Section 1 - Product and Company Information

Product Name                       DI(ETHYLENE GLYCOL), 99%
Product Number                     H26456
Brand                              ALDRICH
Company                            Sigma-Aldrich
Street Address                     3050 Spruce Street
City, State, Zip, Country          SAINT LOUIS MO 63103 US
Technical Phone:                   314 771 5765
Emergency Phone:                   414 273 3850 Ext. 5996
Fax:                               800 325 5052

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>DI(ETHYLENE GLYCOL)</td>
<td>111-46-6</td>
<td>No</td>
</tr>
</tbody>
</table>

Formula         C4H10O3
Synonyms        Bis(2-hydroxyethyl) ether * Brecolane ndg * Deactivator E * DEG * Dicol * Diethylenglykol (Czech) * Diglycol * Dihydroxydiethyl ether * beta,beta'-Dihydroxydiethyl ether * 2,2'-Dihydroxyethyl ether * Dissolvant APV * Ethanol, 2,2'-oxydi- * Ethylene diglycol * 3-Oxapentane-1,5-diol * 3-Oxa-1,5-pentanediol * 2,2'-Oxybisethanol * 2,2'-Oxydiethanol * 2,2'-Oxyethanol * TL4N
RTECS Number:   ID5950000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Harmful.
Harmful if swallowed.
Target organ(s): Liver. Kidneys.

HMIS RATING
HEALTH: 1*
FLAMMABILITY: 1
REACTIVITY: 1

NFPA RATING
HEALTH: 1
FLAMMABILITY: 1
REACTIVITY: 1

*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.

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
  253.4 °F   123 °C   Method: closed cup

EXPLOSION LIMITS
  Lower: 2 %   Upper: 12.3 %

AUTOIGNITION TEMP
  228 °C

FLAMMABILITY
  N/A

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

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.

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.

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.

Section 7 - Handling and Storage

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

STORAGE
Suitable: Keep tightly closed.

SPECIAL REQUIREMENTS
Hygroscopic.

Section 8 - Exposure Controls / PPE

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

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

GENERAL HYGIENE MEASURES
Wash thoroughly after handling.

EXPOSURE LIMITS
<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td>10 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td>-</td>
<td></td>
</tr>
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</table>

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value or Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Physical State: Liquid</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>106.12 AMU</td>
</tr>
<tr>
<td>pH</td>
<td>5 - 8</td>
</tr>
<tr>
<td>BP/BP Range</td>
<td>125 - 126 °C</td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>-10 °C</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>0.03 mmHg</td>
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<tr>
<td>Vapor Density</td>
<td>2.14 g/l</td>
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<tr>
<td>Saturated Vapor Conc.</td>
<td>N/A</td>
</tr>
<tr>
<td>SG/Density</td>
<td>1.114 g/cm³</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>N/A</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>N/A</td>
</tr>
<tr>
<td>Volatile%</td>
<td>N/A</td>
</tr>
<tr>
<td>VOC Content</td>
<td>N/A</td>
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<tr>
<td>Water Content</td>
<td>&lt; 0.05 %</td>
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<tr>
<td>Solvent Content</td>
<td>N/A</td>
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<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
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<tr>
<td>Viscosity</td>
<td>38 Pas</td>
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<tr>
<td>Surface Tension</td>
<td>48.5 mN/m</td>
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<tr>
<td>Partition Coefficient</td>
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<td>Decomposition Temp.</td>
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<tr>
<td>Flash Point</td>
<td>253.4 °F 123 °C</td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>Lower: 2 %</td>
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<tr>
<td></td>
<td>Upper: 12.3 %</td>
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<tr>
<td>Flammability</td>
<td>N/A</td>
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<tr>
<td>Autoignition Temp</td>
<td>228 °C</td>
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<tr>
<td>Refractive Index</td>
<td>1.446</td>
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<tr>
<td>Optical Rotation</td>
<td>N/A</td>
</tr>
<tr>
<td>Miscellaneous Data</td>
<td>N/A</td>
</tr>
<tr>
<td>Solubility</td>
<td>N/A</td>
</tr>
</tbody>
</table>

N/A = not available
Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions to Avoid: Protect from moisture.
Materials to Avoid: Strong oxidizing agents, Strong acids.

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: May cause skin irritation.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: May cause eye irritation.
Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: Harmful if swallowed.

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

SIGNS AND SYMPTOMS OF EXPOSURE
Prolonged exposure can cause: Nausea, headache, and vomiting.
Unconsciousness. Convulsions. Pulmonary edema. Effects may be delayed.

TOXICITY DATA

Oral
Human
1000 mg/kg
LDLO

Oral
Rat
12565 mg/kg
LD50

Intraperitoneal
Rat
7700 MG/KG
LD50

Subcutaneous
Rat
18800 MG/KG
LD50

Intravenous
Rat
6565 MG/KG
LD50

Oral
Mouse
23700 mg/kg
LD50

Intraperitoneal
Mouse
9719 MG/KG
LD50

Oral
Dog
9000 mg/kg
LD50

Oral
Cat
3300 mg/kg
LD50

Oral
Rabbit
4400 mg/kg
LD50

Skin
Rabbit
11890 mg/kg
LD50

Oral
Guinea pig
7800 mg/kg
LD50

IRRITATION DATA

Skin
Human
112 mg
3D
I
Remarks: Mild irritation effect

Skin
Rabbit
500 mg
Remarks: Mild irritation effect

Eyes
Rabbit
50 mg
Remarks: Mild irritation effect
Species: Rat  
Route of Application: Oral  
Dose: 890 GM/KG  
Exposure Time: 53W  
Frequency: C  

Species: Rat  
Route of Application: Subcutaneous  
Dose: 2500 MG/KG  
Exposure Time: 82W  
Frequency: I  

Species: Mouse  
Route of Application: Oral  
Dose: 420 MG/KG  
Exposure Time: 22W  
Frequency: I  

Species: Mouse  
Route of Application: Inhalation  
Dose: 4 MG/M3  
Exposure Time: 2H/30W-  
Frequency: I  

Species: Mouse  
Route of Application: Subcutaneous  
Dose: 1250 MG/KG  
Exposure Time: 66W  
Frequency: I  

Species: Rat  
Route of Application: Oral  
Dose: 1752 GM/KG  
Exposure Time: 2Y  
Frequency: C  

Species: Rat  
Route of Application: Oral  
Dose: 584 GM/KG  
Exposure Time: 2Y  
Frequency: C  

Species: Rat  
Route of Application: Oral  
Dose: 840 MG/KG  
Exposure Time: 81W  
Frequency: I

CHRONIC EXPOSURE - TERATOGEN

Species: Rat
Dose: 50 GM/KG
Route of Application: Oral
Exposure Time: (1-20D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat
Dose: 76420 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat
Dose: 38212 MG/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse
Dose: 100 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Mouse
Dose: 343 GM/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATION)

Species: Mouse
Dose: 343 GM/KG
Route of Application: Oral
Exposure Time: (MULTIGENERATION)
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Newborn: Other postnatal measures or effects.

Species: Mouse
Dose: 50 GM/KG
Route of Application: Oral
Exposure Time: (6-15D PREG)
Result: Maternal Effects: Other effects.

Section 12 - Ecological Information

ACUTE ECOTOXICITY TESTS

Test Type: EC50 Daphnia
Species: Daphnia magna
Time: 24 h
Value: > 10,000 mg/l

Test Type: LC50 Fish
Species: Leuciscus idus
Time: 48 h
Value: > 1,000 mg/l

Test Type: LC50 Fish
Species: Carassius auratus (Goldfish)
Time: 24 h
Value: 5,000 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. 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: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: Xn
Indication of Danger: Harmful.
R: 22
Risk Statements: Harmful if swallowed.
S: 46
Safety Statements: If swallowed, seek medical advice immediately and show this container or label.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Harmful.
Risk Statements: Harmful if swallowed.
Safety Statements: If swallowed, seek medical advice immediately and show this container or label.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
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
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