

		Page: 1
SAFETY DATA SHEET		Revision Date: 05/22/2017
		Print Date: 6/2/2017
		SDS Number: R0382102
Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant		Version: 1.3
ZXELRU1		

29 CFR 1910.1200 (OSHA HazCom 2012)

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product identifier

Trade name : Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

Relevant identified uses of the substance or mixture and uses advised against

Recommended use : Industrial chemical

<p>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</p>	<p>Emergency telephone number 1-800-VALVOLINE (1-800-825-8654)</p> <p>Regulatory Information Number 1-800-TEAMVAL</p> <p>Product Information 1-800-TEAMVAL</p>
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SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral) : Category 4

Reproductive toxicity : Category 2

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.
Suspected of damaging the unborn child.
May cause damage to organs (Kidney, Liver) through prolonged or repeated exposure if swallowed.

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

Version: 1.3

ZXELRU1

Precautionary Statements**: Prevention:**

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product.

Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.

IF exposed or concerned: Get medical advice/ attention.

Storage:

Store locked up.

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

Chemical name	CAS-No.	Classification	Concentration (%)
ETHYLENE GLYCOL	107-21-1	Acute Tox. 4; H302 STOT RE 2; H373	47.725
DIETHYLENE GLYCOL	111-46-6	Acute Tox. 4; H302 STOT RE 2; H373	2.3855
POTASSIUM 2-ETHYLHEXANOATE	3164-85-0	Skin Irrit. 2; H315 Repr. 2; H361d	1.91

SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.



SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

ZXELRU1

Call a POISON CENTRE or doctor/physician if exposed or you feel unwell.
 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 : Remove contaminated clothing. If irritation develops, get medical attention.
 If on skin, rinse well with water.
 Wash contaminated clothing before re-use.
- 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



SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

ZXELRU1

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.
 Suspected of damaging the unborn child.

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
 acetaldehyde
 formaldehyde-like
 potassium oxide

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

ZXELRU1

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

Further information : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

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 : Use personal protective equipment.
Ensure adequate ventilation.
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.
Avoid contact with skin and eyes.
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.
Observe label precautions.

SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

Version: 1.3

ZXELRU1

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
ETHYLENE GLYCOL	107-21-1	C	100 mg/m3 Aerosol only	ACGIH
		C	50 ppm 125 mg/m3	OSHA P0
		C	40 ppm 100 mg/m3 Vapour	CAL PEL
DIETHYLENE GLYCOL	111-46-6	TWA	10 mg/m3	US WEEL

Hazardous components without workplace control parameters

Components	CAS-No.

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

Respiratory protection : A NIOSH-approved air-purifying respirator with an appropriate cartridge and/or filter may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits (if applicable) or if overexposure has otherwise been determined. Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are not known or any other circumstances where an air-purifying respirator may not provide adequate protection.

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

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

ZXELRU1

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 : orange

Odour : No data available

Odour Threshold : No data available

pH : Average 10.5

Melting point/freezing point : -34 °F / -37 °C

Boiling point/boiling range : 226 °F / 108 °C
(1013.33 hPa)

Flash point : > 250.00 °F / > 121.11 °C

Evaporation rate : No data available

Flammability (solid, gas) : No data available

Upper explosion limit : 15.3 %(V)
Calculated Explosive Limit

Lower explosion limit : 1.2 %(V)
Calculated Explosive Limit

Vapour pressure : 23.3333333 hPa (20 °C)
Calculated Vapor Pressure

Relative vapour density : No data available

Relative density : 1.0700 (60.00 °F)

Density : 1.0700 g/cm³ (60.00 °F)

Solubility(ies)
Water solubility : No data available

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

ZXELRU1

Solubility in other solvents : No data available

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

Thermal decomposition : No data available

Viscosity
Viscosity, dynamic : No data available

Viscosity, kinematic : No data available

Oxidizing properties : No data available

SECTION 10. STABILITY AND REACTIVITY

Reactivity : No decomposition if stored and applied as directed.

Chemical stability : Stable under recommended storage conditions.

Possibility of hazardous reactions : Product will not undergo hazardous polymerization.

Conditions to avoid : excessive heat

Incompatible materials : Acids
Aldehydes
Alkali metals
Alkaline earth metals
Bases
strong alkalis
Strong oxidizing agents
Sulphur compounds

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 : Inhalation

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

Version: 1.3

ZXELRU1

exposure

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 2-ETHYLHEXANOATE:

Acute oral toxicity

: LD50 (Rat): 3,640 mg/kg
Remarks: Information given is based on data obtained from similar substances.

SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

ZXELRU1

Acute inhalation toxicity : LC50 (Rat): > 0.11 mg/l
Exposure time: 8 h
Test atmosphere: dust/mist
Assessment: Not classified as acutely toxic by inhalation under GHS.
Remarks: No mortality observed at this dose.
Information given is based on data obtained from similar substances.

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Assessment: Not classified as acutely toxic by dermal absorption under GHS.
Remarks: Information given is based on data obtained from similar substances.

Skin corrosion/irritation

Not classified based on available information.

Components:

ETHYLENE GLYCOL:

Species: Rabbit

Result: No skin irritation

DIETHYLENE GLYCOL:

Species: Human

Result: Slight, transient irritation

POTASSIUM 2-ETHYLHEXANOATE:

Species: Rabbit

Method: OECD Test Guideline 404

Result: Irritating to skin.

GLP: yes

Serious eye damage/eye irritation

Not classified based on available information.

Product:

Remarks: Vapours may cause irritation to the eyes, respiratory system and the skin.

Components:

ETHYLENE GLYCOL:

Result: Slight, transient irritation

DIETHYLENE GLYCOL:

Species: Rabbit

Result: Slight, transient irritation

POTASSIUM 2-ETHYLHEXANOATE:

Result: Slight, transient irritation

Respiratory or skin sensitisation

SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

Version: 1.3

ZXELRU1

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

Method: Directive 67/548/EEC, Annex V, B.6.

Result: Did not cause sensitisation on laboratory animals.

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

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

Genotoxicity in vivo : Test Type: In vivo micronucleus test
 Test species: Mouse
 Method: OECD Test Guideline 474
 Result: negative
 GLP: yes

Carcinogenicity

Not classified based on available information.

Reproductive toxicity

Suspected of damaging the unborn child.

Components:

POTASSIUM 2-ETHYLHEXANOATE:

Reproductive toxicity - : Some evidence of adverse effects on development, based on

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

Version: 1.3

ZXELRU1

Assessment animal experiments.

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.

DIETHYLENE GLYCOL:

Exposure routes: Ingestion

Target Organs: Kidney

Assessment: May cause damage to organs through prolonged or repeated exposure.

Aspiration toxicity

Not classified based on available information.

Product:

No aspiration toxicity classification

Experience with human exposure**Components:**

DIETHYLENE GLYCOL:

Liver

Further information**Product:**

Remarks: No data available

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 : LC50 (Daphnia magna (Water flea)): > 10,000 mg/l

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

ZXELRU1

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 2-ETHYLHEXANOATE:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 99 %
Exposure time: 28 d
Remarks: Information given is based on data obtained from similar substances.

No data available

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



SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

ZXELRU1

Components:

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

General advice : Dispose of in accordance with all applicable local, state and federal regulations.

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.

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

REGULATION

ID NUMBER	PROPER SHIPPING NAME	*HAZARD CLASS	SUBSIDIARY HAZARDS	PACKING GROUP	MARINE POLLUTANT / LTD. QTY.

U.S. DOT - ROAD

Not dangerous goods

CFR_RAIL_C

Not dangerous goods

U.S. DOT - INLAND WATERWAYS

Not dangerous goods

TDG_ROAD_C

Not dangerous goods

TDG_RAIL_C

Not dangerous goods



SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

Version: 1.3

ZXELRU1

TDG_INWT_C

Not dangerous goods

INTERNATIONAL MARITIME DANGEROUS GOODS

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

Not dangerous goods

MX_DG

Not dangerous goods

*ORM = ORM-D, CBL = COMBUSTIBLE LIQUID

Marine pollutant	no
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Dangerous goods descriptions (if indicated above) may not reflect quantity, end-use or region-specific exceptions that can be applied. Consult shipping documents for descriptions that are specific to the shipment.

SECTION 15. REGULATORY INFORMATION

**EPCRA - Emergency Planning and Community Right-to-Know Act
CERCLA Reportable Quantity**

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
ETHYLENE GLYCOL	107-21-1	5000	10477

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

ETHYLENE GLYCOL 107-21-1 47.72 %

SAFETY DATA SHEET

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant

Version: 1.3

ZXELRU1

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 : This product contains one or several components that are not on the Canadian DSL and have annual quantity limits.

AICS : Not in compliance with the inventory

ENCS : Not in compliance with the inventory

KECI : Not in compliance with the inventory

PICCS : Not in compliance with the inventory

IECSC : On the inventory, or in compliance with the inventory

TSCA : On TSCA Inventory

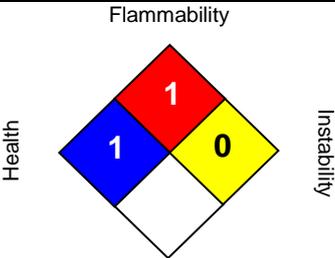
Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information

Revision Date: 05/22/2017

NFPA:	HMIS III:						
 <p>Flammability</p> <p>Health</p> <p>Instability</p> <p>Special hazard.</p>	<table border="1"> <tr> <td data-bbox="853 1545 1212 1612">HEALTH</td> <td data-bbox="1212 1545 1332 1612">1*</td> </tr> <tr> <td data-bbox="853 1612 1212 1680">FLAMMABILITY</td> <td data-bbox="1212 1612 1332 1680">1</td> </tr> <tr> <td data-bbox="853 1680 1212 1747">PHYSICAL HAZARD</td> <td data-bbox="1212 1680 1332 1747">0</td> </tr> </table> <p>0 = not significant, 1 = Slight, 2 = Moderate, 3 = High 4 = Extreme, * = Chronic</p>	HEALTH	1*	FLAMMABILITY	1	PHYSICAL HAZARD	0
HEALTH	1*						
FLAMMABILITY	1						
PHYSICAL HAZARD	0						

NFPA Flammable and Combustible Liquids Classification

Combustible Liquid Class IIIB

Full text of H-Statements

**SAFETY DATA SHEET**

Revision Date: 05/22/2017

Print Date: 6/2/2017

SDS Number: R0382102

Version: 1.3

Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze
Coolant

ZXELRU1

H302	Harmful if swallowed.
H315	Causes skin irritation.
H361d	Suspected of damaging the unborn child.
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

	Page: 19
SAFETY DATA SHEET	Revision Date: 05/22/2017
	Print Date: 6/2/2017
	SDS Number: R0382102
Zerex™ DEX-COOL® Orange OAT Formula RTU Antifreeze Coolant ZXELRU1	Version: 1.3

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