

METHANOL

1. DESCRIPTION OF PRODUCT / COMPANY INFORMATION

- Product name: Methanol
- Supplier: **Copenor – Cia Petroquímica do Nordeste**
 Pólo Petroquímico de Camaçari
 Rua Eteno, nº 1242, COPEC, Camaçari – BA CEP 42810-000
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2. COMPOSITION / INFORMATION ON THE COMPONENTS


- Chemical Nature: “This chemical product is a pure substance.”

<u>Active Ingredients</u>	<u>CAS Number</u>	<u>Concentration</u>	<u>Molecular Formula</u>
Methanol	67-56-1	≥99.85%	CH ₃ OH

- Synonyms: Methyl Alcohol, Wood Alcohol, Carbinol, Monohydroxymethanol, Colonial Spirit, Methyl Carbonal. (CHEMFINDER, 2006)

- Ingredients or impurities that may contribute to danger: This product includes traces of ethanol, aldehydes and keytones that do not contribute to danger.

- Identification of Risks: (GHS, 2006)

<u>Risk</u>	<u>Category</u>	<u>Signal Word</u>	<u>Risk Classification</u>	<u>Symbol</u>
<u>Flammability</u>	2	Danger	Liquid and Vapor highly flammable	
<u>Toxicity</u>	5	Warning	Dangerous if ingested, inhaled or through skin contact	---

3. HAZARD IDENTIFICATION

- Most Important Dangers: This product can be toxic to humans and the environment if not used according to instructions.



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• Effects of Product:

Adverse effects on human health: This product can be absorbed through skin contact, inhalation or ingestion, and is highly likely to cause local irritation. (HSDB 2006)

Environmental Effects: This product is rapidly biodegradable and also evaporates in the environment. (HSDB 2006)

Specific Dangers: There are no specific dangers related to this product.

• Principle Symptoms: Inhalation of high concentrations of methanol vapors (>2.000 ppm) provokes irritation of the mucous membranes of the respiratory tract, and signs and symptoms of systemic effects including neurological disturbances: headache, fatigue, insomnia, vertigo, trembling, ringing in ears, blurred vision, double vision and blindness. Local disturbances: skin irritation and itchiness, dermatitis and eczema, and Digestive Disturbances: nausea, vomiting and stomach ache. Ingestion may lead to symptoms such as: headache, vertigo, intoxication, asthenia (weakness), drowsiness, metabolic acidosis, coma, pupil dilation, diminished visual acuity, and blindness caused by denigration of retinal endings and the optic nerve. Cerebral hemorrhage, lesions of the cerebrum and cerebellum, Hemodynamic disturbances: hypotension and cardiac insufficiency. With eye contact: irritation of the cornea and rarely, contact of retinas with liquid methanol can cause opaqueness. With skin contact: methanol can be absorbed through the skin, and contact with liquid methanol removes skin oils and causes dermatitis. With chronic exposure, the accumulation of formic acid (a product of biotransformation of methanol) causes lesions of the liver and pancreas. There are also documented cases of the combination of methanol and carbon monoxide as a causal factor of cerebral artherosclerosis. Prolonged contact with skin causes loss of skin oils, dryness, rashes and irritation. (HSDB 2006)

4. FIRST AID MEASURES

• First aid: move the victim to a well ventilated space. Remove contaminated clothing. Wash effected areas of the body with abundant water and soap. If the victim is unconscious and no longer breathing, provide artificial respiration or oxygen. Send to the nearest available medical care with this information sheet.

• Inhalation: move the victim to a well ventilated space. If the victim is not breathing, provide artificial respiration. If the victim has difficulty breathing, seek medical care immediately.

• Skin Contact: Immediately wash affected areas with abundant water and soap. Remove contaminated clothing. If there are effects of symptoms, consult a doctor. Wash contaminated clothing before re-use and throw away contaminated shoes.

• Eye Contact: Immediately rinse with abundant water. Seek medical care.

• Ingestion: Do not induce vomiting. Seek a doctor immediately. Vomiting may occur spontaneously and should not be avoided; roll the patient on their side to prevent aspiration of residual vomit. WARNING: Never give an unconscious patient anything via the mouth.



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- Actions to avoid: Do not provide mouth-to-mouth respiration to a patient who has ingested methanol. Instead, use intermediate manual resuscitation equipment (Ambu) to provide artificial respiration.
- Protection for First-Aid Providers: Avoid skin contact and inhalation of methanol during process.
- Notes for doctors: In cases of ingestion, a gastric lavage may be performed if special measures are taken to avoid aspiration (tracheal tube with cuff inflated). Use of activated charcoal is indicated. Maintain hyperventilation to favor elimination of methyl alcohol and correction of acidosis; maintain body temperature. Use of pentobarbital, 100 mg every 6-12 hours, prevents respiratory depression. Administer ethyl alcohol to avoid oxidation of methanol; inject 3 liters of 5% ethyl alcohol solution for twelve hours (for a total of 15 ml of pure alcohol). Treatment should also include support measures to correct electrolyte and metabolic disturbances, as well as respiratory assistance. Monitor continuously hepatic and renal function. An ophthalmological exam of the retina is also recommended. (HSDB 2006)

5. FIRE FIGHTING MEASURES

- Small fires: dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Large fires: water spray, AFF(R) foam (with formation of alcohol-resistant aqueous film) with system delivering 3-6% foam. Maintain other containers exposed to the fire cool. (WHO 1997)
- Specific dangers: Liberation of CO, CO₂, and possibly gaseous formaldehyde. (HSDB 2006)
- Special Procedures: Use Personal Protective Equipment (PPE) as described in item 8 to avoid direct contact with methanol. Skin-protective barrier cream, and Tyvek, Nitril or Trevira suite, PVC boots, and Nitril or Neoprene gloves are recommended. An independent respiratory device should be used to avoid exposure to gasses and smokes caused by methanol combustion. (HSG 1997)

6. ACCIDENTAL RELEASE MEASURES

- Personal Precautions: Use skin-protective barrier cream, and Tyvek, Nitril or Trevira suite, PVC boots, and Nitril or Neoprene gloves. Respiratory protection should depending on the concentration present in the environment or on the extensiveness of the spill/leak; full face masks with a replaceable filter for organic vapors or supplied-air masks (ex. Autonomous masks) should be used for respiratory protection. (WHO 1997)

Removing ignition sources: Interrupt electrical energy and turn off sources of sparks. Remove any material which can cause fires (ex. Diesel fuel). (WHO 1997)

Dust Control: Not applicable for methanol.

Preventing inhalation and contact with skin, mucous membranes and eyes: Use clothing and equipment as described above in the item "Personal Precautions."



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- Environmental Precautions: Avoid contamination of water by preventing access to drainage systems. Prevent methane residue from reaching bodies of water by building dams of soil, sand or other absorbent materials such as cement powder, or with liners appropriate for containment of spills of 3M chemicals. (WHO 1997; 3M 2001)
- Cleanup Methods: Contain and recover spilled material. Place residues in a container for disposal according to local regulations. An industrial vacuum to collect residues and cleaning with detergent or neutral soap is recommended. Avoid use of solvents. (WHO 1997)
- Recuperation Methods: Use alcohol-resistant fluorocarbon foams near the spill to reduce vapors and resulting risk of fires; recover liquid using explosion-proof pumps, maximize methanol recover for possible recycling or reuse. (WHO 1997)
- Neutralization Methods: dilute with water. (WHO 1997)
- Disposal Methods: Collect methanol in a container for later disposal. Dispose of product according to local and federal environmental laws governing disposal of toxic substances.
- Prevention of Secondary Dangers: Prevent methanol from contaminating streams, lakes, wells, water sources, drainage systems and sewers. (WHO 1997)

7. HANDLING AND STORAGE

• Handling

• Technical Measures: Adopt group safety standards. Methanol should be handled in locations with adequate local exhaust ventilation. Keep people, especially children and pets, far from the work area. Do not allow direct contact with methanol. Avoid spills and contamination during handling.

Prevention of exposure of workers: Use PPE as described in item 8. Do not eat, drink or smoke while handling methanol. Do not use damaged or defective application or personal protection equipment. Do not unblock burners, openings, tubes or valves with mouth. Do not manipulate or carry damaged containers.

Precautions for safe handling: Use PPE as described in item 8.

• Safe handling directions: Use PPE as described in item 8. Methanol should be handled in locations with adequate local exhaust ventilation or well-ventilated areas; if outdoors, use with methanol downwind of handlers. If symptoms of intoxication appear, immediately stop work and proceed according to item 4 of this information sheet.



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• Storage

• Appropriate technical measures: Recipients should be located on the ground, tanks should be buried; install a vapor emission control system; install pressure and drainage valves and safety valves; install containment dam with a drainage system for organic effluents; install lightning rod. (WHO 1997)

• Storage Conditions

Appropriate: Maintain recipient completely closed. During filling and emptying, recipient should be buried. Store in a thermally isolated location with a cold-water coil to maintain temperature according to the pressure conditions of the container. (WHO 1997)

Avoid: Heat sources, sparks or flames, oxidants, acids and bases. (WHO 1997)

Incompatible products and materials: Strong oxidizing agents, zinc, aluminum and magnesium, perchlorates, chrome trioxide, sodium hypochlorite, chlorine and hydrogen peroxide. (WHO 1997)

• Safe materials for containers:

Recommended: Methanol anhydride is not corrosive to the majority of metals under environmental conditions, except lead and magnesium. Solid steel is recommended for construction of recipients, and use of high-density polyethylene or vulcanized natural rubber is also possible. (WHO 1997)

Inadequate: Copper plating (or copper alloys), zinc (including galvanized steel), and aluminum are not indicated for storage due to slow corrosion. (WHO 1997)

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

• Engineering control measures: Adopt group safety standards. Methanol should be handled in locations with adequate local exhaust ventilation. Keep people, especially children and pets, far from the work area. Do not allow direct contact with methanol. Avoid spills and contamination during handling.

• Specific Control Parameters:

Occupational Exposure Limits:

Common Name	Exposure Limit	Type	Effects	References
Methanol	200ppm	TLV-TWA ¹	Neuropathy, vision	ACGIH, 2005



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	250ppm	TLV-STEL ²	SNC	
Methanol	156ppm or 200mg/m ³	LT ³	---	NR 15, MT, 1995

¹ TLV-TWA – Threshold exposure limit considering the time weighted average adopted by the United States, at which it is believed all workers may be continually exposed without presenting adverse effects. (ACGIH 2005)

² TLV-STEL – Concentration adopted by the United States which cannot exceed four exposures of less than 15 minutes per 8 hour shift, with at least hour separating exposures. (ACGIH 2002)

³ LT – Exposure limit adopted by the Brazilian Legislature at which it is believed all workers may be continually exposed without presenting adverse effects. (NR 15 1995)

Biological Indicators:

Common Name	Biological Limit	Type	Notes	References
Urinary Methanol	15 mg/L	BEI* or IBMP*	At end of shift	ACGIH, 2005 and NR 7, 1994

*BEI – Biological Exposure Index, relates the dosage of the product, product of biological transformation or early effects of exposure to a particular chemical agent. (ACGIH 2005)

*IBMP – Maximum Permitted Biological Index, adopted by the Brazilian Legislature, with the same meaning as BEI above. NR 7 1994)

Odor threshold: 2000ppm (HSDB 2006)

• Personal Protective Equipment (PPE):

Respiratory Protection: Use a complete face mask with a polyvalent chemical filter for organic vapors, or an oxygen mask for situations which exceed exposure limits and local exhaust.

Hand Protection: Use Neoprene or Nitril gloves. (Silva 2002)

Eye Protection: Use safety goggles for chemical products with a chemical visor. (Silva 2002)

Skin and body protection: Use skin-protective barrier cream, Tyvek, Nitril or Trevira suite, and PVC boots. (Silva 2002)

• Special Precautions: Carefully maintain ventilation/exhaust system. Maintain PPEs clean and in good working order. Store PPEs outside the work area. Inspect PPEs periodically, repairing or replacing any damaged equipment.

• Hygiene measures: Bathe and change clothes after use of product. Wash contaminated clothing separately, avoiding contact with other personal use items.

9. PHYSICAL AND CHEMICAL PROPERTIES

• Physical State: Liquid

• Color: Colorless



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- Odor: Characteristically pungent
- pH: Undetermined
- Temperatures or temperature ranges in which changes of physical state occur:
 - Boiling point: 64.5°C
 - Melting Point: -97.8°C at 760mmHg
- Ignition Temperature: 385°C
- Flash Point: 15,6°C (open cup)
- Explosivity Limits: Lower ↔ 6%v/v
Upper ↔ 36%v/v
- Density: 0.792 at 25°C
- Vapor Density: 1.1 (Air=1)
- Vapor Pressure: 92mmHg at 20.0°C
- Solubility: Infinite in water
- Octanol/Water Partition Coefficient: 100%

10. STABILITY AND REACTIVITY (WHO 1997)

- Instability: Methanol is stable at ambient temperature and pressure, and under normal use and storage conditions. (WHO 1997)
- Dangerous reactions: Reacts with oxidants, strong acids and strong bases. (WHO 1997)
- Incompatible materials or substances: a) Strong oxidizing agents, zinc, lead, aluminum, magnesium, strong acids. Perchloric acid, lead perchlorate, reactive metals that release hydrogen, some plastics such as polythene and rubbers. b) Does not react with water. Highly reactive in ammonia anhydride, sulfuric acid, nitric acid, hydrogen cyanide and hydrogen sulfate. c) Oxidizes to form acetic acid. Oxidizes in air forming peroxides, which can be oxidized or reduced. Polymerizes easily, releasing heat. (WHO 1997)

11. TOXICOLOGICAL INFORMATION

- Acute Toxicology:
 - Oral LD50 in rats: 5628 mg/kg (WHO 2001)
 - Dermal LD50 in rabbits: 15,800 mg/kg (WHO 2001)
 - Inhalatory LC50 in rats: 85 mg/kg/(1/4)h (WHO 2001)
- Local Effects
 - Dermal Irritation: Methanol is not an irritant to 2,000ppm (WHO 2001)
 - Ocular Irritation: Methanol is considered a non-irritant (WHO 2001)
- Chronic Toxicology:
 - Mutagenicity: There are no known mutagenic effects associated with methanol (WHO 2001)
 - Carcinogenicity: There are no known carcinogenic effects associated with methanol (WHO 2001)

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Teratogenicity: Methanol is associated with birth defects in rats after ingestion or inhalation (WHO 2001)

Reproductive Effects: Methanol is considered to have no reproductive effects in humans (WHO 2001)

12. ENVIRONMENTAL INFORMATION:

• Environmental Effects, behaviors and impacts of Methanol

Environmental Impact: In aquatic environments, methanol can be very harmful to life. (HSDB 2006)

Expected behavior: a) In the soil, methanol will migrate to underground waters and/or evaporate quickly. b) In water, half-life of 1-10 days. c) In the air, will persist as an aerosol for a short time, suffering photochemical degradation caused by hydroxyl radicals, with residual methanol removed from the atmosphere by precipitation. (HSDB 2006)

Mobility: Mobility of volatile organic compounds (VOCs) is 100%. (HSDB 2006)

Persistence / Degradability: In the soil, BOD₅: 0.6g/1.1g O₂/g substance COD : 1.42g / O₂/g substance. In water, methanol is easily biodegradable, being soluble in water. Methanol is converted into CO₂ and H₂O. (HSDB 2006)

Bioaccumulation: The bioaccumulation coefficient of methanol is <10 in *Leusiscus idus*, log P_{OW}: -0.82/-0.66. (HSDB 2006)

Ecotoxicity:

Toxicity for fish: CL₅₀ (96hs) 10,800mg/L (ECOTOX 2006)
(*Salmo gairdneri* / *Oncorhynchus mykiss*)

Toxicity for algae: CE₅₀ (72hs) 8,000mg/L (ECOTOX 2006)

Toxicity for microcrustaceans: CE₅₀ (48hs): 24500mg/L (ECOTOX, 2006)
(*Daphnia magna*)

13. DISPOSAL CONSIDERATIONS

• Methods for Treatment and Disposal

Product: Deactivate product through incineration in a designated oven equipped with filter chambers for effluent gasses, and approved by competent bodies. (HSG 1997)

Product residue: Product residues are toxic. Do not dispose of residues inappropriately after use. Biological treatment can be used for aqueous methanol residues, especially those of low concentration. Methanol residues are not appropriate for subterranean injection.

Used containers: Not applicable. Product supplied in tanker cars made of stainless steel/carbon and pipeline. (HSG 1997)

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14. TRANSPORT INFORMATION:

 • National and International Regulations:

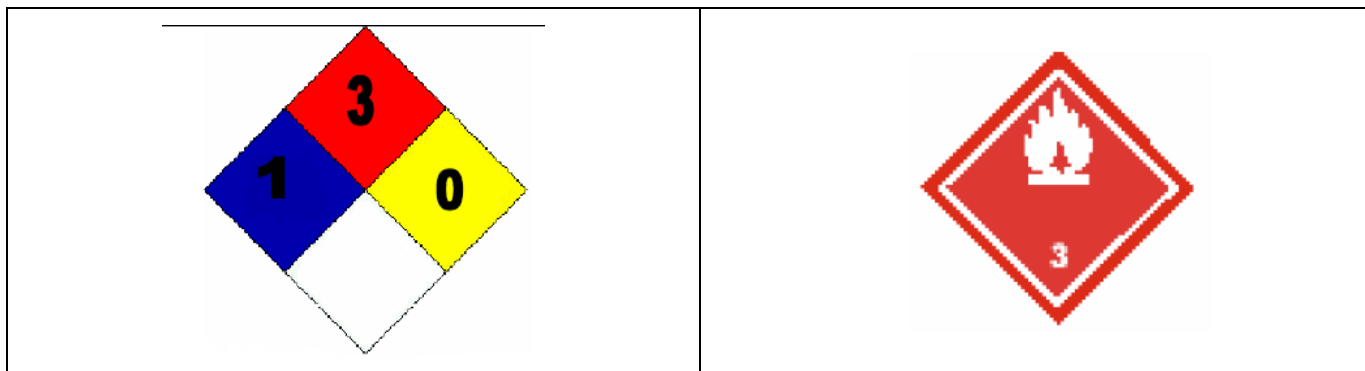
National and International Regulations		
Terrestrial	Transport	GGVS, GGVE, ADR, RID
	Classification	
	Indication of Danger	Methanol
River	Transport	ADR, ADNR
	Classification	Not Practiced
	Indication of Danger	
Maritime	Transport	IMDG, ADNR
	Classification	
	Ems	3-06
	MFAG	306
	Indication of Danger	Methanol
Air	Transport	ICAO, IATA
	Classification	
	Indication of Danger	Methanol
	Packaging Group	
For products classified as Dangerous for Transport (Depending on Mode)		
UN Number	1230	
Appropriate name for loading	Methanol	
Risk Classification	3 – Flammable	
Risk Number	336	
Packaging Group	II	
Subclass	6.1	
Description of risk class	Flammable Liquid	

15. REGULATORY INFORMATION

 • Regulations:

NFPA Symbol for transport, 2001	GHS Symbol for transport, 2006
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• Risk and safety information:

Caution

Danger – Flammable Liquid

Avoid contact with skin and eyes, causes blindness and skin sensitivity

Avoid inhalation and ingestion

Causes severe irritation of the digestive tract. Can be lethal and cause blindness if ingested.

16. OTHER INFORMATION

“This information sheet was produced for [TOXICLIN Consulting and Medical Services](#) using data supplied by the registering company. The information contained in this FISPQ represents the current data and exactly represent our best understanding of the appropriate handling of this product in accordance with the specifications contained in the label and information sheet. Any other uses of this product which we have not recommended will be the responsibility of the user.”

Bibliographical Information

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BRASIL - MINISTÉRIO DO TRABALHO – NORMA REGULAMENTADORA 9 – **Programa de prevenção de riscos ambientais**, 1978, amended by official decree 25, 12-29-1994.

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WHO – WORLD HEALTH ORGANIZATION – IPCS INTERNATIONAL PROGRAMME ON CHEMICAL SAFETY – **Methanol - Health and Safety Guide No. 105**, 1997. Available online at <http://www.inchem.org>. Accessed February 10, 2006.

WHO – WORLD HEALTH ORGANIZATION – Methanol – PIM, 2001. Available online at <http://inchem.org>. Accessed February 10, 2006.