1. Product and Company Identification

Commercial product name
Purolyte A2 Series

Chemical characterization (Mixture)
Electrolyte solution, mixture of organic solvents

Company/undertaking identification
Purolyte Technologies (US)
111 West Irene Road
Zachary, LA 70791
USA
Telephone 1-225-654-6601
Responsible Department
Emergency telephone number: CHEMTREC 1-800-424-8300; CHEMTREC (outside U.S.): 1-703-527-3887
Responsible for the safety data sheet: Purolyte Technologies

2. Hazards Identification

Route(s) of Entry
Skin and eye contact, inhalation and ingestion.

Signs and Symptoms of Exposure
Reacts with water to form hydrofluoric acid. May be corrosive to skin, eyes and respiratory tract. May irritate digestive tract.

Carcinogenicity (NTP): Not listed
Carcinogenicity (IARC): Not listed
Carcinogenicity (OSHA): Not listed

3. Composition/Information on Ingredients

Hazardous components

<table>
<thead>
<tr>
<th>CAS No.</th>
<th>Components</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>616-38-0</td>
<td>Other organic compounds</td>
<td>&lt; 40 %</td>
</tr>
<tr>
<td>105-69-8</td>
<td>Dimethyl carbonate</td>
<td>&lt; 35 %</td>
</tr>
<tr>
<td>121-32-4</td>
<td>Diethyl carbonate</td>
<td>&lt; 35 %</td>
</tr>
<tr>
<td>21324-40-3</td>
<td>Lithium hexafluorophosphate</td>
<td>&lt; 16 %</td>
</tr>
</tbody>
</table>

4. First Aid Measures

General information
Remove contaminated soaked clothing immediately.
Consult a physician.

After inhalation
Move to fresh air in case of accidental inhalation of vapors.
Seek medical advice immediately.
If patient is not breathing, apply artificial respiration.
After contact with skin
Wash off with soap and plenty of water. Use rubber gloves to continuously rub 2.5% calcium gluconate gel into the affected area until arrival of the emergency doctor. Call a physician immediately.

After contact with eyes
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Rinse eye with calcium gluconate solution (1%) until arrival of doctor. Seek medical treatment immediately.

After ingestion
Rinse out mouth and give plenty of water to drink. Do not induce vomiting. Never give anything by mouth to an unconscious person. Summon a doctor immediately. Induce vomiting only upon the advice of a physician.

Advice to physician
Risk of pulmonary oedema.

5. Fire Fighting Measures

Suitable extinguishing media
Alcohol-resistant foam, dry chemical, carbon dioxide (CO2), water-spray.

Unsuitable extinguishing media
Full water jet

Special hazards arising from the chemical
Fire may produce: Carbon monoxide and carbon dioxide. Fluoro pyrolysis products.

Protective equipment and precautions for firefighters
Use breathing apparatus with independent air supply. Protective suit

Additional information
Vapors are heavier than air and spread along ground. The vapor/air mixture is explosive, even in empty, uncleaned receptacles. Cool containers at risk with water spray jet. Backfire at a long distance is possible.

6. Accidental Release Measures

Personal precautions
In case of vapor formation use respirator. Ensure adequate ventilation. Remove persons to safety. Use personal protective clothing. Keep away sources of ignition. Observe protective instructions (see Sections 7 and 8). Avoid contact with skin, eyes and clothing.

Environmental precautions
Do not discharge into the drains/surface waters/groundwater.
Methods for cleaning up/taking up
Seek up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder).
Shovel into suitable container for disposal.

7. Handling and Storage

Handling
Advice on safe handling
Keep container tightly closed.
Do not breathe vapors.
Good local exhaust ventilation is recommended when handling.
Use only in thoroughly ventilated areas.
Avoid contact with skin, eyes and clothing.

Advice on protection against fire and explosion
Do not smoke - volatile.
Keep product and empty container away from heat and sources of ignition.
Take precautionary measures against static discharges.
Vapor/air mixture is explosive, even in empty uncleaned receptacles.

Storage
Requirements for storage rooms and vessels
Keep container tightly closed in a dry, cool and well-ventilated place.

Advice on storage compatibility
Incompatible with:
Reducing agents, Oxidizing agents, Acids and bases.
Humid air, Water

Further information on storage conditions
Keep away from food, drink and animal feeding stuffs.

8. Exposure Controls/Personal Protection

Exposure limit values

<table>
<thead>
<tr>
<th>Exposure limits</th>
<th>ppm</th>
<th>mg/m³</th>
<th>tW/W</th>
<th>Category</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluorides (as F)</td>
<td>2.5</td>
<td>2.5</td>
<td></td>
<td>TWA (8 h)</td>
<td>PEL</td>
</tr>
<tr>
<td>Fluorides (as F)</td>
<td>2.5</td>
<td></td>
<td></td>
<td>TWA (8 h)</td>
<td>TLV</td>
</tr>
<tr>
<td>Fluorides (as F)</td>
<td></td>
<td></td>
<td></td>
<td>STEL (15 min)</td>
<td>TLV</td>
</tr>
<tr>
<td>Fluorides (as F)</td>
<td></td>
<td></td>
<td></td>
<td>Peak</td>
<td></td>
</tr>
</tbody>
</table>

Additional advice on limit values
Minimize exposure in accordance with good hygiene practices.

Exposure controls

Occupational exposure controls
Ensure adequate ventilation, especially in confined areas.

Protective and hygiene measures
Do not inhale vapors.
Wash hands before breaks and immediately after handling the product.
When using, do not eat, drink or smoke.
Take off immediately all contaminated clothing.
Avoid contact with skin, eyes and clothing.
Do not wear contact lenses.
Respiratory protection
In case of insufficient ventilation wear suitable respiratory equipment (gas filter type A).

Hand protection
Splash protection:
Protective gloves resistant to chemicals made of butyl. Minimum coat thickness 0.7 mm. Permeation resistance (wear duration) > 240 minutes, i.e. protective glove «Butoject 898» made by www.kcl.de.
This recommendation refers exclusively to the chemical compatibility and the lab test conforming to EN 374 carried out under lab conditions.
Requirements can vary as a function of the use. Therefore it is necessary to adhere additionally to the recommendations given by the manufacturer of protective gloves.

Eye protection
Safety goggles with side protection
Eye wash bottle with pure water.

Skin protection
Long sleeved clothing.

9. Physical and Chemical Properties

Appearance
Form Liquid
Color Colorless
Odor Etheral

Important health, safety and environmental information

pH-Value : n.d.
Changes in the physical state
Flash point 18 °C (Estimated)

Flammability
Lower explosion limits n.d.
Upper explosion limits
Ignition temperature n.d.
Density (at 20 °C) : 1.15 – 1.35 g/cm³

10. Stability and Reactivity

Stability
Stable

Conditions to avoid
To avoid thermal decomposition, do not overheat.

Materials to avoid
Reducing agents, Oxidizing agents, Acids and bases.
Humid air, Water

Hazardous decomposition products
Carbon monoxide and carbon dioxide., Fluoro pyrolysis products, Hydrogen fluoride

Possibility of Hazardous Reactions
May occur

Additional information
No decomposition if stored and applied as directed.
11. Toxicological Information

Corrosive and irritant effects
Skin irritation (rabbit): non corrosive [OECD 404] [Conclusion by analogy]

Severe effects after repeated or prolonged exposure
This product contains Lithium Hexafluorophosphate which causes kidney and bone damage.
Prolonged or repeated exposure may cause liver or kidney damage.
Chronic overexposure to fluoride may result in digestive disturbances, mottled tooth enamel, abnormal hardening of the bones and other bone changes.
Skin rash and worker complaints related to bones, joints and muscles have been reported.

Empirical data on effects on humans
Risk of severe eye injuries.
Irritating to skin.
Ingestion causes irritation of upper respiratory system and gastrointestinal disturbance.
Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.
Inhalation of vapors in high concentration may cause irritation of respiratory system.
Liver and renal damage is possible.
Components of the product may be absorbed into the body through the skin. (Skin absorption).

12. Ecological Information

Further information
Do not flush into surface water or sanitary sewer system.
A pH-change becomes possible in water.

13. Disposal Considerations

Advice on disposal
Can be incinerated, when in compliance with local regulations.
Where possible recycling is preferred to disposal.

Contaminated packaging
Empty containers should be taken for local recycling, recovery or waste disposal.
Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse.
Packaging that cannot be cleaned should be disposed of like the product.

14. Transport Information

US DOT 49 CFR 172.101
Proper Shipping Name
FLAMMABLE LIQUID, N.O.S. (Diethyl carbonate, Dimethyl carbonate)

ID Number : 1993
Hazard Class or Division : 3
Packing Group : II
Label : 3

Land transport
UN number 1993
Hazard class 3
Material Safety Data Sheet according to ANSI Z400.1-2004
Novolyte Technologies (US)
Revision date: 00-15-2011

Purolyte A2 Series

Packing group  II
Hazard label  3
Limited quantity  LQ

Description of the goods
FLAMMABLE LIQUID, N.O.S. (Diethyl carbonate, Dimethyl carbonate)

Other applicable information
LQ: combination packaging: 1 L / 30 kg (total gross mass)

Inland waterways transport

Marine transport
IMDG code  3
UN number  1993
Marine pollutant  No
EnS  F-E. S-E
Limited quantity :  1 L / 30 kg
IMDG packing group  II
Hazard label  3

Description of the goods
FLAMMABLE LIQUID, N.O.S. (Diethyl carbonate, Dimethyl carbonate)

Other applicable information
Limited quantities (section 3.4): combination packaging: 1 L / 30 kg (total gross mass)

Air transport
ICAO/IATA-DGR  3
UN/ID number  1993
Hazard label  3
IATA-packing instructions - Passenger  353
IATA-max. quantity - Passenger  5 L
IATA-packing instructions - Cargo  364
IATA-max. quantity - Cargo  60 L
ICAC packing group  II
Limited quantity Passenger  Y341 / 1 L

Description of the goods
FLAMMABLE LIQUID, N.O.S. (Diethyl carbonate, Dimethyl carbonate, mixture)

15. Regulatory Information

U.S. Regulations
National Inventory TSCA
All of the components are on the TSCA Inventory.

SARA
To the best of our knowledge this product contains no toxic chemicals subject to the supplier notification requirements of Section 313 of the Superfund Amendments and Reauthorization Act (SARA/EPCRA) and the requirements of 40 CFR Part 372.
16. Other Information

Hazardous Materials Information Label (HMIS)
Health : 2
Flammability : 3
Reactivity : 1

NFPA Hazard Ratings
Health : 2
Flammability : 3
Reactivity : 1

Other data
Data of sections 4 to 8, as well as 10 to 12, do not necessarily refer to the use and the regular handling of the product (in this sense consult package leaflet and expert information), but to release of major amounts in case of accidents and irregularities.
The information describes exclusively the safety requirements for the product(s) and is based on the present level of our knowledge.
The delivery specifications are contained in the corresponding product sheet.
This data does not constitute a guarantee for the characteristics of the product(s) as defined by the legal warranty regulations.
*(n.a. = not applicable; n.d. = not determined)*
MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: Purolyte® Diethyl Carbonate
Chemical Name: Diethyl Carbonate
Synonyms: Carbonic acid, diethyl ester.
Formula: C$_5$H$_{10}$O$_3$
CAS-No.: 105-58-8
Product Code: 1036390

Date of Preparation: 05/14/2010

2. HAZARD IDENTIFICATION

Emergency Overview

Color: Colorless
Physical state: Liquid
Odor: Sweet

Health: 2
Fire: 3
Instability: 1

NFPA 704

Potential Health Effects
Principle routes of exposure: Skin contact. Inhalation. Ingestion.

Eye contact: May cause eye irritation or burning.

Skin contact: May cause moderate to severe irritation, burning, and dryness of the skin.

Inhalation: Breathing of mists, vapors, or fumes may irritate the nose, throat and lungs. Symptoms may include headache, excitement, euphoria, dizziness, incoordination, difficulty breathing, drowsiness, light-headedness, blurred vision, fatigue, stomach pain, nausea or vomiting, tremors, convulsions, loss of consciousness, cyanosis, central nervous system depression, coma, respiratory arrest and death, depending on the concentration and duration of exposure.

Ingestion: May cause irritation of the mouth, throat and gastrointestinal tract. May cause headache, pain, salivation, dizziness, diarrhoea, and nausea.

Chronic toxicity: This product may cause teratogenic or mutagenic effects.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl Carbonate</td>
<td>105-58-8</td>
<td>100%</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult a physician.

Skin contact: Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Inhalation: Move to fresh air. If not breathing, give artificial respiration. Call a physician immediately.

Ingestion: Drink plenty of water. Never give anything by mouth to an unconscious person or convulsing. Do not induce vomiting. Call a physician immediately.

Notes to physician: Individuals with pre-existing respiratory conditions may be more susceptible to the effects from exposure to this product.

Product name: Purolyte® Diethyl Carbonate
5. FIRE-FIGHTING MEASURES

Flash point (°C): 25 | 77°F  Method: COC

Autoignition temperature (°C): 230

Flammable limits in air - lower (%): 1.46 %
Flammable limits in air - upper (%): 11.06 %

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam.

Hazardous decomposition products: Carbon dioxide (CO2), Carbon monoxide.

Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.

Unusual hazards: During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Vapors are heavier than air and may spread along floors. Flash back possible over considerable distance.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Remove all sources of ignition. Evacuate area of all unnecessary personnel.

Environmental precautions: Do not allow material to contaminate ground water system. Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. Local authorities should be advised if significant spillages cannot be contained.

Methods for cleaning up: Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container.

7. HANDLING AND STORAGE

Handling: Do not breathe vapors or spray mist. Avoid contact with skin, eyes and clothing. Handle in accordance with good industrial hygiene and safety practice.

Storage: Keep tightly closed in a dry, cool and well-ventilated place. Keep product and empty container away from heat and sources of ignition. Do not freeze. Store in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl Carbonate</td>
<td>Not established</td>
<td>Not established</td>
</tr>
</tbody>
</table>

Engineering measures: Use only in area provided with appropriate exhaust ventilation. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Eye protection: Safety glasses with side-shields.

Skin and body protection: Long sleeved clothing.

Hand protection: Rubber gloves.

Respiratory protection: Use NIOSH approved respirator when ventilation is inadequate.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Sweet</td>
</tr>
<tr>
<td>Boiling point/Range (°C):</td>
<td>123.0 - 128.0</td>
</tr>
<tr>
<td>Melting point/Range (°C):</td>
<td>-43.0 (-45.4°F)</td>
</tr>
<tr>
<td>Specific gravity (Water = 1):</td>
<td>0.980</td>
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<tr>
<td>Vapor pressure (mmHg):</td>
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</tr>
<tr>
<td>Water solubility (mg/l):</td>
<td>Insoluble</td>
</tr>
<tr>
<td>VOC content (%):</td>
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<tr>
<td>Physical state:</td>
<td>Liquid</td>
</tr>
<tr>
<td>Molecular weight:</td>
<td>118.00</td>
</tr>
<tr>
<td>pH:</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Freezing point/Range (°C):</td>
<td>-43.0</td>
</tr>
<tr>
<td>Vapor density (Air=1):</td>
<td>4.10</td>
</tr>
<tr>
<td>Evaporation Rate (Water = 1):</td>
<td>No data available</td>
</tr>
<tr>
<td>Solubility in other solvents:</td>
<td>Diethyl ether.</td>
</tr>
</tbody>
</table>

Product name: Puracyte® Diethyl Carbonate
10. STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions.

Polymerization: Will not occur.

Hazardous decomposition products: Carbon dioxide (CO₂), Carbon monoxide.


Conditions to avoid: Exposure to air. Water.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: No data is available on the product itself.

Eye irritation: Contact with eyes may cause irritation or burning.

Skin irritation: May cause moderate to severe irritation, burning, and dryness of the skin.

Chronic Toxicity: This product may cause teratogenic or mutagenic effects.

Carcinogenic Effects: Not listed by IARC, NTP or OSHA as a carcinogen.

Mutagenic Effects: Animal experiments showed mutagenic and teratogenic effects.

Target Organ Effects: No information available.

Reproductive Toxicity: Diethyl Carbonate has been found to cause birth defects in laboratory animals when administered at a concentration equal to one half the published LD₅₀. Individuals who might be exposed to diethyl carbonate, or mixtures containing this chemical should minimize exposure.

Component Information: Component information, if any, is listed below.

12. ECOLOGICAL INFORMATION

Aquatic toxicity: Not determined.

Persistence and degradability: Not determined.

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused products: In accordance with local and national regulations.

14. TRANSPORT INFORMATION

DOT (U.S.)
UN/ID No: UN2356
Proper shipping name: Diethyl carbonate
U.S. DOT - Hazard Class: 3
Packing group: III
ERG No: 126

TDG (Canada)
Proper shipping name: Diethyl carbonate
Hazard class: 3
Packing group: III

15. REGULATORY INFORMATION

U.S. Regulations:
Not subject to the provisions of SARA 313 Title III

Not subject to TSCA 12(b) Export Notification

State Regulations:
This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

Product name: Purlyte® Diethyl Carbonate
<table>
<thead>
<tr>
<th>Components</th>
<th>State Regulations - NJ; PA; CA Prop65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl Carbonate</td>
<td>Listed (NJEPA)</td>
</tr>
</tbody>
</table>

**Canadian WHMIS**

WHMIS hazard class: B2 Flammable liquid, D2B Toxic materials.

**International Inventories**

TSCA 8(b): Listed or exempt.
Canadian DSL: Listed or exempt
EC-No.: Listed or exempt.
Philippines (PICCS): Listed.
Japan (ENCS): Listed or exempt.
Korea (KECL): Listed.
China (EC): Listed.
Australia (AICS): Listed.

**16. OTHER INFORMATION**

For Industrial Use Only

**HMIS**

Health: 2
Fire: 3
Physical hazard: 1
PPE: H

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet
1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

<table>
<thead>
<tr>
<th>Product Name:</th>
<th>Monoglyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Family:</td>
<td>Glymes</td>
</tr>
<tr>
<td>Chemical Name:</td>
<td>Ethylene Glycol Dimethyl Ether</td>
</tr>
<tr>
<td>Synonyms:</td>
<td>1,2 Dimethoxyethane</td>
</tr>
<tr>
<td>Formula:</td>
<td>C4H10O2</td>
</tr>
<tr>
<td>CAS-No.:</td>
<td>110-71-4</td>
</tr>
<tr>
<td>Product Code:</td>
<td>1035785, 1035786, 1036379</td>
</tr>
</tbody>
</table>

Date of Preparation: 02/03/2009

2. HAZARD IDENTIFICATION

Emergency Overview

Danger
Flammable liquid and vapor. Probable reproductive hazard. May cause eye/skin irritation. May cause irritation of respiratory tract. May cause gastrointestinal irritation.

NFPA 704

| Health: | 2 |
| Fire: | 3 |
| Instability: | 1 |

Potential Health Effects

Eye contact: Contact with eyes may cause irritation or burning.

Skin contact: May cause moderate to severe irritation, burning, and dryness of the skin.

Inhalation: Breathing of mists, vapors, or fumes may irritate the nose, throat and lungs.

Ingestion: Gastrointestinal disturbance, irritating to mouth, throat and stomach. May cause headache, pain, salivation, dizziness, diarrhea, and nausea.

Chronic toxicity: This product may cause teratogenic or mutagenic effects.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Dimethoxyethane</td>
<td>110-71-4</td>
<td>100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye contact: Consult a physician. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If eye irritation persists, consult a specialist.

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

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Call a physician immediately.
**Ingestion:** Drink plenty of water. Never give anything by mouth to an unconscious person or convulsing. Do not induce vomiting. Call a physician immediately.

**Notes to physician:** In the case of ingestion, the stomach should be emptied by gastric lavage under qualified medical supervision. If ingested, irrigate the stomach using activated charcoal in addition.

## 5. FIRE-FIGHTING MEASURES

**Flash point (°C):** -6, (21.2 °F) Method: CC

**Autoignition temperature (°C):** 202

**Flammable limits in air - lower (%):** 1.60 %

**Flammable limits in air - upper (%):** 10.40 %

**Suitable extinguishing media:** Water fog or spray, Carbon dioxide, Foam. Do not use water.

**Hazardous decomposition products:** Carbon oxides.

**Special protective equipment for firefighters:** As in any fire, wear self-contained breathing apparatus pressure demand, NIOSH (approved or equivalent) and full protective gear.

**Unusual hazards:** Vapors are heavier than air and may spread along floors.

## 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Evacuate area of all unnecessary personnel. Remove all sources of ignition. Avoid contact with skin, eyes and clothing. Wear personal protective equipment.

**Environmental precautions:** Prevent further leakage or spillage if safe to do so. Do not allow material to contaminate ground water system. Prevent product from entering drains.

**Methods for cleaning up:** Absorb spill with inert material (e.g. dry sand or earth); then place in a chemical waste container. Pick up and transfer to properly labelled containers. Dispose of promptly.

## 7. HANDLING AND STORAGE

**Handling:** Avoid contact with skin, eyes and clothing. Do not breathe vapors or spray mist. Handle in accordance with good industrial hygiene and safety practice. To avoid ignition of vapors by static electricity discharge, containers and equipment must be bonded and grounded. Keep away from open flames, hot surfaces and sources of ignition.

**Storage:** Keep containers dry and tightly closed to avoid moisture absorption and contamination. Keep product and empty container away from heat and sources of ignition.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Exposure limits**

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Dimethoxyethane</td>
<td>Not established</td>
<td>Not established</td>
</tr>
</tbody>
</table>

**Glycol Ethers:** Forro Threshold Limit Value (TLV): 1 ppm TWA.

**Engineering measures:** Use only in area provided with appropriate exhaust ventilation. Ensure that eyewash stations and safety showers are proximal to the work-station location.

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

**Skin and body protection:** Impervious clothing. If conditions warrant, use butyl rubber apron and boots.

**Hand protection:** Impervious gloves.

**Respiratory protection:** Use NIOSH approved respirator when ventilation is inadequate.

---

**Product name:** Monoglyme
9. PHYSICAL AND CHEMICAL PROPERTIES

Color: Colorless
Odor threshold: ~1 ppm
Molecular weight: 90.12
pH: 8.2
Freezing point/range (°C): -59.0
Vapor density (Air=1): 3.10
Evaporation Rate (Water = 1): 4.90
Partition coefficient (n-octanol/water): -0.37
Viscosity (cP): 1.1
Physical state: Liquid
Odor: Ethereal
Boiling point/range (°C): 85.2
Melting point/range (°C): -69
Specific gravity (Water =1): 0.870
Vapor pressure (mmHg): 54.0000
Water solubility (mg/l): 100
VOC content (%): No data available

10. STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions. If exposed to air, organic peroxides will develop.
Polymerization: None under normal processing.
Hazardous decomposition products: Will not occur.
Materials to avoid: Strong oxidizing agents.
Conditions to avoid: Exposure to air.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: Oral LD50 Rat: >3200 mg/kg.
Chronic Toxicity: This product may cause teratogenic or mutagenic effects.
Component Information: Component information, if any, is listed below.

12. ECOLOGICAL INFORMATION

Aquatic toxicity: Not determined
Persistence and degradability: Not determined

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Dispose of according to all federal, state and local applicable regulations. Where possible recycling is preferred to disposal or incineration.

14. TRANSPORT INFORMATION

DOT (U.S.)
UN/ID No: UN2252
Proper shipping name: 1,2-Dimethoxyethane
U.S. DOT - Hazard Class: 3
Packing group: II
ERG No: 127

TDG (Canada)
Proper shipping name: 1,2-Dimethoxyethane
Hazard class: 3
Packing group: II

Product name: Monogyme
15. REGULATORY INFORMATION

U.S. Regulations:

Not subject to TSCA 12(b) Export Notification

<table>
<thead>
<tr>
<th>Component</th>
<th>SARA 315:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Dimethoxyethane (100)</td>
<td>1.0 % de minimis concentration (Chemical Category N230)</td>
</tr>
</tbody>
</table>

State Regulations

This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

<table>
<thead>
<tr>
<th>Component</th>
<th>State Regulations - NJ; PA; CA Prop 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Dimethoxyethane</td>
<td>Listed (NJ, PA)</td>
</tr>
<tr>
<td></td>
<td>Listed (CA)</td>
</tr>
</tbody>
</table>

Canadian WHMIS

WHMIS hazard class: B2 Flammable liquid, D2B Toxic material.

International inventories

TSCA 8(b): Listed or exempt.
Canadian DSL: Listed or exempt.
EC-No. Listed or exempt.
Philippines (PICCS): Listed.
Japan (ENCS): Listed or exempt.
Korea (KEKSL): Listed.
China (IECS): Listed.
Australia (AICS): Listed.

16. OTHER INFORMATION

For Industrial Use Only

HMIS
Health: 2
Fire: 3
Physical hazard: 1
PPE: X

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet

Product name: Monoglyme
MATERIAL SAFETY DATA SHEET

Novolyte Technologies
111 West Iren e Road
Zachary, LA 70791 USA

Emergency telephone number
CHEMTREC: 1-800-424-9300
CHEMTREC (outside U.S.): 1-703-527-3587
Plant Number: 1-225-854-8501

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: Li Hexafluorophosphate
Chemical Name: Lithium hexafluorophosphate
Formula: LiPF6
CAS-No.: 21324-49-3
Product Code: 1035178, 1035180

Date of Preparation: 04/08/2010

2. HAZARD IDENTIFICATION

Emergency Overview
Danger
reacts with water to form hydrofluoric acid. May cause burns to skin and eyes. Effects may be delayed. May cause blindness. Harmful if swallowed. Causes burns. Hygroscopic.

NFPA 704
Health: 3
Fire: 0
Instability: 1

Potential Health Effects
Principle routes of exposure: Eye contact, Skin contact, Inhalation.

Eye contact: Corrosive to the eyes and may cause severe damage including blindness.

Skin contact: Causes skin burns. Toxic in contact with skin.

Inhalation: Causes inflammation and ulceration of the respiratory tract If inhaled, rapid inflammation of fluid in the lungs and death may occur. This material may cause delayed burns that may not be immediately visible or painful. Muscle spasms, heart effects and death may also occur.

Ingestion: Harmful if swallowed. Ingestion causes burns of the upper digestive and respiratory tracts. May cause vomiting.

Chronic toxicity: Prolonged or repeated exposure may cause liver or kidney damage. This compound contains lithium hexafluorophosphate which causes kidney and bone damage. Chronic overexposure to fluoride may result in digestive disturbances, mottled bone enamel, abnormal hardening of the bones and other bone changes, and damage to the liver and kidneys. Skin rashes and worker complaints related to bones, joints, and muscles have been reported. High doses of stannous fluoride have been reported to cause impaired reproductive performance in animals.

Other information on acute toxicity: Exposure to material to any area containing water may generate hydrofluoric acid which can cause immediate burns on skin, severe eye burns, burns to the mouth and gastrointestinal tract if ingested, and laryngal edema if inhaled. Direct exposure to areas of the body need to be treated immediately to prevent injury. Toxicity of fluoride compounds: 2.5 mg/m³.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium hexafluorophosphate</td>
<td>21324-49-3</td>
<td>100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye contact: Rinses immediately with plenty of water, also under the eyelids, for at least 15 minutes. Irrigate with calcium gluconate (1%) in saline until medical attention is obtained. Call a physician immediately.

Skin contact: Before washing use a dry brush to remove dust from skin. Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Follow directly with application of 2.5% calcium gluconate gel by rubbing into exposed area. Continue applying and rubbing calcium gluconate gel 30 minutes after pain has stopped and medical attention is obtained. Call a physician immediately.
Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately. Trained personnel should administer 2.5% calcium gluconate through a nebulizer for 20 minutes.

Ingestion: Rinse mouth. Drink 1 or 2 glasses of water. Do not induce vomiting. Never give anything by mouth to an unconscious person or convulsing. Call a physician immediately.

Notes to physician: In cases of major hydrogen fluoride exposure, hypocalcaemia may be present. Monitor calcium levels frequently and EKG for signs of calcium depletion. Patients with burns of the neck or face, or with signs of respiratory irritation, should be monitored for delayed pulmonary edema, and edema of the upper airway with respiratory obstruction. Respiratory care should be supervised and may include further administration of 2.5% calcium gluconate by inhalation. Do not administer local anesthetics after skin contact as the level of pain is an indication of the effectiveness of the calcium gluconate treatment. If pain continues longer than 30 minutes, consider injecting calcium gluconate (5%) into the skin and subcutaneous tissue beneath, around and within the affected area.

5. FIRE-FIGHTING MEASURES

Flash point (°C): Non combustible

Suitable extinguishing media: The product itself does not burn. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Hazardous decomposition products: Carbon oxides. Fluorine fumes.

Special protective equipment for firefighters: As any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear. Do not allow water to touch the product. Water mist may be used to cool closed containers.

Unusual hazards: This material does not represent an unusual fire or explosion hazard.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation.

Environmental precautions: Do not allow material to contaminate ground water system. Do not flush into surface water or sanitary sewer system. Prevent further leakage or spillage. Local authorities should be advised if significant spills cannot be contained.

Methods for cleaning up: Sweep up and shovel into suitable containers for disposal. Avoid dusting conditions at all stages of handling. Dispose of promptly. In the case of respirable dust and/or fumes, use self-contained breathing apparatus and dust impervious protective suit.

7. HANDLING AND STORAGE

Handling: Avoid dust formation. Do not breathe vapors/dust. Avoid contact with skin and eyes. Wear personal protective equipment. Use only in area provided with appropriate exhaust ventilation.

Storage: Keep containers tightly closed in a dry, cool and well-ventilated place. Store in original container. This compound is hygroscopic.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Exposure limits</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>Not established</td>
<td>Not established</td>
</tr>
</tbody>
</table>

Fluoride compounds have limits of 2.5 mg/m³ (TWA ACGIH).

Engineering measures: Use only in area provided with appropriate exhaust ventilation. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Eye protection: Goggles.

Skin and body protection: Long sleeved clothing. Wear chemically protective gloves, lab coat or apron to prevent prolonged or repeated skin contact.


Respiratory protection: Use NIOSH approved respirator when ventilation is inadequate.

Product name: Li Hexafluorophosphate
9. PHYSICAL AND CHEMICAL PROPERTIES

Color: White
Odor: Odorless
Boiling point/range (°C): No data available
Melting point/range (°C): 160
Vapor pressure (mmHg): No data available
Water solubility (mg/l): Soluble
Physical state: Powder
Molecular weight: 151.92
pH: No data available
Specific gravity (Water =1): 1.500
Evaporation Rate (Water = 1): No data available
VOC content (%): 0

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.
Polymerization: None under normal processing.
Hazardous decomposition products: Hydrogen fluoride, Fumes, Phosphine.
Materials to avoid: Strong acids and oxidizing agents.
Conditions to avoid: Exposure to moisture, Water.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: No data is available on the product itself.
Carcinogenic Effects: Not listed by IARC, NTP or OSHA as a carcinogen.
Target Organ Effects: This compound contains Lithium Hexafluorophosphate which causes kidney and bone damage.
Other information on acute toxicity: Exposure of material to any area containing water may generate hydrofluoric acid which can cause immediate burns on skin, severe eye burns, burns to the mouth and gastrointestinal tract if ingested, and laryngeal edema if inhaled. Direct exposure to areas of the body need to be treated immediately to prevent injury. Toxicity of fluoride compounds: 2.5 mg/l.

Component Information Component information, if any, is listed below

12. ECOLOGICAL INFORMATION

No data is available on the product itself. May be dangerous if water supply is contaminated by this product. Notify officials if entrance occurs.

Aquatic toxicity: Hydrogen fluoride may be released upon contact with water and is lethal in freshwater fish at 60 ppm. The toxicity of the lithium ion in the aquatic environment is poorly understood and related to overall water quality. As LiOH, the LC50 to Daphnia magna is 7.2 mg/l. The hydroxyl ion will affect the pH of the water and may acquire the corrosive properties of lithium hydroxide. The toxicity of the lithium ion in the aquatic environment is poorly understood and related to overall water quality. As LiCl, the LC50 to Daphnia magna is 7.2 mg/l. The hydroxyl ion will affect the pH of the water and may acquire the corrosive properties of lithium hydroxide.

Persistence and degradability: Not determined

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Where possible recycling is preferred to disposal or incineration.

14. TRANSPORT INFORMATION

DOT (U.S.)
UN/ID No: UN2923
Proper shipping name: Corrosive solid, toxic, n.o.s (Lithium hexafluorophosphate)
U.S. DOT - Hazard Class: 8, 6.1
Packing group: II
ERG No: 154

TDG (Canada)
Proper shipping name: Corrosive solid, toxic, n.o.s (Lithium hexafluorophosphate)
Hazard class: 8, 6.1
Packing group: II

Product name: Li Hexafluorophosphate
15. REGULATORY INFORMATION

U.S. Regulations:
Not subject to the provisions of SARA 313 Title III
Not subject to TSCA 12(b) Export Notification

State Regulations
This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

Canadian WHMIS
WHMIS hazard class: D2A Very toxic materials, E Corrosive material.

International Inventories
TSCA 8(b): Listed or exempt.
Canadian DSL: One or more ingredient(s) are not on the DSL list.
EC-NO. Listed or exempt.
Philippines (PICCS): Listed.
Japan (ENCS): One or more ingredient(s) are not on the ENCS list.
Korea (KECL): Listed.
China (IECS): Listed.
Australia (AICS): Listed.

<table>
<thead>
<tr>
<th>Components</th>
<th>Canadian NDSL:</th>
<th>ELINCS:</th>
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</thead>
<tbody>
<tr>
<td>Lithium hexafluorophosphate</td>
<td>Present</td>
<td></td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

For Industrial Use Only

HMIS
Health: 3
Fire: 0
Physical hazard: 1
PPE: E

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet
1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: Purolyte® DMC
Chemical Name: Dimethyl Carbonate
Synonyms: Carbonic acid, dimethyl ester.
Formula: C3H6O3
CAS-No.: 616-38-6
Product Code: 1035856, 1035857, 1035858

Date of Preparation: 03/17/2010

2. HAZARD IDENTIFICATION

Emergency Overview
Warning
Flammable. May cause eye/skin irritation. May cause irritation of respiratory tract. May cause gastrointestinal irritation.

NFPA 704
Color: Colorless to light
Physical state: Liquid
Odor: Hydrocarbon

Health: 2
Fire: 3
Instability: 1

Potential Health Effects
Principle routes of exposure: Inhalation, ingestion, skin and eye contact.

Eye contact: May cause eye irritation or burning.

Skin contact: May cause irritation.

Inhalation: Breathing of mist, vapors, or fumes may irritate the nose, throat and lungs. Symptoms may include headache, excitement, dizziness, incoordination, difficulty breathing, drowsiness, light-headedness, blurred vision, fatigue, stomach pain, nausea or vomiting, tremor, convulsions, loss of consciousness, cyanosis, central nervous system depression, coma, respiratory arrest and death, depending on the concentration and duration of exposure.

Ingestion: May cause irritation of the mouth, throat and gastrointestinal tract.

Chronic toxicity: No evidence of adverse affects.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Carbonate</td>
<td>616-38-6</td>
<td>100%</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult a physician.

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

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

Ingestion: Drink plenty of water. Do not induce vomiting. Call a physician immediately.
Notes to physician: Treat symptomatically

5. FIRE-FIGHTING MEASURES

Flash point (°C): 19 (66°F) Method: COC

Suitable extinguishing media: Use dry chemical, CO₂, water spray or "alcohol" foam. Water may be effective for cooling, but not extinguishment.

Hazardous decomposition products: Carbon oxides.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Water mist may be used to cool closed containers.

Unusual hazards: Flash back possible over considerable distance. Heating may cause explosion. Vapors may form explosive mixture with air.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Avoid contact with skin, eyes and clothing. Wear personal protective equipment.

Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not flush into surface water or sanitary sewer system.

Methods for cleaning up: Absorb spill with inert material (e.g., dry sand or earth), then place in a chemical waste container. Dispose of promptly.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Do not eat, drink, or smoke in areas of use or storage. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors). Remove all sources of ignition.

Storage: Keep tightly closed in a dry, cool and well-ventilated place. Keep away from heat.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits
Minimize exposure in accordance with good hygiene practice.

Engineering measures: Use only in area provided with appropriate exhaust ventilation. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Eye protection: Tightly fitting safety goggles.

Skin and body protection: Long sleeved clothing. Wear chemically protective gloves, lab coat or apron to prevent prolonged or repeated skin contact.

Hand protection: Impervious gloves.

Respiratory protection: Use NIOSH approved respirator when ventilation is inadequate.
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Colorless to light</td>
</tr>
<tr>
<td>Odor</td>
<td>Hydrocarbon</td>
</tr>
<tr>
<td>Boiling point/range (°C)</td>
<td>91.3</td>
</tr>
<tr>
<td>Melting point/range (°C)</td>
<td>No data available</td>
</tr>
<tr>
<td>Specific gravity (Water =1)</td>
<td>1.070</td>
</tr>
<tr>
<td>Vapor pressure (mmHg)</td>
<td>18,000 - 20,000</td>
</tr>
<tr>
<td>Water solubility (mg/l)</td>
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<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
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<td>pH</td>
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<tr>
<td>Freezing point/range (°C)</td>
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</tr>
<tr>
<td>Vapor density (Air=1)</td>
<td>3.10</td>
</tr>
<tr>
<td>Evaporation Rate (Water = 1)</td>
<td>No data available</td>
</tr>
<tr>
<td>VOC content (%)</td>
<td>100</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.
Polymerization: Will not occur.
Hazardous decomposition products: Carbon oxides.
Conditions to avoid: Water.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: No data is available on the product itself.
Eye irritation: Contact with eyes may cause irritation or burning.
Skin irritation: May cause skin irritation in susceptible persons.
Chronic Toxicity: No evidence of adverse affects.
Carcinogenic Effects: Not listed by IARC, NTP or OSHA as a carcinogen.
Teratogenicity: Possibly mutagenic and teratogenic.
Component Information: Component information, if any, is listed below.

Dimethyl Carbonate
LD50s and LC50s: Oral LD50 Rat: 13000 mg/kg; Dermal LD50 Rat: >2500 mg/kg;
Dermal LD50 Rabbit: >5 g/kg; Inhalation LC50 Rat: 140 mg/L/4H;

12. ECOLOGICAL INFORMATION

Ecotox statement: No data is available on the product itself.
Aquatic toxicity: Not determined
Persistence and degradability: Not determined

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Where possible recycling is preferred to disposal or incineration. Dispose of according to all federal, state, and local applicable regulations.
14. TRANSPORT INFORMATION

DOT (U.S.)
UN/ID No.: UN1161
Proper shipping name: Dimethyl Carbonate
U.S. DOT - Hazard Class: 3
Packing group: II
ERG No.: 129

TDG (Canada)
Proper shipping name: Dimethyl Carbonate
Hazard class: 3
Packing group: II

15. REGULATORY INFORMATION

U.S. Regulations:
Not subject to the provisions of SARA 313 Title III
Not subject to TSCA 12(b) Export Notification

State Regulations
This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

<table>
<thead>
<tr>
<th>Components</th>
<th>State Regulations - NJ; PA; CA Prop65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Carbonate</td>
<td>Listed (NJRTK)</td>
</tr>
<tr>
<td></td>
<td>Listed (PARTK)</td>
</tr>
</tbody>
</table>

Canadian WHMIS

International Inventories
TSCA 8(b): Listed or exempt.
Canadian DSL: Listed or exempt.
EC-No. Listed or exempt.
Philippines (PICCS): Listed.
Japan (ENCS): Listed or exempt.
Korea (KECL): Listed.
China (IECS): Listed.
Australia (AICS): Listed.

16. OTHER INFORMATION

For Industrial Use Only

HMIS
Health: 3
Fire: 3
Physical hazard: 0
PPE: X

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet
1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: Purolyte® 1,3 Dioxane
Chemical Family: Cyclic acetal
Chemical Name: 1,3-Dioxolane
Synonyms: Dioxolane
Formula: C3H6O2
CAS-No.: 646-06-6
Product Code: 1035828, 1035829, 1035830

Date of Preparation: 12/22/2009

2. HAZARD IDENTIFICATION

Emergency Overview:
Danger: Extremely flammable. May cause burns. Causes severe eye irritation, irritating to respiratory system.

Health: 2
Fire: 3
Instability: 1

NFPA 704

Color: Colorless to light
Physical state: Liquid
Odor: Ethereal

Potential Health Effects

Principle routes of exposure: Skin contact. Eye contact. Inhalation.

Eye contact: Causes eye burns. Corrosive to the eyes and may cause severe damage including blindness.

Skin contact: Prolonged skin contact may cause skin irritation and/or dermatitis.

Inhalation: Breathing of mists, vapors, or fumes may irritate the nose, throat and lungs. Symptoms may include headache, excitation, euphoria, dizziness, incoordination, difficulty breathing, drowsiness, light-headedness, blurred vision, fatigue, stomach pain, nausea or vomiting, tremors, convulsions, loss of consciousness, cyanosis, central nervous system depression, coma, respiratory arrest and death, depending on the concentration and duration of exposure.

Ingestion: Ingestion causes irritation of upper respiratory system and gastrointestinal disturbance. May cause headache, pain, salivation, dizziness, diarrhoea, and nausea.

Chronic toxicity: Prolonged exposure may cause chronic effects. Corrosive to the eyes and may cause severe damage including blindness. Chronic inhalation causes tiredness, headache and rhinitis. Chronic exposure may cause headache, confusion, tremors, memory loss, slurred speech and anorexia. Chronic exposure may cause nausea and vomiting, higher exposure causes unconsciousness. Prolonged or repeated exposure may cause injuries to liver, kidneys, lungs, nerves and hereditary factors.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,3-Dioxolane</td>
<td>646-06-6</td>
<td>100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult a physician.

Skin contact: Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.
Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Consult a physician.

Ingestion: Drink plenty of water. Do not induce vomiting. Consult a physician.

Notes to physician: Treat symptomatically

### 5. FIRE-FIGHTING MEASURES

**Flash point (°C):** -6 (21 °F)  **Method:** COC

**Autoignition temperature (°C):** 274

**Flammable limits in air - lower (%):** 2.10 %

**Flammable limits in air - upper (%):** 20.50 %

**Suitable extinguishing media:** Use dry chemical, CO₂, water spray or "alcohol" foam. Do not use a solid water stream as it may scatter and spread fire.

**Hazardous decomposition products:** Formaldehyde vapors.

**Special protective equipment for firefighters:** As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.

**Unusual hazards:** Extremely flammable. Vapors are heavier than air and may spread along floors. Formaldehyde may form when burned or in contact with strong acids.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions:** Avoid contact with skin, eyes and clothing. Do not breathe vapors/dust. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. In the case of hazardous fumes, wear self-contained breathing apparatus.

**Environmental precautions:** Do not allow material to contaminate ground water system. Prevent product from entering drains.

**Methods for cleaning up:** Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. In the case of respirable dust and/or fumes, use self-contained breathing apparatus and dust impervious protective suit.

### 7. HANDLING AND STORAGE

**Handling:** Do not breathe vapors or spray mist. Avoid contact with skin and eyes. Keep away from open flames, hot surfaces and sources of ignition. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapors)

**Storage:** Store in inert atmosphere or keep well sealed to prevent the development of peroxides and other oxidation products.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

<table>
<thead>
<tr>
<th>Exposure limits</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,3-Dioxolane</td>
<td>Not established</td>
<td>20 ppm TWA</td>
</tr>
</tbody>
</table>

**Engineering measures:** Ensure adequate ventilation. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Eye protection:** Tightly fitting safety goggles.

**Skin and body protection:** Lightweight protective clothing. Chemical resistant apron.

**Hand protection:** Solvent-resistant gloves (butyl rubber). Neoprene gloves.

**Respiratory protection:** Use NIOSH approved respirator when ventilation is inadequate.

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Product name: Purolyte®1,3 Dioxolane
### 9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Colorless to light</td>
</tr>
<tr>
<td>Odor</td>
<td>Ethereal</td>
</tr>
<tr>
<td>Boiling point/range (°C):</td>
<td>75.6</td>
</tr>
<tr>
<td>Melting point/range (°C):</td>
<td>-95</td>
</tr>
<tr>
<td>Specific gravity (Water = 1)</td>
<td>1.070</td>
</tr>
<tr>
<td>Vapor pressure [mmHg]</td>
<td>70,000</td>
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<tr>
<td>Water solubility (mg/l)</td>
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<tr>
<td>VOC content (%)</td>
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</tr>
<tr>
<td>Physical state</td>
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</tr>
<tr>
<td>Molecular weight</td>
<td>74.08</td>
</tr>
<tr>
<td>pH</td>
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</tr>
<tr>
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</tr>
<tr>
<td>Vapor density (Air=1)</td>
<td>2.60</td>
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<td>Evaporation Rate (Water = 1)</td>
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<td>Partition coefficient</td>
<td>0.37</td>
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<tr>
<td>(n-octanol/water)</td>
<td></td>
</tr>
<tr>
<td>Viscosity (cP)</td>
<td>0.6</td>
</tr>
</tbody>
</table>

### 10. Stability and Reactivity

**Stability:** If exposed to air, organic peroxides will develop.

**Polymerization:** Polymerization can occur.

**Hazardous decomposition products:** Formaldehyde may form when burned or in contact with strong acids.

**Materials to avoid:** Incompatible with strong acids and oxidizing agents.

**Conditions to avoid:** Exposure to air. Heat, flames and sparks.

### 11. Toxicological Information

**Acute toxicity:**

LD50/oral/rat = 3 g/kg

LD50/dermal/rabbit = 8460 μL/kg

LC50/inhalation/4h/rat = 20650 mg/m³/4h

**Chronic Toxicity:** Chronic exposure may cause headache, confusion, tremors, memory loss, slurred speech and anorexia. Prolonged or repeated exposure may cause injuries to liver, kidneys, lungs, nerves and hereditary factors. Chronic inhalation causes tiredness, headache and mints.

**Component Information:** Component information, if any, is listed below

1,3-Dioxolane

**LD50s and LC50s:** Oral LD50 Rat: 3 g/kg; Dermal LD50 Rat: 15 g/kg; Dermal LD50 Rabbit: 9480 μL/kg; Inhalation LC50 Rat: 20650 mg/m³/4h

### 12. Ecological Information

**Aquatic toxicity:** No information available.

**Persistence and degradability:** Not determined

### 13. Disposal Considerations

**Waste from residues / unused products:** Where possible recycling is preferred to disposal or incineration. Waste must be disposed of in accordance with federal, state and local environmental control regulations.

### 14. Transport Information

**DOT (U.S.)**

UN/ID No: UN1186

**Proper shipping name:** Dioxolane

**U.S. DOT - Hazard Class:** 3

Product name: PurelytE® 1,3 Dioxolane
14. TRANSPORT INFORMATION

Packing group: II
ERG No: 127

TDG (Canada)
Proper shipping name: Dioxolane
Hazard class: 3
Packing group: II

15. REGULATORY INFORMATION

U.S. Regulations:
Not subject to the provisions of SARA 313 Title III
Not subject to TSCA 12(b) Export Notification

State Regulations
This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

<table>
<thead>
<tr>
<th>Components</th>
<th>State Regulations - NJ: PA: CA Prop65</th>
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<tbody>
<tr>
<td>1,3-Dioxolane</td>
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<td>Listed (PAFTK)</td>
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</table>

Canadian WHMIS
WHMIS hazard class: B2 Flammable liquid, D1B Toxic materials.

Canadian Ingredient Disclosure List (IDL):

International Inventories
TSCA 8(b): Listed or exempt.
Canadian DSL: Listed or exempt.
EC-No. Listed or exempt.
Philippines (PICCS): Listed.
Japan (ENCS): Listed or exempt.
Korea (KECL): Listed.
China (IECS): Listed.
Australia (AICS): One or more ingredient(s) are not on the AICS list.

16. OTHER INFORMATION

For Industrial Use Only

HMIS
Health: 2
Fire: 3
Physical hazard: 1
PPE: H

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet
MATERIAL SAFETY DATA SHEET

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: Lithium (bis) Trifluoromethane Sulfonimide
CAS-No.: 90076-65-6
Product Code: 1115704

Date of Preparation: 05/20/2010

2. HAZARD IDENTIFICATION

Emergency Overview
Warning
Reacts with water to form hydrofluoric acid. May cause respiratory tract, eye and skin irritation. May cause gastrointestinal irritation.

NFPA 704

Color: White
Physical state: Powder
Odor: Odorless

Health: 3
Fire: 0
Instability: 0

Potential Health Effects

Principle routes of exposure: Inhalation, Ingestion, Skin contact, Eye contact.

Eye contact: Exposure may cause severe burns, destruction of eye tissue and possible permanent injury or blindness.

Skin contact: May cause moderate to severe irritation, burning, and dryness of the skin.

Inhalation: Breathing of mists, vapors, or fumes may irritate the nose, throat, and lungs.

Ingestion: May cause irritation of the mouth, throat and gastrointestinal tract. May cause headache, pain, salivation, dizziness, diarrhea, and nausea. Although oral therapeutic administration of lithium into humans has shown adverse effects on the central nervous system, kidneys, heart, and developing fetus, these effects have not been associated with workplace exposures and are not considered likely to occur when normal hygienic practices are observed.

Chronic toxicity: Chronic overexposure to fluoride may result in digestive disturbances, mottled tooth enamel, abnormal hardening of the bones and other bone changes, and damage to the liver and kidneys. Skin rashes and worker complaints related to bones, joints, and muscles have been reported. High doses of stannous fluoride have been reported to cause impaired reproductive performance in animals.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Trifluoromethane Sulfonimide</td>
<td>90076-65-6</td>
<td>100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Irrigate with calcium gluconate (1%) in saline until medical attention is obtained.

Skin contact: Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Follow directly with application of 2.5% calcium gluconate gel by rubbing into exposed area. Continue applying and rubbing calcium gluconate gel 30 minutes after pain has stopped and medical attention is obtained. Get medical attention if irritation develops.

Inhalation: Move to fresh air. If symptoms persist, call a physician. Trained personnel should administer 2.5% calcium gluconate through a nebulizer for 20 minutes.

Ingestion: Drink 1 or 2 glasses of water. Do not induce vomiting. Obtain medical attention. Never give anything by mouth to an unconscious person or convulsing.

Product name: Lithium (bis) Trifluoromethane Sulfonimide
Notes to physician: Treat symptomatically. In all cases of major hydrogen fluoride exposure, hypocalcemia may be present. Monitor calcium levels frequently and EKG for signs of calcium depletion. Patients with burns of the neck or face, or with signs of respiratory irritation, should be monitored for delayed pulmonary edema, and edema of the upper airway with respiratory obstruction. Respiratory care should be supervised and may include further administration of 2.5% calcium gluconate by inhalation. Do not administer local anesthetics after skin contact as the level of pain is an indication of the effectiveness of the calcium gluconate treatment. If pain continues longer than 30 minutes, consider injecting calcium gluconate (5%) into the skin and subcutaneous tissue beneath, around and within the affected area.

5. FIRE-FIGHTING MEASURES

Flash point (°C): Non-combustible

Suitable extinguishing media: Use dry chemical, CO2, water spray or "alcohol" foam.

Hazardous decomposition products: Carbon monoxide, Carbon dioxide (CO2), Nitrogen oxides (NOx), Sulphur oxides, Hydrogen fluoride.

Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, NIOSH (approved or equivalent) and full protective gear.

Unusual hazards: Vapors are heavier than air and may spread along floors. Vapor may travel considerable distance to source of ignition and flash back.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Evacuate personnel to safe areas. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Remove all sources of ignition.

Environmental precautions: Not applicable.

Methods for cleaning up: Sweep up and shovel into suitable containers for disposal. Avoid cleanup procedures that may result in water contamination. Wear a self-contained breathing apparatus and appropriate personal protective equipment.

7. HANDLING AND STORAGE

Handling: Do not breathe vapors/dust. Avoid contact with skin and eyes. Wear personal protective equipment.

Storage: Keep containers tightly closed in a dry, cool and well-ventilated place. Store in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium Trifluoromethane Sulfonimide</td>
<td>Not established</td>
<td>Not established</td>
</tr>
</tbody>
</table>

No TLV assigned. Minimize exposure in accordance with good hygiene practices.

Engineering measures: Use only in an area provided with appropriate exhaust ventilation.

Eye protection: Tightly fitting safety goggles.

Skin and body protection: Impervious clothing. Wear chemically protective gloves, lab coat or apron to prevent prolonged or repeated skin contact.


Respiratory protection: Use NIOSH approved respirator when ventilation is inadequate. Seek professional advice prior to respirator selection and use.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Ensure that eyewash stations and safety showers are proximal to the work station location.

Product name: Lithium (Bis) Trifluoromethane Sulfonimide
9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Color</td>
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<tr>
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</tr>
<tr>
<td>Boiling point/range (°C)</td>
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</tr>
<tr>
<td>Melting point/range (°C)</td>
<td>No data available</td>
</tr>
<tr>
<td>Vapor pressure (mmHg)</td>
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<td>Specific gravity (Water = 1)</td>
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<td>Evaporation Rate (Water = 1)</td>
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</tr>
<tr>
<td>VOC content (%)</td>
<td>No data available</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.
Polymerization: Will not occur.
Hazardous decomposition products: Carbon monoxide, Carbon oxides, Nitrogen oxides (NOx), Sulphur oxides, Hydrogen fluoride.
Conditions to avoid: None known

11. TOXICOLOGICAL INFORMATION

Acute toxicity: No data is available on the product itself.
Carcinogenic Effects: Not listed by IARC, NTP or OSHA as a carcogen.
Component Information: Component information, if any, is listed below

12. ECOLOGICAL INFORMATION

Aquatic toxicity: Hydrogen fluoride may be released upon contact with water and is lethal in freshwater fish at 60 ppm. The toxicity of the lithium ion in the aquatic environment is poorly understood and related to overall water quality. As LiCl, the LC50 to Daphnia magna is 7.2 mg/L. The hydroxyl ion will affect the pH of the water and may acquire the corrosive properties of lithium hydroxide.
Persistence and degradability: Not determined

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Where possible recycling is preferred to disposal or incineration. Combustion products will include hydrofluoric acid.

14. TRANSPORT INFORMATION

DOT (U.S.)
UN/ID No: UN2823
Proper shipping name: Corrosive solid, toxic, n.o.s (Lithium (Bis) Trifluoromethane-Sulfonylimide)
U.S. DOT - Hazard Class: 8 6.1
Packing group: III

TDG (Canada)
Proper shipping name: Corrosive solid, toxic, n.o.s (Lithium (Bis) Trifluoromethane-Sulfonylimide)
Packing group: III

15. REGULATORY INFORMATION

U.S. Regulations:
Not subject to the provisions of SARA 313 Title III
Not subject to TSCA 12(b) Export Notification

State Regulations:
This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

Canadian WHMIS
WHMIS hazard class: D2B Toxic materials.

Product name: Lithium (Bis) Trifluoromethane Sulfonylimide
International Inventories
TSCA (6): Listed or exempt.
Canadian DSL: Listed or exempt.
EC-No: One or more ingredient(s) are not on the EINECS list.
Philippines (PICCS): One or more ingredient(s) are not on the PICCS list.
Japan (ENCS): Listed or exempt.
Korea (KECL): Listed.
China (IECS): Listed.
Australia (AICS): Listed.

16. OTHER INFORMATION

For Industrial Use Only

HMIS
Health: 3
Fire: 0
Physical hazard: 0
PPE: X

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet
1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product Name: Purolyte® EC
Chemical Name: Ethylene Carbonate
Synonyms: 1,3-Dioxolane, EC.
Formula: C₃H₆O₃
CAS-No.: 96-49-1
Product Code: 1035861, 1035862, 1035863

Date of Preparation: 05/06/2010

2. HAZARD IDENTIFICATION

Emergency Overview
Warning: May cause eye/skin irritation. May cause irritation of respiratory tract. May irritate digestive tract.

Color: Colorless to light
Physical state: Solid
Odor: Slight

NFPA 704
Health: 2
Flame: 1
Instability: 1

Potential Health Effects

Principle routes of exposure: Eye contact, Skin contact, Inhalation.

Eye contact: May cause eye irritation or burning. Direct contact may cause irritation, redness, tearing, and blurred vision.

Skin contact: May cause irritation. Prolonged or repeated exposure may cause: Redness and swelling.

Inhalation: Breathing of mists, vapors, or fumes may irritate the nose, throat, and lungs.

Ingestion: Irritating to mouth, throat and stomach. May cause headache, pain, salivation, dizziness, diarrhea, and nausea.

Chronic toxicity: Prolonged exposure may cause chronic effects. Liver and kidney injuries may occur.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>Weight %</th>
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<tr>
<td>Ethylene Carbonate</td>
<td>95-45-1</td>
<td>100%</td>
</tr>
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4. FIRST AID MEASURES

Eye contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult a physician.

Skin contact: Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. If skin irritation persists, call a physician.

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

Ingestion: Drink plenty of water. Do not induce vomiting. Aspiration may cause pulmonary edema and pneumonia. Call a physician immediately. Never give anything by mouth to an unconscious person or convulsing.

Notes to physician: This product may be metabolized to ethylene glycol. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Flash point (°C): 152 (306 °F) Method: Closed cup

Suitable extinguishing media: Use dry chemical, CO₂, water spray or "alcohol" foam. Water and/or foam may cause foaming.

Hazardous decomposition products: Carbon oxides.

Product name: Purolyte® EC
Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus. Water mist may be used to cool closed containers.

Unusual hazards: Burning produces irritant fumes.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid contact with skin, eyes and clothing. Do not breathe vapors/dust. Remove all sources of ignition.

Environmental precautions: Do not allow material to contaminate ground water system. Prevent product from entering drains. Prevent further leakage or spillage if safe to do so.

Methods for cleaning up: Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. In the case of hazardous fumes, wear self contained breathing apparatus.

7. HANDLING AND STORAGE

Handling: Do not breathe vapors or spray mist. Avoid contact with skin and eyes.

Storage: Keep tightly closed in a dry, cool and well-ventilated place. Store in original container.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene Carbonate</td>
<td>Not established</td>
<td>Not established</td>
</tr>
</tbody>
</table>

This compound may contain from 5 to 25 ppm free ethylene oxide. Residual ethylene oxide can accumulate in the headspace of containers and be released into the environment. The OSHA PEL for ethylene oxide is 1 ppm.

Engineering measures: Use only in area provided with appropriate exhaust ventilation. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Eye protection: If splashes are likely to occur, wear: Tightly fitting safety goggles.

Skin and body protection: Wear chemically protective gloves, lab coat or apron to prevent prolonged or repeated skin contact.

Hand protection: Impervious gloves.

Respiratory protection: Use NIOSH approved respirator when ventilation is inadequate. In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit. In the case of hazardous fumes, wear self contained breathing apparatus.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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<tbody>
<tr>
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<td>VOC content (%)</td>
<td>100</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions.

Polymerization: None under normal processing.

Hazardous decomposition products: Carbon oxides.

Materials to avoid: None under normal use.

Conditions to avoid: None known.

Product name: Purolite® EC
11. TOXICOLOGICAL INFORMATION

Acute toxicity: No data is available on the product itself.

Eye irritation: May cause eye irritation with susceptible persons.

Skin irritation: May cause skin irritation in susceptible persons.

Chronic Toxicity: Prolonged or repeated exposure may cause liver or kidney damage.

Carcinogenic Effects: Not listed by IARC, NTP or OSHA as a carcinogen.

Target Organ Effects: Liver, Kidney.

Component Information: Component information, if any, is listed below.

12. ECOLOGICAL INFORMATION

Ecotoxicity: No data is available on the product itself.

Aquatic toxicity: Not determined.

Persistence and degradability: Not determined.

13. DISPOSAL CONSIDERATIONS

Waste from residues or unused products: In accordance with local and national regulations. Where possible recycling is preferred to disposal or incineration.

14. TRANSPORT INFORMATION

DOT (U.S.)
Proper shipping name: Not regulated.

TDG (Canada)
Proper shipping name: Not regulated.

15. REGULATORY INFORMATION

U.S. Regulations:
Not subject to the provisions of SARA 313 Title III

Not subject to TSCA 12(b) Export Notification

State Regulations
This product or its ingredients have been evaluated for New Jersey, Pennsylvania, and California Prop 65 supplier notification requirements. Substances that are subject to notification requirements, if any, are listed below.

<table>
<thead>
<tr>
<th>Components</th>
<th>State Regulations - NJ; PA; CA Prop65</th>
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<tr>
<td>Ethylene Carbonate</td>
<td>Listed (PARTK)</td>
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Canadian WHMIS
WHMIS hazard class: D2B Toxic materials.

International Inventories
TSCA 8(b): Listed or exempt.
Canadian DSL: Listed or exempt.
EC-No: Listed or exempt.
Philippines (PICCS): Listed.
Japan (ENCS): Listed or exempt.
Korea (KECL): Listed.
China (IECS): Listed.
Australia (AICS): Listed.

Product name: Purolyte® EC
For Industrial Use Only

HMIS
Health: 2
Fire: 1
Physical hazard: 1
PPE: H

The information and recommendations contained in this Material Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the MSDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or state laws.

End of Safety Data Sheet
Certificate of Analysis

Product Shipped:                  Purolyte® Lithium Hexafluorophosphate
Chemical Formula:                 LiPF₆
Lot Number:                       3026-93
Novolyte Order Number:           70001192
Customer P.O. Number:            103/MC-02054B

<table>
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<th>Parameter</th>
<th>Specification</th>
<th>Analysis</th>
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<tbody>
<tr>
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<td>99.9</td>
</tr>
<tr>
<td>Water, ppm</td>
<td>20.0 max</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Approved: Michael J. Moehring
8001 East Pleasant Valley Road
Independence, OH 44131-5526 USA
Phone: (216) 867-1040 Fax: (216)-867-1088

Sila Nanotechnologies
311 Ferst Dr NW
Ford Environmental Sci & Tech Bldg
Suite L1358
Atlanta, GA 30033-0100
Attn: Alex Jacobs  Tel: 617 953 1548

Certificate of Analysis

<table>
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<tr>
<th>Product Shipped:</th>
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<td>9/23/2011 Novolyte Order Number: 70001192</td>
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<td>Quantity Shipped:</td>
<td>1 kg Customer P.O. Number: 103/MC-02054B</td>
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<th>Analysis</th>
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<td>HF, ppm</td>
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<td>17.1</td>
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</table>

Approved: Michael J. Moehring
Certificate of Analysis

Product Shipped: Purolyte® Lithium bis (trifluoromethanesulfonyl) imide
Chemical Formula: LiN(CF₃SO₂)₂
CAS Number: 90076-65-6
Lot Number: 3026-92
Packing Date: 9/23/2011
Quantity Shipped: 1 kg
Novolyte Order Number: 70001192
Customer P.O. Number: 103/MC-02054B

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<tr>
<td>Water, ppm</td>
<td>100.0 max</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Approved: Michael J. Moehring
8001 East Pleasant Valley Road
Independence, OH 44131-5526 USA
Phone: (216) 867-1040 Fax: (216)-867-1088

Sila Nanotechnologies
311 Ferst Dr NW
Ford Environmental Sci & Tech Bldg
Suite L1358
Atlanta, GA 300332-0100
Attn: Alex Jacobs  Tel: 617 953 1548

Certificate of Analysis

Product Shipped: Purolite® 1,2-Dimethoxymethane (Monoglyme)
Chemical Formula: CH₃OCH₂CH₂OCH₃
CAS Number: 110-71-4
Lot Number: 3025-143
Packing Date: 8/22/2011
Quantity Shipped: 1 kg
Novolyte Order Number: 70001192
Customer P.O. Number: 103/MC-02054B

<table>
<thead>
<tr>
<th></th>
<th>Specification</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2-Dimethoxyethane, wt%</td>
<td>99.98 min</td>
<td>99.98</td>
</tr>
<tr>
<td>Water, ppm</td>
<td>20.0 max</td>
<td>8.5</td>
</tr>
</tbody>
</table>

Approved: Michael J. Moehring
Certificate of Analysis

Product Shipped: Purolyte® 1,3-Dioxolane
Chemical Formula: C₃H₆O₂
CAS Number: 646-08-0
Lot Number: 3025-142
Packing Date: 8/22/2011
Quantity Shipped: 1 kg
Novolyte Order Number: 70001192
Customer P.O. Number: 103/MC-020548

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<tbody>
<tr>
<td>1,3-Dioxolane, wt%</td>
<td>99.98 min.</td>
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</tr>
<tr>
<td>Water, ppm</td>
<td>20 max</td>
<td>12.0</td>
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</tbody>
</table>

Approved: Michael J. Moehring
NOVOLYTE

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Atlanta, GA 300332-0100
Attn: Alex Jacobs  Tel: 617 953 1548

Certificate of Analysis

<table>
<thead>
<tr>
<th>Specification</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimethyl Carbonate (DMC), wt%</td>
<td>99.98 min.</td>
</tr>
<tr>
<td>Water, ppm</td>
<td>20.0 max</td>
</tr>
</tbody>
</table>

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311 Ferst Dr NW  
Ford Environmental Sci & Tech Bldg  
Suite L1358  
Atlanta, GA 30033-0100  
Attn: Alex Jacobs Tel: 617 953 1548  

Certificate of Analysis  

<table>
<thead>
<tr>
<th>Product Shipped:</th>
<th>Purolyte® Ethylene Carbonate</th>
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<tbody>
<tr>
<td>Chemical Formula:</td>
<td>C₃H₆O₃</td>
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<tr>
<td>CAS Number:</td>
<td>96-49-1</td>
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<td>Lot Number:</td>
<td>3025-139</td>
</tr>
<tr>
<td>Packing Date:</td>
<td>8/22/2011</td>
</tr>
<tr>
<td>Quantity Shipped:</td>
<td>1 kg</td>
</tr>
<tr>
<td>Novolyte Order Number:</td>
<td>70001192</td>
</tr>
<tr>
<td>Customer P.O. Number:</td>
<td>103/MC-02054B</td>
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<table>
<thead>
<tr>
<th>Specification</th>
<th>Analysis</th>
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</thead>
<tbody>
<tr>
<td>Ethylene Carbonate, wt%</td>
<td>99.95 min</td>
</tr>
<tr>
<td>Water, ppm</td>
<td>20.0 max</td>
</tr>
</tbody>
</table>

Approved: Michael J. Moehring

[Signature]
Certificate of Analysis

Product Shipped: Purolyte® Diethyl Carbonate
Chemical Formula: C₈H₁₀O₃
CAS Number: 105-58-8
Lot Number: 3025-141
Packing Date: 8/22/2011
Quantity Shipped: 1 kg
Novolyte Order Number: 70001192
Customer P.O. Number: 103/MC-02054B

<table>
<thead>
<tr>
<th>Specification</th>
<th>Analysis</th>
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</thead>
<tbody>
<tr>
<td>Diethyl Carbonate, wt%</td>
<td>99.98 min</td>
</tr>
<tr>
<td>Water, ppm</td>
<td>20.0 max</td>
</tr>
</tbody>
</table>

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