

Formaldehyde Exposure Control Plan

1. PURPOSE

The purpose of the University of Louisville Formaldehyde Exposure Control Plan is to ensure that all employees and students are protected from the hazards of formaldehyde and understand its potential hazards. They will be provided with information concerning its hazards and how to protect themselves from it. This program is designed to meet all the requirements of OSHA 29 CFR 1910.1048 Formaldehyde Standard.

2. SCOPE

This program and procedures applies to all University of Louisville employees and students while on University owned property and/or worksites who have the potential for any occupational exposure to formaldehyde. This includes formaldehyde gas, solutions and materials that release formaldehyde. It establishes the procedure to identify and evaluate potential exposures to formaldehyde in the workplace. It also covers responsibilities, monitoring, safe work practices, training and documentation requirements.

Laboratories (Academic, Animal, Histology, Pathology and Research)

Laboratories that handle formaldehyde, solutions or materials that could release formaldehyde are covered by this standard. If other chemicals are used in the laboratories the laboratories must also comply with the OSHA Laboratory Standard 29 CFR 1910.1450 and follow the Chemical Hygiene Plan.

3. DEFINITIONS

Action level - an exposure level of 0.5 part formaldehyde per million parts of air (0.5 ppm) calculated as an eight (8)-hour time-weighted average (TWA) concentration.

EHS - Environmental Health and Safety Department.

Employee exposure - the exposure to airborne formaldehyde which would occur without corrections for protection provided by any respirator that is in use.

Formaldehyde - the chemical substance, HCHO, Chemical Abstracts Service Registry No. 50-00-0.

Formalin - liquid solutions containing formaldehyde.

Laboratory scale - work with substances in which the containers used for reactions, transfers, and other handling of substances are designed to be easily and safely manipulated by one person. "Laboratory scale" excludes those workplaces whose function is to produce commercial quantities of materials.

PEL - Permissible exposure limit.

PPE - Personal protective equipment.

PPM - Parts per million.

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SDS - Safety data sheet.

STEL - Short term exposure limit.

TWA - Time weighted average.

4. RESPONSIBILITIES

The Environmental Health and Safety Department will:

- Develop, implement and maintain the written Formaldehyde Exposure Control Plan
- Assist Departments with program compliance
- Assist Departments in the development of safe work practices to reduce exposure
- Assist in the development of exposure evaluation and monitoring plan
- Coordinate workplace and employee monitoring
- Inform Supervisors or PI of the results of area and personal monitoring
- Inform employees of corrective actions take if monitoring results are above the PEL
- Develop and provide training for employees and students
- Evaluate the ongoing effectiveness of this program

Departments will:

- Notify EHS if there is a potential for formaldehyde exposure in their area
- Assign responsibility to a Supervisor or PI
- Provide resources to meet program requirements
- Provide and maintain appropriate engineering controls
- Provide appropriate PPE
- Notify DEHS whenever there are changes in exposure to formaldehyde

Supervisors and PI will:

- Assist EHS in the identification of tasks with potential exposure to formaldehyde in their area
- Assist DEHS in completing industrial hygiene surveys
- Assist in conducting exposure monitoring
- Notify employees and students of monitoring results
- Inform employees and students of operations where formaldehyde is or could be present
- Ensure employees and students are trained
- Ensure materials are available to contain spills
- Complete semiannual inspections of area

University of Louisville Employees and Students will:

- Follow program requirements
- Understand hazards of formaldehyde
- Allow for monitoring as needed
- Attend training
- Wear proper PPE

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- Follow safe work practices and procedures
- Notify supervisor or PI with concerns

5. PROCEDURE

Exposure Limits

The Permissible Exposure Limit (PEL) is 0.75 parts formaldehyde per million parts of air (0.75 ppm) as an 8-hour TWA.

The Short Term Exposure Limit (STEL) is two parts formaldehyde per million parts of air (2 ppm) as a 15-minute STEL.

The Action Level is a concentration of 0.5 part formaldehyde per million parts of air (0.5 ppm) calculated as an eight (8)-hour time-weighted average (TWA) concentration.

Health Hazards

Formaldehyde and solutions containing the chemicals are potential human carcinogens, irritants, and chemical sensitizers. The following is a list of potential health hazards associated with formaldehyde exposure:

- **Inhalation:** Normal odor threshold is around 0.8 ppm. However concentrations as low as 0.1 ppm in air are capable of causing irritation to the mouth, nose, and throat. Exposure above 25 ppm can cause pulmonary edema (fluid in lungs) which may lead to death. Exposure greater than 100 ppm is immediately dangerous to life and health. If sensitized, inhalation exposure at any concentration may cause allergic respiratory reactions such as asthma, bronchitis, wheezing, and chest tightness.
- **Oral:** Ingestion can cause severe irritation of the mouth, throat, and stomach, nausea, vomiting, convulsions, coma, and death. An oral dose of 30 to 100 ml formalin can be fatal in humans.
- **Skin:** Formalin is a severe skin irritant and sensitizer. Repeated dermal contact may result in sensitization, resulting in allergic dermatitis at relatively low concentrations. Contact causes white discoloration, a burning sensation, drying and scaling of the skin.
- **Eyes:** Concentrations of 3 to 5 ppm may result in severe eye irritation. Direct contact with the eyes and skin may also cause severe burns, blurry vision, and loss of vision. Burns to eyes and skin may have a delayed effect, not appearing for hours after initial contact. An eyewash is should available in areas where solutions are handled.
- **Chronic exposure:** Formaldehyde and its solutions are potential human carcinogens and have been associated with cancers of the lung and nasal passageways.

Safe Work Practices to Reduce Exposure

Employees and student should follow these safe work practices to reduce exposure to formaldehyde:

- Do not eat, drink or store food and beverages in laboratory areas.
- Wear appropriate PPE including latex gloves, lab coats and safety glasses to prevent contact with skin or clothing.
- Avoid contamination of personal items.

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- Store personal items outside of the laboratory area.
- Properly dispose of specimens, contaminated solutions and materials in proper containers.
- Close containers containing formaldehyde solutions or materials when finished.
- Promptly clean up spills of formaldehyde.
- Keep work areas and storage locations clean.

Exposure Monitoring

Departments will identify all employees or students who may be exposed to formaldehyde or formaldehyde containing materials and notify EHS.

EHS will evaluate the exposure to determine if there is a potential for exposure at or above the action level or STEL. If there is, EHS will develop and complete representative sampling of the employee or student's full shift or short-term exposure to formaldehyde. Sampling will be taken for each job classification and shift unless it is documented that exposures for each are equivalent.

Monitoring will be completed initially and at least semiannually by EHS in areas where there is a potential for exposure at or above the action level or STEL.

Monitoring will not be conducted if EHS documents that exposures would not be at or above the action level or STEL.

Exposures will be reevaluated whenever there is a change in production, equipment, process, personnel, or control measures which may result in new or additional exposure to formaldehyde.

If the Department receives reports of signs or symptoms of respiratory or dermal conditions associated with formaldehyde exposure, EHS shall promptly monitor the affected employee's exposure.

Exposure Records

The University of Louisville will establish and maintain an accurate record of all measurements taken to monitor employee exposure to formaldehyde. This record shall include:

- The date of measurement
- The operation being monitored
- The methods of sampling and analysis and evidence of their accuracy and precision
- The number, durations, time, and results of samples taken
- The types of protective devices worn

Notification of Monitoring Results

Employees and students must be notified within 15 working days after the receipt of the results of any monitoring performed. This will be completed by providing an exposure letter to them or by posting the results in an appropriate location that is accessible to employees.

If employee exposure is above the PEL, affected employees must be provided with a description of the corrective actions being taken by the University to decrease exposure.

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Regulated Areas - Signage

The EHS will establish regulated areas where the concentration of airborne formaldehyde exceeds either the PEL or the STEL.

Regulated areas will have all entrances posted with signs stating:

DANGER
FORMALDEHYDE
MAY CAUSE CANCER
CAUSES SKIN, EYE, AND RESPIRATORY IRRITATION
AUTHORIZED PERSONNEL ONLY

Access to regulated area will be limited to authorized persons who have been trained to recognize the hazards of formaldehyde.

Employees of other companies will be informed of location of and access restrictions to regulated areas by posted signage.

Labeling

All mixtures or solutions containing more than 0.1 percent formaldehyde and materials capable of releasing formaldehyde into the air at concentrations reaching or exceeding 0.1 ppm shall be labeled.

All materials capable of releasing formaldehyde at levels above 0.5 ppm during normal use, the label must also contain the words, "Potential cancer hazard."

Exposure Control

Departments will implement feasible engineering and work practice controls to reduce and maintain worker exposure to formaldehyde at or below the 8 hour TWA and the STEL. Engineering controls include local and general exhaust ventilation. Areas that have the potential for exposures above the action level should have a ventilation systems to reduce exposure.

If these controls cannot reduce exposure to or below the PELs, respirators will be provided.

Personal Protective Equipment

Employees and students will be informed of the personal protective equipment that must be worn when handling formaldehyde solutions or materials containing formaldehyde. PPE could include impervious clothing, gloves, aprons, safety glasses, chemical splash goggles to prevent skin and eye contact. Refer to the area PPE Hazard Assessment, PPE Program and safe work practices for additional information.

Respiratory protection may also be provided if needed. Employees that wear respiratory protection must be enrolled into the University Respiration Protection program and follow all program requirements.

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Safety showers and eyewash stations must be installed if splashing is likely.

Medical Surveillance

Medical surveillance will be provided for all workers exposed to formaldehyde at concentrations at or above the action level or exceeding the STEL, for those who develop signs and symptoms of overexposure, and for all workers exposed to formaldehyde in emergencies. Medical surveillance will follow the requirement outlined in 29 CFR 1910.1048(l)(1).

Spills

Spill kits will be provided in work areas where spillage may occur to contain the spill, to decontaminate the work area, and to dispose of the waste.

The University shall assure that all leaks are repaired and spills are cleaned promptly by employees wearing suitable protective equipment and trained in proper methods for cleanup and decontamination.

Formaldehyde contaminated waste and debris resulting from leaks or spills shall be placed in sealed containers for disposal. The containers will be labeled bearing a label warning of formaldehyde's presence and of the hazards associated with formaldehyde.

Workplace Inspections

The Department or EHS will conduct the following workplace inspections every six months:

- Visually inspect regulated areas to detect for leaks and spills
- Verify proper signage to entrances
- Verify proper operation of exhaust ventilation
- Verify monitoring has been completed
- Verify the location of spill cleanup materials

6. TRAINING

Training will be provided to each employee or student that is or could be exposed to formaldehyde concentrations at or above 0.1 ppm. Training will be provided initially, annually, and whenever a new exposure to formaldehyde is introduced into the work area. It will include at least the following topics:

- Regulatory requirements
- Formaldehyde Exposure Control Plan location and availability
- Operations and materials in the work area where formaldehyde is present
- Safe work practices to limit exposure in each job
- Safety Data Sheets; contents, location and information
- Potential health hazards of formaldehyde
- Signs and symptoms of exposure to formaldehyde
- How to immediately report development of any adverse signs or symptoms of exposure
- Purpose, proper use and limitations of personal protective clothing and equipment

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- Instructions for handling spills, emergencies and clean-up
- Explanation of the importance of engineering and work practice controls and how to use them
- Review of emergency procedures to include specific duties or assignments of each employee in the event of an emergency
- Purpose and description of the Medical surveillance program
- Location and availability of written training materials

7. DOCUMENTATION

The following documents, including department where they will be maintained and duration of retention, are required for compliance with this program:

1. Written Formaldehyde Exposure Control Plan (DEHS; Most recent)
2. Safety Data Sheet (DEHS; Most Recent)
3. List of jobs with potential formaldehyde exposure (DEHS; Most recent)
4. Exposure records (DEHS; thirty years)
5. Signed employee monitoring notification letters (DEHS; Duration of employment)
6. Medical records (Campus Health; Duration of employment plus 30 years)
7. Respirator fit test records (DEHS; Most recent)
8. Specific procedures to protect from exposure to formaldehyde (Department; Most recent)
9. Personal protective equipment to be used (Department; Most recent Hazard Assessment)
10. Semiannual workplace inspection (Department; Most recent)
11. Training documentation (Department; Five years)

8. REFERENCES

29 CFR 1910.1048 Formaldehyde

<https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1048>

OSHA Fact Sheet – Formaldehyde

https://www.osha.gov/OshDoc/data_General_Facts/formaldehyde-factsheet.pdf

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES TOXICOLOGICAL PROFILE FOR FORMALDEHYDE

<https://www.atsdr.cdc.gov/toxprofiles/tp111.pdf>

9. APPENDICES

None