1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Zerex™ G-05 Antlfreeze
Product code	:	377726
Company	:	Ashland United States of America Columbus, OH 43216 P.O. Box 2219
E-mail address	:	EHS Customer Requests@ashland.com
Telephone	:	614-790-3333
Telefax	:	
Emergency telephone number	:	1-800-ASHLAND (1-800-274-5263)

2. HAZARDS IDENTIFICATION

GHS Classification

Acute toxicity (Oral)	:	Category 4
Reproductive toxicity	:	Category 1B
Specific target organ toxicity - repeated exposure (Oral)	:	Category 2 (Kidney, Liver)
Acute aquatic toxicity	:	Category 3

GHS-Labelling

Hazard pictograms :

Signal word : Danger

Hazard statements : H302 Harmful if swallowed.
H360FD May damage fertility. May damage the unborn child.
H373 May cause damage to organs (Kidney, Liver) through prolonged or repeated exposure if swallowed.
H402 Harmful to aquatic life.

Precautionary statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P330 Rinse mouth.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous components

Chemical Name	CAS-No.	Concentration
ETHYLENE GLYCOL	107-21-1	>=60 - <=100 %
DIETHYLENE GLYCOL	111-46-6	>=1 - <5 %
SODIUM BENZOATE	532-32-1	>=1 - <5 %
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	>=1 - <5 %
SODIUM NITRITE	7632-00-0	>=0.1 - <1 %

4. FIRST AID MEASURES

General advice : Consult a physician.
Show this safety data sheet to the doctor in attendance.

First aid measures for different exposure routes

In case of eye contact : Flush eyes with water at least 15 minutes. Get medical attention if eye irritation develops or persists.
Remove contact lenses.

In case of skin contact : Take off contaminated clothing and shoes immediately.
Wash off immediately with plenty of water.

If inhaled : Move to fresh air.
Consult a physician after significant exposure.
If symptoms persist, call a physician.
In case of shortness of breath, give oxygen.

If swallowed : Do not induce vomiting without medical advice.
Never give anything by mouth to an unconscious person.
Consult a physician if necessary.

Most important symptoms and effects, both acute and delayed (new) : 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
central nervous system excitation (giddiness, liveliness, light-headed feeling) followed by central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness) and other central nervous system effects
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)
liver damage
Convulsions
coma

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 tachypnia, 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.
Ingestion or other significant exposure to this material (or a component) may cause metabolic acidosis.

Notes to physician (new) :

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.
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, diethylene glycol and methanol poisoning.

5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	ABC powder Carbon dioxide (CO2) Dry chemical Water mist
Unsuitable extinguishing media	:	Halons
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 Hydrocarbons Sodium oxides toxic fumes
Specific extinguishing methods	:	Keep containers and surroundings cool with water spray. Prevent fire extinguishing water from contaminating surface water or the ground water system. 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. Use personal protective equipment.

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 further leakage or spillage if safe to do so.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Large spills should be collected mechanically (remove by

pumping) for disposal.
Keep in suitable, closed containers for disposal.

Additional advice : Comply with all applicable federal, state, and local regulations.

7. HANDLING AND STORAGE

Handling

Technical measures : Normal measures for preventive fire protection.

Advice on safe handling : Do not breathe vapours or spray mist.
For personal protection see section 8.
Provide sufficient air exchange and/or exhaust in work rooms.
Avoid exceeding of the given occupational exposure limits (see section 8).
Smoking, eating and drinking should be prohibited in the application area.

Avoidance of contact : Acids
Aldehydes
Alkali metals
Alkaline earth metals
Bases
iron salts
strong alkalis
Strong oxidizing agents
Sulphur compounds

Storage

Conditions for safe storage : Store in original container.
Keep containers tightly closed in a dry, cool and well-ventilated place.

Materials to avoid : Acids, Aldehydes, Alkali metals, Alkaline earth metals, Bases, iron salts, strong alkalis, Strong oxidizing agents, Sulphur compounds

Other data : Stable under recommended storage conditions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value (Form of exposure)	Control parameters / Permissible concentration	Basis
ETHYLENE GLYCOL	107-21-1	Ceiling (Aerosol.)	100 mg/m3	UY OEL
ETHYLENE GLYCOL	107-21-1	Ceiling	100 mg/m3	PY OEL

		(Aerosol.)		
ETHYLENE GLYCOL	107-21-1	Ceiling (Aerosol.)	100 mg/m3	EC OEL
ETHYLENE GLYCOL	107-21-1	Ceiling (Aerosol.)	100 mg/m3	CR OEL
ETHYLENE GLYCOL	107-21-1	(Aerosol.)		CR OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	TWA (Inhalable fraction.)	2 mg/m3	UY OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	STEL (Inhalable fraction.)	6 mg/m3	UY OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	TWA (Inhalable fraction.)	2 mg/m3	PY OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	STEL (Inhalable fraction.)	6 mg/m3	PY OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	TWA (Inhalable fraction.)	2 mg/m3	EC OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	STEL (Inhalable fraction.)	6 mg/m3	EC OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	TWA (Inhalable fraction.)	2 mg/m3	CR OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	STEL (Inhalable fraction.)	6 mg/m3	CR OEL
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	(Inhalable fraction.)		CR OEL

US. ACGIH Threshold Limit Values

Components	CAS-No.	Value (Form of exposure)	Control parameters / Permissible concentration	Basis
ETHYLENE GLYCOL	107-21-1	Ceiling (Aerosol.)	100 mg/m3	ACGIH
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	TWA (Inhalable fraction.)	2 mg/m3	ACGIH
DISODIUM TETRABORATE ANHYDROUS	1330-43-4	STEL (Inhalable fraction.)	6 mg/m3	ACGIH

Engineering measures : Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below level of overexposure (from known, suspected or apparent adverse effects).

Personal protective equipment

Respiratory protection : When workers are facing concentrations above the exposure limit

they must use appropriate certified respirators.

Eye protection	:	Safety glasses with side-shields
Hand protection	:	Wear resistant gloves such as:
Material	:	neoprene
		nitrile rubber
Skin and body protection	:	Wear as appropriate: Safety shoes
Hygiene measures	:	Keep away from food, drink and animal feedingstuffs. When using do not eat, drink or smoke. Ensure that eyewash stations and safety showers are close to the workstation location.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Colour	:	light yellow
Odour	:	mild
pH	:	Average 6.5
Freezing point	:	No data available
Boiling point	:	330 °F (1013 hPa)
Flash point	:	> 121.1 °C Method: Closed Cup
Evaporation rate	:	> 1 Ethyl Ether
Upper explosion limit	:	15.3 %(V)
Lower explosion limit	:	3.2 %(V)
Vapour pressure	:	1.1 mmHg (20 °C)
Relative vapour density	:	> 1AIR=1
Density	:	Average 1.1362 g/cm3 (15.56 °C)
Solubility(ies)		
Water solubility	:	No data available
Solubility in other solvents	:	No data available
Relative vapour density	:	> 1AIR=1

Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available
Thermal decomposition	:	No data available

10. STABILITY AND REACTIVITY

Possibility of hazardous reactions	:	No hazards to be specially mentioned. Hazardous polymerisation does not occur.
Conditions to avoid	:	None known.
Incompatible materials	:	Acids Aldehydes Alkali metals Alkaline earth metals Bases iron salts strong alkalis Strong oxidizing agents Sulphur compounds
Hazardous decomposition products	:	Alcohols Aldehydes carbon dioxide and carbon monoxide ethers Hydrocarbons Organic acids Sodium oxides toxic fumes ketones

11. TOXICOLOGICAL INFORMATION

Product

Acute oral toxicity	:	No data available
Acute inhalation toxicity	:	No data available
Acute dermal toxicity	:	No data available
Skin corrosion/irritation	:	No data available

Serious eye damage/eye irritation	:	No data available
Respiratory or skin sensitisation	:	No data available

Components:

ETHYLENE GLYCOL:

Acute oral toxicity	:	LD 50 Rat: 6,140 mg/kg LD50 Human: Estimated 1.56 g/kg The component/mixture is classified as acute oral toxicity, category 4.
Acute dermal toxicity	:	LD 50 Rabbit: 9,530 mg/kg
STOT - repeated exposure	:	Exposure routes: Ingestion Target Organs: Kidney, Liver Assessment: May cause damage to organs through prolonged or repeated exposure.

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 No adverse effect has been observed in acute inhalation toxicity tests.
Acute dermal toxicity	:	LD 50 Rabbit: 13,300 mg/kg
Respiratory or skin sensitisation	:	Test Method: Maximisation Test (GPMT) Species: guinea pig Result: Did not cause sensitisation on laboratory animals. Method: Directive 67/548/EEC, Annex V, B.6.

Germ cell mutagenicity

Genotoxicity in vitro	:	Type: Ames test with and without metabolic activation Result: negative Method: OECD Test Guideline 471 GLP: yes
	:	Test species: Chinese hamster ovary cells with and without metabolic activation Result: negative Method: OECD Test Guideline 479

		GLP: yes
Genotoxicity in vivo	:	Type: In vivo micronucleus test Test species: mouseMethod: OECD Test Guideline 474 GLP: yes Result: negative
STOT - repeated exposure	:	Exposure routes: Ingestion Target Organs: Kidney Assessment: May cause damage to organs through prolonged or repeated exposure.
Experience with human exposure	:	Liver

SODIUM BENZOATE:

Acute oral toxicity	:	LD 50 Rat, male and female: 3,450 mg/kg

DISODIUM TETRABORATE ANHYDROUS:

Acute dermal toxicity	:	LD 50 Rabbit: > 1,055 mg/kg

SODIUM NITRITE:

Acute oral toxicity	:	LD 50 Rat: 180 mg/kg
Acute inhalation toxicity	:	LC 50 Rat: 5.5 mg/l Exposure time: 4 h

12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

No data available

Components:

ETHYLENE GLYCOL:

Toxicity to fish	:	LC 50 (Bluegill (Lepomis macrochirus)): 27,540 mg/l Exposure time: 96 h Method: Static Mortality LC 50 (Fathead minnow (Pimephales promelas)): 8,050 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	LC 50 (Water flea (Daphnia magna)): > 10,000 mg/l Exposure time: 48 h Test Method: static test

DIETHYLENE GLYCOL:

Toxicity to fish	:	LC 50 (Fathead minnow (Pimephales promelas)): 75,210 mg/l Exposure time: 96 h Test Method: flow-through test
Toxicity to daphnia and other aquatic invertebrates	:	LC 50 (Water flea (Daphnia magna)): > 10,000 mg/l Exposure time: 24 h Test Method: static test Method: DIN 38412

SODIUM BENZOATE:

Toxicity to fish	:	LC 50 (Fathead minnow (Pimephales promelas)): > 100 mg/l Exposure time: 96 h Test Method: static test Method: Static Mortality
Toxicity to daphnia and other aquatic invertebrates	:	LC 50 (Water flea (Daphnia magna)): > 100 mg/l Exposure time: 96 h Test Method: static test Method: Static Mortality

SODIUM NITRITE:

Toxicity to fish	:	LC 50 (Oncorhynchus mykiss (rainbow trout)): 0.54 - 26.3 mg/l Exposure time: 96 h Test Method: flow-through test
Toxicity to daphnia and other aquatic invertebrates	:	EC 50 (Water flea (Daphnia magna)): 15.4 mg/l Exposure time: 48 h Test Method: static test Method: OECD Test Guideline 202
Toxicity to algae	:	EC 50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Test Method: Growth inhibition Method: OECD Test Guideline 201
Toxicity to bacteria	:	EC10 (activated sludge): 210 mg/l Exposure time: 3 h Test Method: Static Method: OECD Test Guideline 209
Toxicity to fish (Chronic toxicity)	:	NOEC: 6.16 mg/l Exposure time: 31 d Species: Ictalurus catus (catfish) Test Method: flow-through test
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 9.86 mg/l Exposure time: 80 d Species: Aquatic invertebrates Test Method: static test

Persistence and degradability

Product:

No data available

Components:

DIETHYLENE GLYCOL:

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

Bioaccumulative potential

Product:

No data available

Components:

ETHYLENE GLYCOL:

Bioaccumulation	:	Species: Crayfish (Procambarus) Exposure time: 61 d Concentration: 1000 mg/l Bioconcentration factor (BCF): 0.27 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

SODIUM NITRITE:

Partition coefficient: n-octanol/water	:	log Pow: -3.700 (25 °C)

Mobility in soil

Product:

No data available

Components:

ETHYLENE GLYCOL:

Surface tension	:	48.4 mN/m

DIETHYLENE GLYCOL:

Surface tension	:	48.5 mN/m

SODIUM NITRITE:

Stability in soil	:	Not expected to adsorb on soil.

Other adverse effects

Product:

Ozone-Depletion Potential : No data available

Components:

No data available

13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with the European Directives on waste and hazardous waste.

Do not contaminate ponds, waterways or ditches with chemical or used container.
Container hazardous when empty.
Dispose of in accordance with local 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.
Do not burn, or use a cutting torch on, the empty drum.

DISPOSAL CONSIDERATIONS

Dispose of in accordance with local regulations.

14. TRANSPORT INFORMATION

International transport regulations

REGULATION

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

INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

Not dangerous goods

INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

Not dangerous goods

INTERNATIONAL MARITIME DANGEROUS GOODS

Not dangerous goods

UN_DG

Not dangerous goods

***ORM = ORM-D, CBL = COMBUSTIBLE LIQUID**

Marine pollutant		no

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.

15. REGULATORY INFORMATION

Other international regulations

Notification status

US. Toxic Substances Control Act	:	y (positive listing)
Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL). (Can. Gaz. Part II, Vol. 133)	:	y (positive listing)
Australia. Industrial Chemical (Notification and Assessment) Act	:	y (positive listing)
Japan. ENCS - Existing and New Chemical Substances Inventory	:	n (Negative listing)
Korea. Toxic Chemical Control Law (TCCL) List	:	n (Negative listing)
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	:	y (positive listing)
China. Inventory of Existing Chemical Substances	:	y (positive listing)

16. OTHER INFORMATION

Further information

Other information : 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 MSDS has been prepared by Ashland's Environmental Health and Safety Department.

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