# Material Safety Data Sheet

Date Printed: 27/JAN/2004
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Version 1.7
According to 91/155/EEC

## 1 - Product and Company Information

| | |
|---|---|
| Product Name | METHANOL, 99.8+%, A.C.S. REAGENT |
| Product Number | 179337 |
| Company | Sigma-Aldrich Pte., Ltd.<br>Pasir Panjang Road<br>118529<br>Singapore |
| Technical Phone # | 65 271 1089 |
| Fax | 65 271 1571 |

## 2 - Composition/Information on Ingredients

| Product Name | CAS # | EC no |
|---|---|---|
| METHANOL | 67-56-1 | 200-659-6 |

| | |
|---|---|
| Formula | CH4O |
| Molecular Weight | 32.04 AMU |
| Synonyms | Alcool methylique (French) * Alcool metilico (Italian) * Bieleski's solution * Carbinol * Colonial Spirit * Columbian Spirit * Metanolo (Italian) * Methanol (ACGIH) * Methyl alcohol (DOT:OSHA) * Methylol * Methylalkohol (German) * Methyl hydrate * Methyl hydroxide * Metylowy alkohol (Polish) * Monohydroxymethane * Pyroxylic Spirit * RCRA waste number U154 * Wood alcohol * Wood naphtha * Wood Spirit |

## 3 - Hazards Identification

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT
Highly flammable. Toxic by inhalation, in contact with skin and if swallowed. Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

## 4 - First Aid Measures

AFTER INHALATION
If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

AFTER SKIN CONTACT
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

AFTER EYE CONTACT
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

AFTER INGESTION
If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately.

## 5 - Fire Fighting Measures

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

SPECIAL RISKS
Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.
Explosion Hazards: Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

## 6 - Accidental Release Measures

PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

ENVIRONMENTAL PRECAUTION(S)
Do not allow material to enter drains or water courses.

METHODS FOR CLEANING UP
Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

## 7 - Handling and Storage

HANDLING
Directions for Safe Handling: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Conditions of Storage: Keep container closed. Keep away from heat, sparks, and open flame.

## 8 - Exposure Controls / Personal Protection

ENGINEERING CONTROLS
Safety shower and eye bath. Use nonsparking tools. Use only in a chemical fume hood.

GENERAL HYGIENE MEASURES
Wash contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS

| Country | Source | Type | Value |
|---|---|---|---|

| | | |
|---|---|---|
| Poland | NDS | 100 MG/M3 |
| Poland | NDSCh | 300 MG/M3 |
| Poland | NDSP | - |

EXPOSURE LIMITS - DENMARK

| Source | Type | Value |
|---|---|---|
| OEL | TWA | 260 mg/m3 |
| | | 200 ppm |

Remarks: H

EXPOSURE LIMITS - GERMANY

| Source | Type | Value |
|---|---|---|
| TRGS 900 | OEL | 260 mg/m3 |
| | | 200 ppm |

Remarks: 4
Remarks: H

EXPOSURE LIMITS - NORWAY

| Source | Type | Value |
|---|---|---|
| OEL | TWA | 130 mg/m3 |
| | | 100 ppm |

Remarks: H

EXPOSURE LIMITS - SWEDEN

| Source | Type | Value |
|---|---|---|
| | LLV (Level | 250 mg/m3 |
| | | 200 ppm |

Remarks: H

EXPOSURE LIMITS - SWITZERLAND

| Source | Type | Value |
|---|---|---|
| OEL | OEL | 260 mg/m3 |
| | | 200 ppm |

Remarks: H M C

EXPOSURE LIMITS - UNITED KINGDOM

| Source | Type | Value |
|---|---|---|
| OEL | OEL | 266 mg/m3 |
| | | 200 ppm |
| OEL | STEL | 333 mg/m3 |
| | | 250 ppm |

Remarks: Skin Indicative limit value

PERSONAL PROTECTIVE EQUIPMENT
Respiratory Protection: Government approved respirator.
Hand Protection: Compatible chemical-resistant gloves.
Eye Protection: Chemical safety goggles.

## 9 - Physical and Chemical Properties

| | |
|---|---|
| Appearance | Physical State: Liquid<br>Color: Colorless |

| Property | Value | At Temperature or Pressure |
|---|---|---|
| pH | N/A | |
| BP/BP Range | 64 - 65 °C | 760 mmHg |
| MP/MP Range | -98 °C | |
| Flash Point | 11 °C | Method: closed cup |
| Flammability | N/A | |
| Autoignition Temp | 385 °C | |
| Oxidizing Properties | N/A | |

| | | |
|---|---|---|
| Explosive Properties | N/A | |
| Explosion Limits | Lower: 6 %<br>Upper: 36 % | |
| Vapor Pressure | 97.68 mmHg | 20 °C |
| SG/Density | 0.791 g/cm3 | |
| Partition Coefficient | N/A | |
| Viscosity | N/A | |
| Vapor Density | 0.79 g/l | |
| Saturated Vapor Conc. | N/A | |
| Evaporation Rate | N/A | |
| Bulk Density | N/A | |
| Decomposition Temp. | N/A | |
| Solvent Content | N/A | |
| Water Content | N/A | |
| Surface Tension | N/A | |
| Conductivity | N/A | |
| Miscellaneous Data | N/A | |
| Solubility | Solubility in Water:Miscible. | |

## 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Materials to Avoid: Acids, Acid chlorides, Acid anhydrides, Oxidizing agents, Alkali metals, Reducing agents.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

## 11 - Toxicological Information

RTECS NUMBER: PC1400000

ACUTE TOXICITY

LDLO
Oral
Man
6422 mg/kg
Remarks: Brain and Coverings:Changes in circulation (hemorrhage,thrombosis, etc.). Lungs, Thorax, or Respiration:Dyspnea. Gastrointestinal:Nausea or vomiting.

LDLO
Oral
Human
428 mg/kg
Remarks: Behavioral:Headache. Lungs, Thorax, or Respiration:Other changes.

LDLO
Oral
Human
143 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Optic nerve neuropathy. Lungs, Thorax, or Respiration:Dyspnea. Gastrointestinal:Nausea or vomiting.

LD50

Oral
Rat
5628 mg/kg

LC50
Inhalation
Rat
64,000 ppm
4H

LD50
Intraperitoneal
Rat
7529 MG/KG

LD50
Intravenous
Rat
2131 MG/KG

LD50
Oral
Mouse
7300 mg/kg

LD50
Intraperitoneal
Mouse
10765 MG/KG

LD50
Subcutaneous
Mouse
9800 MG/KG

LD50
Intravenous
Mouse
4710 MG/KG

LD50
Oral
Monkey
7000 mg/kg
Remarks: Behavioral:Muscle weakness. Behavioral:Ataxia. Behavioral:Coma.

LD50
Oral
Rabbit
14200 mg/kg

LD50
Skin
Rabbit
15800 mg/kg

LD50
Intraperitoneal
Rabbit
1826 MG/KG

LD50
Intravenous
Rabbit
8907 MG/KG

LD50
Intraperitoneal
Guinea pig
3556 MG/KG

LD50
Intraperitoneal
Hamster
8555 MG/KG

IRRITATION DATA

Skin
Rabbit
20 mg
24H
Remarks: Moderate irritation effect

Eyes
Rabbit
40 mg
Remarks: Moderate irritation effect

Eyes
Rabbit
100 mg
24H
Remarks: Moderate irritation effect

SIGNS AND SYMPTOMS OF EXPOSURE

Methyl alcohol may be fatal or cause blindness if swallowed. Cannot be made non-poisonous. Ingestion can cause: Nausea, headache, and vomiting. Gastrointestinal disturbances. Dizziness. Weakness. Confusion. Drowsiness. Unconsciousness. May cause convulsions.

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.
Skin Absorption: Toxic if absorbed through skin.
Eye Contact: Causes eye irritation.
Inhalation: Toxic if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.
Ingestion: Toxic if swallowed.

TARGET ORGAN INFORMATION

Eyes. Kidneys. Liver. Heart. Central nervous system.

CHRONIC EXPOSURE - MUTAGEN

Human
300 MMOL/L
Cell Type: lymphocyte
DNA inhibition

Rat
10 UMOL/KG
Oral

DNA damage

Mouse
7900 MG/L (+S9)
Cell Type: lymphocyte
Mutation in microorganisms

Mouse
1 GM/KG
Oral
Cytogenetic analysis

Mouse
75 MG/KG
Intraperitoneal
Cytogenetic analysis

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 35295 MG/KG
Route of Application: Oral
Exposure Time: (1-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Newborn: Biochemical and metabolic.

Species: Rat
Dose: 20000 PPM/7H
Route of Application: Inhalation
Exposure Time: (1-22D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Specific Developmental Abnormalities: Urogenital system.

Species: Rat
Dose: 20000 PPM/7H
Route of Application: Inhalation
Exposure Time: (7-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Endocrine system.

Species: Rat
Dose: 10000 PPM/7H
Route of Application: Inhalation
Exposure Time: (7-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat
Dose: 5200 UL/KG
Route of Application: Oral
Exposure Time: (10D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Eye, ear. Specific Developmental Abnormalities: Urogenital system.

Species: Mouse
Dose: 40 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse
Dose: 4 GM/KG
Route of Application: Oral
Exposure Time: (7D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 1500 PPM/6H
Route of Application: Inhalation
Exposure Time: (7-9D PREG)
Result: Specific Developmental Abnormalities: Central nervous system.

Species: Mouse
Dose: 5000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse
Dose: 2000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat
Dose: 7500 MG/KG
Route of Application: Oral
Exposure Time: (17-19D PREG)
Result: Effects on Newborn: Behavioral.

Species: Rat
Dose: 35295 MG/KG
Route of Application: Oral
Exposure Time: (1-15D PREG)
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated ). Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat
Dose: 20 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat
Dose: 200 PPM/20H
Route of Application: Oral
Exposure Time: (78W MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Mouse
Dose: 7500 PPM/7H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetal death.

Species: Mouse
Dose: 15000 PPM
Route of Application: Inhalation
Exposure Time: (7-9D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 5 GM/KG
Route of Application: Intraperitoneal
Exposure Time: (5D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology,motility, and count).

## 12 - Ecological Information

ECOTOXICOLOGICAL EFFECTS

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96 h
Value: 19,000 mg/l

Test Type: LC50 Fish
Species: Cyprinus carpio
Time: 48 h
Value: 36,000 mg/l

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 48 h
Value: 24,500 mg/l

Test Type: EC100 Daphnia
Species: Daphnia magna
Time: 24 h
Value: 10,000 mg/l

## 13 - Disposal Considerations

SUBSTANCE DISPOSAL

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and

local environmental regulations.

## 14 - Transport Information

RID/ADR
- UN#: 1230
- Class: 3
- PG: II
- Proper Shipping Name: Methanol

IMDG
- UN#: 1230
- Class: 3
- PG: II
- Subrisk: 6.1
- EmS Number: 3-06
- MFAG Number: 306
- Proper Shipping Name: Methanol
- Marine Pollutant: No
- Severe Marine Pollutant: No

IATA
- UN#: 1230
- Class: 3
- PG: II
- Subrisk: 6.1
- Proper Shipping Name: Methanol
- Inhalation Packing Group I: No

## 15 - Regulatory Information

CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES
- ANNEX I INDEX NUMBER: 603-001-00-X
- INDICATION OF DANGER: F T
  Highly Flammable. Toxic.
- R-PHRASES: 11 23/24/25 39/23/24/25
  Highly flammable. Toxic by inhalation, in contact with skin and if swallowed. Toxic: danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.
- S-PHRASES: 7 16 36/37 45
  Keep container tightly closed. Keep away from sources of ignition - no smoking. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

COUNTRY SPECIFIC INFORMATION
Germany

- WGK: 1
- VbF: B

SWITZERLAND
- SWISS POISON CLASS: 3

NORWAY
Labelling for organic solvents where the package is 1liter or more.

- YL-tall m3/l: 8507
- YL-group: 5
- Safety phrases: 38 42 210

In case of insufficient ventilation, wear suitable respiratory equipment. During fumigation/spraying wear suitable respiratory equipment. Use compressed air- or fresh air line breathing apparatus in confined spaces.

Declaration Number: 1931

## 16 - Other Information

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. 

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