Formaldehyde Program

Occupational Health, Safety and Injury Prevention

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1.0 INTRODUCTION

1.1 The Cornell University Formaldehyde Program is intended to establish who may be at risk for exposure to formaldehyde and provide education and resources for the safe handling of formaldehyde. This program is in compliance with The Occupational Health and Safety Administration (OSHA) Formaldehyde Standard 29 CFR 1910.1048

2.0 OBJECTIVES AND METRICS

2.1 The Cornell University Formaldehyde Program establishes the procedures and requirements necessary to be compliant with established regulations for the use of formaldehyde. This program provides the necessary health and safety protection to those employees and students falling within the jurisdiction of the program.

3.0 SCOPE

3.1 The Cornell University Formaldehyde Program applies to all faculty, staff and students using formaldehyde as part of their normal work duties.

3.2 Applies to all Cornell University facilities with the exception of Weill Cornell Medicine

4.0 BACKGROUND

4.1 Formaldehyde, Formalin, Paraformaldehyde

➢ Formaldehyde is CH2O, the simplest aldehyde.
➢ Formalin is the name for water saturated (37%) formaldehyde solution. Thus, a protocol calling for 10% formalin is roughly equivalent to 4% formaldehyde.
➢ Paraformaldehyde (PFA) is actually polymerized formaldehyde. "Pure", methanol-free formaldehyde can be made by heating the solid PFA.

4.1.1 Formaldehyde characteristics:

a. Colorless chemical
b. Pungent odor
c. Gas at standard temperature and pressure

4.1.2 Formaldehyde can be a liquid (formalin) or a solid (paraformaldehyde). Often referred to as formalin

a. Synonyms
   • Paraform
   • Methylene Glycol
   • Methyl Aldehyde
   • Morbicid Acid

4.1.3 Examples of Materials/Processes that release formaldehyde

a. Fixed tissues
b. Perfusions of tissues
4.2 OSHA 1910.1048 Exposure Limits

4.2.1 Permissible Exposure Limit (PEL): 0.75 ppm
   a. The time-weighted average (TWA) concentration calculated as an 8-hour workday and a 40-hour workweek

4.2.2 Short Term Exposure Limit (STEL): 2.0 ppm
   b. A 15-minute TWA exposure which should never be exceeded

4.2.3 Action Level (AL): 0.5 ppm
   c. An airborne concentration calculated as an TWA concentration

5.0 ROLES AND RESPONSIBILITIES

5.1 University Administration
   5.1.1 University Administrators are to provide senior management support for the implementation of this Formaldehyde Program

5.2 Department of Environmental Health and Safety
   5.2.1 The Department of Environmental Health and Safety develops, supports, and oversees the implementation of the Formaldehyde Program, by:
      a. Create, review, and revise the Formaldehyde Program
      b. Provide and offer training as required by OSHA 29 CFR 1910.1048
      c. Conduct exposure monitoring and maintain the corresponding records
         • Identify personnel requiring medical surveillance based on monitoring results and notify Cornell Health Occupational Medicine
         • Identify areas where respiratory protection is required based on monitoring results and follow the Cornell University Respiratory Protection Program
      d. Provide recommendations on substitutions, engineering and administrative controls
      e. Determine appropriate Personal Protective Equipment (PPE)

5.3 Occupational Medicine
   5.3.1 The Occupational Medicine Department within Cornell Health supports the Formaldehyde Program by:
      a. Provide medical surveillance to qualified individuals in accordance with the OSHA regulations per EHS referral based on sampling results
      b. Follow established protocol for those required to wear respirator per the Cornell University Respiratory Protection Program
      c. Maintain medical surveillance records and respirator medical clearance records

5.4 Department Managers/Supervisors and Principal Investigators (P.I.)
   5.4.1 Cornell University Department Managers, Supervisors, and P.I. support the Formaldehyde Program by:
      a. Require persons under supervision to take training required in section 8.0 if this document
      b. Provide personnel working with formaldehyde with proper PPE
• This includes closed toed shoes, long pants, proper gloves, lab coats, and protective eyewear

c. Contact EHS to conduct exposure monitoring when there is potential for formaldehyde exposure. Examples of when to call EHS:
   • Start of a new project utilizing formaldehyde
   • Change in process/procedures
   • Change in chemical manufacturer
      o Consult Safety Data Sheets (SDS’s) to ensure there is not a change in concentration

d. Ensure that affected employees, based on EHS recommendations, receive proper medical evaluations, as required based on exposure monitoring
e. Provide employees with proper respiratory protection, as required based on exposure monitoring
f. Label all solutions containing greater than 0.1% formaldehyde, in accordance with the Cornell University’s Laboratory Safety Manual or Cornell University’s Hazard Communication Program

5.5 Affected Employees

5.5.1 Affected employees are responsible for:
   a. Complete the required EHS trainings: EHS 2341 and EHS 2343 OR EHS 2555
   b. Follow the procedures of the Formaldehyde program and department SOPs/protocols
   c. Read the formaldehyde SDS
   d. Don appropriate PPE as described in Standard Operating Procedures (SOPs)
   e. Seek medical surveillance when required or as needed for health concerns related to working with Formaldehyde

6.0 PROCEDURES

6.1 Compliance Procedure

6.1.1 Where exposure monitoring indicates, the Department Manager/Supervisor or P.I. shall do the following:
   a. Evaluate the affected employee’s work practices for ways to reduce exposures
   b. The affected employee will be enrolled by EHS for medical surveillance with Cornell Health Occupational Medicine after sampling is conducted
   c. Where possible, substitute the chemical for a less hazardous one

6.2 Exposure Monitoring

6.2.1 As a result of air sampling and monitoring, EHS will make recommendations and/or requirements for the task sampled
   a. Recommendations for employee occupational exposures will follow the protection hierarchy. The established hierarchy order is: Engineering Controls, Administrative Controls, and Personal Protective Equipment (PPE)

6.2.2 Follow-up monitoring will be conducted when exposures are at or above the AL and/or STEL after engineering controls have been implemented, by EHS. The following timeline will be utilized for followup sampling:
b. At or above the AL: Every six months

c. At or above the STEL: Annually

6.2.3 Monitoring will end when results from two consecutive sampling periods (taken at least 7 days apart) show employee exposure is below the AL and the STEL.

6.2.4 Exampled for requesting and conducting exposure monitoring:

a. Any employees who have a potential exposure to formaldehyde will be included in sampling plans

b. When EHS is notified of a change in production, equipment, process, personnel, or control measures that has the risk of producing a new or greater exposure to formaldehyde

c. When an employee requests monitoring or reports dermal or respiratory conditions indicative of formaldehyde exposure

6.3 Notification of Monitoring Results

6.3.1 All results of personal air sampling will be made available to the employee within five business days of receipt of lab analysis results

6.3.2 All results will be held on file by EHS for the course of the employee’s time with Cornell University, and 30 years beyond their separation from the University

6.4 Regulated Areas

6.4.1 A supervisor must designate an area as a “regulated area” if repeated monitoring by EHS concludes that the airborne concentration of formaldehyde is above the permissible exposure limit (PEL) and/or STEL. Every entrance and access must be marked with the following signage:

6.4.2 The “regulated area” is to only be accessed by those who wear the appropriate PPE, know how to properly handle formaldehyde, are aware of its hazards, and have taken annual training

7.0 MEDICAL SURVEILLANCE

7.1 Medical surveillance is mandatory if:

7.1.1 Exposure to formaldehyde is at or above the AL and/or STEL

7.1.2 Signs and symptoms of potential exposure develop
7.2 Medical surveillance includes:

7.2.1 Examination by a physician

7.2.2 Medical disease questionnaire
   a. As described in OSHA 29 CFR 1910.1048 Appendix D

7.2.3 Medical examination, that shall include
   a. Physical examination
   b. Respirator exam and laboratory tests for persons in the respirator program
   c. Any other tests the physician deems necessary
   d. Counseling of employees with medical conditions that would be directly or indirectly aggravated by exposure to formaldehyde

7.2.4 Examinations for employees in an emergency
   a. Shall be made as soon as possible
   b. Shall include all steps listed in 7.2.3

7.2.5 Physician’s written opinion
   a. Affected employee shall receive a copy of the physician’s written opinion with 15 days

8.0 TRAINING

8.1 All workers exposed to formaldehyde concentrations of 0.1 ppm or greater at the time of initial job assignment and whenever a new exposure to formaldehyde is introduced into the work area, must be trained. Training is required annually

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9.0 RECORDS AND DOCUMENT CONTROL

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10.0 DEFINITIONS

10.1 Action Level – An airborne concentration of 0.5 parts of formaldehyde per million parts of air (0.5 ppm) calculated as an 8-hour time-weighted average (TWA) concentration
10.2 **Administrative Controls (or Work Practice)** – Changes in work procedures such as written safety policies, rules, supervision, schedules, and training with the goal of reducing the duration, frequency, and severity of exposure to hazardous chemicals or situations.

10.3 **Authorized person** – A person who, due to work duties or authorization by his/her employer, is allowed to be in regulated areas.

10.4 **Engineering Controls** – To eliminate or reduce exposure to a chemical or physical hazard through the use or substitution of engineered machinery or equipment.

10.5 **Formaldehyde** – A gas that is colorless with a strong odor often found in aqueous solutions. It is a gas at standard pressure and temperature. Formalin (4-10%) and paraformaldehyde (4%) are solutions containing formaldehyde.

10.6 **Permissible Exposure Limit (PEL)** – A legal limit (0.75 ppm for formaldehyde exposure) in the US for exposure of an employee to a chemical substance or physical agent. It is the TWA concentration calculated as an 8-hour workday and a 40-hour workweek.

10.7 **Personal Protective Equipment (PPE)** – Protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury or infection. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter.

10.8 **Regulated Area** – An area that is marked with danger signage by a supervisor due to repeated monitoring concluding that the airborne concentration of a chemical (e.g. formaldehyde) is above the permissible exposure limit (PEL) and/or STEL. This area can only be accessed by those who wear the appropriate PPE, know how to properly handle the chemical (e.g. formaldehyde), and are aware of the chemical’s hazards.

10.9 **Respirator** – A device designed to protect the wearer from inhalation of harmful atmospheres.

10.10 **Short Term Exposure Limits (STEL)** – A 15-minute TWA exposure (2.0 ppm for formaldehyde), which should never be exceeded.

11.0**REFERENCES**


11.2 Cornell University Hazard Communication Program:
https://sp.ehs.cornell.edu/osh/occupational-health/hazard-communication/Pages/default.aspx

11.3 Cornell University Laboratory Safety Manual: https://sp.ehs.cornell.edu/lab-research-safety/laboratory-safety-manual/Pages/default.aspx

11.4 Cornell University Respiratory Protection Program: https://sp.ehs.cornell.edu/osh/occupational-health/respiratory-protection/Pages/default.aspx

11.5 Cornell Health Occupational Medicine:
https://health.cornell.edu/services/occupational-medicine
## 12.0 DOCUMENT HISTORY

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