

Praxair™ Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Formaldehyde solutions, flammable (MSDS No. P-6224)		Trade Name: 37% Formaldehyde Aqueous Solution
Chemical Name: Mixture of formaldehyde, methanol, & water		Synonyms: Formalin
Formula: Mixture of HCHO, CH ₃ OH, & H ₂ O		Chemical Family: Aldehyde
Telephone:	Emergencies: 1-800-645-4633* CHEMTREC: 1-800-424-9300* Routine: 1-800-PRAXAIR	Company Name: Praxair, Inc. 39 Old Ridgebury Road Danbury, CT 06810-5113

* Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier, Praxair sales representative, or call 1-800-PRAXAIR (1-800-772-9247).

2. Composition/Information on Ingredients

For custom mixtures of this product, request an MSDS for each component. See section 16 for important information about mixtures.

INGREDIENT	CAS NUMBER	% BY VOL	OSHA PEL	ACGIH TLV-TWA
Formaldehyde	50-00-0	37%	0.75 ppm; 2 ppm, 15 min STEL)	0.3 ppm, (ceiling)**
Water	7732-18-5	>62%*	None currently established	None currently established
Methanol	67-56-1	0.1-0.3%	200 ppm	200 ppm; 250 ppm, 15-min STEL**

* The symbol > means "greater than;" the symbol <, "less than."

** See section 3.

3. Hazards Identification

EMERGENCY OVERVIEW

DANGER! Flammable, corrosive liquid.

May cause cancer.

May form explosive mixtures with air.

Harmful or fatal if swallowed.

Harmful if inhaled or absorbed through the skin.

Eye and skin irritant.

Self-contained breathing apparatus may be required by rescue workers.

Odor: Pungent

THRESHOLD LIMIT VALUE: TLV-Ceiling, formaldehyde, 0.3 ppm, 0.37 mg/m³ (ACGIH, 1997). TLV-TWA (skin), methanol, 200 ppm, 262 mg/m³; 15 min STEL, 250 ppm, 328 mg/m³ (ACGIH, 1997). TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations. Ceiling values are not time-weighted average.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION– Respiratory tract irritant. Causes headache, nausea, vomiting, dizziness, drowsiness, and sensory impairment, e.g., of senses of smell and sight.

SKIN CONTACT–Skin irritant; may cause burns. Prolonged and widespread contact may result in the absorption of harmful amounts of formaldehyde.

SWALLOWING–Causes severe irritation and inflammation of the mouth, throat, and stomach, accompanied by nausea, vomiting, and severe abdominal pain. May cause blindness and death.

EYE CONTACT–Severe eye irritant. Vapors may cause severe irritation and tearing. Liquid may cause permanent eye injury from chemical burns.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE: May cause skin sensitization. May cause liver and kidney damage.

OTHER EFFECTS OF OVEREXPOSURE: None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE: Formaldehyde may aggravate an existing eye, skin, or respiratory condition. The potential to cause liver and kidney injury may exacerbate existing liver and/or kidney diseases.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION: None known.

CARCINOGENICITY: ACGIH (1997) lists formaldehyde as a suspected human carcinogen (A2), because it causes cancer in experimental animals under conditions considered relevant to human exposure. Formaldehyde is listed by NTP and OSHA as a potential cancer hazard. OSHA has established OSHA Standard 1910.1048, Formaldehyde, governing its handling and use. IARC deems formaldehyde to be an animal carcinogen with insufficient evidence to link to human cancer.

4. First Aid Measures

INHALATION: Immediately remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, qualified personnel may give oxygen. Call a physician.

SKIN CONTACT: Remove contaminated clothing and shoes. Flush skin with copious quantities of water.

SWALLOWING: Do not induce vomiting. If conscious, give water or milk. Get immediate medical attention.

EYE CONTACT: Flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN: *There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.*

5. Fire Fighting Measures

FLASH POINT (test method):	152°F (66.7°C) OC	
AUTOIGNITION TEMPERATURE:	806°F (430°C)	
FLAMMABLE LIMITS IN AIR , % by volume:	LOWER: 7.0%	UPPER: 73%

EXTINGUISHING MEDIA: CO₂, dry chemical foam. Water may be ineffective. Use water spray or fog to reduce flammable vapors.

SPECIAL FIRE FIGHTING PROCEDURES: **DANGER! Flammable, corrosive liquid.** Evacuate all personnel from danger area. Remove sources of ignition if without risk. Do not extinguish any flames emitted from containers; stop flow if without risk, or allow flames to burn out. Reapproach with extreme caution using self-contained breathing apparatus. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

UNUSUAL FIRE AND EXPLOSION HAZARDS: May form explosive mixtures with air and oxidizing agents. If venting or leaking formaldehyde catches fire, do not extinguish flames. Flammable vapors are heavier than air and may spread extensively from leak, creating an explosive re-ignition hazard at considerable distances from the source. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an approved explosion meter.

HAZARDOUS COMBUSTION PRODUCTS: Formaldehyde, carbon monoxide, carbon dioxide

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: **DANGER! Flammable, corrosive liquid.** May form explosive mixtures with air. (See section 5.) Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray, taking care to prevent runoff. Shut off flow if without risk. Ventilate area. Flammable vapors may spread from spill. Before entering area, especially confined areas, check atmosphere with an appropriate device. Absorb spill with an inert material and place into containers for later disposal.

WASTE DISPOSAL METHOD: Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, state, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Never store formaldehyde in open containers or containers made of incompatible materials. (See section 10.) Store formaldehyde containers in approved storage cabinets for flammable liquids. Otherwise, separate from oxygen, chlorine, and other oxidizers by at least 20 ft (6.1 m) or use a barricade of noncombustible material. This barricade should be at least 5 ft (1.53 m) high and have a fire resistance rating of at least ½ hour. Firmly secure containers upright to keep them from falling or being knocked over. Keep valves tightly closed. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed

125°F (52°C). Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For full details and requirements, see NFPA 50A, published by the National Fire Protection Association.

PRECAUTIONS TO BE TAKEN IN HANDLING: Protect containers from damage. All piped formaldehyde systems and associated equipment must be grounded. Electrical equipment must be non-sparking or explosion-proof. Leak check system with soapy water; never use a flame. Open formaldehyde valves slowly and carefully.

For other precautions in using formaldehyde, see section 16.

8. Exposure Controls/Personal Protection

VENTILATION/ENGINEERING CONTROLS:

LOCAL EXHAUST—Use an explosion proof local exhaust ventilation system with sufficient air flow velocity to maintain the concentration of formaldehyde vapors below the TLV in the worker's breathing zone.

MECHANICAL (general)—May be the only practical control method if devices emitting formaldehyde are widely dispersed.

SPECIAL—None

OTHER—None

RESPIRATORY PROTECTION: Select in accordance with OSHA Standard 1910.1048, Formaldehyde. Respiratory protection must conform to OSHA rules as specified in 29 CFR 1910.134.

SKIN PROTECTION: Wear work gloves for container handling; plastic or rubber gloves where exposure to liquid may occur.

EYE PROTECTION: Wear safety glasses and a full face shield. Select in accordance with OSHA 29 CFR 1910.133.

OTHER PROTECTIVE EQUIPMENT: Protective clothing and footwear where needed. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133. Regardless of protective equipment, never touch live electrical parts.

9. Physical and Chemical Properties

MOLECULAR WEIGHT (HCHO):	30.03
SPECIFIC GRAVITY (H₂O = 1) at 68°F (20°C) and 1 atm:	1.075
BOILING POINT at 1 atm:	208°F (98.9°C)
APPEARANCE, ODOR, AND STATE: Clear, colorless liquid; pungent odor.	

10. Stability and Reactivity

STABILITY: ☒ Unstable ☐ Stable

INCOMPATIBILITY (materials to avoid): Strong oxidizers, strong alkalies and acids (esp. hydrochloric acid and perchloric acid), alkali metals, amines and ammonia, phenol, and reducing agents..

HAZARDOUS DECOMPOSITION PRODUCTS: Fumes of formaldehyde gas

HAZARDOUS POLYMERIZATION: ☒ May Occur ☐ Will Not Occur

CONDITIONS TO AVOID: Polymerization catalysts

11. Toxicological Information

LD₅₀=800 mg/kg, oral, rat; LD₅₀=42 mg/kg, oral, mouse; LC_{Lo}=250 mg/kg, inhalation, rat; LC_{Lo}=900 mg/kg, inhalation, mouse; LC₅₀=590 mg/kg, inhalation, mouse

12. Ecological Information

No adverse ecological effects expected. Formaldehyde does not contain any Class I or Class II ozone-depleting chemicals. Formaldehyde is not listed as a marine pollutant by DOT.

13. Disposal Considerations

WASTE DISPOSAL METHOD: See section 6.

14. Transport Information

NOTE: The information below applies to general shipment by highway or rail. Praxair normally supplies this product by pipeline.

DOT/IMO SHIPPING NAME: Formaldehyde, solutions, flammable

HAZARD CLASS: 3	IDENTIFICATION NUMBER: UN 1198	PRODUCT RQ: 100 lbs (45.4 kg)
SHIPPING LABEL(s):	FLAMMABLE LIQUID, CORROSIVE	
PLACARD (when required):	FLAMMABLE LIQUID, CORROSIVE	

SPECIAL SHIPPING INFORMATION: Containers should be transported in a secure position, in a well-ventilated vehicle. Containers transported in an enclosed, nonventilated compartment of a vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, state, and local regulations.

U.S. FEDERAL REGULATIONS:**EPA (ENVIRONMENTAL PROTECTION AGENCY)**

CERCLA: COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (40 CFR Parts 117 and 302):

Reportable Quantity (RQ): 100 lbs (45.4 kg)

SARA: SUPERFUND AMENDMENT AND REAUTHORIZATION ACT:

SECTIONS 302/304: Require emergency planning based on Threshold Planning Quantity (TPQ) and release reporting based on Reportable Quantities (RQ) of extremely hazardous substances (40 CFR Part 355):

Threshold Planning Quantity (TPQ): 500 lbs (227 kg)

Extremely Hazardous Substances (40 CFR 355): None.

SECTIONS 311/312: Require submission of MSDSs and reporting of chemical inventories with identification of EPA hazard categories. The hazard categories for this product are as follows:

IMMEDIATE: Yes

PRESSURE: No

DELAYED: Yes

REACTIVITY: Yes

FIRE: Yes

SECTION 313: Requires submission of annual reports of release of toxic chemicals that appear in 40 CFR Part 372.

Formaldehyde and methanol must be reported under Section 313.

40 CFR 68: RISK MANAGEMENT PROGRAM FOR CHEMICAL ACCIDENTAL RELEASE PREVENTION: Requires development and implementation of risk management programs at facilities that manufacture, use, store, or otherwise handle regulated substances in quantities that exceed specified thresholds.

Formaldehyde is listed as a regulated substance in quantities of 15,000 lbs (6810 kg) or greater.

TSCA: TOXIC SUBSTANCES CONTROL ACT: The components of this solution are listed on the TSCA inventory.

OSHA: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION:

29 CFR 1910.119: PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS: Requires facilities to develop a process safety management program based on Threshold Quantities (TQ) of highly hazardous chemicals.

Formaldehyde is listed in Appendix A as a highly hazardous chemical in quantities of 1,000 lbs (454 kg) or greater.

STATE REGULATIONS:

CALIFORNIA: Formaldehyde is listed by California under the SAFE DRINKING WATER TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65) as a chemical known to the state to cause cancer.

PENNSYLVANIA: This product is subject to the PENNSYLVANIA WORKER AND COMMUNITY RIGHT-TO-KNOW ACT (35 P.S. Sections 7301-7320).

16. Other Information

Be sure to read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *Flammable, corrosive liquid.* May form explosive mixtures with air. Use piping and equipment adequately designed to withstand pressures to be encountered. Use only in a closed system. Use only spark-proof tools and explosion-proof equipment. Ground all equipment. Keep away from heat, sparks, and open flame. *Never work on an operating system.* First, shut down operations. Then, in an environmentally safe manner in compliance with all federal, state, and local laws, depressurize the system and drain it of as much formaldehyde as possible before opening the system or attempting to repair any leaks. *Vapors are toxic and can cause symptoms of suffocation due to oxygen deficiency.* Store and use with adequate ventilation. Keep containers and container valves tightly closed when not in use, even when empty. *Do not eat, drink, or smoke* in areas where formaldehyde is used or stored. Wash hands and face thoroughly to clean them of any residual product before eating, drinking, smoking, using the toilet, or applying cosmetics.

MIXTURES: When you mix two or more gases or liquefied gases, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Remember, gases and liquids have properties that can cause serious injury or death.

HAZARD RATING SYSTEMS:

NFPA RATINGS:

HEALTH	= 2
FLAMMABILITY	= 2
REACTIVITY	= 0
SPECIAL	= None

HMIS RATINGS:

HEALTH	= 2
FLAMMABILITY	= 2
REACTIVITY	= 0

Ask your supplier about free Praxair safety literature. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 1725 Jefferson Davis Highway, Arlington, VA 22202-4102, Telephone (703) 412-0900.

P-14	<i>Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmospheres</i>
SB-2	<i>Oxygen-Deficient Atmospheres</i>
—	<i>Handbook of Compressed Gases, Third Edition</i>

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair MSDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current Praxair MSDSs for these products, contact your Praxair sales representative or local distributor or supplier. If you have questions regarding Praxair MSDSs, would like the form number and date of the latest MSDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (**Phone:** 1-800-PRAXAIR; **Address:** Praxair Call Center, Praxair, Inc., PO Box 44, Tonawanda, NY 14150-7891).

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