

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Methanol (MSDS No. P-4672-H)	Trade Names: Methanol, UCAR™ HTF Heat Treating Fluid
Chemical Name: Methanol	Synonyms: Methyl alcohol, carbinol, wood spirit, wood alcohol, pyroxylic spirit
Chemical Family: Alcohol	Product Grades: Not available.
Telephone:	Company Name: Praxair, Inc.
Emergencies: 1-800-645-4633*	39 Old Ridgebury Road
CHEMTREC: 1-800-424-9300*	Danbury, CT 06810-5113
Routine: 1-800-PRAXAIR	

*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. Hazards Identification

EMERGENCY OVERVIEW



DANGER! Flammable liquid, poison.
May form explosive mixtures with air.
May be fatal or cause blindness if swallowed.
Harmful if inhaled or absorbed through the skin.
May cause dizziness and drowsiness.
Self-contained breathing apparatus and protective clothing may be required by rescue workers.
Under ambient conditions, this is a clear, colorless liquid with an alcohol-like odor.

OSHA REGULATORY STATUS: This material is considered hazardous by the OSHA Hazard Communications Standard (29 CFR 1910.1200).

POTENTIAL HEALTH EFFECTS:

Effects of a Single (Acute) Overexposure

Inhalation. Dizziness, drowsiness, and disturbances of vision; tingling, numbness, and shooting pains in the hands and forearms.

Skin Contact. Prolonged contact with the skin may cause reddening and defatting of the skin. Prolonged and widespread contact may result in the absorption of harmful amounts of methanol.

Swallowing. Nausea, abdominal pain, vomiting, headache, dizziness, shortness of breath, weakness, fatigue, leg cramps, restlessness, confusion, drunken behavior, visual disturbances, drowsiness, coma, and death. There may be a delay of several hours between swallowing methanol and the onset of signs and symptoms. The effects

observed are in part due to acidosis and partially to cerebral edema. Visual effects include blurred vision, diplopia, changes in color perception, restriction of visual fields, complete blindness. Ingestion of moderate quantities of methanol also produces metabolic acidosis. Onset of symptoms may be delayed up to 48 hours. A fatal dose for most adults is 60-200 ml. Ingestion of as little as 10 ml has caused blindness. With massive overdoses, liver, kidney and heart muscle injury have been described.

Eye Contact. Liquid may cause mild redness and swelling of the conjunctiva, with transient superficial injury of the cornea.

Effects of Repeated (Chronic) Overexposure. Long-term, repeated overexposure to methanol vapor concentrations of 3000 ppm or greater may be harmful. The cumulative effects can include nausea, vomiting, headache, ringing in the ears, insomnia, trembling, unsteady gait, vertigo, clouded and double vision. Liver and/or kidney injury may occur. Prolonged overexposure at levels of 800-1000 ppm may result in severe eye damage in some persons.

Other Effects of Overexposure. None known.

Medical Conditions Aggravated by Overexposure. By defatting skin tissues, methanol may aggravate an existing skin condition such as eczema. The potential of methanol to cause liver and kidney injury may exacerbate existing liver and/or kidney diseases.

CARCINOGENICITY: Methanol is not listed by NTP, OSHA, or IARC.

POTENTIAL ENVIRONMENTAL EFFECTS: For further information, see section 12, Ecological Information.

3. Composition/Information on Ingredients

See section 16 for important information about mixtures.

COMPONENT	CAS NUMBER	CONCENTRATION
Methanol	67-56-1	>99%*

*The symbol > means "greater than."

4. First Aid Measures

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

SKIN CONTACT: Remove contaminated clothing and flush skin thoroughly with water.

SWALLOWING: Give two glasses of water and induce vomiting. Call a physician urgently. Administer ethanol (whiskey, brandy, etc.), 30 ml every 3 hours, until medical assistance is obtained.

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. Immediately see a physician, preferably an ophthalmologist.

NOTES TO PHYSICIAN: *The combination of visual disturbances, metabolic acidosis, and formic acid in the urine is evidence of methanol poisoning. The therapeutic intravenous administration of ethanol (10 ml per hour) allows it to be preferentially oxidized and reduces production of methanol metabolites. Acidosis must be treated by means of intravenous sodium bicarbonate, and methanol elimination may be increased by hemodialysis as indicated. Treatment should be based on blood methanol levels and acid-base balance. Folates may be*

administered to enhance the metabolism of formaldehyde. 4-Methyl pyrazole has been suggested as an antidote: because of its alcohol dehydrogenase inhibiting effects, it reduces the production of formate and the development of metabolic acidosis. However, the value of this antidote remains to be proven in humans.

Contact the Poison Control Center in your area for additional information on patient management and follow-up.

5. Fire Fighting Measures

FLAMMABLE PROPERTIES: May form explosive mixtures with air and oxidizing agents. Heat of fire can build pressure in container and cause it to rupture.

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

PRODUCTS OF COMBUSTION: Carbon monoxide, carbon dioxide, water.

PROTECTION OF FIREFIGHTERS: DANGER! Flammable liquid, poison. Evacuate all personnel from danger area. Immediately spray containers with water from maximum distance until cool, taking care not to extinguish flames. Remove sources of ignition if without risk. Remove all containers from the fire area if without risk; continue cooling water spray while moving cylinders. Do not extinguish any flames emitted from containers; stop flow of gas if without risk, or allow flames to burn out. Reapproach with extreme caution using self-contained breathing apparatus and protective clothing. On-site fire brigades must comply with OSHA 29 CFR 1910.156.

Specific Physical and Chemical Hazards. No part of a container should be subjected to a temperature higher than 125°F (52°C). Methanol containers are equipped with a pressure-relief device. (Exceptions may exist where authorized by DOT.) If venting or leaking methanol catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive re-ignition hazard. 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.

Protective Equipment and Precautions for Firefighters. Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

DANGER! Flammable liquid, poison.

Personal Precautions. May form explosive mixtures with air. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus and protective clothing where needed. Remove all sources of ignition if without risk. Reduce vapors with fog or fine water spray. Shut off flow if without risk. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from spill. Before entering area, especially confined areas, check atmosphere with an appropriate device. Cover spill with an absorbent or flush with water, taking care to prevent runoff.

Environmental Precautions. 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 HANDLING: May form explosive mixtures with air. Keep away from heat, sparks, and open flame. Use only spark-proof tools and explosion-proof equipment. Protect containers from damage. Use a suitable hand truck or mechanical device to move containers; do not drag, roll, slide, or drop. Leak check system with soapy water; never use a flame. Open methanol valves slowly and carefully.

PRECAUTIONS TO BE TAKEN IN STORAGE: Store and use with adequate ventilation. Separate methanol containers 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) 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. Never store methanol in open containers or containers made of incompatible materials. 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 cylinders for long periods.

RECOMMENDED PUBLICATIONS: For further information on storage, handling, and use, see NFPA 30, *Flammable and Combustible Liquids Code*, published by the National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101; 1-800-344-3555; www.nfpa.org.

8. Exposure Controls/Personal Protection

COMPONENT	OSHA PEL	ACGIH TLV-TWA (2009)
Methanol	200 ppm, 260 mg/m ³	200 ppm; 250 ppm, 15 min. STEL

TLV-TWAs should be used as a guide in the control of health hazards and not as fine lines between safe and dangerous concentrations.

IDLH = 6000 ppm

ENGINEERING CONTROLS:

Local Exhaust. Use an explosion-proof local exhaust ventilation system with sufficient air flow velocity to maintain the concentration of methanol vapors below the exposure limit in a worker's breathing zone.

Mechanical (General). Not recommended as a primary ventilation system to control worker's exposure.

Special. Use only in a closed system.

Other. None

PERSONAL PROTECTIVE EQUIPMENT:

Skin Protection. Wear work gloves for container handling; nitrile gloves where exposure to liquid may occur. Wear metatarsal shoes for cylinder handling; protective clothing where needed. Select in accordance with OSHA 29 CFR 1910.132 and 1910.133.

Eye/Face Protection. Wear safety glasses and a full face shield. Select in accordance with OSHA 29 CFR 1910.133.

Respiratory Protection. A respiratory protection program that meet OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable) requirements must be followed whenever workplace conditions warrant respirator use. Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure (e.g., an organic vapor cartridge). For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus.

9. Physical and Chemical Properties
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APPEARANCE:	Colorless liquid	
ODOR:	Alcohol-like odor	
ODOR THRESHOLD:	Not available.	
PHYSICAL STATE:	Liquid at normal temperature and pressure	
pH:	Not applicable.	
FREEZING POINT at 1 atm:	-143.9°F (-97.7°C)	
BOILING POINT at 1 atm:	148.4°F (64.66°C)	
FLASH POINT (test method):	52°F (11.1°C) TCC	
EVAPORATION RATE (Butyl Acetate = 1):	High	
FLAMMABILITY:	Flammable	
FLAMMABLE LIMITS IN AIR , % by volume:	LOWER: 6.0%	UPPER: 36.5%
VAPOR PRESSURE at 68°F (20°C):	1.86 psia (12.82 kPa abs)	
VAPOR DENSITY at 70°F (21.1°C) and 1 atm:	Not applicable.	
SPECIFIC GRAVITY (H ₂ O = 1) at 39.2°F (4°C):	0.7924	
SPECIFIC GRAVITY (Air = 1) at 70°F (21.1°C) and 1 atm:	1.11	
SOLUBILITY IN WATER 68°F (20°C):	Complete	
PARTITION COEFFICIENT: n-octanol/water:	Not available.	
AUTOIGNITION TEMPERATURE:	725°F (385°C)	
DECOMPOSITION TEMPERATURE:	Not available.	
PERCENT VOLATILES BY VOLUME:	100	
MOLECULAR WEIGHT:	32.04	
MOLECULAR FORMULA:	CH ₃ OH	

10. Stability and Reactivity

CHEMICAL STABILITY: Unstable Stable

CONDITIONS TO AVOID: None known.

INCOMPATIBLE MATERIALS: Acids, alkali metals, halogens, halogen compounds, oxidizing agents, lead and its alloys, magnesium, and Viton™ (fluoroelastomer).

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may produce H₂.

POSSIBILITY OF HAZARDOUS REACTIONS: May Occur Will Not Occur

Thermal decomposition may produce H₂.

11. Toxicological Information

ACUTE DOSE EFFECTS: LC₅₀, 4 hr, rat = 64,000 ppm; LD₅₀, oral, rat = 5,628 mg/kg

STUDY RESULTS: None known.

12. Ecological Information

ECOTOXICITY: No known effects.

OTHER ADVERSE EFFECTS: No adverse ecological effects expected. Methanol does not contain any Class I or Class II ozone-depleting chemicals.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

DOT/IMO SHIPPING NAME: Methanol

HAZARD CLASS:	PACKING GROUP/Zone:	IDENTIFICATION NUMBER:	PRODUCT RQ:
3	II	UN1230	5000 lb (2270 kg)

SHIPPING LABEL(s): FLAMMABLE LIQUID, POISON

PLACARD (when required): FLAMMABLE LIQUID, POISON

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

MARINE POLLUTANTS: Methanol is not listed as a marine pollutant by DOT.

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): 5000 lb (2270 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 (EHS) (40 CFR Part 355):

TPQ: None

EHS RQ (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

DELAYED: Yes

PRESSURE: No

REACTIVITY: No

FIRE: Yes

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

Methanol is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA) and 40CFR Part 372.

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.

Methanol is not listed as a regulated substance.

TSCA: TOXIC SUBSTANCES CONTROL ACT: Methanol is 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.

Methanol is not listed in Appendix A as a highly hazardous chemical. However, any process that involves a flammable liquid on site in one location in quantities of 10,000 lb (4536 kg) or greater is covered under this regulation unless the liquid is used as a fuel.

STATE REGULATIONS:

CALIFORNIA: Methanol is not listed by California under the SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 (Proposition 65).

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

16. Other Information

Read and understand all labels and instructions supplied with all containers of this product.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE: *Flammable liquid, poison.* Use piping and equipment adequately designed to withstand pressures to be encountered. Use a backflow prevention device in any piping. Use only in a closed system. All piped methanol systems and associated equipment must be grounded. Electrical equipment must be non-sparking or explosion-proof. 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 methanol 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.

Furnace gas atmospheres produced using methanol and nitrogen are toxic, flammable, and will not support life. These atmospheres contain substantial quantities of carbon monoxide (CO), hydrogen (H₂), and nitrogen (N₂). CO is a toxic gas with a TLV-TWA of 25 ppm (ACGIH 2009). CO and H₂ are highly flammable gases and form explosive mixtures with air. Since furnace atmospheres contain no oxygen, they are suffocating and will not support life. Furnace atmospheres must be burned and the exhaust vented to a safe location. For more information, request a copy of Praxair's free booklet P-14-039, *Safe Handling of Methanol in Furnace Atmospheres*.

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	= 1
FLAMMABILITY	= 3
INSTABILITY	= 0
SPECIAL	= None

HMIS RATINGS:

HEALTH	= 1
FLAMMABILITY	= 3
PHYSICAL HAZARD	= 0

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information can be found in the following materials published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, <http://www.cganet.com/Publication.asp>.

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

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