

# Material Safety Data Sheet

**Product name** Methanol (MeOH)

## 1. Identification of the substance/mixture and of the company/undertaking

1.1. Product name	Methanol
1.2. CAS-No.	67-56-1
1.3. Relevant identified uses of the substance or mixture and uses advised against	
Identified uses	Solvent, fuel, feedstock
Restrictions on Use	Do not use in a confined area without proper ventilation. Contact lenses may cause further damage in case of splash into eye. Avoid use near heat, flames, sparks, and other sources of ignition.
1.4. Details of the supplier of the safety data sheet	
Company	Glory Global CO.,LTD
Address	C-208, 10, Nowon-ro 15-gil, Nowon-gu, Seoul, Korea
Emergency Phone	+82 2 6223 0862

## 2. Hazards identification

### 2.1. Classification of the substance or mixture

GHS Classification	<ul style="list-style-type: none"> <li>- Flammable Liquid, Category 1</li> <li>- Acute Toxicity Category 1*</li> <li>- Reproductive Toxicity 1B</li> <li>- Specific Target Organ Toxicity (Repeated Exposure)</li> </ul>
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### 2.2. GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

- Extremely flammable liquid and vapour.
- Fatal if swallowed.
- May damage fertility or the unborn child (fetotoxic and teratogenic effects).
- May cause damage to eyes and central nervous system if ingested or inhaled.
- Colourless liquid, with a mild, characteristic alcohol odour when pure. Crude methanol may have a repulsive, pungent odour. Hygroscopic (moisture absorbing).
- Burns with a clean, clear flame, which is almost invisible in daylight, or a light blue flame. Can decompose at high temperatures forming carbon monoxide and formaldehyde. Confined space toxicity hazard. Mild central nervous system depressant following inhalation, skin absorption or ingestion. May cause headache, nausea, dizziness, drowsiness, and un-coordination. Severe vision effects, including increased sensitivity to light, blurred vision, and blindness may develop following an 8-24 hour symptom-free period. Coma and death may result.
- Causes eye irritation. Aspiration hazard. Swallowing or vomiting of the liquid may result in aspiration (breathing) into the lungs.
- May cause fetotoxic (toxic to the fetus during the latter stages of pregnancy, often through the placenta) and teratogenic effects (causing malformations of the fetus), based on animal information.

FLAMMABLE LIQUID AND VAPOUR

IRRITANT

POSSIBLE REPRODUCTIVE HAZARD

### 2.3. NFPA Ratings

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

## 3. Composition/information on ingredients

### 3.1. Substances

Component	% (w/w)	Exposure Limits (ACGIH)*	LD50	LC50
Methanol (CAS 67-56-1)	99-100	ACGIH* TLV-TWA: 200 ppm, skin; TLV-STEL: 250 ppm, skin PEL-TWA: 200 ppm, skin PEL-STEL: 250 ppm, skin IDLH: 6000 ppm, acute inhalation toxicity to animals TLV Basis, critical effects: neuropathy, vision, central nervous system(CNS)	5628 mg/kg (oral/ rat)  15800 mg/kg (dermal/ rabbit)	64000 ppm (inhalation/rat)

## 4. First aid measures

#### 4.1. Description of first aid measures

##### General advice

– Emergency assistance may also be available from the local poison control centre.

##### If inhaled

– Remove to fresh air, restore or assist breathing if necessary. Obtain medical

##### In case of skin contact

– In case of contact, remove contaminated clothing. In a shower, wash affected areas with soap and water for at least 15 minutes. Seek medical attention if irritation occurs or persists.

– Wash clothing before reuse.

– Prolonged contact with methanol may defat skin tissue, resulting in drying and cracking.

##### In case of eye contact

– Remove contact lenses if worn. In case of contact, immediately flush eyes with plenty of clean running water for at least 15 minutes, lifting the upper and lower eyelids occasionally.

– Obtain medical attention.

##### If swallowed

– Swallowing methanol is potentially life threatening.

– Onset of symptoms may be delayed for 18 to 24 hours after digestion.

– If conscious and medical aid is not immediately available, do not induce vomiting.

– In actual or suspected cases of ingestion, transport to medical facility immediately.

### 5. Firefighting measures

#### 5.1. Suitable extinguishing media

– Small fires: Dry chemical, CO<sub>2</sub>, water spray

– Large fires: Water spray (see note in Unsuitable Extinguishing Media), AFFF(R) (Aqueous Film Forming Foam (alcohol resistant)) type with either a 3% or 6% foam proportioning system.

#### 5.2. Special hazards arising from the substance or mixture

– Methanol vapours may burn with an invisible flame. During a fire, carbon monoxide, carbon dioxide and irritation and toxic gases such as formaldehyde may be generated.

– Vapours can accumulate in confined spaces resulting in a toxicity and flammability hazard.

– Closed containers may rupture violently and suddenly release large quantities of methanol when exposed to fire or excessive heat for a sufficient period of time.

– Vapours are slightly heavier than air and may travel long distances toward sources of ignition.

#### 5.3. Advice for firefighters

– Methanol burns with a clean clear flame that is almost invisible in daylight.

– Stay upwind! Isolate and restrict area access.

– Concentrations of greater than 25% methanol in water can be ignited.

– Use fine water spray or fog to control fire spread and cool adjacent structures or containers.

– Contain fire control water for later disposal. Fire fighters must wear full face, positive pressure, self-contained breathing apparatus or airline and appropriate protective fire fighting clothing as per NFPA.

– Note that methanol fires may require proximity suits. Take care not to walk through any spilled chemical.

#### 5.4. Special protective device to protect the fire fighters.

– Vapours can flow along surfaces to distant ignition sources and flash back.

### 6. Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

– Full face, positive pressure self-contained breathing apparatus or airline, and fire resistant protective clothing with chemical resistant splash suit must be worn. If product ignites, approach and fire fighting must be done with appropriate fire fighting clothing.

#### 6.2. Environmental precautions

– Biodegrades easily in water. Methanol in fresh or salt water may have serious effects on aquatic life. A study on methanol's toxic effects on sewage sludge bacteria reported little effect on digestion at 0.1% while 0.5% methanol retarded digestion. Methanol will be broken down to carbon dioxide and water.

#### 6.3. Methods and materials for containment and cleaning up

– Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal.

#### 6.4. Remedial Measures

– Flammable liquid. Release can cause an immediate fire/explosion hazard.

– Eliminate all sources of ignition, stop leak and use absorbent materials.

– Collect liquid with explosion proof pumps.

#### 6.5. Small Spills

– Do not walk through spill product as it may be on fire and not visible.

– Soak up spill with non-combustible absorbent material.

– Recover methanol and dilute with water to reduce fire hazard.

– Prevent spilled methanol from entering sewers, confined spaces, drains, or waterways.

– Restrict access to unprotected personnel. Put material in suitable, covered, labeled containers.

#### 6.6. Large Spills

– Flush area with water.

– If necessary, contain spill by diking. Fluorocarbon alcohol resistant foams may be applied to

spill to diminish vapour and fire hazard. Maximize methanol recovery for recycling or reuse. Collect liquid with explosion proof pumps.

### 7. Handling and storage

#### 7.1. Precautions for safe handling

– No smoking or open flame in storage, use or handling areas. Use explosion proof electrical equipment. Ensure proper electrical grounding procedures are in place.

## 7.2. Conditions for safe storage, including any incompatibilities

- Store in totally enclosed equipment, designed to avoid ignition and human contact. Tanks must be grounded, vented, and should have vapour emission controls. Tanks must be diked as per NFPA or API Standards. A flammable mixture of methanol vapour and air is possible inside a storage tank or transportation tank, and handlers should take appropriate precautions to reduce the risk of ignition. Handlers must eliminate ignition sources or purge the tank with an inert gas such as nitrogen. All equipment must be grounded – bonded when transferring product in order to avoid static discharge from the equipment, and subsequent possible fire. Avoid storage with incompatible materials. Anhydrous methanol is non-corrosive to most metals at ambient temperatures except for lead, nickel, monel, cast iron and high silicon iron. Coatings of copper (or copper alloys), zinc (including galvanized steel), or aluminum are unsuitable for storage. These materials may be attacked slowly by the methanol. Storage tanks of welded construction are normally satisfactory. They should be designed and built in conformance with good engineering practice for the material being stored. While plastics can be used for short term storage, they are generally not recommended for
- no data available

## 7.3. Specific end use(s)

## 8. Exposure controls/personal protection

### 8.1. Control parameters

#### Engineering Controls

- In confined areas, local and general ventilation should be provided to maintain airborne concentrations below permissible exposure limits. Ventilation systems must be designed according to approved engineering standards.

### 8.2. Exposure controls

#### Appropriate engineering controls

- Local exhaust ventilation or use in a closed system is recommended.

#### Personal protective equipment

##### a) Eye/face protection

- Face shield and chemical splash goggles when transferring is taking place. Contact lenses should not be worn when working with methanol.

##### b) Skin protection

- Butyl and nitrile rubbers are recommended for gloves. Check with manufacturer. Wear chemical resistant pants and jackets, preferably of butyl or nitrile rubber. Check with manufacturer.

##### c) Footwear

- Chemical resistant and as specified by the workplace.

##### d) Respiratory protection

- NIOSH/OSHA recommendations for methanol concentrations in air:  
Up to 2000 ppm: supplied air respirator  
Up to 5000 ppm: supplied air respirator operated in a continuous-flow mode.  
Up to 6000 ppm: supplied air respirator with a tight-fitting facepiece operated in a continuous-flow mode; or Full-facepiece self-contained breathing apparatus or Full-facepiece supplied air respirator.
- Cartridge type respirators are NOT recommended.

##### e) Control of environmental exposure

- Not available.

## 9. Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Appearance	Liquid, clear, colourless
Odour	Mild characteristic alcohol odour
Odour Threshold	detection: 4.2 – 5960 ppm (geometric mean) 160 ppm recognition: 53 – 8940 ppm (geometric mean) 690 ppm
pH	Not available
Freezing point	–97.8°C
Initial boiling point/range	64.7°C / Not determined
Flash point	11.0°C
Solubility	Completely soluble
Partial Coefficient	Log P (oct) = –0.82
Vapour Pressure	12.8 kPa @ 20°C
Upper Explosive Limit (UEL)	36.50%
Lower Explosive Limit (LEL)	6%
Auto Ignition Temperature	464°C
Solvent Solubility	Soluble in all proportions in ethanol, benzene, other alcohols, chloroform, diethyl ether, other ethers, esters, ketones and most organic solvents
Critical Temperature	239.4°C
Specific Gravity	0.791 @ 20°C
Evaporation Rate	4.1 (n-butyl acetate =1)
Vapour Density	1.105 @ 15°C (air = 1)
Decomposition Temperature	Not determined
Sensitivity to Impact	No
Sensitivity to Static Charge	Low
9.2. Other safety information	Dissociation constant: pKa = 12.45 (25°C)

10. Stability and reactivity	
10.1. Chemical stability	– Stable as supplied.
10.2. Hazardous Reactions	– Yes. Avoid contact with strong oxidizers, strong mineral or organic acids, and strong bases. Contact with these materials may cause a violent or explosive reaction. May be corrosive to lead, aluminum, magnesium, and platinum.
10.3. Conditions to avoid	– Avoid contact with sparks, heat, open flame, or ignition sources.
10.4. Incompatible materials	– Yes. Avoid contact with strong oxidizers, strong mineral or organic acids, and strong bases. Contact with these materials may cause a violent or explosive reaction. May be corrosive to lead, aluminum, magnesium, and platinum. May react with metallic aluminum or magnesium and generate hydrogen gas. May attack some forms of plastic, rubber, and coatings.
10.5. Hazardous decomposition products	– Formaldehyde, carbon dioxide, and carbon monoxide.
10.6. Hazardous Polymerization	– Will not occur.

## 11. Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity	Inhalation of high airborne concentrations can also irritate mucous membranes, cause headaches, sleepiness, nausea, confusion, loss of consciousness, digestive and visual disturbances and even death. NOTE: Odour threshold of methanol is several times higher than the TLV-TWA. Depending upon severity of poisoning and the promptness of treatment, survivors may recover completely or may have permanent blindness, vision disturbances and/or nervous system effects. Concentrations in air exceeding 1000 ppm may cause irritation of the mucous membranes.
Skin corrosion/irritation	Methanol is moderately irritating to the skin. Methanol can be absorbed through the skin and harmful effects have been reported by this route of entry. Effects are similar to those described in "Inhalation".
Serious eye damage/eye irritation	Methanol is a mild to moderate eye irritant. High vapour concentration or liquid contact with eyes causes irritation, tearing and burning.
Ingestion	Swallowing even small amounts of methanol could potentially cause blindness or death. Effects of sub lethal doses may be nausea, headache, abdominal pain, vomiting and visual disturbances ranging from blurred vision to light sensitivity.
Respiratory or skin sensitisation	None reported.
Germ cell mutagenicity	There is insufficient information available to conclude that methanol is mutagenic
Irritancy	Prolonged contact with skin may defat tissue causing dermatitis or aggravate existing skin problems.
Carcinogenicity	Not listed by IARC, NTP, ACGIH, or OSHA as a carcinogen
Teratogenicity	Methanol has produced fetotoxicity in rats and teratogenicity in mice exposed by inhalation to high concentrations of methanol vapours .
Reproductive Toxicity	Information available does not suggest that methanol is a reproductive toxin.
Synergistic Products	In animals, high concentrations of methanol can increase the toxicity of other chemicals, particularly liver toxins like carbon tetrachloride. Ethanol significantly reduces the toxicity of methanol because it competes for the same metabolic enzymes, and has been used to treat methanol poisoning.

## 12. Ecological information

12.1. Toxicity	
Environmental toxicity	DO NOT discharge into sewer or waterways.
12.2. Persistence and degradability	
Biodegradability	Biodegrades easily in water and soil.
12.3. Bioaccumulation	
TERRESTRIAL FATE	Based on a classification scheme, an estimated Koc value of 1 determined from a structure estimation method indicates that methanol is expected to have very high mobility in soil. Volatilization of methanol from moist soil surfaces is expected to be an important fate process given a Henry's Law constant of $4.55 \times 10^{-6}$ (atm m <sup>3</sup> /mol). The potential for volatilization of methanol from dry soil surfaces may exist based upon a vapor pressure of 127 mm Hg. Biodegradation is expected to be an important fate process for methanol.

## AQUATIC FATE

Based on a classification scheme, an estimated Koc value of 1, determined from a structure estimation method, indicates that methanol is not expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is expected based upon a Henry's Law constant of  $4.55 \times 10^{-6}$  (atm m<sup>3</sup> /mol). Using this Henry's Law constant and an estimation method, volatilization half-lives for a model river and model lake are three and 35 days, respectively. According to a classification scheme, a BCF of less than 10 measured in fish, suggests bioconcentration in aquatic organisms is low. Hydrolysis and photolysis in sunlit surface waters is not expected to be an important environmental fate process for methanol since this compound lacks functional groups that hydrolyze or absorb light under environmentally relevant conditions. Methanol has been shown to undergo rapid biodegradation in a variety of screening studies using sewage seed and activated sludge inoculum, which suggests that biodegradation will occur in aquatic environments.

## ATMOSPHERIC FATE

According to a model of gas/particle partitioning of semi volatile organic compounds in the atmosphere, methanol, which has a vapor pressure of 127 mm Hg at 25°C, is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase methanol is degraded in the atmosphere by reaction with photo-chemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days, calculated from its rate constant of  $9.4 \times 10^{-13}$  cu cm/molecule-sec at 25°C

## 13. Disposal considerations

### 13.1 Container disposal

– Empty containers may contain hazardous residue. Return to supplier for reuse if possible. Never weld, cut or grind empty containers. If disposing of containers, ensure they are well rinsed with water, then disposed of at an authorised landfill. After cleaning, all existing labels should be removed.

## 14. Transport information

### 14.1. Canada Transportation of Dangerous Goods (TDG):

UN 1230, Methanol, Class 3(6.1), P.G. II  
Limited Quantity: 1 litres  
ERG Guide Number: 131

### 14.2. United States Department of Transport (49CFR) (Domestic Only)

UN 1230, Methanol, Class 3, P.G. II, (RQ 5000 lbs/2270 kg)  
Limited Quantity: 1 litres  
ERG Guide Number: 131

### 14.3. International Air Transport Association (IATA)

UN 1230, Methanol, Class 3(6.1), P.G. II  
Packaging Instruction (passenger aircraft):  
305, 1 litre maximum per package

### 14.4. International Maritime Organization (IMO)

UN 1230, Methanol, Class 3(6.1), P.G.II, Flash Point = 11°C  
EmS No. F-E, S-D  
Stowage Category "B", Clear of living quarters

### 14.5. Marine Pollutant

No

## 15. Regulatory information

### 15.1. CANADIAN FEDERAL REGULATIONS

– CEPA, DOMESTIC SUBSTANCES LIST  
: Listed (Canadian Environmental Protection Act (CEPA) Schedule I)  
– WHMIS CLASSIFICATION: B2, D1B, D2A, D2B

### 15.2. UNITED STATES REGULATIONS

– 29CFR 1910.1200 (OSHA): Hazardous  
– 40CFR 116–117 (EPA): Hazardous  
– 40CFR 355, Appendices A and B: Subject to Emergency Planning and Notification  
– 40CFR 372 (SARA Title III): Listed  
– 40CFR 302 (CERCLA): Listed  
– TOXIC SUBSTANCES CONTROL ACT (TSCA): Listed in the inventory.

## 16. Other information

### 16.1. Further information

– Always work safely around open hatches on bulk tanks. The low density makes flotation difficult for immersed person.

