



UNIVERSITY OF MINNESOTA  
University Health, Safety, and Risk Management

**Formaldehyde Program**

**Effective Date:** 07/01/2024

**I. PURPOSE**

The purpose of the Formaldehyde Program is to minimize risk to personnel and students by providing guidance and instructions for individuals who may be exposed to formaldehyde during their duties and outline sampling, training, and medical surveillance requirements.

**II. SCOPE**

This program applies to all employees that use formaldehyde or are exposed to formaldehyde at the University of Minnesota and their supervisors.

**III. DEFINITIONS**

**Action Level** – a concentration of 0.5 parts formaldehyde per million parts of air (0.5 ppm), calculated as an 8-hour time-weighted average (TWA).

**Permissible Exposure Limit (PEL)** – a concentration of 0.75 parts formaldehyde per million parts of air (0.75 ppm), calculated as an 8-hour TWA.

**Short Term Exposure Limit (STEL)** – a concentration of 2 parts formaldehyde per million parts of air (2 ppm), within the course of 15 minutes. This limit is not to be exceeded at any time during the work shift.

**Formaldehyde** – a chemical substance, HCHO, Chemical Abstracts Service Registry No. 50-00-0.

**IV. FORMALDEHYDE HAZARDS**

Formaldehyde is a colorless, flammable gas with a pungent odor, most commonly found in liquid solution. Formaldehyde is used in pressed-wood products, coatings, pesticides, preservatives, and as a chemical reactant.

Formalin is an aqueous solution containing formaldehyde. Typically, this solution is made up of 37% formaldehyde and 10-15% methanol. The methanol acts as a stabilizer preventing polymerization of the formaldehyde. Formalin can release formaldehyde gas, especially when poured or spilled over a large surface area.

**Acute Exposure Effects:**

Formaldehyde presents a primary acute exposure hazard of irritation. Presence of formaldehyde in the air at 0.1 ppm or higher can lead to acute symptoms of upper respiratory, skin, eye irritation, and nausea. Splashes to the eye and skin can cause irritation.

**Chronic Exposure Effects:**

Formaldehyde is considered by the International Agency for Research on Cancer (IARC) and National Toxicology Program as a known human carcinogen. Formaldehyde is also a sensitizer, which can cause allergy symptoms to develop and worsen in certain individuals, and potentially lead to occupational asthma and dermatitis upon subsequent exposures.

**V. RESPONSIBILITIES****Employee Responsibilities**

- Participate in all required training, medical evaluations, personal protective equipment requirements, and other program activities.
- Report any symptoms of illness that may be related to respirator usage or exposure to hazardous atmospheres.
- Report any changes in the workplace which may require re-evaluation of respirator use.
- Report any changes of health status which affect the ability to safely wear a respirator.

**Supervisor/Principal Investigator Responsibilities**

- Identify tasks that use formaldehyde, or changes in the workplace that require re-evaluation of formaldehyde exposure.
- Ensure compliance with this program and that staff complete medical evaluations, training, and other requirements.
- Ensure containers, work areas, and all other required items are labeled appropriately when formaldehyde is in use.
- Provide staff with the recommended personal protective equipment, which may include gloves, gowns, goggles, and respirators.

**Health, Safety, and Risk Management (HSRM) Responsibilities**

- Assist in identification and evaluation, including necessary industrial hygiene sampling, of formaldehyde use in the workplace and report the findings to the affected department.
- Document exposure assessments of areas and work tasks involving exposure to formaldehyde.
- Evaluate the workplace as necessary to ensure the program provisions are being implemented.

- Recommend action steps to reduce formaldehyde exposure levels where needed, including recommending engineering controls, work practices, or personal protective equipment.
- Coordinate the University's relationship with occupational health providers to provide medical surveillance if needed.
- Maintain records for medical surveillance.
- Recommend appropriate training methods and materials.
- Update Formaldehyde Program every two years.

## **VI. PROCEDURES**

### **1. Exposure Reduction**

#### **1.1 Elimination and Substitution**

Classrooms and academic labs using preserved specimens must attempt to source specimens fixed using alternative chemicals such as phenoxyethanol, Formalternate, Carosafe, and similar compounds. Glutaraldehyde should not be considered a safe alternative for formalin/formaldehyde. If alternatives are not found or able to be used, contact HSRM to ensure the room is appropriate for use of formaldehyde-based preservatives, and to put a monitoring plan into place.

#### **1.2 Engineering Controls**

Local exhaust ventilation is the best control method to prevent formaldehyde levels from reaching the action level. Slot-hood or downdraft tables should be used during embalming procedures and while performing work or study on embalmed specimens. Procedures that use smaller quantities of formaldehyde must be performed in a fume hood. Local exhaust such as a snorkel or slot hood should be used when performing waste pouring or bulking procedures.

General dilution ventilation can be used as an additional control to lower formaldehyde levels in the air, but should not be used as the main means of exposure control.

#### **1.3 Spill Clean-up and Waste**

If a spill of more than 1-liter occurs, lab members are not comfortable cleaning up the spill, or the spill occurred in a public space such as a hallway, contact HRSM (612-626-6002) for assistance.

Areas using large quantities of formaldehyde may want to keep formaldehyde neutralizing agents in their spill kits to minimize vaporization from spilled formaldehyde-containing liquids.

Formaldehyde wastes must be placed in a sealed container and disposed of as hazardous waste.

## 2. Administrative Controls

### 2.1 Training

All employees must receive training at their time of initial assignment to a job, area, or task where formaldehyde is used in amounts that may exceed 0.1 ppm of exposure. Training is available online through the Training Hub or can be given in-person by a qualified supervisor or principal investigator. HSRM staff are available to assist upon request.

Training content must include:

- A description of the potential health hazards of formaldehyde.
- Description of signs and symptoms of exposure to formaldehyde, including that employees should immediately report any of these symptoms to their supervisor.
- Description of the work areas where formaldehyde is present, and the safe work practices used to limit formaldehyde exposure.
- Proper use of personal protective equipment, as well as its limitations
- Waste, spill, and clean-up procedures.
- Explanation of available engineering or work practice controls, including instructions on how to use such controls (i.e., ventilation system, fume hoods, etc.).
- Emergency procedures.

Training must be provided:

- At time of initial assignment to the formaldehyde-using work area or task.
- When a new exposure to formaldehyde is introduced to the work area.
- As a refresher annually.

### 2.2 Labeling and Signage

Label all containers of formaldehyde, including containers of preserved specimens with the chemical name and hazard of the chemical in accordance with the Chemical Hygiene Plan.

Label all mixtures or solutions as “Contains Formaldehyde” when composed of greater than 0.1 percent formaldehyde or the material is capable of releasing formaldehyde into the air at concentrations reaching or exceeding 0.1 ppm. For all materials capable of releasing formaldehyde at levels above 0.5 ppm during normal use, the label must contain the words “potential cancer hazard.”

Areas found by HSRM monitoring to have concentrations of airborne formaldehyde exceeding the PEL or STEL will have signage posted at all entrances and access ways that states the following:

**DANGER**  
**FORMALDEHYDE**  
**MAY CAUSE CANCER**

## **CAUSES SKIN, EYE, AND RESPIRATORY IRRITATION AUTHORIZED PERSONNEL ONLY**

### **3. Personal Protective Equipment**

Any person working with liquid containing 1% or more formaldehyde must wear personal protective equipment sufficient to prevent any contact with eyes and skin, potentially including gloves, gowns, goggles, and face shields. If a face shield is worn, chemical safety goggles are also required.

#### **3.1 Respiratory Protection**

In some scenarios, respirators may be required to reduce exposure levels below the PEL or STEL. Some employees and users of formaldehyde may also experience allergy symptoms or wish to minimize exposure during gestation. In all these cases, the University's [Respiratory Protection Program](#) applies and must be followed.

Work with HRSM to select cartridges that are appropriate for use with formaldehyde and any other contaminants in the area and create an appropriate change-out schedule. Half-face respirators may only be used concurrently with goggles, as formaldehyde is also an eye irritant.

### **4. Exposure Evaluation, Sampling, and Recordkeeping**

#### **4.1 Exposure Evaluation**

When supervisors or employees identify situations where formaldehyde is being used or is planned to be used, they must contact Health, Safety, and Risk Management to request a workplace exposure assessment.

Health, Safety, and Risk Management will assess the work area, collecting pertinent information on how formaldehyde is being used. Air monitoring may be performed if required.

In some circumstances, objective data can be used to demonstrate that the formaldehyde-containing product in question could not cause airborne concentrations of formaldehyde that would be above the action level or STEL. In this scenario, air monitoring is not necessary.

#### **4.2 Exposure Sampling**

If employees could feasibly be exposed at or above the action level or STEL, sampling is required, and will be carried out following the requirements as listed in CFR 1910.1048. Sampling must capture the worst-case exposure scenario and should include STEL and full-shift sampling run concurrently.

For formaldehyde exposure from formalin preservative solutions, OSHA method 52 or NIOSH method 2541 should be used to ensure accurate results, as passive badges and real-time samplers are not an appropriate means of exposure assessment in this circumstance. Exposure sampling parameters and data must be

recorded in a written IH Report. IH reports will be retained on the Health, Safety and Risk Management secured drive in the IH Exposure Monitoring folder.

Based on the results, sampling must be repeated at regular intervals, as shown in Table 1 below.

**Table 1: Formaldehyde Sampling Requirements**

<b>Result</b>	<b>Sampling Interval</b>	<b>Notes</b>
At or above 0.5 ppm action level	6 months	
At or above 2.0 ppm Short-Term Exposure Limit	At least annually	Sampling is required to be of the “worst-case scenario” for exposure
Below action limit and Short-Term Exposure Limit	Discontinue after 2 consecutive events	Two consecutive events, at least 7 days apart, are required before discontinuing monitoring

#### **4.3 Exposure Notification and Recordkeeping**

Employees must be notified of the monitoring results within 15 working days of receipt of the monitoring results, either individually in writing or by posting in an area accessible to employees.

If results are above the PEL, the affected employees must be notified and provided with a description of the corrective actions that will be taken to lower exposure to below the PEL. Receipt of notification of exposures over the PEL must be confirmed and recorded.

Records of all exposure sampling and determinations must be maintained for at least 30 years.

### **5. Medical Surveillance**

If employees are exposed to formaldehyde concentrations at or above the action level, or above the STEL, they are required to undergo regular medical surveillance. Employees who have signs or symptoms of overexposure to formaldehyde and employees exposed to formaldehyde in an emergency will be given the opportunity to participate in medical surveillance.

HRSM will assist with connecting affected employees with medical providers and maintaining any written opinions given by medical providers. All medical surveillance will be performed as listed in 29 CFR 1910.1048.

Medical records must be maintained for the duration of employment plus 30 years.

### **6. Program Evaluation**

At least every two years, Health, Safety, and Risk Management will review and evaluate the written Formaldehyde Program.

## **VII. References**

[29 CFR 1910.1048 Formaldehyde Standard](#)

[OSHA Method 52](#)

[NIOSH Manual of Analytical Methods, Method 2541](#)

[UMN Formaldehyde Fact Sheet](#)