

Formaldehyde Exposure Control Plan

- I. **Purpose:** It is the intent of this plan to ensure the safety of individuals that work with formaldehyde, formalin, formaldehyde solutions, or any materials that releases formaldehyde. The University of Wisconsin-Madison’s Formaldehyde Exposure Control Plan is designed to inform employees and students of potential dangers associated with workplace exposure. Procedures are specified for regulatory compliance and protection of employee safety and health. Chapter SPS 332 of Wisconsin administrative code requires that all places of employment and public buildings of a public employer shall comply with the federal Occupational Safety and Health Administration (OSHA) requirements adopted under SPS 332.50. Procedures are also specified for industrial hygiene investigation, labeling, institution of engineering controls, utilizing personal protective equipment (PPE) and employee training.

- II. **Regulatory Limits:** Workplace formaldehyde exposures shall be at or below the regulatory limits. The Occupational Safety and Health Association (OSHA) Formaldehyde Standard 29 CFR 1910.1048 defines these limits. The OSHA permissible exposure limits (PEL) are as follows:

8-hour Time Weighted Average (TWA)	0.75 ppm
15-minute Short Term Exposure Level (STEL)	2.0 ppm
8-hour TWA Action Level (AL)	0.5 ppm

- III. **Non-Regulatory Limits:** Though the values below are not enforceable under SPS 332.15, they represent guidance of professional and governmental organizations pertaining to health-based limits for formaldehyde exposure. These levels are substantially below enforceable OSHA values and reflect the risk posed at even small levels of exposure. For this reason, supervisors and employees are encouraged to manage exposures to the lowest levels possible.

ACGIH TWA	0.1 ppm
ACGIH STEL	0.3 ppm

- IV. **Health Effects:** The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have characterized formaldehyde as a human carcinogen (cancer causing material) and a suspected reproductive hazard. Short term exposures between 0.1 to 3 parts per million (ppm) can irritate the eyes, nose and throat. Shortness of breath, cough, headaches, chest tightness and heart palpitations are also symptoms of formaldehyde exposure. Chronic exposures to formaldehyde can lead to sensitization, asthma-like respiratory problems and dermatitis. Occupational exposure limits and work practice controls are designed to prevent formaldehyde concentrations from exceeding the levels that could lead to these symptoms.

V. Definitions:

Action level (AL): An exposure to an airborne concentration of 0.5 ppm formaldehyde calculated as an 8-hour time-weighted average (TWA) concentration.

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.

Emergency: 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.

OSHA Permissible Exposure Limit (PEL): The legal limit in the United States established by the Occupational Safety and Health Administration for exposure of an employee to a chemical substance or physical agent.

OSHA Short Term Exposure Level (STEL): An exposure to an airborne concentration of formaldehyde of 2.0 ppm over a 15 minute duration.

Regulated area: An area the employer has identified where the concentration of airborne formaldehyde exceeds either the TWA or STEL.

Time Weighted Average (TWA): An employee's average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded.

VI. Responsibilities:

Principal Investigators/Lab Managers/Supervisors

- Designate and address the use of formaldehyde as part of the individual Laboratory Safety Plan.
- Ensure that laboratory personnel are aware of and trained in the hazards related to formaldehyde exposure.
- Ensure that laboratory personnel are utilizing the proper engineering controls,

workpractices and PPE to prevent exposure to formaldehyde.

Environmental & Occupational Health Unit (EOH)

- Develops and coordinates implementation of the Formaldehyde Exposure Control Plan.
- Conducts formaldehyde exposure monitoring as required.
- Reviews and provides recommendations on work procedures, engineering controls, and PPE.
- Updates the exposure control plan as necessary and provides formaldehyde safety resources and training.

Employees

- Review the formaldehyde training as required.
- Review and follow proper work practices, utilize proper engineering controls and wear proper personal protective equipment to minimize formaldehyde exposure.
- Immediately report any signs and symptoms of formaldehyde exposure to employer.

VII. *Exposure Monitoring:* Initial exposure monitoring is required for all work areas that use formaldehyde. Monitoring will also be conducted:

- If there is a change in production, equipment, personnel or control measure.
- An employee exhibits signs and symptoms of formaldehyde exposure, EOH will promptly monitor the affected individual's exposure.
- If individual monitoring levels exceed the OSHA action level, follow up monitoring will be performed at least every 6 months. Periodic monitoring will be discontinued if the results from two consecutive sampling events taken at least 7 days apart show that the employee exposure is below the AL and the STEL.

Employees shall be notified within 15 working days after EOH receives the results of formaldehyde exposure monitoring.

VIII. *Medical Surveillance:* Employee health concerns should be brought to the attention of the supervisor and/or the Occupational Medicine Program of University Health Services. Medical consultation and follow up medical services are available at the [Occupational Medicine Clinic](#) (608) 265-5610. Medical surveillance will be offered to all employees exposed to formaldehyde at or above 0.3 ppm as an 8 hour TWA. Occupational medical services are also available for individuals who develop signs and symptoms of overexposure to formaldehyde and for those exposed to formaldehyde in emergencies. If an employee is enrolled into the medical surveillance program the following shall be completed.

- Employees must complete a medical disease questionnaire.
- Employee questionnaires will be reviewed by Occupational Medicine staff.
- Medical evaluations and procedures will be completed by or under the supervision of an occupational health physician.

Medical surveillance will be performed without cost or loss of pay to the employee and at reasonable time.

IX. Controls: Ventilation has shown to be the best method for reducing the concentration of airborne contaminants. Local exhaust ventilation such as chemical fume hoods, snorkel exhausts and downdraft tables should be used whenever possible. Work practices and administrative controls can also help in reducing airborne concentrations of formaldehyde. Recommended work practices include:

- Develop standard operating procedures (SOPs) for formaldehyde use.
- Keep formaldehyde solutions containers closed when not in use.
- Use the minimum amount of formaldehyde required for each procedure.
- Do not heat up formaldehyde solutions.
- Substitute formaldehyde preservatives whenever possible.

X. Personal Protective Equipment (PPE): PPE and protective clothing is important to prevent splash and other sudden contact with formaldehyde by creating a barrier between the user and formaldehyde. PPE minimizes the potential for employee exposure, but unlike engineering and work practice controls, does not reduce the airborne formaldehyde levels. For this reason PPE should only be used as a supplement to engineering and work practice controls and should not be relied on solely for protection. PPE shall be provided at no cost to employees and students and includes (as needed):

- Clothing (cover gown or apron)
- Face shields and/or safety goggles
- Gloves
- Respiratory protection as needed

All required PPE shall be repaired and replaced as necessary to assure its effectiveness. If respirators are used as a control measure, their use shall follow the requirements outlined in 29 CFR 1910.1048(g)(2). Where respirator use is required or if an employee or student would like to utilize one they must first:

- Complete a Respirator Medical Evaluation Questionnaire.
- Schedule a fit test to ensure that the respirator fits properly.
- Chemical cartridges and canisters must be approved for formaldehyde use.
- Normal organic vapor cartridges are NOT approved for formaldehyde use per the OSHA standard. 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 work shift, whichever condition occurs first.

XI. Labeling: Hazard warning labels complying with the requirements of the Hazard Communication Standard

(29 CFR 1910.1200) shall be affixed to all container of materials.

- Label 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.
- 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”.
- Additional information on the Hazard Communication Standard can be found at [Environment, Health & Safety’s \(EH&S\) webpage](#).

When concentrations of airborne formaldehyde exceeds the TWA or STEL, entrances shall have signs bearing the following information:

DANGER
FORMALDEHYDE
MAY CAUSE
CANCER

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

- XII. *Training:*** Employees who are exposed to formaldehyde at concentrations above 0.1 ppm must be trained on its hazards and the available methods of protection. Training will be provided for new hires and when there is a change in assignment that results in potential exposure to formaldehyde. Training will be repeated annually. Training shall include but is not limited to the following: health hazards associated with formaldehyde, occupational regulations, medical surveillance program information, reporting requirements, proper PPE use and care, engineering and workplace practice controls, and instructions for emergencies, spills and cleanup. Formaldehyde Awareness training is available online through UW Canvas.

Principal Investigator/Lab Manager/Supervisor must supplement this information with a discussion of the safety data sheet (SDS) for the formaldehyde containing products, a 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.

- XIII. *Recordkeeping:*** Environmental and personal exposure monitoring records shall be kept for 30 years. These records will be maintained by the Environmental & Occupational Health Unit. Personal exposure monitoring results will be entered into the patient electronic health record. These records will include:

- The date of the measurement.
- Procedures being monitored
- Sampling methods and analysis.
- The number, duration and results of the samples taken.
- Types of controls and PPE used at the time of monitoring.

- Medical records will be maintained for the length of employment of the individual plus 30 years.

XIV. *Emergency Situations and Spills:* A written plan should be in effect for work areas that utilize large volumes of formaldehyde or are more likely to have a spill based on the work process. The emergency plan should be communicated to employees and posted in an accessible area. If there is any possibility that an employee's eyes may be splashed with solutions containing formaldehyde, eyewash facilities shall be provided within the immediate work area for use. Emergency showers shall also be provided if there is potential for an employee's skin to be splashed with solutions containing 1% or greater of formaldehyde. Small spills (<100 mL solution) cleanup shall require the individual to wear the appropriate PPE (lab coat, gloves, shoes covers, goggles, etc.). Spill kits or absorbents may be used to clean up small spills.

Large spills (100 mL < solution) should result in immediate evacuation of the area. Access to the area where the spill occurred shall also be restricted. The EH&S department (608-265-5000) should be notified during business hours or the UW-Madison Police Department (608) 264-2677 if after hours.