Section 1 - Product and Company Information

Product Name                  ETHYLENE GLYCOL MONOETHYL ETHER
Product Number                E2632
Brand                         SIGMA

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

<table>
<thead>
<tr>
<th>Substance Name</th>
<th>CAS #</th>
<th>SARA 313</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-ETHOXYETHANOL</td>
<td>110-80-5</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Formula                     C4H10O2
Synonyms                    Athyleneglykol-monoathylylather (German) *
                            Cellosolve (OSHA) * Cellosolve solvent * Celosolv (Czech) * Dowanol 8 * Dowanol EE * Ektasolve EE *
                            Ether monoethylique de l'ethyleneglycol (French) * 2-Ethoxyethanol (ACGIH:OSHA) * Ethyl cellosolve
                            * Ethylene glycol ethyl ether * Ethylene glycol monoethyl ether * Etoksyetylowy alkohol (Polish) *
                            Glycol monoethyl ether (OSHA) * Jeffersol EE *
                            NCI-C54853 * Oxitol * Poly-Solv EE * RCRA waste number U227 * RCRA waste number U359
RTECS Number:              KK8050000

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
REACTIVITY: 0

*additional chronic hazards present.
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

FLASH POINT
107.6 °F   42 °C   Method: closed cup

EXPLOSION LIMITS
Lower: 1.8 %   Upper: 14 %

AUTOIGNITION TEMP
238 °C

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

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
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP
Cover with an activated carbon adsorbent, take up and place in
Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Keep away from heat and open flame.

Section 8 - Exposure Controls / PPE

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

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 ABEK (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 contaminated clothing before reuse. Wash thoroughly after handling.

EXPOSURE LIMITS, RTECS
Country     Source            Type      Value
USA         ACGIH             TWA       5 PPM
Remarks: Skin
USA         MSHA Standard-air TWA       100 PPM (370 MG/M3) (SKIN)
USA         OSHA.             PEL       8H TWA 200 PPM (740 MG/M3) (SK
USA         NIOSH             TWA       0.5 PPM (SK)

EXPOSURE LIMITS
Country     Source            Type      Value
Poland                        NDS       20 MG/M3
Poland                        NDSCh     80 MG/M3
Poland                        NDSP      -

Section 9 - Physical/Chemical Properties

Appearance  Physical State: Liquid
Property      Value At Temperature or Pressure
Molecular Weight  90.12 AMU
pH            N/A
BP/BP Range  133.0 - 135.0 °C
MP/MP Range  - 90.0 °C
Freezing Point  N/A
Vapor Pressure  3.8 mmHg 20 °C
Vapor Density  3.1 g/l
Saturated Vapor Conc. N/A
SG/Density  0.931 g/cm3
Bulk Density  N/A
Odor Threshold  N/A
Volatile%  N/A
Water Content  < 0.1 %
Solvent Content  N/A
Evaporation Rate  N/A
Viscosity  0.002 Pas  20 °C
Surface Tension  N/A
Partition Coefficient  N/A
Decomposition Temp.  N/A
Flash Point  107.6 °F  42 °C  Method: closed cup
Explosion Limits  Lower: 1.8 %
                 Upper: 14 %
Flammability  N/A
Autoignition Temp  238 °C
Refractive Index  1.408
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.
   Conditions to Avoid: May form peroxides on contact with air.
   Materials to Avoid: Oxidizing agents, Copper.

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: Readily absorbed through skin. 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
   2125 mg/kg
   LD50
   Remarks: Lungs, Thorax, or Respiration:Respiratory depression.

Inhalation
Rat
2,000 ppm
LC50

Skin
Rat
3900 mg/kg
LD50

Intraperitoneal
Rat
2800 MG/KG
LD50

Subcutaneous
Rat
3400 MG/KG
LD50

Intravenous
Rat
2400 MG/KG
LD50

Oral
Mouse
2451 mg/kg
LD50

Inhalation
Mouse
1,820 ppm
LC50

Intraperitoneal
Mouse
1707 MG/KG
LD50

Intravenous
Mouse
3900 MG/KG
LD50

Oral
Rabbit
1275 mg/kg
LD50
Skin
Rabbit
3300 mg/kg
LD50

Subcutaneous
Rabbit
2 GM/KG
LD50

Intravenous
Rabbit
900 MG/KG
LD50

Oral
Guinea pig
1400 mg/kg
LD50

IRRITATION DATA

Eyes
Human
6,000 ppm

Skin
Rabbit
500 mg
Remarks: Open irritation test

Eyes
Rabbit
50 mg
Remarks: Moderate irritation effect

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: 600 MG/KG
Route of Application: Oral
Exposure Time: (10-12D PREG)
Result: Specific Developmental Abnormalities: Cardiovascular (circulatory) system. Specific Developmental Abnormalities: Musculoskeletal system. Effects on Embryo or Fetus: Fetotoxicity
(except death, e.g., stunted fetus).

Species: Rat
Dose: 1800 MG/KG
Route of Application: Oral
Exposure Time: (7-15D PREG)
Result: Effects on Embryo or Fetus: Fetal death.

Species: Rat
Dose: 200 PPM/7H
Route of Application: Inhalation
Exposure Time: (1-19D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Species: Rat
Dose: 50 GM/KG
Route of Application: Skin
Exposure Time: (7-16D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Species: Rat
Dose: 1955 MG/KG
Route of Application: Subcutaneous
Exposure Time: (1-21D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rabbit
Dose: 160 PPM/7H
Route of Application: Inhalation
Exposure Time: (1-18D PREG)

Species: Rabbit
Dose: 175 PPM/6H
Route of Application: Inhalation
Exposure Time: (6-18D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rabbit
Dose: 160 PPM/7H
Route of Application: Inhalation
Exposure Time: (1-18D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

CHRONIC EXPOSURE - MUTAGEN

Species: Rat
Route: Oral
Dose: 23400 MG/KG
Exposure Time: 5W
Mutation test: sperm
Species: Hamster  
Dose: 6830 MG/L  
Cell Type: ovary  
Mutation test: Cytogenetic analysis

Species: Hamster  
Dose: 3170 MG/L  
Cell Type: ovary  
Mutation test: Sister chromatid exchange

**CHRONIC EXPOSURE - REPRODUCTIVE HAZARD**  
Result: May cause reproductive disorders.

Species: Rat  
Dose: 500 MG/KG  
Route of Application: Oral  
Exposure Time: (5D MALE)  
Result: Effects on Fertility: Other measures of fertility

Species: Rat  
Dose: 7820 MG/KG  
Route of Application: Oral  
Exposure Time: (1-21D PREG)  
Result: Effects on Fertility: Abortion. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Rat  
Dose: 4500 MG/KG  
Route of Application: Oral  
Exposure Time: (6W MALE)  
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Rat  
Dose: 10 PPM/6H  
Route of Application: Inhalation  
Exposure Time: (6-15D PREG)  
Result: Specific Developmental Abnormalities: Musculoskeletal system. Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat  
Dose: 600 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (7-13D 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: Rat  
Dose: 100 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (14-20D PREG)  

Species: Rat  
Dose: 50 GM/KG  
Route of Application: Skin  
Exposure Time: (7-16D 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). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat
Dose: 50 GM/KG
Route of Application: Skin
Exposure Time: (7-16D PREG)

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

Species: Mouse
Dose: 252 GM/KG
Route of Application: Oral
Exposure Time: (18W PRE)
Result: Effects on Newborn: Live birth index (# fetuses per litter; measured after birth). Effects on Newborn: Stillbirth.

Species: Mouse
Dose: 5600 MG/KG
Route of Application: Oral
Exposure Time: (8-14D PREG)
Result: Effects on Newborn: Live birth index (# fetuses per litter; measured after birth). Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Species: Mouse
Dose: 12600 MG/KG
Route of Application: Oral
Exposure Time: (8-14D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Other developmental abnormalities.

Species: Rabbit
Dose: 400 PPM/6H
Route of Application: Inhalation
Exposure Time: (65D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Rabbit
Dose: 617 PPM/7H
Route of Application: Inhalation
Exposure Time: (1-18D PREG)
Result: Maternal Effects: Uterus, cervix, vagina. Effects on Fertility: Other measures of fertility

Section 12 - Ecological Information

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Ethylene glycol monoethyl ether
UN#: 1171
Class: 3
Packing Group: Packing Group III
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: Ethylene glycol monoethyl ether
IATA UN Number: 1171
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: 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).

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
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.
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