

Principal Investigator:

Date Approved:

**This document covers basic chemical safety information for formaldehyde, formalin, and paraformaldehyde. The use of formaldehyde, formalin, and paraformaldehyde is subject to approval by the Toxic Substance Committee. DO NOT USE FORMALDEHYDE, FORMALIN, OR PARAFORMALDEHYDE UNTIL YOU HAVE OBTAINED THE NECESSARY APPROVAL. Even though the use of formaldehyde, formalin, and paraformaldehyde is common in a University setting, they are considered a Particularly Hazardous Substance and are required to be used in a designated area with appropriate exposure awareness.**

## Formaldehyde, Formalin, and Paraformaldehyde

Refer to the University of Arkansas Chemical Hygiene Plan for a description of chemicals that will be considered as a Particularly Hazardous Substance (PHS).

Chemicals that meet the definition of a PHS carcinogen must be used only in a designated area where limited access, special procedures, knowledge, and work skills are required. A designated area can be the entire laboratory, a specific laboratory workbench, or a laboratory hood. Designated areas must be clearly marked with signs that identify the chemical hazard and include an appropriate warning; for example: WARNING! CARCINOGEN WORK AREA



## Exposure, Signs and Symptoms and Chemical Properties

Review the appropriate sections of the chemical specific Safety Data Sheet (SDS) for additional health and safety information. If data is lacking in any area, refer to the following sites for additional information:

<https://pubchem.ncbi.nlm.nih.gov/>

<https://druginfo.nlm.nih.gov/drugportal/>

<https://toxnet.nlm.nih.gov/index.html>

<http://web.doh.state.nj.us/rtkhsfs/indexfs.aspx>

FORMALDEHYDE is a colorless aqueous solution of formaldehyde, which is a gas at ordinary conditions. Has a pungent irritating odor. Flash point varies from 122 to 141°F. Denser than water. The vapors are heavier than air and are highly irritating to the nose. Toxic if swallowed. Contact can cause severe injury to the skin accompanied by drying, cracking, and scaling.

FORMALDEHYDE, SOLUTIONS (FORMALIN) (CORROSIVE) is a colorless liquid with a pungent irritating odor. Contains 37-50% formaldehyde by mass and varying amounts of methanol, added to prevent precipitation of formaldehyde polymers. Formalin free of methanol is also shipped but must be kept warm (about 30°C (86°F)) to prevent polymerization. Vapor from formalin solution is flammable and an explosion hazard when exposed to flame or heat. Skin and eye irritant. Confirmed carcinogen.

PARAFORMALDEHYDE is a white solid with a light pungent odor. Flammable, although may take some effort to ignite. Flash point 158°F. Used in fungicides, bactericides, and in the manufacture of adhesives. A hazard to the environment. Immediate steps should be taken to limit spread to the environment.

Exposure routes include inhalation, skin and/or eye contact. Symptoms include irritation of eyes, nose, throat, respiratory system, lacrimation (discharge of tears), and coughing and wheezing. Carcinogenic to humans. The probable oral lethal dose for humans is 0.5-5 g/kg, or between 1 ounce and 1 pint for a 150-pound person. Odor perceptible to most below 1 ppm. Will experience mild tingling of the eyes between 2-3 ppm. Increased discomfort and mild lacrimation at 4-5 ppm. Profuse lacrimation that can be withstood only for few minutes at 10 ppm. Breathing difficulty, cough, severe burning of nose and throat between 10-20 ppm. Acute irritation of respiratory tract, very serious injury likely between 50-100 ppm. Effects in women include menstrual disorders and secondary sterility. Solutions splashed in eyes have caused injuries ranging from severe, permanent corneal opacification and loss of vision to minor discomfort. In people sensitized to formaldehyde, late asthmatic reactions may be provoked by brief exposures at approximately 3 ppm. Permissible Exposure Limit: 8 Hr Time-Weighted Avg 0.75 ppm; 15 Min STEL 2 ppm.

Always use the smallest amount of chemical that is consistent with the requirements of the work performed. Understand the chemical properties and what are the likely routes of exposure based on those properties and the procedures to be performed. Use containment devices (e.g., fume hood, glove box) when substance can volatilize, when the substance is manipulated, whenever aerosols or particulates may be produced, or when an action may result in an uncontrolled release.

Contact Environmental Health and Safety (EHS) if there are any questions (479-575-5448).

## Personal Protective Equipment (PPE) & Personnel Monitoring



**Lab Coat**

Flame resistant lab coat



**Gloves**

Nitrile, chloroprene, or natural rubber gloves



**Eye Protection**

ANSI Z87.1-compliant safety glasses or safety goggles if a splash hazard is present

## Labeling & Storage

Store in secondary containment, in a well-ventilated area, away from heat, flame and from other materials that are not particularly hazardous or which may be chemically incompatible. Each container's label must include appropriate warnings and identify the material as carcinogenic, sensitizing, toxic, and an irritant. Containers of pure formaldehyde or paraformaldehyde, or flammable mixtures of formaldehyde, must also be labeled as flammable. Containers of these materials must be stored in leak-proof secondary containment within a Designated Area. The secondary container's label must include appropriate pictograms and identify the same hazards as the primary container. Also, if not plainly visible (e.g. through a cabinet window), labelling must be applied to storage locations where these are stored to avoid an inadvertent encounter.

## Engineering Controls, Equipment & Materials

### Fume Hood

Use a fume hood (or equivalent) to keep exposure to Formaldehyde as low as possible. If your protocol does not permit the handling of such materials in a fume hood, contact EH&S (479-575-5448) to perform an exposure assessment to determine whether alternative engineering controls or additional respiratory protection is necessary to keep exposures below the action level of 0.5 ppm. NOTE: The odor threshold for formaldehyde is 0.8 ppm.

## Housekeeping

### Spills

For very small spills, follow decontamination procedures using appropriate PPE; otherwise, notify others in the area (to include the supervisor) of the spill and evacuate. Call 911 and report any exposure to EHS (479-575-5448). Remain on-site (at a safe distance) to provide detailed information to first responders.

### Decontamination

Decontaminate work space with 70-75% ethanol. Wash hands and arms with soap and water after finished. Contaminated items and gloves should be discarded as hazardous waste.

### Waste

Refer to the UA Chemical Hygiene Plan for details and contact EHS (479-575-5448) for specific disposal instructions.

## First Aid & Emergencies

### Skin or Eye Contact

Remove contaminated clothing and accessories; flush affected area for at least 15 minutes with water. If symptoms persist, get medical attention/call 911.

### Inhalation

Move person into fresh air. If symptoms persist, get medical attention/call 911.

### Ingestion

Rinse mouth with water. If symptoms persist, get medical attention/call 911.

