



TEXAS TECH UNIVERSITY HEALTH SCIENCES CENTER EL PASO

Operating Policy and Procedure

HSCEP OP: 75.23, **Formaldehyde Safety**
OSHA Standard 1910 Subpart Z
CFR 1910.1048

PURPOSE: The purpose of this Texas Tech University Health Sciences Center El Paso (TTUHSC El Paso) Operating Policy and Procedure (HSCEP OP) is to protect faculty, staff and students from the hazards associated with formaldehyde and to maintain formaldehyde exposures levels below the regulatory limits.

This standard practice applies to all TTUHSC El Paso faculty, staff and students who will use/handle and dispose of formaldehyde, formalin (an aqueous solution of formaldehyde in water, usually 37%) or other formaldehyde –containing solutions.

REVIEW: This HSCEP OP applies and will be distributed to all TTUHSC El Paso School of Medicine clinics and research centers.

This HSCEP OP will be reviewed in March of every even numbered year by the senior director of safety services, with recommendations and revisions forward through the managing director of physical plant and support services to the chief operating officer.

PROCEDURE:

I. RESPONSIBILITIES:

A. Department of Safety Services Managers is responsible for:

- Program development and implementation of the program;
- Monitoring compliance with the OSHA standard-29 CFR 1910.1048
- Providing general formaldehyde safety training;
- Conducting exposure assessments and evaluating exposure control measures as necessary;
- Providing or coordinating emergency response for chemical spills;
- Investigating accidents; and
- Maintaining employee exposure records.

B. All Laboratories; Research, Clinical, Educational and Gross Anatomy will be responsible for:

- Ensuring departmental compliance with all the procedures outlined in this program.
- Ensuring compliance with this program in their work area(s);
- Developing standard operating procedures (SOP's) that address the specific safety measures to be implemented when using formaldehyde;
- Coordinating the provision of medical examinations, exposure monitoring and record keeping, as required;

C. Faculty, Employees/Students are required to:

- Know the provisions of the formaldehyde safety program;

- Report accidents, possible overexposures or unsafe conditions to their supervisor; and
- Wear/utilize personal protective equipment and engineering controls when recommended and provided.

II. **HAZARD DATA:** Source Safety Data Sheet (SDS) 05/04/2007

Formaldehyde exposures may cause sore throat, coughing, shortness of breath and sensitization of the respiratory tract. The sense of smell and eye irritation are less sensitive over time as the body adapts to formaldehyde exposure; therefore, one cannot rely on formaldehyde's warning properties to alert the individual to the potential for overexposure. The dose, or amount of exposure, determines the type and degree of beneficial or adverse health effects.

A. Acute Health Effects – Symptoms that occur at very high concentrations of exposure.

1. Inhalation - Formaldehyde is highly irritating to the upper respiratory tract and eyes. Severity of symptoms depends on the concentration in air coupled with the duration of exposure.

0.5 to 2.0 ppm	may irritate eyes, nose, throat
3 to 5 ppm	may cause irritation and tearing of the eyes
10 to 20 ppm	causes difficulty breathing, burning of nose and throat, cough and heavy tearing of the eyes
25 to 30 ppm	causes severe respiratory tract injury leading to pulmonary edema and pneumonitis
>100 ppm	immediately dangerous to life and health

2. Skin Absorption - Formaldehyde is a severe skin irritant and sensitizer. Skin contact with formaldehyde causes white discoloration, drying, cracking and scaling. Prolonged and repeated contact can cause numbness or hardening of the skin. Previously exposed persons may react to future exposure with an allergic eczematous dermatitis or hives.
3. Eye Contact - Formaldehyde solutions splashed in the eyes can cause injuries ranging from transient discomfort to severe, permanent corneal clouding and loss of vision. The severity of the effect depends on the concentration of formaldehyde and whether or not the eyes are flushed with water immediately after the incident.
4. Ingestion - 10% to 40% solutions of formaldehyde can cause severe irritation of the mouth, throat and stomach. Severe stomach pains will follow ingestion with possible loss of consciousness and death. Ingestion of dilute solutions (0.03%-0.04%) may cause discomfort in the stomach and throat.

- B. Chronic Health Effects - Formaldehyde has the potential to cause various respiratory impairments, such as bronchitis and nasal cancer that may appear over a relatively long period of time after repeated and prolonged exposures above the OSHA permissible exposure limits (PEL). In humans, formaldehyde exposure has been associated with cancers of the lung, and nasal passages. Some people have allegedly developed asthma or bronchitis following exposure to formaldehyde, apparently after a single exposure to a high concentration.

- C. Physical Hazards - Formaldehyde poses a moderate fire and explosion hazard when exposed to heat or flame. The flash point for 37% formaldehyde is 185 degrees Fahrenheit with an explosion range of 7 to 73% by volume in air, and is classified as a III-A flammable liquid in the OSHA regulations.

Avoid contact with strong oxidizing agents, strong alkalis, isocyanides, anhydrides, and inorganic acids. Formaldehyde reacts with nitrogen dioxide, nitro-methane, peroxyformic acid, perchloric acid and aniline to yield explosive compounds.

III. PERMISSIBLE EXPOSURE LIMITS:

OSHA has issued several types of limits for employee exposures to trigger various regulatory requirements.

- A. Action Level - A limit defined as 0.5 part formaldehyde per million parts of air (0.5 ppm). OSHA mandates that employers initiate certain required activities such as exposure monitoring and medical surveillance.
- B. Permissible Exposure Limit (PEL) - A limit defined as 0.75 parts formaldehyde per million parts of air (0.75 ppm), calculated as an 8-hour time-weighted average. At concentrations at or above this limit, OSHA requires employers to provide protective equipment such as respirators, establish administrative controls, study and install engineering controls (if feasible), establish regulated areas, and perform other OSHA-required procedures and duties.
- C. Short Term Exposure Limit (STEL) - A limit defined as 2 parts formaldehyde per million parts of air (2 ppm), averaged over any one 15-minute period. If this STEL limit is exceeded, the OSHA mandates followed by the employer are identical to those required when there is exposure above the OSHA PEL.

IV. EMPLOYEE EXPOSURE ASSESSMENTS:

Whenever formaldehyde is used in a work area, Safety Services will conduct air monitoring to determine faculty, staff and student exposures. Exposure measurements will be representative of a full shift or STEL and will be taken in each work area.

Call the Safety Services Department and request a representative utilize special sampling equipment to collect representative air samples for laboratory analysis of the formaldehyde level. *“Representative air samples” are defined in this policy as the air located at a typical working distance of the head of a dissector to a cadaver that he/she is dissecting (approximately 14 inches).* If employee/student exposures are found to be at or above the action level, Safety Services will repeat air monitoring every six (6) months. If exposures are above the STEL, air monitoring will be conducted at least once per year. Monitoring will continue until exposures can be reduced below these levels by engineering or administrative controls.

Air monitoring will be conducted promptly in a work area if employees are experiencing signs or symptoms of formaldehyde exposure. Air monitoring will be repeated in an area each time there is a change in equipment, processes or controls which may result in additional exposure to formaldehyde. Safety Services must be notified at 215-4820 to conduct this monitoring.

V. REDUCING EMPLOYEE EXPOSURE TO FORMALDEHYDE:

- A. Substitution - When possible, substitution of a less hazardous chemical or process will be used to reduce or eliminate formaldehyde use and exposures.

- B. Engineering Controls - When possible, chemical fume hoods and/or local exhaust ventilation will be used to reduce exposures to formaldehyde. Local exhaust is used to capture and exhaust formaldehyde vapors, preventing the accumulation of high exposures in the employee's breathing zone. For the anatomy lab areas, the room air turnover rate will be maintained at levels specified by the designers (~ 20 exchanges per hour).
- C. Administrative Controls - If engineering controls cannot be implemented, alteration of work practices will be used to reduce exposure to formaldehyde. This could include limiting the amount of time employees spend working in high exposure areas such as by rotating personnel.
- D. Personal Protective Equipment (PPE) - Prevent direct contact with the eyes or skin with liquids containing 1% or more formaldehyde, by the use of protective garments and equipment which are resistant to formaldehyde (Neoprene, Nitrile, rubber and PVC have all been rated as "excellent" for resistance to formalin solutions). The type of PPE necessary will vary depending on the concentration, amount used and the potential for splashing and may include goggles, face shield, gloves, gowns, lab coats, aprons and arm sleeves. Safety Services can provide your area with guidance on the appropriate PPE for your area.
- E. Respirators- If employee exposures are found to exceed the PEL or STEL, respirators will be provided until feasible engineering or administrative controls can be implemented. If respirator use is necessary, Safety Services will fit-test and train individuals before using a respirator. [Refer to Policy 75.12 "Guidelines for Using N-95 Respirators"](#)

All PPE must be inspected by employees prior to each use. PPE must be stored in a clean and sanitary manner.

- F. Hygiene - To prevent the accidental ingestion of formaldehyde, eating, drinking and smoking is prohibited in the laboratory area. Employees should wash their hands after using formaldehyde even when wearing gloves. If employees are required to change from work clothing into protective clothing, change rooms are provided. Protective clothing contaminated with formaldehyde must not be taken home by employees. Reusable protective clothing must be laundered by the department, using a company that is trained to recognize the hazards of formaldehyde.
- G. Emergency Eyewash and Shower - If there is a possibility that employees' skin may be splashed by formaldehyde-containing solutions, emergency showers and drench hoses are available in the work areas. If there is a possibility that employees' eyes may be splashed by formaldehyde-containing solutions, plumbed eyewash station are provided in the work areas.

Employees must be instructed on the proper use of the eyewash and emergency showers. If an employee's eyes or skin are splashed by formaldehyde-containing solutions, the employee must flush immediately for at least 15 minutes. The employee should then seek medical attention.

VI. **SIGNAGE AND LABELING:**

- A. Regulated areas where the airborne levels of formaldehyde are found to exceed the PEL and/or STEL will be regulated areas. Access to these areas will be limited to persons trained to recognize the hazards of formaldehyde. Signs will be posted on all entrances bearing the following information:

DANGER
Formaldehyde
Irritant and Potential Cancer Hazard
Authorized Personnel Only

B. Container Labels

The OSHA hazard communication regulations require that all containers must be labeled with the name of the product and the most significant hazards(s) associated with the contents. Because OSHA has designated formaldehyde as a carcinogen, when a chemical product containing greater than 0.1% formaldehyde is transferred into a container other than the original, it must be labeled with the following information:

Small Containers:	Large Containers:
CAUTION Contains Formaldehyde Potential Cancer Hazard	CAUTION Contains Formaldehyde Toxic by inhalation and if swallowed. Potential Cancer Hazard May cause respiratory sensitization. Irritating to eyes, skin and respiratory system.

Safety Services will provide these labels upon request. When labeling containers using NFPA labeling process, use the following hazard ratings: Health-3, Flammability-2, Reactivity-0, and Personal Protective Equipment-this will vary based on the use and must be at least a "B" rating.

VII. **STANDARD OPERATING PROCEDURES:**

Work with formaldehyde requires a written Standard Operating Procedure (SOP) that addresses the following:

- The hazards of formaldehyde
- What containment devices (i.e., chemical fume hoods, glove boxes) will be used when working with formaldehyde
- What personal protective equipment is required
- Designated storage and use areas
- How to dispose of waste formaldehyde solutions
- Decontamination and spill clean-up procedures

VIII. **TRAINING:**

Faculty, Staff and Students working with formaldehyde must receive training regarding the hazards of formaldehyde. A training module will be provided to supervisors with employees working with formaldehyde. Supervisors should review this information with employees annually. The training should cover the following:

- Requirements of the Standard;
- Explanation of TTUHSC El Paso Safety Services - Formaldehyde Safety Program;
- Contents of the Safety Data Sheet for formaldehyde;
- Description of the medical surveillance program;
- Description of the health hazards associated with exposure;
- Signs and symptoms of exposure;

- Instructions to report any signs or symptoms that may be attributable to formaldehyde exposure;
- Description of the operations in the work area where formaldehyde is present;
- Work practices to reduce exposure, including engineering and administrative controls and personal protective equipment required; and
- Instructions for handling spills and emergency procedures.

This training must be conducted whenever:

- A new hazard is introduced into the work area.
- When the employee transfers to another job.
- Whenever the employee demonstrates behavior that indicates a lack of understanding of the basic rules for the safe handling of chemicals.

Supervisors are responsible for ensuring that employees with potential exposure to formaldehyde receive the appropriate training before working with it. All training must be documented by the individual presenting the training session and a copy of the training records will be submitted to Safety Services.

IX. **MEDICAL SURVEILLANCE:**

Employees found to have exposures that exceed the action level or the STEL will be included in a medical surveillance program. [Refer to TTUHSC EL PASO - Exposure Control Plan 7.02](#)

Employees exposed to formaldehyde will be provided with the opportunity to receive medical attention under the following circumstances:

- Whenever an employee has developed signs or symptoms associated with exposure to formaldehyde; and/or
- Whenever an employee is involved in a spill, leak or other occurrence resulting in a possible overexposure to formaldehyde.

TTUHSC El Paso employees may obtain free medical consultation regarding concerns about formaldehyde exposures by contacting the Employee Occupational Health Services at 915-215-4429. Medical Students with concerns about chemical or other exposures should contact Student Affairs.

It is the intent of TTUHSC El Paso to provide a work environment which does not compromise the reproductive health of any employee or student, regardless of sex. Counseling on reproductive health matters may be obtained by contacting Employee Occupational Health or Student Affairs.

Employees experiencing significant irritation of the eyes, upper airways or skin, respiratory sensitization or dermal sensitization attributed to formaldehyde exposure will be seen by the Occupational Health Clinic. If they determine that the symptoms may be the result of a possible overexposure, Safety Services will evaluate the work area to determine if the symptoms are the result of an over-exposure. If exposures are in excess of the OSHA PEL or STEL, Safety Services will determine which further administration and/or engineering control measures are necessary.

X. **SPILLS:**

Laboratory/clinical personnel can clean up the vast majority of chemical spills that occur. The individual(s) who caused the spill are responsible for prompt and proper clean-up. Departments should have a spill kit, clean-up materials and personal protective equipment, which are appropriate for the chemicals being handled; they need to be readily available. The department

supervisor is responsible to ensure that spills are cleaned up as soon as possible. Two categories of chemical spills and response procedures have been identified;

- A. Minor spills – Minor spills can be cleaned up with absorbent material. The appropriate personal protective equipment, such as safety glasses and formaldehyde resistant gloves, must be used to prevent skin contact with the formaldehyde. The spill clean-up materials must be double-bagged, tightly closed, labeled and picked up by Safety Services for disposal. If an individual experiences any eye or upper respiratory irritation while cleaning up the spill, she/he should stop immediately and call Safety Services at 915-215-4820 for assistance.
- B. Major spills - Employees should not attempt to clean up large quantity spills (more than 5 gallons) of formaldehyde, particularly in confined or restricted spaces, unless training has been received, appropriate spill clean-up materials are available, and personal protective equipment is readily available. In the event of a very large spill for which an individual is not properly trained or prepared, the area should be evacuated and Texas Tech Police contacted at 915-215-7111 and Safety Services at 915-215-4820. **Refer to TTUHSC EL PASO – Hazardous Material Emergency Response Plan – 75.26**

XI. **DISPOSAL:**

All chemical waste must be disposed of according to the TTUHSC El Paso waste disposal manual. This manual must be referenced before any chemical is disposed of. Formaldehyde-containing wastes should be placed in a labeled waste container in a flammable storage cabinet. Call Safety Services at 915-215-4820 for pickup of waste materials.

A “Request for Transfer of Chemicals” form should be submitted using the on-line system. This on-line form is located on the Safety Services website. Safety Services will print out a hardcopy for signatures when the chemicals are picked up. Copies will be available for the department upon request.

XII. **STORAGE:**

Ideally, formaldehyde should be stored in a well-ventilated cabinet in an unbreakable, chemically resistant secondary container to contain spills. The storage area should exhibit a sign warning of the presence and hazards of formaldehyde. Formaldehyde should not be stored with inorganic acids, caustics, strong alkalis, isocyanides, anhydrides or oxidizing agents.

XIII. **APPROVAL AUTHORITY:**

This policy shall be recommended for approval by the TTUHSC El Paso Safety Committee. The policy will be monitored for compliance by the Department of Safety Services.

XIV. **RESPONSIBILITY AND REVISIONS:**

It is the responsibility of the Department of Safety Services to review and initiate necessary revisions based on and changes to the Federal rules and regulations.