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Section 1: Product and Company Identification

Gulf Engineering Co. LLC
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 Business: (800) 347-4749
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Product Name: Gessco™ 231*
Generic Name: Aqueous solution of aliphatic amines
Synonyms: NA
Product Description: Boiler condensate treatment
CAS # NA - blend
Date of Revision: 5/17/2006

The fourth digit of the product number designates the container size:
 Gessco™ 231-1 - 5 gallon
 Gessco™ 231-2 - 30 gallon
 Gessco™ 231-3 - 55 gallon

24-Hour Emergency Phone Number: (800) 424-9300 (CHEMTREC)

Section 2: Hazard Identification

Emergency Overview: Appearance: clear, pale yellow or colorless liquid liquid. Flash Point: 88°F. Danger! Flammable liquid and vapor. Corrosive. Causes burns to any area of contact. May be fatal if swallowed. Harmful if inhaled or absorbed through skin. Causes severe irritation to respiratory tract. May cause allergic skin reaction. Affects central nervous system.

OSHA Regulatory Status: This material is considered hazardous under the OSHA standard.

Potential Health Effects:

Inhalation: Inhalation can cause severe irritation of mucous membranes and upper respiratory tract. Symptoms may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting. May cause pulmonary edema, a medical emergency.

Ingestion: Corrosive. Swallowing can cause severe burns of the mouth, throat, and stomach. Can cause sore throat, vomiting, diarrhea. May cause central nervous system depression. Symptoms may include lethargy, drowsiness, staggering and sleepiness.

Skin Contact: Corrosive. Symptoms of redness, pain, and severe burn can occur. May cause skin sensitization. May be absorbed through the skin with possible systemic effects.

Eye Contact: Causes eye burns. Vapor or mist may cause irritation and severe burns. Contact with liquid is corrosive to the eyes and causes severe burns. May cause chemical conjunctivitis and corneal damage.

Chronic Exposure: No information found.

Aggravation of Pre-existing Conditions: No information found.

Target Organs: Central nervous system, eyes, skin, mucous membranes

Section 3: Composition / Information On Ingredients

Component	CAS #	Weight %	OSHA PEL	ACGIH TLV
Cyclohexylamine	108-91-8	9 -14	NE	10 ppm; 50 mg/m ³
Morpholine	110-91-8	4 - 8	20 ppm; 71 mg/m ³	20 ppm; 71 mg/m ³
N,N-Diethylhydroxylamine	3710-84-7	4 - 8	NE	NE
Ethoxylated tallowamine	61791-26-2	5-10	NE	NE

Non-hazardous components may or may not be listed. Carcinogens are listed when present at 0.1% or more; components which are otherwise hazardous according to OSHA are listed when present at 1.0% or more. This is not intended to be complete compositional disclosure. See Section 15 for applicable states right to know and other regulatory information.

Section 4: First Aid Measures

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Ingestion: If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Skin: 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. Thoroughly clean shoes before reuse.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physicians: NA

Section 5: Fire Fighting Measures

Fire: Vapors can flow along surfaces to distant ignition source and flash back. Moderate explosion hazard when heated. Sealed containers may rupture when heated. Sensitive to static discharge.

Explosion: Above flash point, vapor-air mixtures are explosive within flammable limits.

Extinguishing Media: Water spray, dry chemical, alcohol foam, or carbon dioxide. Do not use a solid stream of water, since the stream scatters and spreads the fire. Water spray may be used to keep fire exposed containers cool.

Special Precautions: In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

NFPA Rating: Health - 3 Flammability - 3 Reactivity - 0 Other - NA

Section 6: Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

Section 7: Handling and Storage

Protect container against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

Section 8: Exposure Control / Personal Protection

Exposure Guidelines: CAS # 108-91-8: OSHA PEL – None ACGIH TLV 10 ppm; 50 mg/m³
 CAS # 110-91-8: OSHA PEL 20 ppm; 71 mg/m³ ACGIH TLV 20 ppm; 71 mg/m³
 CAS # 3710-84-7: OSHA PEL - None ACGIH TLV - None
 CAS # 61791-26-2: OSHA PEL - None ACGIH TLV - None

Personal Protective Equipment:

Skin Contact: Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Contact: Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Inhalation: Use NIOSH approved vapor respirator if exposure is unknown or exceeds permissible limits. A respiratory protection program that meets OSHA's 29 CFR 1910.134 or ANSI Z88.2 requirements must be followed whenever workplace conditions warrant respirator use. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Engineering Controls: A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally 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 ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

Section 9: Physical and Chemical Properties

Appearance	Clear, pale yellow liquid	Specific Gravity (g/mL)	0.99
Odor	Ammoniacal, fishy	pH	12.0
Odor Threshold	ND	Solubility in water	Complete
Melting Point	-5°C (23°F)	% Volatiles	94%
Boiling Point	106°C (221°F)	Evaporation Rate	ND
Flash Point	38°C (100°F)	Vapor Pressure	10 mm @ 23°C
Lower Explosive Limit	1.5 %	Vapor Density (air = 1.0)	3.0
Upper Explosive Limit	9.4 %	Viscosity	ND
Auto-Ignition Temperature	291°C (555°F)	log (Part. Coeff oct-H ₂ O)	ND
Decomposition Temp	254°C (489°F)		

Section 10: Stability and Reactivity

Chemical Stability: Stable under ordinary conditions of use and storage

Hazardous Decomposition Products: May form carbon oxides, nitrogen oxides, hydrocarbons, amine vapors and ammonia when heated to decomposition

Hazardous Polymerization: Will not occur

Incompatibilities: Cyclohexylamine reacts vigorously with oxidizing materials. It is incompatible with acids, all copper alloys, lead, chlorine, hypochlorite, acid anhydrides, acid chlorides, halogenated compounds, and reactive organic compounds. It is corrosive to copper, aluminum, zinc and galvanized steel

Conditions to Avoid: Heat, flames, ignition sources and incompatibles

Section 11: Toxicological Information

Acute Dose Effects: Cyclohexylamine: Eye: irritation data (std Draize, rabbit) 2 mg/24 H skin - severe, 50 ug/24 H eye – severe; Skin: 320 ul/kg LD50 rabbit; Oral: 11 mg/kg LD50 rat; Inhalation: 7500 mg/m³ LC50 rat.

Morpholine: Eye: Draize test, rabbit, eye: 2 mg Severe; Skin: rabbit LD50: 1220 mg/Kg; Oral: rat LD50: 1450 mg/kg; Oral, mouse: LD50 = 525 mg/kg; Inhalation: mouse: LC50 = 1320 mg/m³/2H; Inhalation, rat: LC50 = 8000 ppm/8H.

N,N-Diethylhydroxylamine: Eye Irritation - Slightly Irritating to Rabbits; Dermal, guinea pig: LD50 = 100 uL/kg; Dermal - Slightly Toxic to Rabbits (LD50 1,300 mg/kg); Oral - Slightly Toxic to Rats (LD50 2,190 mg/kg); Inhalation, mouse: LC50 = 5000 mg/m³; Inhalation, rat = 3140 ppm - 4 hrs.

Section 12: Ecological Information

Environmental Fate: When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may leach into groundwater. When released into the soil, this material may evaporate to a moderate extent. When released into water, this material may evaporate to a moderate extent. This material is not expected to significantly bioaccumulate. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals.

Ecotoxicity: Cyclohexylamine: Fish: Rainbow trout: LC50 = 90 mg/L; 96 Hr.; Static Condition, 15°C; Fish: Rainbow trout: LC50 = 44 mg/L; 96 Hr.; 20.0 mg/L CaCO₃ Water flea Daphnia: EC50 = 80 mg/L; 24 Hr.; 70.0 mg/L CaCO₃ Algae: EC50 = 20 mg/L; 96 Hr.

Morpholine: Fish: Bluegill/Sunfish: LC50 = 350.0 mg/L; 96 Hr.; Static conditions, 18-22°C; Water flea Daphnia: LC50 = 100.0-119.0 mg/L; 24 Hr.; Unspecified; Algae: EC50 = 28.0 mg/L; 96 Hr.; Phytobacterium phosphoreum: EC50 = 57.0 mg/L; 30 minutes; Microtox test

N,N-Diethylhydroxylamine is practically non-toxic to guppies (96-hr LC50 150 mg/l; neutralized material) and Daphnia magna. (48-hr EC50 111 mg/l). It is slightly toxic to bacteria (16-hr EC50 37 mg/l)

Section 13: Disposal Considerations

As a waste, this product as sold IS considered a HAZARDOUS WASTE under RCRA (29 CFR 261) based on the characteristic of ignitability. EPA Hazardous waste number: D001

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

Section 14: Transport Information

Proper Shipping Name: Cyclohexylamine

DOT Hazard Class: 8,3

UN Number: UN2357

Packing Group: II

CERCLA Reportable Quantity (RQ): NA

Releases exceeding the reportable quantity (RQ) must be reported to the National Response Center (800) 424-8802.

This data provided for information only. The description shown may not apply to all shipping situations. Consult 49 CFR, or appropriate regulations to properly classify your shipment for transportation.

Section 15: Regulatory Information

TSCA Chemical Inventory: All of the chemicals in this product are listed on the TSCA Inventory.

TSCA Sec 4 Chemical Test Rule: None of the chemicals in this product are under a Chemical Test Rule.

TSCA Sec 8(d): None of the chemicals in this product are on the Health and Safety Reporting List.

TSCA Sec 12(b) Notices of Export: None of the chemicals in this product are on this list.

TSCA Significant New Use Rule (SNUR): None of the chemicals in this product are on this list.

SARA Sec 302 (EHS) TPQ: Cyclohexylamine has a TPQ of 10,000 lbs.

SARA Sec 304 (EHS) RQ: Cyclohexylamine has a RQ of 10,000 lbs.

SARA Sec 311/312: Acute – YES; Chronic – YES; Fire – YES; Release of Pressure – NO; Reactivity – NO

SARA 313 List: No chemicals in this product are reportable under Section 313 Title III and 40 CFR Part 372

CERCLA Hazardous Substances and corresponding RQs: None of the chemicals in this product are on this list.

RCRA: None of the chemicals in this product are on this list.

Clean Air Act: Hazardous Air Pollutants? NO **Class 1 Ozone Depletors?** NO **Class 2 Ozone Depletors?** NO
Cyclohexylamine has a TQ of 15,000 lbs.

Clean Water Act: Hazard Substance? NO **Priority Pollutant?** NO **Toxic Pollutant?** NO

Chemical Weapons Convention: None of the chemicals in this product are on this list.

Drug Enforcement Agency (DEA) CDTA: None of the chemicals in this product are on this list.

OSHA: None of the chemicals in this product are considered Highly Hazardous by OSHA.

FDA: Federal Food, Drug and Cosmetic Act: When use situations necessitate compliance with FDA regulations, this product **is not** acceptable under 21 CFR 173.310 Boiler Water Additives.

State Right-to-Know Lists: Cyclohexylamine and Morpholine are found on the Right-to-Know lists of California, Florida, New Jersey, Pennsylvania, Minnesota and Massachusetts.

Section 16: Other Information

Abbreviations and acronyms used:

ACGIH	American Congress of Governmental Industrial Hygienists	NA	not applicable, not available
ANSI	American National Standards Institute	NIOSH	National Institute for Occupational Safety and Health
atm	atmosphere (pressure unit)	ND	not determined
BOD	biological oxygen demand	NFPA	National Fire Prevention Association
CAS	Chemical Abstracts Service	NTP	National Toxicology Program
CC	closed cup	OC	open cup
CDTA	Chemical Drug and Trafficking Act	OSHA	Occupational Safety and Health Administration
COC	Cleveland Open Cup	Part	partition
COD	chemical oxygen demand	PEL	permissible exposure limits
coeff.	coefficient	ppb	parts per billion
CFR	Code of Federal Regulations	PPE	personal protective equipment
CPR	cardio-pulmonary resuscitation	ppm	parts per million
DEA	Drug Enforcement Agency	psi	pounds per square inch
DOT	Department of Transportation	RCRA	Resource Conservation and Recovery Act
FDA	Food and Drug Administration	RQ	Reportable quantity
IARC	Internat'l Agency for Research on Cancer	RTK	Right to Know
IDLH	immediate danger to life and health	SARA	Superfund Amendments and Reauthorization Act
kg	kilogram	STEL	short-term exposure limit
L	liter	TCC	Tagliabue Closed Cup
LC50	median lethal concentration	TPQ	threshold planning quantity
LD50	median lethal dose	TQ	threshold quantity
LEL	lower explosive limit	TSCA	Toxic Substances Control Act
mg	milligram	TWA	time-weighted average
mL	milliliter	UEL	upper explosive limit

This document was prepared in accordance with 29 CFR 1910.1200 and ANSI Z400.1-2005.

Prepared by Douglas R. Chrisope on May 17, 2006.

REVISION STATEMENT: Changes have been made throughout this Material Safety Data Sheet. Please read the entire document.

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