PROGRAM DIRECTIVE

Program Directive A-243
Issued 9/21/00
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Subject: Spray Finishing: Assessing Fire Safety and Industrial Hygiene Issues

AFFECTED STANDARDS/ DIRECTIVES:
OAR 437-002-0107, Spray Finishing
"Preventing Asthma and Death from Diisocyanate Exposure," NIOSH Publication 96-111
"Automotive Refinishing Industry Isocyanate Profile," New Chemicals Environmental Technology Initiative, U.S.E.P.A. Contract No. 68-D4-0098, May 1, 1997
NIOSH Health Hazard Evaluation Report, HETA 95-0311-2593

Purpose: This directive provides guidance for identifying the hazards of spray finishing, and evaluating spray booths and engineering controls for overexposures.

Scope: This instruction applies to all Oregon OSHA.

Background:

Fire Safety Issues: Spray Finishing/Spray Application involving flammable liquids

Oregon OSHA's rule on spray finishing, 437-002-0107, combines the spray finishing requirements from federal OSHA's 29 CFR 1910.107, "Spray Finishing using Flammable and Combustible Liquids," and 29 CFR 1910.94, "Ventilation."

1910.107 is a fire safety code derived from NFPA 33-1969, which is the National Fire Protection Association's "Standard for Spray Application Using Flammable and Combustible Materials," and 1910.94 incorporated concepts from NFPA 33-1969. With periodic updates made by NFPA to its "33 Standard," they have made it clear that the "33 Standard" is not designed or intended to be used in the mitigation of industrial health hazards. (437-002-0107 should not be used to address overexposures due to spray finishing.) Overexposures, including engineering controls, should be addressed by using 437-002-0382 Oregon Rules for Air Contaminants.)

The Oregon State Fire Marshal's office adopted the Uniform Fire Code (UFC) as their fire safety rules, and Article 45, "Application of Flammable Finishes," was used in the creation of 437-002-0107. In those areas where Article 45 was more restrictive than 1910.107 or NFPA 33, those elements

were adopted into 437-002-0107 since those requirements already existed for Oregon. In 2003, the Oregon State Fire Marshal's office adopted the International Fire Code (IFC), which incorporated requirements of the UFC. Under the IFC, spray finishing is addressed in Chapter 15, "Flammable Finishes."

Action: **Oregon-OSHA Health Compliance Officers (HCOs), Safety Compliance Officers (SCOs) and Health Consultants, Safety Consultants and their respective field managers must use the guidelines in this instruction to ensure uniform application of this standard.**

A. Accumulation of spray finishing residue:

All spraying areas must be kept free from the accumulation of deposits of combustible residues. Cleanup and removal of residues from the spray area, and proper disposal are essential safety practices applicable to all spray finishing operations, regardless of whether it's a spray booth or spray area. See 437-002-0107(3)(e)(B) and (e)(C).

B. Noncombustible and Class IIIB liquids:

In the automobile undercoating industry and sprayon bed liners, various classes of flammable or combustible liquids are used. 437-002-0107 was written to allow for liquids with a flashpoint above 199.4º F to be used outside of a spray booth, but still within a defined spray area. 1910.107, NFPA 33, and IFC 15 exempt automobile undercoating from the spray finishing rules Generally, the local fire authority will exempt operations using Category 4 flammable liquids (those having flashpoints of 140°F and above) from their spray finishing requirements, but this is by no means a given. Note: Very often with spray-on bed liners, the main issue is diisocyanate overexposures/engineering controls – these are best addressed with 437-002-0382.

C. Consulting with the Fire Marshal:

Check with the fire marshal having jurisdiction to determine if a fire safety issue is substantiated. These would include such factors as the flammability of the chemicals or combustibility of the residues, electrical safety, ventilation control, sprinkler systems, access/egress, or work practices. This collaborative effort is a reasonable step to assure fire safety issues are being addressed and does not predispose agencies from enforcing rules within their jurisdiction.

Agency interaction to identify compliance efforts reduces duplicative enforcement actions when good faith efforts are being made on the part of an employer. If possible, obtain a written statement from the Fire Marshal regarding their position on the matter in question. Employer compliance with current fire safety regulations with verification with the local Fire Marshal may substantiate a minimal violation of Oregon OSHA rules. If there is disagreement between Oregon OSHA and a Fire Marshal about fire safety issues, document the reasons for each issue. Once it has been determined that fire safety issues exist in relation to spray finishing, cite OAR 437-002-0107 as appropriate.

D. Ventilation

OAR 437-002-0107(3)(h)(C) requires ventilation sufficient to keep contaminant concentrations below 25 percent of their lower explosive limit (LEL), and requires a linear velocity of 100 feet per minute to achieve that requirement.

However, this requirement is complicated by the fact that modern down-draft booths are very different from conventional cross-draft booths. The Oregon OSHA spray finishing regulations were written to address conventional cross draft booths only. Currently there is no clear national guidance on the evaluation of down draft booths or side-down draft booths. Downdraft and side-down draft booths are typically not designed to operate at 100 fpm. When possible, review manufacturers' guidelines for booth air flow and then determine if the booth is meeting that guideline.

When measuring a down-draft booth, the cross sectional area must be perpendicular to the air flow. This means that CFM should be calculated using the width by the length of the booth, not the height by the width. The majority of all violations with Oregon OSHA's air contaminants, PPE, and spray finishing regulations do not rely on air flow measurements inside a spray booth. The evaluation guidelines outlined below can be used as the basis for determining compliance with Oregon OSHA standards.

E. Evaluation Guidance:

Various aspects of a spray booth affect its ability to achieve good control of both fire and health hazards created during spray finishing. Take a comprehensive approach when evaluating these booths.

Four Steps for the Evaluation of a Spray Booth:

1. Address design issues:
    a. Review booth specifications and installation to ensure that the booth is being used for what and how it was designed to be used.
    b. Determine if the local fire authority has evaluated the booth.
    c. Identify how the employer ensures that the required airflow is maintained (manometer, alarm, or other pressure-sensing device).
    d. Evaluate all electrical components within the booth to ensure that they are explosion proof.

2. Booth maintenance:
    a. Evaluate maintenance and cleaning procedures to ensure that the booth continues to operate at optimum performance. Review maintenance records, including cleaning schedules, belt changes, air flow measurements, etc.
    b. Determine how the filters are monitored and replaced.
    c. Evaluate if there is mechanical maintenance on the booth, including the lights, doors, hinges, belts, etc.

d. Measure air flow with a velometer and compare to manufacturer's specifications.

3. Evaluate exposure monitoring:
   a. Review air sampling and exposure monitoring records, if available.
   b. Review the employer's monitoring program, if available.
   c. Determine if the air sampling is representative of the work being performed.
   d. Conduct sampling if sufficient air monitoring has not been done.

4. Evaluate work practices and PPE:
   a. Determine if the employer provides PPE and requires its use, how often it is replaced, and if it is appropriate for the hazards of the chemicals being used.
   b. Determine if the employer has a respirator cartridge change out schedule.
   c. Determine if the products being painted are placed correctly in the booth to ensure sufficient airflow around the object to be sprayed, reduce turbulent airflow as much as possible, and reduce or eliminate the need for the employee to stand downstream.
   d. Determine if there are multiple painters.
   e. Determine if the body position of the painter is increasing the exposure. For example, is the painter between the piece to be painted and the filter, pulling contaminants past their breathing zone?

Oregon OSHA Citation Guidance

If the employer has an engineered and installed a spray booth:

Cite identified over-exposures using the air contaminants rule. Generally, both the overexposure and engineering control rules will be cited, unless the compliance officer determines that all feasible controls have been implemented. The overexposure violation and controls violation are often grouped. Document the facts around feasibility, lack of controls, etc., in the field notes.

The deficiencies should be proven by using any of the following documents: ACGIH Industrial Ventilation Manual, manufacturer's design criteria, or NIOSH Control Matrix for Spray Painting.

If the employer has built a spray booth:

Cite identified over-exposures out of the Air Contaminants rule. Generally, both the overexposure and engineering control rules will be cited, unless the compliance officer determines that all feasible controls have been implemented. This should be documented in the field notes.

Evaluate the spray booth to determine if the system is capable of maintaining flammable concentrations below 25% of the LEL.

If the booth is not capable of maintaining air flow sufficient to maintain vapor concentrations below 25% LEL, then violations of the Spray Finishing rule may also be cited. Generally this would be grouped with engineering controls (437-002-0382), or "In the Alternative" with engineering controls. Request Fire Marshal reports and make a referral to the Fire Marshal.

If the Fire Marshal has approved the spray booth:

Determine if the Fire Marshal has approved the booth in writing and get a copy of the approval. A hazard letter should be written for any identified ventilation system deficiencies. The Fire Marshal should be notified of our findings.

If the Fire Marshal has issued orders to correct Fire Code violations:

Cite any violations identified.

If the Fire Marshal is not aware of the spray booth:

A referral should be made. Determine if the Fire Marshal will be conducting an inspection. If not, any violations identified by the compliance officer will be cited.

Any opportunity to complete field work (side by side) with the Fire Marshal is highly encouraged.

If the employer does not have a booth and overexposures are identified:

Cite identified overexposures out of the Air Contaminants rule. Generally, both the overexposure and engineering control rules should be cited, unless the compliance officer determines that all feasible controls have been implemented. This should be documented in the field notes.

Cite appropriate violations of 437-002-0107. Make a referral to the Fire Marshal if necessary.

If the employer does not have a booth and overexposures are not documented:

Cite identified violations of 437-002-0107 and make a referral to the Fire Marshal.

If the employer has chosen to conduct spray finishing outside:

Evaluate if the outside spray area qualifies as exempt (an area away from the main building, open on at least two sides at all times). Ensure that combustible residue accumulation is not excessive. A referral to Oregon DEQ Air Quality Division may be warranted.

History: Issued 9-21-2000 Revised 12-1-2004 and 5-13-2015