MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product code: T1118
Product Name: TRIETHYLENE GLYCOL, PURIFIED
Chemical Name: No information available
Synonyms:
1,2-Bis(2-hydroxyethoxy)ethane
Di-beta-hydroxyethoxyethane
3,6-Dioxaoctane-1,8-diol
2,2'-(1,2-Ethanediylbis(oxy))bisethanol
Ethanol, 2,2'-(ethylenedioxy)di-
2,2'-Ethyleneoxybis(ethanol)
2,2'-Ethyleneoxydiethanol
2,2'-Ethyleneoxyethanol
Ethylene glycol-bis-(2-hydroxyethyl ether)
Ethylene glycol dihydroxydiethyl ether
Glycol bis(hydroxyethyl) ether
TEG
Triglycol
Trigen
CAS #: 112-27-6
Formula: C6-H14-O4
RTECS #: YE4550000
Cl#: Not available
Supplier: Spectrum Chemicals and Laboratory Products, Inc.
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000
Emergency Telephone Number: CHEMTREC: 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Chris Terpak (East Coast)

See Section 8.

2. HAZARDS IDENTIFICATION

NFPA | HMIS | Personal Protective Equipment
--- | --- | ---
Health Hazard | 1 | Face shield
Fire Hazard | 1 | Goggles
Reactivity | 0 | Gloves

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2. HAZARDS IDENTIFICATION

OSHA Regulatory Status
This material is not considered hazardous by the OSHA Hazard Communication Standard (29 1910.1200)

POTENTIAL HEALTH EFFECTS

Principal Routes of Exposure:
Skin. Ingestion. Eyes.

Acute Potential Health Effects:

Skin Contact:
May cause skin irritation.

Eye Contact:
Contact with eyes may cause irritation. Mild eye irritation.

Inhalation:
May cause irritation of respiratory tract. May affect respiration. May cause loss of appetite. May cause central nervous system effects. May affect the urinary system. It may affect the peripheral nervous system.

Ingestion:
Ingestion may cause gastrointestinal irritation, nausea, vomiting, and diarrhoea. May cause loss of appetite. May affect the liver. It may affect the kidneys. May cause central nervous system effects.

Chronic Potential Health Effects:

<table>
<thead>
<tr>
<th>Component</th>
<th>Carcinogen Status:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethylene Glycol</td>
<td>No information available</td>
</tr>
<tr>
<td>112-27-6 (100)</td>
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</table>

Target Organs: No information available.

Teratogenic Effects: May cause birth defects (teratogenic effects) based on animal test data. Showed teratogenic effects in animal experiments.

Mutagenic Effects: No information available.

Aggravated Medical Conditions: No information available.

See Section 11 for additional Toxicological Information

POTENTIAL ENVIRONMENTAL EFFECTS

No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight %</th>
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</table>

Product code: T1118
Product name: TRIETHYLENE GLYCOL, PURIFIED
3. COMPOSITION/INFORMATION ON INGREDIENTS

| Triethylene Glycol | 112-27-6 | 100 |

4. FIRST AID MEASURES

**General Advice:** Poison information centres in each State capital city can provide additional assistance for scheduled poisons (13 1126)

**Skin Contact:** Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Get medical attention if irritation develops.

**Eye Contact:** Flush eye with water for 15 minutes. Get medical attention if irritation occurs. If symptoms persist, call a physician.

**Inhalation:** Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Ingestion:** Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Obtain medical attention.

**Notes to Physician:** Treat symptomatically

5. FIRE-FIGHTING MEASURES

**Flammable Properties**

<table>
<thead>
<tr>
<th>Flashpoint (°C/°F):</th>
<th>177 °C/350.6 °F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>166 °C/331 °F</td>
</tr>
</tbody>
</table>

**Tested according to:**
- Open cup
- Closed cup

<table>
<thead>
<tr>
<th>Lower Explosion Limit (%):</th>
<th>0.9%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Explosion Limit (%):</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

**Autoignition Temperature (°C/°F):** 347-371 °C/656.6-700 °F

**Suitable Extinguishing Media:** Dry chemical. Carbon dioxide (CO2). Water spray mist or foam. Alcohol-resistant foam.

**Unsuitable Extinguishing Media:** No information available.

**Hazardous Combustion Products:** Carbon monoxide; Carbon dioxide

**Specific hazards:** May be combustible at high temperatures. May be ignited by heat, sparks or flames. Container explosion may occur under fire conditions or when heated.

**Special Protective Equipment for Firefighters:** As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

**Specific Methods:** No information available.
6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Use personal protective equipment. Remove all sources of ignition.

Environmental Precautions:
Do not let product enter drains.

Methods for Cleaning Up:
Absorb spill with inert material (e.g. vermiculite, dry sand or earth), then place in a suitable chemical waste container. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Handling

Technical Measures/Precautions:
Provide sufficient air exchange and/or exhaust in work rooms. Remove all sources of ignition. Keep away from incompatible materials.

Safe Handling Advice:
Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Do not ingest. Do not breathe vapors or spray mist. Handle in accordance with good industrial hygiene and safety practice.

Storage

Technical Measures/Storage Conditions:
Hygroscopic. Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Store away from incompatible materials.

Incompatible Products:
Oxidizing agents. Acids.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure:
Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Personal Protective Equipment

Eye protection: Safety glasses with side-shields. Safety glasses.

Skin and body protection: Long sleeved clothing. Chemical resistant apron. Gloves.

Respiratory protection: Respiratory protection is not necessary for normal handling. Good room ventilation or use of local exhaust (fume hood) is sufficient. Use a vapor respirator under conditions where exposure to the substance is apparent (e.g. generation of high concentrations of mist or vapor, inadequate ventilation, development of respiratory tract irritation), and engineering controls are not feasible. Be sure to use an approved/certified respirator or equivalent.

Hygiene measures: Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.

Product code: T1118    Product name: TRIETHYLENE GLYCOL, PURIFIED
National occupational exposure limits

**United States**
U.S Occupational Exposure Limits: Not determined

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WHEEL</th>
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<tr>
<td>Triethylene Glycol - 112-27-6</td>
<td>None</td>
<td>None</td>
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**Canada**
Canada Occupational Exposure Limits: Not determined

<table>
<thead>
<tr>
<th>Components</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Ontario</th>
<th>Quebec</th>
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<td>Triethylene Glycol</td>
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<tr>
<td>112-27-6</td>
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**Australia and Mexico**
Occupational Exposure Limits for Australia and Mexico: Not determined

<table>
<thead>
<tr>
<th>Components</th>
<th>Australia</th>
<th>Mexico</th>
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</thead>
<tbody>
<tr>
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<td>None</td>
<td>None</td>
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<tr>
<td>112-27-6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. PHYSICAL AND CHEMICAL PROPERTIES

**Physical state:**
Liquid.

**Odor:**
Mild. Sweet.

**Flash point (°C):**
Not applicable

**Autoignition Temperature (°C/°F):**
347-371 °C/656.6-700 °F

**Boiling point/range(°C/°F):**
285-287.4 °C/545-549.32 °F

**Density (g/cm3):**
1.123 - 1.1274@ 20 °C

**Evaporation rate:**
No information available

**Odor threshold (ppm):**
No information available

**Taste**
No information available

**Lower Explosion Limit (%):**
0.9%

**Upper Explosion Limit (%):**
9.2%

**Decomposition temperature(°C/°F):**
No information available

**pH:**
No information available

**Melting point/range(°C/°F):**
-7 °C/19.4 °F

**Specific gravity:**
No information available

**Vapor pressure @ 20°C (kPa):**
0.000133322

**VOC content (g/L):**
No information available

**Miscibility:**
Miscible with water
Miscible with alcohol
Miscible with Benzene
Miscible with Toluene

**Color:**
Clear. Colorless. Light yellow.

**Molecular/Formula weight:**
150.18

**Partition coefficient (n-octanol/water):**
-1.7; -1.98

**Odor threshold (ppm):**
No information available

**Partition coefficient (n-octanol/water):**
5.17

**Appearance:**
Oily.

**Miscibility:**
Miscible with water
Miscible with alcohol
Miscible with Benzene
Miscible with Toluene

**Solubility:**
Soluble in Water
Sparingly soluble in Ether
Practically insoluble in Petroleum Ether
Slightly soluble in Ether
Slightly soluble in chloroform

Product code: T1118  
Product name: TRIETHYLENE GLYCOL, PURIFIED
10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions


Materials to avoid: Oxidising agents. Acids.

Hazardous decomposition products: When heated to decomposition it emits acrid smoke and irritating fumes. Carbon monoxide. Carbon dioxide.

Possibility of Hazardous Reactions: No information available

Polymerization: Hazardous polymerisation does not occur

Corrosivity: No information available

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

Triethylene Glycol - 112-27-6

LD50/oral/rat = 15000 mg/kg Oral LD50 Rat
LD50/oral/mouse = 20000 mg/kg
LD50/dermal/rabbit = 22460 mg/kg Dermal LD50 Rabbit
>20 ml/kg
LD50/dermal/rat = No information available
LC50/inhalation/rat = >4400 mg/m³ 4h
LC50/inhalation/mouse = No information available
Other LD50 or LC50 information = 8400 mg/kg oral LD50 Rabbit
7900 mg/kg oral LD50 Guinea Pig

Product Information

LC50/inhalation/rat = >4400 mg/m³ 4h
LC50/Inhalation/mouse = No information available
LD50/dermal/rabbit = 22460 mg/kg
>20 ml/kg
LD50/dermal/rat = No information available
LD50/oral/mouse = 20000 mg/kg
LD50/oral/rat = 15000 mg/kg

Local Effects
Skin irritation: May cause skin irritation. Mild skin irritation.

Eye irritation: Contact with eyes may cause irritation. Mild eye irritation. May cause conjunctival irritation.

Inhalation: May cause irritation of respiratory tract. May affect respiration (respiratory depression). It may affect the peripheral nervous system (sensory change involving peripheral nerve).

Ingestion: Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. May affect liver. May affect urinary system (kidneys). It may affect the spleen. May affect behavior/central nervous system (ataxia).

Sensitization: No information available

**Chronic Toxicity**

Prolonged or repeated ingestion may affect behavior/central nervous system (somnolence). Prolonged or repeated ingestion may affect the kidneys. Prolonged or repeated ingestion may cause weight loss. Prolonged or repeated inhalation may affect metabolism (weight loss). Prolonged or repeated inhalation may affect the kidneys. Prolonged or repeated inhalation may affect behavior/central nervous system (ataxia).

Carcinogenic effects: Not considered carcinogenic

<table>
<thead>
<tr>
<th>Components</th>
<th>NTP</th>
<th>IARC</th>
<th>OSHA HCS - Carcinogens</th>
<th>ACGIH - Carcinogens</th>
<th>Australia - Prohibited Carcinogenic Substances</th>
<th>Australia - Notifiable Carcinogenic Substances</th>
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<td>Triethylene Glycol</td>
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<td>Not listed</td>
<td>Not listed</td>
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</table>

Mutagenic Effects: No information available

Reproductive Effects: May cause adverse reproductive effects based on animal test data. Experiments have shown reproductive toxicity effects on laboratory animals.

Teratogenic Effects: May cause birth defects (teratogenic effects) based on animal test data. Showed teratogenic effects in animal experiments.

Target Organs: No information available.

**12. ECOLOGICAL INFORMATION**

**ECOTOXICITY**

Toxicity to terrestrial and aquatic plants and animals: Information given is based on data on the components and the ecotoxicology of similar products

Ecotoxicity effects: Aquatic environment.

Aquatic toxicity:

*Triethylene Glycol - 112-27-6*

**Freshwater Fish Species Data:**
56200 - 63700 mg/L LC50 Pimephales promelas 96 h flow-through 1
10000 mg/L LC50 Lepomis macrochirus 96 h static 1
61000 mg/L LC50 Lepomis macrochirus 96 h flow-through 1

**Water Flea Data:**
42426 mg/L EC50 Daphnia magna 48 h
52400 mg/L LC50 Daphnia magna 48 h
Mobility: No information available
Persistence and degradability: No information available
Bioaccumulative potential: No information available

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:
Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging:
Empty containers should be taken for local recycling, recovery or waste disposal

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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethylene Glycol</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

DOT
UN-No: Not regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: None
Subsidiary Risk: Not applicable
Marine Pollutant: No data available
ERG No: No information available
DOT RQ (lbs): No information available

TDG (Canada)
UN-No: Not Regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Description: No information available

ADR
UN-No: Not Regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Classification Code: No information available
Description: No information available
CEFIC Tremcard No: No information available

IMO / IMDG
UN-No: Not Regulated
Proper Shipping Name: No information available
Hazard Class: No information available
Packing Group: No information available
Subsidiary Risk: No information available
Classification Code: No information available
Description: No information available
IMDG Page: No information available
Marine Pollutant: No information available

Product code: T1118
Product name: TRIETHYLENE GLYCOL, PURIFIED

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15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Components</th>
<th>U.S. TSCA</th>
<th>Philippines (PICCS)</th>
<th>KOREA KECL</th>
<th>Japan ENCS</th>
<th>CHINA</th>
<th>Australia (AICS)</th>
<th>EINECS-No.</th>
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<tbody>
<tr>
<td>Triethylene Glycol</td>
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<td>Present</td>
<td>KE-13201</td>
<td>2-429</td>
<td>Present</td>
<td>Present</td>
<td>203-953-2</td>
</tr>
</tbody>
</table>

U.S. Regulations

Triethylene Glycol

Pennsylvania RTK: Present


Chemicals Known to the State of California to Cause Cancer:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

<table>
<thead>
<tr>
<th>Components</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
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</table>

CERCLA/SARA

<table>
<thead>
<tr>
<th>Components</th>
<th>CERCLA - Hazardous Substances and their Reportable Quantities</th>
<th>Section 302 Extremely Hazardous Substances and TPQs</th>
<th>Section 302 Extremely Hazardous Substances and RQs</th>
<th>Section 313 - Chemical Category</th>
<th>Section 313 - Reporting de minimis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethylene Glycol</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
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</table>

Product code: T1118
Product name: TRIETHYLENE GLYCOL, PURIFIED
U.S. TSCA

<table>
<thead>
<tr>
<th>Components</th>
<th>TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)</th>
<th>TSCA 8(d) - Health and Safety Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethylene Glycol</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

Canada

WHMIS hazard class:
Non-controlled

Triethylene Glycol
Uncontrolled product according to WHMIS classification criteria

Canada Controlled Products Regulation:
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

<table>
<thead>
<tr>
<th>Components</th>
<th>WHMIS Ingredient Disclosure List -</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethylene Glycol</td>
<td>1 %</td>
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</table>

Inventory

<table>
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<tr>
<th>Components</th>
<th>Canada (DSL)</th>
<th>Canada (NDSL)</th>
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<tbody>
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<td>Triethylene Glycol</td>
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</table>

<table>
<thead>
<tr>
<th>Components</th>
<th>CEPA Schedule I - Toxic Substances</th>
<th>CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triethylene Glycol</td>
<td>Not listed</td>
<td>Not listed</td>
</tr>
</tbody>
</table>

EU Classification

R -phrase(s)
not determined

S -phrase(s)
none

The product is classified in accordance with Annex VI to Directive 67/548/EEC

Indication of danger:
Not dangerous

16. OTHER INFORMATION

Product code: T1118
Product name: TRIETHYLENE GLYCOL, PURIFIED
### 16. OTHER INFORMATION

The MSDS format complies with ANSI Z400.1-2004 standards.

<table>
<thead>
<tr>
<th>Preparation Date</th>
<th>21-Dec-2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for revision:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Prepared by:</td>
<td>Sonia Owen</td>
</tr>
<tr>
<td>Literature reference:</td>
<td>No information available</td>
</tr>
</tbody>
</table>

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. The physical properties reported in this MSDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.