

Supplied by: Startex Chemical, Inc.  
P.O. Box 3087  
Conroe, TX 77305  
(936) 539-6244

Material Safety Data Sheet

# Methanol

MSDS Number 2016 (Revised April 1, 2001)

8 Pages

## 1. CHEMICAL PRODUCT and EMERGENCY TELEPHONE CONTACT

Product Name..... : Methanol  
Chemical Family..... : Aliphatic Alcohol  
Synonyms..... : Carbinol, Columbian Spirits, Methyl Alcohol,  
Pyroligneous Spirits, Wood Alcohol, Methylol,  
Wood Naphtha, Wood Spirits, Manhattan Spirits,  
Pyroxylic Spirits, Colonial Spirits,  
Methyl Hydroxide, Monohydroxymethane  
Formula..... : CH<sub>3</sub>OH

### EMERGENCY TELEPHONE NUMBER

CHEMTREC..... : 800-424-9300

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name/CAS Number	Concentration	Exposure Limits
Methanol #67-56-1	99-100%	200 ppm TWA 250 ppm STEL 6000 ppm IDLH (1 ppm = 1.33 mg/m <sup>3</sup> )

## 3. HAZARDS IDENTIFICATION

### EMERGENCY OVERVIEW

Methanol is a colorless volatile liquid with a faintly sweet pungent odor similar to ethyl alcohol. The substance is fully soluble in water. Vapors of methanol are slightly heavier than air and may travel some distance to a source of ignition and flash back. Accumulations of vapors in confined spaces such as buildings or sewers may explode if ignited. There is potential for containers of liquid to rupture violently if exposed to fire or excessive heat for sufficient time duration. Methanol is listed as a "Poison-Class B". It is harmful if swallowed or absorbed through the skin. Ingestion of as little as one ounce can cause irreversible injury to the nervous system, blindness, or death. It can not be made non-poisonous. Causes eye and respiratory system irritation and may cause skin irritation. Avoid liquid, mist, or vapor contact. Vapor inhalation or liquid penetration of the skin can cause central nervous system depression.

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## **POTENTIAL HEALTH EFFECTS**

**Primary Routes of Entry:** Inhalation, skin contact/absorption, eye contact, and ingestion.  
**General Acute Exposure:** Liquid, mist, or vapors can cause eye, skin, and respiratory tract irritation and Central Nervous System (CNS) depression.

### **Inhalation**

**Acute Exposure:** Short term exposure to high concentrations of methanol may cause CNS depression. Symptoms may include headache, weakness, drowsiness, lightheadedness, nausea, difficult breathing, drunkenness, eye irritation, blurred vision, blindness, loss of consciousness, vertigo, fatigue, convulsions, and possibly death, depending on exposure. Victims may improve and then get worse again up to 30 hours later.

### **Skin**

**Acute Contact:** Upon prolonged or repeated contact, absorption through the skin may occur and produce toxic effects similar to those resulting from inhalation exposure. Repeated or prolonged skin contact may cause drying, cracking, and inflammation of the skin due to the defatting action of the product.

### **Eye**

**Acute Contact:** Eye irritation may occur upon short-term exposure, including a burning sensation, tearing, redness, or swelling. Upon direct contact with liquid, conjunctivitis and corneal burns may occur. The primary toxic effect of methanol is exerted upon the nervous system, particularly the optic nerves and possibly the retina. The condition can progress to permanent blindness.

### **Ingestion**

Ingestion may cause serious poisoning with effects similar to those of inhalation and absorption through the skin. Toxic effects are more common after ingestion. Death from as little as one ounce has been reported.

### **Neurologic**

**Acute Exposure:** Central Nervous System (CNS) depression may occur upon exposure.

### **Summary of Chronic Exposure**

Methanol is slowly eliminated from the body, hence repeated exposures may result in toxic levels in the blood and tissues. Due to its slow elimination, methanol should be regarded as a cumulative poison. Though single exposures to fumes may cause no harmful effect, daily exposure may result in the accumulation of sufficient methanol in the body to cause illness.

**Note to the Physician:** Coma resulting from massive exposures may last as long as 2-4 days. In the body, products formed by its oxidation are formaldehyde and formic acid.

### **Carcinogenicity:**

NTP..... : Not Listed  
IARC..... : Not Listed  
OSHA..... : Not Regulated

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**Medical Conditions Aggravated by Exposure:** Personnel with pre-existing CNS disease, skin disorders, impaired liver or kidney function, GI tract disorders or chronic respiratory diseases should avoid exposure.

#### **4. FIRST AID MEASURES**

**First Aid for Eyes:** Immediately flush eyes with copious amounts of tepid water for at least 15 minutes. The patient should be seen in a health care facility and referral to an ophthalmologist considered.

**First Aid for Skin:** Immediately flush exposed area with copious amounts of tepid water for at least 15 minutes while removing contaminated clothing and shoes, followed by washing area thoroughly with soap and water. The patient should be seen in a health care facility if irritation or pain persists or if symptoms of toxicity develop. Wash contaminated clothing and shoes before reuse.

**First Aid for Inhalation:** Move patient to fresh air and keep warm and at rest. Monitor for respiratory distress. If difficulty in breathing develops or if breathing has stopped, administer artificial respiration and seek medical attention. If trained to do so administer supplemental oxygen with assisted ventilation as required. *Caution:* Administration of mouth-to-mouth resuscitation may expose the first aid provider to chemical within the victim's lungs or vomit.

**First Aid for Ingestion:** If patient is conscious, immediately give two glasses of water and induce vomiting. Do not make an unconscious person vomit. Get medical attention immediately. NOTE: NIOSH suggests that vomiting be induced only if immediate medical attention is not available.

**Note to Physician:** Provide standard methanol ingestion treatment. To prepare the antidote, make a solution using 100 ml of 100-proof ethyl alcohol (grain alcohol) in 2000 ml of water and give 1.5 ml per kg of body weight, or 100 ml for an average adult. Following this, at 2-hour intervals for 4 days, give the antidote (0.5-1.0 ml per kg of body weight, orally or intravenously to reduce the metabolism of the methanol and to allow time for its excretion). Blood ethanol levels should be 1.0-1.5 mg/L.

#### **5. FIRE FIGHTING MEASURES**

Flash Point..... : 52° F, closed cup  
Lower Flammable Limit..... : 6.0 % Volume in Air  
Upper Flammable Limit..... : 36.5 % Volume in Air  
Autoignition Temperature..... : 725° F, 385° C

**General Information:**

Methanol is extremely flammable! This material releases vapors at or below ambient temperatures. When mixed with air this substance can burn in the open or explode in confined space conditions. Methanol vapors are heavier than air and may travel long distances along the ground before reaching a point of ignition and flashing back. Methanol-water mixtures containing as little as 21% methanol by volume (25% by weight) are also flammable liquids. Methanol fires may not be visible to the naked eye during daylight.

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**Extinguishing Media:**

Water may be ineffective but may be used to dilute spills to nonflammable mixtures.

Small Fire..... : Dry chemical, CO<sub>2</sub>, water spray or alcohol-resistant foam  
Large Fire..... : Water spray, fog or alcohol-resistant foam

**Special Fire Fighting Procedures:**

- a. Move container from fire area if you can do it without risk.
- b. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Stay away from ends of tanks due to exploding potential when tanks are involved in a fire.
- c. Dike fire control water for later disposal, do not scatter the material.
- d. Do not use straight streams due to spreading of methanol.
- e. Positive pressure self-contained breathing apparatus (SCBA) should be used when there is a potential for inhalation of vapors and/or fumes.
- f. Structural fire fighter's protective clothing is recommended for fire situations ONLY; it is not effective in spill situations.

**Fire involving Tanks or Rail Car/Trailer Loads**

- a. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- b. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- c. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.
- d. Isolate area for 1/2 mile in all directions.

**6. ACCIDENTAL RELEASE MEASURES**

**Spill or Leak Measures:** Stop leak if you can do it without risk. Keep unnecessary people away and deny entry. Isolate spill or leak area immediately for at least 330 to 660 feet in all directions. Stay upwind, out of low areas, and ventilate closed spaces before entering. Eliminate all ignition sources. Do not touch or walk through spilled material. Prevent entry of product into waterways, sewers, basements, or confined spaces. A vapor suppressing foam may be used to reduce vapors. All equipment used when handling the product must be grounded and/or spark resistant. Water spray may reduce vapors but may not prevent ignition in closed spaces. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

**Determining Spill Size:** Generally, a small spill is one which involves a single, small package (i.e. up to a 55 gallon drum), small cylinder, or a small (non-continuing) leak from a large container.

- Small Spill:**
- a. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal.
  - b. Use clean non-sparking tools to collect absorbed material.

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- Large Spill:**
- Dike far ahead of liquid spill for later disposal.
  - Follow local emergency protocol for handling.
  - Water spray may reduce vapor; but may not prevent ignition in closed spaces.

## **7. HANDLING AND STORAGE**

Handling and storage for methanol should follow the standards listed below. Other standards or regulations may apply which are not listed.

- National Electrical Code; Hazard Classification for Methanol is Class I, Div. 1 or 2, Group D.
- NEPA No. 30, "Flammable and Combustible Liquids Code".

**Handling Precautions:** Use proper personal protective equipment when working with or around methanol. See Section 8.

## **8. EXPOSURE CONTROLS, PERSONAL PROTECTION**

### **Respiratory Protection Requirements:**

- <200 ppm: No protection required.
- 200 to 250 ppm: Protection required if the daily TWA is exceeded, a fresh air supplied system must be used if protection is needed.
- >250 ppm: A fresh air supply system must be used (i.e. positive pressure self contained breathing apparatus)

**Skin Protection Requirements:** Equipment should prevent repeated or prolonged skin contact with the product. This may include rubber boots, resistant gloves, and other impervious and resistant clothing. Compatible materials may include butyl rubber, natural rubber, neoprene, nitrile rubber, viton and others. Review the equipment manufacturer's compatibility data.

**Eye Protection Requirements:** Use chemical (indirectly vented) goggles when there is a potential for contact with product, including vapor. A full-face shield may be worn over goggles for additional protection, but not as a substitute for goggles.

**Other Protective Equipment:** Safety shower and eyewash fountain should be provided in the methanol handling area. Proper fire extinguishment equipment must be kept in the handling area.

**Engineering Controls:** Adequate ventilation to keep methanol concentrations below applicable standards when possible.

**NOTE:** See Section 2 for regulatory exposure guidelines.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form.....	: Liquid
Color.....	: Colorless
Odor.....	: Faintly sweet pungent odor like ethyl alcohol
Boiling Point.....	: 148° F at atmospheric pressure
Melting point.....	: -144° F
pH.....	: 7.2
Solubility.....	: 100%
Specific Gravity.....	: 0.792 (@ 68° F)
Vapor Density.....	: 1.11 (@ 60° F)
Vapor Pressure.....	: 1.86 psia (@ 68° F)
% Volatile by Volume.....	: 100
Molecular Weight.....	: 32.04
Density.....	: 6.63 lb. per gallon (@ 60° F)
Critical Temperature.....	: 464° F
Critical Pressure.....	: 1142 psia

## 10. REACTIVITY

Stability.....	: This is a stable material.
Hazardous Polymerization.....	: Will not occur.

### **Decomposition:**

Excessive heating and/or incomplete combustion will generate carbon monoxide, formaldehyde, and possibly unburned methanol.

### **Incompatibilities:**

- Methanol has an explosive reaction with chloroform + sodium methoxide and diethyl zinc (see note following).
- Methanol has a violent reaction with alkyl aluminum salts, acetyl bromide, chloroform + sodium hydroxide, cyanuric chloride, nitric acid, etc. (see note following)
- Incompatible with beryllium dihydride, metals (potassium, magnesium, etc.), oxidants (barium, perchlorate, bromine, chlorine, etc.), etc. (see note following)
- Dangerous; can react vigorously with oxidizing materials. (see note following)

**NOTE:** The incompatibilities above is a partial list taken from two books by Sax & Lewis: "Dangerous Properties of Industrial Materials", 9th. ed., 1995 and "Hawley's Condensed Chemical Dictionary", 11th. ed. 1987, both published by Van Nostrand Reinhold Company, New York. It is recommend that if additional information is needed, refer to these and other published information.

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**11. TOXICOLOGICAL INFORMATION**

LDLo Human..... : 143 mg/kg; Eye, Pul, GIT  
LD<sub>50</sub> Mouse..... : 7300 mg/kg  
LC<sub>50</sub> Rat..... : 64,000 ppm / 4 hours  
LC<sub>50</sub> Goldfish..... : 250 ppm / 11hours

**12. ECOLOGICAL INFORMATION**

- a. Methanol is harmful to aquatic life in low concentrations and may be hazardous if it enters water intakes.
- b. Local health and wildlife authorities, as well as operators of water intakes in the vicinity, should be notified of water releases.
- c. Biological Oxygen Demand: 0.6 to 1.12 lb./lb. in 5 days

**13. DISPOSAL CONSIDERATIONS**

Waste must be disposed of in accordance with federal, state, and local environmental control regulations. Waste methanol in concentrations equal to or greater than 24 % by weight meets the definition of an ignitable hazardous waste. Product grade methanol, when disposed, is a listed hazardous waste.

For large spills, maximize product recovery for reuse or recycling. Free liquid may be collected using explosion-proof pumps. For small spills, take up with sand or other non-combustible absorbent. Use registered transporters to move contaminated product/soil/water in D.O.T. approved containers. Dispose of materials at a licensed facility permitted to handle RCRA "Hazardous Wastes". Incineration is the recommended disposal method. Burn concentrated liquid in systems compatible with water soluble waste. Biodegradation may be used on dilute aqueous waste. Assure emissions and effluent comply with applicable laws.

**14. TRANSPORTATION INFORMATION**

D.O.T. Shipping Name..... : Methanol  
D.O.T. Hazard Class..... : Flammable Liquid, Class 3  
U.N. / N A. Number..... : 1230  
D.O.T. Placard..... : Flammable Liquid, Class 3, color: red  
OSHA Label Required..... : Yes  
RQ (Reportable Quantity)..... : 5000 pounds or appx. 755 gallons  
STCC Number..... : 4909230

**15. REGULATORY INFORMATION**

OSHA: This product is considered a hazardous material under criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.

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**SARA TITLE III:**

- a. EHS (Extremely Hazardous Substances) List: Not Listed  
Note: Chemicals on the original list that do not meet the toxicity criteria but because of their high production volume and recognized toxicity are considered chemicals of concern ("other chemicals").
- b. RQ (Reportable Quantity): Not Listed
- c. TPQ (Threshold Planning Quantity): Not Listed
- d. Section 313: "Specific Toxic Chemical Listings" - 40 CFR Part 372  
Methanol is subject to the reporting requirements of Section 313 and 40 CFR Part 372. Terra Nitrogen is required by 40 CFR 372.45 to notify certain customers as to which of its mixture or trade name products contain those chemicals. The purpose of that notification is to ensure that facilities that may be subject to reporting requirements of Section 313 and that use products of unknown formulation will have knowledge that they are receiving products that contain chemicals subject to those reporting requirements.

**CERCLA Hazardous Substances List:**

- a. RQ (Reportable Quantity): 5000 pounds or appx. 755 gallons
- b. Regulation: "Designation, Reportable Quantities, Notification" - 40 CFR 302

**TSCA Inventory:**

Listed (RTECS)

**16. OTHER INFORMATION**

Nov. 5, 1996: The MSDS was rewritten to comply with ANSI Standard Z400.1-1993.

Feb. 16, 1999: Revised to make minor typographical and editorial changes.

April 1, 2001: Revised to change the mailing address of Terra Nitrogen Corporation and to make minor editorial changes.

The information and recommendations herein are taken from data contained in independent, industry recognized references including but not limited to NIOSH, OSHA, NFPA, D.O.T. ERG, CHRIS, and SAX's Dangerous Properties of Industrial Materials. Thus, Terra Nitrogen Corporation makes no guarantee, warranty or other representation concerning this substance, since conditions of its use are beyond the control of the company. Terra Nitrogen Corporation disclaims any liability for loss or damage incurred in connection with the use of this substance.