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|  | Material Safety Data Sheet (MSDS) | |  |
| | Product Name: Methanol | | |
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| Flammability | | | |
| Health | | | |

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/ UNDERTAKING

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| Identification of the substance or preparation: | Methanol / CH ₃ -OH |
| Country of origin: | Iran (Islamic Republic of Iran) |
| CAS Number: | 67-56-1 |
| UN Number: | 1230 |
| REACH Registration Number: | (01-2119433307-44-0046) |
| Synonyms: | Methyl alcohol, methyl hydrate, wood spirit, methyl hydroxide |
| Company/undertaking identification | Zagros Petrochemical Company Pars Special Energy Economic Zone (Asalooyeh), Booshehr Province; IRAN |
| Manufacturer subcontractor: | None |
| Emergency phone number: | 00987727323330 – 32 |
| Contact email: | info@zpcir.com |
| Fax: | 00987727323207 |
| Association/Organization: | None |
| Use of the substance/Preparation: | Feed stock for many end products such as Formaldehyde and Acetic acid, solvent, many kinds of fuel etc. |

2. COMPOSITION/INFORMATION ON INGREDIENTS

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| Hazardous substances: | Methanol |
| Hazardous label(s): | 6 (toxics) |
| Toxicological characteristics: | Toxic |
| Classified as: | Hazardous according to NOHSC criteria Dangerous good by the criteria of the ADG code |
| Other component: | None |

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3. IDENTIFICATION OF HAZARDS



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| Risk phrases: | R11 Highly flammable, R23/25 Toxic by inhalation and if swallowed. |
| Skin contact: | Will result in dryness (defatting) and moderate irritation. Can be absorbed through skin and affect nervous system and depress it. Cause blindness and even lead to death. |
| Eye contact: | Create opaque vision and blindness. Cause inflammation of mucus membrane. |
| If swallowed: | Toxic if swallowed. Cause to Irritation of mouth and throat's membrane tissues. Affect nervous system and cause nausea, blindness and even death. |
| Inhalation: | Vapors can irritate eyes, nose, throat and respiratory tract. Also can depress central nervous system (CNS) and cause to blindness. |
| Fire and Explosion: | Vapors of methanol spread in air easily and get fire to produce CO and CO2. If enough concentration exists explosion due to ignition sources will occur. |



4. FIRST AID MEASURES

As a general rule, in case of doubt or if symptoms persist, always call a doctor. NEVER induce swallowing in an unconscious person. Eye wash facilities and water shower should be available

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| In case of exposure by inhalation: | Leave the contaminated area. Breathe deeply. See a doctor. |
| In case of splashes or contact with eyes: | Flush eyes (while eyelids are hold apart) with plenty of water for at least 15 minutes. Keep patient calm. |

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In case of swallowing: Note of physician:

Contact a doctor or Poisons Information Centre. Doctor should watch for toxic effect which may be delayed, including chemical pneumonitis. Apply antidote treatment with ethanol. Central nervous system. Depression, and acidosis from methanol metabolites, including formaldehyde liver function and optic nerve, and other effects should be treated symptomatically.

In case of contact with skin:

Remove contaminated clothing (with methanol) and flush affected area with water. See doctor if irritation develops. Wash contaminated clothing before reuse.

5. FIRE FIGHTING MEASURES

HazChem Code:

2WE. Highly flammable.
Auto-ignition temperature: 470 °C (Kirk-Other 1981: ullmann, 1975)
LEL: 5.5% U E L : 3 5 . 6 %

Suitable extinguishing media:

Dry chemical, carbon dioxide, foam or water fog. For large fires water jet is ineffective. Use water fog to cool intact containers and nearby storage areas.
Eliminate all ignition sources including cigarettes, open flame, sparks, heaters etc. at dispensing earth containers.

Special exposure hazards arising from the Substance or preparation itself, combustion Products, resulting gases:



Methanol vapors may form explosive mixtures with air. Toxic gases such as carbon oxides, hydrocarbons are produced after decomposition at high temperature and combustion.

Special protective equipment for firefighting:

Full face, positive pressure, self-contained breathing apparatus and suitable protective clothing. Do not walk through spilled products as it may be on fire and not visible.

Other information:

Flame of methanol is almost invisible in daylight. Remain upwind and notify those downwind of hazard. Concentration of greater than 25% methanol in water can be ignited.

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6. ACCIDENTAL RELEASE MEASURES

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| Personal precautions: | Refer to section 8 |
| Environmental precautions: | Ventilate and clear area of all unprotected personnel. Eliminate all ignition sources. |
| Methods for cleaning up and disposal: | Absorb spill with sand or similar, collect and place in sealable containers for disposal |
| Other information: | Contact emergency services. Wear splash- proof goggles, gloves, organic vapor respirator, coveralls and boots. Prevent soil and water pollution. Plug the leak. Collect the spilled methanol using explosion proof pumps, or dilute with water to reduce fire danger. |

7. HANDLING AND STORAGE

The regulations relating to storage premises apply to workshop where the product is handled:

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| Handling: | <p>Use safe work practice to avoid eye or skin contact and inhalation. Prohibit smoking, drinking and eating while handling methanol containers or uncontaminated area.</p> <p>Keep containers tightly closed. Use explosion proof lift trucks, try to reduce evaporation.</p> <p>Reduce fire hazard by applying safety measures.</p> |
| Storage: | <p>Store in cool, ventilated and possibly cool area.</p> <p>Keep away from oxidizing agents, acids, alkalis, direct sunlight, heat or ignition and food stuff.</p> <p>Containers should be labeled and grounded properly.</p> <p>Check regularly for leaks and spills.</p> <p>Methanol is suitable for most metallic and plastic containers except made of lead and magnesium.</p> <p>Mild steel is recommended material for tank construction.</p> <p>Modern vessel containers are made of stainless steel.</p> <p>Corrosion rates for several materials: Cast iron, Monel, Lead, Nickel: < 0.508 mm/year</p> <p>High silicon iron : < 0.051 mm/year</p> <p>Polyethylene : some attack</p> <p>Neoprene, phenolic Resins, Polyesters, Natural Rubber, Butyl Rubber, satisfactory Polyvinyl chloride, Unplasticized : resistant</p> |



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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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| Exposure limit values: | TLV-TWA: 200 ppm TLV-STEL: 250 ppm Odor threshold: 200 ppm Irritation at: 1000 ppm |
| Exposure controls: | Do not inhale vapors. Use explosion proof ventilation systems. Methanol vapors are heavier than air and may travel some distance to an ignition source and flash back to leakage point. Keep vapor level below the recommended exposure standard. |
| Personal protective equipment: | PVC apron, suitable goggle or face shield and neoprene gloves are recommended. In case of inhalation risk, wear a Type A respirator or air-line respirator. |
| Eye protection: | Use face shield and chemical splash mask or goggles. |
| Respiratory protection: | Use air respirator in case of exceeding exposure limits. |
| Hand protection: | Use gloves made of Butyl or Nitrile rubber. |
| Skin and body protection: | Use protective clothing made of Butyl or Nitrile rubber. |
| Health measures: | In confined areas, explosion proof ventilation should maintain air borne concentration below permissible exposure limits. Sampling methods: NIOSH 2000 or OSHA 91 |
| Environmental exposure controls: | See section 13. Dangerous for aquatic organisms. |

9. PHYSICAL AND CHEMICAL PROPERTIES



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| General information: | Methanol is a liquid product. |
| Appearance (at 20 °C): | Clear liquid |
| Color: | Colorless |
| Odor: | Slight alcohol odor (highly variable) |
| PH (at 20 °C): | N.D. |

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| Affinity to: | Mixable with water |
| Boiling point/range (°C): | 64.6 °C |
| Flash point (°C): | 12.2(TCC) (closed vessel), 15.6 °C (open vessel) |
| Flammability: | Flammable |
| Auto-ignition temperature: | 470 °C (Kirk-Other 1981: ullmann, 1975) |
| Explosive properties: | 5.5 – 35.6 vol% |
| Oxidizing properties: | None |
| Vapor pressure (at50°C): | 535 hpa (at 20 °C: 128 hpa or 96 mmHg) |
| Density (at 20°C): | 0.792 (relative) / relative vapor Density: 1.11 |
| Solubility (at 20°C): | Soluble in ethanol, ether, acetone, chloroform Solubility in fats: reacts with fats to form bio- diesel |
| Viscosity (40°C): | 0.0006 pa.s |
| Evaporation rate: | Ratio to butyl acetate: 5.9 / to ether: 5.3 |
| Other information: | Melting point: -97.6 °C |

10. STABILITY AND REACTIVITY

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| Stability: | Stable under normal conditions. |
| Conditions to avoid: | Heat, spark and ignition sources. |
| Material to avoid: | Oxidizing agents, acids, alkaline metals, halogens and amines. |
| Hazardous decomposition products: | Carbon di & mono oxides and formaldehyde. |

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11. TOXICOLOGICAL INFORMATION



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| Acute toxicity (methanol) | - LD ₅₀ , oral, rat (5628 mg.kg ⁻¹): - LD ₅₀ , inhalation rat (85 mg/l/ 4 h): - LD ₅₀ , dermal rabbit (15800 mg.kg ⁻¹): |
| Sub chronic – chronic toxicity: | Not listed |
| Sensibilization: | Not listed |
| Carcinogenicity: | Not listed |
| Reproductive effects: | Not listed |
| Human experience: | Repeated exposure by inhalation or absorption: systemic poisoning, impaired vision and blindness |
| Other information: | Reported to cause birth defects in rats exposed to 2000 ppm. |

12. ECOLOGICAL INFORMATION

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| Bio accumulative potential: | Slightly bio accumulative. |
| Mobility: | Voc: 100%. Soluble in water |
| Persistence and degradability: | If released to atmosphere, degrades. It is expected to biodegrade in both soil and water. Rapid evaporation from dry surface occurs. |
| Other adverse effects: | Chronic aquatic toxicity possible above 32 ppm. Not dangerous for the ozone layer. |

13. DISPOSAL CONSIDERATIONS

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| Disposal of product: | Incineration is recommended. Waste materials should be disposed of in accordance with your municipal, state, provincial, and federal regulations. |
| Disposal of packaging: | Dispose of in accordance with relevant local regulations. |

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14. TRANSPORT INFORMATION

Land transport:

Class: 3
Packing group: II
Danger label tanks: 3+6.1
Danger label packaging: 3+6.1
HazChem: 2WE

ADR/RID: (transport by road and rail)

Class: 3(flammable liquids)
Packing group: II
HazChem: 2WE

Maritime transport:

Class: 3
Sub risks: 3.1 packing Group: II MFAG: 19
EMS: F-E, S-D

Air transport:

Class: 3
Sub risks: 6.1
Packing: II
Packing instruction passenger aircraft: 305-y305
Packing instruction cargo aircraft: 307



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15. REGULATORY INFORMATION

Hazardous label(s):



Highly flammable, toxic

Safety phrases:

S (01/02); S 07; S 16; S 36/37; S45

Risk phrases:

R 11; R23 /24 /25; R39 /23 /24/25

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16. OTHER INFORMATION

NOTE TO PHYSICIAN

After 40 minutes up to 72 hours, the symptoms of acute exposure to methanol, either through ingestion or breathing high airborne concentrations, could appear. Signs and symptoms are usually limited to central nerve system (CNS), eyes and gastrointestinal tract. Because of the initial CNS's effects of headache, vertigo, lethargy, and confusion, there may be an impression of ethanol intoxication. Blurred vision, decreased acuity and photophobia are common complains of the patients.

Treatment with ipecac or lavage is indicated in any patient presenting the symptoms within two hours of ingestion. A profound metabolic acidosis occurs in severe poisoning and serum bicarbonate is a more accurate measure of severity than serum methanol level. Treatment procedures are present at major hospitals and early collaboration with said hospitals is recommended.

Chemical data sheets available in many countries now contain codes for certain "risk phrases", shown as R23, R45 etc. These risk phrase codes have the following meanings:

- R11 Highly flammable.
- R23 Toxic by inhalation.
- R24 Toxic in contact with skin.
- R25 Toxic if swallowed.
- R39 Danger of very serious irreversible effects.

Under EC legislation, data sheets available now contain codes for certain "safety phrases", shown as S1, S17 etc. These phrases are also extensively used elsewhere in the world. Safety phrase codes have the following meanings:

- S1 Keep locked up.
- S2 Keep out of the reach of children.
- S7 Keep container tightly closed.
- S16 Keep away from sources of ignition.
- S36 Wear suitable protective clothing.
- S37 Wear suitable gloves.
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible.)

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