

Division of Administrative Services

**ENVIRONMENTAL HEALTH AND SAFETY**

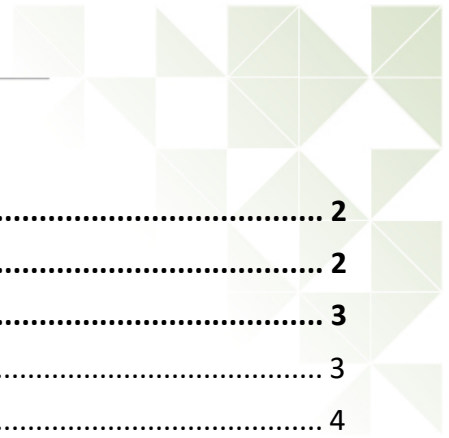
# FORMALDEHYDE EXPOSURE CONTROL PLAN



October 2018

 VirginiaTech



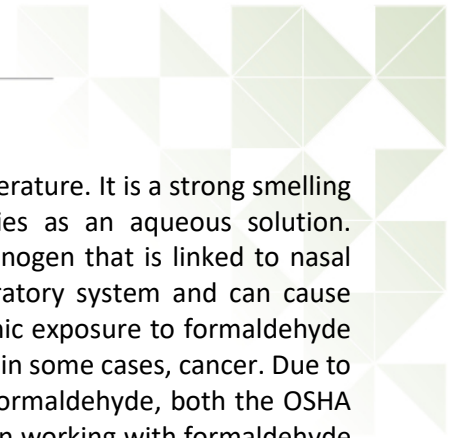


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## Purpose

Formaldehyde is a colorless, highly toxic, and flammable gas at room temperature. It is a strong smelling chemical which is commonly used in research and medical laboratories as an aqueous solution. Formaldehyde can act as a sensitizing agent and is a known human carcinogen that is linked to nasal cancer and lung cancer. Acute exposure is highly irritating to the respiratory system and can cause headaches and eye and throat irritation at very low concentrations. Chronic exposure to formaldehyde can lead to sensitization, asthma-like respiratory problems, dermatitis, and in some cases, cancer. Due to the above acute and chronic symptoms that can occur with exposure to formaldehyde, both the OSHA action level for formaldehyde monitoring and the workplace practices when working with formaldehyde are designed to keep potential formaldehyde exposures below the level where we would expect to see acute or chronic symptoms.

The Occupational Safety and Health Administration (OSHA) formaldehyde standard (29 CFR 1910.1048) covers all workers exposed to formaldehyde. The standard applies to all forms of formaldehyde including gas, aqueous solutions, solids, and materials that can release it. This program outlines what actions must be taken to assure compliance with this standard.

## Responsibilities

### Deans, Directors and Department Heads

- Ensure supervisor(s) and Principal Investigators understand their responsibilities for assuring compliance with the Formaldehyde Exposure Control Plan as applicable.
- Actively support this Plan within individual units.
- Ensure all persons working with formaldehyde are trained as required and comply with all requirements of the plan.

### Principal Investigators and Supervisors

- Address the use of formaldehyde as part of the laboratory-specific documentation in the Chemical Hygiene Plan if applicable, or the Hazard Communication Plan for other worksites,
- Ensure that personnel performing work with formaldehyde are trained and provided appropriate protective equipment,
- Ensure that personnel are utilizing the proper engineering controls, work practices and personal protective equipment (PPE) to minimize formaldehyde exposure.
- Contact EHS to arrange exposure monitoring whenever work area exposures are or may be over 0.1 parts per million (ppm), when workplace exposures to formaldehyde occur, or when persons indicate experiencing signs or symptoms they associate with exposure to formaldehyde at any level.

### Employees

- Comply with this Plan and any further safety recommendations provided by supervisors and/or EHS regarding the Formaldehyde Exposure Control Plan.
- Contact the supervisor or EHS to request technical assistance, and to evaluate health and safety concerns within their department.



## Environmental Health and Safety

- Develops, implements and administers the program,
- Provides training on the safe use of formaldehyde-containing products and materials,
- Maintaining centralized records if online training is taken,
- Conducts formaldehyde exposure monitoring,
- When requested or as needed, reviews and provides feedback on individual Laboratory Safety Plans that identify formaldehyde use and recommend appropriate work procedures, controls and personal protective equipment (PPE),
- Evaluates the overall effectiveness of the program on a periodic basis and makes appropriate changes as needed to assure the safety of all persons.

## Program Requirements

### Monitoring and Exposure Assessments

The OSHA permissible exposure limit (PEL) for formaldehyde is 0.75 parts per million (ppm) as an 8-hour time weighted average (TWA) and a short-term exposure limit (STEL) of 2 ppm in a 15-minute period. The OSHA action level (AL) for formaldehyde is 0.5 ppm as an 8-hour TWA. The action level is the threshold for increased exposure monitoring and initiation of medical surveillance.

Exposure monitoring is required for work areas where the concentration of formaldehyde exceeds the STEL or AL. Representative sampling will be performed in order to determine which university work activities fall within this scope. EHS will conduct initial exposure monitoring for employees who may be exposed at or above the STEL or AL. Initial monitoring will be repeated each time there is a change in production, equipment, personnel, or control measures which may result in new or additional exposure to formaldehyde. If an employee exhibits signs and symptoms of formaldehyde exposure, EHS will promptly monitor the affected employee's exposure. Periodic monitoring will be conducted for those employees with initial monitoring results at or above the STEL or AL. If the last monitoring results reveal employee exposure at or above the AL or STEL, EHS will repeat monitoring at least every six months. Periodic monitoring will be discontinued if the results from two consecutive sampling periods show that the employee exposure is below the AL and the STEL.

Processes or occupational activities at Virginia Tech that may result in formaldehyde exposure include (but are not limited to):

- Handling biological specimens/tissues preserved in formaldehyde
- Sterilization or disinfection procedures
- Embalming procedures
- Gross Anatomy laboratories involving cadavers
- Fumigation procedures

In laboratories, a standard operating procedure (SOP) for formaldehyde and/or formaldehyde solution use must be developed and maintained with the lab-specific documentation. If all work using formaldehyde-containing materials is performed inside a chemical fume hood or using similar engineering controls, it is presumed that exposures over 0.1 ppm will not occur unless there is a spill outside of these controls. Similarly, if all work is performed in a Class II A2 or B biosafety cabinet that is connected to the building hazardous exhaust system, and where only small quantities are used, it is presumed that

exposures over 0.1 ppm will not occur. Work with minute quantities where the exposures are of very short duration (for example, opening up a small container of formalin in which to place a piece of excised tissue) are also not an exposure concern. For assistance or to arrange monitoring for suspect work exposures, please contact EHS directly.

## Employee Notification

Employee(s) will be notified in writing of the results of the assessment within 15 workdays or the results will be posted in an appropriate location accessible to all affected persons.

If the result is above the STEL, AL or PEL, the notification will include the actions that are being taken to reduce the exposure to below these limits.

## Regulated Areas

EHS will work with the affected department to establish regulated areas where the concentration of airborne formaldehyde exceeds either the PEL or the STEL. The department will be required to post and maintain legible signs bearing the following information at all entrances or access ways:

DANGER  
FORMALDEHYDE  
IRRITANT AND POTENTIAL CANCER HAZARD  
AUTHORIZED PERSONNEL ONLY

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

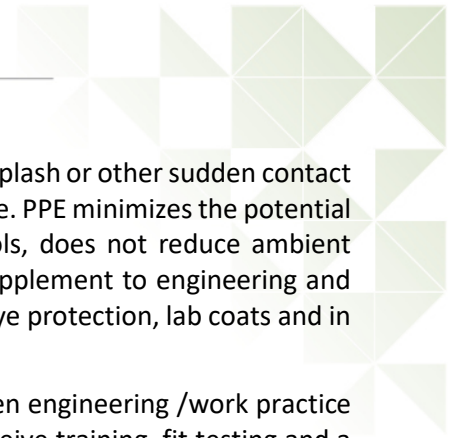
## Engineering Controls

Ventilation is the best method for reducing the concentration of airborne substances in the breathing zone of workers. Local exhaust ventilation in the form of a chemical fume hood, snorkel or downdraft table must be used whenever possible. Class II A2 or B biosafety cabinets which are connected to the building hazardous exhaust system can be used if only minute quantities of formaldehyde are being used over a short duration.

## Work Practice Controls

Work practices and administrative controls can also help in reducing airborne concentrations of formaldehyde and potential exposures and are to be used in conjunction with engineering controls. Recommended laboratory work practices include:

- Develop a standard operating procedure (SOP) for formaldehyde and/or formaldehyde solution use
- Keep solution containers of formaldehyde closed when not in use
- Use the smallest amount of formaldehyde required for each procedure
- Perform tasks involving formaldehyde only when using engineering controls like fume hoods or in well ventilated areas
- Do not autoclave or microwave formaldehyde solutions
- Use formaldehyde preservative substitutes whenever possible



## Personal Protective Equipment

Personal protective equipment (PPE) is important to prevent for employee splash or 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 ambient formaldehyde exposure levels. Therefore PPE should only be used as a supplement to engineering and work practice controls. Recommended PPE includes impermeable gloves, eye protection, lab coats and in some cases respiratory protection.

Respirators are only be used in limited circumstances (emergencies or when engineering /work practice controls are not feasible). Persons wearing respiratory protection must receive training, fit testing and a medical evaluation from EHS before being permitted to wear a respirator.

## Other Required Controls

If a person's skin could be splashed with solutions containing 1 percent or greater formaldehyde (because of equipment failure, work practices or an accident), a quick drench safety shower must be available for use.

If a person's eyes could be splashed with solutions containing 1 percent or greater formaldehyde (because of equipment failure, work practices or an accident), a safety eyewash must be available for use.

## Housekeeping and Spill Response

In areas where formaldehyde is utilized and spills may occur, provisions must be made to contain spills, decontaminate the work area and dispose of the waste. Employees cleaning up spills must be properly trained and wear suitable protective clothing. For small spills (<100 ml aqueous solution), remove all ignition sources, isolate the hazard area and deny entry to unnecessary persons, contain the spill with absorbent materials while wearing proper protective equipment. For larger spills (>100 ml aqueous solutions) or emergencies where the PEL or STEL may be exceeded, evacuate the area and call EHS (540-231-3600) during work hours or 911 after hours. All debris resulting from a spill response, including any contaminated clothing and PPE, must be kept in a tightly sealed container until it can be removed by EHS.

## Medical Services

Medical surveillance will be provided by EHS for all employees exposed to formaldehyde at or above the AL or STEL. Occupational medical services are also available for employees who develop signs and symptoms of overexposure to formaldehyde and for employees exposed to formaldehyde in emergencies. If respirators need to be worn by an employee, the employee must be medically cleared, fitted to the respirator and trained annually by EHS.

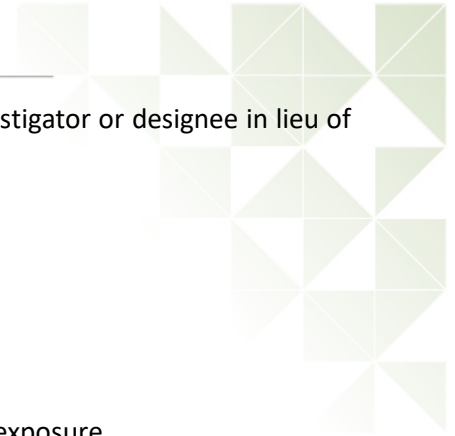
## Hazard Communication

Each histology, pathology, and human or animal anatomy laboratory, and any workgroup using formaldehyde in the field or outside of a laboratory setting, must include formaldehyde in its hazard communication program. This includes proper labeling and having a Safety Data Sheet (SDS).

## Training

All persons exposed to formaldehyde (including those that receive or transport biological samples/tissues preserved in formaldehyde) must be trained on its hazards and the available methods of protection. This training must occur at the time of initial job assignment and whenever a new exposure to formaldehyde is introduced into the work area. The online training may be used, but it must be supplemented by lab





and procedure-specific training. If training is provided by the Principal Investigator or designee in lieu of the online training, it must address the following:

- Properties of formaldehyde,
- Formaldehyde exposure limits and exposure monitoring,
- Engineering and work practice controls in use in the lab
- Required use of personal protective equipment
- How to respond to spills and other exposure events
- Potential health effects
- How to recognize and reports signs or symptoms of formaldehyde exposure

Training documentation must be maintained in the lab for at least three years for review by EHS. Note that the online training does have a one year expiration.

All persons assigned to workplaces where airborne formaldehyde concentrations meet or exceed 0.1 ppm must be trained on an annual basis to confirm their understanding of formaldehyde, its hazards and the available methods of protection. Such locations may include necropsy areas, histology, pathology, and anatomy labs/classes. It may also include areas where formaldehyde-containing products are used without engineering controls, such as when larger quantities of these products are used in the field. The training is mandatory and must be repeated annually. You can register to take this training here. This training must be supplemented by specific training on the engineering and work practice controls used at the location.