SAFETY DATA SHEET

Zerex™ Extended Life Heavy Duty Formula RTU Antifreeze Coolant

ZXEDRU2


SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier
Trade name : Zerex™ Extended Life Heavy Duty Formula RTU Antifreeze Coolant

Relevant identified uses of the substance or mixture and uses advised against
Recommended use : ANTIFREEZE COOLANT

Details of the supplier of the safety data sheet
Valvoline LLC
100 Valvoline Way
Lexington, KY 40509
United States of America (USA)
1-800-TEAMVAL

Emergency telephone number
1-800-VALVOLINE (1-800-825-8654)

Regulatory Information Number
1-800-TEAMVAL

Product Information
1-800-TEAMVAL

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification
Acute toxicity (Oral) : Category 4
Specific target organ systemic toxicity - repeated exposure (Oral) : Category 2 (Kidney, Liver)

GHS label elements
Hazard pictograms :

Signal Word : Warning
Hazard Statements : Harmful if swallowed. May cause damage to organs (Kidney, Liver) through prolonged or repeated exposure if swallowed.
Precautionary Statements : Prevention:
Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.

Response:
IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
Get medical advice/attention if you feel unwell.

Disposal:
Dispose of contents/container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>CAS-No.</th>
<th>Classification</th>
<th>Concentration (%)</th>
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</thead>
<tbody>
<tr>
<td>ETHYLENE GLYCOL</td>
<td>107-21-1</td>
<td>Acute Tox. 4; H302</td>
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<td>STOT RE 2; H373</td>
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<tr>
<td>DIETHYLENE GLYCOL</td>
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<td>STOT RE 2; H373</td>
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<td>POTASSIUM HYDROXIDE</td>
<td>1310-58-3</td>
<td>Met. Corr. 1; H290</td>
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<td>Acute Tox. 4; H302</td>
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<td>Skin Corr. 1A; H314</td>
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<tr>
<td></td>
<td></td>
<td>Eye Dam. 1; H318</td>
<td></td>
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</tbody>
</table>

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Do not leave the victim unattended.

If inhaled : If breathed in, move person into fresh air.
If unconscious, place in recovery position and seek medical
advice.
If symptoms persist, call a physician.

In case of skin contact: First aid is not normally required. However, it is recommended that exposed areas be cleaned by washing with soap and water.

In case of eye contact: Flush eyes with water as a precaution.
Remove contact lenses.
Protect unharmed eye.
If eye irritation persists, consult a specialist.

If swallowed: Obtain medical attention.
Rinse mouth with water.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.

Most important symptoms and effects, both acute and delayed: Effects of acute ethylene glycol poisoning appear in three fairly distinct stages. The initial stage occurs shortly after exposure, lasts 6-12 hours, and is characterized by central nervous system effects (transient exhilaration, nausea, vomiting, and in severe cases, coma, convulsions, and possible death). The second stage lasts from 12-36 hours after exposure and is initiated by the onset of coma. This phase is characterized by tachypnea, tachycardia, mild hypotension, cyanosis, and in severe cases, pulmonary edema, bronchopneumonia, cardiac enlargement, and congestive failure. The final stage occurs 24-72 post-exposure and is characterized by renal failure, ranging from a mild increase in blood urea nitrogen and creatinine followed by recovery, to complete anuria with acute tubular necrosis that can lead to death. Oxaluria is found in most cases. The most significant laboratory finding in ethylene glycol intoxication is severe metabolic acidosis.

Signs and symptoms of exposure to this material through breathing, swallowing, and/or passage of the material through the skin may include:
stomach or intestinal upset (nausea, vomiting, diarrhea)
irritation (nose, throat, airways)
Cough
pain in the abdomen and lower back
cyanosis (causes blue coloring of the skin and nails from lack of oxygen)
lung edema (fluid buildup in the lung tissue)
acute kidney failure (sudden slowing or stopping of urine production)
Convulsions
Harmful if swallowed.
Notes to physician: This product contains ethylene glycol. Ethanol decreases the metabolism of ethylene glycol to toxic metabolites. Ethanol should be administered as soon as possible in cases of severe poisoning since the elimination half-life of ethylene glycol is 3 hours. If medical care will be delayed several hours, give the patient three to four 1-ounce oral "shots" of 86-proof or higher whiskey before or during transport to the hospital. Fomepizole (4-methylpyrazole) is an effective antagonist of alcohol dehydrogenase, and as such, may be used as an antidote in the treatment of ethylene glycol poisoning. Hemodialysis effectively removes ethylene glycol and its metabolites from the body.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media: Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
- Water spray
- Foam
- Carbon dioxide (CO2)
- Dry chemical

Unsuitable extinguishing media: High volume water jet

Specific hazards during firefighting: Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous combustion products: Alcohols, Aldehydes, carbon dioxide and carbon monoxide, ethers, toxic fumes, Hydrocarbons, potassium oxide

Specific extinguishing methods: Product is compatible with standard fire-fighting agents.

Further information: Standard procedure for chemical fires.

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus.
SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed.

Environmental precautions:
Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
If the product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up:
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Keep in suitable, closed containers for disposal.

Other information:
Comply with all applicable federal, state, and local regulations.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling:
Do not breathe vapours/dust.
Do not smoke.
Container hazardous when empty.
Smoking, eating and drinking should be prohibited in the application area.
For personal protection see section 8.
Dispose of rinse water in accordance with local and national regulations.

Conditions for safe storage:
Keep container tightly closed in a dry and well-ventilated place.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters / Permissible concentration</th>
<th>Basis</th>
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</thead>
<tbody>
<tr>
<td>ETHYLENE GLYCOL</td>
<td>107-21-1</td>
<td>C</td>
<td>100 mg/m³ Aerosol only</td>
<td>ACGIH</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>50 ppm 125 mg/m³</td>
<td>OSHA P0</td>
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<tr>
<td></td>
<td></td>
<td>C</td>
<td>40 ppm 100 mg/m³</td>
<td>CAL PEL</td>
</tr>
</tbody>
</table>
Engineering measures: Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below exposure guidelines (if applicable) or below levels that cause known, suspected or apparent adverse effects.

Personal protective equipment

Hand protection

Remarks: The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection: Not required under normal conditions of use. Wear splash-proof safety goggles if material could be misted or splashed into eyes.

Skin and body protection: Wear resistant gloves (consult your safety equipment supplier). Wear as appropriate:
- Impervious clothing
- Safety shoes
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures: Wash hands before breaks and at the end of workday. When using do not eat or drink. When using do not smoke.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: liquid

Colour: dark orange

Odour: No data available

Odour Threshold: No data available

pH: 8 - 10

Melting point/freezing point: < -33 °F / < -36 °C

Boiling point/boiling range: 225 °F / 107 °C
### Flash point
- Value: > 250.00 °F / > 121.11 °C

### Evaporation rate
- Value: No data available

### Flammability (solid, gas)
- Value: No data available

### Upper explosion limit
- Value: 15.3 %(V)

### Lower explosion limit
- Value: 1 %(V)

### Vapour pressure
- Value: 23.3333333 hPa (20 °C)
  - Notes: Calculated Vapor Pressure

### Relative vapour density
- Value: No data available

### Relative density
- Value: 1.0745 (15.6 °C)

### Density
- Value: 1.0745 g/cm³ (15.6 °C)

### Solubility(ies)
- **Water solubility**: No data available

### Solubility in other solvents
- Value: No data available

### Partition coefficient: n-octanol/water
- Value: No data available

### Thermal decomposition
- Value: No data available

### Viscosity
- **Viscosity, dynamic**: No data available

### Oxidizing properties
- Value: No data available

### SECTION 10. STABILITY AND REACTIVITY

#### Reactivity
- Value: No decomposition if stored and applied as directed.

#### Chemical stability
- Value: Stable under recommended storage conditions.

#### Possibility of hazardous reactions
- Value: Product will not undergo hazardous polymerization.

#### Conditions to avoid
- Value: Keep away from heat, flame, sparks and other ignition
Incompatible materials:

- Acids
- Alcohols
- Aldehydes
- Alkali metals
- Alkaline earth metals
- Amines
- Bases
- Chlorinated solvents
- Halogenated hydrocarbons
- Strong alkalis
- Strong oxidizing agents
- Sulphur compounds
- Zinc

Hazardous decomposition products:

- Alcohols
- Aldehydes
- Carbon dioxide and carbon monoxide
- Ethers
- Hydrocarbons
- Organic acids
- Potassium oxide
- Ketones

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure:

- Inhalation
- Skin contact
Eye Contact
Ingestion

**Acute toxicity**
Harmful if swallowed.

**Product:**

Acute oral toxicity
Remarks: Ingestion of medications contaminated with diethylene glycol has caused kidney failure and death in humans. Products containing diethylene glycol should be considered toxic by ingestion.

Acute dermal toxicity
Remarks: Skin absorption of this material (or a component) may be increased through injured skin.

**Components:**

**ETHYLENE GLYCOL:**
Acute oral toxicity: LD0 (Human): Estimated 1.56 g/kg
Assessment: The component/mixture is classified as acute oral toxicity, category 4.

Acute inhalation toxicity: LC50 (Rat): 10.9 mg/l
Exposure time: 1 h
Test atmosphere: dust/mist
Assessment: No adverse effect has been observed in acute inhalation toxicity tests.

Acute dermal toxicity: LD50 (Rabbit): 9,530 mg/kg

**DIETHYLENE GLYCOL:**
Acute oral toxicity: LD50 (Human): Expected 1,120 mg/kg
Target Organs: Kidney

Acute inhalation toxicity: LC50 (Rat): > 4.6 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Assessment: No adverse effect has been observed in acute inhalation toxicity tests.

Acute dermal toxicity: LD50 (Rabbit): 13,300 mg/kg

**POTASSIUM HYDROXIDE:**
Acute oral toxicity: LD50 (Rat): 333 mg/kg

**Skin corrosion/irritation**
Not classified based on available information.
Product:
Result: No skin irritation
Remarks: Expected based on components.

Components:
ETHYLENE GLYCOL:
Species: Rabbit
Result: No skin irritation

DIETHYLENE GLYCOL:
Species: Human
Result: Slight, transient irritation

POTASSIUM HYDROXIDE:
Species: Rabbit
Result: Corrosive after 3 minutes or less of exposure

Serious eye damage/eye irritation
Not classified based on available information.
Product:
Result: No eye irritation
Remarks: Expected based on components.

Remarks: Unlikely to cause eye irritation or injury.

Components:
ETHYLENE GLYCOL:
Result: Slight, transient irritation

DIETHYLENE GLYCOL:
Species: Rabbit
Result: Slight, transient irritation

POTASSIUM HYDROXIDE:
Species: Rabbit
Result: Corrosive

Respiratory or skin sensitisation
Skin sensitisation: Not classified based on available information.
Respiratory sensitisation: Not classified based on available information.
Components:
ETHYLENE GLYCOL:
Test Type: Maximisation Test
Species: Guinea pig
Assessment: Does not cause skin sensitisation.

DIETHYLENE GLYCOL:
Test Type: Maximisation Test
Species: Guinea pig
Result: Did not cause sensitisation on laboratory animals.

POTASSIUM HYDROXIDE:
Test Type: Maximisation Test
Species: Guinea pig
Assessment: Does not cause skin sensitisation.

Germ cell mutagenicity
Not classified based on available information.

Components:
ETHYLENE GLYCOL:
Genotoxicity in vitro: Test Type: Ames test
Test species: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: negative

DIETHYLENE GLYCOL:
Genotoxicity in vitro: Test Type: Ames test
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

Genotoxicity in vivo: Test species: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative
GLP: yes

Carcinogenicity
Not classified based on available information.
Reproductive toxicity
Not classified based on available information.
STOT - single exposure
Not classified based on available information.
STOT - repeated exposure
Not classified based on available information.
Components:
ETHYLENE GLYCOL:
Exposure routes: Ingestion
Target Organs: Kidney, Liver
Assessment: May cause damage to organs through prolonged or repeated exposure.
SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

**Product:**
Ecotoxicology Assessment
Acute aquatic toxicity : Not classified based on available information.
Chronic aquatic toxicity : Not classified based on available information.

**Components:**
ETHYLENE GLYCOL:
Toxicity to fish : LC50 (Lepomis macrochirus (Bluegill sunfish)): 27,540 mg/l
Exposure time: 96 h
Test Type: static test

LC50 (Pimephales promelas (fathead minnow)): 8,050 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): > 10,000 mg/l
Exposure time: 48 h
Test Type: static test

Toxicity to algae : EC50 (Pseudokirchneriella subcapitata (green algae)): 6,500 - 13,000 mg/l
End point: Growth inhibition
**Exposure time:** 7 Days

**Toxicity to fish (Chronic toxicity):**
- NOEC (Pimephales promelas (fathead minnow)): 32,000 mg/l
  - Exposure time: 7 d

**Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity):**
- NOEC (Daphnia magna (Water flea)): 24,000 mg/l
  - Exposure time: 7 d

**DIETHYLENE GLYCOL:**
- **Toxicity to fish:**
  - LC50 (Fathead minnow (Pimephales promelas)): 75,210 mg/l
    - Exposure time: 96 h
    - Test Type: flow-through test

- **Toxicity to daphnia and other aquatic invertebrates:**
  - LC50 (Water flea (Daphnia magna)): > 10,000 mg/l
    - Exposure time: 24 h
    - Test Type: static test
    - Method: DIN 38412

**POTASSIUM HYDROXIDE:**
- **Toxicity to fish:**
  - LC50 (Gambusia affinis (Mosquito fish)): 80 mg/l
    - Exposure time: 96 h
    - Test Type: static test

**Ecotoxicology Assessment**
- Chronic aquatic toxicity: Not expected to cause long-term toxicity to fish., Not expected to cause long-term toxicity to aquatic invertebrates., Not expected to cause long-term toxicity to aquatic plants.

**Persistence and degradability**

**Components:**

**ETHYLENE GLYCOL:**
- Biodegradability: Result: Readily biodegradable.
  - Biodegradation: 90 - 100 %
  - Exposure time: 10 d
  - Method: OECD Test Guideline 301

**DIETHYLENE GLYCOL:**
- Biodegradability: Result: Readily biodegradable.
  - Biodegradation: 70 - 80 %
  - Exposure time: 28 d
  - Method: OECD Test Guideline 301B

**POTASSIUM HYDROXIDE:**
- Biodegradability: Result: The methods for determining biodegradability are not applicable to inorganic substances.

**Bioaccumulative potential**

**Components:**
ETHYLENE GLYCOL:
Bioaccumulation: Species: Crayfish (Procambarus)
Bioconcentration factor (BCF): 0.27
Exposure time: 61 d
Concentration: 1000 mg/l
Method: Flow through
Partition coefficient: n-octanol/water: log Pow: -1.36

DIETHYLENE GLYCOL:
Bioaccumulation: Species: Leuciscus idus (Golden orfe)
Bioconcentration factor (BCF): 100
Partition coefficient: n-octanol/water: log Pow: -1.47

No data available
Mobility in soil
Components: No data available
Other adverse effects No data available
Product: Additional ecological information: No data available
Components: POTASSIUM HYDROXIDE: Additional ecological information: No data available

SECTION 13. DISPOSAL CONSIDERATIONS
Disposal methods
General advice: Do not dispose of waste into sewer.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Send to a licensed waste management company.
Dispose of in accordance with all applicable local, state and federal regulations.

Contaminated packaging: Empty remaining contents.
Dispose of as unused product.
Empty containers should be taken to an approved waste handling site for recycling or disposal.
Do not re-use empty containers.

SECTION 14. TRANSPORT INFORMATION

International transport regulations

<table>
<thead>
<tr>
<th>REGULATION</th>
<th>ID NUMBER</th>
<th>PROPER SHIPPING NAME</th>
<th>HAZARD CLASS</th>
<th>SUBSIDIARY HAZARDS</th>
<th>PACKING GROUP</th>
<th>MARINE POLLUTANT / LTD. QTY.</th>
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<tbody>
<tr>
<td>U.S. DOT - ROAD</td>
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<td>INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER</td>
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<td>MX_DG</td>
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</tbody>
</table>
Not dangerous goods

*ORM = ORM-D, CBL = COMBUSTIBLE LIQUID

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
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<tbody>
<tr>
<td>ETHYLENE GLYCOL</td>
<td>107-21-1</td>
<td>5000</td>
<td>10203</td>
</tr>
</tbody>
</table>

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards: Chronic Health Hazard
: Acute Health Hazard

SARA 313

California Prop 65: This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

The components of this product are reported in the following inventories:
- DSL: All components of this product are on the Canadian DSL
- AICS: On the inventory, or in compliance with the inventory
- ENCS: Not in compliance with the inventory
- KECI: On the inventory, or in compliance with the inventory
- PICCS: On the inventory, or in compliance with the inventory
- IECSC: On the inventory, or in compliance with the inventory
- TSCA: On TSCA Inventory

Inventories
SECTION 16. OTHER INFORMATION

Further information
Revision Date: 05/22/2017

<table>
<thead>
<tr>
<th>NFPA: Flammability</th>
<th>HMIS III:</th>
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<td>Health 1 0 1</td>
<td>HEALTH 1*</td>
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<tr>
<td>Flammability</td>
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<tr>
<td>Instability</td>
<td>PHYSICAL HAZARD 0</td>
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<tr>
<td>Special hazard.</td>
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**NFPA Flammable and Combustible Liquids Classification**
Combustible Liquid Class IIIB

**Full text of H-Statements**

- **H290**: May be corrosive to metals.
- **H302**: Harmful if swallowed.
- **H314**: Causes severe skin burns and eye damage.
- **H318**: Causes serious eye damage.
- **H373**: May cause damage to organs through prolonged or repeated exposure if swallowed.

**Sources of key data used to compile the Safety Data Sheet**
Valvoline internal data including own and sponsored test reports
The UNECE administers regional agreements implementing harmonised classification for labelling (GHS) and transport.

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with the company or not. Recipients are advised to confirm in advance of need that the
information is current, applicable, and suitable to their circumstances. This SDS has been prepared by Valvoline's Environmental Health and Safety Department (1-800-VALVOLINE).

List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet:
- ACGIH: American Conference of Industrial Hygienists
- BEI: Biological Exposure Index
- CAS: Chemical Abstracts Service (Division of the American Chemical Society)
- CMR: Carcinogenic, Mutagenic or Toxic for Reproduction
- FG: Food grade
- GHS: Globally Harmonized System of Classification and Labeling of Chemicals.
- H-statement: Hazard Statement
- IATA: International Air Transport Association.
- IATA-DGR: Dangerous Goods Regulation by the “International Air Transport Association” (IATA).
- ICAO: International Civil Aviation Organization
- ICAO-TI (ICAO): Technical Instructions by the “International Civil Aviation Organization”
- IMDG: International Maritime Code for Dangerous Goods
- ISO: International Organization for Standardization
- logPow: octanol-water partition coefficient
- LCxx: Lethal Concentration, for xx percent of test population
- LDxx: Lethal Dose, for xx percent of test population.
- ICxx: Inhibitory Concentration for xx of a substance
- Ecxx: Effective Concentration of xx
- N.O.S.: Not Otherwise Specified
- OECD: Organization for Economic Co-operation and Development
- OEL: Occupational Exposure Limit
- P-Statement: Precautionary Statement
- PBT: Persistent, Bioaccumulative and Toxic
- PPE: Personal Protective Equipment
- STEL: Short-term exposure limit
- STOT: Specific Target Organ Toxicity
- TLV: Threshold Limit Value
- TWA: Time-weighted average
- vPvB: Very Persistent and Very Bioaccumulative
- WEL: Workplace Exposure Level

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act
DOT: Department of Transportation
FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act
HMIRC: Hazardous Materials Information Review Commission
HMIS: Hazardous Materials Identification System
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Safety and Health Administration
PMRA: Health Canada Pest Management Regulatory Agency
RTK: Right to Know
WHMIS: Workplace Hazardous Materials Information System
<table>
<thead>
<tr>
<th>SAFETY DATA SHEET</th>
<th>Revision Date: 05/22/2017</th>
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<tr>
<td></td>
<td>Print Date: 6/2/2017</td>
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<tr>
<td>Zerex™ Extended Life Heavy Duty Formula RTU Antifreeze Coolant</td>
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