MATERIAL SAFETY DATA SHEET

Methanol

SECTION 1: IDENTIFICATION OF MATERIAL AND SUPPLIER

Product Name: Methanol
Other Names: METHYL ALCOHOL; CARBINOL; METHANOL;
Product Codes/Trade Names: -
Recommended Use: Manufacture of formaldehyde, acetic acid and dimethyl terephthalate, chemical synthesis (methyl amines, methyl chloride, methyl methacrylate), antifreeze; solvent for nitrocellulose, ethylcellulose, polyvinyl butyral, shellac, rosin, manila resin, dyes; denaturant for ethanol; dehydrator for natural gas; fuel for utility plants (methyl fuel); feedstock for manufacture of synthetic proteins by continuous fermentation; source of hydrogen for fuel cells; home- heating-oil extender.

Applicable In: Australia
Supplier: ACB Group (ABN 79 724 186 134)
Address: 118 Swann Drive, Derrimut Victoria-3030
Telephone: +61 3 93690220
Email Address: info@acbgroup.com.au
Facsimile: +61 3 93690883
Emergency Phone Number: 000 Fire Brigade and Police (available in Australia only).
Poisons Information Centre: 13 11 26 (available in Australia only).

This Material Safety Data Sheet (MSDS) is issued by the Supplier in accordance with National standards and guidelines from the Australian Safety and Compensation Council (ASCC, formerly National Occupational Health and Safety Commission - NOHSC). The information in it must not be altered, deleted or added to. The Supplier will not accept any responsibility for any changes made to its MSDS by any other person or organization. The Supplier will issue a new MSDS when there is a change in product specifications and/or ASCC standards, codes, guidelines, or Regulations.

SECTION 2: HAZARD IDENTIFICATION

Methanol is classified as Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail.

Risk Phrases
R11 - Highly flammable.
R41- Risk of serious damage to eyes.
R23/24/25- Toxic by inhalation, in contact with skin & if swallowed.
R39/23/24/25- Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

Safety Phrases
S7- Keep container tightly closed
S7/9 - Keep container tightly closed and in a well-ventilated place.
S16- In case of fire and/or explosion do not breathe fumes.
S20- When using do not eat or drink
S24- Avoid contact with skin.
S29- Do not empty into drains
S33-Take precautionary measures against static discharges
S36/37 -Wear suitable protective clothing and gloves.
S38- In case of insufficient ventilation wear suitable
SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Synonyms</th>
<th>Proportion</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol</td>
<td>---------</td>
<td>100%</td>
<td>67-56-1</td>
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</table>

SECTION 4: FIRST AID MEASURES

If poisoning occurs, contact a doctor or Poisons Information Centre.

**Swallowed:** Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Keep at rest. Seek immediate medical attention.

**Eyes:** If in eyes, hold eyelids apart and flush the eye continuously with running water. Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. In all cases of eye contamination, it is a sensible precaution to seek medical advice.

**Skin:** If skin or hair contact occurs, immediately remove any contaminated clothing and flush skin and hair with running water. Continue to flush with water until advised to stop by the Poisons Information Centre or a doctor.

**Inhaled:** Using proper respiratory protection, remove victim from exposure to fresh air - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm and at rest. If patient finds breathing difficult, and develops a bluish discoloration of the skin, ensure airways are clear, and have qualified person give oxygen through a face mask. Seek immediate medical advice.

**First Aid Facilities:** First aid kits, safety showers, eye wash stations

**Advice to Doctor:** Treat symptomatically based on judgement of doctor and individual reactions of patient. Watch for toxic effects which may be delayed. Metabolic acidosis may occur up to 12 hours after ingestion. Central nervous system depression and acidosis from methanol metabolites, including formaldehyde liver function and optic nerve, and other effects should be treated symptomatically. Administration of ethanol reduces toxic effects by blocking the metabolic route to formaldehyde/formic acid production in the body.

**Aggravated medical conditions caused by exposure**
Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed. Methanol primarily affects the central nervous system, with symptoms of headache, nausea, vomiting and dizziness. Damage to the optic nerves may occur with chronic or high level exposure, causing visual problems and blindness. Chronic exposure to concentrations greater than 1000ppm can result in permanent blindness. Experimental teratogen.
SECTION 5: FIRE FIGHTING MEASURES

Flammability: Extremely flammable liquid - Explosive Vapour.

Suitable extinguishing media: In case of fire, appropriate extinguishing media include water fog, if unavailable use fine water spray, foam, or dry agent such as carbon dioxide or dry chemical powder. Either allow fire to burn under controlled conditions or extinguish with alcohol type foam or dry chemical. Try to cover liquid spills with foam. Spill fires may be extinguished by flooding with large amounts of water. Use water spray to cool fire exposed surfaces and to protect personnel. If a leak or a spill has not ignited, use water spray to disperse the vapours and to protect personnel trying to stop a leak.

Hazards from combustion products: Highly flammable liquid - Explosive vapour. Vapours may form explosive mixtures with air. Vapour may travel a considerable distance to source of ignition and flash back. Incompatible with oxidising agents, inorganic acids, aldehydes, alkylene oxides, halogens, acid anhydrides, monomers, polymers, esters, acids, alkanes, and ignition sources. Heating can cause expansion or decomposition of the material, which can lead to the containers exploding. May evolve toxic gases when heated to decomposition. These may include carbon oxides, hydrocarbons, and formaldehyde.

Special protective precautions and equipment for fire fighters: Fire fighters should wear a positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots and gloves) or chemical splash suit. Clear fire area of all non-emergency personnel. Evacuate area and contact emergency services. Shut off "fuel" to fire. If safe to do so, remove containers from path of fire. Keep containers cool with water spray. Remain upwind and notify those downwind of fire and explosion hazard. Keep out of low areas. Do NOT allow fire fighting water to reach waterways, drains or sewers. Store fire fighting water for treatment.

HAZCHEM Code: 2WE

SECTION 6: ACCIDENTAL RELEASE MEASURES

Emergency Procedure: Shut off all possible sources of ignition. Personnel involved in the clean up should wear full protective clothing as listed in section 8. Avoid accidents, clean up immediately. Evacuate all unnecessary personnel. Increase ventilation. Avoid walking through spilled product as it is slippery when spilt. Stop leak if safe to do so. Warn occupants in downwind areas of fire and explosion hazard. Keep public away. Shut off source if safe to do so without hazard. Use water spray to disperse vapour. Do NOT let product reach drains or water-ways. If product does enter a waterway, advise the Environmental Protection Authority or your local Waste Management. Use clean, non-sparking tools and equipment. Water spray may be used to cool and disperse vapours, protect personnel, and dilute spills to form non-flammable mixtures. Extreme hazard: Leaks of gas or spills of liquid can readily form flammable mixtures at temperatures at or above the flash point.

Containment Procedure: Soak up spilled product using absorbent non-combustible material such as sand or soil. Avoid using sawdust or cellulose. Dilute contained spill with water. Recover by pumping (use an explosion proof or hand pump) or with suitable absorbent. If liquid is too viscous for pumping, scrape up with shovels or pails and place in suitable containers for prompt disposal as hazardous waste. Wash down area with excess water. WATER SPILL: Eliminate sources of ignition. Warn occupants and shipping in downwind areas of fire and explosion hazard and request for them to stay clear. Hose over spill area to effect dilution of water soluble material. Consult an expert on disposal of any recovered material and ensure conformity to local disposal regulations.
SECTION 7: HANDLING AND STORAGE

Handling: Ensure an eye bath and safety shower are available and ready for use. Observe good personal hygiene practices and recommended procedures. Wash thoroughly after handling. Take precautionary measures against static discharges by bonding and grounding equipment. Product can accumulate static charges which can cause an incendiary electrical discharge. Eliminate all ignition sources. Earth containers when dispensing fluids. Handle containers with care. Open slowly in order to control possible pressure release. Do NOT handle, store or open near an open flame, source of heat or sources of ignition. Do NOT pressurise, cut, heat, or weld containers. Empty product containers may contain product residue. Do NOT reuse empty containers without commercial cleaning or reconditioning. Container remains hazardous when empty. Continue to observe all precautions. Use spark-proof tools and explosion-proof equipment. Avoid contact with eyes, skin, and clothing. Do not inhale vapour/fumes. Avoid prolonged or repeated exposure. Prevent any possibility of contact with this product. Remove contaminated clothing and wash before reuse.

Storage (including Incompatibles): Store in a cool, dry, well-ventilated area. Keep containers tightly closed when not in use. Inspect regularly for deficiencies such as damage or leaks. Protect against physical damage. Store away from incompatible materials as listed in section 10. Protect from direct sunlight, heat, and ignition sources. Keep away from foodstuffs, and keep out of the reach of children. Ensure containers are adequately labelled. Large storage areas should have appropriate fire protection. Storage, transport and loading/unloading temperature: Ambient. Storage/transport pressure: Atmospheric. Product may present electrostatic accumulation hazard: use proper grounding procedures. Product is hygroscopic. This product has a UN classification of 1230, Dangerous Goods Class 3 (flammable), and Subsidiary Risk 6.1 (Toxic) according to the Australian Code for the Transport of Dangerous Goods By Road by Road and Rail.

Container Type
Packaging must comply with requirements of Hazardous Substances (Packaging) Regulations 2001. Store in original packaging as approved by manufacturer. USUAL SHIPPING CONTAINERS: Drums, Rail wagons MATERIALS AND COATINGS - SUITABLE: Iron, Mild steel, Stainless steel. MATERIALS AND COATINGS - UNSUITABLE: Lead, Magnesium, Polystyrene, Perspex, Leather, PVC, Zinc Coatings, Synthetic Resins. Compatibility with plastic materials can vary; therefore recommend that compatibility is tested prior to use.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

The following exposure standard has been established by The Australian Safety and Compensation Council (ASCC); Methanol CAS 67-56-1: TWA = 200ppm (262mg/m3) STEL = 250ppm (328mg/m3) 'Sk' Notice. NOTE: The exposure value at the TWA is the average airborne concentration of a particular substance when calculated over a normal 8 hour working day for a 5 day working week. 'Sk' Notice - Absorption through the skin may be a significant source of exposure. The exposure standard is invalidated if such contact should occur. These exposure standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

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TWA (Time Weighted Average): the time-weighted average airborne concentration over an eight-hour working day, for a five-day working week over an entire working life. According to current knowledge this concentration should neither impair the health of, nor cause undue discomfort to, nearly all workers.

STEL (Short Term Exposure Limit): the average airborne concentration over a 15 minute period that should not be exceeded at any time during a normal eight-hour work day.

Biological Limit Values:
N/A

ENGINEERING CONTROLS

Ventilation:
Where an inhalation risk exists, mechanical explosion proof extraction ventilation is recommended. Flammable/explosive vapours may accumulate poorly ventilated areas. Vapours are heavier than air and may travel some distance to an ignition source and flash back. Do NOT enter confined spaces where vapour may have collected. Maintain vapour levels below the recommended exposure standard. Keep containers closed when not in use.

Special Consideration for Repair &/or Maintenance of Contaminated Equipment:
Empty containers retain residue (liquid and/or vapour) and are dangerous. Do not pressure cut, weld, braze, solder, drill, grind or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition.
Vapour is heavier than air – prevent concentration in hollows or sumps. Do not enter confined spaces where vapour may have collected. Keep containers closed when not in use.

PERSONAL PROTECTION

Personal Protection


SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Mobile clear colourless liquid
Odour: Faint Odour - Similar to Ethyl Alcohol
pH, at stated concentration: N/A
Vapour pressure: 12.8 kPa (25°C) mm Hg (1 atmosphere
Vapour Density: 1.11
Boiling Point/range (°C): 64.5 deg C
Freezing/Melting Point (°C): -97.7 deg C
Solubility: Soluble (100.00 wt%)

Specific Gravity (H₂O = 1):

0.798 (15°C)

FLAMMABLE MATERIALS

Flash Point: 10°C
Flash Point Method: Closed cup
Flammable (Explosive) Limit - Upper: 36.5%
Flammable (Explosive) Limit – Lower: 6%
Auto ignition Temperature: 464°C

ADDITIONAL PROPERTIES

Evaporation Rate: 0.00119 vol/vol/C
Volatile Organic Compounds Content (VOC) (as specified by the Green Building Council of Australia) 100%
SECTION 10: STABILITY AND REACTIVITY

Chemical Stability: Product is stable under normal conditions of use, storage and temperature. Highly Flammable Liquid. Hygroscopic (absorbs moisture from the air).

Incompatible Materials: Incompatible with oxidising agents, inorganic acids, aldehydes, alkylene oxides, halogens, acid anhydrides, monomers, polymerisable esters, acids, alkalis, and ignition sources.

Conditions to avoid: Avoid heat, sparks, flames, direct sunlight, moisture, freezing, static accumulation/charges, mechanical shock, high temperatures, and other high energy ignition sources. Also avoid enclosed spaces.

Hazardous Decomposition Products: May evolve toxic gases when heated to decomposition. These may include carbon oxides, hydrocarbons, and formaldehyde.

SECTION 11: TOXICOLOGICAL INFORMATION

Health effects information is based on reported effects in use from overseas and Australian reports.

Toxicological Data: Acute toxicity:
Oral LD50 Rat : 5600mg/Kg Oral LD50 Rat : 5628mg/Kg Dermal LD50 Rabbit : 15800mg/Kg Inhalation LC50 Rat : 64000ppm/4hr Inhalation LC50 Mouse : 50g/m3/2hr SKIN : Moderate Irritant (Rabbit) EYES : Moderate Irritant (Rabbit)

Effects: Swallowed: Toxic if swallowed. Ingestion can result in nausea, vomiting, severe abdominal pain, back pain, central nervous system effects including optic nerve damage (hyperaemia etc), convulsions, blindness, loss of consciousness and ultimately proceed to coma and death. If the victim is showing signs of CNS depression (like those of drunkeness) there is greater likelihood of the patient breathing in vomit and causing damage to the lungs. Death may occur if large amounts are ingested. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause bronchopneumonia or pulmonary edema.

Eyes: Severely irritating to eyes. May cause watering of the eyes, stinging or blurred vision and sensitivity to light. If not removed promptly, will injure the eye tissue, which may result in permanent damage.

Skin: Toxic in contact with skin. Contact with skin may result in irritation. Will have a degreasing effect on the skin. Can be absorbed through the skin with resultant adverse effects. Contact with the skin will result in defatting, leading to moderate irritation, discomfort and dermatitis. Repeated and prolonged skin contact may lead to irritant contact dermatitis. Can be absorbed through the skin in harmful amounts. Methyl alcohol may be absorbed which can contribute to damage of the optic nerve resulting in permanent visual changes, loss of vision or total blindness.

Inhaled: Toxic by inhalation. The vapour is irritating to the mucous membranes and respiratory tract. Inhalation of vapour can cause headache, nausea, central nervous system effects, dizziness, drowsiness, and visual impairment, possibly blindness. Central nervous system depression may lead to loss of co-ordination, impaired judgement and if exposure is prolonged, unconsciousness. Continued exposure can result in health effects as per ingestion.

Effects: Chronic
No data available for long term exposure.

Additional Notes
No data available.

SECTION 12: ECOLOGICAL INFORMATION

Eco-toxicity: No data available.
Persistence and This product is expected to biodegrade rapidly and be "readily biodegradable"
Degradability: according to OECD guidelines. If released into the atmosphere methanol degrades via reaction with photochemically produced hydroxyl radicals. It is expected to biodegrade in both soil and water. This substance is expected to be removed in waste water treatment facility.

Mobility: If spilt on soil, it is expected to be susceptible to significant leaching, as well as rapid evaporation from dry surfaces is likely to occur. This product is water soluble and is expected to remain primarily in water.

Environmental Fate (Exposure) Avoid contaminating waterways, drains and sewers.

Bioaccumulative potential No information available on bioaccumulation for this product.

SECTION 13: DIPOSAI CONSIDERATIONS

Dispose of in accordance with all local, state and federal regulations. All empty packaging should be disposed of in accordance with Local, State, and Federal Regulations or recycled/reconditioned at an approved facility. Contact a specialist disposal company or the local waste regulator for advice. This should be done in accordance with 'The Hazardous Waste Act'. Advise flammable nature. This product is NOT suitable for disposal by either landfill or via municipal sewers, drains, natural streams or rivers. This product is ashless and can be burned directly in appropriate equipment. For large volumes, atomise into incinerator (mixing with more flammable solvent if required) or recycle by gravimetric separation, distilling, and reusing.

SECTION 14: TRANSPORT INFORMATION

Proper Shipping Name: METHANOL
UN number: 1230
DG Class: 3, Flammable liquids
Subsidiary Risk 1: 6.1 Toxic substance
Packaging Group: II
HAZCHEM code: 2WE
Marine Pollutant: No
Special Precautions for User: Refer to incompatibilities in section 7 and stability and reactivity information in section 10.

ADDITIONAL TRANSPORT REQUIREMENTS: Nil

SECTION 15: REGULATORY INFORMATION

Poisons Schedule: 6
EPG 16
AICS Name Methanol
NZ Toxic substance 3
HSNO Hazard Classification 3.1B 6.1D
6.4A 6.8B 6.9A 9.3C
ERMA Approval code HSR001186

SECTION 16: OTHER INFORMATION

For further information on this product, please contact: ACB Group (ABN 79 724 186 134) 118 Swann Drive, Derrimut Victoria-3030, Australia. Phone: +61 3 93690220
ADDITIONAL INFORMATION

Australian Standards References:

AS 1020  The Control of undesirable static electricity.
AS 1076  Code of Practice for selection, installation and maintenance of electrical apparatus and associated equipment for use in explosive atmospheres (other than mining applications) – Parts 1 to 13.
AS/NZS 1336  Recommended Practices for Occupational Eye Protection
AS/NZS 1715  Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716  Respiratory Protective Devices
AS 1940  The Storage and Handling of Flammable and Combustible Liquids.
AS 2161  Industrial Safety Gloves and Mittens (excluding electrical and medical gloves)
AS 2380  Electrical equipment for explosive atmospheres – Explosion Protection Techniques (Parts 1 to 9).
AS 3000  Electrical installations (known as the Australian/New Zealand Wiring Rules).

Other References:


AUTHORISATION

Reason for Issue: 5 year review
Authorised by: ACB Technical Director
Date of Issue: 2 September 2010
Expiry Date: September 2015

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END OF MSDS