Section 1 - Product and Company Information

Product Name: 1-PROPANOL, 99.5+%, HPLC GRADE
Product Number: 293288
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

Substance Name: 1-PROPANOL
CAS #: 71-23-8
SARA 313: No

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Flammable (USA) Highly Flammable (EU). Irritant.
Risk of serious damage to eyes. Vapors may cause drowsiness and dizziness.
Target organ(s): Nerves. Liver.

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.

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 contact, immediately wash skin with soap and copious amounts of water.

EYE EXPOSURE
In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

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
72 °F   22 °C   Method: closed cup

EXPLOSION LIMITS
Lower: 2.1 %   Upper: 13.7 %

AUTOIGNITION TEMP
371 °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 respirator, chemical safety goggles, 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.

Section 7 - Handling and Storage

HANDLING
User Exposure: Avoid breathing 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. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

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

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>200 MG/M3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>600 MG/M3</td>
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<tr>
<td>USA</td>
<td>OSHA.</td>
<td>STEL</td>
<td>250 ppm</td>
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<tr>
<td>USA</td>
<td>OSHA.</td>
<td>TWA</td>
<td>200 ppm</td>
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</tbody>
</table>

Section 9 - Physical/Chemical Properties

Appearance              Physical State: Clear liquid
                        Color: Colorless

Property                Value               At Temperature or Pressure
Molecular Weight        60.1 AMU
pH                      8.5                 20 °C Concentration: 200 g/l
BP/BP Range             97 °C               760 mmHg
MP/MP Range             -127 °C
Freezing Point          N/A
Vapor Pressure          14.9 mmHg           20 °C
Vapor Density           2.1 g/l
Saturated Vapor Conc.   N/A
SG/Density              0.8 g/cm3
Bulk Density            N/A
Odor Threshold          2.6 ppm
Volatile%               N/A
VOC Content             N/A
Water Content           N/A
Solvent Content         N/A
Evaporation Rate        1
Viscosity               2 Pas
Surface Tension         N/A
Partition Coefficient   Log Kow: 0.25 - 0.34
Decomposition Temp.     N/A
Flash Point             72 °F 22 °C         Method: closed cup
Explosion Limits        Lower: 2.1 %
                        Upper: 13.7 %
Flammability            N/A
Autoignition Temp        371 °C
Refractive Index         1.384
Optical Rotation        N/A
Miscellaneous Data      N/A
Solubility

Solubility in Water: Complete

N/A = not available

Section 10 - Stability and Reactivity

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

SENSITIZATION
Sensitization: Will not occur

TARGET ORGAN(S) OR SYSTEM(S)
Nerves. Liver.

SIGNS AND SYMPTOMS OF EXPOSURE
Can cause CNS depression. Prolonged exposure can cause: Narcotic effect. Drying, cracking, or irritation of the skin.

TOXICITY DATA
Oral
Rat
1,870 mg/kg LD50
Oral
Mouse
4,500 mg/kg LD50
Oral
Rat
8,038 mg/kg LD50 1 HR.
Inhalation
Rat
20,000 ppm LC50
Skin
Rabbit
4,000 mg/kg LC50

IRRITATION DATA
Skin
Rabbit
Remarks: Mild irritation effect
Eyes
Rabbit
Remarks: Moderate irritation effect
Eyes
Rabbit
Remarks: Severe irritation effect
Skin
Rabbit
500 mg
Remarks: Open irritation test
Eyes
Rabbit
20 mg
24H
Remarks: Moderate irritation effect

CHRONIC EXPOSURE - CARCINOGEN
Species: Rat
Route of Application: Oral
Dose: 4
Exposure Time: 4 DAYS
Frequency: 1/ day
Species: Mouse
Route of Application: Inhalation
Exposure Time: 95 HR
Frequency: 7874 ppm
Species: Rat
Route of Application: Oral
Dose: 50 GM/KG
Exposure Time: 81W
Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria.
Liver:Tumors. Blood:Leukemia
Species: Rat
Route of Application: Subcutaneous
Dose: 6 GM/KG
Exposure Time: 95W
Frequency: I
Result: Tumorigenic:Carcinogenic by RTECS criteria.
Liver:Tumors. Blood:Leukemia

CHRONIC EXPOSURE - TERATOGEN
Species: Rat
Dose: 7000 PPM/7H
Route of Application: Inhalation
Exposure Time: (1-19D PREG)
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD
Species: Rat
Dose: 7000 PPM/7H
Route of Application: Inhalation
Exposure Time: (6W MALE)
Result: Effects on Fertility: Male fertility index (e.g., #
males impregnating females per # males exposed to fertile nonpregnant females).

Species: Rat  
Dose: 10000 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (1-19D 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. Specific Developmental Abnormalities: Musculoskeletal system.

Section 12 - Ecological Information

PHYSICAL PROPERTIES AFFECTING ECOTOXICITY

COD: 1.4 %  
BOD: < 2 %  
BOD after 5 Days: 1.43 - 1.6 %

ACUTE ECOTOXICITY TESTS

Test Type: LC50 Fish  
Species: Pimephales promelas (Fathead minnow)  
Time: 96 h  
Value: 1,000 mg/l

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 48 h  
Value: 3,642 mg/l

Test Type: LC50 Fish  
Species: Carassius auratus (Goldfish)  
Time: 24 h  
Value: 5,000 mg/l

Test Type: LC50 Fish  
Species: other fish  
Time: 48 h  
Value: 4,320 - 4,560 mg/l

Test Type: LC50 Fish  
Species: Leuciscus idus  
Time: 48 h  
Value: > 4,000 mg/l

ELIMINATION

Elimination: > 60 %

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: n-Propanol [or] Propyl alcohol, normal
UN#: 1274
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA
Proper Shipping Name: n-Propanol
IATA UN Number: 1274
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: F Xi
Indication of Danger: Highly Flammable. Irritant.
R: 11 41 67
Risk Statements: Highly flammable. Risk of serious damage to eyes. Vapors may cause drowsiness and dizziness.
S: 7 16 24 26 39
Safety Statements: Keep container tightly closed. Keep away from sources of ignition - no smoking. Avoid contact with skin. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

US CLASSIFICATION AND LABEL TEXT
Risk Statements: Risk of serious damage to eyes. Vapors may cause drowsiness and dizziness.
Safety Statements: Keep container tightly closed. Keep away from sources of ignition - no smoking. Avoid contact with skin. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

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