KROFF Chemical Company, Inc.

Suite 450
One North Shore Center
12 Federal Street
Pittsburgh, PA 15212

KR-93SDL

MATERIAL SAFETY DATA SHEET

FOR EMERGENCY ASSISTANCE
CALL: 1-800-424-9300 CHEMTREC

FOR ADDITIONAL INFORMATION
CALL: 412-321-9800

SECTION 1: PRODUCT IDENTIFICATION

PRODUCT NAME: **KR-93SDL**
CHEMICAL DESCRIPTION: Aqueous amine solution
PRODUCT CLASS: Boiler Water
MSDS REVISION: 7-12-2012

SECTION 2: INFORMATION ON INGREDIENTS

Chemical Name	CAS #	Weight %	OSHA PEL	ACGIH TLV
Cyclohexylamine	108-91-8	1-20	TWA:10 ppm 40 mg/m^3	TWA:10 ppm 41 mg/m^3
Morpholine	110-91-8	1-20	TWA: 20 ppm 70 mg/m^3 STEL: 30 ppm 105 mg/m^3 (skin)	TWA: 20 ppm 71 mg/m^3 (skin)
2-(Diethylamino)ethanol [DEAE]	100-37-8	1-20	TWA: 10 ppm 50 mg/m^3 (skin)	TWA: 2 ppm 9.6 mg/m^3 (skin)

SECTION 3: HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW**********

Clear, colorless to light yellow liquid with an amine odor.
DANGER! CORROSIVE!
May cause severe eye and skin damage.
May be harmful if absorbed through skin or if swallowed.
May cause allergic skin reaction.
May cause respiratory tract irritation.
May cause CNS effects.
Flammable/Combustible liquid and vapor.

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PRIMARY ROUTES OF ENTRY: Eye contact, skin contact, skin absorption, ingestion, and inhalation

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Conditions of the eye, skin, liver, kidney, and respiratory system may be aggravated by exposure to this product.

POTENTIAL HEALTH EFFECTS:

EYE CONTACT: This product would be expected to cause severe eye irritation or burns on contact and possibly permanent injury. Exposure to vapors may result in eye irritation, redness, and pain. Exposure to vapors of the product component, cyclohexylamine may cause the development of corneal opacities. At low concentrations in air, both morpholine and DEAE have caused transient corneal edema and temporary foggy vision with halos around lights in workers exposed for many hours.

SKIN CONTACT: This product would be expected to cause severe skin irritation on contact and possibly skin burns. The vapors may also be irritating to the skin. The product may cause an allergic skin reaction. Based on the low rabbit skin penetration LD50 values of the ingredients, the product would be considered to be potentially toxic by skin absorption. Therefore, prolonged or widespread skin contact with this product may result in the absorption of harmful amounts of material. The symptoms of overexposure would be similar to those seen from ingestion.

INGESTION: Swallowing this product can cause severe irritation or burns of the mouth, throat, esophagus, and stomach, possibly leading to death. This product is considered toxic by ingestion. Symptoms of ingestion may include abdominal and chest pain, sore throat, thirst, nausea, vomiting, diarrhea, anxiety, restlessness, drowsiness, inactivity, tremors, tearing, salivation, weakness, and collapse. Cyclohexylamine, a product component, is a weak methemoglobin-forming substance which means it slightly reduces the oxygen-carrying ability of the blood.

INHALATION: Inhalation of product mist or vapor may result in irritation of the eyes, nose, and throat, a burning sensation, coughing, wheezing, laryngitis, shortness of breath, lightheadedness, drowsiness, anxiety, nausea, and vomiting. Repeated or severe exposure by inhalation may result in lung injury.

SUBCHRONIC, CHRONIC: No information is available for this product. Information on components follows.

The product component, cyclohexylamine has caused embryotoxic and reproductive effects in animals at high doses, however, no such effects have been seen at industrially relevant levels in humans. Weight loss and corneal opacity are effects of chronic exposure to cyclohexylamine.

In subacute feeding experiments with morpholine, rats and guinea pigs have shown evidence of intense irritation of the intestinal tract and microscopic examination revealed increasing liver and kidney injury with increasing doses. Skin, liver, and kidney injury was also produced by repeated skin application of morpholine to rabbits. Repeated exposures of rats and guinea pigs to morpholine vapor resulted in lung injury largely centered about the bronchi and bronchioles, and kidney and liver sections showed cloudy swelling and congestion. A two-year inhalation oncogenic study with morpholine was negative in rats. No chronic effects for morpholine have been reported in industry.

Long-term feeding studies in rats and dogs at doses from 200 ppm to 10,000 pm DEAE showed testicular atrophy in some rats at all doses given. Dogs showed severe weakness, tremors, convulsions, and death at 5,000 ppm and 10,000 ppm. Some cerebellar degeneration was observed at 5,000 ppm. Groups of F344 rats were exposed to DEAE vapors 6 hours/day, 5 days/week, for 14 weeks. The groups were exposed to 0, 10, 25, and 75 ppm. The study resulted in a no adverse effect concentration of 10 ppm and in irritation of the nasal mucosa at 25 ppm.

CARCINOGENICITY:
NTP: No ingredients listed in this section
IARC: No ingredients listed in this section
OSHA: No ingredients listed in this section

SECTION 4: FIRST AID MEASURES

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally to ensure complete rinsing. Get medical attention immediately.

SKIN CONTACT: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Victims with major skin contact should be maintained under medical observation for at least 24 hours due to the possibility of delayed reaction.

INGESTION: If swallowed, do NOT induce vomiting. If victim is conscious and alert, rinse out mouth with water and give large quantities of water to drink. Get medical attention immediately. Never give anything by mouth to an unconscious person.

INHALATION: If inhaled remove victim to fresh air. If breathing stops, give artificial respiration. If breathing is difficult, have a trained medical person give oxygen. Get medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

FLASHPOINT: Not available
This product is a fire hazard.

FLAMMABLE LIMITS: (for components)
LOWER: Cyclohexylamine: 1.5%; Morpholine: 1.8%; DEAE: 6.7%
UPPER: Cyclohexylamine: 9.4%; Morpholine: 11.0%; DEAE: 11.7%

AUTO-IGNITION TEMPERATURE: Not available

EXTINGUISHING MEDIA: Use dry chemical, "alcohol" foam, carbon dioxide, or water spray. Use water spray to keep fire-exposed containers cool and to flush spills away from exposures.

FIRE-FIGHTING INSTRUCTIONS: Exercise caution when fighting any chemical fire. A self-contained breathing apparatus and protective clothing are essential.

FIRE & EXPLOSION HAZARDS: This product emits toxic gases under fire conditions. Product vapors are heavier than air and may travel a considerable distance to a source of ignition and flash back. Contact with amphoteric metals such as aluminum for a period of time may cause the formation of flammable and explosive hydrogen gas.

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, ammonia, and/or oxides of nitrogen

NFPA RATINGS: Health = 3 Flammability = 2 Reactivity = 0 Special Hazard = None

Hazard rating scale: 0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Restrict access to the spill area as appropriate until clean-up operations are complete. Ensure clean-up is conducted by trained personnel only. Use personal protective equipment recommended in Section 8 (Exposure Control/Personal Protection). Remove all source of ignition. Use non-sparking tools and equipment. Ventilate the spill area if possible. Do not touch spilled material. Stop or reduce any leaks if it is safe to do so. Notify appropriate government, occupational health and safety, and environmental authorities.

METHODS FOR CLEAN-UP:
Small spills: Soak up spill with an inert absorbent material (e.g. vermiculite, dry sand, earth). Do not use combustible materials, such as saw dust. Place residues in a suitable, covered, properly labeled container. Wash the affected area.
Large spills: Contain liquid using an inert absorbent material (e.g. vermiculite, dry sand,

earth), by digging trenches, or by diking. Do not use combustible materials, such as saw dust. Reclaim into recovery or salvage drums or tank truck for proper disposal. Wash site of spillage thoroughly with water. Contact an approved waste hauler for disposal of contaminated recovered material. Dispose of material in compliance with regulations indicated in Section 13 (Disposal Considerations).

REPORTING: U.S. Regulations (CERCLA) require the reporting of spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the National Response Center is 800-424-8802.

ENVIRONMENTAL PRECAUTIONS: Do not contaminate surface water.

SECTION 7: HANDLING AND STORAGE

HANDLING:
Avoid contact with eyes, skin, and clothing.
Avoid breathing vapor or mist.
Use with adequate ventilation.
Wash thoroughly after handling.
Do not take internally.
Keep containers closed when not in use.
Ensure that containers are properly labeled.
Since empty containers retain product residues (vapors, liquid), observe all warnings and precautions listed for the product.
Do not pressurize, cut, heat, weld, or expose containers to flame or other sources of ignition.
Do not use, store, or pour near heat, sparks, open flame, or other sources of ignition.
Have emergency equipment (for fires, spills, leaks, etc.) readily available.

STORAGE:
Store in a cool, dry, well-ventilated area away from incompatibles.
Keep away from heat, flame, sparks, and other sources of ignition.
Use proper grounding procedures.
Separate from oxidizing materials, acids, and sources of halogens.
Amine and sulfite products should not be stored within close proximity or resulting vapors may form visible airborne particles.

UNSATISFACTORY MATERIALS OF CONSTRUCTION: Aluminum, copper, zinc, and galvanized surfaces

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE/FACE PROTECTION: Chemical splash goggles and face shield

HAND PROTECTION: Butyl gloves. Most glove materials are of low chemical resistance. Replace gloves regularly.

SKIN PROTECTION: Wear a chemical resistant apron, chemical splash goggles, impervious gloves, and impervious boots. A full slicker suit is recommended if gross exposure is possible.

RESPIRATORY PROTECTION: If airborne concentrations exceed published exposure limits, use a NIOSH approved respirator in accordance with OSHA respiratory protection requirements (29 CFR 1910.134)

ENGINEERING CONTROLS: A system of local and/or general exhaust is recommended to keep employee exposures below the airborne exposure limits. Local exhaust ventilation if preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the latest edition of the ACGIH document *Industrial Ventilation, A Manual of Recommended Practices* for details.

WORK PRACTICES: Eye wash station and safety shower should be accessible in the immediate area of use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

pH: 11.0-13.0

SPECIFIC GRAVITY: 0.90-1.01 g/mL

SOLUBILITY: Complete

BOILING POINT: Not available

FREEZING POINT: Not available

VAPOR DENSITY (air=1): >1

VAPOR PRESSURE: Not available

APPEARANCE AND ODOR: Clear, colorless to light yellow liquid with an amine odor.

SECTION 10: STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

HAZARDOUS POLYMERIZATION: Will not occur

CONDITIONS TO AVOID: Keep away from heat and flame.

INCOMPATIBILITY: Contact with strong acids (e.g. sulfuric, phosphoric, nitric, hydrochloric, chromic, sulfonic) may generate heat, splattering or boiling and toxic vapors. Contact with strong oxidizers (e.g. chlorine, peroxides, chromates, nitric acid, perchlorate, concentrated oxygen, permanganate) may generate heat, fires, explosions and/or toxic vapors. Avoid contact with SO_2 or acidic bisulfite products, which may react to form visible airborne amine salt particles. Certain amines in contact with nitrous acid, organic or inorganic nitrites or atmospheres with high nitrous oxide concentrations may produce N-nitrosamines, many of which are cancer-causing agents to laboratory animals. Product may be corrosive to some metals (aluminum, copper, zinc, galvanized steel, etc.).

DECOMPOSITION PRODUCTS: Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide, ammonia, and/or oxides of nitrogen

SECTION 11: TOXICOLOGICAL INFORMATION

ON INGREDIENTS:

Chemical Name	Oral LD50 (rat)	Dermal LD50 (rabbit)	Inhalation LC50 (rat)
Cyclohexylamine	156 mg/Kg	277 mg/Kg	7,500 mg/m^3
Morpholine	1,050 mg/Kg	500 mg/Kg	8,000 ppm/8 H
2-(Diethylamino)ethanol [DEAE]	1,300 mg/Kg	1,260 mg/Kg	LCLo (rat): 4,500 mg/m^3/4 H

SECTION 12: ECOLOGICAL INFORMATION

ON INGREDIENTS:

Chemical Name	Aquatic Toxicity Data
Cyclohexylamine	24 hr LC50 (Daphnia magna): 44-90 mg/L 96 hr LC50 (Rainbow trout): 58-80 mg/L
Morpholine	24 hr LC50 (Daphnia magna): 100-119 mg/L 96 hr LC50 (Bluegill sunfish): >350 mg/L
2-(Diethylamino)ethanol [DEAE]	24 hr LC50 (Daphnia magna): 180 mg/L 96 hr EC50 (Fathead minnow): 1,780 mg/L 96 hr LC50 (Leuciscus idus): 100-220 mg/L 72 hr EC50 (Algae): 30 mg/L

SECTION 13: DISPOSAL CONSIDERATIONS

RCRA STATUS: Discarded product, as sold, would be considered a RCRA Hazardous Waste because it exhibits the characteristics of ignitability and corrosivity. The EPA Hazardous Waste Numbers are D001 and D002.

DISPOSAL: Dispose of according to federal, state, and local regulations.

SECTION 14: TRANSPORT INFORMATION

DOT CLASSIFICATION:
ID Number: UN 2734
Proper Shipping Name: Amines, liquid, corrosive, flammable, n.o.s.
(contains cyclohexylamine, morpholine, and 2-(diethylamino)ethanol)
Primary Hazard Class: 8
Secondary Hazard Class: 3
Packing Group: II
Label: Corrosive, flammable liquid

SECTION 15: REGULATORY INFORMATION

OSHA Hazard Communication Status: Hazardous

TSCA: The ingredients of this product are listed on the Toxic Substances Control Act (TSCA) Chemical Substances Inventory.

CERCLA: EPA Hazardous Substances (40 CFR 302):

Chemical Name	CERCLA Reportable Quantity (RQ)
None	

SARA TITLE III (Sections 302, 311, 312, and 313):

Section 302 Extremely Hazardous Substances (40 CFR 355):

Chemical Name	CAS#	RQ	TPQ
Cyclohexylamine	108-91-8	10,000 lb	10,000 lb

Section 311 and 312 Health and Physical Hazards:

Immediate	Delayed	Fire	Pressure	Reactivity
yes	yes	yes	no	no

Section 313 Toxic Chemicals (40 CFR 372):

Chemical Name	CAS Number	Percent by Weight
None		

SECTION 16: OTHER INFORMATION

HMIS RATINGS: Health = 3 Flammability = 2 Reactivity = 0

Hazard rating scale: 0=Minimal; 1=Slight; 2=Moderate; 3=Serious; 4=Severe

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The preceding information is accurate to the best of our knowledge. However, since data, safety standards, and government regulations are subject to change, and the conditions of handling and use or misuse are beyond our control, Kroff Chemical Company, Inc. makes no warranty, either express or implied, with respect to the completeness or continuing accuracy of the information contained herein, and disclaims all liability for reliance thereon. User should satisfy himself that he has all current data relevant to his particular use.