

MATERIAL SAFETY DATA SHEET

METHANOL

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Ontario Competition Fuels
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Mississauga, ON
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WHMIS#: 00060463
Index: GCD0187/11A
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www.profuels.ca

EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)

Toronto, ON (416) 226-6117
Edmonton, AB (780) 424-1754

Montreal, QC (514) 861-1211
Calgary, AB (403) 263-8660

Winnipeg, MB (204) 943-8827
Vancouver, BC (604) 685-5036

PRODUCT IDENTIFICATION

Product Name: Methanol.
Chemical Name: Methyl Alcohol.
Synonyms: Methyl Hydrate; Wood Spirit; Carbinol; Colonial Spirit; Columbian Spirit; Methyl Hydroxide; Wood Naphtha; Wood Alcohol; Methanol with Additive.
Chemical Family: Alcohol.
Molecular Formula: CH₃-OH.
Product Use: Industrial solvent, cleaner, degreaser. Fuel for heaters and wick lamps. Automotive coolant/antifreeze. Chemical intermediate. Lacquer thinner.

WHMIS Classification / Symbol:

B-2: Flammable Liquid
D-1B: Toxic (acute effects)
D-2A: Very Toxic (teratogen)
D-2B: Toxic (eye irritant)



READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)

<i>Ingredient</i>	<i>CAS#</i>	<i>ACGIH TLV</i>	<i>% Concentration</i>
Methanol	67-56-1	200 ppm (Skin)	60 - 100

Skin Notation: Contact with skin, eyes and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Poison. May be fatal or cause blindness if swallowed. Can cause teratogenic effects. Causes eye irritation. Mists or sprays are irritating to eyes and respiratory tract. At elevated temperatures may cause irritation of the eyes and respiratory tract. See "Other Health Effects" Section. Flammable liquid and vapour. May cause flash fire or explosion. Can decompose at high temperatures forming toxic gases. Contents may develop pressure on prolonged exposure to heat.

POTENTIAL HEALTH EFFECTS

Inhalation: Contact with mist or spray will cause irritation of mucous membranes, coughing and difficulty in breathing. See "Other Health Effects" Section.

Skin Contact:	Prolonged and repeated contact may lead to dermatitis. May cause defatting, drying and cracking of the skin. Skin contact can cause irritation, especially under the finger nails (and other confined spaces such as under rings or watch bands).
Skin Absorption:	May be absorbed through intact skin.
Eye Contact:	Vapours from this product are irritating to the eyes. Splashes to the eye may cause irritation, redness and pain. Product residues on fingers, hands or gloves may contact the eyes and cause eye irritation, redness and pain.
Ingestion:	This product causes irritation, a burning sensation of the mouth and throat and abdominal pain.
Other Health Effects:	Effects (irritancy) on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential. May cause visual disturbances, blindness, photophobia, central nervous system (CNS) depression, liver damage, kidney damage, metabolic acidosis, endocrine effects, systemic poisoning and death. Mild blurring of vision to complete blindness may occur, including changes in colour perception and photophobia. Symptoms usually develop 12-18 hours after exposure. Abnormal sensitivity to light is termed photophobia. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination. Severe overexposures may lead to coma and possible death due to respiratory failure. Liver damage is characterized by the loss of appetite, jaundice (yellowish skin colour), and occasional pain in the upper left-hand side of the abdomen. Signs and symptoms of kidney damage generally progress from oliguria, to blood in the urine, to total renal failure. Metabolic acidosis is a condition that describes a decreased pH and bicarbonate concentration in the body fluids.

4. FIRST AID MEASURES

FIRST AID PROCEDURES

Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Obtain medical attention IMMEDIATELY.
Skin Contact:	Start flushing while removing contaminated clothing. Wash affected areas thoroughly with soap and water. If irritation, redness, or a burning sensation develops and persists, obtain medical advice.
Eye Contact:	Immediately flush eyes with running water for a minimum of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention IMMEDIATELY.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. IMMEDIATELY contact local Poison Control Centre. Vomiting should only be induced under the direction of a physician or a poison control centre. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. IMMEDIATELY transport victim to an emergency facility.
Note to Physicians:	This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed. When plasma methanol concentrations are higher than 20 mg/dL, when ingested doses are greater than 30 mL, and when there is evidence of acidosis or visual abnormalities, a 10% solution of ethanol in 5% aqueous dextrose, administered intravenously, is a safe, effective antidote. (3) Medical conditions that may be aggravated by exposure to this product include neurological and cardiovascular disorders, diseases of the skin, eyes or respiratory tract, preexisting liver and kidney disorders.

5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	Autoignition Temperature (°C)	Flammability Limits in Air (%):	
		LEL	UEL
11. (3)	385. (3)	5.5. (3, 4)	36. (3)
Flammability Class (WHMIS):	B-2: Flammable Liquid		
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include formaldehyde and oxides of carbon.		

Unusual Fire or Explosion Hazards:	Vapours from this product are heavier than air, and may "travel" to a source of ignition (eg. pilot lights, heaters, electric motors) some distance away, and then "flash back" to the point of product discharge causing an explosion and fire. Closed containers exposed to heat may explode. Spilled material may cause floors and contact surfaces to become slippery.
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.
Rate of Burning:	Not available.
Explosive Power:	Not available.
Sensitivity to Static Discharge:	Expected to be sensitive to static discharge when vapours are present between the lower and upper explosive limits.

EXTINGUISHING MEDIA

Fire Extinguishing Media: Use carbon dioxide or dry chemical media for small fires. If only water is available, use it in the form of a fog. This material may produce a floating fire hazard in extreme fire conditions.

FIRE FIGHTING INSTRUCTIONS

Instructions to the Fire Fighters: Use water spray to cool fire-exposed containers or structures. Use water spray to disperse vapours; re-ignition is possible.

Fire Fighting Protective Equipment: Use self-contained breathing apparatus and protective clothing.

6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures: In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS. Wear protective clothing. Do not use combustible materials such as sawdust as an absorbent. Eliminate all sources of ignition. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

7. HANDLING AND STORAGE

HANDLING

Handling Practices: Ground and bond equipment and containers to prevent a static charge buildup. Use spark-resistant tools and avoid "splash-filling" of containers. Use normal "good" industrial hygiene and housekeeping practices. Containers exposed to heat may be under internal pressure. These should be cooled and carefully vented before opening. A face shield and apron should be worn. Vent container frequently, and more often in warm weather, to relieve pressure. Absorption via contact with skin, eyes and mucous membranes can contribute to the overall exposure. Consider measures to prevent absorption by these routes.

Ventilation Requirements: See Section 8, "Engineering Controls".

Other Precautions: Use only with adequate ventilation and avoid breathing vapours and aerosols. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use. Do not use cutting or welding torches on empty drums that contained this material/product. Store wiping rags and similar material in metal cans with tight fitting lids. Enforce NO SMOKING rules in area of use.

STORAGE

Storage Temperature (°C): See below.

Ventilation Requirements: Ventilation should be explosion proof.

Storage Requirements: Store in a cool, well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Do not expose sealed containers to temperatures above 40° C. Avoid moisture contamination. Protect from direct sunlight. Protect against physical damage.

Special Materials to be Used for Packaging or Containers: Equipment for storage, handling or transport should NOT be made from the following material, or, where applicable, its alloys: lead, nickel, cast iron, copper, zinc, galvanized steel or aluminum. Confirm suitability of any material before using.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

ENGINEERING CONTROLS

Engineering Controls: Local exhaust ventilation required. Ventilation should be explosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense vapours may collect.

For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue. Use the "buddy" system. The second person should be in view and trained and equipped to execute a rescue. (4)

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Eye Protection: Safety glasses with side shields are recommended to prevent eye contact. Use chemical safety goggles when there is potential for eye contact. Contact lenses should not be worn when working with this material.

Skin Protection: Gloves and protective clothing made from butyl rubber or viton should be impervious under conditions of use. Prior to use, user should confirm impermeability. Do not use gloves or protective clothing made from natural rubber, neoprene, nitrile rubber or polyvinyl alcohol (PVA). Discard contaminated gloves.

Respiratory Protection: A NIOSH/MSHA-approved air-purifying respirator equipped with organic vapour cartridges for concentrations up to 200 ppm. A NIOSH/MSHA-approved full facepiece air-supplied respirator if concentrations are higher or unknown.

If while wearing a respiratory protection, you can smell, taste or otherwise detect anything unusual, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator to face seal is still good. If it is, replace the filter, cartridge or canister. If the seal is no longer good, you may need a new respirator. (4)

Methanol: Immediately Dangerous to Life and Health (IDLH) value: 6 000 ppm. The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory equipment. In the event of failure of respiratory protective equipment, every effort should be made to exit immediately. (4)

Other Personal Protective Equipment: Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

Clothing and footwear that is fire retardant and dissipates static electrical charges should be worn when handling flammable materials. Natural fibers (cotton, wool, leather and linen) should be selected in favour of synthetic materials (rayon, nylon and polyester).

Skin Notation: Contact with skin, eyes and mucous membranes can contribute to the overall exposure and may invalidate the TLV. Consider measures to prevent absorption by these routes.

EXPOSURE GUIDELINES

SUBSTANCE	ACGIH TLV (STEL)	OSHA PEL		NIOSH REL	
		(TWA)	(STEL)	(TWA)	(STEL)
Methanol	250 ppm (Skin)	200 ppm	—	200 ppm (Skin)	250 ppm (Skin)

9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)

Physical State:	Liquid.
Appearance:	Clear, colourless liquid.
Odour:	Mild alcohol odour.
Odour Threshold (ppm):	4.2 - 5 960. (3)
Boiling Range (°C):	64.7. (3)
Melting/Freezing Point (°C):	- 97.8. (3)
Vapour Pressure (mm Hg at 20° C):	96. (3)
Vapour Density (Air = 1.0):	1.11. (3)
Relative Density (g/cc):	0.786 - 0.793. (3)

Bulk Density:	Not available.
Viscosity:	Not available.
Evaporation Rate (Butyl Acetate = 1.0):	4.1. (3)
Solubility:	Soluble in water. Hygroscopic (readily absorbs water).
% Volatile by Volume:	100.
pH:	Not applicable.
Coefficient of Water/Oil Distribution:	< 0. (3)
Volatile Organic Compounds (VOC):	100.
Flashpoint (°C):	11. (3)

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY

Under Normal Conditions:	Stable.
Under Fire Conditions:	Flammable.
Hazardous Polymerization:	Will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames and all other sources of ignition.
Materials to Avoid:	Strong oxidizers, Lewis or mineral acids, Sulphuric Acid, Hydrogen Peroxide, Lead, Aluminum and its alloys, Magnesium, Platinum, Nickel, Cast Iron, Copper and its alloys, Zinc and its alloys, Galvanized Steel. Mixtures or reactions of alcohols with the following materials may cause explosions: barium perchlorate, chlorine, hypochlorous acid, ethylene oxide, hexamethylene diisocyanate and other isocyanates, nitrogen tetroxide, permonosulfuric acid and tri-isobutyl aluminum. (4)
Decomposition or Combustion Products:	Thermal decomposition products are toxic and may include formaldehyde and oxides of carbon.

II. TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA:

SUBSTANCE	LD50 (Oral, Rat)	LD50 (Dermal, Rabbit)	LC50 (Inhalation, Rat, 4h)
Methanol	5 628 mg/kg (1)	15 800 mg/kg (1)	64 000 ppm (1)
Carcinogenicity Data:	The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP.		
Reproductive Data:	No adverse reproductive effects are anticipated.		
Mutagenicity Data:	No adverse mutagenic effects are anticipated.		
Teratogenicity Data:	Methanol may cause teratogenic/embryotoxic effects based on studies in laboratory animals.		
Respiratory / Skin Sensitization Data:	None known.		
Synergistic Materials:	Alcohols may interact synergistically with chlorinated solvents (example - carbon tetrachloride, chloroform, bromotrichloromethane), dithiocarbamates (example - disulfiram), dimethylnitrosamine and thioacetamide. (4)		

Other Studies Relevant to
Material:

Methanol caused moderate skin and eye irritation when tested on rabbits using the Standard Draize Test. Methanol showed no evidence of carcinogenic potential in limited animal studies in which methanol was given orally or applied to the skin. Limited evidence of mutagenicity exists in *in vitro* mouse lymphoma forward mutation assay. There is no *in vivo* information. Methanol is reported to cause birth defects in rats exposed to very high levels of vapours (20,000 ppm). (3)

The pathologic changes found in the tissues of animals exposed by inhalation to Methyl Alcohol are quite similar to those observed in animals following ingestion of this compound. In the eyes of dogs, hyperemia (increased amount of blood) of the choroid and edema of the ocular tissue with early signs of degeneration of the ganglionic cells of the retina and nerve fibers were found. The blood vessels of the choroid in poisoned animals were markedly congested, the entire retina was edematous and the ganglion cells were degenerated. Hemorrhage, edema, congestion and pneumonia were observed in the lungs of the various species that were exposed to vapours containing Methyl Alcohol. The livers and kidneys showed congestion, albuminous and fatty acid degeneration and fatty infiltration. Cardiac dilation and myocardial degeneration were observed in the hearts of the animals. (4)

The effects of alcohol on hearing were studied in the rat by examining the modification of the acoustic startle reflexes by pure tone pulses and by gaps in white noise. Groups of rats received four injections of 0, 0.25, 1 and 2 g/Kg of Methyl Alcohol or Ethyl Alcohol in increasing order at one hour intervals, loudness perception or temporal acuity was tested after 30 minutes. Both alcohols produced a dose dependent reduction in baseline startle amplitude that was greater during exposure Ethanol than in Methanol. Loudness functions associated with pulse intensity were not diminished by the alcohols, however inhibition produced by gap in noise reduced following the highest dose of either alcohol. (4)

Mature male rats were examined for alterations in circulating free testosterone, luteinizing hormone and follicle stimulating hormone after inhalation of Methanol vapour for six weeks at doses ranging from 200 ppm to 10,000 ppm. The most extensive effects were noticed after exposure to 200 ppm Methanol for six weeks, with serum levels of testosterone being 32 % of the controls. A significant change in luteinizing hormone concentration after exposure to 10,000 ppm of methanol for six weeks was also demonstrated while follicle stimulating and the elimination of testosterone from the blood remained unchanged throughout the experiment. (4)

The result of skin absorption experiments were described by stating that all animals subjected to the action of any amount of Methanol by skin absorption has died. The lowest lethal dose was 0.5 ml / Kg for one monkey. It was reported that rabbits were far less susceptible to Methyl Alcohol poisoning by this route than monkeys or rats. In a study of the effects of continuous exposure to methanol, a known amount was dropped onto or injected into the gauze pads 4 times / day. All such treated monkeys displayed dilated pupils within 2 hours after one such administration of 1.3 mg / Kg Methanol. The minimum lethal dose was a total of four administrations of 0.5 ml / Kg of Methanol in one day. It was concluded that sufficient amounts of Methanol can be absorbed through the skin and that the threshold for immediate danger to monkeys was below the minimum lethal dose. (4)

A negative consensus resulted from all sister chromatid exchange tests when no exogenous metabolic activation system was used. A negative consensus resulted from both cell transformation in primary cells using limited lifetime strains and cell transformation via viral enhancement tests when no exogenous activation system was used. A negative consensus resulted from all *Neurospora crassa* tests when no exogenous metabolic activation system was used. (4)

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Methanol:
96-hour LC50 (*Pimephales promelas*) = 28 g/L. (3)
96-hour LC50 (*Lepomis macrochirus*) = 15.4 g/L. (3)
48-hour EC50 (*Daphnia magna*) = 24.5 g/L. (3)

Environmental Fate:

If released to the atmosphere, methanol degrades via reactions with photochemically produced hydroxyl radicals with an approximate half-life of 17.8 days. Physical removal from air can occur via rainfall. If released to water, decomposition via biodegradation is expected to occur. If released to soil, methanol is expected to degrade via biodegradation and be susceptible to leaching. (4)

Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

13. DISPOSAL CONSIDERATIONS

Deactivating Chemicals:

None required.

Waste Disposal Methods:	Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification.
Safe Handling of Residues:	See "Waste Disposal Methods".
Disposal of Packaging:	Empty containers retain product residue and can be dangerous. Empty drums should be completely drained, properly bunged and promptly returned to a drum reconditioner. Do not expose such containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death. Do not dispose of package until thoroughly washed out.

14. TRANSPORTATION INFORMATION

CANADIAN TDG ACT SHIPPING DESCRIPTION:

METHANOL, Class 3(6.1), UN1230, PG II.

Label(s): Flammable Liquids, Toxic Substances. Placard: Flammable Liquids.

ERAP Index: —, Exemptions: None known.

US DOT CLASSIFICATION (49CFR 172.101, 172.102):

METHANOL, Class 3(6.1), UN1230, PG II.

Label(s): Flammable Liquid, Poison. Placard: Flammable Liquid.

CERCLA-RQ: Methanol: 5 000 lb / 2 270 Kg. Exemptions: Not applicable.

15. REGULATORY INFORMATION

CANADA

CEPA - NSNR: This material is included on the DSL under the CEPA.

CEPA - NPRI: Methanol.

Controlled Products Regulations Classification (WHMIS):

- B-2: Flammable Liquid
- D-1B: Toxic (acute effects)
- D-2A: Very Toxic (teratogen)
- D-2B: Toxic (eye irritant)

USA

Environmental Protection Act: This material is included on the TSCA Inventory.

OSHA HCS (29CFR 1910.1200): Flammable Liquid, Toxic, Teratogenic and Embryotoxic, Eye Irritant.

NFPA: 1 Health, 3 Fire, 0 Reactivity (3)

HMIS: 2 Health, 3 Fire, 0 Reactivity (3)

INTERNATIONAL

This product or its components are on the European inventory of existing commercial chemicals (EINECS).

16. OTHER INFORMATION

REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s).
4. CHEMINFO chemical profile, Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2008, American Conference of Governmental Industrial Hygienists, Cincinnati, 2008.
6. Regulatory Affairs Group, Brenntag Canada Inc.

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7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
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The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

To obtain revised copies of this or other Material Safety Data Sheets, contact Ontario Competition Fuels

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