MATERIAL SAFETY DATA SHEET

Date Printed: 03/28/2006
Date Updated: 02/07/2006
Version 1.13

Section 1 - Product and Company Information

Product Name	METHANOL, BIOTECH GRADE SOLVENT, 99.93%
Product Number	494437
Brand	ALDRICH
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
METHANOL	67-56-1	Yes

Formula	CH4O
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 * METHYL ALCOHOL * WOOD ALCOHOL
RTECS Number:	PC1400000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Toxic.
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. Irritating to eyes and skin.
Target organ(s): Eyes. Kidneys.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

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

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

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

EYE EXPOSURE
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.

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS
Flammable Hazards: Yes

EXPLOSION HAZARDS
Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

FLASH POINT
52 °F 11 °C Method: closed cup

EXPLOSION LIMITS
Lower: 6 % Upper: 36 %

AUTOIGNITION TEMP
385 °C

FLAMMABILITY
N/A

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

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE 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.

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.

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

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

Section 8 - Exposure Controls / PPE

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

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Use supplied-air or SCBA respirators. Europe permits the use of type AXBEK full-face cartridge respirators (EN 14387).
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

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

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	STEL	250 PPM
Remarks: Skin			
USA	ACGIH	TWA	200 PPM
Remarks: Skin			
USA	MSHA Standard-air	TWA	200 PPM (260 MG/M3) (SKIN)
USA	OSHA.	PEL	8H TWA 200 PPM (260 MG/M3)
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	200 PPM (SK)
		STEL	250 PPM (SK)

EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	100 MG/M3
Poland		NDSCh	300 MG/M3
Poland		NDSP	-

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Liquid Color: Colorless

Property	Value	At Temperature or Pressure

Molecular Weight	32.04 AMU	
pH	N/A	
BP/BP Range	64.0 - 65.0 °C	760 mmHg
MP/MP Range	- 98.0 °C	
Freezing Point	N/A	
Vapor Pressure	97.68 mmHg	20 °C
Vapor Density	0.79 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.791 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	100 %	
VOC Content	100 %	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	Log Kow: - 0.770	
Decomposition Temp.	N/A	
Flash Point	52 °F 11 °C	Method: closed cup
Explosion Limits	Lower: 6 % Upper: 36 %	
Flammability	N/A	
Autoignition Temp	385 °C	
Refractive Index	1.329	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water:Miscible.	

N/A = not available

Section 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

Section 11 - Toxicological Information

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

TARGET ORGAN(S) OR SYSTEM(S)
Eyes. Kidneys. Liver. Heart. Central nervous system.

SIGNS AND SYMPTOMS OF EXPOSURE
Nausea, headache, and vomiting. Gastrointestinal disturbances. Dizziness. Weakness. Confusion. Drowsiness. Unconsciousness. May cause convulsions. Ingestion can cause: Methyl alcohol may be

fatal or cause blindness if swallowed. Cannot be made non-poisonous.

TOXICITY DATA

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

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

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

Oral
Rat
5628 mg/kg
LD50

Inhalation
Rat
64,000 ppm
LC50

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
LD50
Remarks: Behavioral:Coma. Behavioral:Ataxia. Behavioral:Muscle weakness.

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
LD50

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

CHRONIC EXPOSURE - TERATOGEN

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

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

Species: Rat
Dose: 20000 PPM/7H
Route of Application: Inhalation
Exposure Time: (7-15D PREG)
Result: Specific Developmental Abnormalities: Endocrine system. Specific Developmental Abnormalities: Musculoskeletal 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: Specific Developmental Abnormalities: Urogenital system. Specific Developmental Abnormalities: Eye, ear. Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 40 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

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

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: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Central nervous system.

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

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 300 MMOL/L
Cell Type: lymphocyte
Mutation test: DNA inhibition

Species: Rat
Route: Oral
Dose: 10 UMOL/KG
Mutation test: DNA damage

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

Species: Mouse
Route: Oral
Dose: 1 GM/KG
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Intraperitoneal
Dose: 75 MG/KG
Mutation test: Cytogenetic analysis

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: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). 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: Female

fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated).

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

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 Embryo or Fetus: Fetal death. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

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

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).

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

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

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
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.

Section 14 - Transport Information

DOT
Proper Shipping Name: Methanol
UN#: 1230
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Methanol
IATA UN Number: 1230
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: F-T
Indication of Danger: Highly Flammable. Toxic.
R: 11-23/24/25-39/23/24/25
Risk Statements: 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: 7-16-36/37-45
Safety Statements: 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).

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Flammable (USA) Highly Flammable (EU). Toxic.
Risk Statements: 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. Irritating to eyes and skin.
Safety Statements: Keep container tightly closed. Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges. Avoid contact with skin. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
US Statements: Target organ(s): Eyes. Kidneys.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes

DEMINIMIS: 1 %
NOTES: This product is subject to SARA section 313 reporting requirements.
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

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. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. 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.