Section 1 - Product and Company Information

Product Name                 2-METHOXYETHANOL, ANHYDROUS, 99.8%
Product Number               284467
Brand                        SIAL
Company                      Sigma-Aldrich Canada, Ltd
Address                      2149 Winston Park Drive
                              Oakville ON L6H 6J8 CA
Technical Phone:             9058299500
Fax:                         9058299292
Emergency Phone:             800-424-9300

Section 2 - Composition/Information on Ingredient

Substance Name                          CAS #                 SARA 313
2-METHOXYETHANOL                        109-86-4              Yes

Formula         C3H8O2

RTECS Number:   KL5775000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Combustible (USA) Flammable (EU). Toxic.
May impair fertility. May cause harm to the unborn child. Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin.

HMIS RATING
HEALTH: 2*
FLAMMABILITY: 2
REACTIVITY: 0

NFPA RATING
HEALTH: 2
FLAMMABILITY: 2
Section 4 - First Aid Measures

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

INHALATION EXPOSURE
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of contact, immediately wash skin with soap and copious amounts of water.

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

EXPLOSION HAZARDS
Forms explosive mixtures in air.

FLASH POINT
104 °F  40 °C  Method: closed cup

EXPLOSION LIMITS
Lower: 2.5 %  Upper: 24.5 %

AUTOIGNITION TEMP
287 °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): Emits toxic fumes under fire conditions. Combustible liquid.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Shut off all sources of ignition. Evacuate area and keep personnel upwind.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.
METHODS FOR CLEANING UP
Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

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

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 tightly closed. Keep away from heat and open flame. Store in a cool dry place.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Safety shower and eye bath. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Hand: Compatible chemical-resistant gloves. Eye: Chemical safety goggles.

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

EXPOSURE LIMITS, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>TWA</td>
<td>5 PPM</td>
</tr>
<tr>
<td>Remarks: Skin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard-air</td>
<td>TWA</td>
<td>25 PPM (80 MG/M3) (SKIN)</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA.</td>
<td>PEL</td>
<td>8H TWA 25 PPM (80 MG/M3) (SKIN)</td>
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<tr>
<td>New Zealand OEL</td>
<td>Remarks: check ACGIH TLV</td>
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<td></td>
</tr>
<tr>
<td>USA</td>
<td>NIOSH</td>
<td>TWA</td>
<td>0.1 PPM (SK)</td>
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EXPOSURE LIMITS

<table>
<thead>
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<th>Country</th>
<th>Source</th>
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<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
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<td>15 MG/M3</td>
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<tr>
<td>Poland</td>
<td>NDSCh</td>
<td></td>
<td>60 MG/M3</td>
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<tr>
<td>Poland</td>
<td>NDSP</td>
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Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>At Temperature or Pressure</th>
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</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Physical State: Clear liquid</td>
<td></td>
</tr>
<tr>
<td>Color: Colorless</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SIAL - 284467  www.sigma-aldrich.com  Page 3
Molecular Weight        76.1 AMU
pH                      5.0 - 7.0           25 °C
BP/BP Range             124.0 - 125.0 °C    760 mmHg
MP/MP Range             - 85.0 °C
Freezing Point          - 86.0 °C
Vapor Pressure          6.17 mmHg           20 °C
Vapor Density           2.62 g/l
Saturated Vapor Conc.   N/A
SG/Density              0.964 g/cm3
Bulk Density            N/A
Odor Threshold          2.3 ppm
Volatile%               > 99 %
VOC Content             N/A
Water Content           N/A
Solvent Content         N/A
Evaporation Rate        N/A
Viscosity               N/A
Surface Tension         N/A
Partition Coefficient   Log Kow: - 0.8
Decomposition Temp.     204.00 - 232.00 °C
Flash Point             104 °F 40 °C        Method: closed cup
Explosion Limits        Lower: 2.5 %
                        Upper: 24.5 %
Flammability            N/A
Autoignition Temp       287 °C
Refractive Index        1.402
Optical Rotation        N/A
Miscellaneous Data      N/A
Solubility              Solubility in Water:Soluble.

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions to Avoid: Heat. 45°C
Materials to Avoid: Strong oxidizing 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: Harmful if absorbed through skin.
Eye Contact: Causes eye irritation.
Inhalation: Harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.
Ingestion: Harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

SIGNS AND SYMPTOMS OF EXPOSURE
In laboratory studies with this material, birth defects, fetotoxicity, embryolethality, anemia, bone marrow damage,
hemolysis, immunosuppression, and damage to the male reproductive tissues have been observed.

TOXICITY DATA

Oral
Rat
4,900 mg/kg
LD50
Skin
Rabbit
2,400 mg/kg
LD50
Inhalation
Rat
1,500 ppm
LC50

Oral
Human
3380 mg/kg
LDLO

Oral
Rat
2370 mg/kg
LD50
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Lungs, Thorax, or Respiration:Other changes.

Inhalation
Rat
1,500 ppm
LC50

Intraperitoneal
Rat
2500 MG/KG
LD50

Intravenous
Rat
2068 MG/KG
LD50
Remarks: Blood:Other hemolysis with or without anemia.

Oral
Mouse
2560 mg/kg
LD50

Inhalation
Mouse
1,480 ppm
LC50
Intraperitoneal
Mouse
2147 MG/KG
LD50

Oral
Rabbit
890 mg/kg
LD50

Skin
Rabbit
1280 mg/kg
LD50

Oral
Guinea pig
950 mg/kg
LD50

IRRITATION DATA

Skin
Rabbit
483 mg
24H
Remarks: Mild irritation effect

Eyes
Rabbit
97 mg

Eyes
Rabbit
500 mg
24H
Remarks: Mild irritation effect

Eyes
Guinea pig
0.01 mg
Remarks: Mild irritation effect

CHRONIC EXPOSURE - TERATOGEN
Result: May cause congenital malformation in the fetus.

Species: Rat
Dose: 175 MG/KG
Route of Application: Oral
Exposure Time: (7-13D PREG)
Result: Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Species: Rat
Dose: 1 GM/KG
Route of Application: Skin
Exposure Time: (12D PREG)
Result: Specific Developmental Abnormalities: Gastrointestinal system. Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat
Dose: 330 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (12D PREG)
Result: Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 190 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (14D PREG)
Result: Specific Developmental Abnormalities: Urogenital system. Specific Developmental Abnormalities: Central nervous system.

Species: Rat
Dose: 190 MG/KG
Route of Application: Intraperitoneal
Exposure Time: (12D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 250 MG/KG
Route of Application: Oral
Exposure Time: (13D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 175 MG/KG
Route of Application: Oral
Exposure Time: (11D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 250 MG/KG
Route of Application: Oral
Exposure Time: (11D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 50 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Exposure Time: (7-13D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 250 MG/KG
Route of Application: Subcutaneous
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Central nervous system.

Species: Monkey
Dose: 633 MG/KG
Route of Application: Oral
Exposure Time: (20-45D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rabbit
Dose: 50 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)

Species: Rabbit
Dose: 50 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 150 MMOL/L
Cell Type: lymphocyte
Mutation test: Cytogenetic analysis

Species: Rat
Route: Oral
Dose: 500 MG/KG
Mutation test: Dominant lethal test

Species: Rat
Route: Oral
Dose: 500 MG/KG
Mutation test: sperm

Species: Mouse
Route: Oral
Dose: 500 MG/KG  
Mutation test: sperm  

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD  
Result: May cause reproductive disorders.  
Species: Rat  
Dose: 175 MG/KG  
Route of Application: Oral  
Exposure Time: (7-13D PREG)  

Species: Rat  
Dose: 150 MG/KG  
Route of Application: Oral  
Exposure Time: (13W MALE)  
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).  

Species: Rat  
Dose: 100 MG/KG  
Route of Application: Oral  
Exposure Time: (1D MALE)  
Result: Paternal Effects: Testes, epididymis, sperm duct.  

Species: Rat  
Dose: 350 MG/KG  
Route of Application: Oral  
Exposure Time: (9-15D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth). Specific Developmental Abnormalities: Cardiovascular (circulatory) system.  

Species: Rat  
Dose: 68 MG/KG/4H  
Route of Application: Inhalation  
Exposure Time: (1-19D PREG)  
Result: 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: 30 PPM/6H  
Route of Application: Inhalation  
Exposure Time: (65D MALE)  
Result: Paternal Effects: Testes, epididymis, sperm duct.  

Species: Rat  
Dose: 100 PPM/6H  
Route of Application: Inhalation  
Exposure Time: (6-17D PREG)  
Result: Maternal Effects: Parturition. Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Newborn: Live birth index (# fetuses per litter; measured after birth).  

Species: Rat
Dose: 100 PPM/6H  
Route of Application: Inhalation  
Exposure Time: (6-17D PREG)  
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive).

Species: Rat  
Dose: 30 PPM/6H  
Route of Application: Inhalation  
Exposure Time: (13W MALE)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat  
Dose: 11592 MG/KG  
Route of Application: Skin  
Exposure Time: (6-17D PREG)  
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Embryo or Fetus: Fetal death.

Species: Rat  
Dose: 4375 MG/KG  
Route of Application: Skin  
Exposure Time: (7D MALE)  
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Paternal Effects: Testes, epididymis, sperm duct. Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females).

Species: Rat  
Dose: 2 GM/KG  
Route of Application: Skin  
Exposure Time: (10D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat  
Dose: 190 MG/KG  
Route of Application: Intraperitoneal  
Exposure Time: (8D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat  
Dose: 600 MG/KG  
Route of Application: Subcutaneous  
Exposure Time: (6-20D PREG)  
Result: Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive). Effects on Newborn: Live birth index (# fetuses per litter; measured after birth).

Species: Rat  
Dose: 440 MG/KG  
Route of Application: Subcutaneous  
Exposure Time: (7-17D PREG)  
Result: Effects on Newborn: Live birth index (# fetuses per litter; measured after birth).
Species: Mouse
Dose: 2 GM/KG
Route of Application: Oral
Exposure Time: (7-14D PREG)
Result: Specific Developmental Abnormalities: Central nervous system. Effects on Embryo or Fetus: Fetal death. Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Mouse
Dose: 500 MG/KG
Route of Application: Oral
Exposure Time: (9D 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). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Mouse
Dose: 6250 MG/KG
Route of Application: Oral
Exposure Time: (25D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Mouse
Dose: 1000 PPM/6H
Route of Application: Inhalation
Exposure Time: (11D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Mouse
Dose: 500 PPM/7H
Route of Application: Inhalation
Exposure Time: (5D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Mouse
Dose: 50 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Urogenital system. Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Mouse
Dose: 3200 MG/KG
Route of Application: Subcutaneous
Exposure Time: (7-14D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Monkey
Dose: 930 MG/KG
Route of Application: Oral
Exposure Time: (20-45D PREG)

Species: Rabbit
Dose: 300 PPM/6H
Route of Application: Inhalation
Exposure Time: (65D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Rabbit
Dose: 10 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Guinea pig
Dose: 6250 MG/KG
Route of Application: Oral
Exposure Time: (25D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish
Species: Onchorhynchus mykiss (Rainbow trout)
Time: 96 h
Value: 16,000 mg/l

Test Type: LC50 Fish
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: 10,000 mg/l

Test Type: LC50 Fish
Species: Daphnia magna
Time: 24 h
Value: 10,000 mg/l

Test Type: LC50 Fish
Species: other fish
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. Observe all federal, state, and local environmental regulations. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.
Section 14 - Transport Information

DOT
Proper Shipping Name: Ethylene glycol monomethyl ether
UN#: 1188
Class: 3
Packing Group: Packing Group III
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Ethylene glycol monomethyl ether
IATA UN Number: 1188
Hazard Class: 3
Packing Group: III

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: T
Indication of Danger: Toxic.
R: 60-61-10-20/21/22
Risk Statements: May impair fertility. May cause harm to the unborn child. Flammable. Also harmful by inhalation, in contact with skin and if swallowed.
S: 53-45
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. 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: Combustible (USA) Flammable (EU). Toxic.
Risk Statements: May impair fertility. May cause harm to the unborn child. Harmful by inhalation, in contact with skin and if swallowed. Irritating to eyes, respiratory system and skin.
Safety Statements: Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

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

UNITED STATES - STATE REGULATORY INFORMATION
CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s) known to the state of California to cause male developmental toxicity.

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
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.
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