



Safe Method of Use 17 - Formaldehyde

Exposure to formaldehyde can be irritating to the eyes, nose, and upper respiratory tract. In certain individuals, repeated skin exposure to formaldehyde can cause sensitization that may result in allergic dermatitis. Formaldehyde is a suspected human carcinogen and a suspected reproductive hazard. The aqueous solution formalin is 37-40 percent formaldehyde.

Paraformaldehyde is the crystallized polymer of formaldehyde that is weighed out and dissolved in solution for experimentation or cell and tissue fixation. Typically 3-10% formalin or paraformaldehyde solutions are used to perfuse or fix tissues.

United States OSHA has adopted a permissible exposure limit (PEL) of 0.75 ppm (parts per million) for airborne formaldehyde averaged over an 8-hour work shift (TWA), with an action level of 0.5 ppm. Formaldehyde can be smelled at less than 0.5 ppm.

A short-term exposure limit (STEL) of 2 ppm for 15 minutes has also been established. The American Conference of Governmental Industrial Hygienists (ACGIH) has established a much lower Threshold Limit Value-Ceiling for formaldehyde of 0.3 ppm, which should never be exceeded.

The World Health Organisation International Agency for Research On Cancer (IARC) reclassified formaldehyde as a substance carcinogenic to humans.

A. Minimizing Exposure to Formaldehyde

- All work with concentrated formalin solutions must be done in a chemical fume hood.
- Significant formaldehyde exposures can occur while dissecting or working with tissue specimens perfused with or fixed in formaldehyde. Chemical exposures can be minimized by working in a hood or allowing tissues to “air out” in a well-ventilated area prior to handling the specimen. Eliminating puddles of formaldehyde in the specimen by rinsing or blotting the excess with paper towels can reduce exposure.
- Gloves must be worn whenever formalin or tissues preserved or fixed with formaldehyde are handled. While latex gloves provide some

protection against formaldehyde liquids, butyl or nitrile gloves are recommended and should be worn when contact is anticipated.

- Formaldehyde splashed in the eye can cause irreversible damage to the cornea. Safety glasses must always be worn when working with formaldehyde.

B. Storage

- All solutions of formaldehyde and tissues preserved in formalin must be stored in tightly sealed, properly labelled, containers to prevent leakage, spills and evaporation.
- Solutions of formaldehyde or paraformaldehyde must be labelled. This does not include sealed specimen jars.
- Labelling must include the word “formaldehyde” and the concentration.
- Signs warning of flammability hazards should be posted on the doors to the area where over 10 gallons of formaldehyde are stored or utilized.

C. Spills

- If formaldehyde contacts the body, flush with water for at least 15 minutes in an eyewash and seek medical attention.
- Trace amounts of formaldehyde solutions, such as puddles left on a tray after fixing tissue or examining a specimen may be flushed into a sink drain using copious water to dilute the material.
- Small spills of dilute formalin solutions must be cleaned up immediately. Cover the spill with paper towel or other suitable absorbent material. Use copious amounts of water to dilute spilled material and flush absorbent pads into a sink drain using copious water to dilute the material.

D. Emergency Response Procedures:

- If the spilled formaldehyde causes eye, nose, or throat irritation, immediately clear the area, close all doors to contain vapours, and contact Lab Manager.