1. IDENTIFICATION

Product name: UCON™ Refrigeration Lubricant 993

Recommended use of the chemical and restrictions on use
Identified uses: Selection of the appropriate polyglycol product for a specific application requires knowledge of the fluid requirements of the application, awareness of the most important of these requirements, and a match-up with the properties of the various polyglycol materials. Polyglycol products can be formulated for use in numerous industry applications such as hydraulic fluids, quenchants, compressor and refrigeration lubricants, heat transfer fluids, machinery lubricants, solder assist fluids, metalworking lubricants, textile finishing, etc. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

COMPANY IDENTIFICATION
THE DOW CHEMICAL COMPANY
2030 DOW CENTER
MIDLAND MI 48674-0000
UNITED STATES

Customer Information Number: 800-258-2436
SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: CHEMTREC +1 800-424-9300
Local Emergency Contact: 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification
GHS classification in accordance with 29 CFR 1910.1200
Not a hazardous substance or mixture.

Other hazards
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS
This product is a mixture.

<table>
<thead>
<tr>
<th>Component</th>
<th>CASRN</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyalkylene glycol</td>
<td>Trade secret</td>
<td>&gt; 55.0 - &lt; 65.0 %</td>
</tr>
<tr>
<td>Polypropylene glycol</td>
<td>Trade secret</td>
<td>&gt; 35.0 - &lt; 45.0 %</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

Description of first aid measures

General advice:
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Skin contact: Wash off with plenty of water.

Eye contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Ingestion: No emergency medical treatment necessary.

Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed
Notes to physician: Repeated excessive exposure may aggravate preexisting lung disease. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitusives and corticosteroids may be of help. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: Do not use direct water stream. May spread fire.

Special hazards arising from the substance or mixture
**Hazardous combustion products:** During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide.

**Unusual Fire and Explosion Hazards:** Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

**Advice for firefighters**

**Fire Fighting Procedures:** Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.

**Special protective equipment for firefighters:** Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions, protective equipment and emergency procedures:** Keep upwind of spill. Ventilate area of leak or spill. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

**Environmental precautions:** Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

**Methods and materials for containment and cleaning up:** Contain spilled material if possible. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

### 7. HANDLING AND STORAGE

**Precautions for safe handling:** Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. Avoid breathing mist. Use with adequate ventilation. Keep container closed. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

**Conditions for safe storage:** Store in the following material(s): 316 stainless steel. Carbon steel. Glass-lined container. Polypropylene. Polyethylene-lined container. Stainless steel. Teflon. This material may soften and lift certain paint and surface coatings. Use product promptly after opening. Store in original unopened container. Unopened containers of material stored beyond the recommended shelf life should be retested against the sales specifications before use. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact.
Storage stability

Shelf life: Use within 24 Month

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Exposure controls
Engineering controls: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

Individual protection measures
Eye/face protection: Use safety glasses (with side shields).
Skin protection
Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate (“EVAL”). Examples of acceptable glove barrier materials include: Natural rubber (“latex”). Neoprene. Nitrile/butadiene rubber (“nitrile” or “NBR”). Polyvinyl chloride (“PVC” or “vinyl”).

Notice: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other protection: Wear clean, body-covering clothing.
Respiratory protection: Under intended handling conditions, no respiratory protection should be needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Physical state Liquid.
Color Colorless to yellow
Odor Mild
Odor Threshold No test data available
pH 5.5 - 8.5 ASTM E70 (16.7 % in isopropanol/water, 10:6)
Melting point/range Not applicable to liquids
Freezing point See Pour Point
Boiling point (760 mmHg) > 200 °C (> 392 °F) Calculated.
Flash point closed cup 188 °C (370 °F) ASTM D 93
Evaporation Rate (Butyl Acetate = 1)  No test data available

Flammability (solid, gas)  Not applicable to liquids
Lower explosion limit  No test data available
Upper explosion limit  No test data available
Vapor Pressure  < 0.01 mmHg at 20 °C (68 °F) ASTM E1719
Relative Vapor Density (air = 1)  9 Calculated.
Relative Density (water = 1)  1.024 at 20 °C (68 °F) Calculated.
Water solubility  59 % at 20 °C (68 °F) Visual
Partition coefficient: n-octanol/water  No data available
Auto-ignition temperature  No test data available
Decomposition temperature  No test data available
Kinematic Viscosity  73.0 - 82.0 cSt at 40 °C (104 °F) ASTM D 445
Explosive properties  No data available
Oxidizing properties  No data available
Molecular weight  No data available
Percent volatility  Not reported No test data available
Pour point  -48 °C (-54 °F) ASTM D97
Volatile Organic Compounds  1 g/L EPA Method No. 24

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No data available

Chemical stability: Thermally stable at typical use temperatures.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems.


11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity
   Acute oral toxicity
Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

As product: Single dose oral LD50 has not been determined.

Based on information for component(s):
LD50, Rat, > 5,000 mg/kg  Estimated.

**Acute dermal toxicity**  
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined.

Based on information for component(s):
LD50, Rabbit, > 8,000 mg/kg  Estimated.

**Acute inhalation toxicity**  
At room temperature, exposure to vapor is minimal due to low volatility; single exposure is not likely to be hazardous.

As product: The LC50 has not been determined.

**Skin corrosion/irritation**  
Prolonged contact may cause slight skin irritation with local redness.

**Serious eye damage/eye irritation**  
May cause slight temporary eye irritation.  
Corneal injury is unlikely.

**Sensitization**  
For the component(s) tested:
Did not cause allergic skin reactions when tested in humans.

For respiratory sensitization:
No specific, relevant data available for assessment.

**Specific Target Organ Systemic Toxicity (Single Exposure)**  
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

**Specific Target Organ Systemic Toxicity (Repeated Exposure)**  
Mist may cause irritation of upper respiratory tract (nose and throat) and lungs.

**Carcinogenicity**  
Similar material(s) did not cause cancer in laboratory animals.

**Teratogenicity**  
No specific, relevant data available for assessment.

**Reproductive toxicity**  
No specific, relevant data available for assessment.

**Mutagenicity**  
No specific, relevant data available for assessment.

**Aspiration Hazard**
Based on physical properties, not likely to be an aspiration hazard.

**COMPONENTS INFLUENCING TOXICOLOGY:**

**Polyalkylene glycol**

*Acute inhalation toxicity*
LC50, Rat, 4 Hour, dust/mist, > 5.01 mg/l No deaths occurred at this concentration.

**Polypropylene glycol**

*Acute inhalation toxicity*
As product: The LC50 has not been determined.

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**12. ECOLOGICAL INFORMATION**

Ecotoxicological information appears in this section when such data is available.

**Toxicity**

**Polyalkylene glycol**

*Acute toxicity to fish*
Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).
LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 24,500 mg/l, OECD Test Guideline 203 or Equivalent

*Acute toxicity to aquatic invertebrates*
EC50, Daphnia magna (Water flea), static test, 48 Hour, 21,000 mg/l, OECD Test Guideline 202 or Equivalent

*Toxicity to bacteria*
IC50, Bacteria, static test, 16 Hour, Growth inhibition, 32,000 mg/l, OECD 209 Test

**Polypropylene glycol**

*Acute toxicity to fish*
Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).
LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 86 mg/l, OECD Test Guideline 203 or Equivalent

*Acute toxicity to aquatic invertebrates*
EC50, Daphnia magna (Water flea), static test, 48 Hour, 250 mg/l, OECD Test Guideline 202 or Equivalent

*Toxicity to bacteria*
IC50, Bacteria, static test, 16 Hour, Growth inhibition, 1,300 mg/l

**Persistence and degradability**

**Polyalkylene glycol**
**Biodegradability:** Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

**10-day Window:** Fail

**Biodegradation:** 45%

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301B or Equivalent

**Biodegradation:** 44%

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301F or Equivalent

**Polypropylene glycol**

**Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

**10-day Window:** Pass

**Biodegradation:** 99%

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301B or Equivalent

**Bioaccumulative potential**

**Polyalkylene glycol**

**Bioaccumulation:** For this family of materials: No bioconcentration is expected because of the relatively high water solubility.

**Polypropylene glycol**

**Bioaccumulation:** No data available.

**Mobility in soil**

**Polyalkylene glycol**

No relevant data found.

**Polypropylene glycol**

No relevant data found.

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**13. DISPOSAL CONSIDERATIONS**

**Disposal methods:** DO NOT DUMP INTO ANY SEwers, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.
14. TRANSPORT INFORMATION

DOT
Not regulated for transport

Classification for SEA transport (IMO-IMDG):

- Not regulated for transport
- Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):
Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312
No SARA Hazards

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Pennsylvania Worker and Community Right-To-Know Act:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Prop. 65
This product contains a chemical that is at or below California Propositions 65’s "safe harbor level" as determined via a risk assessment. Therefore, the chemical is not required to be listed as a Prop 65 chemical on the SDS or label.

United States TSCA Inventory (TSCA)
All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.
16. OTHER INFORMATION

Hazard Rating System
NFPA

<table>
<thead>
<tr>
<th>Health</th>
<th>Flammability</th>
<th>Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Revision
Identification Number: 177571 / A001 / Issue Date: 07/06/2018 / Version: 7.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Full text of other abbreviations
AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IM - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.
THE DOW CHEMICAL COMPANY urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

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