Dow (hereinafter, and for purposes of this MSDS only, refers to The Dow Chemical Company and to Dow Chemical Canada Inc.) encourages and expects you to read and understand the entire MSDS, as there is important information throughout the document. Dow expects you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 IDENTIFICATION

Product Name: TRITON(TM) DF-16 SURFACTANT

1.2 COMPANY IDENTIFICATION

The Dow Chemical Company
Midland, MI 48674

1.3 EMERGENCY TELEPHONE NUMBER

24-HOUR EMERGENCY TELEPHONE NUMBER: (989)636-4400.
Customer Information Number: 1-800-258-2436.
2. COMPOSITION INFORMATION

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount (%W/W)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohols, C8-C10, ethoxylated</td>
<td>68603-25-8</td>
<td>&gt; 98 %</td>
</tr>
<tr>
<td>propoxylated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyethylene glycol</td>
<td>25322-68-3</td>
<td>&lt; 2%</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Appearance: Transparent colorless

Physical State: Liquid

Odor: Pungent

Hazards of product: DANGER! CAUSES EYE BURNS. ASPIRATION MAY CAUSE LUNG DAMAGE.

3.2 POTENTIAL HEALTH EFFECTS

Effects of Single Acute Overexposure

Inhalation: Mist may cause irritation of the respiratory tract, experienced as nasal discomfort and discharge, with chest pain and coughing.

Eye Contact: Causes severe irritation, experienced as discomfort or pain, excess blinking and tear production, marked excess redness and swelling of the conjunctiva, and chemical burns of the eye. Corneal injury may be severe, extensive, and, if not treated promptly, could result in permanent impairment of vision.
Skin Contact  May cause minor irritation with itching and possible slight local redness.

Skin Absorption  No evidence of harmful effects from available information.

Swallowing  Moderately toxic. May cause abdominal discomfort, nausea, vomiting, and diarrhea. Aspiration into the lungs may occur during ingestion or vomiting, resulting in lung injury.

Chronic, Prolonged or Repeated Overexposure

Effects of Repeated Overexposure  No adverse effects anticipated from available information.

Other Effects of Overexposure  None currently known.

Medical Conditions Aggravated by Exposure

A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure is unlikely to aggravate existing medical conditions.

See Section 11 for toxicological information and additional information about potential health effects.

3.3 POTENTIAL ENVIRONMENTAL EFFECTS

See Section 12 for Ecological Information.

4. FIRST AID PROCEDURES

4.1 INHALATION
Remove to fresh air.

4.2 EYE CONTACT
Immediately flush eyes with water and continue washing for at least 15 minutes. DO NOT remove contact lenses, if worn. Obtain medical attention without delay, preferably from an ophthalmologist.

4.3 SKIN CONTACT
Wash skin with plenty of water.

4.4 SWALLOWING
If patient is fully conscious, give two glasses of water. DO NOT INDUCE VOMITING. Obtain medical attention.
4.5 NOTES TO PHYSICIAN
There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient. Any material aspirated during vomiting may cause lung injury. Therefore, emesis should not be induced mechanically or pharmacologically. If it is considered necessary to evacuate the stomach contents, this should be done by means least likely to cause aspiration (e.g., gastric lavage after endotracheal intubation).

5. FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES - REFER TO SECTION 9, PHYSICAL AND CHEMICAL PROPERTIES

5.2 EXTINGUISHING MEDIA
Apply alcohol-type or all-purpose-type foam by manufacturers’ recommended techniques for large fires. Use water spray, carbon dioxide, or dry chemical media for small fires.

5.3 FIRE FIGHTING PROCEDURES
Do not direct a solid stream of water or foam into hot, burning pools; this may cause frothing and increase fire intensity.

5.4 SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS
Use self-contained breathing apparatus and protective clothing.

5.5 UNUSUAL FIRE AND EXPLOSION HAZARDS
Avoid accumulation of water. Product may be carried across water surface spreading fire or contacting an ignition source.

5.6 HAZARDOUS COMBUSTION PRODUCTS
Burning can produce the following products: Carbon monoxide and/or carbon dioxide. Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant.

6. ACCIDENTAL RELEASE MEASURES

Steps to be Taken if Material is Released or Spilled:
Contain spills immediately with inert materials (e.g., sand, earth). Transfer liquids and solid diking material to suitable containers for recovery or disposal. To avoid gelling and foaming problems, do not use water to flush away spills.
Personal Precautions: Wear eye and skin protection. Floor may be slippery; use care to avoid falling. See Section 8.2 - Personal Protection.

Environmental Precautions: Avoid discharge to natural waters.

### 7. HANDLING AND STORAGE

#### 7.1 HANDLING

**General Handling**
Do not get in eyes.
Do not swallow.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.

FOR INDUSTRY USE ONLY.

**Ventilation**
Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

**Other Precautions**
Surfactants can cause foaming problems in biological wastewater treatment plants and other high shear operations.

#### 7.2 STORAGE

Store in accordance with good industrial practices. Storage information may be obtained from product-specific Storage and Handling Guides, or by calling Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada).

### 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

#### 8.1 EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Component</th>
<th>Exposure Limits</th>
<th>Skin</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyethylene glycol</td>
<td>10 mg/m3 TWA8 AIHA WEEL</td>
<td>Aerosol</td>
<td></td>
</tr>
</tbody>
</table>
In the Exposure Limits Chart above, if there is no specific qualifier (i.e., Aerosol) listed in the Form Column for a particular limit, the listed limit includes all airborne forms of the substance that can be inhaled.

A "Yes" in the Skin Column indicates a potential significant contribution to overall exposure by the cutaneous (skin) route, including mucous membranes and the eyes, either by contact with vapors or by direct skin contact with the substance. A "Blank" in the Skin Column indicates that exposure by the cutaneous (skin) route is not a potential significant contributor to overall exposure.

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8.2 PERSONAL PROTECTION

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. When airborne exposure guidelines and/or comfort levels may be exceeded, use an approved air-purifying respirator. For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

Ventilation: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

Eye Protection: Chemical splash goggles and face shield

Protective Gloves: Neoprene

Butyl

Other Protective Equipment: Eye Bath, Safety Shower

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Appearance: Transparent colorless

Odor: Pungent

Flash Point - Closed Cup: 157.2 °C  315 °F Pensky-Martens Closed Cup ASTM D 93
Flash Point - Open Cup: 215.6 °C  420 °F  *Cleveland Open Cup ASTMD 92*

Flammable Limits In Air:
- Lower: *Not determined.*
- Upper: *Not determined.*

Autoignition Temperature: *Not currently available.*

Vapor Pressure: < 0.01 mmHg  20 °C

Boiling Point (760 mmHg): > 200 °C  > 392 °F

Vapor Density (air = 1): 9

Specific Gravity (H2O = 1): 0.996  20 °C / 20 °C

Freezing Point: -6 °C  21 °F

Melting Point: *Not applicable.*

Solubility in Water (by weight): 100 %  20 °C

pH: 4.7

Molecular Weight: 570 g/mol  *(Approx.)*

Evaporation Rate (Butyl Acetate = 1): < 0.01

Percent Volatiles: 0.03 Wt%

10. STABILITY AND REACTIVITY

10.1 STABILITY/INSTABILITY  Stable

Conditions to Avoid: Prolonged excessive heat may cause product decomposition.

Incompatible Materials: Avoid contact with strong oxidizing and/or reducing agents. Avoid strong bases at high temperatures, strong acids, and materials reactive with amines and hydroxyl compounds.
10.2 HAZARDOUS POLYMERIZATION  Will not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Peroral

Rat; female; LD50 = 616 (447 - 847) mg/kg

Major Signs: sluggishness, unsteady gait, prostration, labored breathing, encrustation on perinasal fur, diarrhea

Gross Pathology: lungs, liver and stomach discolored; intestines and stomach liquid-filled

Peroral

Rat; male; LD50 = 500 mg/kg

Mortality: 0/3

Major Signs: sluggishness, unsteady gait, prostration, labored breathing, encrustation on perinasal fur, diarrhea

Gross Pathology: lungs, liver and stomach discolored; intestines and stomach liquid-filled

Percutaneous

Rabbit; male; LD50 = 4 g/kg; 24 h occluded.

Mortality: 1/3

Major Signs: sluggishness, labored breathing, prostration, wetness or staining on perioral fur

Gross Pathology: lungs, liver, kidneys discolored; blood in urine
Percutaneous

Rabbit; female; LD50 = 5.66 (2.66 - 12.00) g/kg; 24 h occluded.

**Major Signs:** sluggishness, labored breathing, prostration, wetness or staining on perioral fur

**Gross Pathology:** lungs, liver, kidneys discolored; blood in urine

Inhalation

dynamic generation of vapor Rabbit; (1 h) = 8.0 mg/l; 35 °C.

**Mortality:** 0/6

**Major Signs:** None.

**Gross Pathology:** None.

IRRITATION

**Skin:** Rabbit; 4 h occluded

**Results:** minor to moderate erythema and minor edema with subsequent desquamation

**Eye:** Rabbit; 0.1 ml

**Results:** minor to severe corneal injury with vascularization and corneal deformation; iritis; severe corneal irritation with red discharge

**SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMANS**

In studies with rabbits sustained occluded skin contact of the undiluted surfactant can cause inflammatory changes in the lung.

12. ECOLOGICAL INFORMATION

12.1 ENVIRONMENTAL FATE

<table>
<thead>
<tr>
<th>BOD (% Oxygen consumption)</th>
<th>Day 5</th>
<th>Day 10</th>
<th>Day 15</th>
<th>Day 20</th>
<th>Day 28/30</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26 %</td>
<td>31 %</td>
<td>63 %</td>
<td>82 %</td>
<td></td>
</tr>
</tbody>
</table>
12.2 ECOTOXICITY

Toxicity to Micro-organisms
Bacterial/NA; 16 h; IC50
Result value: 770 mg/l

Toxicity to Micro-organisms
Bacterial/NA; 16 h; IC50
Result value: 220 mg/l

Toxicity to Micro-organisms
Bacterial/NA; 16 h; IC50
Result value: 490 mg/l

Toxicity to Aquatic Invertebrates
Daphnia; 48 h; LC50
Result value: (5 - 10) mg/l

Toxicity to Aquatic Invertebrates
Daphnia; 48 h; NOEC
Result value: 7.2 mg/l

Toxicity to Aquatic Invertebrates
Daphnia; 48 h; EC50
Result value: 12.3 (11.4 - 13.2) mg/l

Toxicity to Fish
Fathead Minnow; 96 h; LC50
Result value: 13.3 mg/l

Toxicity to Fish
Fathead Minnow; 96 h; NOEC
Result value: 7.7 mg/l

12.3 FURTHER INFORMATION

Theoretical Oxygen Demand (THOD) - measured: 2.31 mg/mg

13. DISPOSAL CONSIDERATIONS

13.1 DISPOSAL

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. DOW HAS 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 2 (Composition/ Information on Ingredients). FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: incinerator or other thermal destruction device. waste water treatment system. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details .

14. TRANSPORT INFORMATION

14.1 U.S. D.O.T.

NON-BULK
Proper Shipping Name : NOT REGULATED

BULK
Proper Shipping Name : NOT REGULATED
This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. 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

15.1 FEDERAL/NATIONAL

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980 (CERCLA) SECTION 103

This product contains the following substances subject to CERCLA Section 103 reporting requirements and are listed in 40 CFR Part 302.4.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene oxide</td>
<td>75-56-9</td>
<td>&lt;= 0.0010%</td>
</tr>
<tr>
<td>Ethylene oxide</td>
<td>75-21-8</td>
<td>&lt;= 0.0003%</td>
</tr>
</tbody>
</table>

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTION 302

This product contains the following substances subject to SARA Section 302 reporting requirements and are listed in 40 CFR Part 302.4.

None.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTION 313

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act 1986 and 40 CFR Part 372.

This product does not contain toxic chemicals at levels which require reporting under the statute.
SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTIONS 311 AND 312

- Delayed (Chronic) Health Hazard: Yes
- Fire Hazard: No
- Immediate (Acute) Health Hazard: Yes
- Reactive Hazard: No
- Sudden Release of Pressure Hazard: No

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements.

EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS)

The components of this product are on the EINECS inventory or are exempt from EINECS inventory requirements.

CEPA - DOMESTIC SUBSTANCES LIST (DSL)

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

15.2 STATE/LOCAL

PENNSYLVANIA (WORKER AND COMMUNITY RIGHT-TO-KNOW ACT)

The following product components are cited in the Pennsylvania Hazardous Substances List, the Pennsylvania Special Hazardous Substance List, and/or the Pennsylvania Environmental Hazardous Substance list, and are present at levels which require reporting. None.

MASSACHUSETTS (HAZARDOUS SUBSTANCES DISCLOSURE BY EMPLOYERS)
The following components of this product appear on the Massachusetts Substance List and are present at levels which could require identification in the MSDS:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene oxide</td>
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<td>&lt;= 0.0003%</td>
</tr>
</tbody>
</table>

CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

This product contains the following chemical(s) known to the State of California to cause cancer:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene oxide</td>
<td>75-56-9</td>
<td>&lt;= 0.0010%</td>
</tr>
</tbody>
</table>

CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

This product contains the following chemical(s) known to the State of California to cause cancer and birth defects or other reproductive harm:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene oxide</td>
<td>75-21-8</td>
<td>&lt;= 0.0003%</td>
</tr>
</tbody>
</table>

CALIFORNIA SCAQMD RULE 443.1 (SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 443.1, LABELING OF MATERIALS CONTAINING ORGANIC SOLVENTS)

VOC: Vapor pressure <0.01 mmHg at 20°C
0.00 g/l
0.00 g/l less water and less exempted compounds

This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.

16. OTHER INFORMATION

16.1 ADDITIONAL INFORMATION
ADDITIONAL INFORMATION: Additional product safety information on this product may be obtained by calling Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada).

16.2 HAZARD RATING SYSTEM

NFPA ratings for this product are:  H - 3  F - 1  R - 0

These ratings are part of a specific hazard communication program and should be disregarded where individuals are not trained in the use of this hazard rating system. You should be familiar with the hazard communication programs applicable to your workplace.

16.3 RECOMMENDED USES AND RESTRICTIONS

FOR INDUSTRY USE ONLY

16.4 REVISION

Version: 4.0
Revision: 02/14/2003
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

16.5 LEGEND

Bacterial/NA  Non Acclimated Bacteria
F            Fire
H            Health
IHG          Industrial Hygiene Guideline
N/A          Not available
NFPA         National Fire Protection Association
O            Oxidizer
R            Reactivity
TS           Trade secret
VOL/VOL      Volume/Volume
W            Water Reactive
W/W          Weight/Weight
NOTICE: Dow urges each customer or recipient of this MSDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this MSDS 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 its 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 Dow, 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 MSDSs, Dow is not and cannot be responsible for MSDSs obtained from any source other than Dow. If you have obtained a Dow MSDS from a non-Dow source or if you are not sure that a Dow MSDS is current, please contact Dow for the most current version.