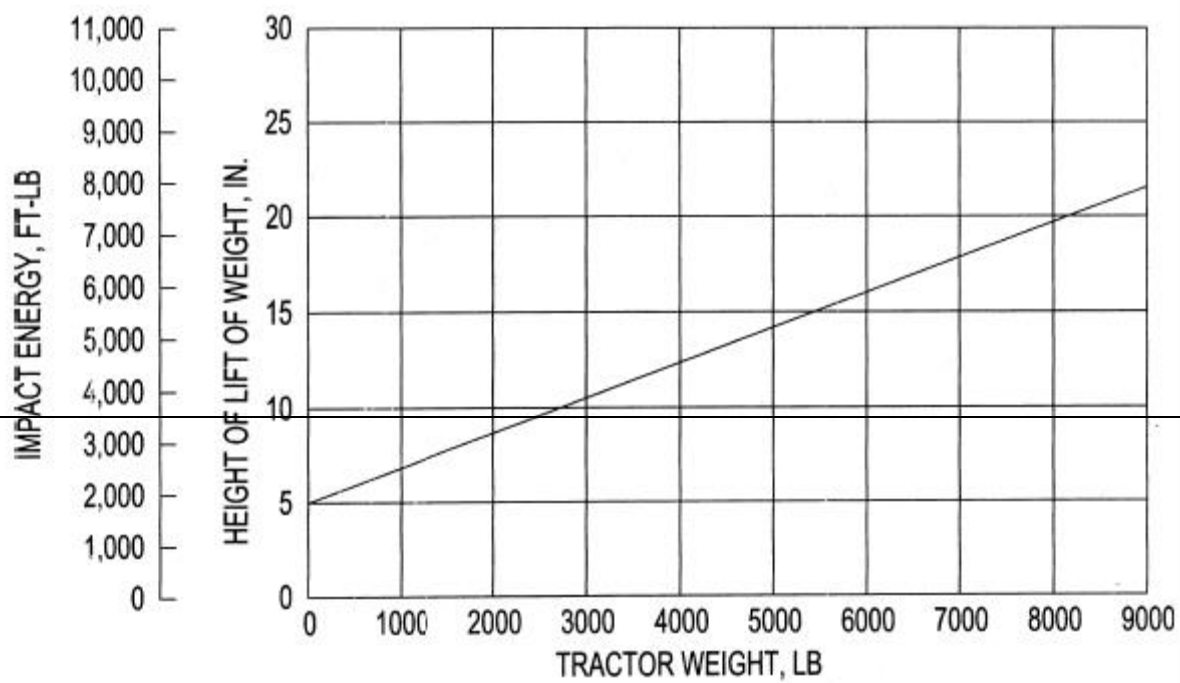
[Figure W-21—Pendulum]



[Figure W-22 Method of Impact From Rear]

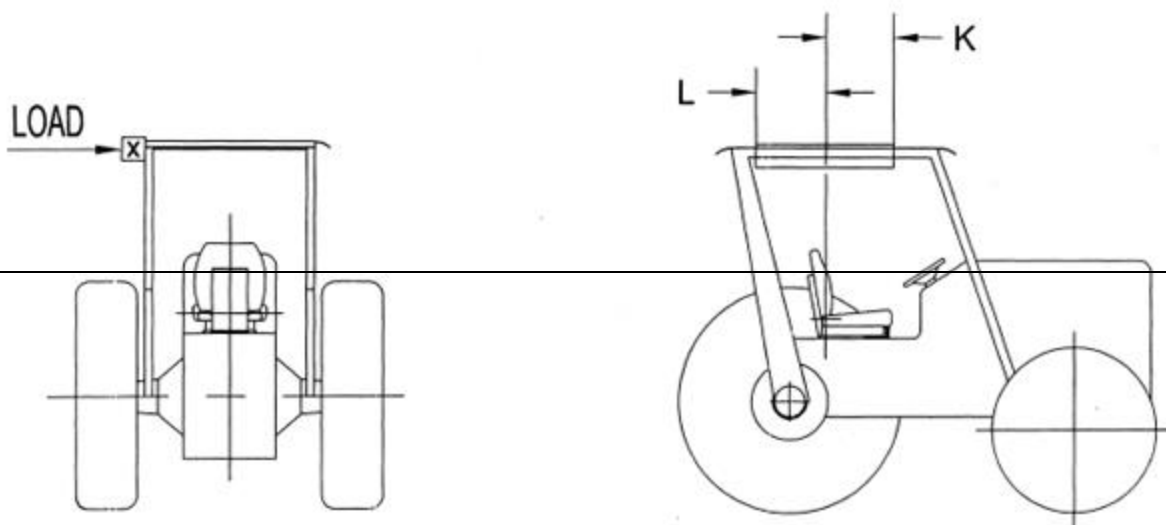


[Figure W-23 Method of Impact From Side]

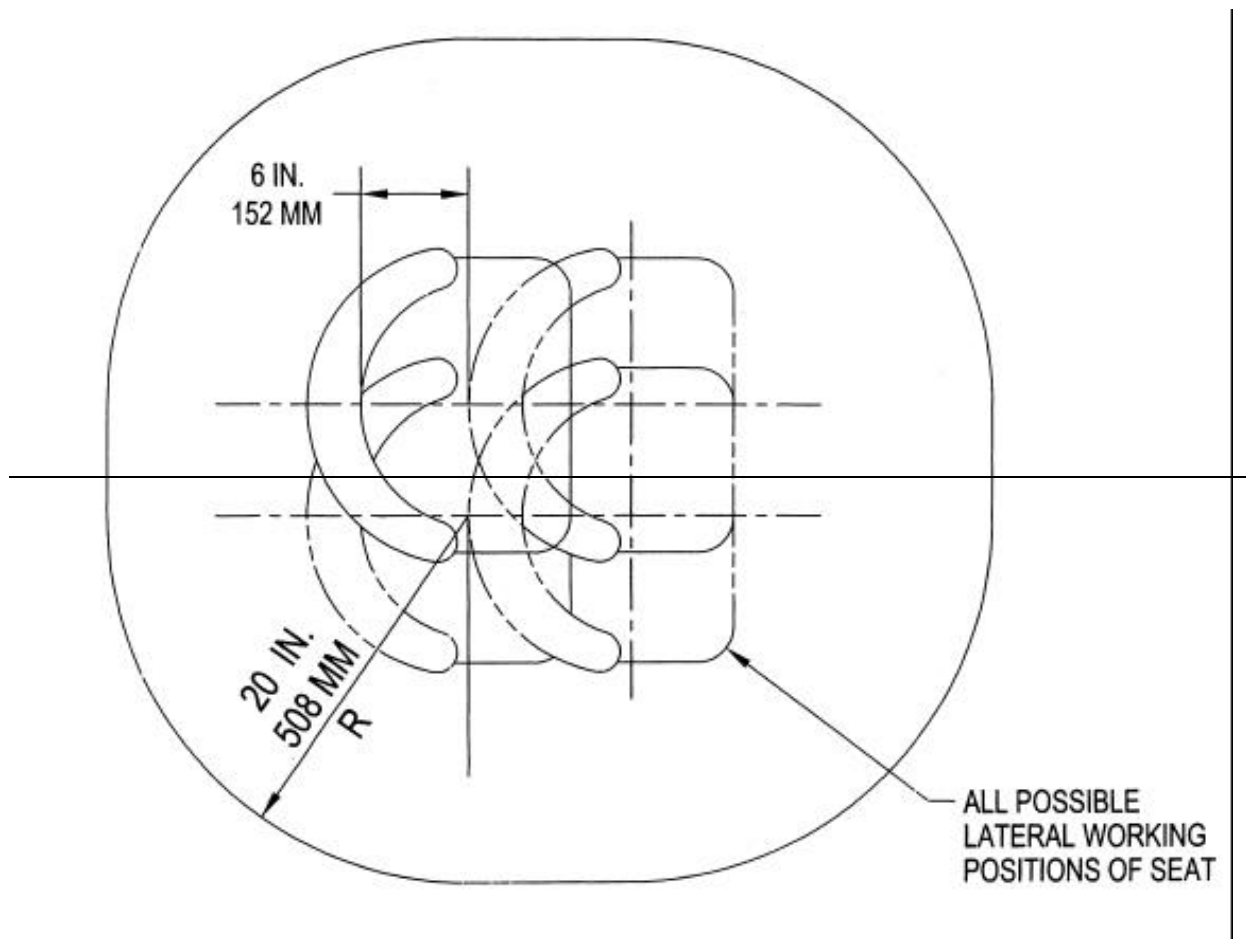


NOTATION OF FORMULAE
 $H=4.92+0.00190W$ or $H'=125+0.107W'$
 W =tractor weight specified by 29 CFR
 1926.1002(e)(1) and (e)(3) in lbs (W' in kg).

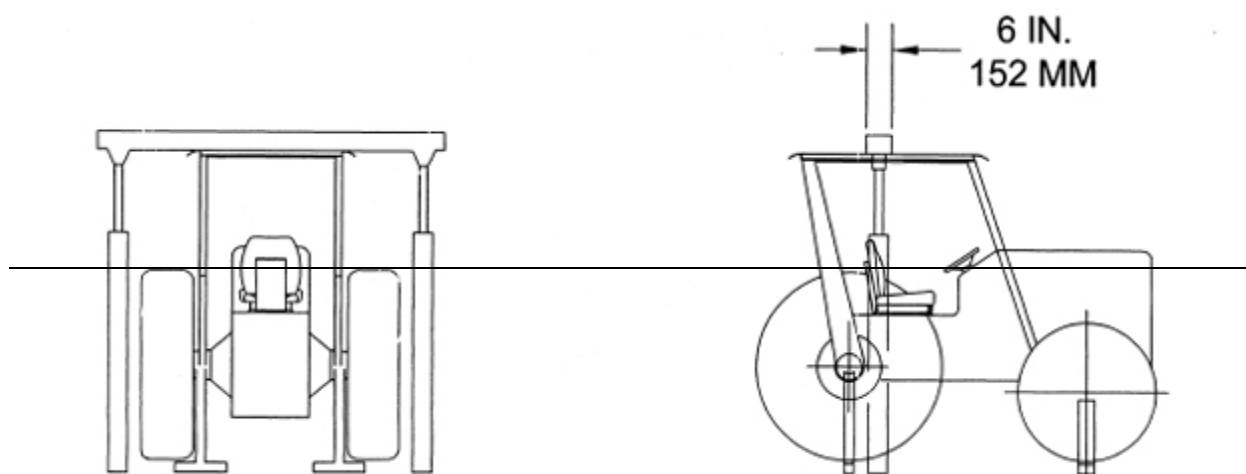
[Figure W-24—Impact Energy Corresponding Lift
 Height of 4,410 lb (2,000 kg) Weight]



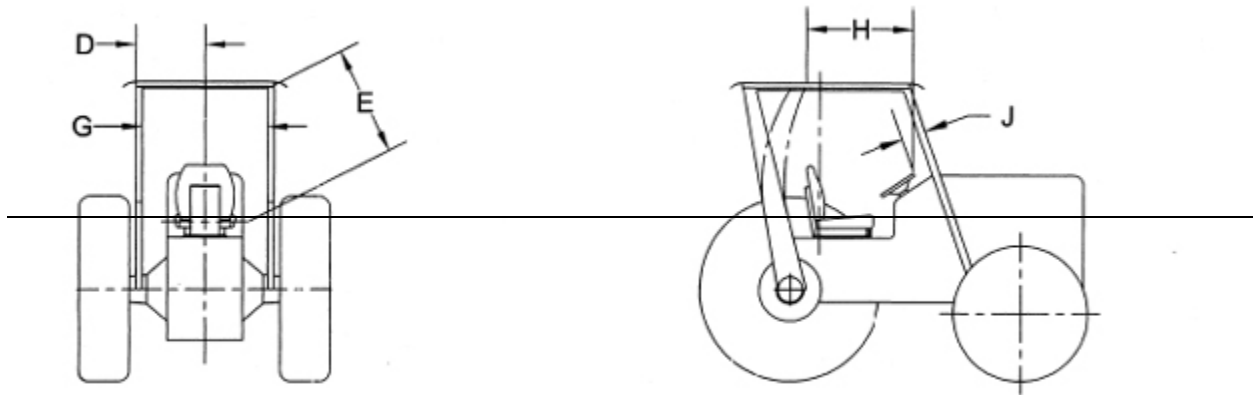
[Figure W-25—Location of Side Load]



[Figure W-26—Zone of Protection for Drop Test]



[Figure W-27—Method of Load Application for Crush Test]



[~~Figure W-28 Protected Zone During Crush and Drop Test~~]

[Stat. Auth.: ORS 654.025(2) and 656.726(4).]

[Stats. Implemented: ORS 654.001 through 654.295]

[Hist: OR-OSHA Admin. Order 5-2006, f. 8/7/06, ef. 1/1/07.]

Division 3/Z, Toxic & Hazardous Substances

437-003-1000

Oregon Rules for Air Contaminants

An employee's exposure to any substance listed in Oregon Tables Z-1, Z-2, or Z-3 of this section shall be limited in accordance with the requirements of the following paragraphs of this section.

(1) Oregon Table Z-1.

(a) Substances with limits preceded by "C" – Ceiling Values. An employee's exposure to any substance in Oregon Table Z-1, the exposure limit of which is preceded by a "C", shall at no time exceed the exposure limit given for that substance. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute time weighted average exposure which shall not be exceeded at any time during the working day.

(b) Other substances – 8-hour Time Weighted Averages. An employee's exposure to any substance in Oregon Table Z-1, the exposure limit of which is not preceded by a "C", shall not exceed the 8-hour Time Weighted Average given for that substance in any 8-hour work shift of a 40-hour work week.

(c) Other Substances – Excursion Limits. Excursions in worker exposure levels may exceed 3 times the PEL-TWA for no more than a total of 30 minutes during a workday, and under no circumstances should they exceed 5 times the PEL-TWA, provided that the PEL-TWA is not exceeded.

(d) Skin Designation. To prevent or reduce skin absorption, an employee's skin exposure to substances listed in Oregon Table Z-1 with an "X" in the Skin Designation column following the substance name shall be prevented or reduced to the extent necessary in the circumstances through the use of gloves, coveralls, goggles, or other appropriate personal protective equipment, engineering controls or work practices.

(2) Oregon Table Z-2. An employee's exposure to any substance listed in Oregon Table Z-2 shall not exceed the exposure limits specified as follows:

(a) 8-hour time weighted averages. An employee's exposure to any substance listed in Oregon Table Z-2, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that substance in Oregon Table Z-2.

(b) Acceptable ceiling concentrations. An employee's exposure to a substance listed in Oregon Table Z-2 shall not exceed the acceptable ceiling concentration for the given substance in the table at any time during an 8-hour shift except:

(i) Acceptable maximum peak above the acceptable ceiling concentration for an 8-hour shift. An employee's exposure to a substance listed in Oregon Table Z-2 shall not exceed the acceptable maximum peak above the acceptable ceiling concentration, and shall not exceed the maximum duration for the given substance during an 8-hour shift.

(c) Example.

Substance	8-Hour Time-Weighted Average	Acceptable Ceiling Concentration	Acceptable Max. Peak Above the Acceptable Ceiling Concentration for an 8-hour Shift		<u>Skin</u>
			Concentration	Maximum Duration	
Benzene (a) (Z87.4-1969)	10 ppm	25 ppm	50 ppm	10 min.	
Beryllium and beryllium compounds (Z37.17-1970)	2 $\mu\text{g}/\text{m}^3$	5 $\mu\text{g}/\text{m}^3$	25 $\mu\text{g}/\text{m}^3$	30 min.	
<u>Carbon disulfide (Z37.3-1968)</u>	<u>20 ppm</u>	<u>30 ppm</u>	<u>100 ppm</u>	<u>30 min.</u>	<u>X</u>
Carbon tetrachloride (Z37.19-1967)	10 ppm	25 ppm	200 ppm	5 min. in any 4 hours	

During an 8-hour work shift, an employee exposed to benzene may be exposed to an 8-hour time weighted average (TWA) of 10 ppm. Concentrations of benzene during the 8-hour work shift may not exceed 25 ppm, unless that exposure is no more than 50 ppm and does not

exceed 10 minutes during an 8-hour work shift. Such exposures must be compensated by exposures to concentrations below 10 ppm so that the 8-hour time-weighted average is less than 10 ppm.

(d) Skin Designation. To prevent or reduce skin absorption, an employee's skin exposure to substances listed in Oregon Table Z-2 with an "X" in the Skin Designation column following the substance name shall be prevented or reduced to the extent necessary in the circumstances through the use of gloves, coveralls, goggles, or other appropriate personal protective equipment, engineering controls or work practices.

(3) Oregon Table Z-3. An employee's exposure to any substance listed in Oregon Table Z 3, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that substance in the table.

(4) Computation formulae. The computation formula which shall apply to employee exposure to more than one substance for which 8-hour time weighted averages are included in OAR 437, Division 2/Z, Toxic and Hazardous Substances, in order to determine whether an employee is exposed over the regulatory limit is as follows:

(a) Cumulative exposures.

(i) The cumulative exposure for an 8-hour work shift shall be computed as follows:

$$E = (C_a T_a + C_b T_b + \dots C_n T_n) \div 8$$

Where:

E is the equivalent exposure for the working shift.

C is the concentration during any period of time T where the concentration remain constant.

T is the duration in hours of the exposure at the concentration C.

The value of E shall not exceed the 8-hour time weighted average specified in subpart Z of 29 CFR part 1910 for the substance involved.

(ii) To illustrate the formula prescribed in paragraph (4)(a)(i) of this section, assume that Substance A has an 8-hour time weighted average limit of 100 ppm (Oregon Table Z-1). Assume that an employee is subject to the following exposure:

Two hours exposure at 150 ppm

Two hours exposure at 75 ppm

Four hours exposure at 50 ppm

Substituting this information in the formula, we have

$$(2 \times 150) + (2 \times 75) + (4 \times 50) \div 8 = 81.25 \text{ ppm}$$

Since 81.25 ppm is less than 100 ppm, the 8-hour time weighted average limit, the exposure is acceptable.

(b) Mixtures.

(i) In case of a mixture of air contaminants an employer shall compute the equivalent exposure as follows:

$$E_m = (C_1 \div L_1) + (C_2 \div L_2) + \dots (C_n \div L_n)$$

Where:

E_m is the equivalent exposure for the mixture.

C is the concentration of a particular contaminant.

L is the exposure limit for that substance specified in Subpart Z of 29 CFR Part 1910.

The value of E_m shall not exceed unity (1).

(ii) To illustrate the formula prescribed in paragraph (4)(b)(i) of this section, consider the following exposures:

<i>Substance</i>	<i>Actual concentration of 8-hour exposure</i>	<i>8-hour time weighted average exposure limits</i>
<i>B</i>	<i>500 ppm</i>	<i>1,000 ppm</i>
<i>C</i>	<i>45 ppm</i>	<i>200 ppm</i>
<i>D</i>	<i>40 ppm</i>	<i>200 ppm</i>

Substituting in the formula, we have:

$$E_m = (500 \div 1000) + (45 \div 200) + (40 \div 200)$$

$$E_m = 0.500 + 0.225 + 0.200$$

$$E_m = 0.925$$

Since E_m is less than unity (1), the exposure combination is within acceptable limits.

(5) To achieve compliance with paragraphs (1) through (4) of this section, administrative or engineering controls must first be determined and implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and/or technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with 1910.134.

Table Z-1

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
Abate	3383-96-8	—	10	
Acetaldehyde	75-07-0	100	180	

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
Acetic Acid	64-19-7	10	25	
Acetic anhydride	108-24-7	5	20	
Acetone	67-64-1	1,000	2,400	
Acetonitrile	75-05-8	40	70	
2-Acetylaminoflourine	53-96-3	(C)	(See 1910.1003)	
Acetylene	74-86-2	1,000	—	
Acetylene dichloride, see 1,2-Dichloroethylene				
Acetylene tetrabromide	79-27-6	1	14	
Acrolein	107-02-8	0.1	0.25	
Acrylamide	79-06-1	—	0.3	x
Acrylonitrile	107-13-1		(See 1910.1045)	x
Aldrin	309-00-2	—	0.25	x
Allyl alcohol	107-18-6	2	5	x
Allyl chloride	107-05-1	1	3	
Allyl glycidyl ether (AGE)	106-92-3	5 (C) 10	22 (C) 45	
Allyl propyl disulfide	2179-59-1	2	12	
alpha Alumina	1344-28-1			
Total Dust		—	10	
Respirable Fraction		—	5	
Aluminum Metal Dust	7429-90-5			
Total Dust		—	10	
Respirable Fraction		—	5	
Alundum (A1203)		—	10	
4-Aminodiphenyl	92-67-1		(See 1910.1003)	
2-Aminoethanol, see Ethanolamine				
2-Aminopyridine	504-29-0	0.5	2	
Ammonia	7664-41-7	25	18	
Ammonium Chloride Fumes	12125-02-09	—	10	
Ammonium sulfamate	7773-06-0			
Total Dust		—	10	
Respirable Fraction		—	5	
n-Amyl acetate	628-63-7	100	525	
sec-Amyl Acetate	626-38-0	125	650	
Aniline and homologs	62-53-3	5	19	X
Anisidine (o, p-isomers)	29191-52-4	0.1	0.5	X
Antimony & Compounds (as Sb)	7440-36-0	—	0.5	
ANTU (alpha naphthyl-thiourea)	86-88-4	—	0.3	
Arsenic Inorganic Compounds (as As)	7440-38-2		(See 1910.1018) 0.01	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Arsenic Organic Compounds (as As)	7440-38-2	—	0.5	
Arsine	7784-42-1	0.05	0.2	
Asbestos		(See 1910.1001 and 1926.1101)		
Asphalt (petroleum) Fumes	8052-42-4	<u>—</u>	<u>5</u>	
Azinphos-methyl	86-50-1	<u>—</u>	0.2	X
Barium (soluble compounds)	7440-39-3	<u>—</u>	0.5	
Barium Sulfate Total Dust Respirable Fraction	7727-43-7	<u>—</u> <u>—</u>	<u>10</u> <u>5</u>	
Benomyl Total Dust Respirable Fraction	17804-35-2	— —	10 5	
Benzene See Oregon Table Z-2 for the limits applicable in the operations or sectors excluded in 1910.1028 ^(d)	71-43-2		(See 1910.1028)	
Benzidine	92-87-5		(See 1910.1003)	
p-Benzoquinone, see Quinone				
Benzoyl peroxide	94-36-0	—	5	
Benzyl chloride	100-44-7	1	5	
Beryllium and Beryllium compounds (as Be); see Division 2/Z Beryllium ^(k)	7440-41-7		(See Oregon Table Z-2)	
Biphenyl, see Diphenyl				
Bismuth telluride (undoped) Total Dust Respirable Fraction	1304-82-1	— —	10 5	
Bismuth telluride (Se-doped)		—	5	
Bisphenol A, see Diglycidyl ether				
Boron oxide	1303-86-2	—	10	
Boron tribromide	10294-33-4	1	10	
Boron trifluoride	7637-07-2	(C) 1	(C) 3	
Bromine	7726-95-6	0.1	0.7	
Bromine pentafluoride	7789-30-2	0.1	0.7	
Bromoform	75-25-2	0.5	5	X
Butadiene (1,3-Butadiene)	106-99-0	1 ppm/5 ppm STEL	(See 1910.1051; 1910.19(I))	
Butane	106-97-8	800	1,900	
Butanethiol, see Butyl mercaptan				
2-Butanone (Methyl Ethyl Ketone)	78-93-3	200	590	
2-Butoxyethanol (Butyl cellosolve)	111-76-2	50	240	X
Butyl acetate (n-Butyl acetate)	123-86-4	150	710	

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
sec-Butyl acetate	105-46-4	200	950	
tert-Butyl acetate	540-88-5	200	950	
n-Butyl alcohol	71-36-3	100	300	
sec-Butyl alcohol	78-92-2	150	450	
tert-Butyl alcohol	75-65-0	100	300	
Butyl lactate	138-22-7	1	5	
Butylamine	109-73-9	(C) 5	(C) 15	X
tert-Butyl chromate (as CrO ₃)	1189-85-1	(See 1926.1126) ^(h)		
n-Butyl glycidyl ether (BGE)	2426-08-6	50	270	
Butyl mercaptan	109-79-5	0.5	1.5	
p-tert-Butyltoluene	98-51-1	10	60	
Cadmium dust and fume (as Cd)	7440-43-9	(See 1910.1027, 1926.1127 and Division 4) 0.005		
Calcium carbonate	1317-65-3			
Total Dust		—	10	
Respirable Fraction		—	5	
Calcium hydroxide	1305-62-0			
Total Dust		—	10	
Respirable Fraction		—	5	
Calcium oxide	1305-78-8	—	5	
Calcium silicate	1344-95-2			
Total Dust		—	10	
Respirable Fraction		—	5	
Calcium sulfate	7778-18-9			
Total Dust		—	10	
Respirable Fraction		—	5	
Camphor, synthetic	76-22-2	—	2	
Caprolactam (2-Oxonexa-methylenimine)	105-60-2	—	5	
Carbaryl (Sevin®)	63-25-2	—	5	
Carbon black	1333-86-4	—	3.5	
Carbon dioxide	124-38-9	5,000	9,000	
Carbon disulfide	75-15-0		(See Oregon Table Z-2)	
Carbon monoxide	630-08-0	50	55	
Carbon tetrachloride	56-23-5		(See Oregon Table Z-2)	
Cellulose	9006-34-6			
Total Dust		—	10	
Respirable Fraction		—	5	
Chlordane	57-74-9	—	0.5	X
Chlorinated camphene	8001-35-2	—	0.5	X
Chlorinated diphenyl oxide	55720-99-5	—	0.5	
Chlorine	7782-50-5	(C) 1	(C) 3	
Chlorine dioxide	10049-04-4	0.1	0.3	
Chlorine trifluoride	7790-91-2	(C) 0.1	(C) 0.4	

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
Chloroacetaldehyde	107-20-0	(C) 1	(C) 3	
a-Chloroacetophenone (phenacyl chloride)	532-27-4	0.05	0.3	
Chlorobenzene	108-90-7	75	350	
o-Chlorobenzylidene malononitrile	2698-41-1	0.05	0.4	
Chlorobromomethane	74-97-5	200	1,050	
2-Chloro-1, 3-butadiene, see beta-Chloroprene				
Chlorodiphenyl (42% Chlorine)	53469-21-9	—	1	X
Chlorodiphenyl (54% Chlorine)	11097-69-1	—	0.5	X
1-Chloro, 2, 3-epoxypropane, see Epichlorhydrin				
2-Chloroethanol, see Ethylene Chlorohydrin				
Chloroethylene, see Vinyl Chloride				
Chloroform (trichloromethane)	67-66-3	(C) 25	(C) 120	
bis-Chloromethyl ether	542-88-1		(See 1910.1003)	
Chloromethyl methyl ether	107-30-2		(See 1910.1003)	
1-Chloro-1-nitropropane	600-25-9	20	100	
Chloropicrin	76-06-2	0.1	0.7	
Beta-Chloroprene (2-chloro-1,3-butadiene)	126-99-8	25	90	X
2-Chloro-6-(trichloromethyl) pyridine	1929-82-4			
Total Dust		—	10	
Respirable Fraction		—	5	
Chromic acid and chromates (as CrO ₃)			(See Oregon Table Z-2)	
Chromium (II) compounds (as Cr)	7440-47-3	—	0.5	
Chromium (III) compounds (as Cr)	7440-47-3	—	0.5	
Chromium (VI) compounds		(See 1926.1126) ⁽ⁱ⁾		
Chromium metal & insol. salts	7440-47-3	—	1	
Clopidol	2971-90-6			
Total Dust		—	10	
Respirable Fraction		—	5	
Coal Dust			(See Oregon Table Z-3)	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Coal tar pitch volatiles (Benzene soluble fraction) anthracene, BaP, phenanthracene, acridine, chrysene, pyrene	65966-93-2	—	0.2 (See 1910.1002)	
Cobalt metal, fume & dust	7440-48-4	—	0.1	
Coke oven emissions			(See 1910.1029)	
Copper fume	7440-50-8	—	0.1	
Dusts and Mists	7440-50-8	—	1	
Corundum (A1203)	1302-74-5	—	10	
Cotton dust			(See 1910.1043)	
Cotton dust (raw)		—	1 (e)	
Crag® herbicide (Sesone)	136-78-7			
Total Dust		—	10	
Respirable Fraction		—	5	
Cresol (all isomers)	1319-77-3	5	22	X
Crotonaldehyde	123-73-9/ 4170-30-3	2	6	
Cumene	98-82-8	50	245	X
Cyanide (as CN)		—	5	X
Cyanogen	460-19-5	10	—	
Cyclohexane	110-82-7	300	1,050	
Cyclohexanol	108-93-0	50	200	
Cyclohexanone	108-94-1	50	200	
Cyclohexene	110-83-8	300	1,015	
Cyclopentadiene	542-92-7	75	200	
2,4-D (Dichlorophenoxyacetic acid)	94-75-7	—	10	
DDT	50-29-3	—	1	X
DDVP, see Dichlorvos				
Decaborane	17702-41-9	0.05	0.3	X
Demeton® (Systox)	8065-48-3	—	0.1	X
Diacetone alcohol (4-hydroxy-4- methyl-2-pentanone)	123-42-2	50	240	
1, 2-Diaminoethane, see Ethylenediamine				
Diazinon	333-41-5	—	0.1	X
Diazomethane	334-88-3	0.2	0.4	
Diborane	19287-45-7	0.1	0.1	
Dibrom®	300-76-5	—	3	
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	0.001	(See 1910.1044)	
1,2-Dibromoethane, see Ethylene dibromide				

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
2-N-Dibutylaminoethanol	102-81-8	2	14	X
Dibutyl phosphate	107-66-4	1	5	
Dibutyl phthalate	84-74-2	—	5	
Dichloroacetylene	7572-29-4	(C) 0.1	(C) 0.4	
o-Dichlorobenzene	95-50-1	(C) 50	(C) 300	
p-Dichlorobenzene	106-46-7	75	450	
3,3-Dichlorobenzidine	91-94-1		(See 1910.1003)	X
Dichlorodifluoromethane	75-71-8	1,000	4,950	
1,3-Dichloro-5, 5-dimethyl hydantoin	118-52-5	—	0.2	
Dichlorodiphenyltrichloroethane (DDT)	50-29-3	—	1	X
1, 1-Dichloroethane	75-34-3	100	400	
1, 2-Dichloroethane, see Ethylene dichloride				
1, 2-Dichlorethylene	540-59-0	200	790	
Dichloroethyl Ether	111-44-4	5 (C) 15	30 (C) 90	X X
Dichloromethane, see Methylenechloride				
Dichloromonofluoromethane	75-43-4	1,000	4,200	
1, 1-Dichloro-1-nitroethane	594-72-9	(C) 10	(C) 60	
1, 2-Dichloropropane, see Propylene dichloride				
Dichlorotetrafluoroethane	76-14-2	1,000	7,000	
Dichlorvos (DDVP)	62-73-7	0.1	1	X
Dicyclohexylmethane 4,4'-diisocyanate (hydrogenated MDI, see Oregon Table Z-2 (Diisocyanates))	5124-30-1			
Dicyclopentadienyl iron	102-54-5	—	10	
Total Dust		—	5	
Respirable Fraction				
Dieldrin	60-57-1	—	0.25	X
Diethylamine	109-89-7	25	75	
2-Diethylaminoethanol	100-37-8	10	50	X
Diethylene triamine	111-40-0	(C) 1	(C) 4	X
Diethylether, see Ethyl ether				
Difluorodibromomethane	75-61-6	100	860	
Diglycidyl ether (DGE)	2238-07-5	(C) 0.5	(C) 2.8	
Dihydroxybenzene, see Hydroquinone				
Diisobutyl ketone	108-83-8	25	150	
Diisopropylamine	108-18-9	5	20	X
Dimethoxymethane, see Methylal				

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Dimethyl acetamide	127-19-5	10	35	X
Dimethylamine	124-40-3	10	18	
4-Dimethylaminoazobenzene	60-11-7		(See 1910.1003)	
Dimethylaminobenzene, see Xylidene				
Dimethylaniline (N,N-Dimethylaniline)	121-69-7	5	25	X
Dimethylbenzene, see Xylene				
Dimethyl-1,2-dibromo-2,2-dichloroethyl phosphate	300-76-5	—	3	
Dimethylformamide	68-12-2	10	30	X
2,6-Dimethylheptanone, see Diisobutyl ketone				
1,1-Dimethylhydrazine	57-14-7	0.5	1	X
Dimethylphthalate	131-11-3	—	5	
Dimethyl sulfate	77-78-1	1	5	X
Dinitrobenzene (all isomers)	528-29-0/ 99-65-0/ 100-25-4			
Dinitro-o-cresol	534-52-1	—	0.2	X
Dinitrotoluene	25321-14-6	—	1.5	X
Dioxane (Diethylene dioxide)	123-91-1	100	360	X
Diphenyl (Biphenyl)	92-52-4	0.2	1	
Diphenylamine	122-39-4	—	10	
Diphenylmethane diisocyanate (MDI), see Oregon Table Z-2 (Diisocyanates)				
Dipropylene glycol methyl ether	34590-94-8	100	600	X
Diquat	231-36-7	—	0.5	
Di-sec, octyl phthalate (Di-2-ethyl-hexyl-phthalate)	117-81-7	—	5	
Emery Total Dust Respirable Fraction	12415-34-8	— —	10 5	
Endosulfan (Thiodan®)	115-29-7	—	0.1	X
Endrin	72-20-8	—	0.1	X
Epichlorohydrin	106-89-8	5	19	X
EPN	2104-64-5	—	0.5	X
1,2-Epoxypropane, see Propylene oxide				
2,3-Epoxy-1-propanol, see Glycidol				
Ethane	74-84-0	1,000	—	
Ethanethiol, see Ethyl mercaptan				
Ethanolamine	141-43-5	3	6	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
2-Ethoxyethanol (Cellosolve)	110-80-5	100	370	
2-Ethoxyethyl acetate (Cellosolve acetate)	111-15-9	100	540	X
Ethyl acetate	141-78-6	400	1,400	
Ethyl acrylate	140-88-5	25	100	X
Ethyl alcohol (ethanol)	64-17-5	1,000	1,900	
Ethylamine	75-04-7	10	18	
Ethyl amyl ketone (5-methyl-3-heptanone)	541-85-5	25	130	
Ethyl benzene	100-41-4	100	435	
Ethyl bromide	74-96-4	200	890	
Ethyl butyl ketone (3-Heptanone)	106-35-4	50	230	
Ethyl chloride	75-00-3	1,000	2,600	
Ethyl ether	60-29-7	400	1,200	
Ethyl formate	109-94-4	100	300	
Ethyl mercaptan	75-08-1	0.5 (C) 10	1 (C) 25	
Ethyl silicate	78-10-4	100	850	
Ethylene	74-85-1	1,000	—	
Ethylene chlorohydrin	107-07-3	5	16	X
Ethylenediamine	107-15-3	10	25	
Ethylene dibromide	106-93-4		(See Oregon Table Z-2)	
Ethylene dichloride	107-06-2		(See Oregon Table Z-2)	
Ethylene glycol particulate		—	10	
Ethylene glycol, Vapor	107-21-1	100	260	
Ethylene glycol dinitrate	628-96-6	(C) 0.2	(C) 1	X
Ethylene glycol methyl acetate (Methyl cellosolve acetate) (2-Methoxy-ethyl acetate)	110-49-6	25	120	
Ethylenimine	151-56-4		(See 1910.1003)	
Ethylene oxide	75-21-8		(See 1910.1047)	
Ethylidene chloride, see 1,1-Dichloroethane				
N-Ethylmorpholine	100-74-3	20	94	X
Ferbam	14484-64-1			
Total Dust		—	10	
Respirable Fraction		—	5	
Ferrovanadium dust	12604-58-9	—	1	
Fibrous glass, see Glass, Fibrous				
Fluorides (As F)		—	2.5 (See Oregon Table Z-2)	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Fluorine	7782-41-4	0.1	0.2	
Fluorotrichloromethane (Trichlorofluoromethane)	75-69-4	1,000	5,600	
Formaldehyde	50-00-0	0.75	(See 1910.1048)	
Formic acid	64-18-6	5	9	
Furfural	98-01-1	5	20	X
Furfuryl alcohol	98-00-0	5	20	
Gasoline	8006-61-9	—	(g)	
Germanium tetrahydride	7782-65-2	0.2	0.6	
Glass, Fibrous or dust		—	10	
Glycerin (mist) Total Dust Respirable Fraction	56-81-5	— —	10 5	
Glycidol	556-52-5	50	150	
Glycol monoethyl ether, see 2-Ethoxyethanol				
Grain dust (oat, wheat, barley)		—	10	
Graphite natural, respirable	7782-42-5		(See Oregon Table Z-3)	
Graphite (Synthetic) Total Dust Respirable Fraction	7782-42-5	— —	10 5	
Guthion®, see Azinphosmethyl				
Gypsum Total Dust Respirable Fraction	13397-24-5	— —	10 5	
Hafnium	7440-58-6	—	0.5	
Heptachlor	76-44-8	—	0.5	X
Heptane (n-heptane)	142-82-5	500	2,000	
Hexachlorocyclopentadiene	77-47-4	0.1	1	
Hexachloroethane	67-72-1	1	10	X
Hexachloronaphthalene	1335-87-1	—	0.2	X
Hexafluoracetone	684-16-2	0.1	0.7	X
Hexamethylene diisocyanate (HDI), see Oregon Table Z-2 (Diisocyanates)	822-06-01			
1,6 Hexamethylene diisocyanate Based Adduct, see Oregon Table Z-2 (Diisocyanates)				
Hexane (n-hexane)	110-54-3	500	1,800	
2-Hexanone	591-78-6	100	410	
Hexone (Methyl isobutyl ketone)	108-10-1	100	410	
sec-Hexyl acetate	108-84-9	50	300	
Hydrazine	302-01-2	1	1.3	X
Hydrogen	1333-74-0	1,000	—	

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
Hydrogen bromide	10035-10-6	3	10	
Hydrogen chloride	7647-01-0	(C) 5	(C) 7	
Hydrogen cyanide	74-90-8	10	11	X
Hydrogen fluoride (as F)	7664-39-3		(See Oregon Table Z-2)	
Hydrogen peroxide	7722-84-1	1	1.4	
Hydrogen selenide (as Se)	7783-07-5	0.05	0.2	
Hydrogen sulfide	7783-06-4		(See Oregon Table Z-2)	
Hydroquinone	123-31-9	—	2	
Indene	95-13-6	10	45	
Indium and compounds (as In)	7440-74-6	—	0.1	
Iodine	7553-56-2	(C) 0.1	(C) 1	
Iron oxide fume	1309-37-	1—	10	
Iron pentacarbonyl	13463-40-6	0.1	.23	
Iron salts, soluble, as Fe		—	1	
Isoamyl acetate	123-92-2	100	525	
Isoamyl alcohol (primary and secondary)	123-51-3	100	360	
Isobutyl acetate	110-19-0	150	700	
Isobutyl alcohol	78-83-1	100	300	
Isophorone	78-59-1	10	55	
Isophorone diisocyanate (IPDI), see Oregon Table Z-2 (Diisocyanates)	4098-71-9			
Isopropyl acetate	108-21-4	250	950	
Isopropyl alcohol	67-63-0	400	980	
Isopropylamine	75-31-0	5	12	
Isopropyl ether	108-20-3	250	1,050	
Isopropyl glycidyl ether (IGE)	4016-14-2	50	240	
Kaolin	1332-58-7			
Total Dust		—	10	
Respirable Fraction		—	5	
Ketene	463-51-4	0.5	0.9	
Lead, inorganic (as Pb)	7439-92-1	(See 1910.1025 & 1926.62)	(See 1910.1025 & 1926.62)	
Lead arsenate	7784-40-9	(See 1910.1018)	0.01	
Limestone	1317-65-3			
Total Dust		—	10	
Respirable Fraction		—	5	
Lindane	58-89-9	—	0.5	X
Lithium hydride	7580-67-8	—	0.025	
L.P.G. (Liquified petroleum gas)	68476-85-7	1,000	1,800	

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
Magnesite	546-93-0			
Total Dust		—	10	
Respirable Fraction		—	5	
Magnesium oxide fume	1309-48-4			
Total Dust		—	10	
Respirable Fraction		—	5	
Malathion	121-75-5	—	10	X
Maleic anhydride	108-31-6	0.25	1	
Manganese Compounds (as Mn)	7439-96-5	—	(C) 5	
Manganese fume (as Mn)	7439-96-5	—	(C) 5	
Marble	1317-65-3			
Total Dust		—	10	
Respirable Fraction		—	5	
Mercury (aryl, inorganic, organo, and vapor) (as Hg)	7439-97-6		(See Oregon Table Z-2)	
Mesityl oxide	141-79-7	25	100	
Methane	74-82-8	1,000	—	
Methanethiol, see Methyl mercaptan				
Methoxychlor	72-43-5			
Total Dust		—	10	
Respirable Fraction		—	5	
2-Methoxyethanol (Methyl Cellosolve)	109-86-4	25	80	X
2-Methoxyethyl acetate (Methyl cellosolve acetate)	110-49-6	25	120	X
Methyl acetate	79-20-9	200	610	
Methyl acetylene (propyne)	74-99-7	1,000	1,650	
Methyl acetylene-propadiene mixture (MAPP)		1,000	1,800	
Methyl acrylate	96-33-3	10	35	X
Methylacrylonitrile	126-98-7	1	3	X
Methylal (dimethoxy-methane)	109-87-5	1,000	3,100	
Methyl alcohol (methanol)	67-56-1	200	260	
Methylamine	74-89-5	10	12	
Methyl amyl alcohol, see Methyl isobutyl carbinol				
Methyl (n-amyl) ketone	110-43-0	100	465	
Methyl bromide	74-83-9	15	60	X
		(C) 20	(C) 80	
Methyl butyl ketone, see 2-Hexanone				
Methyl cellosolve, see 2 Methoxy ethanol				X
Methyl cellosolve acetate (Ethylene glycol monomethyl ether acetate)	110-49-6	25	120	X

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
Methyl Chloride	74-87-3		(See Oregon Table Z-2)	
Methyl Chloroform (1,1,1-Trichloroethane)	71-55-6	350	1,900	
Methyl Chloromethyl ether			(See 1910.1003)	
Methyl 2-cyanoacrylate	137-05-3	2	8	
Methylcyclohexane	108-87-2	500	2,000	
Methylcyclohexanol	25639-42-3	50	235	
o-Methylcyclohexanone	583-60-8	50	230	X
2-Methylcyclopentadienyl manganese tricarbonyl (as Mn)	12108-13-3	0.1	0.2	X
Methyl demeton	8022-00-2	—	0.5	X
Methyl ethyl ketone (MEK), see 2-Butanone				
Methyl formate	107-31-3	100	250	
Methyl iodide	74-88-4	5	28	X
Methyl isoamyl ketone	110-12-3	100	475	
Methyl isobutyl carbinol	108-11-2	25	100	X
Methyl isobutyl ketone, see Hexone				
Methyl isocyanate	624-83-9	0.02	0.05	X
Methyl mercaptan	74-93-1	0.5 (C) 10	1 (C) 20	
Methyl methacrylate	80-62-6	100	410	
Methyl parathion	298-00-0	—	0.2	X
Methyl propyl ketone, see 2-Pentanone				
Methyl silicate	681-84-5	(C) 5	(C) 30	
a-Methyl styrene	98-83-9	(C) 100	(C) 480	
Methylene bisphenyl isocyanate (MDI)	101-68-8	(See Oregon Table Z-2 (diisocyanates))		
Methylenedianiline (MDA)		(See 1910.1050 & 1926.60)	0.01	
Methylene Chloride	75-09-2	25	(See 1910.1052)	
Mineral Wool Fiber		—	10	
MOCA	101-14-4		(See 437-002-0346)	
Molybdenum (soluble compounds)	7439-98-7	—	5	
(insoluble compounds)		—	10	
Monomethyl aniline	100-61-8	2	9	X
Monomethyl hydrazine	60-34-4	(C) 0.2	(C) 0.35	X
Morpholine	110-91-8	20	70	X

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Naphtha (coal tar)	8030-30-6	100	400	
Naphthalene	91-20-3	10	50	
Naphthalene diisocyanate (NDI), see Oregon Table Z-2 (Diisocyanates)	3173-72-6			
Alpha naphthylamine	134-32-7		(See 1910.1003)	
B-Naphthylamine	91-59-8		(See 1910.1003)	
Nickel carbonyl (as Ni)	13463-39-3	0.001	0.007	
Nickel, metal and insoluble compounds, as Ni	7440-02-0	—	1	
Nickel, soluble compounds, (as Ni)	7440-02-0	—	1	
Nicotine	54-11-5	0.075	0.5	X
Nitric acid	7697-37-2	2	5	
Nitric oxide	10102-43-9	25	30	
p-Nitroaniline	100-01-6	1	6	
Nitrobenzene	98-95-3	1	5	X
4-Nitrodiphenyl	92-93-3		(See 1910.1003)	
p-Nitrochlorobenzene	100-00-5	—	1	X
Nitroethane	79-24-3	100	310	
Nitrogen dioxide	10102-44-0	(C) 5	(C) 9	
Nitrogen trifluoride	7783-54-2	10	29	
Nitroglycerin	55-63-0	(C) 0.2	(C) 2	X
Nitromethane	75-52-5	100	250	
1-Nitropropane	108-03-2	25	90	
2-Nitropropane	79-46-9	25	90	
N-Nitrosodimethylamine			(See 1910.1003)	
Nitrotoluene (all isomers)	88-72-2/ 99-08-1/ 99-99-0	5	30	X
Nitrotrichloromethane, see Chloropicrin				
Nitrous oxide	10024-97-2	50	90	
Octachloronaphthalene	2234-13-1	—	0.1	X
Octane	111-65-9	400	1,900	
Oil mist (mineral)	8012-95-1	—	5	
Oil mist, vapor		—	(g)	
Osmium tetroxide (as Os)	20816-12-0		0.002	
Oxalic acid	144-62-7	—	1	
Oxygen difluoride	7783-41-7	0.05	0.1	
Ozone	10028-15-6	0.1	0.2	
Parafin wax fume	8002-74-2	—	1	

Substance	CAS No. ^(c)	Ppm ^(a)	Mg/m ³ ^(b)	Skin
Paraquat respirable dust	4685-14-7/ 1910-42-5/ 2074-50-2	—	0.5	X
Parathion	56-38-2	—	0.1	X
Particulates not otherwise regulated (PNOR)^(f)				
Total Dust		—	10	
Respirable Fraction		—	5	
Pentaborane	19624-22-7	0.005	0.01	
Pentachloronaphthalene	1321-64-8	—	0.5	X
Pentachlorophenol	87-86-5	—	0.5	X
Pentaerythritol	115-77-5			
Total Dust		—	10	
Respirable Fraction		—	5	
Pentane	109-66-0	500	1,500	
2-Pentanone (Methyl propyl ketone)	107-87-9	200	700	
Perchloroethylene (tetrachloroethylene)	127-18-4		(See Oregon Table Z-2)	
Perchloromethyl mercaptan	594-42-3	0.1	0.8	
Perchloryl fluoride	7616-94-6	3	13.5	
Perlite	93763-70-3			
Total Dust		—	10	
Respirable Fraction		—	5	
Petroleum distillates (naphtha) (Rubber Solvent)		500	2,000 ^(g)	
Phenol	108-95-2	5	19	X
Phenothiazine	92-84-2	—	5	X
p-Phenylene diamine	106-50-3	—	0.1	X
Phenyl ether (vapor)	101-84-8	1	7	
Phenyl ether - biphenyl mixture (vapor)	8004-13-5	1	7	
Phenylethylene, see Styrene				
Phenyl glycidyl ether (PGE)	122-60-1	10	60	
Phenylhydrazine	100-63-0	5	22	X
Phenylphosphine	638-21-1	(C) 0.05	(C) 0.25	
Phosdrin (Mevinphos [®])	7786-34-7		0.1	X
Phosgene (carbonyl chloride)	75-44-5	0.1	0.4	
Phosphine	7803-51-2	0.3	0.4	
Phosphoric acid	7664-38-2	—	1	
Phosphorus (yellow)	7723-14-0	—	0.1	
Phosphorus pentachloride	10026-13-8	—	1	
Phosphorus pentasulfide	1314-80-3	—	1	
Phosphorus trichloride	7719-12-2	0.5	3	
Phthalic anhydride	85-44-9	2	12	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Picloram	1918-02-1	—	10	
Total Dust		—	5	
Respirable Fraction				
Picric acid	88-89-1	—	0.1	X
Pindone (2-Pivalyl-1, 3-indandione)	83-26-1	—	0.1	
Plaster of Paris	26499-65-0	—	10	
Total Dust		—	5	
Respirable Fraction				
Platinum (Soluble Salts) as Pt	7440-06-4	—	0.002	
Polychlorobiphenyls, see Chlorodiphenyls				
Portland Cement	65997-15-1	—	10	
Total Dust		—	5	
Respirable Fraction				
Propane	74-98-6	1,000	1,800	
Beta-Propiolactone	57-57-8		(See 1910.1003)	
Propargyl alcohol	107-19-7	1	—	X
n-Propyl acetate	109-60-4	200	840	
n-Propyl alcohol	71-23-8	200	500	
n-Propyl nitrate	627-13-4	25	110	
Propylene dichloride	78-87-5	75	350	
Propylene glycol monomethyl ether	107-98-2	100	360	
Propylene imine	75-55-8	2	5	X
Propylene oxide	75-56-9	100	240	
Propyne, see Methyl acetylene				
Pyrethrum	8003-34-7	—	5	
Pyridine	110-86-1	5	15	
Quinone	106-51-4	0.1	0.4	
RDX (Cyclonite)	121-82-4	—	1.5	X
Rhodium, Metal fume and dusts, as Rh Soluble salts	7440-16-6 7440-16-6	— —	0.1 0.001	
Ronnel	299-84-3	—	10	
Rosin core solder pyrolysis Products (as Formaldehyde)		—	0.1	
Rotenone	83-79-4	—	5	
Rouge		—	10	
Total Dust		—	5	
Respirable Fraction				
Selenium compounds (as Se)	7782-49-2	—	0.2	
Selenium hexafluoride (as Se)	7783-79-1	0.05	0.4	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Silica, crystalline, respirable dust^(j) Cristobalite Quartz Tripoli (as quartz) Tridamite	14464-46-1 14808-60-7 1317-95-9 15468-32-3	—	(See Division 2/Z Silica)	
Silicon Total Dust Respirable Fraction	7440-21-3	— —	10 5	
Silicon carbide Total Dust Respirable Fraction	409-21-2	— —	10 5	
Silver, metal and soluble compounds (as Ag)	7440-22-4	—	0.01	
Sodium fluoroacetate	62-74-8	—	0.05	X
Sodium hydroxide	1310-73-2	—	2	
Starch Total Dust Respirable Fraction	9005-25-8	— —	10 5	
Stibine	7803-52-3	0.1	0.5	
Stoddard solvent	8052-41-3	200	1,150	
Strychnine	57-24-9	—	0.15	
Styrene	100-42-5		(See Oregon Table Z-2)	
Subtilisins (Proteolytic enzymes) (as 100% pure crystalline enzyme)	1395-21-7	—	(C) 0.0003	
Sucrose Total Dust Respirable Fraction	57-50-1	— —	10 5	
Sulfur dioxide	7446-09-5	5	13	
Sulfur hexafluoride	2551-62-4	1,000	6,000	
Sulfuric acid	7664-93-9	—	1	
Sulfur monochloride	10025-67-9	1	6	
Sulfur pentafluoride	5714-22-7	0.025	0.25	
Sulfur tetrafluoride	7783-60-0	0.1	0.4	
Sulfuryl fluoride	2699-79-8	5	20	
Systox, see Demeton®				
2, 4, 5-T	93-76-5	—	10	
Tantalum, metal and oxide dust	7440-25-7	—	5	
TEDP (Sulfotepp)	3689-24-5	—	0.2	X
Tellurium and compounds (as Te)	13494-80-9	—	0.1	
Tellurium hexafluoride (as Te)	7783-80-4	0.02	0.2	
Temephos Total Dust Respirable Fraction	3383-96-8	— —	10 5	
TEPP (Tetraethyl pyrophosphate)	107-49-3	0.004	0.05	X

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Terphenyls	26140-60-3	(C) 1	(C) 9	
1, 1, 1, 2-Tetrachloro-2,2-difluoroethane	76-11-9	500	4,170	
1, 1, 2, 2-Tetrachloro-1,2-difluoroethane	76-12-0	500	4,170	
1, 1, 2, 2-Tetrachloroethane	79-34-5	5	35	X
Tetrachloroethylene, see Perchloroethylene				
Tetrachloronaphthalene	1335-88-2	—	2	X
Tetrachloromethane, see Carbon tetrachloride				
Tetraethyl lead (as Pb)	78-00-2	—	0.075	X
Tetrahydrofuran	109-99-9	200	590	
Tetramethyl lead (as Pb)	75-74-1	—	0.075	X
Tetramethyl succinonitrile	3333-52-6	0.5	3	X
Tetranitromethane	509-14-8	1	8	
Tetryl (2, 4, 6-trinitro-phenyl-methyl-nitramine)	479-45-8	—	1.5	X
Thallium (soluble compounds) as Tl	7440-28-0	—	0.1	X
4,4'-Thiobis (6-tert, Butyl-m-cresol) Total Dust Respirable Fraction	96-69-5	— —	10 5	
Thiram	137-26-8		(See 437-002-0373) 0.15	
Tin (inorganic compounds, except oxides) as Sn	7440-31-5	—	2	
Tin (organic compounds)	7440-31-5	—	0.1	
Tin oxide Total Dust Respirable Fraction	1332-29-2	— —	10 5	
Titanium dioxide	13463-67-7	—	10	
Toluene (toluol)	108-88-3		(See Oregon Table Z-2)	
Toluene diisocyanate (TDI), See Oregon Table Z-2 (Diisocyanates)	584-84-9			
o-Toluidine	95-53-4	5	22	X
Toxaphene, see Chlorinated camphene				
Tributyl phosphate	126-73-8	—	5	
1, 1, 1-Trichloroethane, see Methyl chloroform				
1, 1, 2-Trichloroethane	79-00-5	10	45	X
Trichloroethylene	79-01-6		(See Oregon Table Z-2)	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Trichloromethane, see Chloroform				
Trichloronaphthalene	1321-65-9	—	5	
1, 2, 3-Trichloropropane	96-18-4	50	300	
1, 1, 2-Trichloro 1, 2, 2-trifluoroethane	76-13-1	1,000	7,600	
Triethylamine	121-44-8	25	100	
Trifluorobromomethane	75-63-8	1,000	6,100	
Trimethyl benzene	25551-13-7	25	120	
2, 4, 6-Trinitrophenol, see Picric acid				
2, 4, 6-Trinitrophenylmethyl-nitramine, see Tetryl				
Trinitrotoluene (TNT)	118-96-7		1.5	X
Triorthocresyl phosphate	78-30-8	—	0.1	
Triphenyl phosphate	115-86-6	—	3	
Tungsten & compounds, as W	7440-33-7			
Soluble		—	1	
Insoluble		—	5	
Turpentine	8006-64-2	100	560	
Uranium (as U)	7440-61-1			
Soluble compounds		—	0.05	
Insoluble compounds		—	0.2	
Vanadium respirable dust				
(as V ₂ O ₅)	1314-62-1	—	(C) 0.5	
Fume (as V ₂ O ₅)	1314-62-1	—	(C) 0.05	
Vegetable oil mist				
Total Dust		—	10	
Respirable Fraction		—	5	
Vinyl acetate	108-05-4	10	30	
Vinyl benzene, see Styrene				
Vinyl bromide	593-60-2	250	1,100	
Vinyl chloride	75-01-4		(See 1910.1017)	
Vinyl cyanide, see Acrylonitrile				
Vinyl toluene	25013-15-4	100	480	
Warfarin	81-81-2	—	0.1	
Wood Dust (non-allergenic)		—	10	
Xylene (o-, m-, p-isomers)	1330-20-7	100	435	
Xylidine	1300-73-8	5	25	X
Yttrim	7440-65-5	—	1	
Zinc chloride fume	7646-85-7	—	1	
Zinc oxide	1314-13-2			
Total Dust		—	10	
Respirable Fraction		—	5	
Zinc oxide fume	1314-13-2	—	5	

Substance	CAS No. (c)	Ppm (a)	Mg/m ³ (b)	Skin
Zinc stearate	557-05-1	—	10	
Total Dust		—	5	
Respirable Fraction		—	5	
Zirconium compounds (as Zr)	7440-67-7	—	5	

Note: Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits.

Note: PNOR means "particles not otherwise regulated."

FOOTNOTES:

(a) Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 torr.

(b) Milligrams of substance per cubic meter of air. When entry is in this column only, the value is exact; when listed with a ppm entry, it is approximate.

(c) The CAS number is for information only. Enforcement is based on the substance name. For an entry covering more than one metal compound, measured as the metal, the CAS number for the metal is given – not CAS numbers for the individual compounds.

(d) The final benzene standard in 1910.1028 applies to all occupational exposures to benzene except in some circumstances the distribution and sale of fuels, sealed containers and pipelines, coke production, oil and gas drilling and production, natural gas processing, and the percentage exclusion for liquid mixtures; for the excepted subsegments, the benzene limits in Oregon Table Z-2 apply. See 1910.1028 for specific circumstances.

(e) This 8-hour TWA applies to respirable dust as measured by a vertical elutriator cotton dust sampler or equivalent instrument. The time weighted average applies to the cotton waste processing operations of waste recycling (sorting, blending, cleaning, and willowing) and garnetting. See also 1910.1043 for cotton dust limits applicable to other sectors.

(f) All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by the Particulates Not Otherwise Regulated (PNOR) limit which is the same as the inert or nuisance dust limit of Oregon Table Z-3.

(g) Usually a mixture, in general the aromatic hydrocarbon content will determine which TWA applies.

(h) If the exposure limit in 1926.1126 is stayed or is otherwise not in effect, the exposure limit is a ceiling of 0.1 mg/m³.

(i) If the exposure limit in 1926.1126 is stayed or is otherwise not in effect, the exposure limit is 0.1 mg/m³ (as CrO₃) as an 8-hour TWA.

(j) See Table Z-3 for the exposure limit for any operations or sectors where the exposure limit in Division 2/Z-Silica is stayed or is otherwise not in effect.

(k) This standard applies to any operations or sectors for which the beryllium standard, Division 2/Z Beryllium, is stayed or otherwise is not in effect.

Table Z-2

Substance	8-Hour Time Weighted Average	Acceptable Ceiling Concentration	Acceptable Max. Peak Above the Acceptable Ceiling Concentration for an 8-Hour Shift		Skin
			Concentration	Maximum Duration	
Benzene ^(a) (Z87.4-1969)	10 ppm	25 ppm	50 ppm	10 min.	
Beryllium, and beryllium compounds (Z37.29-1970)	2 µg/m ³	5 µg/m ³	25 µg/m ³	30 min.	
Cadmium fume ^(b) (Z37.5-1970)	0.1 mg/m ³	0.3 mg/m ³			
Cadmium dust ^(b) (Z37.5-1970)	0.2 mg/m ³	0.6 mg/m ³			
Carbon disulfide (Z37.3-1968)	20 ppm	30 ppm	100 ppm	30 min.	X
Carbon tetrachloride (Z37.17-1967)	10 ppm	25 ppm	200 ppm	5 min. in any 4 hrs	
Chromic acid and chromates (Z37.7-1971) (as CrO ₃) ^(c)		0.1 mg/m ³			
Ethylene dibromide (Z37.31-1970)	20 ppm	30 ppm	50 ppm	5 min.	X
Ethylene dichloride (Z37.21-1969)	50 ppm	100 ppm	200 ppm	5 min. in any 3 hrs	
Fluoride as dust (Z37.28-1969)	2.5 mg/m ³				
Formaldehyde (see 1910.1048)					
Hydrogen fluoride (Z37.28-1969)	3 ppm				
Hydrogen sulfide (Z37.2-1966)		20 ppm	50 ppm	10 min. once, only if no other measureable exposure occurs	

Substance	8-Hour Time Weighted Average	Acceptable Ceiling Concentration	Acceptable Max. Peak Above the Acceptable Ceiling Concentration for an 8-Hour Shift		Skin
			Concentration	Maximum Duration	
Mercury (Z37.8-1971)	0.05 mg/m³	0.1 mg/m³			X
Methyl chloride (Z37.18-1969)	100 ppm	200 ppm	300 ppm	5 min. in any 3 hrs	
Organo (alkyl) mercury (Z37.30-1969)	0.001 mg/m³	0.01 mg/m³			X
Styrene (Z37.15-1969)	100 ppm	200 ppm	600 ppm	5 min. in any 3 hrs	
Tetrachloroethylene (Z37.22-1967)	100 ppm	200 ppm	300 ppm	5 min. in any 3 hrs	
Toluene (Z37.12-1967)	100 ppm	300 ppm	500 ppm	10 min.	
Trichloroethylene (Z37.19-1967)	100 ppm	200 ppm	300 ppm	5 min. in any 2 hrs	
Diisocyanates					
Dicyclohexylmethane 4,4'-diisocyanate (hydrogenated MDI)	.055 mg/m ³ .005 ppm	.210 mg/m ³ .02 ppm			
Diphenylmethane diisocyanate (MDI)	.050 mg/m ³ .005 ppm	.200 mg/m ³ .02 ppm			
Hexamethylene diisocyanate (HDI)	.035 mg/m ³ .005 ppm	.140 mg/m ³ .02 ppm			
1,6 Hexamethylene diisocyanated Based Adduct (includes HDI-Biuret trimer, and other polymeric forms of HDI, including isocyanurates)	0.5 mg/m ³	1.0 mg/m ³			
Isophorone diisocyanate (IPDI)	.045 mg/m ³ .005 ppm	.180 mg/m ³ .02 ppm			
Napthalene diisocyanate (NDI)	.040 mg/m ³ .005 ppm	.170 mg/m ³ .02 ppm			
Toluene diisocyanate (TDI)	.035 mg/m ³ .005 ppm	.140 mg/m ³ .02 ppm			

Note: Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal limits.

FOOTNOTES:

(a) This standard applies to the industry segments exempt from the 1 ppm 8-hour TWA and 5 ppm STEL of the Benzene Standard, 1910.1028.

(b) This standard applies to any operations on sectors for which the Cadmium Standard, 1910.1027, is stayed or otherwise not in effect.

(c) This standard applies to any operations or sectors for which the exposure limit in the Chromium (VI) standard, 1926.1126, is stayed or is otherwise not in effect.

Table Z-3

Substance	mppcf ^(a)	mg/m ³
Silica: Crystalline Quartz (respirable)		0.1 mg/m ³
Quartz (total dust)		$\frac{30 \text{ mg/m}^3}{\% \text{SiO}_2 + 2}$
Cristobalite (respirable) Tridymite: Use 1/2 the value calculated from the formulae for quartz.		0.05 mg/m ³
Amorphous, including natural diatomaceous earth	20	$\frac{80 \text{ mg/m}^3}{\% \text{SiO}_2}$
Silicates (less than 1% crystalline silica):		
Mica	20	
Soapstone	20	
Talc (not containing asbestos)	20 ^(c)	
Talc (containing asbestos) Use asbestos limit; see 1926.1101.	20	
Tremolite, asbestiform (see OAR 437, Div. 2/Z, 1910.1001 and 1926.1101 , Asbestos).		
Portland cement	50	
Graphite (Natural)		5 mg/m ³
Coal Dust: Respirable fraction less than 5% SiO ₂		2.4 mg/m ^{3(e)(f)}
Coal Dust: Respirable fraction greater than 5% SiO ₂		0.1 mg/m ^{3(e)}
Inert or Nuisance Dust: ^(d) Respirable fraction Total dust		5 mg/m ³ 10 mg/m ³

Note: Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal limits.

Note: Conversion factors - mppcf x 35.3 = million particles per cubic meter = particles per c.c.

FOOTNOTES:

(a) Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

(b) The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

(c) Containing less than 1% quartz; if 1% quartz or more, use quartz limit.

(d) All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Oregon Table Z-1.

(e) Silica sampling methods must conform to OSHA or NIOSH sampling methods for respirable quartz silica.

(f) The measurements under this note refer to the use of an AEC (now NRC) instrument. If the respirable fraction of coal dust is determined with a MRE the figure corresponding to that of 2.4 mg/m³ in the table for coal dust is 4.5 mg/m³.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: WCB Admin. Order, Safety 3-1975, f. 10/6/75, ef. 11/1/75.
WCB Admin. Order, Safety 6-1978, f. 7/5/78, ef. 7/15/78.
WCD Admin. Order, Safety 12-1979, f. 12/21/79, ef. 3/1/80.
WCB Admin. Order, Safety 2-1980, f. 4/17/80, ef. 8/1/80.
WCB Admin. Order, Safety 1-1982, f. 3/4/82, ef. 5/5/82.
WCB Admin. Order, Safety 6-1983, f. 5/25/83, ef. 5/25/83.
WCB Admin. Order, Safety 21-1984, f. 12/20/84, ef. 1/1/85.
WCD Admin. Order, Safety 4-1986, f. 5/5/86, ef. 5/5/86.
WCB Admin. Order, Safety 5-1986, f. 5/20/86, ef. 6/13/86.
APD Admin. Order 13-1989, f. 7/17/89, ef. 7/17/89.
OR-OSHA Admin. Order 6-1997, f. 5/2/97, ef. 5/2/97.
OR-OSHA Admin. Order 4-2001, f. 02/05/01, ef. 02/05/01.
OR-OSHA Admin. Order 6-2006, f. 8/30/06, ef. 8/30/06.
OR-OSHA Admin. Order 6-2008, f. 5/13/08, ef. 7/1/08.
OR-OSHA Admin. Order 5-2016, f. 9/23/16, ef. 7/1/18.
OR-OSHA Admin. Order 3-2017, f. 07/07/17, ef. 03/12/18.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.1101

Asbestos

(a) Scope and application. This section regulates asbestos exposure in all work as defined in 29 CFR 1910.12(b), including but not limited to the following:

(1) Demolition or salvage of structures where asbestos is present;

(2) Removal or encapsulation of materials containing asbestos;

(3) Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain asbestos;

(4) Installation of products containing asbestos;

(5) Asbestos spill/emergency cleanup; and

(6) Transportation, disposal, storage, containment of and housekeeping activities involving asbestos or products containing asbestos, on the site or location at which construction activities are performed.

(7) Coverage under this standard shall be based on the nature of the work operation involving asbestos exposure.

(8) This section does not apply to asbestos-containing asphalt roof coatings, cements and mastics.

(b) Definitions.

Aggressive method means removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact ACM.

Amended water means water to which surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate ACM.

Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this standard, "asbestos" includes PACM, as defined below.

Asbestos-containing material (ACM) means any material containing more than one percent asbestos.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person authorized by the employer and required by work duties to be present in regulated areas.

Building/facility owner is the legal entity, including a lessee, which exercises control over management and record keeping functions relating to a building and/or facility in which activities covered by this standard take place.

Certified Industrial Hygienist (CIH) means one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I asbestos work means activities involving the removal of TSI and surfacing ACM and PACM.

Class II asbestos work means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III asbestos work means repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.

Class IV asbestos work means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

Clean room means an uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

Closely resemble means that the major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person means, in addition to the definition in 29 CFR 1926.32(f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f): in addition, for Class I and Class II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR Part 763) for supervisor, or its equivalent and, for Class III and Class IV work, who is trained in a manner consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2).

Critical barrier means one or more layers of plastic sealed over all openings into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

Decontamination area means an enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment that are contaminated with asbestos.

Demolition means the wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products.

Director means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Disturbance means activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. Disturbance includes cutting away small amounts of ACM and PACM, no greater than the amount which can be contained in one standard sized glove bag or waste bag in order to access a building component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 60 inches in length and width.

Employee exposure means that exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

Equipment room (change room) means a contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber means a particulate form of asbestos, 5 micrometers or longer, with a length to-diameter ratio of at least 3 to 1.

Glovebag means not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-containing material, with glove-like appendages through which material and tools may be handled.

High-efficiency particulate air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

Homogeneous area means an area of surfacing material or thermal system insulation that is uniform in color and texture.

Industrial hygienist means a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

Intact means that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

Modification for purposes of paragraph (g)(6)(ii) means a changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system. Omitting a procedure or component, or reducing or diminishing the stringency or strength of a material or component of the control system is not a "modification" for purposes of paragraph (g)(6) of this section.

Negative Initial Exposure Assessment means a demonstration by the employer, which complies with the criteria in paragraph (f)(2)(iii) of this section, that employee exposure during an operation is expected to be consistently below the PELs.

PACM means "presumed asbestos containing material".

Presumed Asbestos Containing Material means thermal system insulation and surfacing material found in buildings constructed no later than 1980. The designation of a material as "PACM" may be rebutted pursuant to paragraph (k)(5) of this section.

Project Designer means a person who has successfully completed the training requirements for an abatement project designer established by 40 U.S.C. 763.90(g).

Regulated area means an area established by the employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos exceed or there is a reasonable possibility they may exceed the permissible exposure limit. Requirements for regulated areas are set out in paragraph (e) of this section.

Removal means all operations where ACM and/or PACM is taken out or stripped from structures or substrates, and includes demolition operations.

Renovation means the modifying of any existing structure, or portion thereof.

Repair means overhauling, rebuilding, reconstructing, or reconditioning of structures or substrates, including encapsulation or other repair of ACM or PACM attached to structures or substrates.

Surfacing material means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).

Surfacing ACM means surfacing material which contains more than 1% asbestos.

Thermal system insulation (TSI) means ACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

Thermal system insulation ACM is thermal system insulation which contains more than 1% asbestos.

(c) Permissible exposure limits (PELS).

(1) Time-weighted average limit (TWA). The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter of air as an eight (8) hour time-weighted average (TWA), as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

(2) Excursion limit. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes, as determined by the method prescribed in Appendix A to this section, or by an equivalent method.

(d) Multi-employer worksites.

(1) On multi-employer worksites, an employer performing work requiring the establishment of a regulated area shall inform other employers on the site of the nature of the employer's work with asbestos and/or PACM, of the existence of and requirements pertaining to regulated areas, and the measures taken to ensure that employees of such other employers are not exposed to asbestos.

(2) Asbestos hazards at a multi-employer work site shall be abated by the contractor who created or controls the source of asbestos contamination. For example, if there is a significant breach of an enclosure containing Class I work, the employer responsible for erecting the enclosure shall repair the breach immediately.

(3) In addition, all employers of employees exposed to asbestos hazards shall comply with applicable protective provisions to protect their employees. For example, if employees working immediately adjacent to a Class I asbestos job are exposed to asbestos due to the inadequate containment of such job, their employer shall either remove the employees from the area until the enclosure breach is repaired; or perform an initial exposure assessment pursuant to (f) of this section.

(4) All employers of employees working adjacent to regulated areas established by another employer on a multi-employer work-site, shall take steps on a daily basis to ascertain the integrity of the enclosure and/or the effectiveness of the control method relied on by the primary asbestos contractor to assure that asbestos fibers do not migrate to such adjacent areas.

(5) All general contractors on a construction project which includes work covered by this standard shall be deemed to exercise general supervisory authority over the work covered by

this standard, even though the general contractor is not qualified to serve as the asbestos “competent person” as defined by paragraph (b) of this section. As supervisor of the entire project, the general contractor shall ascertain whether the asbestos contractor is in compliance with this standard, and shall require such contractor to come into compliance with this standard when necessary.

(e) Regulated areas.

(1) All Class I, II and III asbestos work shall be conducted within regulated areas. All other operations covered by this standard shall be conducted within a regulated area where airborne concentrations of asbestos exceed, or there is a reasonable possibility they may exceed a PEL. Regulated areas shall comply with the requirements of paragraphs (2), (3), (4) and (5) of this section.

(2) Demarcation. The regulated area shall be demarcated in any manner that minimizes the number of persons within the area and protects persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area. Signs shall be provided and displayed pursuant to the requirements of paragraph (k)(7) of this section.

(3) Access. Access to regulated areas shall be limited to authorized persons and to persons authorized by the Act or regulations issued pursuant thereto.

(4) Respirators. All persons entering a regulated area where employees are required pursuant to paragraph (h)(1) of this section to wear respirators shall be supplied with a respirator selected in accordance with paragraph (h)(2) of this section.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated area.

(6) Competent Persons. The employer shall ensure that all asbestos work performed within regulated areas is supervised by a competent person, as defined in paragraph (b) of this section. The duties of the competent person are set out in paragraph (o) of this section.

(f) Exposure assessments and monitoring.

(1) General monitoring criteria.

(i) Each employer who has a workplace or work operation where exposure monitoring is required under this section shall perform monitoring to determine accurately the airborne concentrations of asbestos to which employees may be exposed.

(ii) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee.

(iii) Representative 8-hour TWA employee exposure shall be determined on the basis of one or more samples representing full-shift exposure for employees in each work area. Representative 30-minute short-term employee exposures shall be determined on the basis of one or more samples representing 30-minute exposures associated with operations that are most likely to produce exposures above the excursion limit for employees in each work area.

(2) Initial Exposure Assessment.

(i) Each employer who has a workplace or work operation covered by this standard shall ensure that a “competent person” conducts an exposure assessment immediately before or at the initiation of the operation to ascertain expected exposures during that operation or workplace. The assessment must be completed in time to comply with requirements which are triggered by exposure data or the lack of a “negative exposure assessment,” and to provide information necessary to assure that all control systems planned are appropriate for that operation and will work properly.

(ii) Basis of Initial Exposure Assessment: Unless a negative exposure assessment has been made pursuant to paragraph (f)(2)(iii) of this section, the initial exposure assessment shall, if feasible, be based on monitoring conducted pursuant to paragraph (f)(1)(iii) of this section. The assessment shall take into consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the employer which indicate the levels of airborne asbestos likely to be encountered on the job. For Class I asbestos work, until the employer conducts exposure monitoring and documents that employees on that job will not be exposed in excess of the PELs, or otherwise makes a negative exposure assessment pursuant to paragraph (f)(2)(iii) of this section, the employer shall presume that employees are exposed in excess of the TWA and excursion limit.

(iii) Negative Exposure Assessment: For any one specific asbestos job which will be performed by employees who have been trained in compliance with the standard, the employer may demonstrate that employee exposures will be below the PELs by data which conform to the following criteria;

(A) Objective data demonstrating that the product or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the TWA and excursion limit under those work conditions having the greatest potential for releasing asbestos; or

(B) Where the employer has monitored prior asbestos jobs for the PEL and the excursion limit within 12 months of the current or projected job, the monitoring and analysis were performed in compliance with the asbestos standard in effect; and the data were obtained during work operations conducted under workplace conditions “closely resembling” the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer’s current operations, the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job, and these data show that under the conditions prevailing and which will prevail in the current workplace there is a high degree of certainty that employee exposures will not exceed the TWA and excursion limit; or

(C) The results of initial exposure monitoring of the current job made from breathing zone air samples that are representative of the 8-hour TWA and 30 minute short-term exposures of each employee covering operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs.

(3) Periodic monitoring.

(i) Class I and II operations. The employer shall conduct daily monitoring that is representative of the exposure of each employee who is assigned to work within a regulated area who is performing Class I or II work, unless the employer pursuant to (f)(2)(iii) of this section, has made a negative exposure assessment for the entire operation.

(ii) All operations under the standard other than Class I and II operations. The employer shall conduct periodic monitoring of all work where exposures are expected to exceed a PEL, at intervals sufficient to document the validity of the exposure prediction.

(iii) Exception: When all employees required to be monitored daily are equipped with supplied-air respirators operated in the pressure demand mode, or other positive pressure mode respirator, the employer may dispense with the daily monitoring required by this paragraph. However, employees performing Class I work using a control method which is not listed in paragraph (g)(4)(i), (ii), or (iii) of this section or using a modification of a listed control method, shall continue to be monitored daily even if they are equipped with supplied-air respirators.

(4) Termination of monitoring.

(i) If the periodic monitoring required by paragraph (f)(3) of this section reveals that employee exposures, as indicated by statistically reliable measurements, are below the permissible exposure limit and excursion limit the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(ii) Additional monitoring. Notwithstanding the provisions of paragraph (f)(2) and (3), and (f)(4) of this section, the employer shall institute the exposure monitoring required under paragraph (f)(3) of this section whenever there has been a change in process, control equipment, personnel or work practices that may result in new or additional exposures above the permissible exposure limit and/or excursion limit or when the employer has any reason to suspect that a change may result in new or additional exposures above the permissible exposure limit and/or excursion limit. Such additional monitoring is required regardless of whether a "negative exposure assessment" was previously produced for a specific job.

(5) Employee notification of monitoring results. The employer must, as soon as possible but no later than 5 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(6) Observation of monitoring.

(i) The employer shall provide affected employees and their designated representatives an opportunity to observe any monitoring of employee exposure to asbestos conducted in accordance with this section.

(ii) When observation of the monitoring of employee exposure to asbestos requires entry into an area where the use of protective clothing or equipment is required, the observer shall be provided with and be required to use such clothing and equipment and shall comply with all other applicable safety and health procedures.

(g) Methods of compliance.

(1) Engineering controls and work practices for all operations covered by this section. The employer shall use the following engineering controls and work practices in all operations covered by this section, regardless of the levels of exposure:

(i) Vacuum cleaners equipped with HEPA filters to collect all debris and dust containing ACM and PACM, except as provided in paragraph (g)(8)(ii) of this section in the case of roofing material.

(ii) Wet methods, or wetting agents, to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup, except where employers demonstrate that the use of wet methods is infeasible due to for example, the creation of electrical hazards, equipment malfunction, and, in roofing, except as provided in paragraph (g)(8)(ii) of this section; and

(iii) Prompt clean-up and disposal of wastes and debris contaminated with asbestos in leak-tight containers, except in roofing operations, where the procedures specified in paragraph (g)(8)(ii) of this section apply.

(2) In addition to the requirements of paragraph (g)(1) of this section, the employer shall use the following control methods to achieve compliance with the TWA permissible exposure limit and excursion limit prescribed by paragraph (c) of this section;

(i) Local exhaust ventilation equipped with HEPA filter dust collection systems;

(ii) Enclosure or isolation of processes producing asbestos dust;

(iii) Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device equipped with a HEPA filter;

(iv) Use of other work practices and engineering controls that the Assistant Secretary can show to be feasible.

(v) Wherever the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the permissible exposure and/or excursion limit prescribed in paragraph (c), of this section, the employer shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (h) of this section.

(3) Prohibitions. The following work practices and engineering controls shall not be used for work related to asbestos or for work which disturbs ACM or PACM, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

(i) High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

(ii) Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

(iii) Dry sweeping, shoveling or other dry clean-up of dust and debris containing ACM and PACM.

(iv) Employee rotation as a means of reducing employee exposure to asbestos.

(4) Class I Requirements. In addition to the provisions of paragraphs (g)(1) and (2) of this section, the following engineering controls and work practices and procedures shall be used.

(i) All Class I work, including the installation and operation of the control system shall be supervised by a competent person as defined in paragraph (b) of this section;

(ii) For all Class I jobs involving the removal of more than 25 linear or 10 square feet of thermal system insulation or surfacing material; for all other Class I jobs, where the employer cannot produce a negative exposure assessment pursuant to paragraph (f)(2)(iii) of this section, or where employees are working in areas adjacent to the regulated area, while the Class I work is being performed, the employer shall use one of the following methods to ensure that airborne asbestos does not migrate from the regulated area:

(A) Critical barriers shall be placed over all the openings to the regulated area, except where activities are performed outdoors; or

(B) The employer shall use another barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified by perimeter area surveillance during each work shift at each boundary of the regulated area, showing no visible asbestos dust; and perimeter area monitoring showing that clearance levels contained in 40 CFR Part 763, Subpart E, of the EPA Asbestos in Schools Rule are met, or that perimeter area levels, measured by Phase Contrast Microscopy (PCM) are no more than background levels representing the same area before the asbestos work began. The results of such monitoring shall be made known to the employer no later than 24 hours from the end of the work shift represented by such monitoring. Exception: For work completed outdoors where employees are not working in areas adjacent to the regulated areas, this paragraph (g)(4)(ii) is satisfied when the specific control methods in paragraph (g)(5) of this section are used.

(iii) For all Class I jobs, HVAC systems shall be isolated in the regulated area by sealing with a double layer of 6 mil plastic or the equivalent;

(iv) For all Class I jobs, impermeable drop cloths shall be placed on surfaces beneath all removal activity;

(v) For all Class I jobs, all objects within the regulated area shall be covered with impermeable drop cloths or plastic sheeting which is secured by duct tape or an equivalent.

(vi) For all Class I jobs where the employer cannot produce a negative exposure assessment, or where exposure monitoring shows that a PEL is exceeded, the employer shall ventilate the regulated area to move contaminated air away from the breathing zone of employees toward a HEPA filtration or collection device.

(5) Specific control methods for Class I work. In addition, Class I asbestos work shall be performed using one or more of the following control methods pursuant to the limitations stated below:

(i) Negative Pressure Enclosure (NPE) systems: NPE systems may be used where the configuration of the work area does not make the erection of the enclosure infeasible, with the following specifications and work practices.

(A) Specifications:

- (1) The negative pressure enclosure (NPE) may be of any configuration,
- (2) At least 4 air changes per hour shall be maintained in the NPE,
- (3) A minimum of -0.02 column inches of water pressure differential, relative to outside pressure, shall be maintained within the NPE as evidenced by manometric measurements,
- (4) The NPE shall be kept under negative pressure throughout the period of its use, and
- (5) Air movement shall be directed away from employees performing asbestos work within the enclosure, and toward a HEPA filtration or a collection device.

(B) Work Practices:

- (1) Before beginning work within the enclosure and at the beginning of each shift, the NPE shall be inspected for breaches and smoketested for leaks, and any leaks sealed.
- (2) Electrical circuits in the enclosure shall be deactivated, unless equipped with ground-fault circuit interrupters.

(ii) Glovebag systems may be used to remove PACM and/or ACM from straight runs of piping and elbows and other connections with the following specifications and work practices:

(A) Specifications:

- (1) Glovebags shall be made of 6 mil thick plastic and shall be seamless at the bottom.
- (2) Glovebags used on elbows and other connections must be designed for that purpose and used without modifications.

(B) Work Practices:

- (1) Each glovebag shall be installed so that it completely covers the circumference of pipe or other structure where the work is to be done.
- (2) Glovebags shall be smoke-tested for leaks and any leaks sealed prior to use.
- (3) Glovebags may be used only once and may not be moved.
- (4) Glovebags shall not be used on surfaces whose temperature exceeds 150° F.
- (5) Prior to disposal, glovebags shall be collapsed by removing air within them using a HEPA vacuum.

(6) Before beginning the operation, loose and friable material adjacent to the glovebag/box operation shall be wrapped and sealed in two layers of six mil plastic or otherwise rendered intact,

(7) Where system uses attached waste bag, such bag shall be connected to collection bag using hose or other material which shall withstand pressure of ACM waste and water without losing its integrity:

(8) Sliding valve or other device shall separate waste bag from hose to ensure no exposure when waste bag is disconnected:

(9) At least two persons shall perform Class I glovebag removal operations.

(iii) Negative Pressure Glove Bag Systems. Negative pressure glove bag systems may be used to remove ACM or PACM from piping.

(A) Specifications: In addition to specifications for glove bag systems above, negative pressure glove bag systems shall attach HEPA vacuum systems or other devices to bag to prevent collapse during removal.

(B) Work Practices:

(1) The employer shall comply with the work practices for glove bag systems in paragraph (g)(5)(ii)(B)(4) of this section.

(2) The HEPA vacuum cleaner or other device used to prevent collapse of bag during removal shall run continually during the operation until it is completed, at which time the bag shall be collapsed prior to removal of the bag from the pipe.

(3) Where a separate waste bag is used along with a collection bag and discarded after one use, the collection bag may be reused if rinsed clean with amended water before reuse.

(iv) Negative Pressure Glove Box Systems: Negative pressure glove boxes may be used to remove ACM or PACM from pipe runs with the following specifications and work practices.

(A) Specifications:

(1) Glove boxes shall be constructed with rigid sides and made from metal or other material which can withstand the weight of the ACM and PACM and water used during removal:

(2) A negative pressure generator shall be used to create negative pressure in the system:

(3) An air filtration unit shall be attached to the box:

(4) The box shall be fitted with gloved apertures:

(5) An aperture at the base of the box shall serve as a bagging outlet for waste ACM and water:

(6) A back-up generator shall be present on site:

(7) Waste bags shall consist of 6 mil thick plastic double-bagged before they are filled or plastic thicker than 6 mil.

(B) Work practices:

(1) At least two persons shall perform the removal:

(2) The box shall be smoke-tested for leaks and any leaks sealed prior to each use.

(3) Loose or damaged ACM adjacent to the box shall be wrapped and sealed in two layers of 6 mil plastic prior to the job, or otherwise made intact prior to the job.

(4) A HEPA filtration system shall be used to maintain pressure barrier in box.

(v) Water Spray Process System. A water spray process system may be used for removal of ACM and PACM from cold line piping if, employees carrying out such process have completed a 40-hour separate training course in its use, in addition to training required for employees performing Class I work. The system shall meet the following specifications and shall be performed by employees using the following work practices.

(A) Specifications:

(1) Piping shall be surrounded on 3 sides by rigid framing.

(2) A 360 degree water spray, delivered through nozzles supplied by a high pressure separate water line, shall be formed around the piping.

(3) The spray shall collide to form a fine aerosol which provides a liquid barrier between workers and the ACM and PACM.

(B) Work Practices:

(1) The system shall be run for at least 10 minutes before removal begins.

(2) All removal shall take place within the water barrier.

(3) The system shall be operated by at least three persons, one of whom shall not perform removal, but shall check equipment, and ensure proper operation of the system.

(4) After removal, the ACM and PACM shall be bagged while still inside the water barrier.

(vi) A small walk-in enclosure which accommodates no more than two persons (mini-enclosure) may be used if the disturbance or removal can be completely contained by the enclosure with the following specifications and work practices.

(A) Specifications:

(1) The fabricated or job-made enclosure shall be constructed of 6 mil plastic or equivalent:

(2) The enclosure shall be placed under negative pressure by means of a HEPA filtered vacuum or similar ventilation unit:

(B) Work practices:

(1) Before use, the mini-enclosure shall be inspected for leaks and smoke-tested to detect breaches, and any breaches sealed.

(2) Before reuse, the interior shall be completely washed with amended water and HEPA-vacuumed.

(3) During use, air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

(6) Alternative control methods for Class I work. Class I work may be performed using a control method which is not referenced in paragraph (g)(5) of this section, or which modifies a control method referenced in paragraph (g)(5) of this section, if the following provisions are complied with:

(i) The control method shall enclose, contain or isolate the processes or source of airborne asbestos dust, or otherwise capture or redirect such dust before it enters the breathing zone of employees.

(ii) A certified industrial hygienist or licensed professional engineer who is also qualified as a project designer as defined in paragraph (b) of this section, shall evaluate the work area, the projected work practices and the engineering controls and shall certify in writing that the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements of EPA's Asbestos in Schools rule issued under AHERA, or perimeter monitoring which meets the criteria in paragraph (g)(4)(ii)(B) of this section.

(A) Where the TSI or surfacing material to be removed is 25 linear or 10 square feet or less, the evaluation required in paragraph (g)(6) of this section may be performed by a "competent person", and may omit consideration of perimeter or clearance monitoring otherwise required.

(B) The evaluation of employee exposure required in paragraph (g)(6) of this section, shall include and be based on sampling and analytical data representing employee exposure during the use of such method under worst-case conditions and by employees whose training and experience are equivalent to employees who are to perform the current job.

(7) Work Practices and Engineering Controls for Class II work.

(i) All Class II work shall be supervised by a competent person as defined in paragraph (b) of this section.

(ii) For all indoor Class II jobs, where the employer has not produced a negative exposure assessment pursuant to paragraph (f)(2)(iii) of this section, or where during the job, changed conditions indicate there may be exposure above the PEL or where the employer does not remove the ACM in a substantially intact state, the employer shall use one of the following methods to ensure that airborne asbestos does not migrate from the regulated area;

(A) Critical barriers shall be placed over all openings to the regulated area; or,

(B) The employer shall use another barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified by perimeter area monitoring or clearance monitoring which meets the criteria set out in paragraph (g)(4)(ii)(B) of this section.

(C) Impermeable dropcloths shall be placed on surfaces beneath all removal activity;

(iii) Reserved

(iv) All Class II asbestos work shall be performed using the work practices and requirements set out above in paragraph (g)(1)(i) through (g)(1)(iii) of this section.

(8) Additional Controls for Class II work. Class II asbestos work shall also be performed by complying with the work practices and controls designated for each type of asbestos work to be performed, set out in this paragraph. Where more than one control method may be used for a type of asbestos work, the employer may choose one or a combination of designated control methods. Class II work also may be performed using a method allowed for Class I work, except that glove bags and glove boxes are allowed if they fully enclose the Class II material to be removed.

(i) For removing vinyl and asphalt flooring materials which contain ACM or for which in buildings constructed no later than 1980, the employer has not verified the absence of ACM pursuant to paragraph (g)(8)(i)(I) of this section. The employer shall ensure that employees comply with the following work practices and that employees are trained in these practices pursuant to paragraph (k)(9):

(A) Flooring or its backing shall not be sanded.

(B) Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.

(C) Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination. Rip-up of resilient sheet floor material is prohibited.

(D) All scraping of residual adhesive and/or backing shall be performed using wet methods.

(E) Dry sweeping is prohibited.

(F) Mechanical chipping is prohibited unless performed in a negative pressure enclosure which meets the requirements of paragraph (g)(5)(i) of this section.

(G) Tiles shall be removed intact, unless the employer demonstrates that intact removal is not possible.

(H) When tiles are heated and can be removed intact, wetting may be omitted.

(I) Resilient flooring material including associated mastic and backing shall be assumed to be asbestos-containing unless an industrial hygienist determines that it is asbestos-free using recognized analytical techniques.

(ii) For removing roofing material which contains ACM the employer shall ensure that the following work practices are followed:

(A) Roofing material shall be removed in an intact state to the extent feasible.

(B) Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards.

(C) Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.

(D) When removing built-up roofs with asbestos-containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. When removing built-up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line. The dust and debris shall be immediately bagged or placed in covered containers.

(E) Asbestos-containing material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist:

(1) Any ACM that is not intact shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.

(2) Intact ACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.

(F) Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.

(G) Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.

(H) Notwithstanding any other provision of this section, removal or repair of sections of intact roofing less than 25 square feet in area does not require use of wet methods or HEPA vacuuming as long as manual methods which do not render the material non-intact are used to remove the material and no visible dust is created by the removal method used. In determining whether a job involves less than 25 square feet, the employer shall include all removal and repair work performed on the same roof on the same day.

(iii) When removing cementitious asbestos-containing siding and shingles or transite panels containing ACM on building exteriors (other than roofs, where paragraph (g)(8)(ii) of this section applies), the employer shall ensure that the following work practices are followed:

(A) Cutting, abrading or breaking siding, shingles, or transite panels, shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used.

(B) Each panel or shingle shall be sprayed with amended water prior to removal.

(C) Unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.

(D) Nails shall be cut with flat, sharp instruments.

(iv) When removing gaskets containing ACM, the employer shall ensure that the following work practices are followed:

(A) If a gasket is visibly deteriorated and unlikely to be removed intact, removal shall be undertaken within a glovebag as described in paragraph (g)(5)(ii) of this section.

(B) Reserved

(C) The gasket shall be immediately placed in a disposal container.

(D) Any scraping to remove residue must be performed wet.

(v) When performing any other Class II removal of asbestos containing material for which specific controls have not been listed in paragraph (g)(8)(iv)(A) through (D) of this section, the employer shall ensure that the following work practices are complied with.

(A) The material shall be thoroughly wetted with amended water prior to and during its removal.

(B) The material shall be removed in an intact state unless the employer demonstrates that intact removal is not possible.

(C) Cutting, abrading or breaking the material shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release are not feasible.

(D) Asbestos-containing material removed, shall be immediately bagged or wrapped, or kept wetted until transferred to a closed receptacle, no later than the end of the work shift.

(vi) Alternative Work Practices and Controls. Instead of the work practices and controls listed in paragraph (g)(8)(i) through (v) of this section, the employer may use different or modified engineering and work practice controls if the following provisions are complied with.

(A) The employer shall demonstrate by data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used, that employee exposure will not exceed the PELs under any anticipated circumstances.

(B) A competent person shall evaluate the work area, the projected work practices and the engineering controls, and shall certify in writing, that the different or modified controls are adequate to reduce direct and indirect employee exposure to below the PELs under all

expected conditions of use and that the method meets the requirements of this standard. The evaluation shall include and be based on data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used for the current job, and by employees whose training and experience are equivalent to employees who are to perform the current job.

(9) Work Practices and Engineering Controls for Class III asbestos work. Class III asbestos work shall be conducted using engineering and work practice controls which minimize the exposure to employees performing the asbestos work and to bystander employees.

(i) The work shall be performed using wet methods.

(ii) To the extent feasible, the work shall be performed using local exhaust ventilation.

(iii) Where the disturbance involves drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material, the employer shall use impermeable dropcloths, and shall isolate the operation using mini-enclosures or glovebag systems pursuant to paragraph (g)(5) of this section or another isolation method.

(iv) Where the employer does not produce a “negative exposure assessment” for a job, or where monitoring results show the PEL has been exceeded, the employer shall contain the area using impermeable dropcloths and plastic barriers or their equivalent, or shall isolate the operation using a control system listed in and in compliance with paragraph (g)(5) of this section.

(v) Employees performing Class III jobs, which involve the disturbance of thermal system insulation or surfacing material, or where the employer does not produce a “negative exposure assessment” or where monitoring results show a PEL has been exceeded, shall wear respirators which are selected, used and fitted pursuant to provisions of paragraph (h) of this section.

(10) Class IV asbestos work. Class IV asbestos jobs shall be conducted by employees trained pursuant to the asbestos awareness training program set out in paragraph (k)(9) of this section. In addition, all Class IV jobs shall be conducted in conformity with the requirements set out in paragraph (g)(1) of this section, mandating wet methods, HEPA vacuums, and prompt clean up of debris containing ACM or PACM.

(i) Employees cleaning up debris and waste in a regulated area where respirators are required shall wear respirators which are selected, used and fitted pursuant to provisions of paragraph (h) of this section.

(ii) Employers of employees who clean up waste and debris in, and employers in control of, areas where friable thermal system insulation or surfacing material is accessible, shall assume that such waste and debris contain asbestos.

(11) Alternative methods of compliance for installation, removal, repair, and maintenance of certain roofing and pipeline coating materials. Notwithstanding any other provision of this section, an employer who complies with all provisions of this paragraph (g)(11) when installing, removing, repairing, or maintaining intact pipeline asphaltic wrap, or roof flashings which contain asbestos fibers encapsulated or coated by bituminous or resinous compounds shall be deemed to be in compliance with this section. If an employer does not comply with all provisions of this

paragraph (g)(11), or if during the course of the job the material does not remain intact, the provisions of paragraph (g)(8) of this section apply instead of this paragraph (g)(11).

(i) Before work begins and as needed during the job, a competent person who is capable of identifying asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate such hazards, shall conduct an inspection of the worksite and determine that the roofing material is intact and will likely remain intact.

(ii) All employees performing work covered by paragraph (g)(11) shall be trained in a training program that meets the requirements of paragraph (k)(9)(viii) of this section.

(iii) The material shall not be sanded, abraded, or ground. Manual methods which do not render the material non-intact shall be used.

(iv) Material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist. All such material shall be removed from the roof as soon as practicable, but in any event no later than the end of the work shift.

(v) Where roofing products which have been labeled as containing asbestos pursuant to paragraph (k)(8) of this section are installed on nonresidential roofs during operations covered by this paragraph (g)(11), the employer shall notify the building owner of the presence and location of such materials no later than the end of the job.

(vi) All removal or disturbance of pipeline asphaltic wrap shall be performed using wet methods.

(h) Respiratory protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Class I asbestos work.

(ii) Class II asbestos work when ACM is not removed in a substantially intact state.

(iii) Class II and III asbestos work that is not performed using wet methods, except for removal of ACM from sloped roofs when a negative-exposure assessment has been conducted and ACM is removed in an intact state.

(iv) Class II and III asbestos work for which a negative-exposure assessment has not been conducted.

(v) Class III asbestos work when TSI or surfacing ACM or PACM is being disturbed.

(vi) Class IV asbestos work performed within regulated areas where employees who are performing other work are required to use respirators.

(vii) Work operations covered by this section for which employees are exposed above the TWA or excursion limit.

(viii) Emergencies.

(2) Respirator program.

Note: Oregon OSHA repealed 1926.1101(h)(2)(i). In Oregon, OAR 437-003-1101 applies.

437-003-1101 Asbestos Respiratory Protection Program

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 3/Z, 1926.1101 Asbestos, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Asbestos rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

1926.1101 (h)(2)(ii): No employee shall be assigned to asbestos work that requires respirator use if, based on their most recent medical examination, the examining physician determines that the employee will be unable to function normally while using a respirator, or that the safety or health of the employee or other employees will be impaired by the employee's respirator use. Such employees must be assigned to another job or given the opportunity to transfer to a different position that they can perform. If such a transfer position is available, it must be with the same employer, in the same geographical area, and with the same seniority, status, rate of pay, and other job benefits the employee had just prior to such transfer.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134; however, employers must not select or use filtering facepiece respirators for use against asbestos fibers.

(B) Provide HEPA filters for powered and non-powered air-purifying respirators.

(ii) Employers must provide an employee with tight-fitting, powered airpurifying respirator (PAPR) instead of a negative pressure respirator selected according to paragraph (h)(3)(i)(A) of this standard when the employee chooses to use a PAPR and it provides adequate protection to the employee.

(iii) Employers must provide employees with an air-purifying half mask respirator, other than a filtering facepiece respirator, whenever the employees perform:

(A) Class II or Class III asbestos work for which no negative exposure assessment is available.

(B) Class III asbestos work involving disturbance of TSI or surfacing ACM or PACM.

(iv) Employers must provide employees with:

(A) A tight-fitting powered air-purifying respirator or a full face piece, supplied-air respirator operated in the pressure-demand mode and equipped with either HEPA egress cartridges or an auxiliary positive pressure, self-contained breathing apparatus (SCBA) whenever the employees are in a regulated area performing Class I asbestos work for which a negative exposure assessment is not available and the exposure assessment indicates that the exposure level will be at or below 1 f/cc as an 8-hour time-weighted average (TWA).

(B) A full face piece supplied-air respirator operated in the pressure demand mode and equipped with an auxiliary positive-pressure SCBA whenever the employees are in a regulated area performing Class I asbestos work for which a negative exposure assessment is not available and the exposure assessment indicates that the exposure level will be above 1 f/cc as an 8-hour TWA.

(i) Protective clothing.

(1) General. The employer shall provide or require the use of protective clothing, such as coveralls or similar whole-body clothing, head coverings, gloves, and foot coverings for any employee exposed to airborne concentrations of asbestos that exceed the TWA and/or excursion limit prescribed in paragraph (c) of this section, or for which a required negative exposure assessment is not produced, or for any employee performing Class I operations which involve the removal of over 25 linear or 10 square feet of TSI or surfacing ACM and PACM.

(2) Laundering.

(i) The employer shall ensure that laundering of contaminated clothing is done so as to prevent the release of airborne asbestos in excess of the TWA and/or excursion limit prescribed in paragraph (c) of this section.

(ii) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in paragraph (i)(2)(i) of this section to effectively prevent the release of airborne asbestos in excess of the TWA and excursion limit prescribed in paragraph (c) of this section.

(3) Contaminated clothing. Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and be labeled in accordance with paragraph (k) of this section.

(4) Inspection of protective clothing.

(i) The competent person shall examine worksuits worn by employees at least once per workshift for rips or tears that may occur during performance of work.

(ii) When rips or tears are detected while an employee is working, rips and tears shall be immediately mended, or the worksuit shall be immediately replaced.

(j) Hygiene facilities and practices for employees.

(1) Requirements for employees performing Class I asbestos jobs involving over 25 linear or 10 square feet of TSI or surfacing ACM and PACM.

(i) Decontamination areas: the employer shall establish a decontamination area that is adjacent and connected to the regulated area for the decontamination of such employees. The decontamination area shall consist of an equipment room, shower area, and clean room in series. The employer shall ensure that employees enter and exit the regulated area through the decontamination area.

(A) Equipment room. The equipment room shall be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.

(B) Shower area. Shower facilities shall be provided which comply with 29 CFR 1910.141(d)(3), unless the employer can demonstrate that they are not feasible. The showers shall be adjacent both to the equipment room and the clean room, unless the employer can demonstrate that this location is not feasible. Where the employer can demonstrate that it is not feasible to locate the shower between the equipment room and the clean room, or where the work is performed outdoors, the employers shall ensure that employees:

(1) Remove asbestos contamination from their worksuits in the equipment room using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or

(2) Remove their contaminated worksuits in the equipment room, then don clean work suits, and proceed to a shower that is not adjacent to the work area.

(C) Clean change room. The clean room shall be equipped with a locker or appropriate storage container for each employee's use. When the employer can demonstrate that it is not feasible to provide a clean change area adjacent to the work area or where the work is performed outdoors, the employer may permit employees engaged in Class I asbestos jobs to clean their protective clothing with a portable HEPA equipped vacuum before such employees leave the regulated area. Following showering, such employees however must then change into street clothing in clean change areas provided by the employer which otherwise meet the requirements of this section.

(ii) Decontamination area entry procedures. The employer shall ensure that employees:

(A) Enter the decontamination area through the clean room;

(B) Remove and deposit street clothing within a locker provided for their use; and

(C) Put on protective clothing and respiratory protection before leaving the clean room.

(D) Before entering the regulated area, the employer shall ensure that employees pass through the equipment room.

(iii) Decontamination area exit procedures. The employer shall ensure that:

(A) Before leaving the regulated area, employees shall remove all gross contamination and debris from their protective clothing.

(B) Employees shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers.

(C) Employees shall not remove their respirators in the equipment room.

(D) Employees shall shower prior to entering the clean room.

(E) After showering, employees shall enter the clean room before changing into street clothes.

(iv) Lunch Areas. Whenever food or beverages are consumed at the worksite where employees are performing Class I asbestos work, the employer shall provide lunch areas in which the airborne concentrations of asbestos are below the permissible exposure limit and/or excursion limit.

(2) Requirements for Class I work involving less than 25 linear or 10 square feet of TSI or surfacing ACM and PACM, and for Class II and Class III asbestos work operations where exposures exceed a PEL or where there is no negative exposure assessment produced before the operation.

(i) The employer shall establish an equipment room or area that is adjacent to the regulated area for the decontamination of employees and their equipment which is contaminated with asbestos which shall consist of an area covered by an impermeable drop cloth on the floor or horizontal working surface.

(ii) The area must be of sufficient size as to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area (as determined by visible accumulations).

(iii) Work clothing must be cleaned with a HEPA vacuum before it is removed.

(iv) All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment room or area.

(v) The employer shall ensure that employees enter and exit the regulated area through the equipment room or area.

(3) Requirements for Class IV work. Employers shall ensure that employees performing Class IV work within a regulated area comply with the hygiene practice required of employees performing work which has a higher classification within that regulated area. Otherwise employers of employees cleaning up debris and material which is TSI or surfacing ACM or identified as PACM shall provide decontamination facilities for such employees which are required by paragraph (j)(2) of this section.

(4) Smoking in work areas. The employer shall ensure that employees do not smoke in work areas where they are occupationally exposed to asbestos because of activities in that work area.

(k) Communication of hazards.

(1) Hazard communication.

(i) This section applies to the communication of information concerning asbestos hazards in construction activities to facilitate compliance with this standard. Most asbestos-related construction activities involve previously installed building materials. Building owners often are the only and/or best sources of information concerning them. Therefore, they, along with employers of potentially exposed employees, are assigned specific information conveying and retention duties under this section. Installed Asbestos Containing Building Material. Employers and building owners shall identify TSI and sprayed or troweled on surfacing materials in buildings as asbestos-containing, unless they determine in compliance with paragraph (k)(5) of this section that the material is not asbestos containing. Asphalt and vinyl flooring material installed no later than 1980 must also be considered as asbestos containing unless the employer, pursuant to paragraph (g)(8)(i)(I) of this section determines that it is not asbestos-containing. If the employer/building owner has actual knowledge, or should have known through the exercise of due diligence, that other materials are asbestos-containing, they too must be treated as such. When communicating information to employees pursuant to this standard, owners and employers shall identify "PACM" as ACM. Additional requirements relating to communication of asbestos work on multiemployer worksites are set out in paragraph (d) of this section.

(ii) The employer shall include asbestos in the program established to comply with the Hazard Communication Standard (HCS) (1910.1200). The employer shall ensure that each employee has access to labels on containers of asbestos and safety data sheets, and is trained in accordance with the provisions of HCS and paragraphs (k)(9) and (10) of this section. The employer shall provide information on at least the following hazards: cancer and lung effects.

(2) Duties of building and facility owners.

(i) Before work subject to this standard is begun, building and facility owners shall determine the presence, location, and quantity of ACM and/or PACM at the work site pursuant to paragraph (k)(1)(i) of this section.

(ii) Building and/or facility owners shall notify the following persons of the presence, location and quantity of ACM or PACM, at the work sites in their buildings and facilities. Notification either shall be in writing, or shall consist of a personal communication between the owner and the person to whom notification must be given or their authorized representatives:

(A) Prospective employers applying or bidding for work whose employees reasonably can be expected to work in or adjacent to areas containing such material;

(B) Employees of the owner who will work in or adjacent to areas containing such material:

(C) On multi-employer worksites, all employers of employees who will be performing work within or adjacent to areas containing such materials;

(D) Tenants who will occupy areas containing such material.

(3) Duties of employers whose employees perform work subject to this standard in or adjacent to areas containing ACM and PACM. Building/facility owners whose employees perform such work shall comply with these provisions to the extent applicable.

(i) Before work in areas containing ACM and PACM is begun; employers shall identify the presence, location, and quantity of ACM, and/or PACM therein pursuant to paragraph (k)(1)(i) of this section.

(ii) Before work under this standard is performed employers of employees who will perform such work shall inform the following persons of the location and quantity of ACM and/or PACM present in the area and the precautions to be taken to insure that airborne asbestos is confined to the area.

(A) Owners of the building/facility;

(B) Employees who will perform such work and employers of employees who work and/or will be working in adjacent areas.

(iii) Within 10 days of the completion of such work, the employer whose employees have performed work subject to this standard, shall inform the building/facility owner and employers of employees who will be working in the area of the current location and quantity of PACM and/or ACM remaining in the area and final monitoring results, if any.

(4) In addition to the above requirements, all employers who discover ACM and/or PACM on a worksite shall convey information concerning the presence, location and quantity of such newly discovered ACM and/or PACM to the owner and to other employers of employees working at the work site, within 24 hours of the discovery.

(5) Criteria to rebut the designation of installed material as PACM.

(i) At any time, an employer and/or building owner may demonstrate, for purposes of this standard, that PACM does not contain asbestos. Building owners and/or employers are not required to communicate information about the presence of building material for which such a demonstration pursuant to the requirements of paragraph (k)(5)(ii) of this section has been made. However, in all such cases, the information, data and analysis supporting the determination that PACM does not contain asbestos, shall be retained pursuant to paragraph (n) of this section.

(ii) An employer or owner may demonstrate that PACM does not contain more than 1% asbestos by the following:

(A) Having a completed inspection conducted pursuant to the requirements of AHERA (40 CFR Part 763, Subpart E) which demonstrates that the material is not ACM; or

(B) Performing tests of the material containing PACM which demonstrate that no ACM is present in the material. Such tests shall include analysis of bulk samples collected in the manner described in 40 CFR 763.86. The tests, evaluation and sample collection shall be conducted by an accredited inspector or by a CIH. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) or the National Institute for Standards and Technology (NIST) or the Round Robin for bulk samples administered by the American Industrial Hygiene Association (AIHA) or an equivalent nationally-recognized round robin testing program.

(iii) The employer and/or building owner may demonstrate that flooring material including associated mastic and backing does not contain asbestos, by a determination of an industrial hygienist based upon recognized analytical techniques showing that the material is not ACM.

(6) At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain ACM and/or PACM, the building owner shall post signs which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed. The employer shall ensure, to the extent feasible, that employees who come in contact with these signs can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

(7) Signs.

(i) Warning signs that demarcate the regulated area shall be provided and displayed at each location where a regulated area is required to be established by paragraph (e) of this section. Signs shall be posted at such a distance from such a location that an employee may read the signs and take necessary protective steps before entering the area marked by the signs.

(ii)

(A) The warning signs required by paragraph (k)(7) of this section shall bear the following information:

DANGER
ASBESTOS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
AUTHORIZED PERSONNEL ONLY

(B) In addition, where the use of respirators and protective clothing is required in the regulated area under this section, the warning signs shall include the following:

WEAR RESPIRATORY PROTECTION AND
PROTECTIVE CLOTHING IN THIS AREA

(C) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (k)(7)(ii)(A) of this section:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

(D) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (k)(7)(ii)(B) of this section:

RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA

(iii) The employer shall ensure that employees working in and contiguous to regulated areas comprehend the warning signs required to be posted by paragraph (k)(7)(i) of this section. Means to ensure employee comprehension may include the use of foreign languages, pictographs and graphics.

(8) Labels.

(i) Labels shall be affixed to all products containing asbestos and to all containers containing such products, including waste containers. Where feasible, installed asbestos products shall contain a visible label.

(ii) The employer shall ensure that such labels comply with paragraph (k) of this section.

(iii) The employer shall ensure that labels of bags or containers of protective clothing and equipment, scrap, waste, and debris containing asbestos fibers bear the following information:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST
AVOID CREATING DUST

(iv)

(A) Prior to June 1, 2015, employers may include the following information on raw materials, mixtures or labels of bags or containers of protective clothing and equipment, scrap, waste, and debris containing asbestos fibers in lieu of the labeling requirements in paragraphs (k)(8)(ii) and (k)(8)(iii) of this section.

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

(B) Labels shall also contain a warning statement against breathing asbestos fibers.

(v) Reserved.

(vi) The provisions for labels required by paragraphs (k)(8)(i) through (k)(8)(iii) of this section do not apply where:

(A) Asbestos fibers have been modified by a bonding agent, coating, binder, or other material, provided that the manufacturer can demonstrate that, during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of asbestos fibers in excess of the permissible exposure limit and/or excursion limit will be released, or

(B) Asbestos is present in a product in concentrations less than 1.0 percent.

(vii) When a building owner or employer identifies previously installed PACM and/or ACM, labels or signs shall be affixed or posted so that employees will be notified of what materials contain PACM and/or ACM. The employer shall attach such labels in areas where they will clearly be noticed by employees who are likely to be exposed, such as at the entrance to mechanical room/areas. Signs required by paragraph (k)(6) of this section may be posted in lieu of labels so long as they contain information required for labelling. The employer shall ensure, to the extent feasible, that employees who come in contact with these signs or labels can comprehend them. Means to ensure employee comprehension may include the use of foreign languages, pictographs, graphics, and awareness training.

(9) Employee Information and Training.

(i) The employer shall train each employee who is likely to be exposed in excess of a PEL, and each employee who performs Class I through IV asbestos operations, in accordance with the requirements of this section. Such training shall be conducted at no cost to the employee. The employer shall institute a training program and ensure employee participation in the program.

(ii) Training shall be provided prior to or at the time of initial assignment and at least annually thereafter.

(iii) Training for Class I operations and for Class II operations that require the use of critical barriers (or equivalent isolation methods) and/or negative pressure enclosures under this section shall be the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR Part 763, Subpart E, Appendix C).

(iv) Training for Class II work.

(A) For work with asbestos containing roofing materials, flooring materials, siding materials, ceiling tiles, or transite panels, training shall include at a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to that category. Such course shall include "hands-on" training and shall take at least 8 hours.

(B) An employee who works with more than one of the categories of material specified in paragraph (k)(9)(iv)(A) of this section shall receive training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.

(C) For Class II operations not involving the categories of material specified in paragraph (k)(9)(iv)(A) of this section, training shall be provided which shall include at a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to the category of material being removed, and shall include "hands-on" training in the work practices applicable to each category of material that the employee removes and each removal method that the employee uses.

(v) Training for Class III employees shall be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2). Such a course shall also include "hands on" training and shall take at least 16 hours. Exception: For Class III operations for which the competent person determines that the EPA curriculum

does not adequately cover the training needed to perform that activity, training shall include as a minimum all the elements included in paragraph (k)(9)(viii) of this section and in addition, the specific work practices and engineering controls set forth in paragraph (g) of this section which specifically relate to that activity, and shall include “hands-on” training in the work practices applicable to each category of material that the employee disturbs.

(vi) Training for employees performing Class IV operations shall be consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(1). Such a course shall include available information concerning the locations of thermal system insulation and surfacing ACM/PACM, and asbestos-containing flooring material, or flooring material where the absence of asbestos has not yet been certified; and instruction in recognition of damage, deterioration, and delamination of asbestos containing building materials. Such course shall take at least 2 hours.

(vii) Training for employees who are likely to be exposed in excess of the PEL and who are not otherwise required to be trained under paragraph (k)(9)(iii) through (vi) of this section, shall meet the requirements of paragraph (k)(9)(viii) of this section.

(viii) The training program shall be conducted in a manner that the employee is able to understand. In addition to the content required by provisions in paragraph (k)(9)(iii) through (vi) of this section, the employer shall ensure that each such employee is informed of the following:

(A) Methods of recognizing asbestos, including the requirement in paragraph (k)(1) of this section to presume that certain building materials contain asbestos;

(B) The health effects associated with asbestos exposure;

(C) The relationship between smoking and asbestos in producing lung cancer;

(D) The nature of operations that could result in exposure to asbestos, the importance of necessary protective controls to minimize exposure including, as applicable, engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures, and any necessary instruction in the use of these controls and procedures; where Class III and IV work will be or is performed, the contents of EPA 20T-2003, “Managing Asbestos InPlace” July 1990 or its equivalent in content;

(E) The purpose, proper use, fitting instructions, and limitations of respirators as required by 29 CFR 1910.134;

(F) The appropriate work practices for performing the asbestos job;

(G) Medical surveillance program requirements;

(H) The content of this standard including appendices;

(I) The names, addresses and phone numbers of public health organizations which provide information, materials and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in Appendix J to this section, to comply with this requirement; and

(J) The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

(10) Access to training materials.

(i) The employer shall make readily available to affected employees without cost, written materials relating to the employee training program, including a copy of this regulation.

(ii) The employer shall provide to the Assistant Secretary and the Director, upon request, all information and training materials relating to the employee information and training program.

(iii) The employer shall inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, the employer shall distribute such material, consisting of NIH Publication No. 89-1647, or equivalent self-help material, which is approved or published by a public health organization listed in Appendix J to this section.

(l) Housekeeping.

(1) Vacuuming. Where vacuuming methods are selected, HEPA filtered vacuuming equipment must be used. The equipment shall be used and emptied in a manner that minimizes the reentry of asbestos into the workplace.

(2) Waste disposal. Asbestos waste, scrap, debris, bags, containers, equipment, and contaminated clothing consigned for disposal shall be collected and disposed of in sealed, labeled, impermeable bags or other closed, labeled, impermeable containers except in roofing operations, where the procedures specified in paragraph (g)(8)(ii) of this section apply.

(3) Care of asbestos-containing flooring material.

(i) All vinyl and asphalt flooring material shall be maintained in accordance with this paragraph unless the building/facility owner demonstrates, pursuant to paragraph (g)(8)(i)(I) of this section that the flooring does not contain asbestos.

(ii) Sanding of flooring material is prohibited.

(iii) Stripping of finishes shall be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods.

(iv) Burnishing or dry buffing may be performed only on flooring which has sufficient finish so that the pad cannot contact the flooring material.

(4) Waste and debris and accompanying dust in an area containing accessible thermal system insulation or surfacing ACM/PACM or visibly deteriorated ACM:

(i) Shall not be dusted or swept dry, or vacuumed without using a HEPA filter;

(ii) Shall be promptly cleaned up and disposed of in leak tight containers.

(m) Medical surveillance.

(1) General.

(i) Employees covered.

(A) The employer shall institute a medical surveillance program for all employees who for a combined total of 30 or more days per year are engaged in Class I, II and III work or are exposed at or above a permissible exposure limit. For purposes of this paragraph, any day in which a worker engages in Class II or Class III operations or a combination thereof on intact material for one hour or less (taking into account the entire time spent on the removal operation, including cleanup) and, while doing so, adheres fully to the work practices specified in this standard, shall not be counted.

(B) For employees otherwise required by this standard to wear a negative pressure respirator, employers shall ensure employees are physically able to perform the work and use the equipment. This determination shall be made under the supervision of a physician.

(ii) Examination.

(A) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and are provided at no cost to the employee and at a reasonable time and place.

(B) Persons other than such licensed physicians who administer the pulmonary function testing required by this section shall complete a training course in spirometry sponsored by an appropriate academic or professional institution.

(2) Medical examinations and consultations.

(i) Frequency. The employer shall make available medical examinations and consultations to each employee covered under paragraph (m)(1)(i) of this section on the following schedules:

(A) Prior to assignment of the employee to an area where negative pressure respirators are worn;

(B) When the employee is assigned to an area where exposure to asbestos may be at or above the permissible exposure limit for 30 or more days per year, or engage in Class I, II, or III work for a combined total of 30 or more days per year, a medical examination must be given within 10 working days following the thirtieth day of exposure;

(C) And at least annually thereafter.

(D) If the examining physician determines that any of the examinations should be provided more frequently than specified, the employer shall provide such examinations to affected employees at the frequencies specified by the physician.

(E) Exception: No medical examination is required of any employee if adequate records show that the employee has been examined in accordance with this paragraph within the past 1-year period.

(ii) Content. Medical examinations made available pursuant to paragraphs (m)(2)(i)(A) through (m)(2)(i)(C) of this section shall include:

(A) A medical and work history with special emphasis directed to the pulmonary, cardiovascular, and gastrointestinal systems.

(B) On initial examination, the standardized questionnaire contained in Part 1 of Appendix D to this section, and, on annual examination, the abbreviated standardized questionnaire contained in Part 2 of Appendix D to this section.

(C) A physical examination directed to the pulmonary and gastrointestinal systems, including a **14- by 17-inch or other reasonably-sized standard film or digital posterior-anterior chest X-ray**~~[reentgenogram]~~ to be administered at the discretion of the physician, and pulmonary function tests of forced vital capacity (FVC) and forced expiratory volume at one second (FEV(1)). **C**~~[e]~~lassification of **all** chest **X-rays**~~[reentgenograms]~~ shall be conducted in accordance with Appendix E to this section.

(D) Any other examinations or tests deemed necessary by the examining physician.

(3) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and Appendices D, E, and I to this section;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's representative exposure level or anticipated exposure level;

(iv) A description of any personal protective and respiratory equipment used or to be used; and

(v) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

(4) Physician's written opinion.

(i) The employer shall obtain a written opinion from the examining physician. This written opinion shall contain the results of the medical examination and shall include:

(A) The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;

(B) Any recommended limitations on the employee or on the use of personal protective equipment such as respirators; and

(C) A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.

(D) A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

(ii) The employer shall instruct the physician not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos.

(iii) The employer shall provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

(n) Recordkeeping.

(1) Objective data relied on pursuant to paragraph (f) of this section.

(i) Where the employer has relied on objective data that demonstrates that products made from or containing asbestos or the activity involving such products or material are not capable of releasing fibers of asbestos in concentrations at or above the permissible exposure limit and/or excursion limit under the expected conditions of processing, use, or handling to satisfy the requirements of paragraph (f), the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) The record shall include at least the following information:

(A) The product qualifying for exemption;

(B) The source of the objective data;

(C) The testing protocol, results of testing, and/or analysis of the material for the release of asbestos;

(D) A description of the operation exempted and how the data support the exemption; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(iii) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Exposure measurements.

(i) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to asbestos as prescribed in paragraph (f) of this section.

Note: The employer may utilize the services of competent organizations such as industry trade associations and employee associations to maintain the records required by this section.

(ii) This record shall include at least the following information:

(A) The date of measurement;

(B) The operation involving exposure to asbestos that is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and results of samples taken;

(E) Type of protective devices worn, if any; and

(F) Name~~[-, social security number,]~~ and exposure of the employees whose exposures are represented.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 29 CFR 1910.1020.

(3) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by paragraph (m) of this section, in accordance with 29 CFR 1910.1020.

(ii) The record shall include at least the following information:

(A) The name ~~[and social security number]~~ of the employee;

(B) A copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests, and physician's recommendations.

(C) Physician's written opinions;

(D) Any employee medical complaints related to exposure to asbestos; And

(E) A copy of the information provided to the physician as required by paragraph (m) of this section.

(iii) The employer shall ensure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 29 CFR 1910.1020.

(4) Training records. The employer shall maintain all employee training records for one (1) year beyond the last date of employment by that employer.

(5) Data to Rebut PACM. Where the building owner and employer have relied on data to demonstrate that PACM is not asbestos-containing, such data shall be maintained for as long as they are relied upon to rebut the presumption.

(6) Records of Required Notifications. Where the building owner has communicated and received information concerning the identification, location and quantity of ACM and PACM, written records of such notifications and their content shall be maintained by the building owner for the duration of ownership and shall be transferred to successive owners of such buildings/facilities.

(7) Availability.

(i) The employer, upon written request, shall make all records required to be maintained by this section available to the Assistant Secretary and the Director for examination and copying.

(ii) The employer must comply with the requirements concerning availability of records set forth in 29 CFR 1910.1020.

(8) Transfer of records. The employer must comply with the requirements concerning transfer of records set forth in 29 CFR 1910.1020(h).

(o) Competent person.

(1) General. On all construction worksites covered by this standard, the employer shall designate a competent person, having the qualifications and authorities for ensuring worker safety and health required by Subpart C, General Safety and Health Provisions for Construction (29 CFR 1926.20 through 1926.32).

(2) Required Inspections by the Competent Person. Section 1926.20(b)(2) which requires health and safety prevention programs to provide for frequent and regular inspections of the job sites, materials, and equipment to be made by competent persons, is incorporated.

(3) Additional Inspections. In addition, the competent person shall make frequent and regular inspections of the job sites, in order to perform the duties set out below in paragraph (o)(3)(i) of this section. For Class I jobs, on-site inspections shall be made at least once during each work shift, and at any time at employee request. For Class II, III and IV jobs, on-site inspections shall be made at intervals sufficient to assess whether conditions have changed, and at any reasonable time at employee request.

(i) On all worksites where employees are engaged in Class I or II asbestos work, the competent person designated in accordance with paragraph (e)(6) of this section shall perform or supervise the following duties, as applicable:

(A) Set up the regulated area, enclosure, or other containment;

(B) Ensure (by on-site inspection) the integrity of the enclosure or containment;

(C) Set up procedures to control entry to and exit from the enclosure and/or area;

(D) Supervise all employee exposure monitoring required by this section and ensure that it is conducted as required by paragraph (f) of this section;

(E) Ensure that employees working within the enclosure and/or using glovebags wear respirators and protective clothing as required by paragraphs (h) and (i) of this section;

(F) Ensure through on-site supervision, that employees set up, use, and remove engineering controls, use work practices and personal protective equipment in compliance with all requirements;

(G) Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in paragraph (j) of this section;

(H) Ensure that through on-site inspection, engineering controls are functioning properly and employees are using proper work practices; and,

(I) Ensure that notification requirement in paragraph (k) of this section are met.

(ii) Reserved

(4) Training for the competent person.

(i) For Class I and II asbestos work the competent person shall be trained in all aspects of asbestos removal and handling, including: abatement, installation, removal and handling; the contents of this standard; the identification of asbestos; removal procedures, where appropriate; and other practices for reducing the hazard. Such training shall be obtained in a comprehensive course for supervisors that meets the criteria of EPA's Model Accreditation Plan (40 CFR Part 763, Subpart E, Appendix C), such as a course conducted by an EPA-approved or state-approved training provider, certified by EPA or a state, or a course equivalent in stringency, content and length.

(ii) For Class III and IV asbestos work, the competent person shall be trained in aspects of asbestos handling appropriate for the nature of the work, to include procedures for setting up glove bags and mini-enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of this standard, and the identification of asbestos. Such training shall include successful completion of a course that is consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2), or its equivalent in stringency, content, and length. Competent persons for Class III and IV work, may also be trained pursuant to the requirements of paragraph (o)(4)(i) of this section.

(p) Appendices.

(1) Appendices A, C, D, and E to this section are incorporated as part of this section and the contents of these appendices are mandatory.

(2) Appendices B, F, H, I, J, and K to this section are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.

OR-OSHA Admin. Order 3-1990, f. 1/19/90, ef. 1/19/90 (temp).

OR-OSHA Admin. Order 7-1990, f. 3/2/90, ef. 3/2/90 (perm).

OR-OSHA Admin. Order 13-1990, f. 6/28/90, ef. 8/1/90 (temp).

OR-OSHA Admin. Order 19-1990, f. 8/31/90, ef. 8/31/90 (perm).

OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92.

OR-OSHA Admin. Order 4-1995, f. 3/29/95, ef. 3/29/95.

OR-OSHA Admin. Order 8-1995, f. 8/25/95, ef. 8/25/95.

OR-OSHA Admin. Order 5-1996, f. 11/29/96, ef. 11/29/96.

OR-OSHA Admin. Order 6-1996, f. 11/29/96, ef. 11/29/96.

OR-OSHA Admin. Order 3-1998, f. 7/7/98, ef. 7/7/98.

OR-OSHA Admin. Order 7-1998, f. 12/28/98, ef. 12/12/98.

OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.

OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.

OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.

OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.

OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.

OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.

OR-OSHA Admin. Order 4-2013, f. 7/19/13, ef. 7/19/13.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix D to 1926.1101 — Medical Questionnaires — Mandatory

This mandatory appendix contains the medical questionnaires that must be administered to all employees who are exposed to asbestos above the permissible exposure limit, and who will therefore be included in their employer's medical surveillance program. Part 1 of the appendix contains the Initial Medical Questionnaire, which must be obtained for all new hires who will be covered by the medical surveillance requirements. Part 2 includes the abbreviated Periodical Medical Questionnaire, which must be administered to all employees who are provided periodic medical examinations under the medical surveillance provisions of the standard.

Part 1

INITIAL MEDICAL QUESTIONNAIRE

1. NAME _____

[2. SOCIAL SECURITY NUMBER # _____]

[3]2. CLOCK NUMBER _____

[4]3. PRESENT OCCUPATION _____

[5]4. PLANT _____

[6]5. ADDRESS _____

[7]6. _____
(Zip Code)

[8]7. TELEPHONE NUMBER _____

[9]8. INTERVIEWER _____

[10]9. DATE _____

[11]10. Date of Birth _____
Month Day Year

[12]13. Place of Birth _____

[13]12. Sex 1. Male ____ 2. Female ____

[14]13. What is your marital status?
1. Single ____ 2. Married ____ 3. Widowed ____ 4. Separated/Divorced ____

[15]14. (Check all that apply)

1. White ____ 2. Black **or African American** ____ 3. Asian ____ 4. Hispanic **or Latino** ____

5. **American** Indian **or Alaska Native** ____ 6. **Native Hawaiian or** Other **Pacific Islander** ____

[16]15. What is the highest grade completed in school?
(For example 12 years is completion of high school)[_____] _____

OCCUPATIONAL HISTORY

[47]16A. Have you ever worked full time (30 hours per week or more) for 6 months or more?

1. Yes ____

2. No ____

IF YES TO [47]16A:

B. Have you ever worked for a year or more in any dusty job?

1. Yes ____

2. No ____

3. Does Not Apply ____

Specify job/industry _____ Total Years Worked _____

Was dust exposure:

1. Mild ____

2. Moderate ____

3. Severe ____

C. Have you ever been exposed to gas or chemical fumes in your work?

1. Yes ____

2. No ____

Specify job/industry _____ Total Years Worked _____

Was exposure:

1. Mild ____

2. Moderate ____

3. Severe ____

D. What has been your usual occupation or job -- the one you have worked at the longest?

1. Job occupation _____

2. Number of years employed in this occupation _____

3. Position/job title _____

4. Business, field or industry _____

(Record on lines the years in which you have worked in any of these industries, e.g. 1960-1969)

Have you ever worked:

YES

NO

E. In a mine?

F. In a quarry?

G. In a foundry?

H. In a pottery?

I. In a cotton, flax or hemp mill?

J. With asbestos?

[48]17. PAST MEDICAL HISTORY

A. Do you consider yourself to be in good health? YES NO

If "NO" state reason _____

B. Have you any defect of vision? YES NO

If "YES" state nature of defect _____

C. Have you any hearing defect? YES NO

If "YES" state nature of defect _____

D. Are you suffering from or have you ever suffered from: YES NO

a. Epilepsy (or fits, seizures, convulsions)? YES NO

b. Rheumatic fever? YES NO

c. Kidney disease? YES NO

d. Bladder disease? YES NO

e. Diabetes? YES NO

f. Jaundice? YES NO

..... _

[49]18. CHEST COLDS AND CHEST ILLNESSES

[49]18A. If you get a cold, does it "usually" go to your chest? (Usually means more than 1/2 the time)

1. Yes ____ 2. No ____ 3. Don't get colds ____

[20]19A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes ____ 2. No ____

IF YES TO [20]19A:

B. Did you produce phlegm with any of these chest illnesses?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. In the last 3 years, how many such illnesses with (increased) phlegm did you have which lasted a week or more?

Number of illnesses ____

No such illnesses ____

[21]20. Did you have any lung trouble before the age of 16?

1. Yes ____ 2. No ____

[22]21. Have you ever had any of the following?

1A. Attacks of bronchitis?

1. Yes ____ 2. No ____

IF YES TO 1A:

B. Was it confirmed by a doctor?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. At what age was your first attack?

Age in Years ____ Does Not Apply ____

2A. Pneumonia (include bronchopneumonia)?

1. Yes ____ 2. No ____

IF YES TO 2A:

B. Was it confirmed by a doctor?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. At what age did you first have it?

Age in Years ____ Does Not Apply ____

3A. Hay Fever?

1. Yes ____ 2. No ____

IF YES TO 3A:

B. Was it confirmed by a doctor?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. At what age did it start?

Age in Years ____ Does Not Apply ____

[23]22A. Have you ever had chronic bronchitis?

1. Yes ____ 2. No ____

IF YES TO 23[2]A:

B. Do you still have it?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. Was it confirmed by a doctor?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. At what age did it start?

Age in Years ____ Does Not Apply ____

[24]23A. Have you ever had emphysema?

1. Yes ____ 2. No ____

IF YES TO [24]23A:

B. Do you still have it?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. Was it confirmed by a doctor?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. At what age did it start?

Age in Years ____ Does Not Apply ____

[25]24A. Have you ever had asthma?

1. Yes ____ 2. No ____

IF YES TO [25]24A:

B. Do you still have it?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

C. Was it confirmed by a doctor?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

D. At what age did it start?

Age in Years ____ Does Not Apply ____

E. If you no longer have it, at what age did it stop?

Age stopped ____ Does Not Apply ____

[26]25. Have you ever had:

A. Any other chest illness?

1. Yes ____ 2. No ____

If yes, please specify _____

B. Any chest operations?

1. Yes ____ 2. No ____

If yes, please specify _____

C. Any chest injuries?

1. Yes ____ 2. No ____

If yes, please specify _____

[27]26A. Has a doctor ever told you that you had heart trouble?

1. Yes ____ 2. No ____

IF YES TO [27]26A:

B. Have you ever had treatment for heart trouble in the past 10 years?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

[28]27A. Has a doctor told you that you had high blood pressure?

1. Yes ____ 2. No ____

IF YES TO [28]27A:

B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years?

1. Yes ____ 2. No ____ 3. Does Not Apply ____

[29]28. When did you last have your chest X-rayed? (Year) ____ ____ ____

[30]29. Where did you last have your chest X-rayed (if known)? _____

What was the outcome? _____

FAMILY HISTORY

[34]~~30~~30. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:

	FATHER			MOTHER		
	1.Yes	2.No	3.Don't know	1.Yes	2.No	3.Don't know
A. Chronic Bronchitis?	___	___	___	___	___	___
B. Emphysema?	___	___	___	___	___	___
C. Asthma?	___	___	___	___	___	___
D. Lung cancer?	___	___	___	___	___	___
E. Other chest conditions?	___	___	___	___	___	___
F. Is parent currently alive? ___	___	___	___	___	___	___
G. Please Specify	___ Age if Living ___ Age at Death ___ Don't Know			___ Age if Living ___ Age at Death ___ Don't Know		
H. Please specify cause of death	_____			_____		

COUGH

[32]~~31~~31A. Do you usually have a cough?

Count a cough with first smoke or on first going out of doors.

Exclude clearing of throat.

(If no, skip to question [32]~~31~~31C.)

1. Yes ___ 2. No ___

B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week?

1. Yes ___ 2. No ___

C. Do you usually cough at all on getting up or first thing in the morning?

1. Yes ___ 2. No ___

D. Do you usually cough at all during the rest of the day or at night?

1. Yes ___ 2. No ___

IF YES TO ANY OF ABOVE ([32]~~31~~31A, B, C, OR D.), ANSWER THE FOLLOWING.

IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO NEXT PAGE

E. Do you usually cough like this on most days for 3 consecutive months or more during the year?

1. Yes ___ 2. No ___ 3. Does not apply ___

F. For how many years have you had the cough?

Number of years ____

Does not apply ____

[32]A. Do you usually bring up phlegm from your chest?

Count phlegm with the first smoke or on first going out of doors.

Exclude phlegm from the nose.

Count swallowed phlegm.

(If no, skip to [33]32C)

1. Yes ____ 2. No ____

B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week?

1. Yes ____ 2. No ____

C. Do you usually bring up phlegm at all on getting up or first thing in the morning?

1. Yes ____ 2. No ____

D. Do you usually bring up phlegm at all on during the rest of the day or at night?

1. Yes ____ 2. No ____

IF YES TO ANY OF THE ABOVE ([33]32A, B, C, OR D), ANSWER THE FOLLOWING:

IF NO TO ALL, CHECK "DOES NOT APPLY" AND SKIP TO [34]33A

E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year?

1. Yes ____ 2. No ____ 3. Does not apply ____

F. For how many years have you had trouble with phlegm?

Number of years ____

Does not apply ____

EPISODES OF COUGH AND PHLEGM

[34]33A. Have you had periods or episodes of (increased*) cough and phlegm lasting for 3 weeks or more each year?

*(For persons who usually have cough and/or phlegm)

1. Yes ____ 2. No ____

IF YES TO [34]33A

B. For how long have you had at least 1 such episode per year?

Number of years ____

Does not apply ____

WHEEZING

[35]~~35~~34A. Does your chest ever sound wheezy or whistling

1. When you have a cold?

1. Yes ____ 2. No ____

2. Occasionally apart from colds?

1. Yes ____ 2. No ____

3. Most days or nights?

1. Yes ____ 2. No ____

IF YES TO 1, 2, or 3 in [~~35~~]34A

B. For how many years has this been present?

Number of years ____

Does not apply ____

[36]~~35~~35A. Have you ever had an attack of wheezing that has made you feel short of breath?

1. Yes ____ 2. No ____

IF YES TO [36]35A

B. How old were you when you had your first such attack?

Age in years ____ Does not apply ____

C. Have you had 2 or more such episodes?

1. Yes ____ 2. No ____ 3. Does not apply ____

D. Have you ever required medicine or treatment for the(se) attack(s)?

1. Yes ____ 2. No ____ 3. Does not apply ____

BREATHLESSNESS

[37]~~36~~36. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 39A.

Nature of condition(s) _____

[38]~~37~~37A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill?

1. Yes ____ 2. No ____

IF YES TO [38]37A

B. Do you have to walk slower than people of your age on the level because of breathlessness?

1. Yes ____ 2. No ____ 3. Does not apply ____

C. Do you ever have to stop for breath when walking at your own pace on the level?

1. Yes ____ 2. No ____ 3. Does not apply ____

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level?

1. Yes ____ 2. No ____ 3. Does not apply ____

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs?

1. Yes ____ 2. No ____ 3. Does not apply ____

TOBACCO SMOKING

[39]38A. Have you ever smoked cigarettes? (No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.) 1. Yes ____ 2. No ____

IF YES TO [39]38A

B. Do you now smoke cigarettes (as of one month ago)

1. Yes ____ 2. No ____ 3. Does not apply ____

C. How old were you when you first started regular cigarette smoking?

Age in years ____ Does not apply ____

D. If you have stopped smoking cigarettes completely, how old were you when you stopped?

Age stopped ____ Check if still smoking ____ Does not apply ____

E. How many cigarettes do you smoke per day now?

Cigarettes per day ____ Does not apply ____

F. On the average of the entire time you smoked, how many cigarettes did you smoke per day?

Cigarettes per day ____ Does not apply ____

G. Do or did you inhale the cigarette smoke?

1. Does not apply ____

- 2. Not at all _____
- 3. Slightly _____
- 4. Moderately _____
- 5. Deeply _____

[40]39A. Have you ever smoked a pipe regularly?
(Yes means more than 12 oz. of tobacco in a lifetime.)

- 1. Yes _____
- 2. No _____

IF YES TO [40]39A:

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

B. 1. How old were you when you started to smoke a pipe regularly? Age _____

2. If you have stopped smoking a pipe completely, how old were you when you stopped?
Age stopped _____ Check if still smoking pipe _____ Does not apply _____

C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week? (a standard pouch of tobacco contains 1 1/2 oz.)
oz. per week _____ Does not apply _____

D. How much pipe tobacco are you smoking now?
oz. per week _____

Not currently smoking a pipe _____

E. Do you or did you inhale the pipe smoke?

- 1. Never smoked _____
- 2. Not at all _____
- 3. Slightly _____
- 4. Moderately _____
- 5. Deeply _____

[4+]40A. Have you ever smoked cigars regularly?
(Yes means more than 1 cigar a week for a year)

1. Yes ____ 2. No ____

IF YES TO [4+]40A

FOR PERSONS WHO HAVE EVER SMOKED A CIGARS

B. 1. How old were you when you started smoking cigars regularly? Age ____

2. If you have stopped smoking cigars completely, how old were you when you stopped.
Age stopped ____

Check if still smoking cigars ____

Does not apply ____

C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week?

Cigars per week ____

Does not apply ____

D. How many cigars are you smoking per week now?

Cigars per week ____

Check if not smoking cigars currently ____

E. Do or did you inhale the cigar smoke?

1. Never smoked

2. Not at all

3. Slightly

4. Moderately

5. Deeply

Signature _____ Date _____

Part 2

PERIODIC MEDICAL QUESTIONNAIRE

1. NAME _____

[2.] 2. SOCIAL SECURITY NUMBER # _____

[3.] 2. CLOCK NUMBER _____

[4.] 3. PRESENT OCCUPATION _____

[5.] 4. PLANT _____

[6.] 5. ADDRESS _____

[7.] 6. _____ (Zip Code)

[8.] 7. TELEPHONE NUMBER _____

[9.] 8. INTERVIEWER _____

[10.] 9. DATE _____

[11.] 10. What is your marital status?
1. Single ____ 2. Married ____ 3. Widowed ____ 4. Separated/Divorced ____

[12.] 11. OCCUPATIONAL HISTORY

[12.] 11A. In the past year, did you work full time (30 hours per week or more) for 6 months or more? 1. Yes ____
2. No ____

IF YES TO [12]A:

[12.] 11B. In the past year, did you work in a dusty job?
1. Yes ____ 2. No ____ 3. Does not Apply ____

[12.] 11C. Was dust exposure: 1. Mild ____ 2. Moderate ____ 3. Severe ____

[12.] 11D. In the past year, were you exposed to gas or chemical fumes in your work?
1. Yes ____ 2. No ____

[12.] 11E. Was exposure: 1. Mild ____ 2. Moderate ____ 3. Severe ____

[12.] 11F. In the past year, what was your:
1. Job/occupation? _____
2. Position/job title? _____

[13.] 12. RECENT MEDICAL HISTORY

[13.] 11A. Do you consider yourself to be in good health? Yes ____ No ____

If NO, state reason _____

[43]12B. In the past year, have you developed:

	Yes	No
Epilepsy?	___	___
Rheumatic fever?	___	___
Kidney disease?	___	___
Bladder disease?	___	___
Diabetes?	___	___
Jaundice?	___	___
Cancer?	___	___

[44]13. CHEST COLDS AND CHEST ILLNESSES

[44]13A. If you get a cold, does it "usually" go to your chest? (usually means more than 1/2 the time)

1. Yes ___ 2. No ___ 3. Don't get colds ___

[45]14A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed?

1. Yes ___ 2. No ___ 3. Does Not Apply ___

IF YES TO 15A:

[45]14B. Did you produce phlegm with any of these chest illnesses?

1. Yes ___ 2. No ___ 3. Does Not Apply ___

[45]14C. In the past year, how many such illnesses with (increased) phlegm did you have which lasted a week or more?

Number of illnesses ___ No such illnesses ___

[+6] **15. RESPIRATORY SYSTEM**

In the past year have you had:

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Asthma	_____	_____
Bronchitis	_____	_____
Hay Fever	_____	_____
Other Allergies	_____	_____
Pneumonia	_____	_____
Tuberculosis	_____	_____
Chest Surgery	_____	_____

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Other Lung Problems	_____	_____
Heart Disease	_____	_____

Do you have:

	<u>Yes or No</u>	<u>Further Comment on Positive Answers</u>
Frequent colds	_____	_____
Chronic cough	_____	_____
Shortness of breath when walking or climbing one flight or stairs	_____	_____
Do you:		
Wheeze	_____	_____
Cough up phlegm	_____	_____
Smoke cigarettes	_____ Packs per day _____ How many years _____	

Date _____ Signature _____

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.
OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92.
OR-OSHA Admin. Order 4-1995, f. 3/29/95, ef. 3/29/95.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix E to 1926.1101 — ~~[Interpretation and]~~ Classification of Chest **X-rays**~~[Roentgenograms]~~ — Mandatory

(a) Chest **X-rays**~~[roentgenograms]~~ shall be ~~[interpreted and]~~ classified in accordance with **Guidelines for the use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011) (incorporated by reference, see §1926.6).** ~~[a professionally accepted classification system]~~ and recorded on a ~~[a]~~ **classification**~~[interpretation]~~ form following the format of the CDC/NIOSH (M) 2.8 form. As a minimum, the content within the bold lines of this form (items 1 through 4) shall be included. This form is not to be submitted to NIOSH.

(b) **All X-rays**~~[Roentgenograms]~~ shall be ~~[interpreted and]~~ classified only by a B-reader, a board eligible/certified radiologist, or an experienced physician with known expertise in pneumoconiosis.

(c) ~~[All interpreters, w]~~ Whenever **classifying**~~[interpreting]~~ chest **X-ray film, the physician**~~[roentgenograms made under this section,]~~ shall have immediately available for reference a complete set of the **ILO standard format radiographs provided for use with the Guidelines for the use of the ILO**~~[U/C]~~ **International Classification of Radiographs for Pneumoconioses (revised edition 2011).**~~[, 1980.]~~

(d) Whenever classifying digitally-acquired chest X-rays, the physician shall have immediately available for reference a complete set of ILO standard digital chest radiographic images provided for use with the Guidelines for the Use of the ILO International Classification of Radiographs of Pneumoconioses (revised edition 2011). Classification of digitally-acquired chest X-rays shall be based on the viewing of images displayed as electronic copies and shall not be based on the viewing of hard copy printed transparencies of images.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

Appendix I to 1926.1101 — Medical Surveillance Guidelines for Asbestos, ~~[Non-Mandatory]~~

I. Route of Entry

Inhalation, ingestion.

II. Toxicology

Clinical evidence of the adverse effects associated with exposure to asbestos is present in the form of several well-conducted epidemiological studies of occupationally exposed workers, family contacts of workers, and persons living near asbestos mines. These studies have shown a definite association between exposure to asbestos and an increased incidence of lung cancer, pleural and peritoneal mesothelioma, gastrointestinal cancer, and asbestosis. The latter is a disabling fibrotic lung disease that is caused only by exposure to asbestos. Exposure to asbestos has also been associated with an increased incidence of esophageal, kidney, laryngeal, pharyngeal, and buccal cavity cancers. As with other known chronic occupational diseases, disease associated with asbestos generally appears about 20 years following the first occurrence of exposure: There are no known acute effects associated with exposure to asbestos.

Epidemiological studies indicate that the risk of lung cancer among exposed workers who smoke cigarettes is greatly increased over the risk of lung cancer among non-exposed smokers or exposed nonsmokers. These studies suggest that cessation of smoking will reduce the risk of lung cancer for a person exposed to asbestos but will not reduce it to the same level of risk as that existing for an exposed worker who has never smoked.

III. Signs and Symptoms of Exposure-Related Disease

The signs and symptoms of lung cancer or gastrointestinal cancer induced by exposure to asbestos are not unique, except that a chest X-ray of an exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis, **and may also show asbestosis (i.e., small irregular parenchymal opacities)**. Symptoms characteristic of mesothelioma include shortness of breath, pain in the ~~[walls of the]~~ chest~~[,]~~ or abdominal pain. Mesothelioma has a much longer **average** latency period compared with lung cancer (40 years versus 15-20 years), and mesothelioma is therefore more likely to be found among workers who were first exposed to asbestos at an early age. Mesothelioma is ~~a~~**always** fatal **disease**.

Asbestosis is pulmonary fibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is **most commonly** based on a history of exposure to asbestos, the presence of characteristics radiologic **abnormalities**~~[changes]~~, end-inspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening **may be**~~[are]~~ observed on **chest** X-rays ~~[taken during the early stages of the disease]~~. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

IV. Surveillance and Preventive Considerations

As noted **in section III of this appendix**,~~[above,]~~ exposure to asbestos has been linked to an increased risk of lung cancer, mesothelioma, gastrointestinal cancer, and asbestosis among occupationally exposed workers. Adequate screening tests to determine an employee's potential for developing serious chronic diseases, such as a cancer, from exposure to asbestos do not presently exist. However, some tests, particularly chest X-rays and pulmonary function tests, may indicate that an employee has been overexposed to asbestos, increasing his or her risk of developing exposure related chronic diseases. It is important for the physician to become familiar with the operating conditions in which occupational exposure to asbestos is likely to

occur. This is particularly important in evaluating medical and work histories and in conducting physical examinations. When an active employee has been identified as having been overexposed to asbestos, measures taken by the employer to eliminate or mitigate further exposure should also lower the risk of serious long-term consequences.

The employer is required to institute a medical surveillance program for all employees who are or will be exposed to asbestos at or above the permissible exposure limit (0.1 fiber per cubic centimeter of air). All examinations and procedures must be performed by or under the supervision of a licensed physician, at a reasonable time and place, and at no cost to the employee.

Although broad latitude is given to the physician in prescribing specific tests to be included in the medical surveillance program, OSHA requires inclusion of the following elements in the routine examination:

(i) Medical and work histories with special emphasis directed to symptoms of the respiratory system, cardiovascular system, and digestive tract.

(ii) Completion of the respiratory disease questionnaire contained in Appendix D **of this appendix**.

(iii) A physical examination including a chest **X-ray**~~[roentgenogram]~~ and pulmonary function test that includes measurement of the employee's forced vital capacity (FVC) and forced expiratory volume at one second (FEV₁).

(iv) Any laboratory or other test that the examining physician deems by sound medical practice to be necessary.

The employer is required to make the prescribed tests available at least annually to those employees covered; more often than specified if recommended by the examining physician; and upon termination of employment.

The employer is required to provide the physician with the following information: A copy of this standard **in this section** ~~[and]~~ **(including all** appendices **to this section)**; a description of the employee's duties as they relate to asbestos exposure; the employee's representative level of exposure to asbestos; a description of any personal protective and respiratory equipment used; and information from previous medical examinations of the affected employee that is not otherwise available to the physician. Making this information available to the physician will aid in the evaluation of the employee's health in relation to assigned duties and fitness to wear personal protective equipment, if required.

The employer is required to obtain a written opinion from the examining physician containing the results of the medical examination; the physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of exposure-related disease; any recommended limitations on the employee or on the use of personal protective equipment; and a statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions related to asbestos exposure that require further explanation or treatment. This written opinion must not reveal specific findings or diagnoses unrelated to exposure to asbestos, and a copy of the opinion must be provided to the affected employee.

Stat. Auth.: ORS 654.025(2) and 656.726(4).
Stats. Implemented: ORS 654.001 through 654.295.

Hist: APD Admin. Order 8-1989, f. 7/7/89, ef. 7/7/89.
OR-OSHA Admin. Order 3-1990, f. 1/19/90, ef. 1/19/90 (temp).
OR-OSHA Admin. Order 7-1990, f. 3/2/90, ef. 3/2/90 (perm).
OR-OSHA Admin. Order 11-1992, f. 10/9/92, ef. 10/9/92.
OR-OSHA Admin. Order 4-1995, f. 3/29/95, ef. 3/29/95.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.1126
Chromium (VI)

(a) Scope.

(1) This standard applies to occupational exposures to chromium (VI) in all forms and compounds in construction, except:

NOTE: Oregon OSHA did not adopt 1910.1026(a)(2). Federal OSHA does not regulate the use of pesticides because the Environmental Protection Agency (EPA) regulates these exposures through the Worker Protection Standard (WPS). However, since Oregon OSHA enforces the WPS, this exemption does not apply in Oregon.

(3) Exposures to Portland cement; or

(4) Where the employer has objective data demonstrating that a material containing chromium or a specific process, operation, or activity involving chromium cannot release dusts, fumes, or mists of chromium (VI) in concentrations at or above 0.5 µg/m³ as an 8-hour time-weighted average (TWA) under any expected conditions of use.

(b) Definitions. For the purposes of this section the following definitions apply:

Action level means a concentration of airborne chromium (VI) of 2.5 micrograms per cubic meter of air (2.5 µg/m³) calculated as an 8-hour time-weighted average (TWA).

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Chromium (VI) [hexavalent chromium or Cr(VI)] means chromium with a valence of positive six, in any form and in any compound.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Emergency means any occurrence that results, or is likely to result, in an uncontrolled release of chromium (VI). If an incidental release of chromium (VI) can be controlled at the time of release by employees in the immediate release area, or by maintenance personnel, it is not an emergency.

Employee exposure means the exposure to airborne chromium (VI) that would occur if the employee were not using a respirator.

High-efficiency particulate air [HEPA] filter means a filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter or larger.

Historical monitoring data means data from chromium (VI) monitoring conducted prior to May 30, 2006, obtained during work operations conducted under workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Objective data means information such as air monitoring data from industry-wide surveys or calculations based on the composition or chemical and physical properties of a substance demonstrating the employee exposure to chromium (VI) associated with a particular product or material or a specific process, operation, or activity. The data must reflect workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Physician or other licensed health care professional [PLHCP] is an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by paragraph (i) of this section.

This section means this 1926.1126 chromium (VI) standard.

(c) Permissible exposure limit (PEL). The employer shall ensure that no employee is exposed to an airborne concentration of chromium (VI) in excess of 5 micrograms per cubic meter of air (5 µg/m³), calculated as an 8-hour time-weighted average (TWA).

(d) Exposure determination.

(1) General. Each employer who has a workplace or work operation covered by this section shall determine the 8-hour TWA exposure for each employee exposed to chromium (VI). This determination shall be made in accordance with either paragraph (d)(2) or paragraph (d)(3) of this section.

(2) Scheduled monitoring option.

(i) The employer shall perform initial monitoring to determine the 8-hour TWA exposure for each employee on the basis of a sufficient number of personal breathing zone air samples to accurately characterize full shift exposure on each shift, for each job classification, in each work area. Where an employer does representative sampling instead of sampling all employees in order to meet this requirement, the employer shall sample the employee(s) expected to have the highest chromium (VI) exposures.

(ii) If initial monitoring indicates that employee exposures are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(iii) If monitoring reveals employee exposures to be at or above the action level, the employer shall perform periodic monitoring at least every six months.

(iv) If monitoring reveals employee exposures to be above the PEL, the employer shall perform periodic monitoring at least every three months.

(v) If periodic monitoring indicates that employee exposures are below the action level, and the result is confirmed by the result of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(vi) The employer shall perform additional monitoring when there has been any change in the production process, raw materials, equipment, personnel, work practices, or control methods that may result in new or additional exposures to chromium (VI), or when the employer has any reason to believe that new or additional exposures have occurred.

(3) Performance-oriented option. The employer shall determine the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data, historical monitoring data, or objective data sufficient to accurately characterize employee exposure to chromium (VI).

(4) Employee notification of determination results.

(i) Within 5 work days after making an exposure determination in accordance with paragraph (d)(2) or paragraph (d)(3) of this section, the employer shall individually notify each affected employee in writing of the results of that determination or post the results in an appropriate location accessible to all affected employees.

(ii) Whenever the exposure determination indicates that employee exposure is above the PEL, the employer shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.

(5) Accuracy of measurement. Where air monitoring is performed to comply with the requirements of this section, the employer shall use a method of monitoring and analysis that can measure chromium (VI) to within an accuracy of plus or minus 25 percent ($\pm 25\%$) and can produce accurate measurements to within a statistical confidence level of 95 percent for airborne concentrations at or above the action level.

(6) Observation of monitoring.

(i) Where air monitoring is performed to comply with the requirements of this section, the employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to chromium (VI).

(ii) When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with clothing and equipment and shall assure that the observer uses such clothing and equipment and complies with all other applicable safety and health procedures.

(e) Methods of compliance.

(1) Engineering and work practice controls.

(i) Except as permitted in paragraph (e)(1)(ii) of this section, the employer shall use engineering and work practice controls to reduce and maintain employee exposure to chromium (VI) to or below the PEL unless the employer can demonstrate that such controls are not feasible. Wherever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer shall use them to reduce employee exposure to the lowest levels achievable, and shall supplement them by the use of respiratory protection that complies with the requirements of paragraph (f) of this section.

(ii) Where the employer can demonstrate that a process or task does not result in any employee exposure to chromium (VI) above the PEL for 30 or more days per year (12 consecutive months), the requirement to implement engineering and work practice controls to achieve the PEL does not apply to that process or task.

(2) Prohibition of rotation. The employer shall not rotate employees to different jobs to achieve compliance with the PEL.

(f) Respiratory protection.

(1) General. Where respiratory protection is required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respiratory protection is required during:

(i) Periods necessary to install or implement feasible engineering and work practice controls;

(ii) Work operations, such as maintenance and repair activities, for which engineering and work practice controls are not feasible;

(iii) Work operations for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL;

(iv) Work operations where employees are exposed above the PEL for fewer than 30 days per year, and the employer has elected not to implement engineering and work practice controls to achieve the PEL; or

(v) Emergencies.

(2) Respiratory protection program. Where respirator use is required by this section, the employer shall institute a respiratory protection program in accordance with 29 CFR 1910.134, which covers each employee required to use a respirator.

(g) Protective work clothing and equipment.

(1) Provision and use. Where a hazard is present or is likely to be present from skin or eye contact with chromium (VI), the employer shall provide appropriate personal protective clothing and equipment at no cost to employees, and shall ensure that employees use such clothing and equipment.

(2) Removal and storage.

(i) The employer shall ensure that employees remove all protective clothing and equipment contaminated with chromium (VI) at the end of the work shift or at the completion of their tasks involving chromium (VI) exposure, whichever comes first.

(ii) The employer shall ensure that no employee removes chromium (VI)-contaminated protective clothing or equipment from the workplace, except for those employees whose job it is to launder, clean, maintain, or dispose of such clothing or equipment.

(iii) When contaminated protective clothing or equipment is removed for laundering, cleaning, maintenance, or disposal, the employer shall ensure that it is stored and transported in sealed, impermeable bags or other closed, impermeable containers.

(iv) The employer shall ensure that bags or containers of contaminated protective clothing or equipment that are removed from change rooms for laundering, cleaning, maintenance, or disposal shall be labeled in accordance with the requirements of the Hazard Communication Standard, 29 CFR 1910.1200.

(3) Cleaning and replacement.

(i) The employer shall clean, launder, repair and replace all protective clothing and equipment required by this section as needed to maintain its effectiveness.

(ii) The employer shall prohibit the removal of chromium (VI) from protective clothing and equipment by blowing, shaking, or any other means that disperses chromium (VI) into the air or onto an employee's body.

(iii) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with chromium (VI) of the potentially harmful effects of exposure to chromium (VI) and that the clothing and equipment should be laundered or cleaned in a manner that minimizes skin or eye contact with chromium (VI) and effectively prevents the release of airborne chromium (VI) in excess of the PEL.

(h) Hygiene areas and practices.

(1) General. Where protective clothing and equipment is required, the employer shall provide change rooms in conformance with 29 CFR 1926.51. Where skin contact with chromium (VI) occurs, the employer shall provide washing facilities in conformance with 29 CFR 1926.51. Eating and drinking areas provided by the employer shall also be in conformance with 1926.51.

(2) Change rooms. The employer shall assure that change rooms are equipped with separate storage facilities for protective clothing and equipment and for street clothes, and that these facilities prevent cross-contamination.

(3) Washing facilities.

(i) The employer shall provide readily accessible washing facilities capable of removing chromium (VI) from the skin, and shall ensure that affected employees use these facilities when necessary.

(ii) The employer shall ensure that employees who have skin contact with chromium (VI) wash their hands and faces at the end of the work shift and prior to eating, drinking, smoking, chewing tobacco or gum, applying cosmetics, or using the toilet.

(4) Eating and drinking areas.

(i) Whenever the employer allows employees to consume food or beverages at a worksite where chromium (VI) is present, the employer shall ensure that eating and drinking areas and surfaces are maintained as free as practicable of chromium (VI).

(ii) The employer shall ensure that employees do not enter eating and drinking areas with protective work clothing or equipment unless surface chromium (VI) has been removed from the clothing and equipment by methods that do not disperse chromium (VI) into the air or onto an employee's body.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in areas where skin or eye contact with chromium (VI) occurs; or carry the products associated with these activities, or store such products in these areas.

(i) Medical surveillance.

(1) General.

(i) The employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for all employees:

(A) Who are or may be occupationally exposed to chromium (VI) at or above the action level for 30 or more days a year;

(B) Experiencing signs or symptoms of the adverse health effects associated with chromium (VI) exposure; or

(C) Exposed in an emergency.

(ii) The employer shall assure that all medical examinations and procedures required by this section are performed by or under the supervision of a PLHCP.

(2) Frequency. The employer shall provide a medical examination:

(i) Within 30 days after initial assignment, unless the employee has received a chromium (VI) related medical examination that meets the requirements of this paragraph within the last twelve months;

(ii) Annually;

(iii) Within 30 days after a PLHCP's written medical opinion recommends an additional examination;

(iv) Whenever an employee shows signs or symptoms of the adverse health effects associated with chromium (VI) exposure;

(v) Within 30 days after exposure during an emergency which results in an uncontrolled release of chromium (VI); or

(vi) At the termination of employment, unless the last examination that satisfied the requirements of paragraph (i) of this section was less than six months prior to the date of termination.

(3) Contents of examination. A medical examination consists of:

(i) A medical and work history, with emphasis on: past, present, and anticipated future exposure to chromium (VI); any history of respiratory system dysfunction; any history of asthma, dermatitis, skin ulceration, or nasal septum perforation; and smoking status and history;

(ii) A physical examination of the skin and respiratory tract; and

(iii) Any additional tests deemed appropriate by the examining PLHCP.

(4) Information provided to the PLHCP. The employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the following information:

(i) A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to chromium (VI);

(ii) The employee's former, current, and anticipated levels of occupational exposure to chromium (VI);

(iii) A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used that equipment; and

(iv) Information from records of employment-related medical examinations previously provided to the affected employee, currently within the control of the employer.

(5) PLHCP's written medical opinion.

(i) The employer shall obtain a written medical opinion from the PLHCP, within 30 days for each medical examination performed on each employee, which contains:

(A) The PLHCP's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to chromium (VI);

(B) Any recommended limitations upon the employee's exposure to chromium (VI) or upon the use of personal protective equipment such as respirators;

(C) A statement that the PLHCP has explained to the employee the results of the medical examination, including any medical conditions related to chromium (VI) exposure that require further evaluation or treatment, and any special provisions for use of protective clothing or equipment.

(ii) The PLHCP shall not reveal to the employer specific findings or diagnoses unrelated to occupational exposure to chromium (VI).

(iii) The employer shall provide a copy of the PLHCP's written medical opinion to the examined employee within two weeks after receiving it.

(j) Communication of chromium (VI) hazards to employees.

(1) Hazard communication. The employer shall include chromium (VI) in the program established to comply with the Hazard Communication Standard (HCS) (1910.1200). The employer shall ensure that each employee has access to labels on containers of chromium and safety data sheets, and is trained in accordance with the provisions of 1910.1200 and paragraph (j)(2) of this section. The employer shall provide information on at least the following hazards: Cancer; eye irritation; and skin sensitization.

(2) Employee information and training.

(i) The employer shall ensure that each employee can demonstrate knowledge of at least the following:

(A) The contents of this section; and

(B) The purpose and a description of the medical surveillance program required by paragraph (i) of this section.

(ii) The employer shall make a copy of this section readily available without cost to all affected employees.

(k) Recordkeeping.

(1) Air monitoring data.

(i) The employer shall maintain an accurate record of all air monitoring conducted to comply with the requirements of this section.

(ii) This record shall include at least the following information:

(A) The date of measurement for each sample taken;

(B) The operation involving exposure to chromium (VI) that is being monitored;

(C) Sampling and analytical methods used and evidence of their accuracy;

(D) Number, duration, and the results of samples taken;

(E) Type of personal protective equipment, such as respirators worn; and

(F) Name~~[-, social security number,]~~ and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

(iii) The employer shall ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

(2) Historical monitoring data.

(i) Where the employer has relied on historical monitoring data to determine exposure to chromium (VI), the employer shall establish and maintain an accurate record of the historical monitoring data relied upon.

(ii) The record shall include information that reflects the following conditions:

(A) The data were collected using methods that meet the accuracy requirements of paragraph (d)(5) of this section;

(B) The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which exposure is being determined;

(C) The characteristics of the chromium (VI) containing material being handled when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined;

(D) Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which exposure is being determined; and

(E) Other data relevant to the operations, materials, processing, or employee exposures covered by the exception.

(iii) The employer shall ensure that historical exposure records are maintained and made available in accordance with 29 CFR 1910.1020.

(3) Objective data.

(i) The employer shall maintain an accurate record of all objective data relied upon to comply with the requirements of this section.

(ii) This record shall include at least the following information:

(A) The chromium containing material in question;

(B) The source of the objective data;

(C) The testing protocol and results of testing, or analysis of the material for the release of chromium (VI);

(D) A description of the process, operation, or activity and how the data support the determination; and

(E) Other data relevant to the process, operation, activity, material, or employee exposures.

(iii) The employer shall ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020.

(4) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee covered by medical surveillance under paragraph (i) of this section.

(ii) The record shall include the following information about the employee:

(A) Name ~~[and social security number]~~;

(B) A copy of the PLHCP's written opinions;

(C) A copy of the information provided to the PLHCP as required by paragraph (i)(4) of this section.

(iii) The employer shall ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020.

(l) Dates.

(1) For employers with 20 or more employees, all obligations of this section, except engineering controls required by paragraph (e) of this section, commence November 27, 2006.

(2) For employers with 19 or fewer employees, all obligations of this section, except engineering controls required by paragraph (e) of this section, commence May 30, 2007.

(3) For all employers, engineering controls required by paragraph (e) of this section shall be implemented no later than May 31, 2010.

[71 FR 10382, Feb. 28, 2006 as amended at 73 FR 75589, Dec. 12, 2008; 75 FR 12686, Mar. 17, 2010; 77 FR 17895, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 6-2006, f. 8/30/06, ef. 8/30/06 (Chromium (VI)).

OR-OSHA Admin. Order 5-2009, f. 5/29/09, ef. 5/29/09.

OR-OSHA Admin. Order 3-2010, f. 6/10/10, ef. 6/15/10.

OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.

OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

1926.1127

Cadmium

(a) Scope. This standard applies to all occupational exposures to cadmium and cadmium compounds, in all forms, in all construction work where an employee may potentially be exposed to cadmium. Construction work is defined as work involving construction, alteration and/or repair, including but not limited to the following:

- (1) Wrecking, demolition or salvage of structures where cadmium or materials containing cadmium are present;
 - (2) Use of cadmium containing-paints and cutting, brazing, burning, grinding or welding on surfaces that were painted with cadmium-containing paints;
 - (3) Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain cadmium, or materials containing cadmium;
 - (4) Cadmium welding; cutting and welding cadmium-plated steel; brazing or welding with cadmium alloys;
 - (5) Installation of products containing cadmium;
 - (6) Electrical grounding with cadmium welding, or electrical work using cadmium-coated conduit;
 - (7) Maintaining or retrofitting cadmium-coated equipment;
 - (8) Cadmium contamination/emergency cleanup; and
 - (9) Transportation, disposal, storage, or containment of cadmium or materials containing cadmium on the site or location at which construction activities are performed.
- (b) Definitions.

Action level (AL) is defined as an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air (2.5 µg/m³), calculated as an 8-hour time-weighted average (TWA).

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Authorized person means any person authorized by the employer and required by work duties to be present in regulated areas or any person authorized by the OSH Act or regulations issued under it to be in regulated areas.

Competent person, in accordance with 29 CFR 1926.32(f), means a person designated by the employer to act on the employer's behalf who is capable of identifying existing and potential cadmium hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards. The duties of a competent person include at least the following: Determining prior to the performance of work whether cadmium is present in the workplace; establishing, where necessary, regulated areas and assuring that access to and from those areas is limited to authorized employees; assuring the adequacy of any employee exposure monitoring required by this standard; assuring that all employees exposed to air cadmium levels above the PEL wear appropriate personal protective equipment and are trained in the use of appropriate methods of exposure control; assuring that proper hygiene facilities are provided and that workers are trained to use those facilities; and assuring that the engineering controls required by this standard are implemented, maintained in proper operating condition, and functioning properly.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Employee exposure and similar language referring to the air cadmium level to which an employee is exposed means the exposure to airborne cadmium that would occur if the employee were not using respiratory protective equipment.

Final medical determination is the written medical opinion of the employee's health status by the examining physician under paragraphs (I)(3) through (12) of this section or, if multiple physician review under paragraph (I)(13) of this section or the alternative physician determination under paragraph (I)(14) of this section is invoked, it is the final, written medical finding, recommendation or determination that emerges from that process.

High-efficiency Particulate Air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of mono-dispersed particles of 0.3 micrometers in diameter.

Regulated area means an area demarcated by the employer where an employee's exposure to airborne concentrations of cadmium exceeds, or can reasonably be expected to exceed the permissible exposure limit (PEL).

This section means this cadmium standard.

(c) Permissible Exposure Limit (PEL). The employer shall assure that no employee is exposed to an airborne concentration of cadmium in excess of five micrograms per cubic meter of air (5 $\mu\text{g}/\text{m}^3$), calculated as an eight-hour time-weighted average exposure (TWA).

(d) Exposure Monitoring.

(1) General.

(i) Prior to the performance of any construction work where employees may be potentially exposed to cadmium, the employer shall establish the applicability of this standard by determining whether cadmium is present in the workplace and whether there is the possibility that employee exposures will be at or above the action level. The employer shall designate a competent person who shall make this determination. Investigation and material testing techniques shall be used, as appropriate, in the determination. Investigation shall include a review of relevant plans, past reports, material safety data sheets, and other available records, and consultations with the property owner and discussions with appropriate individuals and agencies.

(ii) Where cadmium has been determined to be present in the workplace, and it has been determined that there is a possibility the employee's exposure will be at or above the action level, the competent person shall identify employees potentially exposed to cadmium at or above the action level.

(iii) Determinations of employee exposure shall be made from breathing-zone air samples that reflect the monitored employee's regular, daily 8-hour TWA exposure to cadmium.

(iv) Eight-hour TWA exposures shall be determined for each employee on the basis of one or more personal breathing-zone air samples reflecting full shift exposure on each shift, for each job classification, in each work area. Where several employees perform the same job tasks, in

the same job classification, on the same shift, in the same work area, and the length, duration, and level of cadmium exposures are similar, an employer may sample a representative fraction of the employees instead of all employees in order to meet this requirement. In representative sampling, the employer shall sample the employee(s) expected to have the highest cadmium exposures.

(2) Specific.

(i) Initial monitoring. Except as provided for in paragraph (d)(2)(iii) of this section, where a determination conducted under paragraph (d)(1)(i) of this section shows the possibility of employee exposure to cadmium at or above the action level, the employer shall conduct exposure monitoring as soon as practicable that is representative of the exposure for each employee in the workplace who is or may be exposed to cadmium at or above the action level.

(ii) In addition, if the employee periodically performs tasks that may expose the employee to a higher concentration of airborne cadmium, the employee shall be monitored while performing those tasks.

(iii) Where the employer has objective data, as defined in paragraph (n)(2) of this section, demonstrating that employee exposure to cadmium will not exceed airborne concentrations at or above the action level under the expected conditions of processing, use, or handling, the employer may rely upon such data instead of implementing initial monitoring.

(iv) Where a determination conducted under paragraphs (d)(1) or (d)(2) of this section is made that a potentially exposed employee is not exposed to airborne concentrations of cadmium at or above the action level, the employer shall make a written record of such determination. The record shall include at least the monitoring data developed under paragraphs (d)(2)(i) through (iii) of this section, where applicable, and shall also include the date of determination, and the name ~~and social security number~~ of each employee.

(3) Monitoring frequency (periodic monitoring).

(i) If the initial monitoring or periodic monitoring reveals employee exposures to be at or above the action level, the employer shall monitor at a frequency and pattern needed to assure that the monitoring results reflect with reasonable accuracy the employee's typical exposure levels, given the variability in the tasks performed, work practices, and environmental conditions on the job site, and to assure the adequacy of respiratory selection and the effectiveness of engineering and work practice controls.

(ii) If the initial monitoring or the periodic monitoring indicates that employee exposures are below the action level and that result is confirmed by the results of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(4) Additional monitoring. The employer also shall institute the exposure monitoring required under paragraphs (d)(2)(i) and (d)(3) of this section whenever there has been a change in the raw materials, equipment, personnel, work practices, or finished products that may result in additional employees being exposed to cadmium at or above the action level or in employees already exposed to cadmium at or above the action level being exposed above the PEL, or whenever the employer or competent person has any reason to suspect that any other change might result in such further exposure.

(5) Employee notification of monitoring results.

(i) The employer must, as soon as possible but no later than 5 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

(ii) Wherever monitoring results indicate that employee exposure exceeds the PEL, the employer shall include in the written notice a statement that the PEL has been exceeded and a description of the corrective action being taken by the employer to reduce employee exposure to or below the PEL.

(6) Accuracy of measurement. The employer shall use a method of monitoring and analysis that has an accuracy of not less than plus or minus 25 percent ($\pm 25\%$), with a confidence level of 95 percent, for airborne concentrations of cadmium at or above the action level and the permissible exposure limit.

(e) Regulated areas.

(1) Establishment. The employer shall establish a regulated area wherever an employee's exposure to airborne concentrations of cadmium is, or can reasonably be expected to be in excess of the permissible exposure limit (PEL).

(2) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees of the boundaries of the regulated area, including employees who are or may be incidentally in the regulated areas, and that protects persons outside the area from exposure to airborne concentrations of cadmium in excess of the PEL.

(3) Access. Access to regulated areas shall be limited to authorized persons.

(4) Provision of respirators. Each person entering a regulated area shall be supplied with and required to use a respirator, selected in accordance with paragraph (g)(2) of this section.

(5) Prohibited activities. The employer shall assure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, or carry the products associated with any of these activities into regulated areas or store such products in those areas.

(f) Methods of compliance.

(1) Compliance hierarchy.

(i) Except as specified in paragraph (f)(1)(ii) of this section, the employer shall implement engineering and work practice controls to reduce and maintain employee exposure to cadmium at or below the PEL, except to the extent that the employer can demonstrate that such controls are not feasible.

(ii) The requirement to implement engineering controls to achieve the PEL does not apply where the employer demonstrates the following:

(A) The employee is only intermittently exposed; and

(B) The employee is not exposed above the PEL on 30 or more days per year (12 consecutive months).

(iii) Wherever engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer nonetheless shall implement such controls to reduce exposures to the lowest levels achievable. The employer shall supplement such controls with respiratory protection that complies with the requirements of paragraph (g) of this section and the PEL.

(iv) The employer shall not use employee rotation as a method of compliance.

(2) Specific operations.

(i) Abrasive blasting. Abrasive blasting on cadmium or cadmium-containing materials shall be conducted in a manner that will provide adequate protection.

(ii) Heating cadmium and cadmium-containing materials. Welding, cutting, and other forms of heating of cadmium or cadmium-containing materials shall be conducted in accordance with the requirements of 29 CFR 1926.353 and 29 CFR 1926.354, where applicable.

(3) Prohibitions.

(i) High speed abrasive disc saws and similar abrasive power equipment shall not be used for work on cadmium or cadmium-containing materials unless they are equipped with appropriate engineering controls to minimize emissions, if the exposure levels are above the PEL.

(ii) Materials containing cadmium shall not be applied by spray methods, if exposures are above the PEL, unless employees are protected with supplied-air respirators with full facepiece, hood, helmet, suit, operated in positive pressure mode and measures are instituted to limit overspray and prevent contamination of adjacent areas.

(4) Mechanical ventilation.

(i) When ventilation is used to control exposure, measurements that demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure shall be made as necessary to maintain its effectiveness.

(ii) Measurements of the system's effectiveness in controlling exposure shall be made as necessary within five working days of any change in production, process, or control that might result in a significant increase in employee exposure to cadmium.

(iii) Recirculation of air. If air from exhaust ventilation is recirculated into the workplace, the system shall have a high efficiency filter and be monitored to assure effectiveness.

(iv) Procedures shall be developed and implemented to minimize employee exposure to cadmium when maintenance of ventilation systems and changing of filters is being conducted.

(5) Compliance program.

(i) Where employee exposure to cadmium exceeds the PEL and the employer is required under paragraph (f)(1) of this section to implement controls to comply with the PEL, prior to the commencement of the job the employer shall establish and implement a written compliance program to reduce employee exposure to or below the PEL. To the extent that engineering and work practice controls cannot reduce exposures to or below the PEL, the employer shall include in the written compliance program the use of appropriate respiratory protection to achieve compliance with the PEL.

(ii) Written compliance programs shall be reviewed and updated as often and as promptly as necessary to reflect significant changes in the employer's compliance status or significant changes in the lowest air cadmium level that is technologically feasible.

(iii) A competent person shall review the comprehensive compliance program initially and after each change.

(iv) Written compliance programs shall be provided upon request for examination and copying to the Assistant Secretary, the Director, affected employees, and designated employee representatives.

(g) Respirator protection.

(1) General. For employees who use respirators required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph. Respirators must be used during:

(i) Periods necessary to install or implement feasible engineering and work-practice controls when employee exposures exceed the PEL.

(ii) Maintenance and repair activities, and brief or intermittent work operations, for which employee exposures exceed the PEL and engineering and work-practice controls are not feasible or are not required.

(iii) Work operations in the regulated areas specified in paragraph (e) of this section.

(iv) Work operations for which the employer has implemented all feasible engineering and work-practice controls, and such controls are not sufficient to reduce employee exposures to or below the PEL.

(v) Work operations for which an employee, who is exposed to cadmium at or above the action level, requests a respirator.

(vi) Work operations for which engineering controls are not required by paragraph (f)(1)(ii) of this section to reduce employee exposures that exceed the PEL.

(vii) Emergencies.

(2) Respirator program.

Note: Oregon OSHA repealed 1926.1127(g)(2)(i). In Oregon, OAR 437-003-1127 applies.

437-003-1127 Cadmium Respiratory Protection Program

The employer must implement a respiratory protection program in accordance with Division 2/I, 1910.134(b) through (d) (except (d)(1)(iii)), and (e) through (m) and (o), which covers each employee required by Division 3/Z, 1926.1127 Cadmium, to use a respirator.

NOTE: This is in addition to other respiratory protection and medical surveillance requirements specified in these Cadmium rules.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.

1926.1127(g)(2)(ii) If an employee exhibits breathing difficulty during fit testing or respirator use, the employer must provide the employee with a medical examination in accordance with paragraph (l)(6)(ii) of this section to determine if the employee can use a respirator while performing the required duties.

(iii) No employee must use a respirator when, based on their most recent medical examination, the examining physician determines that the employee will be unable to continue to function normally while using a respirator. If the physician determines the employee must be limited in, or removed from, their current job because of the employee's inability to use a respirator, the job limitation or removal must be conducted in accordance with paragraphs (l)(11) and (12) of this section.

(3) Respirator selection.

(i) Employers must:

(A) Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

(B) Provide employees with full facepiece respirators when they experience eye irritation.

(C) Provide HEPA filters for powered and non-powered air-purifying respirators.

(ii) The employer must provide a powered air-purifying respirator instead of a negative-pressure respirator when an employee entitled to a respirator chooses to use this type of respirator and such a respirator will provide adequate protection to the employee.

(h) Emergency situations. The employer shall develop and implement a written plan for dealing with emergency situations involving substantial releases of airborne cadmium. The plan shall include provisions for the use of appropriate respirators and personal protective equipment. In addition, employees not essential to correcting the emergency situation shall be restricted from the area and normal operations halted in that area until the emergency is abated.

(i) Protective work clothing and equipment.

(1) Provision and use. If an employee is exposed to airborne cadmium above the PEL or where skin or eye irritation is associated with cadmium exposure at any level, the employer shall provide at no cost to the employee, and assure that the employee uses, appropriate protective

work clothing and equipment that prevents contamination of the employee and the employee's garments. Protective work clothing and equipment includes, but is not limited to:

- (i) Coveralls or similar full-body work clothing;
- (ii) Gloves, head coverings, and boots or foot coverings; and
- (iii) Face shields, vented goggles, or other appropriate protective equipment that complies with 29 CFR 1910.133.

(2) Removal and storage.

- (i) The employer shall assure that employees remove all protective clothing and equipment contaminated with cadmium at the completion of the work shift and do so only in change rooms provided in accordance with paragraph (j)(1) of this section.
- (ii) The employer shall assure that no employee takes cadmium-contaminated protective clothing or equipment from the workplace, except for employees authorized to do so for purposes of laundering, cleaning, maintaining, or disposing of cadmium-contaminated protective clothing and equipment at an appropriate location or facility away from the workplace.
- (iii) The employer shall assure that contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, is placed and stored in sealed, impermeable bags or other closed, impermeable containers that are designed to prevent dispersion of cadmium dust.
- (iv) The employer shall ensure that containers of contaminated protective clothing and equipment that are to be taken out of the change rooms or the workplace for laundering, cleaning, maintenance or disposal shall bear labels in accordance with paragraph (m)(3)(ii) of this section.

(3) Cleaning, replacement, and disposal.

- (i) The employer shall provide the protective clothing and equipment required by paragraph (i)(1) of this section in a clean and dry condition as often as necessary to maintain its effectiveness, but in any event at least weekly. The employer is responsible for cleaning and laundering the protective clothing and equipment required by this paragraph to maintain its effectiveness and is also responsible for disposing of such clothing and equipment.
- (ii) The employer also is responsible for repairing or replacing required protective clothing and equipment as needed to maintain its effectiveness. When rips or tears are detected while an employee is working they shall be immediately mended, or the worksuit shall be immediately replaced.
- (iii) The employer shall prohibit the removal of cadmium from protective clothing and equipment by blowing, shaking, or any other means that disperses cadmium into the air.
- (iv) The employer shall assure that any laundering of contaminated clothing or cleaning of contaminated equipment in the workplace is done in a manner that prevents the release of airborne cadmium in excess of the permissible exposure limit prescribed in paragraph (c) of this section.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with cadmium of the potentially harmful effects of exposure to cadmium, and that the clothing and equipment should be laundered or cleaned in a manner to effectively prevent the release of airborne cadmium in excess of the PEL.

(j) Hygiene areas and practices.

(1) General. For employees whose airborne exposure to cadmium is above the PEL, the employer shall provide clean change rooms, handwashing facilities, showers, and lunchroom facilities that comply with 29 CFR 1926.51.

(2) Change rooms. The employer shall assure that change rooms are equipped with separate storage facilities for street clothes and for protective clothing and equipment, which are designed to prevent dispersion of cadmium and contamination of the employee's street clothes.

(3) Showers and handwashing facilities.

(i) The employer shall assure that employees whose airborne exposure to cadmium is above the PEL shower during the end of the work shift.

(ii) The employer shall assure that employees who are exposed to cadmium above the PEL wash their hands and faces prior to eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.

(4) Lunchroom facilities.

(i) The employer shall assure that the lunchroom facilities are readily accessible to employees, that tables for eating are maintained free of cadmium, and that no employee in a lunchroom facility is exposed at any time to cadmium at or above a concentration of 2.5 µg/m³.

(ii) The employer shall assure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface cadmium has been removed from the clothing and equipment by HEPA vacuuming or some other method that removes cadmium dust without dispersing it.

(k) Housekeeping.

(1) All surfaces shall be maintained as free as practicable of accumulations of cadmium.

(2) All spills and sudden releases of material containing cadmium shall be cleaned up as soon as possible.

(3) Surfaces contaminated with cadmium shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of cadmium becoming airborne.

(4) HEPA-filtered vacuuming equipment or equally effective filtration methods shall be used for vacuuming. The equipment shall be used and emptied in a manner that minimizes the reentry of cadmium into the workplace.

(5) Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other methods that minimize the likelihood of cadmium becoming airborne have been tried and found not to be effective.

(6) Compressed air shall not be used to remove cadmium from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air.

(7) Waste, scrap, debris, bags, and containers, personal protective equipment and clothing contaminated with cadmium and consigned for disposal shall be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers shall be labeled in accordance with paragraph (m)(3)(ii) of this section.

(l) Medical Surveillance.

(1) General.

(i) Scope.

(A) Currently exposed. The employer shall institute a medical surveillance program for all employees who are or may be exposed at or above the action level and all employees who perform the following tasks, operations or jobs: Electrical grounding with cadmium welding; cutting, brazing, burning, grinding or welding on surfaces that were painted with cadmium-containing paints; electrical work using cadmium-coated conduit; use of cadmium containing paints; cutting and welding cadmium-plated steel; brazing or welding with cadmium alloys; fusing of reinforced steel by cadmium welding; maintaining or retrofitting cadmium-coated equipment; and, wrecking and demolition where cadmium is present. A medical surveillance program will not be required if the employer demonstrates that the employee:

(1) Is not currently exposed by the employer to airborne concentrations of cadmium at or above the action level on 30 or more days per year (twelve consecutive months); and,

(2) Is not currently exposed by the employer in those tasks on 30 or more days per year (twelve consecutive months).

(B) Previously exposed. The employer shall also institute a medical surveillance program for all employees who might previously have been exposed to cadmium by the employer prior to the effective date of this standard in tasks specified under paragraph (l)(1)(i)(A) of this section, unless the employer demonstrates that the employee did not in the years prior to the effective date of this section work in those tasks for the employer with exposure to cadmium for an aggregated total of more than 12 months.

(ii) To determine an employee's fitness for using a respirator, the employer shall provide the limited medical examination specified in paragraph (l)(6) of this section.

(iii) The employer shall assure that all medical examinations and procedures required by this section are performed by or under the supervision of a licensed physician, who has read and is familiar with the health effects section of appendix A to this section, the regulatory text of this section, the protocol for sample handling and lab selection in appendix F to this section, and the questionnaire of appendix D to this section.

(iv) The employer shall provide the medical surveillance required by this section, including multiple physician review under paragraph (I)(13) of this section without cost to employees, and at a time and place that is reasonable and convenient to employees.

(v) The employer shall assure that the collecting and handling of biological samples of cadmium in urine (CdU), cadmium in blood (CdB), and beta-2 microglobulin in urine (β 2-M) taken from employees under this section is done in a manner that assures their reliability and that analysis of biological samples of cadmium in urine (CdU), cadmium in blood (CdB), and beta-2 microglobulin in urine (β 2-M) taken from employees under this section is performed in laboratories with demonstrated proficiency to perform the particular analysis. (See appendix F to this section.)

(2) Initial examination.

(i) For employees covered by medical surveillance under paragraph (I)(1)(i) of this section, the employer shall provide an initial medical examination. The examination shall be provided to those employees within 30 days after initial assignment to a job with exposure to cadmium or no later than 90 days after the effective date of this section, whichever date is later.

(ii) The initial medical examination shall include:

(A) A detailed medical and work history, with emphasis on: Past, present, and anticipated future exposure to cadmium; any history of renal, cardiovascular, respiratory, hematopoietic, reproductive, and/or musculoskeletal system dysfunction; current usage of medication with potential nephrotoxic side-effects; and smoking history and current status; and

(B) Biological monitoring that includes the following tests:

(1) Cadmium in urine (CdU), standardized to grams of creatinine (g/Cr);

(2) Beta-2 microglobulin in urine (β 2-M), standardized to grams of creatinine (g/Cr), with pH specified, as described in Appendix F to this section; and

(3) Cadmium in blood (CdB), standardized to liters of whole blood (lwb).

(iii) Recent Examination: An initial examination is not required to be provided if adequate records show that the employee has been examined in accordance with the requirements of paragraph (I)(2)(ii) of this section within the past 12 months. In that case, such records shall be maintained as part of the employee's medical record and the prior exam shall be treated as if it were an initial examination for the purposes of paragraphs (I)(3) and (4) of this section.

(3) Actions triggered by initial biological monitoring.

(i) If the results of the biological monitoring tests in the initial examination show the employee's CdU level to be at or below 3 μ g/g Cr, β 2-M level to be at or below 300 μ g/g Cr and CdB level to be at or below 5 μ g/lwb, then:

(A) For employees who are subject to medical surveillance under paragraphs (I)(1)(i)(A) of this section because of current or anticipated exposure to cadmium, the employer shall provide the minimum level of periodic medical surveillance in accordance with the requirements in paragraph (I)(4)(i) of this section; and

(B) For employees who are subject to medical surveillance under paragraph (I)(1)(i)(B) of this section because of prior but not current exposure, the employer shall provide biological monitoring for CdU, B2-M, and CdB one year after the initial biological monitoring and then the employer shall comply with the requirements of paragraph (I)(4)(vi) of this section.

(ii) For all employees who are subject to medical surveillance under paragraph (I)(1)(i) of this section, if the results of the initial biological monitoring tests show the level of CdU to exceed 3 µg/g Cr, the level of β2-M to be in excess of 300 µg/g Cr, or the level of CdB to be in excess of 5 µg/lwb, the employer shall:

(A) Within two weeks after receipt of biological monitoring results, reassess the employee's occupational exposure to cadmium as follows:

- (1) Reassess the employee's work practices and personal hygiene;
- (2) Reevaluate the employee's respirator use, if any, and the respirator program;
- (3) Review the hygiene facilities;
- (4) Reevaluate the maintenance and effectiveness of the relevant engineering controls;
- (5) Assess the employee's smoking history and status;

(B) Within 30 days after the exposure reassessment, specified in paragraph (I)(3)(ii)(A) of this section, take reasonable steps to correct any deficiencies found in the reassessment that may be responsible for the employee's excess exposure to cadmium; and,

(C) Within 90 days after receipt of biological monitoring results, provide a full medical examination to the employee in accordance with the requirements of paragraph (I)(4)(ii) of this section. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. If the physician determines that medical removal is not necessary, then until the employee's CdU level falls to or below 3 µg/g Cr, β2-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(1) Provide biological monitoring in accordance with paragraph (I)(2)(ii)(B) of this section on a semi-annual basis; and

(2) Provide annual medical examinations in accordance with paragraph (I)(4)(ii) of this section.

(iii) For all employees who are subject to medical surveillance under paragraph (I)(1)(i) of this section, if the results of the initial biological monitoring tests show the level of CdU to be in excess of 15 µg/g Cr, or the level of CdB to be in excess of 15 µg/lwb, or the level of β2-M to be in excess of 1,500 µg/g Cr, the employer shall comply with the requirements of paragraphs (I)(3)(ii)(A)-(B) of this section. Within 90 days after receipt of biological monitoring results, the employer shall provide a full medical examination to the employee in accordance with the requirements of paragraph (I)(4)(ii) of this section. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. However, if the initial biological monitoring results and the biological monitoring results obtained during the medical examination both show that: CdU exceeds 15 µg/g Cr; or CdB exceeds 15 µg/lwb; or β2-M exceeds 1500 µg/g Cr, and in addition CdU exceeds 3 µg/g Cr

or CdB exceeds 5 µg/liter of whole blood, then the physician shall medically remove the employee from exposure to cadmium at or above the action level. If the second set of biological monitoring results obtained during the medical examination does not show that a mandatory removal trigger level has been exceeded, then the employee is not required to be removed by the mandatory provisions of this paragraph. If the employee is not required to be removed by the mandatory provisions of this paragraph or by the physician's determination, then until the employee's CdU level falls to or below 3 µg/g Cr, β2-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(A) Periodically reassess the employee's occupational exposure to cadmium;

(B) Provide biological monitoring in accordance with paragraph (I)(2)(ii)(B) of this section on a quarterly basis; and

(C) Provide semiannual medical examinations in accordance with paragraph (I)(4)(ii) of this section.

(iv) For all employees to whom medical surveillance is provided, beginning on January 1, 1999, and in lieu of paragraph (I)(3)(iii) of this section, whenever the results of initial biological monitoring tests show the employee's CdU level to be in excess of 7 µg/g Cr, or β2-M level to be in excess of 750 µg/g Cr, or CdB level to be in excess of 10 µg/lwb, the employer shall comply with the requirements of paragraphs (I)(3)(ii)(A)-(B) of this section. Within 90 days after receipt of biological monitoring results, the employer shall provide a full medical examination to the employee in accordance with the requirements of paragraph (I)(4)(ii) of this section. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. However, if the initial biological monitoring results and the biological monitoring results obtained during the medical examination both show that: CdU exceeds 7 µg/g Cr; or CdB exceeds 10 µg/lwb; or β2-M exceeds 750 µg/g Cr, and in addition CdU exceeds 3 µg/g Cr or CdB exceeds 5 µg/liter of whole blood, then the physician shall medically remove the employee from exposure to cadmium at or above the action level. If the second set of biological monitoring results obtained during the medical examination does not show that a mandatory removal trigger level has been exceeded, then the employee is not required to be removed by the mandatory provisions of this paragraph. If the employee is not required to be removed by the mandatory provisions of this paragraph or by the physician's determination, then until the employee's CdU level falls to or below 3 µg/g Cr, β2-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(A) Periodically reassess the employee's occupational exposure to cadmium;

(B) Provide biological monitoring in accordance with paragraph (I)(2)(ii)(B) of this section on a quarterly basis; and

(C) Provide semiannual medical examinations in accordance with paragraph (I)(4)(ii) of this section.

(4) Periodic medical surveillance.

(i) For each employee who is covered by medical surveillance under paragraph (I)(1)(i)(A) of this section because of current or anticipated exposure to cadmium, the employer shall provide at least the minimum level of periodic medical surveillance, which consists of periodic medical examinations and periodic biological monitoring. A periodic medical examination shall be

provided within one year after the initial examination required by paragraph (l)(2) of this section and thereafter at least biennially. Biological sampling shall be provided at least annually either as part of a periodic medical examination or separately as periodic biological monitoring.

(ii) The periodic medical examination shall include:

(A) A detailed medical and work history, or update thereof, with emphasis on: Past, present and anticipated future exposure to cadmium; smoking history and current status; reproductive history; current use of medications with potential nephrotoxic side-effects; any history of renal, cardiovascular, respiratory, hematopoietic, and/or musculoskeletal system dysfunction; and as part of the medical and work history, for employees who wear respirators, questions 3-11 and 25-32 in Appendix D to this section;

(B) A complete physical examination with emphasis on: blood pressure, the respiratory system, and the urinary system;

(C) A 14 inch by 17 inch[.] or other[a] reasonably-sized **standard film or digital** posterior-anterior chest X-ray (after the initial X-ray, the frequency of chest X-rays is to be determined by the examining physician);

(D) Pulmonary function tests, including forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1);

(E) Biological monitoring, as required in paragraph (l)(2)(ii)(B) of this section;

(F) Blood analysis, in addition to the analysis required under paragraph (l)(2)(ii)(B) of this section, including blood urea nitrogen, complete blood count, and serum creatinine;

(G) Urinalysis, in addition to the analysis required under paragraph (l)(2)(ii)(B) of this section, including the determination of albumin, glucose, and total and low molecular weight proteins;

(H) For males over 40 years old, prostate palpation, or other at least as effective diagnostic test(s), and;

(I) Any additional tests or procedures deemed appropriate by the examining physician.

(iii) Periodic biological monitoring shall be provided in accordance with paragraph (l)(2)(ii)(B) of this section.

(iv) If the results of periodic biological monitoring or the results of biological monitoring performed as part of the periodic medical examination show the level of the employee's CdU, β 2-M, or CdB to be in excess of the levels specified in paragraphs (l)(3)(ii) or (iii) of this section; or beginning on January 1, 1999, in excess of the levels specified in paragraphs (l)(3)(ii) or (iv), the employer shall take the appropriate actions specified in paragraphs (l)(3)(ii)-(iv) of this section, respectively.

(v) For previously exposed employees under paragraph (l)(1)(i)(B) of this section:

(A) If the employee's levels of CdU did not exceed 3 μ g/g Cr, CdB did not exceed 5 μ g/lwb, and β 2-M did not exceed 300 μ g/g Cr in the initial biological monitoring tests, and if the results of the followup biological monitoring required by paragraph (l)(3)(i)(B) of this section one year after the

initial examination confirm the previous results, the employer may discontinue all periodic medical surveillance for that employee.

(B) If the initial biological monitoring results for CdU, CdB, or β 2-M were in excess of the levels specified in paragraph (I)(3)(i) of this section, but subsequent biological monitoring results required by paragraph (I)(3)(ii)-(iv) of this section show that the employee's CdU levels no longer exceed 3 μ g/g Cr, CdB levels no longer exceed 5 μ g/lwb, and β 2-M levels no longer exceed 300 μ g/g Cr, the employer shall provide biological monitoring for CdU, CdB, and β 2-M one year after these most recent biological monitoring results. If the results of the followup biological monitoring specified in this paragraph, confirm the previous results, the employer may discontinue all periodic medical surveillance for that employee.

(C) However, if the results of the follow-up tests specified in paragraph (I)(4)(v)(A) or (B) of this section indicate that the level of the employee's CdU, β 2-M, or CdB exceeds these same levels, the employer is required to provide annual medical examinations in accordance with the provisions of paragraph (I)(4)(ii) of this section until the results of biological monitoring are consistently below these levels or the examining physician determines in a written medical opinion that further medical surveillance is not required to protect the employee's health.

(vi) A routine, biennial medical examination is not required to be provided in accordance with paragraphs (I)(3)(i) and (I)(4) of this section if adequate medical records show that the employee has been examined in accordance with the requirements of paragraph (I)(4)(ii) of this section within the past 12 months. In that case, such records shall be maintained by the employer as part of the employee's medical record, and the next routine, periodic medical examination shall be made available to the employee within two years of the previous examination.

(5) Actions triggered by medical examinations.

(i) If the results of a medical examination carried out in accordance with this section indicate any laboratory or clinical finding consistent with cadmium toxicity that does not require employer action under paragraphs (I)(2), (3) or (4) of this section, the employer shall take the following steps and continue to take them until the physician determines that they are no longer necessary.

(A) Periodically reassess: The employee's work practices and personal hygiene; the employee's respirator use, if any; the employee's smoking history and status; the respiratory protection program; the hygiene facilities; the maintenance and effectiveness of the relevant engineering controls; and take all reasonable steps to correct the deficiencies found in the reassessment that may be responsible for the employee's excess exposure to cadmium.

(B) Provide semi-annual medical reexaminations to evaluate the abnormal clinical sign(s) of cadmium toxicity until the results are normal or the employee is medically removed; and

(C) Where the results of tests for total proteins in urine are abnormal, provide a more detailed medical evaluation of the toxic effects of cadmium on the employee's renal system.

(6) Examination for respirator use.

(i) To determine an employee's fitness for respirator use, the employer shall provide a medical examination that includes the elements specified in paragraph (I)(6)(i)(A) through (D) of this section. This examination shall be provided prior to the employee's being assigned to a job that

requires the use of a respirator or no later than 90 days after this section goes into effect, whichever date is later, to any employee without a medical examination within the preceding 12 months that satisfies the requirements of this paragraph.

(A) A detailed medical and work history, or update thereof, with emphasis on: past exposure to cadmium; smoking history and current status; any history of renal, cardiovascular, respiratory, hematopoietic, and/or musculoskeletal system dysfunction; a description of the job for which the respirator is required; and questions 3 through 11 and 25 through 32 in Appendix D;

(B) A blood pressure test;

(C) Biological monitoring of the employee's levels of CdU, CdB and β 2-M in accordance with the requirements of paragraph (I)(2)(ii)(B) of this section, unless such results already have been obtained within the twelve months; and

(D) Any other test or procedure that the examining physician deems appropriate.

(ii) After reviewing all the information obtained from the medical examination required in paragraph (I)(6)(i) of this section, the physician shall determine whether the employee is fit to wear a respirator.

(iii) Whenever an employee has exhibited difficulty in breathing during a respirator fit test or during use of a respirator, the employer, as soon as possible, shall provide the employee with a periodic medical examination in accordance with paragraph (I)(4)(ii) of this section to determine the employee's fitness to wear a respirator.

(iv) Where the results of the examination required under paragraph (I)(6)(i), (ii) or (iii) of this section are abnormal, medical limitation or prohibition of respirator use shall be considered. If the employee is allowed to wear a respirator, the employee's ability to continue to do so shall be periodically evaluated by a physician.

(7) Emergency Examinations.

(i) In addition to the medical surveillance required in paragraphs (I)(2) through (6) of this section, the employer shall provide a medical examination as soon as possible to any employee who may have been acutely exposed to cadmium because of an emergency.

(ii) The examination shall include the requirements of paragraph (I)(4)(ii), of this section, with emphasis on the respiratory system, other organ systems considered appropriate by the examining physician, and symptoms of acute overexposure, as identified in paragraphs II(B)(1)-(2) and IV of Appendix A of this section.

(8) Termination of employment examination.

(i) At termination of employment, the employer shall provide a medical examination in accordance with paragraph (I)(4)(ii) of this section, including a chest X-ray where necessary, to any employee to whom at any prior time the employer was required to provide medical surveillance under paragraph (I)(1)(i) or (I)(7) of this section. However, if the last examination satisfied the requirements of paragraph (I)(4)(ii) of this section and was less than six months prior to the date of termination, no further examination is required unless otherwise specified in paragraph (I)(3) or (I)(5) of this section;

(ii) In addition, if the employer has discontinued all periodic medical surveillance under paragraph (l)(4)(v) of this section, no termination of employment medical examination is required.

(9) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and appendices;

(ii) A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to cadmium;

(iii) The employee's former, current, and anticipated future levels of occupational exposure to cadmium;

(iv) A description of any personal protective equipment, including respirators, used or to be used by the employee, including when and for how long the employee has used that equipment; and

(v) Relevant results of previous biological monitoring and medical examinations.

(10) Physician's written medical opinion.

(i) The employer shall promptly obtain a written medical opinion from the examining physician for each medical examination performed on each employee. This written opinion shall contain:

(A) The physician's diagnosis for the employee;

(B) The physician's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to cadmium, including any indications of potential cadmium toxicity;

(C) The results of any biological or other testing or related evaluations that directly assess the employee's absorption of cadmium;

(D) Any recommended removal from, or limitation on the activities or duties of the employee or on the employee's use of personal protective equipment, such as respirators;

(E) A statement that the physician has clearly and carefully explained to the employee the results of the medical examination, including all biological monitoring results and any medical conditions related to cadmium exposure that require further evaluation or treatment, and any limitation on the employee's diet or use of medications.

(ii) The employer shall promptly obtain a copy of the results of any biological monitoring provided by an employer to an employee independently of a medical examination under paragraphs (l)(2) and (l)(4) of this section, and, in lieu of a written medical opinion, an explanation sheet explaining those results.

(iii) The employer shall instruct the physician not to reveal orally or in the written medical opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to cadmium.

(11) Medical Removal Protection (MRP).

(i) General.

(A) The employer shall temporarily remove an employee from work where there is excess exposure to cadmium on each occasion that medical removal is required under paragraphs (l)(3), (l)(4), or (l)(6) of this section and on each occasion that a physician determines in a written medical opinion that the employee should be removed from such exposure. The physician's determination may be based on biological monitoring results, inability to wear a respirator, evidence of illness, other signs or symptoms of cadmium-related dysfunction or disease, or any other reason deemed medically sufficient by the physician.

(B) The employer shall medically remove an employee in accordance with paragraph (l)(11) of this section regardless of whether at the time of removal a job is available into which the removed employee may be transferred.

(C) Whenever an employee is medically removed under paragraph (l)(11) of this section, the employer shall transfer the removed employee to a job where the exposure to cadmium is within the permissible levels specified in that paragraph as soon as one becomes available.

(D) For any employee who is medically removed under the provisions of paragraph (l)(11)(i) of this section, the employer shall provide follow-up medical examinations semi-annually until, in a written medical opinion, the examining physician determines that either the employee may be returned to his/her former job status or the employee must be permanently removed from excess cadmium exposure.

(E) The employer may not return an employee who has been medically removed for any reason to his/her former job status until a physician determines in a written medical opinion that continued medical removal is no longer necessary to protect the employee's health.

(ii) Where an employee is found unfit to wear a respirator under paragraph (l)(6)(ii) of this section, the employer shall remove the employee from work where exposure to cadmium is above the PEL.

(iii) Where removal is based upon any reason other than the employee's inability to wear a respirator, the employer shall remove the employee from work where exposure to cadmium is at or above the action level.

(iv) Except as specified in paragraph (l)(11)(v) of this section, no employee who was removed because his/her level of CdU, CdB and/or β 2-M exceeded the trigger levels in paragraph (l)(3) or (l)(4) of this section may be returned to work with exposure to cadmium at or above the action level until the employee's levels of CdU fall to or below 3 μ g/g Cr, CdB fall to or below 5 μ g/lwb, and β 2-M fall to or below 300 μ g/g Cr.

(v) However, when in the examining physician's opinion continued exposure to cadmium will not pose an increased risk to the employee's health and there are special circumstances that make continued medical removal an inappropriate remedy, the physician shall fully discuss these matters with the employee, and then in a written determination may return a worker to his/her former job status despite what would otherwise be unacceptably high biological monitoring results. Thereafter and until such time as the employee's biological monitoring results have

decreased to levels where he/she could have been returned to his/her former job status, the returned employee shall continue medical surveillance as if he/she were still on medical removal. Until such time, the employee is no longer subject to mandatory medical removal. Subsequent questions regarding the employee's medical removal shall be decided solely by a final medical determination.

(vi) Where an employer, although not required by this section to do so, removes an employee from exposure to cadmium or otherwise places limitations on an employee due to the effects of cadmium exposure on the employee's medical condition, the employer shall provide the same medical removal protection benefits to that employee under paragraph (I)(12) of this section as would have been provided had the removal been required under paragraph (I)(11) of this section.

(12) Medical removal protection benefits.

(i) The employer shall provide medical removal protection benefits to an employee for up to a maximum of 18 months each time, and while the employee is temporarily medically removed under paragraph (I)(11) of this section.

(ii) For purposes of this section, the requirement that the employer provide medical removal protection benefits means that the employer shall maintain the total normal earnings, seniority, and all other employee rights and benefits of the removed employee, including the employee's right to his/her former job status, as if the employee had not been removed from the employee's job or otherwise medically limited.

(iii) Where, after 18 months on medical removal because of elevated biological monitoring results, the employee's monitoring results have not declined to a low enough level to permit the employee to be returned to his/her former job status:

(A) The employer shall make available to the employee a medical examination pursuant to this section in order to obtain a final medical determination as to whether the employee may be returned to his/her former job status or must be permanently removed from excess cadmium exposure; and

(B) The employer shall assure that the final medical determination indicates whether the employee may be returned to his/her former job status and what steps, if any, should be taken to protect the employee's health;

(iv) The employer may condition the provision of medical removal protection benefits upon the employee's participation in medical surveillance provided in accordance with this section.

(13) Multiple physician review.

(i) If the employer selects the initial physician to conduct any medical examination or consultation provided to an employee under this section, the employee may designate a second physician to:

(A) Review any findings, determinations, or recommendations of the initial physician; and

(B) Conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(ii) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician provided by the employer conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, multiple physician review upon the employee doing the following within fifteen (15) days after receipt of this notice, or receipt of the initial physician's written opinion, whichever is later:

(A) Informing the employer that he or she intends to seek a medical opinion; and

(B) Initiating steps to make an appointment with a second physician.

(iii) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(iv) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee, through their respective physicians, shall designate a third physician to:

(A) Review any findings, determinations, or recommendations of the other two physicians; and

(B) Conduct such examinations, consultations, laboratory tests, and discussions with the other two physicians as the third physician deems necessary to resolve the disagreement among them.

(v) The employer shall act consistently with the findings, determinations, and recommendations of the third physician, unless the employer and the employee reach an agreement that is consistent with the recommendations of at least one of the other two physicians.

(14) Alternate physician determination. The employer and an employee or designated employee representative may agree upon the use of any alternate form of physician determination in lieu of the multiple physician review provided by paragraph (I)(13) of this section, so long as the alternative is expeditious and at least as protective of the employee.

(15) Information the employer must provide the employee.

(i) The employer shall provide a copy of the physician's written medical opinion to the examined employee within five working days after receipt thereof.

(ii) The employer shall provide the employee with a copy of the employee's biological monitoring results and an explanation sheet explaining the results within five working days after receipt thereof.

(iii) Within 30 days after a request by an employee, the employer shall provide the employee with the information the employer is required to provide the examining physician under paragraph (I)(9) of this section.

(16) Reporting. In addition to other medical events that are required to be reported on the OSHA Form No. 200, the employer shall report any abnormal condition or disorder caused by

occupational exposure to cadmium associated with employment as specified in Chapter (V)(E) of the Reporting Guidelines for Occupational Injuries and Illnesses.

(m) Communication of cadmium hazards to employees.

(1) Hazard communication. The employer shall include cadmium in the program established to comply with the Hazard Communication Standard (HCS) (1910.1200). The employer shall ensure that each employee has access to labels on containers of cadmium and safety data sheets, and is trained in accordance with the provisions of HCS and paragraph (m)(4) of this section. The employer shall provide information on at least the following hazards: Cancer; lung effects; kidney effects; and acute toxicity effects.

(2) Warning signs.

(i) Warning signs shall be provided and displayed in regulated areas. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area.

(ii) Warning signs required by paragraph (m)(2)(i) of this section shall bear the following legend:

DANGER
CADMIUM
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS AND KIDNEYS
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

(iii) The employer shall ensure that signs required by this paragraph (m)(2) are illuminated, cleaned, and maintained as necessary so that the legend is readily visible.

(iv) Prior to June 1, 2016, employers may use the following legend in lieu of that specified in paragraph (m)(2)(ii) of this section:

DANGER
CADMIUM
CANCER HAZARD
CAN CAUSE LUNG AND KIDNEY DISEASE
AUTHORIZED PERSONNEL ONLY
RESPIRATORS REQUIRED IN THIS AREA

(3) Warning labels.

(i) Shipping and storage containers containing cadmium or cadmium compounds shall bear appropriate warning labels, as specified in paragraph (m)(1) of this section.

(ii) The warning labels for containers of cadmium-contaminated protective clothing, equipment, waste, scrap, or debris shall include at least the following information:

DANGER
CONTAINS CADMIUM
MAY CAUSE CANCER

CAUSES DAMAGE TO LUNGS AND KIDNEYS
AVOID CREATING DUST

(iii) Where feasible, installed cadmium products shall have a visible label or other indication that cadmium is present.

(iv) Prior to June 1, 2015, employers may include the following information on shipping and storage containers containing cadmium, cadmium compounds, or cadmium-contaminated clothing, equipment, waste, scrap, or debris in lieu of the labeling requirements specified in paragraphs (m)(3)(i) and (m)(3)(ii) of this section:

DANGER
CONTAINS CADMIUM
CANCER HAZARD
AVOID CREATING DUST
CAN CAUSE LUNG AND KIDNEY DISEASE

(4) Employee information and training.

(i) The employer shall train each employee who is potentially exposed to cadmium in accordance with the requirements of this section. The employer shall institute a training program, ensure employee participation in the program, and maintain a record of the contents of the training program.

(ii) Training shall be provided prior to or at the time of initial assignment to a job involving potential exposure to cadmium and at least annually thereafter.

(iii) The employer shall make the training program understandable to the employee and shall assure that each employee is informed of the following:

(A) The health hazards associated with cadmium exposure, with special attention to the information incorporated in Appendix A to this section;

(B) The quantity, location, manner of use, release, and storage of cadmium in the workplace and the specific nature of operations that could result in exposure to cadmium, especially exposures above the PEL;

(C) The engineering controls and work practices associated with the employee's job assignment;

(D) The measures employees can take to protect themselves from exposure to cadmium, including modification of such habits as smoking and personal hygiene, and specific procedures the employer has implemented to protect employees from exposure to cadmium such as appropriate work practices, emergency procedures, and the provision of personal protective equipment;

(E) The purpose, proper selection, fitting, proper use, and limitations of respirators and protective clothing;

(F) The purpose and a description of the medical surveillance program required by paragraph (l) of this section;

(G) The contents of this section and its appendices, and,

(H) The employee's rights of access to records under 1926.33(g)(1) and (2).

(iv) Additional access to information and training program and materials.

(A) The employer shall make a copy of this section and its appendices readily available to all affected employees and shall provide a copy without cost if requested.

(B) Upon request, the employer shall provide to the Assistant Secretary or the Director all materials relating to the employee information and the training program.

(5) Multi-employer workplace. In a multi-employer workplace, an employer who produces, uses, or stores cadmium in a manner that may expose employees of other employers to cadmium shall notify those employers of the potential hazard in accordance with paragraph (e) of the hazard communication standard for construction, 29 CFR 1926.59.

(n) Recordkeeping.

(1) Exposure monitoring.

(i) The employer shall establish and keep an accurate record of all air monitoring for cadmium in the workplace.

(ii) This record shall include at least the following information:

(A) The monitoring date, shift, duration, air volume, and results in terms of an 8 hour TWA of each sample taken, and if cadmium is not detected, the detection level;

(B) The name~~[-social security number,]~~ and job classification of all employees monitored and of all other employees whose exposures the monitoring result is intended to represent, including, where applicable, a description of how it was determined that the employee's monitoring result could be taken to represent other employee's exposures;

(C) A description of the sampling and analytical methods used and evidence of their accuracy;

(D) The type of respiratory protective device, if any, worn by the monitored employee and by any other employee whose exposure the monitoring result is intended to represent;

(E) A notation of any other conditions that might have affected the monitoring results.

(F) Any exposure monitoring or objective data that were used and the levels.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with 1926.33 of this part.

(iv) The employer shall also provide a copy of the results of an employee's air monitoring prescribed in paragraph (d) of this section to an industry trade association and to the employee's union, if any, or, if either of such associations or unions do not exist, to another

comparable organization that is competent to maintain such records and is reasonably accessible to employers and employees in the industry.

(2) Objective data for exemption from requirement for initial monitoring.

(i) For purposes of this section, objective data are information demonstrating that a particular product or material containing cadmium or a specific process, operation, or activity involving cadmium cannot release dust or fumes in concentrations at or above the action level even under the worst-case release conditions. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of cadmium-containing products or materials. The data the employer uses from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

(ii) The employer shall maintain the record for at least 30 years of the objective data relied upon.

(3) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee covered by medical surveillance under paragraph (l)(1)(i) of this section.

(ii) The record shall include at least the following information about the employee:

(A) Name~~[- social security number,]~~ and description of duties;

(B) A copy of the physician's written opinions and of the explanation sheets for biological monitoring results;

(C) A copy of the medical history, and the results of any physical examination and all test results that are required to be provided by this section, including biological tests, X-rays, pulmonary function tests, etc., or that have been obtained to further evaluate any condition that might be related to cadmium exposure;

(D) The employee's medical symptoms that might be related to exposure to cadmium; and

(E) A copy of the information provided to the physician as required by paragraph (l)(9) of this section.

(iii) The employer shall assure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with 1926.33 of this part.

(iv) At the employee's request, the employer shall promptly provide a copy of the employee's medical record, or update as appropriate, to a medical doctor or a union specified by the employee.

(4) Availability.

(i) Except as otherwise provided for in this section, access to all records required to be maintained by paragraphs (n)(1) through (3) of this section shall be in accordance with the provisions of 29 CFR 1910.1020.

(ii) Within 15 days after a request, the employer shall make an employee's medical records required to be kept by paragraph (n)(3) of this section available for examination and copying to the subject employee, to designated representatives, to anyone having the specific written consent of the subject employee, and after the employee's death or incapacitation, to the employee's family members.

(5) Transfer of records. Whenever an employer ceases to do business and there is no successor employer or designated organization to receive and retain records for the prescribed period, the employer shall comply with the requirements concerning transfer of records set forth in 1926.33(h) of this part.

(o) Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to cadmium.

(2) Observation procedures. When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with that clothing and equipment and shall assure that the observer uses such clothing and equipment and complies with all other applicable safety and health procedures.

(p) Reserved.

(q) Appendices. Except where portions of Appendices A, B, D, E, and F to this section are expressly incorporated in requirements of this section, these appendices are purely informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[57 FR 42452, Sept. 14, 1992, as amended at 57 FR 49272, Oct. 30, 1992; 58 FR 21787, Apr. 23, 1993. Redesignated and amended at 59 FR 215, Jan. 3, 1994; 61 FR 5510, Feb. 13, 1996; 61 FR 31433, 31434, June 20, 1996; 63 FR 1298, Jan. 8, 1998; 70 FR 1144, Jan. 5, 2005; 71 FR 16675, Apr. 3, 2006; 71 FR 50192, Aug. 24, 2006; 73 FR 75589, Dec. 12, 2008; 76 FR 33612, June 8, 2011; 77 FR 17895, Mar. 26, 2012; **84 FR 21416, May 14, 2019.**]

Stat. Auth.: ORS 654.025(2) and 656.736(4).

Stats. Implemented: ORS 654.001 through 654.295.

Hist: OR-OSHA Admin Order 1-1993, f. 1/22/93, ef. 1/22/93.
OR-OSHA Admin Order 3-1998, f. 7/7/98, ef. 7/7/98.
OR-OSHA Admin. Order 1-2005, f. 4/12/05, ef. 4/12/05.
OR-OSHA Admin. Order 4-2006, f. 7/24/06, ef. 7/24/06.
OR-OSHA Admin. Order 10-2006, f. 11/30/06, ef. 11/30/06.
OR-OSHA Admin Order 5-2009, f. 5/29/09, ef. 5/29/09.
OR-OSHA Admin. Order 4-2011, f. 12/8/11, ef. 12/8/11.
OR-OSHA Admin. Order 5-2011, f. 12/8/11, ef. 7/1/12.
OR-OSHA Admin. Order 5-2012, f. 9/25/12, ef. 9/25/12.
OR-OSHA Admin. Order X-XXXX, f. XX/XX/XX, ef. XX/XX/XX.

DIVISION 5, MARITIME ACTIVITIES

437-005-0001 Adoption by Reference.

In addition to, and not in lieu of, any other safety and health codes contained in OAR Chapter 437, the Department adopts by reference the following federal regulations printed as part of the Code of Federal Regulations, 29 CFR 1915, in the Federal Register:

(1) Subdivision A

(a) 29 CFR 1915.1. Purpose and authority, published 4/20/82, Federal Register (FR) vol. 47, p. 16984.

(b) 29 CFR 1915.2. Scope and application, published 4/20/82, FR vol. 47, p. 16984.

(c) 29 CFR 1915.3. Responsibility, published 4/20/82, FR vol. 47, p. 16984.

(d) 29 CFR 1915.4. Definitions, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(e) 29 CFR 1915.5. Incorporation by reference, published [3/25/16]5/14/19, Federal Register vol. [84]84, no. [58]93, p. [46085]21416.

(f) 29 CFR 1915.6. Commercial diving operations, published 4/20/82, FR vol. 47, p. 16984.

(g) 29 CFR 1915.7. Competent person, published 7/25/94, FR vol. 59, p. 37856.

(h) 29 CFR 1915.9. Compliance duties owed to each employee, published 12/12/08, FR vol. 73, no. 240, pp. 75568-75589.

(2) Subdivision B

(a) 29 CFR 1915.11. Scope, application and definitions applicable to this Subpart, published 7/25/94, FR vol. 59, p. 37857.

(b) 29 CFR 1915.12. Precautions before entering confined and enclosed spaces and other dangerous atmospheres, published 3/16/95, FR vol. 60, no. 51, p. 14218.

(c) 29 CFR 1915.13. Cleaning and other cold work, published 7/25/94, FR vol. 59, p. 37859.

(d) 29 CFR 1915.14. Hot work, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(e) 29 CFR 1915.15. Maintenance of safe conditions, published 6/22/12, FR vol. 77, no. 121, p. 37587.

(f) 29 CFR 1915.16. Warning signs and labels, published 7/25/94, FR vol. 59, p. 37861.

Appendix A to Subpart B published 6/8/11, Federal Register, vol. 76, no. 110, p. 33590.

Appendix B to Subpart B published 7/25/94, FR vol. 59, p. 37816.

(3) Subdivision C

- (a) 29 CFR 1915.31. Scope & application of subdivision, published 4/20/82, FR vol. 47, p. 16984.
- (b) 29 CFR 1915.32. Toxic cleaning solvents, published 5/24/96, FR vol. 61, no. 102, p. 26351.
- (c) 29 CFR 1915.33. Chemical paint & preservative remover, published 5/24/96, FR vol. 61, no. 102, p. 26351.
- (d) 29 CFR 1915.34. Mechanical paint removers, published 5/24/96, FR vol. 61, no. 102, p. 26351.
- (e) 29 CFR 1915.35. Painting, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (f) 29 CFR 1915.36. Flammable liquids, published 4/20/82, FR vol. 47, p. 16984.

(4) Subdivision D

- (a) 29 CFR 1915.51. Ventilation & protection in welding, cutting and heating, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (b) 29 CFR 1915.52. Fire prevention. REMOVED 9/15/04, FR vol. 69, p. 55667.
- (c) 29 CFR 1915.53. Welding, cutting and heating of hollow metal containers & structure not covered by 1915.12, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (d) 29 CFR 1915.55. Gas welding & cutting, published 4/20/82, FR vol. 47, p. 16984.
- (e) 29 CFR 1915.56. Arc welding and cutting, published 4/20/82, FR vol. 47, p. 16984.
- (f) 29 CFR 1915.57. Uses of fissionable material in ship repairing and shipbuilding, published 4/20/82, FR vol. 47, p. 16984.

(5) Subdivision E

- (a) 29 CFR 1915.71. Scaffolds or staging, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (b) 29 CFR 1915.72. Ladders, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (c) 29 CFR 1915.73. Guarding of deck openings and edges, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (d) 29 CFR 1915.74. Access to vessels, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (e) 29 CFR 1915.75. Access to and guarding of dry docks and marine railways, published 7/3/02, FR vol. 67, no. 128, p. 44541.
- (f) 29 CFR 1915.76. Access to cargo spaces and confined spaces, published 4/20/82, FR vol. 47, p. 16984.

(g) 29 CFR 1915.77. Working surfaces, published amended 7/3/02, FR vol. 67, no. 128, p. 44541.

(6) Subdivision F

(a) 29 CFR 1915.80 Scope, application, definitions and effective dates, published [5/2/11]5/14/19, Federal Register vol. [76]84, no. [84]93, p. [24576]21416.

(b) 29 CFR 1915.81 Housekeeping, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(c) 29 CFR 1915.82 Lighting, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(d) 29 CFR 1915.83 Utilities, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(e) 29 CFR 1915.84 Working alone, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(f) 29 CFR 1915.85 Vessel radar and communication systems, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(g) 29 CFR 1915.86 Lifeboats, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(h) 29 CFR 1915.87 Medical services and first aid, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(i) 29 CFR 1915.88 Sanitation, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(j) 29 CFR 1915.89 Control of hazardous energy (lockout/tagout), published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(k) 29 CFR 1915.90 Safety color code for marking physical hazards, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(l) 29 CFR 1915.91. Accident prevention signs and tags, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(m) 29 CFR 1915.92. Retention of DOT markings, placards, and labels, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(n) 29 CFR 1915.93. Motor vehicle safety equipment, operation, and maintenance, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(o) 29 CFR 1915.94. Servicing of multi-piece and single-piece rim wheels, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(7) Subdivision G

(a) 29 CFR 1915.111. Inspection, published 4/20/ 82, FR vol. 47, p. 16984.

(b) 29 CFR 1915.112. Ropes, chains and slings, published 6/8/11, Federal Register, vol. 76, no. 110, p. 33590.

(c) 29 CFR 1915.113. Shackles and hooks, published 6/8/11, Federal Register, vol. 76, no. 110, p. 33590.

(d) 29 CFR 1915.114. Chain falls and pull lifts, published 4/20/82, FR vol. 47, p. 16984.

(e) 29 CFR 1915.115. Hoisting and hauling equipment, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(f) 29 CFR 1915.116. Use of gear, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(g) 29 CFR 1915.117. Qualifications of operators, published 4/20/82, FR vol. 47, p. 16984.

(h) 29 CFR 1915.118. Tables, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(8) Subdivision H

(a) 29 CFR 1915.131. General precautions, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(b) 29 CFR 1915.132. Portable electric tools, published 4/20/82, FR vol. 47, p. 16984.

(c) 29 CFR 1915.133. Hand tools, published 4/20/ 82, FR vol. 47, p. 16984.

(d) 29 CFR 1915.134. Abrasive wheels, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(e) 29 CFR 1915.135. Powder actuated fastening tools, published 5/24/96, FR vol. 61, no. 102, p. 26351.

(f) 29 CFR 1915.136. Internal combustion engines other than ship's equipment, published 4/20/82, FR vol. 47, p. 16984.

(9) Subdivision I

(a) 29 CFR 1915.151. Scope, application and definitions, published 5/24/96, FR vol. 61, no. 102, p. 26352.

(b) 29 CFR 1915.152. General requirements, published 6/8/11, Federal Register, vol. 76, no. 110, p. 33590.

(c) 29 CFR 1915.153. Eye and face protection, published 3/25/16, FR vol. 81, no. 58, p. 16085.

(d) 29 CFR 1915.154. Respiratory protection, published 5/24/96, FR vol. 61, no. 102, p. 26354.

(e) 29 CFR 1915.155. Head protection, published 6/22/12, FR vol. 77, no. 121, p. 37587.

(f) 29 CFR 1915.156. Foot protection, published 9/9/09, FR vol. 74, no. 173, pp. 46350-46361.

(g) 29 CFR 1915.157. Hand and body protection, published 5/24/96, FR vol. 61, no. 102, p. 26354.

(h) 29 CFR 1915.158. Lifesaving equipment, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(i) 29 CFR 1915.159. Personal fall arrest systems (PFAS), published 7/3/02, FR vol. 67, no. 128, p. 44541.

(j) 29 CFR 1915.160. Positioning device systems, published 7/3/02, FR vol. 67, no. 128, p. 44541.

Appendix A to Subpart I, published 7/3/02, FR vol. 67, no. 128, p. 44541.

Appendix B to Subpart I, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(10) Subdivision J

(a) 29 CFR 1915.161. Scope and application of subdivision, published 4/20/ 82, FR vol. 47, p. 16984.

(b) 29 CFR 1915.162. Ship's boilers, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(c) 29 CFR 1915.163. Ship's piping systems, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(d) 29 CFR 1915.164. Ship's propulsion machinery, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(e) 29 CFR 1915.165. Ship's decking machinery, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(11) Subdivision K

(a) 29 CFR 1915.171. Scope and application of subdivision, published 4/20/ 82, FR vol. 47, p. 16984.

(b) 29 CFR 1915.172. Portable air receiver and other unfired pressure vessels, published 7/3/02, FR vol. 67, no. 128, p. 44541.

(c) 29 CFR 1915.173. Drums and containers, published 4/20/82, FR vol. 47, p. 16984.

(12) Subdivision L

(a) 29 CFR 1915.181. Electrical circuits and distribution boards, published 5/2/11, Federal Register vol. 76, no. 84, p. 24576.

(13) Subdivisions M-O (Reserved)

(14) Subdivision P

(a) 29 CFR 1915.501. General provisions, published 9/15/04, FR vol. 69, p. 55667.

- (b) 29 CFR 1915.502. Fire safety plan, published 9/15/04, FR vol. 69, p. 55667.
- (c) 29 CFR 1915.503. Precautions for hot work, published 9/15/04, FR vol. 69, p. 55667.
- (d) 29 CFR 1915.504. Fire watches, published 9/15/04, FR vol. 69, p. 55667.
- (e) 29 CFR 1915.505. Fire response, published 10/17/06, FR vol. 71, no. 200, p. 60843.
- (f) 29 CFR 1915.506. Hazards of fixed extinguishing systems on board vessels and vessel sections, published 9/15/04, FR vol. 69, p. 55667.
- (g) 29 CFR 1915.507. Land-side fire protection systems, published 10/17/06, FR vol. 71, no. 200, p. 60843.
- (h) 29 CFR 1915.508. Training, published 9/15/04, FR vol. 69, p. 55667.
- (i) 29 CFR 1915.509. Definitions applicable to this subpart, published 9/15/04, FR vol. 69, p. 55667.

Appendix A to Subpart P, published 9/15/04, FR vol. 69, p. 55667.

(15) Subdivision Q-Y (Reserved)

(16) Subdivision Z

(a) 29 CFR 1915.1000, Air Contaminants, published 1/9/17, FR vol. 82, no. 5, p. 2735.

(b) 29 CFR 1915.1001, Asbestos, published ~~[2/8/13]~~ **5/14/19**, FR vol. ~~[78]~~ **84**, no. ~~[27]~~ **93**, p. ~~[9344]~~ **21416**.

Appendix A to 1915.1001, published 6/29/95, FR vol. 60, p. 33972.

Appendix B to 1915.1001, published 6/29/95, FR vol. 60, p. 33972.

Appendix C to 1915.1001, published 6/8/11, Federal Register, vol. 76, no. 110, p. 33590.

Appendix D to 1915.1001, published ~~[8/10/94]~~ **5/14/19**, [~~FR~~] **Federal Register**, vol. ~~[59]~~ **84**, no. **93**, p. ~~[40964]~~ **21416**.

Appendix E to 1915.1001, published ~~[6/29/95]~~ **5/14/19**, [~~FR~~] **Federal Register**, vol. ~~[60]~~ **84**, no. **93**, p. ~~[33972]~~ **21416**.

Appendix F to 1915.1001, published 6/29/95, FR vol. 60, p. 33972.

Appendix G to 1915.1001, published 8/10/94, FR vol. 59, p. 40964.

Appendix H to 1915.1001, published 6/29/95, FR vol. 60, p. 33972.

Appendix I to 1915.1001, published ~~[8/10/94]~~ **5/14/19**, [~~FR~~] **Federal Register**, vol. ~~[59]~~ **84**, no. **93**, p. ~~[40964]~~ **21416**.

Appendix J to 1915.1001, published 8/10/94, FR vol. 59, p. 40964.

Appendix K to 1915.1001, published 6/29/95, FR vol. 60, p. 33972.

Appendix L to 1915.1001, published 8/23/96, FR vol. 61, p. 43454.

(c) 29 CFR 1915.1002. Coal tar pitch volatiles; interpretation of term, published 6/20/96, FR vol. 61, p. 31427.

(d) 29 CFR 1915.1003. 13 Carcinogens (4 Nitrobiphenyl, etc.), published 6/20/96, FR vol. 61, p. 31427.

(e) 29 CFR 1915.1004. alpha Naphthylamine, published 6/20/96, FR vol. 61, p. 31427.

(f) 29 CFR 1915.1005. (Reserved)

(g) 29 CFR 1915.1006. Methyl chloromethyl ether, published 6/20/96, FR vol. 61, p. 31427.

(h) 29 CFR 1915.1007. 3,3'Dichlorobenzidene (and its salts), published 6/20/96, FR vol. 61, p. 31427.

(i) 29 CFR 1915.1008. bis Chloromethyl ether, published 6/20/96, FR vol. 61, p. 31427.

(j) 29 CFR 1915.1009. beta Naphthylamine, published 6/20/96, FR vol. 61, p. 31427.

(k) 29 CFR 1915.1010. Benzidine, published 6/20/96, FR vol. 61, p. 31427.

(l) 29 CFR 1915.1011. 4 Aminodiphenyl, published 6/20/96, FR vol. 61, p. 31427.

(m) 29 CFR 1915.1012. Ethyleneimine, published 6/20/96, FR vol. 61, p. 31427.

(n) 29 CFR 1915.1013. beta Propiolactone, published 6/20/96, FR vol. 61, p. 31427.

(o) 29 CFR 1915.1014. 2 Acetylaminofluorene, published 6/20/96, FR vol. 61, p. 31427.

(p) 29 CFR 1915.1015. 4 Dimethylaminoazobenzene, published 6/20/96, FR vol. 61, p. 31427.

(q) 29 CFR 1915.1016. N Nitrosodimethylamine, published 6/20/96, FR vol. 61, p. 31427.

(r) 29 CFR 1915.1017. Vinyl chloride, published 6/20/96, FR vol. 61, p. 31427.

(s) 29 CFR 1915.1018. Inorganic arsenic, published 6/20/96, FR vol. 61, p. 31427.

(t) 29 CFR 1915.1020 Access to employee exposure and medical records, published 6/20/96, FR vol. 61, p. 31427.

(u) 29 CFR 1915.1024 Beryllium, published 1/9/17, FR vol. 82, no. 5, p. 2735.

(v) 29 CFR 1915.1025. Lead, published 6/20/96, FR vol. 61, p. 31427.

(w) 29 CFR 1915.1026 Chromium (VI), published ~~3/26/12~~5/14/19, FR vol. ~~77~~84, no. ~~58~~93, p. ~~47574~~21416.

(x) 29 CFR 1915.1027. Cadmium, published 6/20/96, FR vol. 61, p. 31427.

(y) 29 CFR 1915.1028. Benzene, published 6/20/96, FR vol. 61, p. 31427.

(z) 29 CFR 1915.1030. Bloodborne pathogens, published 6/20/96, FR vol. 61, p. 31427.

(aa) 29 CFR 1915.1044. 1,2 dibromo 3 chloropropane, published 6/20/96, FR vol. 61, p. 31427.

(bb) 29 CFR 1915.1045. Acrylonitrile, published 6/20/96, FR vol. 61, p. 31427.

(cc) 29 CFR 1915.1047. Ethylene oxide, published 6/20/96, FR vol. 61, p. 31427.

(dd) 29 CFR 1915.1048. Formaldehyde, published 6/20/96, FR vol. 61, p. 31427.

(ee) 29 CFR 1915.1050. Methylenedianiline, published 6/20/96, FR vol. 61, p. 31427.

(ff) 29 CFR 1915.1052 Methylene Chloride, published 1/10/97, Federal Register, vol. 62, no. 7, p. 1619.

(gg) 29 CFR 1915.1053 Respirable Crystalline Silica, published 3/25/16, Federal Register, vol. 81, no. 58, p. 16286.

(hh) 29 CFR 1915.1120 Access to employee exposure and medical records has been redesignated to §1915.1020.

(Note: 29 CFR 1915.99, Hazard Communication was redesignated as 1915.1200 on 7/1/93, FR vol. 58, no. 125, p. 35514.)

(ii) 29 CFR 1915.1200. Hazard communication, published 6/20/96, FR vol. 61, p. 31427.

(jj) 29 CFR 1915.1450. Occupational exposure to hazardous chemicals in laboratories, published 6/20/96, FR vol. 61, p. 31427.

Stat. Auth.: ORS 654.025(2) and 656.726(4).

Stats. Implemented: ORS 654.001 to 654.295.

Hist: OR OSHA Admin. Order 9-1992, f. 9/24/92, ef. 11/1/92.

OR OSHA Admin. Order 1-1993, f. 1/22/93, ef. 1/22/93.

OR OSHA Admin. Order 19-1993, f. 12/29/93, ef. 12/29/93.

OR OSHA Admin. Order 4-1994, f. 8/4/94, ef. 8/4/94.

OR OSHA Admin. Order 1-1995, f. 1/19/95, ef. 1/19/95.

OR OSHA Admin. Order 2-1995, f. 1/25/95, ef. 1/25/95.

OR OSHA Admin. Order 4-1995, f. 3/29/95, ef. 3/29/95.

OR OSHA Admin. Order 5-1995, f. 4/6/95, ef. 4/6/95.

OR OSHA Admin. Order 8-1995, f. 8/25/95, ef. 8/25/95.

OR OSHA Admin. Order 5-1996, f. 11/29/96, ef. 11/29/96.

OR OSHA Admin. Order 6-1996, f. 11/29/96, ef. 11/29/96.

OR OSHA Admin. Order 3-1997, f. 3/28/97, ef. 3/28/97.

OR OSHA Admin. Order 4-1997, f. 4/2/97, ef. 4/2/97.

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OR-OSHA Admin. Order 2-2010, f. 2/25/10, ef. 2/25/10.
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OR-OSHA Admin. Order 1-2012, f. 4/10/12, ef. 4/10/12.
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