



Hair smoothing products and formaldehyde

In response to health concerns raised by local hair salons, Oregon OSHA conducted extensive testing of hair-straightening and smoothing products in the fall of 2010. The agency found significant levels of formaldehyde in many popular products, despite being labeled “formaldehyde free.” If salons choose to continue using these products, they must provide training and information to their workers and ensure their workers are not overexposed. This hazard alert provides general information about formaldehyde exposure and steps salons should take to protect their employees.

What is formaldehyde?

Formaldehyde is a colorless, strong-smelling gas. Formaldehyde mixes readily with water, but the bonds that hold the formaldehyde and water together are weak. The formaldehyde will off-gas over time as the formaldehyde and water separate. Formaldehyde in this solution can also be referred to as “formalin” or “methylene glycol,” and may also contain alcohol as a stabilizer. Formaldehyde is used in a wide variety of cosmetics, including hair-straighteners.

How are stylists exposed?

Stylists can inhale formaldehyde as a gas or vapor and absorb it through their skin when they’re applying liquid hair straighteners. Exposures can occur during the entire process, particularly when heat is applied, such as blow drying and flat ironing.

What are the hazards?

Formaldehyde can cause allergic reactions with a single exposure. The World Health Organization (WHO), International Agency for Research on Cancer (IARC) classifies formaldehyde as a human carcinogen, particularly in the nasal cavities. Formaldehyde exposure is linked to leukemia and lung cancer.

Short-term exposures can irritate the eyes and nose and cause coughing and wheezing. Later exposure may cause severe allergic reactions of the skin, eyes, and respiratory tract.

Long-term exposure to low levels of formaldehyde in the air or on the skin can cause asthma-like symptoms and dermatitis.

Airborne concentrations of formaldehyde above 0.1 parts formaldehyde per million parts of air (ppm) can irritate the respiratory tract.



What should salons do to protect their workers?

Know how much your workers are exposed

When using products that contain formaldehyde, employers must conduct air monitoring to identify all workers who may be exposed to formaldehyde at or above certain exposure levels (explained later). Here are some options:

- Purchase air monitoring equipment, such as a passive sampler.
- Call Oregon OSHA at 800-922-2689 and request a consultation.
- Contract with an industrial hygienist.

Oregon OSHA conducted air monitoring at several local salons to determine the exposure levels for workers using hair-straightening products. Air

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monitoring is clearly required when workers who use products that contain formaldehyde experience symptoms of exposure.

Understand the exposure limits

Oregon OSHA's [formaldehyde](#) rule sets the limits for airborne exposure.

- The permissible exposure limit (PEL): **0.75 ppm averaged over an eight-hour period. Employers must ensure that workers aren't exposed to formaldehyde at levels greater than the permissible exposure limit.**
- The action level (AL): 0.5 ppm averaged over an eight-hour period. Workers exposed above this level must have industrial hygiene monitoring and medical surveillance.
- The short-term exposure limit (STEL): 2 ppm. This is the maximum exposure allowed during a 15-minute period.

It's also important to know that other organizations have recommended stricter exposure limits.

- The American Conference of Governmental Industrial Hygienists (ACGIH) has a recommended ceiling limit of 0.3 ppm. A ceiling limit is one that cannot be exceeded at any time during the workday.
- The National Institute for Occupational Safety and Health (NIOSH), part of the Centers for Disease Control and Prevention (CDC), has a recommended ceiling limit of 0.1 ppm.

Educate and train workers

If a product can release formaldehyde at 0.1 ppm or greater, manufacturers must make sure the labeling on the products is clear and employers must provide training for workers.

- Label all mixtures and solutions greater than 0.1 percent formaldehyde and all materials that can release formaldehyde into the air at concentrations reaching or exceeding 0.1 ppm. Any material that can release formaldehyde at levels above 0.5 ppm during normal use must be labeled "potential cancer hazard."
- Train all workers exposed to formaldehyde concentrations of 0.1 ppm or greater at the time of their initial job assignment and whenever a new exposure to formaldehyde is introduced into the work area. Repeat the training annually. This training must include where exposures happen, the signs of exposure, how to protect yourself, the limitations of any protective equipment, how to handle spills or emergency situations, and where to find more information.

Reduce worker exposure

If you have workers whose exposure may exceed the limits described or who are experiencing symptoms of formaldehyde exposure, the formaldehyde rule requires you to take steps to reduce their exposure.

- Reassign workers who have adverse effects from formaldehyde exposure to jobs with less or no exposure until their condition improves. Reassignment can continue for up to six months until the worker can return to the original job — or is unable to return to work — whichever comes first.
- Implement engineering and work practice controls to keep employee exposure to formaldehyde at or below the PEL and the STEL. Workers must be provided with respirators if these controls can't keep exposure at or below these levels.
- Select, provide, and maintain appropriate personal protective equipment such as impervious clothing, gloves, aprons, and chemical splash goggles. Ensure that workers use this equipment to prevent skin and eye contact with formaldehyde.
- Provide showers and eyewash stations if splashing is likely.
- Provide medical surveillance for all workers who:
 - 1) are exposed to formaldehyde at concentrations at or above the AL or greater than the STEL.
 - 2) develop signs and symptoms of overexposure.
 - 3) are exposed to formaldehyde in emergencies.

Where can I find more information about safe handling of hair straighteners?

All manufacturers, importers, and distributors are required to identify formaldehyde on any product that contains more than 0.1 percent formaldehyde — either as a gas or in a solution that can release formaldehyde at concentrations greater than 0.1 ppm — on the material safety data sheet (MSDS) that comes with the product. The MSDS must tell you why a chemical in the product is hazardous, how it can harm you, how to protect yourself, and what to do in an emergency.

However, Oregon OSHA has discovered many products containing formaldehyde do not list formaldehyde as an ingredient on the label or on the MSDS. A list of chemicals tested are available at this [link](#). Call Oregon OSHA's Technical Section at 503-378-3272 if you have questions.