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1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: 578-2/578-3 ANTIFREEZE
SAP Material No: NP001
General or Generic ID: GLYCOL
Company Telephone Numbers
The Valvoline Company Emergency: 1-800-274-5263
P.O. Box 14000
Lexington, KY 40512 Information: 1-859-357-7206

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2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
ETHYLENE GLYCOL	107-21-1	90.0- 90.0
DIETHYLENE GLYCOL	111-46-6	1.0- 10.0
WATER	7732-18-5	1.0- 8.0
DIPOTASSIUM PHOSPHATE	7758-11-4	1.0- 7.0

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3. HAZARDS IDENTIFICATION

Potential Health Effects
Eye
May cause mild eye irritation.
Skin
May cause mild skin irritation. Although rare, skin contact with ethylene glycol may cause allergic skin reaction (delayed skin rash which may be followed by blistering, scaling and other skin effects). Passage through the skin may add to toxic effects from breathing or swallowing.

Swallowing
Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful.
Inhalation
Breathing of vapor or mist is possible.
Symptoms of Exposure
stomach or intestinal upset (nausea, vomiting, diarrhea), irritation (nose, throat, airways), 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, involuntary eye movement, kidney damage.

Target Organ Effects

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals, and may aggravate preexisting disorders of these organs in humans: kidney damage, Overexposure to this material components) has been suggested as a cause of the following effects in humans, and may aggravate preexisting disorders of these organs: central nervous system effects, liver abnormalities, kidney damage, liver damage.

Developmental Information

Ethylene glycol has caused birth defects in animal studies at high oral doses.

Cancer Information

No data

Other Health Effects

No data

Primary Route(s) of Entry

Skin absorption.

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4. FIRST AID MEASURES

Eyes

If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.

Skin

Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.

Swallowing

Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation

If symptoms develop, immediately move individual away from exposure and into fresh air. Seek immediate medical attention; keep person warm and quiet. If person is not breathing, begin artificial respiration. If breathing is difficult, administer oxygen.

Note to Physicians

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

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removes ethylene glycol and its metabolites from the body. 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.

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5. FIRE FIGHTING MEASURES

Flash Point
250.0 F (121.1 C)
Explosive Limit
(for component) Lower 3.2 Upper 15.3 %
Autoignition Temperature
No data
Hazardous Products of Combustion
May form: carbon dioxide and carbon monoxide, various hydrocarbons.
Fire and Explosion Hazards
Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.

Extinguishing Media
alcohol foam, carbon dioxide, dry chemical.
Fire Fighting Instructions
Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.
NFPA Rating
Health - 1, Flammability - 1, Reactivity - 0

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6. ACCIDENTAL RELEASE MEASURES
Small Spill
Absorb liquid on vermiculite, floor absorbent or other absorbent material.
Large Spill
Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid may be taken up on sand, clay, earth, floor absorbent, or other absorbent material and shoveled into containers.

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7. HANDLING AND STORAGE
Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.

Storage
Not applicable

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION
Eye Protection
Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.
Skin Protection
Wear resistant gloves such as: neoprene, nitrile rubber, polyvinyl chloride, To prevent repeated or prolonged skin contact, wear impervious clothing and boots.
Respiratory Protections
If workplace exposure limit(s) of product or any component is

exceeded (See Exposure Guidelines), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (consult your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.
Engineering Controls
Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).
Exposure Guidelines
Component

ETHYLENE GLYCOL (107-21-1)
OSHA VPEL 50.000 ppm - Ceiling
ACGIH TLV 100.000 mg/m3 - Ceiling as an aerosol
DIETHYLENE GLYCOL (111-46-6)
No exposure limits established
WATER (7732-18-5)
No exposure limits established

DIPOTASSIUM PHOSPHATE (7758-11-4)
No exposure limits established

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9. PHYSICAL AND CHEMICAL PROPERTIES
Boiling Point
(for product) 330.0 F (165.5 C) @ 760.00 mmHg
Vapor Pressure
(for product) 1.800 mmHg @ 68.00 F
Specific Vapor Density
No data
Specific Gravity
1.127 @ 60.00 F
Liquid Density
9.388 lbs/gal @ 60.00 F
1.127 kg/l @ 15.60 C
Percent Volatiles (Including Water)
No data
Evaporation Rate
No data
Appearance
No data
State
LIQUID

Physical Form
No data
Color
No data
Odor
No data
pH
10.2 - 11.2

10. STABILITY AND REACTIVITY

Hazardous Polymerization
Product will not undergo hazardous polymerization.
Hazardous Decomposition
May form: carbon dioxide and carbon monoxide, various hydrocarbons.
Chemical Stability
Stable.
Incompatibility
Avoid contact with: strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION

No data

12. ECOLOGICAL INFORMATION

No data

13. DISPOSAL CONSIDERATION

Waste Management Information
Destroy by liquid incineration. Dispose of in accordance with all applicable local, state and federal regulations.

14. TRANSPORT INFORMATION

DOT Information - 49 CFR 172.101
DOT Description:
Not Regulated
Container/Mode:
CASES/SURFACE - NO EXCEPTIONS
NOS Component:
None
RQ (Reportable Quantity) - 49 CFR 172.101

Product Quantity (lbs)	Component

5539 ETHYLENE GLYCOL

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15. REGULATORY INFORMATION
US Federal Regulations
TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed.

CERCLA RQ - 40 CFR 302.4

Component	Component
ETHYLENE GLYCOL	1

SARA 302 Components - 40 CFR 355 Appendix A
None
Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed(X) Fire( ) Reactive( ) Sudden Release of Pressure( )
SARA 313 Components - 40 CFR 372.65

Section 313 Component(s)	CAS Number
ETHYLENE GLYCOL	107-21-1

International Regulations
Inventory Status
DSL (CANADA) The intentional ingredients of this product are listed.
State and Local Regulations
California Proposition 65
None
New Jersey RTK Label Information
ETHYLENE GLYCOL 107-21-1
Pennsylvania RTK Label Information
1,2-ETHANEDIOL 107-21-1

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16. 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.

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Material Identity
Product Name: 578-2/578-3 ANTIFREEZE
SAP Material No: NP001
General or Generic ID: GLYCOL
Company Telephone Numbers
The Valvoline Company Emergency: 1-800-274-5263
P.O. Box 14000
Lexington, KY 40512 Information: 1-859-357-7206

2. COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient(s)	CAS Number	% (by weight)
ETHYLENE GLYCOL	107-21-1	90.0- 90.0
DIETHYLENE GLYCOL	111-46-6	1.0- 10.0
WATER	7732-18-5	1.0- 8.0
DIPOTASSIUM PHOSPHATE	7758-11-4	1.0- 7.0

3. HAZARDS IDENTIFICATION

Potential Health Effects
Eye
Can cause eye irritation.
Skin
May cause mild skin irritation. Although rare, skin contact with ethylene glycol may cause allergic skin reaction (delayed skin rash which may be followed by blistering, scaling and other skin effects). Passage of this material into the body through the skin is possible, but it is unlikely that this would result in harmful effects during safe handling and use.

Swallowing
Swallowing small amounts of this material during normal handling is not likely to cause harmful effects. Swallowing large amounts may be harmful. Liver, kidney and brain damage in humans has resulted from swallowing lethal or near-lethal amounts of ethylene glycol.
Inhalation
It is possible to breathe this material under certain conditions

of handling and use (for example, during heating, spraying, or stirring). Breathing small amounts of this material during normal handling is not likely to cause harmful effects. Symptoms usually occur at air concentrations higher than the recommended exposure limits (See Section 8).

Symptoms of Exposure

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, involuntary eye movement, 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), kidney damage, liver damage, convulsions, coma, and death.

Target Organ Effects

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals, and may aggravate preexisting disorders of these organs in humans: reproductive effects, liver damage, central nervous system damage, kidney damage, Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans, and may aggravate preexisting disorders of these organs: central nervous system effects, kidney damage, liver damage.

Developmental Information

This material (or a component) has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain. Ethylene glycol has caused birth defects in animal studies at high oral doses.

Cancer Information

Based on the available information, this material cannot be classified with regard to carcinogenicity. This material is not listed as a carcinogen by the International Agency for Research on Cancer, the National Toxicology Program, or the Occupational Safety and Health Administration.

Other Health Effects

No data

Primary Route(s) of Entry

Inhalation, Skin absorption, Skin contact, Eye contact, Ingestion.

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4. FIRST AID MEASURES
Eyes
If symptoms develop, immediately move individual away from exposure and into fresh air. Flush eyes gently with water for at least 15 minutes while holding eyelids apart; seek immediate medical attention.
Skin
Remove contaminated clothing. Wash exposed area with soap and water. If symptoms persist, seek medical attention. Launder clothing before reuse.
Swallowing
Seek medical attention. If individual is drowsy or unconscious, do not give anything by mouth; place individual on the left side with the head down. Contact a physician, medical facility, or poison control center for advice about whether to induce vomiting. If possible, do not leave individual unattended.

Inhalation
If symptoms develop, move individual away from exposure and into fresh air. If symptoms persist, seek medical attention. If breathing is difficult, administer oxygen. Keep person warm and quiet; seek immediate medical attention.
Note to Physicians
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. 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. Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: lung (for example, asthma-like conditions), liver, kidneys, central nervous system, Exposure to this material may aggravate any pre-existing condition sensitive to a decrease in available oxygen, such as chronic lung disease, coronary artery disease or anemias.

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5. FIRE FIGHTING MEASURES

Flash Point
250.0 F (121.1 C)

Explosive Limit
(for component) Lower 3.2 Upper 15.3 %

Autoignition Temperature
No data

Hazardous Products of Combustion
May form: carbon dioxide and carbon monoxide, various hydrocarbons.

Fire and Explosion Hazards
Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively.

Extinguishing Media
alcohol foam, carbon dioxide, dry chemical.

Fire Fighting Instructions
Wear a self-contained breathing apparatus with a full facepiece operated in the positive pressure demand mode with appropriate turn-out gear and chemical resistant personal protective equipment. Refer to the personal protective equipment section of this MSDS.

NFPA Rating
Health - 1, Flammability - 1, Reactivity - 0

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6. ACCIDENTAL RELEASE MEASURES

Small Spill
Absorb liquid on vermiculite, floor absorbent or other absorbent material.

Large Spill
Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, pump liquid to salvage tank. Remaining liquid may be taken up on sand, clay, earth, floor absorbent, or other absorbent material and shoveled into containers.

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7. HANDLING AND STORAGE
Handling
Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in the data sheet must be observed.
Storage
Not applicable

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION
Eye Protection
Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. Consult your safety representative.
Skin Protection
Wear resistant gloves such as: neoprene, nitrile rubber, polyvinyl chloride, To prevent repeated or prolonged skin contact, wear impervious clothing and boots.
Respiratory Protections
If workplace exposure limit(s) of product or any component is exceeded (See Exposure Guidelines), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other NIOSH/MSHA respirators (negative pressure type) under specified conditions (consult your industrial hygienist). Engineering or administrative controls should be implemented to reduce exposure.

Engineering Controls
Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).
Exposure Guidelines
Component

ETHYLENE GLYCOL (107-21-1)
OSHA VPEL 50.000 ppm - Ceiling
ACGIH TLV 100.000 mg/m3 - Ceiling as an aerosol
DIETHYLENE GLYCOL (111-46-6)
No exposure limits established
WATER (7732-18-5)

No exposure limits established
DIPOTASSIUM PHOSPHATE (7758-11-4)
No exposure limits established

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9. PHYSICAL AND CHEMICAL PROPERTIES
Boiling Point
(for product) 330.0 F (165.5 C) @ 760.00 mmHg
Vapor Pressure
(for product) 1.800 mmHg @ 68.00 F
Specific Vapor Density
No data
Specific Gravity
1.127 @ 60.00 F

Liquid Density
9.388 lbs/gal @ 60.00 F
1.127 kg/l @ 15.60 C
Percent Volatiles (Including Water)
No data
Evaporation Rate
No data
Appearance
No data
State
LIQUID
Physical Form
No data
Color
No data
Odor
No data
pH
10.2 - 11.2

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10. STABILITY AND REACTIVITY
Hazardous Polymerization
Product will not undergo hazardous polymerization.
Hazardous Decomposition
May form: carbon dioxide and carbon monoxide, various hydrocarbons.

Chemical Stability
Stable.
Incompatibility
Avoid contact with: strong oxidizing agents.

11. TOXICOLOGICAL INFORMATION
No data

12. ECOLOGICAL INFORMATION
No data

13. DISPOSAL CONSIDERATION
Waste Management Information
Dispose of in accordance with all applicable local, state and federal regulations. Do not discharge effluent containing this product into lakes, streams, ponds or estuaries, oceans, or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit, and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

14. TRANSPORT INFORMATION
DOT Information - 49 CFR 172.101
DOT Description:
Not Regulated

Container/Mode:
CASES/SURFACE - NO EXCEPTIONS
NOS Component:
None
RQ (Reportable Quantity) - 49 CFR 172.101

Product Quantity (lbs)	Component
5539	ETHYLENE GLYCOL

15. REGULATORY INFORMATION
US Federal Regulations
TSCA (Toxic Substances Control Act) Status
TSCA (UNITED STATES) The intentional ingredients of this product are listed.
CERCLA RQ - 40 CFR 302.4
Component Component

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ETHYLENE GLYCOL 5000
SARA 302 Components - 40 CFR 355 Appendix A
None
Section 311/312 Hazard Class - 40 CFR 370.2
Immediate(X) Delayed(X) Fire( ) Reactive( ) Sudden
Release of Pressure( )
SARA 313 Components - 40 CFR 372.65
Section 313 Component(s) CAS Number
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ETHYLENE GLYCOL 107-21-1

International Regulations
Inventory Status
DSL (CANADA) The intentional ingredients of this product are
listed.
State and Local Regulations
California Proposition 65
None
New Jersey RTK Label Information
ETHYLENE GLYCOL 107-21-1
Pennsylvania RTK Label Information
1,2-ETHANEDIOL 107-21-1
ETHANOL, 2,2'-OXYBIS- 111-46-6

16. 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.
NAPA Antifreeze & Coolant # 1GAL

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MATERIAL SAFETY DATA SHEET
Effective Date: 1-21-00 Revision Date: 7-22-02
NAPA Antifreeze & Coolant # 1GAL
Code: OWI Page: 1

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Section 1 - Product and Company Identification

PRODUCT NAME: Napa Antifreeze & Coolant # 1GAL

MANUFACTURER'S NAME: EMERGENCY TELEPHONE NUMBER
OLD WORLD INDUSTRIES, INC. (800)424-9300 CHEMTREC
4065 Commercial Avenue
Northbrook, IL 60062-1851 MISCELLANEOUS INFORMATION
(847)559-2000

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Section 2 - Hazardous Ingredients

MATERIAL CAS# % BY WT PEL (OSHA) TLV (ACGIH)

Ethylene Glycol 107-21-1 90-95 50 ppm 50 ppm
Diethylene Glycol 111-46-6 0-5 None None
Di Potassium Phosphate
7758-11-4 1-2 None None

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Section 3 - Hazards Indentification

Slight odor. May be fatal if swallowed. Vapors can cause eye irritation.

LOWEST KNOWN LD5O (ORAL) 107-21-1 5840 mg/kg
(Rats)
LOWEST KNOWN LD50 (SKIN) 107-21-1 9530 mg/kg
(Rabbits)

HAZARD RATING SYSTEM (NFPA)

HEALTH: 1 FLAMMABILITY: 1 REACTIVITY: 0

KEY: 0 - Minimal, 1 - Slight 2. Moderate 3. Serious
4.Severe

Product: Antifreeze/Coolant

POTENTIAL HEALTH EFFECTS

Routes of Exposure: Inhalation, Ingestion, Skin Contact/Absorption, Eye Contact

EYE: May cause slight transient (temporary) eye irritation. Corneal injury is unlikely. Vapors or mists may cause eye irritation.

SKIN: Prolonged or repeated exposure not likely to cause significant skin irritation. A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. Repeated skin exposure may result in absorption of harmful amounts. Massive contact with damaged skin or of material sufficiently hot to burn skin may result in absorption of potential lethal amounts.

INGESTION: Single dose oral toxicity is considered to be moderate. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing amounts larger than that may cause serious injury, even death.

INHALATION: At room temperature, exposures to vapors are minimal due to physical properties; higher temperatures may generate vapor levels sufficient to cause adverse effects.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Repeated excessive exposures may cause severe kidney and also liver gastrointestinal effects. Signs and symptoms of excessive exposure may be central nervous system effects. Signs

Section 3 - Hazards Indentification - Continued

and symptoms of excessive exposure may be nausea and/or vomiting. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects. Observations in animals include formation of bladder stones after repeated oral doses of ethylene glycol. Reports of kidney failure and death in burn patients suggest the ethylene glycol may have been a factor. The use of topical applications containing this material may not be appropriate in severely burned patients or individuals with impaired renal function.

CANCER INFORMATION: Based on data from long-term animal studies, ethylene glycol is not believed to pose a carcinogenic risk to man.
TERATOLOGY (birth defects): Exposure to ethylene glycol has caused birth defects in laboratory animals only at doses toxic to the mother.

REPRODUCTIVE EFFECTS: Ethylene glycol has not interfered with reproduction in animal studies except at very high doses.

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Section 4 - First Aid Measures

Ensure physician has access to this MSDS.

Eyes: Immediately flush eyes with large amounts of water for 15 minutes, lifting lower and upper lids. Get medical attention as soon as possible. Contact lenses should never be worn when working with this chemical.

Skin: Flush area of skin contact immediately with large amounts of water for 15 minutes, while removing contaminated clothing. If irritation persists after flushing, get medical attention promptly. Wash clothing before re-use.

Inhalation: If inhaled, immediately remove victim to fresh air and call emergency medical care. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Ingestion: Obtain medical attention immediately. If patient is fully conscious, give two glasses of water. Do not induce vomiting. If medical advice is delayed, and if the person has swallowed a moderate volume of material (a few ounces), then give three to four ounces of hard liquor, such as whisky. For children, give proportionally less liquor, according to weight.

Section 5 - Firefighting Measures

FLAMMABLE PROPERTIES
FLASH POINT: 119/c (247/F)
METHOD USED: Setaflash
AUTOIGNITION TEMPERATURE: Autoignition temperature for ethylene glycol is 398/(C748/F).

FLAMMABILITY LIMITS - % of vapor concentration at which product can ignite in presence of spark. Lower Flammability Limit: 3.2%; Upper Flammability Limit: 15.3%.

HAZARDOUS COMBUSTION PRODUCTS: Hazardous combustion products may include and are not limited to carbon monoxide, carbon dioxide and trace amounts of aldehydes and organic acids. When available oxygen is limited, as in a fire or when heated to very high temperatures by a hot wire or plate, carbon monoxide and other hazardous compounds such as aldehydes might be generated.

EXTINGUISHING MEDIA: Water fog or fine spray. Alcohol resistant foams (ATC type) are preferred if available. General purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively. Carbon dioxide. Dry chemical. Do not use direct water stream. May spread fire.

FIRE FIGHTING INSTRUCTIONS: No fire and explosion hazards expected under normal storage and handling conditions (i.e. ambient temperatures). However, ethylene glycol or solutions of ethylene glycol and water can form flammable vapors with air if heated sufficiently. Keep people away. Isolate fire area and deny unnecessary entry.

PROTECT EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure, self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire-fighting helmet, coat, pants, boots, and gloves).

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Section 6 - Environmental Release Measures

PROTECT PEOPLE: Material is moderately toxic when ingested. Take adequate precautions to keep people, especially children away from spill site PVC-coated rubber gloves and monogoggles or faceshield can be used during cleanup of spill site.

Protect the environment: Do not dump used product or diluted material into sewers, on the ground, or into any body of water.

CLEANUP: Small spills - soak up with absorbent material. Large spills: Dike and pump into suitable containers for disposal. Ensure compliance with all applicable statues that require notification of appropriate government officials

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Section 7 - Handling and Storage

Product on surfaces can cause slippery conditions. Practice reasonable care and cleanliness. Avoid breathing spray mists if generated. Keep out of reach of children. Product may become a solid at temperatures below: -22 C (-8 F). Do not store near food, foodstuffs, drugs or potable water supplies.

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Section 8 - Exposure Controls/Personal Protection

Respiratory Respiratory protection is required if airborne concentration exceeds Protection:TLV. At any detectable concentration, any self-contained breathing apparatus with a full facepiece and operated in a pressure-demand or other positive pressure mode or any supplied-air respirator with a full facepiece and operated in a pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive
pressure mode.

Escape: Any air-purifying full facepiece respirator (gas mask) with a chin-style or front or back-mounted organic vapor canister or any appropriate escape-type self contained breathing apparatus.

Skin Protection: Protective gloves recommended when prolonged skin contact can not be avoided. Polyethylene; Neoprene; nitrile; Polyvinyl alcohol; Natural Rubber, Butyl Rubber, Safety shower should be available.

Eye Protection: Safety goggles and face shield. Emergency eyewash should be available. Contact lenses should not be worn when working with this chemical.

Engineering Controls: Use general or local exhaust ventilation to meet TLV

requirements.

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Section 9 - Physical and Chemical Properties

Boiling Range: 171 -175 C (339-348F)
Freeze Point: -18C (0F)
Specific Gravity (Water =1 1.12
Pounds/Gallons 9.3
Vapor Pressure (mm Hg) @ 20C <0.1
Vapor Density 2.1
Water Solubility: Complete
Evaporation Rate (BuAc=1): Nil
% Volatile by Volume: 97.0
Appearance Green
Odor: Mild

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Section 10 - Stability and Reactivity

STABILITY: Stable
CONDITIONS TO AVOID: Isolate from oxidizers, heat &
open flame
MATERIALS TO AVOID: Isolate from strong oxidizers
such as permanganates,
chromates & peroxides
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, carbon dioxide from
burning.
HAZARDOUS POLYMERIZATION: Material is not known to polymerize.

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Section 11 - Toxicological Information

SKIN: The dermal LD50 hasb not been determined

INGESTION: The lethal dose in humans is estimated to be 100 m (3
ounces). The oral LD50 for rats is in the 6000 13,000 mg/kg range.

MUTAGENICITY (THE EFFECTS ON GENETIC MATERIAL): In vitro mutagenicity
studies were negative. Animal mutagenicity studies were negative

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Section 12 - Ecological Information

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: Bioconcentration potential is low (BCF less than 100 or Log Kow less than 3). Log octanol/water partition coefficient (log Know) is 1.36. Henry's Law Constant (H) is 6.OE-08 arm-m3/mol. Bioconcentration factor (BCF) is 10 in golden orfe.

DEGRADATION & TRANSFORMATION: Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD GREATER THAN 40%). 5-Day biochemical oxygen demand (BOD5) is 0.78p/p. 10-Day biochemical oxygen demand (BOD10) is 1.06 p/p. 20-Day biochemical oxygen demand (BOD20) is 1.15 p/p. Theoretical oxygen demand (ThOD) is calculated to be 1.29 p/p. Biodegradation may occur under both aerobic and anaerobic conditions (in either the presence or absence of oxygen). Inhibitory concentration (IC50) in OECD " Activated Sludge, Respiration Inhibition Test" (Guideline # 209) is < 1000 mg/L. Degradation is expected in the atmospheric environment within days to weeks.

ECOTOXICOLOGY: Material is practically non-toxic to aquatic organisms on an acute basis (LC50 greater than 100 mg/L in most sensitive species). Acute LC50 for fathead minnow (Pimephales promelas) is 51000 mg/L. Acute LC 50 for bluegil (Lepomis macrochirus) is 27549 mg/L. Acute LC50 for rainbow trout (Oncorhynchus mykiss) is about 18000-46000 mg/L. Acute LC50 for guppy (Poecilia reticulata) is 49300 mg/L. Acute LC50 for water flea (Daphnia magna) is 46300-51100 mg/L. Acute LC50 for the cladoceran Ceriodaphnia dubia is 10000-25800 mg/L. Acute LC50 for crayfish is 91430 mg/L. Acute LC50 for brine shrimp (Artemia salina) is 20000 mg/L. Acute LCC 50 for golden orfe (Leueiscus idus) is greater than 10000 mg/L. Acute LC50 for goldfish (Carassius auratus) is greater than 5000 mg/L.

Growth inhibition EC50 for green alga Selenastrum capricornutum is 9500-13000 mg/L.

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Section 13 - Disposal Considerations

DO NOT discharge to sewer. Wear appropriate personal protection. Take up with sand, vermiculite, or similar inert material. Dispose in accordance wilth federal, state and local regulations.

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Section 14 - Transport Information

US DOT Ethylene Glycol
NON-BULK
Proper Shipping Name: Environmentally Hazardous Material
Liquid N.O.S. (Ethylene Glycol) BULK
Proper Shippinng Name: Ethylene Glycol
UN3082
9
PG III

Technical Name: 5,000 lb.

Section 15 - Regulatory Information

THIS PRODUCT CONTAINS COMPONENT(S) CITED ON THE FOLLOWING REGULATIONS.

CHEMICAL NAME CAS NUMBER

Ethylene Glycol 107-21-1

UNITED STATES
TSCA - Inventory: Listed

WATER STANDARDS: No data available

ATMOSPHERIC Clean Air Act (1990) - List of Hazardous Air Contaminants: listed
STANDARDS:

CERCLA: Reportable Quantity (RQ): 5,000 pounds (532 gallons)

SARA Title III: Section 311/312 - Categories: Acute hazard; chronic hazard

Section 312 - Inventory Reporting: Ethylene glycol is subject to Tier I and/or Tier II annual inventory reporting.

Section 313 - Emission Reporting: Ethylene glycol is subject to Form R reporting requirements.

Section 302 - Extremely Hazardous Substances:
Ethylene glycol is = not listed.

STATE RIGHT-TO-KNOW:

California - Exposure Limits - Ceilings: vapor-50 ppm ceiling; 125 mg/m3 ceiling
Director's List of Hazardous Substances: listed
Florida - Hazardous Substances List: listed
Massachusetts - Right-To-Know List: listed
Minnesota - Haz. Subs. List: listed (particulate and vapor)
New Jersey - Right-To-Know List (Total): Present greater than 1.0%
Pennsylvania Right-To-Know List: environmental hazard

CANADIAN REGULATIONS:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required.

WHMIS INFORMATION: D2A - material has potential toxic effects. Refer elsewhere in the MSDS for the specific warnings and safe handling information. Refer to the employer's workplace education program.

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Section 16 - Other Information

California Proposition 65

This product contains the following chemicals known to the State of California to cause cancer:
Component CAS # Amount
1,4-Dioxane 123-91-1 <=0.0086%
Acetaldehyde 75-07-0 <=0.1000ppm

This contains the following chemical known to the State of California to cause birth defects and/or other reproductive harm.
Component CAS # Amount
Ethylene glycol monomethyl ether
109-86-4 <=0,0009%
California SCAQMD Rule 443.1 (South Coast Air Quality Management District Rule 443.1, Labeling of Materials Containing Organic Solvents)

Contact: Thomas Cholke Phone: (847) 559-2000

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