

ASHLAND

SAFETY DATA SHEET

Page: 1

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
™ Trademark, Solenis or its subsidiaries or affiliates,
registered in various countries100307

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Ashland	Regulatory Information Number	1-800-325-3751
P.O. Box 2219	Telephone	614-790-3333
Columbus, OH 43216	Emergency telephone number	1-800-ASHLAND (1-800-274-5263)
Product name	Drewcor™ 2130 CORROSION INHIBITOR ™ Trademark, Solenis or its subsidiaries or affiliates, registered in various countries	
Product code	100307	
Product Use Description	Corrosion inhibitor.	

2. HAZARDS IDENTIFICATION

Emergency Overview

Appearance: liquid, amber

DANGER! COMBUSTIBLE LIQUID AND VAPOR. VAPOR MAY CAUSE TEMPORARY BLURRING OF VISION. MAY AFFECT THE CENTRAL NERVOUS SYSTEM CAUSING DIZZINESS, HEADACHE OR NAUSEA. HARMFUL IF ABSORBED THROUGH THE SKIN. MAY CAUSE ALLERGIC SKIN REACTION. HARMFUL IF SWALLOWED. CAUSES SEVERE BURNS OF THE EYES AND SKIN.

Potential Health Effects

Exposure routes

Inhalation, Skin absorption, Skin contact, Eye Contact, Ingestion

Eye contact

Can cause permanent eye injury. Symptoms include stinging, tearing, redness, and swelling of eyes. Can injure the cornea and cause blindness.

Skin contact

Can cause permanent skin damage. Symptoms may include redness, burning, and swelling of skin, burns, and other skin damage. May cause allergic skin reaction. Passage of this material into the body through the skin is possible, and skin contact may be harmful.

Ingestion

Swallowing this material may be harmful or fatal. Symptoms may include severe stomach and intestinal irritation (nausea, vomiting, diarrhea), abdominal pain, and vomiting of blood. Swallowing this material may cause burns and destroy tissue in the mouth, throat, and digestive tract. Low blood pressure and shock may occur as a result of severe tissue injury.

Inhalation

ASHLAND®

SAFETY DATA SHEET

Page: 2

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR

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Breathing of vapor or mist is possible. Breathing this material may be harmful or fatal. Symptoms may include severe irritation and burns to the nose, throat, and respiratory tract. Symptoms are not expected at air concentrations below the recommended exposure limits, if applicable (see Section 8.).

Aggravated Medical Condition

Preexisting disorders of the following organs (or organ systems) may be aggravated by exposure to this material: Skin, Upper respiratory tract, lung (for example, asthma-like conditions), Liver, Kidney, thyroid, male reproductive system, eye, Exposure to this material may aggravate any preexisting condition sensitive to a decrease in available oxygen, such as chronic lung disease, coronary artery disease or anemias.

Symptoms

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), thirst, irritation (nose, throat, airways), Cough, central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), nervousness, effects on blood pressure, Abdominal pain, chest pain, halo vision (blurred vision around bright objects), loss of coordination, Difficulty in breathing, methemoglobinemia (blood abnormality which causes a blue coloring to the skin), blood abnormalities (breakage of red blood cells), narcosis (dazed or sluggish feeling), lung edema (fluid buildup in the lung tissue), kidney damage, liver damage, lung damage, respiratory failure, coma

Target Organs

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: thyroid effects, mild, reversible spleen effects, mild, reversible bladder effects, anemia, eye damage, kidney damage, lung damage, effects on male fertility, nasal damage, testis damage, liver damage

Carcinogenicity

Methyl ethyl ketoxime has been shown to cause liver cancer in male rats and mice. The relevance of this finding to humans is uncertain.

Reproductive hazard

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., Methyl ethyl ketoxime was not harmful to the fetus in laboratory animal studies even at levels that were harmful to the pregnant animals.

Other information

This material (or a component) has been both positive and negative in tests for mutagenicity. The relevance of this finding to human health is uncertain. Nitrites should not be added to this material because this can result in formation of nitrosamines. Many nitrosamines cause cancer in laboratory animals. This product contains amines which may react with nitrites or other nitrosating agents to form nitrosamines. Certain nitrosamines have been shown to cause cancer in laboratory animals. Ingestion of alcoholic beverages after exposure to methyl ethyl ketoxime may result in headache, redness of the face, vomiting, sweating, and rapid heartbeat.

3. COMPOSITION/INFORMATION ON INGREDIENTS

ASHLAND

SAFETY DATA SHEET

Page: 3

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
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Hazardous Components	CAS-No. / Trade Secret No.	Concentration
CYCLOHEXYLAMINE	108-91-8	>=40-<50%
MORPHOLINE	110-91-8	>=20-<30%
2-DIETHYLAMINOETHANOL	100-37-8	>=20-<30%
METHYL ETHYL KETONE OXIME	96-29-7	>=5-<10%

4. FIRST AID MEASURES

Eyes

If material gets into the eyes, immediately flush eyes gently with water for at least 15 minutes while holding eyelids apart. If symptoms develop as a result of vapor exposure, immediately move individual away from exposure and into fresh air before flushing as recommended above. Seek immediate medical attention.

Skin

Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Wash clothing before reuse and discard contaminated shoes.

Ingestion

Seek immediate medical attention. Do not induce vomiting. Vomiting will cause further damage to the mouth and throat. If individual is conscious and alert, immediately rinse mouth with water and give milk or water to drink. 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.

Notes to physician

Hazards: Overexposure to this product (or a component) may cause methemoglobinemia, which in sufficient concentration causes cyanosis. Severe cyanosis may require intravenous injection of methylene blue. Methylene blue is contraindicated if the patient has confirmed or suspected glucose-6-phosphate dehydrogenase deficiency. Pulmonary edema may be delayed.

Treatment: No information available.

5. FIREFIGHTING MEASURES

Suitable extinguishing media

Dry chemical, Carbon dioxide (CO₂), Water spray

Hazardous combustion products

Ammonia, carbon dioxide and carbon monoxide, Cyanides, formaldehyde, methyl ethyl ketone, nitrogen compounds, nitrogen oxides (NO_x), substituted amides, toxic fumes, various hydrocarbons

ASHLAND

SAFETY DATA SHEET

Page: 4

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
™ Trademark, Solenis or its subsidiaries or affiliates,
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Precautions for fire-fighting

If product is heated above its flash point it will produce vapors sufficient to support combustion. Vapors are heavier than air and may travel along the ground and be ignited by heat, pilot lights, other flames and ignition sources at locations near the point of release. Never use welding or cutting torch on or near drum (even empty) because product (even just residue) can ignite explosively. Wear full firefighting turn-out gear (full Bunker gear), and respiratory protection (SCBA). Use water spray to cool fire exposed containers and structures until fire is out if it can be done with minimal risk. Avoid spreading burning material with water used for cooling purposes.

NFPA Flammable and Combustible Liquids Classification

Combustible Liquid Class II

6. ACCIDENTAL RELEASE MEASURES

Personal precautions

For personal protection see section 8. Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Ensure adequate ventilation. Eliminate all ignition sources (flares, flames including pilot lights, electrical sparks). Pay attention to the spreading of gases especially at ground level (heavier than air) and to the direction of the wind.

Environmental precautions

Prevent spreading over a wide area (e.g. by containment or oil barriers). Do not let product enter drains. Do not flush into surface water or sanitary sewer system. Local authorities should be advised if significant spillages cannot be contained.

Methods for cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

Other information

Comply with all applicable federal, state, and local regulations. Suppress (knock down) gases/vapours/mists with a water spray jet.

7. HANDLING AND STORAGE

Handling

Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. 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. Static ignition hazard can result from handling and use. Electrically bond and ground all containers, personnel and equipment before transfer or use of material. Special precautions may be necessary to dissipate static electricity for non-conductive containers. Use proper bonding and grounding during product transfer as described in National Fire Protection Association document NFPA 77.

Storage

Store in a cool, dry, ventilated area. Keep from freezing.

ASHLAND

SAFETY DATA SHEET

Page: 5

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
 ™ Trademark, Solenis or its subsidiaries or affiliates,
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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure Guidelines

CYCLOHEXYLAMINE		108-91-8
ACGIH	time weighted average	10 ppm
NIOSH	Recommended exposure limit (REL):	10 ppm
NIOSH	Recommended exposure limit (REL):	40 mg/m ³
MORPHOLINE		110-91-8
ACGIH	time weighted average	20 ppm
NIOSH	Recommended exposure limit (REL):	20 ppm
NIOSH	Recommended exposure limit (REL):	70 mg/m ³
NIOSH	Short term exposure limit	30 ppm
NIOSH	Short term exposure limit	105 mg/m ³
OSHA Z1	Permissible exposure limit	20 ppm
OSHA Z1	Permissible exposure limit	70 mg/m ³
2-DIETHYLAMINOETHANOL		100-37-8
ACGIH	time weighted average	2 ppm
NIOSH	Recommended exposure limit (REL):	10 ppm
NIOSH	Recommended exposure limit (REL):	50 mg/m ³
OSHA Z1	Permissible exposure limit	10 ppm
OSHA Z1	Permissible exposure limit	50 mg/m ³
METHYL ETHYL KETONE OXIME		96-29-7
WEEL	time weighted average	10 ppm
WEEL	time weighted average	36 mg/m ³

General advice

These recommendations provide general guidance for handling this product. Personal protective equipment should be selected for individual applications and should consider factors which affect exposure potential, such as handling practices, chemical concentrations and ventilation. It is ultimately the responsibility of the employer to follow regulatory guidelines established by local authorities.

Exposure controls

Mechanical ventilation systems used to ventilate corrosive storage or process areas must be designed with components that are corrosion resistant.

ASHLAND

SAFETY DATA SHEET

Page: 6

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR

™ Trademark, Solenis or its subsidiaries or affiliates,
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Eye protection

Wear chemical splash goggles and face shield when there is potential for exposure of the eyes or face to liquid, vapor or mist. Maintain eye wash station in immediate work area.

Skin and body protection

Wear appropriate chemical impervious clothing and boots whenever there is potential for skin contact with product. Launder clothing before reuse. Maintain safety shower at all locations where skin contact could occur. Contact your local safety equipment supplier to assist the facility in determining proper selection of personal protective equipment for the applications/operations present at your facility. Wear resistant gloves (consult your safety equipment supplier). Discard gloves that show tears, pinholes, or signs of wear.

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.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	liquid
Colour	amber
Boiling point/boiling range	212 °F / 100 °C @ 1,013.33 hPa Calculated Phase Transition Liquid/Gas
Melting point/range	-36 °F / -38 °C
pH	12.5
Flash point	124.00 °F / 51.11 °C Pensky Martens closed cup
Evaporation rate	(>)1 Ethyl Ether
Lower explosion limit/Upper explosion limit	1.4 %(V) / 11.7 %(V)
Vapour pressure	27.997 hPa @ 68 °F / 20 °C Calculated Vapor Pressure
Relative vapour density	(>)1 AIR=1
Density	(ca.) 0.950 g/cm3 @ 77 °F / 25 °C

10. STABILITY AND REACTIVITY

Stability

Stable.

Conditions to avoid

Heat, flames and sparks.

Incompatible products

ASHLAND

SAFETY DATA SHEET

Page: 7

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR

™ Trademark, Solenis or its subsidiaries or affiliates,
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Acids, acrylates, Alcohols, Aldehydes, alkalis, aluminum, Copper, Copper alloys, galvanized metals, glycols, halogenated hydrocarbons, isocyanates, Ketones, Metals, nitrates, nitrites and other nitrosating agents, organic anhydrides, organic solvent, peroxides, phenols, Reducing agents, Strong oxidizing agents, Zinc, Aqueous solutions of this product corrode steel.

Hazardous decomposition products

Amines, Carbon dioxide (CO₂), carbon dioxide and carbon monoxide, Carbon monoxide, Cyanides, formaldehyde-like, methyl ethyl ketone, nitrogen compounds, nitrogen oxides (NO_x), substituted amides, Ammonia

Hazardous reactions

Product will not undergo hazardous polymerization.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : Inhalation
Skin absorption
Skin contact
Eye Contact
Ingestion

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

Target Organ Systemic Toxicant - Repeated exposure : Target Organs: Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals: thyroid effects, mild, reversible spleen effects, mild, reversible bladder effects, anemia, eye damage, kidney damage, lung damage, effects on male fertility, nasal damage, testis damage, liver damage

ASHLAND

SAFETY DATA SHEET

Page: 8

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
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Components:

CYCLOHEXYLAMINE:

- Acute oral toxicity : LD 50 Rat: 156 mg/kg
- Acute inhalation toxicity : LC 50 Rat: 2.3 mg/l
Exposure time: 4 h
- Acute dermal toxicity : LD 50 Rabbit: 277 mg/kg

MORPHOLINE:

- Acute inhalation toxicity : LC 50 Rat: 8000 ppm
Exposure time: 8 h
- Acute dermal toxicity : LD 50 Rabbit: 500 mg/kg

2-DIETHYLAMINOETHANOL:

- Acute oral toxicity : LD 50 Rat: 1,300 mg/kg
- Acute inhalation toxicity : LC 50 Rat: 4.6 mg/l
Exposure time: 4 h
- Acute dermal toxicity : LD 50 Rabbit: 1,124 mg/kg

METHYL ETHYL KETONE OXIME:

- Acute oral toxicity : LD 50 Rat, male: 2,326 mg/kg
- Acute inhalation toxicity : LC 50 Rat: > 4,830 mg/l
Exposure time: 4 h
- Acute dermal toxicity : LD 50 Rabbit: > 1,000 - 1,800 mg/kg
- Respiratory or skin sensitisation : Classification: May cause sensitization by skin contact.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Product:

- Toxicity to fish : LC 50 (Oncorhynchus mykiss (rainbow trout)): 645 mg/l

ASHLAND

SAFETY DATA SHEET

Page: 9

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR

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Exposure time: 96 h
Test Method: static test

LC 50 (Pimephales promelas (fathead minnow)): 33 mg/l
Exposure time: 96 h
Test Method: static test

Toxicity to daphnia and other aquatic invertebrates : EC 50 (Water flea (Ceriodaphnia dubia)): 22 mg/l
Exposure time: 48 h
Test Method: static test

Components:

CYCLOHEXYLAMINE:

Toxicity to fish : LC 50 (Danio rerio (zebra fish)): 470 mg/l
Exposure time: 96 h
Method: Static
Mortality

Toxicity to daphnia and other aquatic invertebrates : LC 50 (Water flea (Daphnia magna)): 80 mg/l
Exposure time: 24 h
Method: Static
Mortality

2-DIETHYLAMINOETHANOL:

Toxicity to fish : LC 50 (Fathead minnow (Pimephales promelas)): 1,660 - 1,920 mg/l
Exposure time: 96 h
Test Method: flow-through test

METHYL ETHYL KETONE OXIME:

Toxicity to fish : LC 50 (Oncorhynchus mykiss (rainbow trout)): 693 mg/l
Exposure time: 96 h
Test Method: static test

Toxicity to daphnia and other aquatic invertebrates : LC 50 (Water flea (Ceriodaphnia dubia)): 750.8 mg/l
Exposure time: 48 h
Test Method: static test

Persistence and degradability

Product:

Biochemical Oxygen Demand : Biochemical oxygen demand within 5 days

ASHLAND

SAFETY DATA SHEET

Page: 10

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
™ Trademark, Solenis or its subsidiaries or affiliates,
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(BOD) 825,000 mg/l
Chemical Oxygen Demand : 1,500,000 mg/l
(COD) Method: Chemical oxygen demand

Components:

METHYL ETHYL KETONE OXIME:

Biodegradability : Biodegradation: 24.7 %
Exposure time: 28 d
Method: OECD Test Guideline 302C
Biochemical Oxygen Demand : Biochemical oxygen demand within 5 days
(BOD) 59 mg/l
Chemical Oxygen Demand : 880,000 mg/l
(COD) Method: Chemical oxygen demand

Bioaccumulative potential

Product:

no data available

Components:

CYCLOHEXYLAMINE:

Partition coefficient: n- : log Pow: 1.49
octanol/water

MORPHOLINE:

Partition coefficient: n- : log Pow: -0.86
octanol/water

METHYL ETHYL KETONE OXIME:

Partition coefficient: n- : Pow: 0.65 (25 °C)
octanol/water

Mobility in soil

Product:

no data available

Components:

ASHLAND

SAFETY DATA SHEET

Page: 11

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
 ™ Trademark, Solenis or its subsidiaries or affiliates,
 registered in various countries 100307

MORPHOLINE:

Surface tension : 37.5 mN/m

2-DIETHYLAMINOETHANOL:

Surface tension : 29.2 mN/m

13. DISPOSAL CONSIDERATIONS

Waste disposal methods

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

14. TRANSPORT INFORMATION

REGULATION

ID NUMBER	PROPER SHIPPING NAME	*HAZARD CLASS	SUBSIDIARY HAZARDS	PACKING GROUP	MARINE POLLUTANT / LTD. QTY.
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U.S. DOT - ROAD

UN 2920	Corrosive liquids, flammable, n.o.s. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II	
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U.S. DOT - RAIL

UN 2920	Corrosive liquids, flammable, n.o.s. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II	
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U.S. DOT - INLAND WATERWAYS

UN 2920	Corrosive liquids, flammable, n.o.s. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II	
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TRANSPORT CANADA - ROAD

UN 2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II	
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TRANSPORT CANADA - RAIL

ASHLAND

SAFETY DATA SHEET

Page: 12

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
 ™ Trademark, Solenis or its subsidiaries or affiliates,
 registered in various countries 100307

UN	2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II
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TRANSPORT CANADA - INLAND WATERWAYS

UN	2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II
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INTERNATIONAL MARITIME DANGEROUS GOODS

UN	2920	CORROSIVE LIQUID, FLAMMABLE, N.O.S. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II
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INTERNATIONAL AIR TRANSPORT ASSOCIATION - CARGO

UN	2920	Corrosive liquid, flammable, n.o.s. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II
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INTERNATIONAL AIR TRANSPORT ASSOCIATION - PASSENGER

UN	2920	Corrosive liquid, flammable, n.o.s. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II
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MEXICAN REGULATION FOR THE LAND TRANSPORT OF HAZARDOUS MATERIALS AND WASTES

UN	2920	LIQUIDO CORROSIVO INFLAMABLE, N.E.P. (CYCLOHEXYLAMINE, DIETHYL ETHANOLAMINE)	8	(3)	II
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*ORM = ORM-D, CBL = COMBUSTIBLE LIQUID

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

California Prop. 65

Proposition 65 warnings are not required for this product based on the results of a risk assessment.

ASHLAND

SAFETY DATA SHEET

Page: 13

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

Drewcor™ 2130 CORROSION INHIBITOR
 ™ Trademark, Solenis or its subsidiaries or affiliates,
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SARA Hazard Classification

SARA 311/312 Classification

Fire Hazard

Acute Health Hazard

SARA 313 Component(s)

SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

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)
New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand	y (positive listing)
Japan. Kashin-Hou Law List	y (positive listing)
Korea. Toxic Chemical Control Law (TCCL) List	y (positive listing)
Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act	y (positive listing)
China. Inventory of Existing Chemical Substances	y (positive listing)

Reportable quantity - Product

US. EPA CERCLA Hazardous Substances (40 CFR 302)	27777 lbs
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Reportable quantity-Components

BENZENE	71-43-2	10 lbs
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	HMIS	NFPA
Health	3*	3
Flammability	2	2
Physical hazards	1	
Instability		1
Specific Hazard	--	--

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. This MSDS has been prepared by Ashland's Environmental Health and Safety Department (1-800-325-3751).

List of abbreviations and acronyms that could be, but not necessarily are, used in this safety data sheet :

ASHLAND

SAFETY DATA SHEET

Page: 14

Revision Date: 06/01/2013

Print Date: 8/26/2014

MSDS Number: R0220665

Version: 1.10

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™ Trademark, Solenis or its subsidiaries or affiliates,
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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