

Formaldehyde

Training on the hazards of formaldehyde in the workplace



Developed by the Division of Occupational Safety & Health (DOSH) for employee training
November, 2011

Formaldehyde

What this training will cover

Where formaldehyde is used

Health hazards of formaldehyde

Controlling your exposure to formaldehyde

Personal protective equipment for formaldehyde

Medical monitoring if you are exposed to formaldehyde

2

What is Formaldehyde?

Formaldehyde is a colorless, flammable, strong-smelling chemical widely used to make resins for plywood, particle board, pressed wood products and in paper coatings, glues, plastics, and textile finishes.



It is also commonly used as a preservative in medical laboratories, mortuaries, veterinary clinics and in some hair straightening products.

It is often mixed with water to make a liquid called "formalin" which contains 37 % formaldehyde and 6% - 13% methanol.



3

Workplaces in Washington state where formaldehyde is used

Funeral homes and mortuaries – as embalming fluid

Medical labs – tissue preservation and histology

Veterinary hospitals & clinics – tissue preservation

Beauty shops – in some hair straightening products (may not be listed on product label)

[Hazard Alert: What hair stylists need to know about formaldehyde in hair-straightening products](#)



4

Formaldehyde in our workplace

[List locations where formaldehyde or formalin is stored or used]



5

Health Hazards of Formaldehyde



Cancer hazard – mainly nose and throat and lungs

Eye, nose and throat irritation

Respiratory system sensitizer

Skin irritation



6

Formaldehyde is extremely toxic

Short term exposures to high levels of formaldehyde can be fatal at levels as low as 100 parts per million (.01%) in air.



3 to 5 parts per million in air causes eye tearing and is intolerable to some people.



Some people have developed asthma or bronchitis following and single exposure to high levels of formaldehyde in the air from an accidental spill.

Some people are very sensitive to formaldehyde, whereas others have no reaction to the same level of exposure.



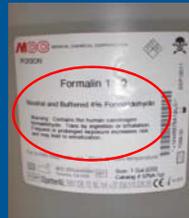
7

Formaldehyde Cancer Hazard

Formaldehyde exposure has been associated with cancer of the nose and pharynx (throat) in humans.

Formaldehyde caused cancer in rats in laboratory tests.

Formaldehyde has recently been associated with a risk of leukemia, more likely with higher and longer exposure.



8

Health Effects as listed in Formaldehyde Standard

Table HT-1 Acute Health Effects of Formaldehyde Exposure	
Type of contact	Health Effects
Ingestion (swallowing)	Liquids containing 10% to 40% formaldehyde cause severe irritation and inflammation of the mouth, throat, and stomach. Severe stomach pains will follow ingestion with possible loss of consciousness and death.
	Ingestion of dilute formaldehyde solutions (0.03% to 0.04%) may cause discomfort in the stomach and pharynx.
Inhalation (breathing)	Formaldehyde is highly irritating to the upper respiratory tract and eyes.
	0.5 to 2.0 parts per million (ppm) may irritate the eyes, nose, and throat of some individuals.
	3 to 5 ppm also cause tearing of the eyes and are intolerable to some persons.
	10 to 20 ppm cause difficulty in breathing, burning of the nose and throat, coughing, and heavy tearing of the eyes.
	25 to 30 ppm causes severe respiratory tract injury leading to inflammation and accumulation of fluid in the lung.
	100 ppm is immediately dangerous to life and health. Deaths from accidental exposure to high concentrations of formaldehyde have been reported.

9

Health Effects as listed in Formaldehyde Standard (continued)

**Table HT-1
Acute Health Effects of Formaldehyde Exposure**

Type of contact	Health Effects
Skin	Formaldehyde is a severe skin irritant and a sensitizer.
	Contact with Formaldehyde causes white discoloration, smarting, drying, cracking, and scaling.
	Prolonged and repeated contact can cause numbness and a hardening or tanning of the skin.
	Previously exposed persons may react to future exposure with an allergic eczematous dermatitis or hives.
Eye	Formaldehyde solutions splashed in the eye can cause injuries ranging from transient discomfort to severe, permanent corneal clouding and loss of vision.
	The severity of the effect depends on the concentration of formaldehyde in the solution and if the eyes are flushed with water immediately after the incident.

10

Permissible Limits for Formaldehyde

The 8-hour average permissible limit for formaldehyde is 0.75 part per million in the air. → 0.75 ppm

The 15-minute (short-term) limit is 2 parts per million in the air. → 2 ppm

ppm – parts per million

11

How We Control Your Exposure to Formaldehyde

We reduce or control your exposure to formaldehyde by the following methods:

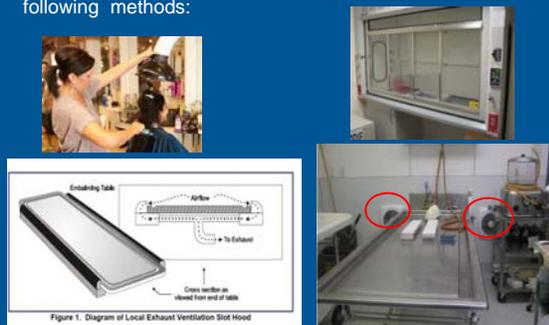


Figure 1. Diagram of Local Exhaust Ventilation Slot Hood

12

Eyewash for Formaldehyde

A formaldehyde or formalin splash to the eyes can be very damaging. We provide an eyewash within 50 feet or 10 seconds travel time of the location where formalin is handled. Our eyewash(s) are found at the following locations:



13



Not acceptable as eyewash

Emergency Showers for Formaldehyde



Our emergency shower(s) are found in the following location(s):

14

Air Monitoring for Formaldehyde

Our air monitoring for formaldehyde is done as outlined below:

Detector tubes



Formaldehyde gas badges

15

If respirators are needed:

The type of respirator needed depends on the amount of formaldehyde in the air.

A cartridge-type respirator can be used for low levels of formaldehyde.

For higher levels, a supplied air respirator is needed.

We will give you the proper type of respirator and provide respirator program training.



16

Using Cartridge Respirators

Respirators must be worn at all times when the amount of formaldehyde in the air is above the permissible limit.

Because formaldehyde is irritating to the eyes, either a full face respirator or half-face respirator with goggles must be worn.

Respirators must fit properly to prevent leaks.

You must have a medical evaluation before you wear a respirator.



Full-face respirator



Half-face respirator

17

Respirators Must Fit Properly

You must have a respirator fit-test before you wear a respirator.

You can't have a beard or other facial hair when wearing a tight-fitting respirator.

We will train you on how to use your respirator.



18

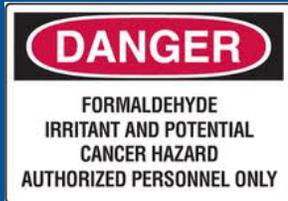
Skin and eye protection needed when handling formaldehyde

We require the use of the following gloves and eye protection when you are handling formalin solutions:



19

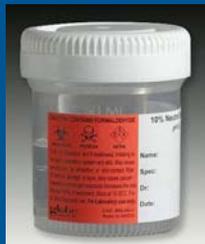
Exposure Control Areas



When the amount of formaldehyde in the air exceeds the permissible limits, we will or have clearly marked exposure control areas where only certain worker can enter or work and must wear respirators.

20

Labeling formaldehyde/formalin containers



21

How to Protect Yourself

Wear respirators assigned to you,

Wear gloves and goggles or face shield if working with formalin,



Be sure the provided eyewash is functioning properly.

22

How to Protect Yourself

To prevent inhaling formaldehyde, make sure your respirator fits properly before entering an area where formaldehyde vapors exist.



If you think your respirator is leaking, leave the area immediately and have it re-fitted, repaired or replaced.



If you know or believe you have inhaled formaldehyde, let your supervisor know immediately.

23

How to Protect Yourself

In the case of large spill or release of formaldehyde:

- Leave the area immediately,
- do not attempt to clean up the spill,
- notify your supervisor.



Note: small spills can be cleaned up with a formaldehyde spill kit similar to the one in this photo.

24

Our spill, emergency and cleanup procedures

25

Medical Monitoring

When is medical monitoring needed?

A medical exam will be made available to you at no cost if you are exposed to formaldehyde above 0.5 ppm over 8 hours or above 2 ppm in any 15 minute period.

The medical exam includes a complete physical exam with emphasis on the skin and the respiratory system.

The medical exam will also be made available to you if you develop eye, respiratory or skin irritation or sensitization while working with formaldehyde



26

Temporary Medical Removal

If abnormalities show up in the medical exam, the doctor may ask for additional tests and temporary removal from your current job.



In that case, we will find other work for you in an area where you are not exposed to formaldehyde.

You do not lose any earnings, seniority or benefits during the removal time.



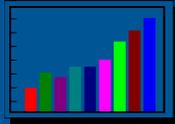
27

Medical and Air Monitoring Records

You have the right to see any of your medical records related to formaldehyde.

These medical records will be kept for 30 years.

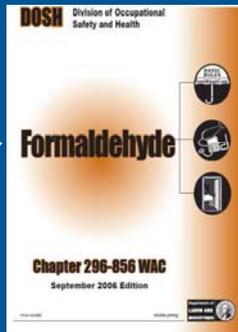
You also have the right to see results of any air sampling for formaldehyde we have done.



28

Formaldehyde Regulations – WAC 296-856

For more details, click on this image to view the complete Formaldehyde Standard.



29

Additional Resources and Information

National Funeral Directors Association (NFDA) – [Formaldehyde Best Management Practices](#)

NFDA - [Recommendations for Effective Preparation Room Ventilation](#)

EPA – [Formaldehyde in public schools](#)

NIOSH – [Controlling Formaldehyde Exposures During Embalming](#)

IRRSST – [Exposure to Formaldehyde in Wood Furniture Manufacturing](#)

California Dept. of Public Health – [Formaldehyde](#)

Oregon OSHA – [Hazard Alert: Hair Smoothing products and formaldehyde](#)

30

Quiz
Question # 1

Formalin is:

- a) a chemical used only in labs
- b) formaldehyde mixed in water
- c) a concentrated type of formaldehyde
- d) formaldehyde in a gaseous state

Quiz
Question # 2

Exposure to formaldehyde can result in the following health effects:

- a) mainly eye, nose and throat irritation
- b) eye, nose & throat irritation and cancer of the nose and throat
- c) severe respiratory damage at 50 parts per million
- d) mainly skin irritation and eye injury

Quiz
Question # 3

An eyewash is required:

- a) wherever concentrated formaldehyde is handled
- b) whenever safety goggles are not available
- c) within 100 feet of where formaldehyde is handled
- d) whenever a product has more than 0.1% formaldehyde is handled

Quiz
Question # 4

Medical monitoring is required:

- a) whenever you handle formalin
- b) whenever the amount of formaldehyde in the air is over 0.5 parts per million in 30 minutes
- c) whenever a person develops sensitization while working with formaldehyde
- d) none of the above
