

**Appendix D – Material Safety Data Sheets and Cooling Tower Additives**

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**GE Betz**

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
Business telephone: (215) 355-3300

Material Safety Data Sheet

Issue Date: 19 NOV 2003

**EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940**

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## 1 PRODUCT IDENTIFICATION

PRODUCT NAME:

**FLOGARD MS6206**

PRODUCT APPLICATION AREA:

**WATER-BASED CORROSION INHIBITOR.**

## 2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

### HAZARDOUS INGREDIENTS:

This product is not hazardous as defined by OSHA regulations.

No component is considered to be a carcinogen by the National Toxicology Program, the international Agency for research on cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

This product contains 5-10% tetrapotassium pyrophosphate (TPPP) CAS# 7320-34-5. TPPP is listed by WHMIS as a hazardous ingredient. TPPP is corrosive to aluminum.

## 3 HAZARDS IDENTIFICATION

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### EMERGENCY OVERVIEW

#### CAUTION

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable  
Emergency Response Guide is not applicable  
Odor: None; Appearance: Colorless, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face piece type). Proper fire extinguishing media: dry chemical, carbon dioxide, foam or water

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**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; May cause slight irritation to the skin.

**ACUTE EYE EFFECTS:**

May cause moderate irritation to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Mists/aerosols may cause irritation to upper respiratory tract.

**INGESTION EFFECTS:**

May cause slight gastrointestinal irritation.

**TARGET ORGANS:**

No evidence of potential chronic effects.

**MEDICAL CONDITIONS AGGRAVATED:**

Not known.

**SYMPTOMS OF EXPOSURE:**

Inhalation of dust and/or vapors may cause eye, nose, throat and respiratory tract irritation.

## 4 FIRST AID MEASURES

**SKIN CONTACT:**

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

**EYE CONTACT:**

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

## 5 FIRE FIGHTING MEASURES

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Thermal decomposition (destructive fires) yields elemental oxides.

**FLASH POINT:**

> 200F > 93C P-M(CC)

## 6 ACCIDENTAL RELEASE MEASURES

### PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

### DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

## 7 HANDLING & STORAGE

### HANDLING:

Normal chemical handling.

### STORAGE:

Keep containers closed when not in use. Reasonable and safe chemical storage.

## 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMITS

This product is not hazardous as defined by OSHA regulations.

### ENGINEERING CONTROLS:

adequate ventilation

### PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

#### RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS. If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

#### SKIN PROTECTION:

neoprene gloves-- Wash off after each use. Replace as necessary.

#### EYE PROTECTION:

splash proof chemical goggles

## 9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav. (70F, 21C)	1.528	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< < 0	Vapor Density (air=1)	< 1.00
Freeze Point (C)	< -18		
Viscosity (cps 70F, 21C)	30	% solubility (water)	100.0
Odor		None	
Appearance		Colorless	
Physical state		Liquid	
Flash Point	P-M(CC)	> 200F > 93C	
pH As Is (approx.)		8.8	

Evaporation Rate (Ether=1) < 1.00

NA = not applicable ND = not determined

## 10 STABILITY & REACTIVITY

### STABILITY:

Stable under normal storage conditions.

### HAZARDOUS POLYMERIZATION:

Will not occur.

### INCOMPATIBILITIES:

May react with strong oxides.

### DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

### INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"A"

## 11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT: >2,000 mg/kg

NOTE - Estimated value

Dermal LD50 RABBIT: >2,000 mg/kg

NOTE - Estimated value

## 12 ECOLOGICAL INFORMATION

### AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Static Renewal Bioassay

LC50= 1275; No Effect Level= 500 mg/L

Fathead Minnow 96 Hour Static Renewal Bioassay

LC50= 1740; No Effect Level= 1000 mg/L

Mysid Shrimp 48 Hour Static Renewal Bioassay

LC50= 724; No Effect Level= 155 mg/L

Rainbow Trout 96 Hour Acute Toxicity (Estimated)

LC50 Greater Than= 1000 mg/L

### BIODEGRADATION

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

## 13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 TRANSPORT INFORMATION

DOT HAZARD: Not Applicable  
 UN / NA NUMBER: Not applicable  
 DOT EMERGENCY RESPONSE GUIDE #: Not applicable

## 15 REGULATORY INFORMATION

**TSCA:**  
 All components of this product are listed in the TSCA inventory.  
**CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):**  
 No regulated constituent present at OSHA thresholds  
**FOOD AND DRUG ADMINISTRATION:**  
 21 CFR 176.170 (components of paper and paperboard in contact  
 with aqueous and fatty foods)  
**SARA SECTION 312 HAZARD CLASS:**  
 Product is non-hazardous under Section 311/312  
**SARA SECTION 302 CHEMICALS:**  
 No regulated constituent present at OSHA thresholds  
**SARA SECTION 313 CHEMICALS:**  
 No regulated constituent present at OSHA thresholds  
**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC  
 ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:**  
 No regulated constituent present at OSHA thresholds  
**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

## 16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

### CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	29-JAN-1997		** NEW **
	05-NOV-1997	2, 3, 8, 16	29-JAN-1997
	10-DEC-1997	12	05-NOV-1997
	02-MAR-1998	12	10-DEC-1997
	21-NOV-2001	15	02-MAR-1998
	04-JAN-2002	2, 3, 4, 8, 16	21-NOV-2001
	13-JUN-2002	2	04-JAN-2002
	10-JUL-2002	12	13-JUN-2002
	19-NOV-2003	3, 16	10-JUL-2002



## Material Safety Data Sheet

Issue Date: 03-APR-2007  
Supersedes: 03-APR-2007

### FOAMTROL AF1440

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## 1 Identification of Product and Company

### Identification of substance or preparation

FOAMTROL AF1440

### Product Application Area

Antifoam.

### Company/Undertaking Identification

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355-3300, F 215 953 5524

### Emergency Telephone

(800) 877-1940

Prepared by Product Stewardship Group: 215 355-3300

## 2 Composition / Information On Ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

### HAZARDOUS INGREDIENTS:

Cas#	Chemical Name	Range (w/w%)
54741-44-2	DISTILLATES, PETROLEUM, STRAIGHT-RUN MIDDLE similar petroleum oils have been shown to cause skin tumors in laboratory animals following lifetime exposure without washing or removal.	60-100

## 3 Hazards Identification

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### EMERGENCY OVERVIEW

#### CAUTION

May cause slight irritation to the skin. May cause dermatitis. May cause moderate irritation to the eyes. Moderate, prolonged exposure may cause headache. May cause chemical pneumonitis if aspirated into lungs.

DOT hazard is not applicable  
odor: Hydrocarbon; Appearance: Amber, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

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#### POTENTIAL HEALTH EFFECTS

##### ACUTE SKIN EFFECTS:

Primary route of exposure; May cause slight irritation to the skin. May cause dermatitis.

##### ACUTE EYE EFFECTS:

May cause moderate irritation to the eyes.

##### ACUTE RESPIRATORY EFFECTS:

Moderate, prolonged exposure may cause headache. May cause chemical pneumonitis if aspirated into lungs.

##### INGESTION EFFECTS:

May cause gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea. Small amounts aspirated during ingestion or vomiting may cause lung injury, possibly leading to death.

##### TARGET ORGANS:

Prolonged or repeated exposures may cause defatting-type dermatitis. Lifetime skin painting studies in mice have produced skin tumors.

##### MEDICAL CONDITIONS AGGRAVATED:

Not known.

##### SYMPTOMS OF EXPOSURE:

Prolonged exposure may cause drying and cracking of skin.

## 4 First Aid Measures

##### SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

##### EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

##### INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

##### INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

##### NOTES TO PHYSICIANS:

This product contains a hydrocarbon solvent. Aspiration into the lungs will result in chemical pneumonia and may be fatal.

## 5 Fire Fighting Measures

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

elemental oxides

**FLASH POINT:**

> 200F > 93C P-M(CC)

## 6 Accidental Release Measures

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container.

Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

## 7 Handling & Storage

**HANDLING:**

Vent carefully before opening.

**STORAGE:**

Keep containers closed when not in use. Store between 90-110F (32-43C) to prevent crystallization. If storage is below 90F (32C), warm and mix prior to use to ensure homogeneity. Store away from oxidizers.

## 8 Exposure Controls / Personal Protection

**EXPOSURE LIMITS**

**CHEMICAL NAME**

DISTILLATES, PETROLEUM, STRAIGHT-RUN MIDDLE

PEL (OSHA): 5 MG/M3

TLV (ACGIH): 5 MG/M3

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges and dust/mist prefilters.

**SKIN PROTECTION:**

viton gloves-- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles

## 9 Physical & Chemical Properties

Specific Grav. (70F, 21C)	0.867	Vapor Pressure (mmHG)	< 1.0
Freeze Point (F)	18	Vapor Density (air=1)	> 1.00
Freeze Point (C)	-8		
Viscosity(cps 70F, 21C)	11	% Solubility (water)	0.0

Odor	Hydrocarbon
Appearance	Amber
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH 5% Emulsion (approx.)	5.6
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	53.9

NA = not applicable      ND = not determined

## 10 Stability & Reactivity

**STABILITY:**  
stable under normal storage conditions.

**HAZARDOUS POLYMERIZATION:**  
Will not occur.

**INCOMPATIBILITIES:**  
May react with strong oxidizers.

**DECOMPOSITION PRODUCTS:**  
elemental oxides

**INTERNAL PUMPCUT/CLEANOUT CATEGORIES:**  
"B"

## 11 Toxicological Information

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg

## 12 Ecological Information

**AQUATIC TOXICOLOGY**

Daphnia magna 48 Hour Static Acute Bioassay  
LC50= 98.2; No Effect Level= 37 mg/L

Rainbow Trout 96 Hour Static Acute Bioassay  
LC50= 100; No Effect Level= 75 mg/L

**BIODEGRADATION**

BOD-28 (mg/g): 285  
BOD-5 (mg/g): 138  
COD (mg/g): 1486  
TOC (mg/g): 500

## 13 Disposal Considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 Transport Information

DOT HAZARD: Not Applicable  
PROPER SHIPPING NAME:

DOT EMERGENCY RESPONSE GUIDE #: Not applicable  
Note: Some containers may be DOT exempt, please check BOL for exact container classification

## 15 Regulatory Information

TSCA:  
All components of this product are listed in the TSCA inventory.  
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

Treat as oil spill

FOOD AND DRUG ADMINISTRATION:

21 CFR 176.210 (defoaming agents used in the manufacture of paper and paperboard)

When used in this specified application, all ingredients comprising this product are authorized by FDA for the manufacture of paper and paperboard that may contact aqueous and fatty foods as per 21 CFR 176.170(a)(4).

USDA FOOD PLANT APPROVALS:

SEC.G7,L1

SARA SECTION 312 HAZARD CLASS:

Immediate (acute), Delayed (Chronic)

SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds

### CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):

This product contains one or more ingredients at trace levels known to the state of California to cause cancer and reproductive toxicity.

### MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

## 16 Other Information

NFPA/HMIS		CODE TRANSLATION
Health	1	slight Hazard
Fire	1	slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

## CHANGE LOG

	EFFECTIVE DATE -----	REVISIONS TO SECTION: -----	SUPERCEDES -----
MSDS status:	29-JAN-1997		** NEW **
	01-JUL-1997	15	29-JAN-1997
	30-APR-1998	;EDIT:9	01-JUL-1997
	09-MAR-2000	15	30-APR-1998
	20-SEP-2000	2,15	09-MAR-2000
	06-OCT-2000	3,4	20-SEP-2000
	06-MAY-2003	4	06-OCT-2000
	03-APR-2007	3,8,15	06-MAY-2003



## Material Safety Data Sheet

Issue Date: 27-JUL-2007  
Supercedes: 27-JUL-2007

GENGARD GN8006

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### 1 Identification of Product and Company

**Identification of substance or preparation**

GENGARD GN8006

**Product Application Area**

Corrosion inhibitor

**Company/Undertaking Identification**

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: 215 355-3300

### 2 Composition / Information On Ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

Cas#	Chemical Name	Range (w/w%)
903573-39-7	ACRYLATE TERPOLYMER Potential eye and skin irritant	10-20
1310-73-2	SODIUM HYDROXIDE (CAUSTIC SODA) Corrosive; toxic (by ingestion)	1-5
7631-95-0	SODIUM MOLYBDATE (MOLYBDIC ACID, DISODIUM SALT) Potential irritant (respiratory); potential lung toxicity	1-5

### 3 Hazards Identification

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**EMERGENCY OVERVIEW**

**WARNING**

May cause slight irritation to the skin. Potential skin sensitizer. Severe irritant to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard: Corrosive to aluminum, RQ  
Odor: Mild; Appearance: Yellow To Amber, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

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#### POTENTIAL HEALTH EFFECTS

##### ACUTE SKIN EFFECTS:

Primary route of exposure; May cause slight irritation to the skin. Potential skin sensitizer.

##### ACUTE EYE EFFECTS:

Severe irritant to the eyes.

##### ACUTE RESPIRATORY EFFECTS:

Mists/aerosols may cause irritation to upper respiratory tract.

##### INGESTION EFFECTS:

May cause slight gastrointestinal irritation with possible nausea, vomiting, abdominal discomfort and diarrhea.

##### TARGET ORGANS:

No evidence of potential chronic effects.

##### MEDICAL CONDITIONS AGGRAVATED:

Not known.

##### SYMPTOMS OF EXPOSURE:

Inhalation may cause irritation of the respiratory tract. Skin contact may cause itching and/or redness.

## 4 First Aid Measures

##### SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

##### EYE CONTACT:

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

##### INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

##### INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 2-8 fluid ounces (60-240 mL) of milk or water.

##### NOTES TO PHYSICIANS:

No special instructions

## 5 Fire Fighting Measures

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of carbon

**FLASH POINT:**

> 213F > 101C P-M(CC)

**MISCELLANEOUS:**

Corrosive to aluminum, RQ  
UN 3266;Emergency Response Guide #154

## 6 Accidental Release Measures

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

## 7 Handling & Storage

**HANDLING:**

Normal chemical handling.

**STORAGE:**

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

## 8 Exposure Controls / Personal Protection

**EXPOSURE LIMITS**

**CHEMICAL NAME**

**ACRYLATE TERPOLYMER**

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

**SODIUM HYDROXIDE (CAUSTIC SODA)**

PEL (OSHA): 2 MG/M3 (CEILING)

TLV (ACGIH): 2 MG/M3 (CEILING)

**SODIUM MOLYBDATE (MOLYBDIC ACID, DISODIUM SALT)**

PEL (OSHA): 5 MG/M3 (AS Mo)

TLV (ACGIH): 0.5 MG/M3 (AS Mo) RESPIRABLE FRACTION

**ENGINEERING CONTROLS:**

adequate ventilation

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR

1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER  
 WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.  
 USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED  
 WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use any of  
 the following particulate respirators: N95, N99, N100, R95,  
 R99, R100, P95, P99 or P100.

**SKIN PROTECTION:**

neoprene gloves-- Wash off after each use. Replace as  
 necessary.

**EYE PROTECTION:**

splash proof chemical goggles

## 9 Physical & Chemical Properties

Specific Grav. (70F, 21C)	1.204	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	10	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-12		
Viscosity (cps 70F, 21C)	27	% Solubility (water)	100.0

Odor	Mild
Appearance	Yellow To Amber
Physical State	Liquid
Flash Point	P-M(CC) > 213F > 100C
pH As Is (approx.)	13.5
Evaporation Rate (Ether=1)	< 1.00
Percent VOC:	0.0

NA = not applicable      ND = not determined

## 10 Stability & Reactivity

**STABILITY:**

Stable under normal storage conditions.

**HAZARDOUS POLYMERIZATION:**

Will not occur.

**INCOMPATIBILITIES:**

May react with strong oxidizers.

**DECOMPOSITION PRODUCTS:**

oxides of carbon

**INTERNAL PUMPOUT/CLEANOUT CATEGORIES:**

"B"

## 11 Toxicological Information

Oral LD50 RAT: >2000 mg/kg

## 12 Ecological Information

**AQUATIC TOXICOLOGY**

Daphnia magna 48 Hour Static Acute Bioassay (Estimated)  
LC50= 2700; No Effect Level= 1500 mg/L  
Fathead Minnow 96 Hour Static Acute Bioassay (Estimated)  
LC50= 3300; No Effect Level= 2600 mg/L

**BIODEGRADATION**

No Data Available.

## 13 Disposal Considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
D002=Corrosive (pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 Transport Information

DOT HAZARD: Corrosive to aluminum, RQ  
PROPER SHIPPING NAME: CORROSIVE LIQUID, BASIC, INORGANIC,  
N.O.S. (SODIUM HYDROXIDE)  
8, UN 3266, PG III, RQ

DOT EMERGENCY RESPONSE GUIDE #: 154

Note: Some containers may be DOT exempt, please check BOL for exact container classification

## 15 Regulatory Information

**TSCA:**

All components of this product are included on or are in compliance with the U.S. TSCA regulations.

**CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):**

4,433 gallons due to SODIUM HYDROXIDE (CAUSTIC SODA);

**SARA SECTION 312 HAZARD CLASS:**

Immediate (acute)

**SARA SECTION 302 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC**

**ENFORCEMENT ACT (PROPOSITION 65):**

This product contains one or more ingredients at trace levels known to the state of California to cause cancer.

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

## 16 Other Information

NFPA/HMIS		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

#### CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	07-MAY-2007		** NEW **
	06-JUN-2007	8,15	07-MAY-2007
	27-JUL-2007	12;EDIT:Rebranding	06-JUN-2007



GE  
Water & Process Technologies

## Material Safety Data Sheet

Issue Date: 26-MAY-2006  
Supercedes: 26-MAY-2006

OPTISPERSE HP54434

### 1 Identification of Product and Company

**Identification of substance or preparation**

OPTISPERSE HP54434

**Product Application Area**

Water based internal boiler treatment chemical.

**Company/Undertaking Identification**

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355-3300, F 215 953 5524

**Emergency Telephone**

(800) 877-1940

Prepared by Product Stewardship Group: 215 355-3300

### 2 Composition / Information On Ingredients

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

Cas#	Chemical Name	Range (w/w%)
1310-73-2	SODIUM HYDROXIDE (CAUSTIC SODA) Corrosive; toxic (by ingestion)	3-7

### 3 Hazards Identification

\*\*\*\*\*

**EMERGENCY OVERVIEW**

**WARNING**

May cause moderate irritation to the skin. Severe irritant to the eyes, possibly corrosive. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard: Corrosive to aluminum, RQ  
Odor: None; Appearance: Colorless To Light Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media:

dry chemical/CO2/foam or water--slippery condition; use sand/grit.

\*\*\*\*\*

#### POTENTIAL HEALTH EFFECTS

##### ACUTE SKIN EFFECTS:

Primary route of exposure; May cause moderate irritation to the skin.

##### ACUTE EYE EFFECTS:

Severe irritant to the eyes, possibly corrosive.

##### ACUTE RESPIRATORY EFFECTS:

Mists/aerosols may cause irritation to upper respiratory tract.

##### INGESTION EFFECTS:

May cause gastrointestinal irritation with possible nausea, vomiting, diarrhea, incoordination, mental confusion, dizziness and lethargy.

##### TARGET ORGANS:

No evidence of potential chronic effects.

##### MEDICAL CONDITIONS AGGRAVATED:

Not known.

##### SYMPTOMS OF EXPOSURE:

May cause redness or itching of skin, irritation, and/or tearing of eyes (direct contact).

## 4 First Aid Measures

##### SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

##### EYE CONTACT:

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

##### INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

##### INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

##### NOTES TO PHYSICIANS:

No special instructions

## 5 Fire Fighting Measures

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical/CO<sub>2</sub>/foam or water--slippery condition; use sand/grit.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

elemental oxides

**FLASH POINT:**

> 200F > 93C P-M(CC)

**MISCELLANEOUS:**

Corrosive to aluminum, RQ  
UN 3266;Emergency Response Guide #154

## 6 Accidental Release Measures

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

## 7 Handling & Storage

**HANDLING:**

Alkaline. Do not mix with acidic material.

**STORAGE:**

Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

## 8 Exposure Controls / Personal Protection

**EXPOSURE LIMITS**

**CHEMICAL NAME**

SODIUM HYDROXIDE (CAUSTIC SODA)  
PEL (OSHA): 2 MG/M<sup>3</sup> (CEILING)  
TLV (ACGIH): 2 MG/M<sup>3</sup> (CEILING)

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.  
USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.  
If air-purifying respirator use is appropriate, use a respirator with dust/mist filters.

**SKIN PROTECTION:**

neoprene gloves-- Wash off after each use. Replace as

necessary.  
**EYE PROTECTION:**  
 splash proof chemical goggles

## 9 Physical & Chemical Properties

Specific Grav. (70F,21C)	1.068	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	29	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-2		
Viscosity(cps 70F,21C)	8	% solubility (water)	100.0

Odor	None		
Appearance	Colorless To Light Yellow		
Physical State	Liquid		
Flash Point	P-M(CC)	> 200F	> 93C
pH As Is (approx.)	> 13.0		
Evaporation Rate (Ether=1)	< 1.00		
Percent VOC:	0.0		

NA = not applicable      ND = not determined

## 10 Stability & Reactivity

**STABILITY:**  
 Stable under normal storage conditions.

**HAZARDOUS POLYMERIZATION:**  
 Will not occur.

**INCOMPATIBILITIES:**  
 May react with strong oxidizers.

**DECOMPOSITION PRODUCTS:**  
 elemental oxides

**INTERNAL PUMPOUT/CLEANOUT CATEGORIES:**  
 "D"

## 11 Toxicological Information

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

## 12 Ecological Information

### AQUATIC TOXICOLOGY

Daphnia magna 48 Hour Acute Toxicity (Estimated)  
 LC50 Greater Than= 5000; No Effect Level= 4950 mg/L  
 Fathead Minnow 96 Hour Acute Toxicity (Estimated)  
 No Effect Level= 5000 mg/L

### BIODEGRADATION

Product contains only inorganics that are not subject to typical biological degradation. Assimilation by microbes may occur in waste treatment or the environment.

## 13 Disposal Considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
D002=Corrosive (pH).

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 Transport Information

DOT HAZARD: Corrosive to aluminum, RQ  
PCPPER SHIPPING NAME: CORROSIVE LIQUID, BASIC, INORGANIC,  
N.O.S.(SODIUM HYDROXIDE)  
8, UN 3266, PG III, RQ  
DOT EMERGENCY RESPONSE GUIDE #: 154  
Note: some containers may be DOT exempt, please check BOL for exact container classification

## 15 Regulatory Information

TSCA:  
All components of this product are listed in the TSCA inventory.  
CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):  
3,213 gallons due to SODIUM HYDROXIDE (CAUSTIC SODA);  
SARA SECTION 312 HAZARD CLASS:  
Immediate (acute)  
SARA SECTION 302 CHEMICALS:  
No regulated constituent present at OSHA thresholds  
SARA SECTION 313 CHEMICALS:  
No regulated constituent present at OSHA thresholds

### CALIFORNIA REGULATORY INFORMATION

CALIFORNIA SAFE DRINKING WATER AND TOXIC  
ENFORCEMENT ACT (PROPOSITION 65):  
No regulated constituents present

### MICHIGAN REGULATORY INFORMATION

No regulated constituent present at OSHA thresholds

## 16 Other Information

NFPA/HMIS		CODE TRANSLATION
Health	2	Moderate Hazard
Fire	0	Minimal Hazard
reactivity	0	Minimal hazard
Special	ALK	pH above 12.0
(1) Protective Equipment	B	Goggles, Gloves

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

### CHANGE LOG

EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
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MSDS status: 07-DEC-1998  
08-JAN-2002 4  
26-MAY-2006 8

\*\* NEW \*\*  
07-DEC-1998  
08-JAN-2002



**GE Betz**

GE Betz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
Business telephone: (215) 355 3300

Material Safety Data Sheet

Issue Date: 28-APR-2003

**EMERGENCY TELEPHONE (Health/Accident): (800) 877-1940**

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## 1 PRODUCT IDENTIFICATION

PRODUCT NAME:

**SPECTRUS NX1103**

PRODUCT APPLICATION AREA:

**WATER-BASED MICROBIAL CONTROL AGENT.**

## 2 COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

CAS#	CHEMICAL NAME
13590-97-1	DODECYLGUANIDINE HYDROCHLORIDE (DGH) Corrosive
6317-18-6	METHYLENE BIS(THIOCYANATE) Corrosive (eyes); toxic (by ingestion); irritant (skin); potential sensitizer (skin)
67-63-0	ISOPROPYL ALCOHOL (IPA) Flammable liquid; chronic overexposure may cause liver and kidney toxicity

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the occupational safety and Health Administration at OSHA thresholds for carcinogens.

## 3 HAZARDS IDENTIFICATION

\*\*\*\*\*

**EMERGENCY OVERVIEW**

**DANGER**

Severe irritant to the skin. Skin sensitizer. Corrosive to the eyes. Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

DOT hazard: Combustible liquid  
Emergency Response Guide #27  
Odor: slight Pungent; Appearance: Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical/CO2/foam or water--slippery condition; use sand/grit.

\*\*\*\*\*

#### POTENTIAL HEALTH EFFECTS

##### ACUTE SKIN EFFECTS:

Primary route of exposure; Severe irritant to the skin. Skin sensitizer.

##### ACUTE EYE EFFECTS:

Corrosive to the eyes.

##### ACUTE RESPIRATORY EFFECTS:

Primary route of exposure; Vapors, gases, mists and/or aerosols cause irritation to the upper respiratory tract.

##### INGESTION EFFECTS:

May cause severe gastrointestinal irritation.

##### TARGET ORGANS:

Prolonged or repeated exposures may cause primary irritant dermatitis and/or skin sensitization.

##### MEDICAL CONDITIONS AGGRAVATED:

Not known.

##### SYMPTOMS OF EXPOSURE:

Inhalation of vapors/mists/aerosols cause eye, nose, throat and lung irritation. Skin contact may cause redness, itching, dermatitis, or skin sensitization.

## 4 FIRST AID MEASURES

##### SKIN CONTACT:

Wash thoroughly with soap and water. Remove contaminated clothing. Thoroughly wash clothing before reuse. Get medical attention if irritation develops or persists.

##### EYE CONTACT:

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

##### INHALATION:

Remove to fresh air. If breathing is difficult, give oxygen. If breathing has stopped, give artificial respiration. Get immediate medical attention.

##### INGESTION:

Do not feed anything by mouth to an unconscious or convulsive

victim. Do not induce vomiting. Immediately contact physician.  
Dilute contents of stomach using 3-4 glasses milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

## 5 FIRE FIGHTING MEASURES

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical/CO2/foam or water--slippery condition; use sand/grit.

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Thermal decomposition (destructive fires) yields elemental oxides.

**FLASH POINT:**

120F 49C SETA(CC)

**MISCELLANEOUS:**

Combustible liquid

NA1993;Emergency Response Guide #27

## 6 ACCIDENTAL RELEASE MEASURES

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Remove ignition sources. Flush area with water. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

## 7 HANDLING & STORAGE

**HANDLING:**

Combustible. Corrosive to skin and/or eyes.

**STORAGE:**

Keep containers closed when not in use. Keep away from flames or sparks. Bond containers during filling or discharge when performed at temperatures at or above the product flash point.

## 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

**EXPOSURE LIMITS**

**CHEMICAL NAME**

DODECYLGUANIDINE HYDROCHLORIDE (DGH)

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

METHYLENE BIS(THIOCYANATE)

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

ISOPROPYL ALCOHOL (IPA)

PEL (OSHA): 400 PPM(500PPM-STEL)

TLV (ACGIH): 400 PPM(500PPM-STEL)

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS. If air-purifying respirator use is appropriate, use a respirator with organic vapor and HEPA cartridges.

**SKIN PROTECTION:**

gauntlet-type neoprene gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles, face shield

**9 PHYSICAL & CHEMICAL PROPERTIES**

Specific Grav. (70F,21C)	1.095	Vapor Pressure (mmHG)	24.0
Freeze Point (F)	< -30	Vapor Density (air=1)	> 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	64	% solubility (water)	< 1.0

odor		Slight Pungent
Appearance		Yellow
Physical State		Liquid
Flash Point	SETA(CC)	120F 48C
pH As Is (approx.)		3.2
Evaporation Rate (Water=1)		< 1.00

NA = not applicable ND = not determined

**10 STABILITY & REACTIVITY****STABILITY:**

Stable under normal storage conditions.

**HAZARDOUS POLYMERIZATION:**

Will not occur.

**INCOMPATIBILITIES:**

May react with strong oxidizers.

**DECOMPOSITION PRODUCTS:**

Thermal decomposition (destructive fires) yields elemental oxides.

**INTERNAL PUMPOUT/CLEANOUT CATEGORIES:**

"B"

**11 TOXICOLOGICAL INFORMATION**

Oral LD50 RAT:	668 mg/kg
NOTE - Rat oral LD50:	520 mg/kg in an earlier study
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Rabbit Dermal LD50:	>16,000 mg/kg in an earlier study
Inhalation LC50 RAT:	>2.90 mg/L/hr
NOTE - Maximum achievable concentration	
Skin Irritation Score RABBIT:	4.9
NOTE - Skin Irritation Score:	2.46 in an earlier study
Eye Irritation Score RABBIT:	102

NCTE - Irreversible; 21 day test, max.ave. score day 2  
Skin Sensitization G.PIG: POSITIVE  
NCTE - Magnusson & Kligman method

## 12 ECOLOGICAL INFORMATION

### AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Acute Bioassay  
LC50= 2.7; No Effect Level= 1.5 mg/L  
Daphnia magna 48 Hour Static Renewal Bioassay  
LC50= .26; No Effect Level= .14 mg/L  
Fathead Minnow 96 Hour Static Renewal Bioassay  
LC50= 1.1; No Effect Level= .36 mg/L  
Rainbow Trout 96 Hour Static Acute Bioassay  
LC50= 2.7; No Effect Level= 1.33 mg/L

### BIODEGRADATION

BOD-28 (mg/g): 518  
BOD-5 (mg/g): 93  
COD (mg/g): 1424  
TOC (mg/g): 418

## 13 DISPOSAL CONSIDERATIONS

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
D001=Ignitable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 TRANSPORT INFORMATION

DOT HAZARD: Combustible liquid  
UN / NA NUMBER: NA1993  
DOT EMERGENCY RESPONSE GUIDE #: 27

## 15 REGULATORY INFORMATION

### TSCA:

This is an EPA registered biocide and is exempt from TSCA inventory requirements.

### CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

No regulated constituent present at OSHA thresholds

### FIFRA REGISTRATION NUMBER:

3876- 121

### FOOD AND DRUG ADMINISTRATION:

The ingredients in this product are approved by FDA under 21 CFR 176.300.

### USDA FEDERALLY INSPECTED MEAT AND POULTRY PLANTS:

SEC.G5,G7

### SARA SECTION 312 HAZARD CLASS:

Immediate(acute);Delayed(Chronic);Fire

### SARA SECTION 302 CHEMICALS:

No regulated constituent present at OSHA thresholds

### SARA SECTION 313 CHEMICALS:

No regulated constituent present at OSHA thresholds  
**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC  
 ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:**

No regulated constituent present at OSHA thresholds  
**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

## 16 OTHER INFORMATION

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
fire	2	Moderate Hazard
Reactivity	0	Minimal Hazard
special	NONE	No special Hazard
(1) Protective Equipment	D	Goggles, Face Shield, Gloves, Apron

(1) refer to section 8 of MSDS for additional protective equipment recommendations.

### CHANGE LOG

	EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
	-----	-----	-----
MSDS status:	03-OCT-1997		** NEW **
	02-DEC-1997	15	03-OCT-1997
	23-DEC-1997	15	02-DEC-1997
	01-JUN-1998	8	23-DEC-1997
	12-JAN-1999	3, 7	01-JUN-1998
	06-APR-1999	1	12-JAN-1999
	22-MAR-2002	4	06-APR-1999
	28-APR-2003	9	22-MAR-2002

**Material Safety Data Sheet**

MSDS Revision Date: 8/20/09

Page 1 of 6

PRODUCT: Sodium Hypochlorite Solution



**1. Product and Company Identification**

**Product Identity: Sodium Hypochlorite Solution**

Chemical Formula: NaOCl

Molecular Weight: 74.45

Synonyms: Sodium Hypochlorite Solution (10-15.6%); Hypochlorite Solution; Bleach Solution, Hypochlorous acid, sodium salt, &/or AB Bleach; sodium hypochlorite/de-ionized water, Sodium Hypochlorite Solution 10%; Sno-glo Bleach; Hypochlorous acid, sodium salt

**Brenntag Mid-South Inc.**  
1405 Hwy 136 W  
Henderson, KY 42420

Technical Information: 270-830-1200  
Emergency Number: 800-424-9300 (CHEMTREC)  
Emergency Number: 703-5273887 (International)

**2. Hazards Identification**

PRECAUTIONARY STATEMENTS (Hazards to humans and domestic animals): Danger! Corrosive! May cause severe skin and eye irritation or chemical burns to broken skin. Causes eye damage. Exposure to skin may cause sensitization or other allergic responses.

INHALATION: Corrosive! Product may cause severe irritation of the nose, throat and respiratory tract. Repeated and/or prolonged exposures may cause productive cough, runny nose, bronchopneumonia, pulmonary edema (fluid build-up in lungs), and reduction of pulmonary function. Repeated inhalation exposure may cause impairment of lung function and permanent lung damage.

EYE CONTACT: Extremely corrosive! This product causes corneal scarring and clouding. Glaucoma, cataracts and permanent blindness may occur.

SKIN CONTACT: Corrosive! Concentrated solutions may cause pain and deep and severe burns to the skin. Prolonged and repeated exposure to diluted solutions often causes irritation, redness, pain and drying and cracking of the skin. Human evidence has indicated that an ingredient in this product can cause skin sensitization.

INGESTION: Corrosive! Will immediately cause severe corrosion of and damage to the gastrointestinal tract. Exposure characterized by nausea, vomiting, diarrhea, abdominal pain, bleeding, and/or tissue ulceration.

PRIMARY ROUTES OF ENTRY: Inhalation and contact.

**3. Composition/Information on Ingredients**

CAS NUMBER	CHEMICAL NAME(S)	*WT%
7681-52-9	Sodium hypochlorite**	10 - 15.6
1310-73-2	Sodium hydroxide	0.3 - 1.8
7647-14-5	Sodium Chloride	9 - 14.9
497-19-8	Sodium carbonate	≤ 0.5
7732-18-5	Water	Balance

## Material Safety Data Sheet

MSDS Revision Date: 8/20/09

Page 2 of 6

PRODUCT: Sodium Hypochlorite Solution



### 4. First Aid Measures

**INHALATION:** Remove victim to fresh air. Give artificial respiration if not breathing. Get medical attention.

**EYE CONTACT:** Wash eyes with plenty of water for at least 15 minutes while holding eyelids open. Consult an eye specialist immediately.

**SKIN CONTACT:** Flush skin with plenty of water while removing contaminated clothing. Get medical attention for persistent irritation. Clean clothing before reuse.

**INGESTION:** If swallowed drink large quantities of water. Do NOT induce vomiting. Call a poison control center or doctor immediately for treatment advice. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water.

### 5. Fire Fighting Measures

**FLASH POINT (METHOD USED):** Non - flammable      **FLAMMABLE LIMITS (% BY VOLUME):** n.a.

**EXTINGUISHING MEDIA:** Use water spray, fog, foam, dry chemicals, or carbon dioxide.

**SPECIAL FIRE FIGHTING PROCEDURES:** Firefighters should wear protective equipment including self contained breathing apparatus. Avoid fumes. Dilute spill with copious amounts of water, ventilate. Be prepared to use respirator.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Possible vigorous reaction upon contamination with organics or oxidizing agents. Bleach decomposes when heated, decomposition products may cause containers to rupture or explode. Many reactions can cause fire and explosion. This material will react with some metals which may cause liberation of oxygen. Toxic fumes can be liberated by contact with acid or heat. Vigorous reactions can occur with oxidizable materials and organics. Keep material cool using a water spray from a safe distance. Keep all unnecessary people away. Stay up wind and stay out of low-lying areas.

### 6. Accidental Release Measures

**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Personnel with proper protective equipment should contain spill. Flush area with large amounts of water. Use reducing agents such as bisulfites or ferrous salt solutions to neutralize.

**Material Safety Data Sheet**

MSDS Revision Date: 8/20/09

Page 3 of 6

PRODUCT: Sodium Hypochlorite Solution



**7. Handling and Storage**

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:** Store this product in a cool dry area; away from direct sunlight and heat to avoid deterioration. In case of spill, flood areas with large quantities of water. Product or rinsates that cannot be used should be diluted with water before disposal in a sanitary sewer. Do not reuse container. Do not contaminate food or feed by storage, disposal or cleaning of equipment. Most metals and metal alloys are NOT suitable for use in contact with sodium hypochlorite solutions including aluminum, brass, bronze, copper, cast iron, galvanized steel, mild steel, nickel, or stainless steel, since these metals act as a catalyst which will **cause** rapid decomposition of the sodium hypochlorite solution through the release of oxygen.

Sodium hypochlorite solutions are basically unstable, and on exposure to heat and/or light, will slowly decompose, becoming less concentrated with time. Sodium hypochlorite solutions should never be allowed to contact or mix with acids or other low pH compounds, due to the release of chlorine gas. Do not allow sodium hypochlorite to mix with ammonia, since chloramines may be formed.

Decomposition of sodium hypochlorite takes place within a few seconds with following salts: ammonium acetate, ammonium carbonate, ammonium nitrate, ammonium oxalate, and ammonium phosphate.

Hypochlorites react with urea to form nitrogen trichloride, which explodes spontaneously in air.

Solutions of sodium hypochlorite are corrosive to the skin, eyes, and mucous membranes. Proper safety equipment should be used when working with or in close proximity of sodium hypochlorite.

**OTHER PRECAUTIONS:** Use with adequate ventilation. Wash thoroughly after handling. Do not get in eyes, on skin or clothing. Do NOT breathe fumes or mist. Mixing this product with chemicals (e.g. common household cleaners, ammonia, acids, detergents, etc.) or organic matter will release chlorine gas, which is irritating to eyes, lungs, and mucous membranes.

**STRONG OXIDIZING AGENT:** Mix only with water according to label directions. Mixing this product with chemicals (e.g. common household cleaners, ammonia, acids, detergents, etc.) or organic matter (e.g. urine, feces, etc.) will release chlorine gas, which is irritating to eyes, lungs and mucous membranes.

**8. Exposure Controls/Personal Protection**

CAS NUMBER	CHEMICAL NAME(S)	*WT%	THRESHOLD LIMIT VALUES (UNITS)			
			OSHA:		ACGIH:	
			PEL	STEL	TLV	STEL
7681-52-9	Sodium hypochlorite*	10-15.6	- NONE ESTABLISHED -			
1310-73-2	Sodium hydroxide	0.3 - 1.8	2 mg/m <sup>3</sup> Ceiling	--	2 mg/m <sup>3</sup> Ceiling	--
7647-14-5	Sodium Chloride	9 - 14.9	- NONE ESTABLISHED -			
497-19-8	Sodium carbonate	≤ 0.5	- NONE ESTABLISHED -			
7732-18-5	Water	Balance	- NONE ESTABLISHED -			

\*\* % (w/w) as Cl<sub>2</sub> 9.5 to 14.9% TLVITWA (ACGIH) 0.5ppm Cl<sub>2</sub>; TLV/STEL (ACGIH) 1ppm Cl<sub>2</sub> & PEL (OSHA) 1ppm Cl<sub>2</sub>

**RESPIRATORY PROTECTION:** When fumes present, use NIOSH approved respirator with acid type canister.

**VENTILATION:** Local exhaust preferable as required to control fumes.

**PROTECTIVE GLOVES:** Rubber or plastic.

**EYE PROTECTION:** Chemical goggles.

**OTHER PROTECTIVE EQUIPMENT:** Clothing to protect skin. Safety shower and eye wash fountain.

## Material Safety Data Sheet

MSDS Revision Date: 8/20/09

Page 4 of 6

PRODUCT: Sodium Hypochlorite Solution



### 9. Physical and Chemical Properties

BOILING POINT of (OC): 110°C for 15% NaClO

SPECIFIC GRAVITY (H2O=1): 1.08 - 1.27

VAPOR DENSITY (AIR =1): n.a.

EVAPORATION RATE: n.a.

VAPOR PRESSURE (mmHg): Vapor pressure of water plus decomposition products.

PERCENT VOLATILE BY VOLUME (%): Water vapor plus decomposition products.

SOLUBILITY IN WATER: Complete

APPEARANCE AND ODOR: Light, yellow-green liquid

### 10. Stability and Reactivity

STABILITY: Unstable (Contingent upon temperature, contamination (metals), and pH.)

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Heat, light exposure, decrease in pH, and contamination with heavy metals, such as nickel, cobalt, copper and iron.

INCOMPATIBILITY (MATERIALS TO AVOID): Heavy metals, reducing agents, organics, ether, ammonia, ammonium acetate, ammonium carbonate, ammonium nitrate, ammonium oxalate, ammonium phosphate, urea and acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Hypochlorous acid, chlorine, hydrochloric acid, sodium chloride, sodium chlorate, and oxygen. Decomposition of sodium hypochlorite takes place within a few seconds with following salts: ammonium acetate, ammonium carbonate, ammonium nitrate, ammonium oxalate, and ammonium phosphate. Hypochlorites react with urea to form nitrogen trichloride, which explodes spontaneously in air.

### 11. Toxicological Information

TOXICITY DATA: Oral LD50: 8,910 mg/kg. (Rats)

Acute dermal toxicity: III; LD50, > 3,000 mg/kg

Dermal LD 50: > 10,000 mg/kg. (Rabbits)

Primary eye irritation: I; Corrosive

Inhalation 0.25-hour LC 50: >10.5 mg/l (Rats)

Primary skin irritation: I; Corrosive

Acute oral toxicity: IV; LD50, 192 mg/kg

SUMMARY: The concentrated solution is corrosive to skin, and a 5% solution is a severe eye irritant. Solutions containing more than 5% available chlorine are classified by DOT corrosive. Toxicity described in animals from single exposures by ingestion includes muscular weakness, and hyperactivity. Repeated ingestion exposure in animals caused an increase in the relative weight of adrenal glands in one study, but no pathological change were observed in two other studies. Long-term administration of compound in drinking water of rats caused depression of the immune system. No adverse changes were observed in an eight-week dermal study of a 1% solution in guinea pigs. Tests in animals demonstrate no carcinogenic activity by either the oral or dermal routes. Tests in bacterial and mammalian cell cultures demonstrate mutagenic activity.

Material Safety Data Sheet  
MSDS Revision Date: 8/20/09  
Page 5 of 6  
PRODUCT: Sodium Hypochlorite Solution



## 12. Ecological Information

**ENVIRONMENTAL HAZARDS:** This pesticide is toxic to fish and aquatic organisms. Do not discharge effluents containing this product into lakes, streams, ponds, 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 sewage treatment plant authority. For guidance, contact you State Water Board or Regional Office of the EPA.

Acute oral-bobwhite quail: LD50, > 2510 mg/kg  
Acute dietary-mallard duck: LC50, > 5220 ppm  
Acute dietary-bobwhite quail: LC50, > 5620 ppm  
Acute fish-rainbow trout: LC50, 0.18-0.22 mg/l  
Acute fish-bluegill sunfish: LC50, 0.44-0.79 mg/l

Acute invertebrate-daphnia: LC50, 0.033-0.048 mg/l  
Fathead minnows: 96-hour LC50, 5.9 mg/LO  
Rainbow Trout: 96-hour LC50, 0.2mg/liter  
Bluegill sunfish: 96-hour LC50, 0.58mg/liter

## 13. Disposal Considerations

**WASTE DISPOSAL METHOD:** Disposal is to be in accordance with all Federal, State, and Local regulations.

## 14. Transport Information

**PROPER SHIPPING NAME:** Hypochlorite Solutions

**HAZARD CLASS:** 8 (Corrosive)

**UN/NA:** UN 1791

**PACKING GROUP:** III

**D.O.T. LABEL REQUIRED:** Corrosive

**REPORTABLE QUANTITY OF PRODUCT:** 800 to 2,000 lbs.

## 15. Regulatory Information

**TSCA (Toxic Substance Control Act):** All components of this product are listed on the TSCA inventory.

**CERCLA AND SARA REGULATIONS, 40 CFR §300-373:**

Super fund Reportable Discharge = 100 pounds (100% NaOCl) CERCLA Hazardous Material: yes

SARA Extremely Hazardous substance: No

SARA Toxic Chemical: No

Title III Hazard Classifications: Acute: yes Chronic: yes Fire: no Reactivity: yes Pressure: No

**EPA "CLEAN AIR ACT":** This product does not contain nor is it manufactured with ozone depleting substances.

**OTHER REGULATIONS/LEGISLATION THAT APPLY TO THIS PRODUCT:** Massachusetts, Pennsylvania, and New Jersey Right-to Know Laws.

## Material Safety Data Sheet

MSDS Revision Date: 8/20/09

Page 6 of 6

PRODUCT: Sodium Hypochlorite Solution

**BRENNTAG**

### 16. Other Information

**HMIS HAZARD RATING:** Health 3

Flammability 0

Reactivity 2

**VOE CONTENT (lbs/gal):** n.a.

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Brenntag Mid-South Inc.  
1405 Hwy 136 W  
Henderson, KY 42420

PREPARED BY: *MS Miller*

APPROVED BY: *James Clements / JSCM*

C:\R01\WORD\MSOS\ 00 HYPOCHLORITE



**BRENNTAG MID-SOUTH, INC.**  
**MATERIAL SAFETY DATA SHEET**  
 Effective Date: June 11, 2008

**SULFURIC ACID**  
 (With more than 51% acid)

**SECTION I - MATERIAL IDENTIFICATION**

**MANUFACTURER'S NAME & ADDRESS:**

Brenntag Mid-South, Inc.  
 1405 Highway 136 West / Geneva Road  
 Henderson, Kentucky 42420

**EMERGENCY TELEPHONE NUMBER:**

270-830-1222

**CHEMICAL NAME AND SYNONYMS:** Sulfuric Acid 1.500, Sulfuric Acid 1.600, 50% by volume, 51 to 89% by weight, 42 to 65° Baume, Sulfuric acid greater than 51% acid.

**CHEMICAL FAMILY:** Mineral acid

**FORMULA:** H<sub>2</sub>SO<sub>4</sub>

**SECTION II - HAZARDOUS INGREDIENTS**

CAS NUMBER	CHEMICAL NAME(S)	WT %	THRESHOLD LIMIT VALUES (UNITS)			
			OSHA:		ACGIH:	
			PEL	STEL	TLV	STEL
7664-93-9	**Sulfuric Acid	> 51%	1 mg/m <sup>3</sup>	—	1 mg/m <sup>3</sup> , A2	3 mg/m <sup>3</sup> , A2
7732-18-5	Water	< 49%	Non - hazardous			

**SECTION III - PHYSICAL DATA**

**BOILING POINT\*F (°C):** 256 - 468° F(124.6 -242.4° C)

**SPECIFIC GRAVITY (H<sub>2</sub>O=1):** min 1.409 @ 60° F

**VAPOR DENSITY (AIR =1):** 1.7 Approximately

**PERCENT VOLATILE BY VOLUME (%):** Water Vapor Only

**VAPOR PRESSURE (mmHg):** 68° F < 0.001 mmHg

**EVAPORATION RATE (Butyl Acetate = 1):** < 1

**SOLUBILITY IN WATER:** Complete.

**APPEARANCE AND ODOR:** Clear, colorless liquid with no odor.

**SECTION IV - FIRE AND EXPLOSION HAZARD DATA**

**FLASH POINT (METHOD USED):** None.

**FLAMMABLE LIMITS (% BY VOLUME):** Not Flammable

**EXTINGUISHING MEDIA:** Acid itself is not flammable but can cause ignition by contact with combustible liquids and solids. Use dry chemical, carbon dioxide, water fog.

**SPECIAL FIRE FIGHTING PROCEDURES:** Hydrogen gas can accumulate in containers and care must be taken not to ignite. Wear protective clothing including self-contained breathing apparatus.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Not Applicable.



**BRENTAG MID-SOUTH, INC.**  
**MATERIAL SAFETY DATA SHEET**  
 Effective Date: June 11, 2008

## SULFURIC ACID

(With more than 51% acid)

### SECTION V - HEALTH HAZARD DATA

#### **EFFECTS OF OVEREXPOSURE:**

**INHALATION:** Can cause irritation or corrosive burns to upper respiratory system, including nose, mouth, and throat. Lung irritation and pulmonary edema can also occur. Pulmonary edema (body fluid in the lungs) with cough, wheezing, and abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin; symptoms may be delayed. Repeated or prolonged exposure to mists may cause corrosion of the teeth.

**EYE CONTACT:** Eye contact can cause irritation, corneal burns, and conjunctivitis. Blindness may result, or severe or permanent injury.

**SKIN CONTACT:** Contact with liquid may cause: skin corrosion, burns or ulcers. Contact with a 1% solution may cause: Slight irritation with itching, redness or swelling. Repeated and/or prolonged exposure to mists may cause: Irritation with itching, burning, redness, swelling or rash.

**INGESTION:** Can cause irritation and corrosive burns to mouth, throat, and stomach, with severe pain, bleeding, vomiting, diarrhea and collapse of blood pressure – damage may appear days after exposure.

**PRIMARY ROUTES OF ENTRY:** Inhalation, eye and Skin Contact.

#### **EMERGENCY AND FIRST AID PROCEDURES:**

**INHALATION:** Remove victim to fresh air. Give artificial respiration if not breathing.

**EYE CONTACT:** Immediately flush eyes with plenty of water while holding eyelids open. Get medical attention immediately.

**SKIN CONTACT:** Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Continue washing with water if medical treatment is not available.

**INGESTION:** Drink large amounts of water or milk to dilute the acid. Do NOT induce vomiting. Get medical help immediately.

### SECTION VI - TOXICOLOGICAL INFORMATION

**TOXICITY DATA: TEETH:** Exposures to high concentrations (reportedly up to 16 mg/m<sup>3</sup>) cause dental erosion. Etching of teeth may occur after a few weeks exposure, progressing to erosion after a few months exposure. Dental etching and erosion occurred about 4 times as frequently in a high exposure group (over 0.3 mg/m<sup>3</sup>) compared to a low exposure group (below 0.07 mg/m<sup>3</sup>).

**Carcinogenicity:** Many studies have reported more cancer of the larynx and to a lesser extent the lungs, than expected, in a wide variety of processes involving the use of strong inorganic acids including sulfuric acid. Throughout these studies, sulfuric acid mists were the most common exposure, and in two studies, the number of cancers increased as exposure increased. Several of the studies had design weaknesses, such as exposure to other potentially carcinogenic chemicals at the same time. Nevertheless, some studies were well conducted and the overall trends indicate that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans. Examples of the processes studied include pickling, electroplating and other acid treatment of metals, the manufacture of lead-acid batteries and phosphate fertilizer production. The International Agency for Research on Cancer (IARC) has not evaluated the carcinogenicity of this chemical. However, IARC has concluded there is sufficient evidence that occupational exposure to strong inorganic acid mists containing sulfuric acid is carcinogenic to humans (Group 1). IARC's classification is for inorganic acid mists containing sulfuric acid and does not apply to sulfuric acid or sulfuric acid solutions. The American Conference of Governmental Industrial Hygienists (ACGIH) has not assigned a carcinogenicity designation to this chemical. However, ACGIH has designated strong inorganic acid mists containing sulfuric acid as A2 (suspected human carcinogen). The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens. However, the US NTP has listed strong inorganic acid mists containing sulfuric acid as a known human carcinogen.

**BRENNTAG MID-SOUTH, INC.****MATERIAL SAFETY DATA SHEET**

Effective Date: June 11, 2008

## SULFURIC ACID

(With more than 51% acid)

**SECTION VI - TOXICOLOGICAL INFORMATION (continued)**

**Teratogenicity and Embryotoxicity:** No human information is available. One animal study indicated that sulfuric acid is not teratogenic, even at maternally toxic doses.

**Reproductive Toxicity:** No human or animal information is available.

**Mutagenicity:** There was a significantly higher number of sister chromatid exchanges, micronuclei and chromosomal aberrations in cultured lymphocytes (white blood cells) from workers exposed to sulfur dioxide in a sulfuric acid factory. There was no correlation with length of service. No conclusions can be made based on this information.

**Toxicologically Synergistic Materials:** No information is available.

**Potential for Accumulation:** Sulfuric acid mist is absorbed through mucous membranes, ultimately into the bloodstream. The sulfate anion becomes part of the pool of sulfate anions in the body and is excreted in the urine in combination with other chemicals in the body. It is unlikely to accumulate in the body.

**SECTION VII - ECOLOGICAL INFORMATION**
**ECOTOXICITY:**

LC50 (rat): 510 mg/m<sup>3</sup> (2 hour-exposure) (255 mg/m<sup>3</sup> - equivalent 4-hour exposure)

LC50 (mouse): 320 mg/m<sup>3</sup> (2-hour exposure) (160 mg/m<sup>3</sup> - equivalent 4-hour exposure)

LD50 (oral, rat): 2140 mg/kg

**Eye Irritation:** Application of a 1% solution caused tissue death (necrosis) in rabbits. Application of a 5% solution, rinsed with water, caused clouding of the cornea and irritation in rabbits which cleared within 7 days; a 10% solution caused severe irritation and damage which persisted to day 7.

**Effects of Short-Term (Acute) Exposure:**

**Inhalation:** Low concentrations of aerosols have produced changes in lung function. There is species variation in sensitivity, with guinea pigs most sensitive (by a factor of 6), then rats and mice, with rabbits most resistant. Aerosol toxicity is influenced by particle size. No harmful changes were observed in rats following one week exposures to up to 100 mg/m<sup>3</sup> (particle size 0.5-1.7 micrometres), while 30 mg/m<sup>3</sup> caused fatal accumulation of fluid in the lungs (pulmonary edema) in guinea pigs.<sup>(5)</sup> The LC50 in guinea pigs ranged from 100 mg/m<sup>3</sup> (particle size 0.4 micrometres) to 30-40 mg/m<sup>3</sup> (particle size 0.8 micrometres) and 18 mg/m<sup>3</sup> (particle size 2.7 micrometres). The animals that died probably suffocated following laryngeal spasm (due to severe irritation). The lowest concentration at which guinea pigs showed increased airway resistance was 0.1 mg/m<sup>3</sup>. There were no cardiovascular effects in dogs exposed briefly to 8 mg/m<sup>3</sup> or to 4 mg/m<sup>3</sup> for 4 hours.

**Effects of Long-Term (Chronic) Exposure:**

**Inhalation:** Chronic exposure to low concentrations by inhalation have produced changes in respiratory tissues and in measures of lung function.<sup>(5,6)</sup> In 3 studies, guinea pigs were exposed to 0.1 to 26.5 mg/m<sup>3</sup> with particle sizes ranging from fine to coarse for periods of 18 to 140 days. Intermittent exposure produced only minimal lung changes while continuous exposure at lower concentrations (4 mg/m<sup>3</sup>) caused more extensive damage (fluid accumulation, bleeding and tissue damage). Changes were most marked for exposures with particle size of 0.9 um. No effects were seen at the lowest concentration (0.1 mg/m<sup>3</sup>). Monkeys were continuously exposed for 78 weeks to two concentrations, with two particle sizes. Effects on pulmonary function and respiratory cells were seen at 4.79 mg/m<sup>3</sup> (particle size 0.73 um). At 0.48 mg/m<sup>3</sup> (0.54 um) and 0.38 mg/m<sup>3</sup> (2.15 um), only minimal effects were noted. In a guinea pig study, there were no effects following continuous exposure to 0.1 and 0.08 mg/m<sup>3</sup> for 52 weeks.<sup>(6)</sup> Factors such as mucociliary clearance, alveolar defence mechanisms, cellular changes, and lung function have been evaluated in many studies. While changes in these parameters have been demonstrated, it is not clear whether they relate to chronic lung disease.

**Teratogenicity, Embryotoxicity and/or Fetotoxicity:**

Sulfuric acid was not teratogenic in mice and rabbits, but was slightly embryotoxic in rabbits (a minor, rare skeletal variation). The animals were exposed to 5 and 20 mg/m<sup>3</sup> (1.6 and 2.4 um respectively) for 7 hours/day throughout pregnancy. Slight maternal toxicity was present at the highest dose in both species.

**Mutagenicity:**

There are no mutagenicity studies specifically of sulfuric acid. However, there are established effects of reduced pH in mutagenicity testing, as would be caused by sulfuric acid. These effects are an artifact of low pH and are not necessarily due to biological effects of sulfuric acid itself.



**BRENNTAG MID-SOUTH, INC.**  
**MATERIAL SAFETY DATA SHEET**  
 Effective Date: June 11, 2008

## SULFURIC ACID (With more than 51% acid)

### SECTION VIII - REACTIVITY DATA

**STABILITY:** Stable.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Temperature of 300° C or higher: yields sulfur trioxide gas, which is toxic, corrosive, and an oxidizer.

**INCOMPATIBILITY (MATERIALS TO AVOID):** Nitro compounds, carbides, dienes, alcohols (when heated), oxidizing agents, allyl compounds, and aldehydes. Reacts with most metals, especially when dilute, to give flammable, potentially explosive hydrogen gas. Follow appropriate National Fire Protection Association (NFPA) codes.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Sulfur trioxide, also this is a fire risk if in contact with organic materials.

### SECTION IX - SPILL OR LEAK PROCEDURES

**STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:** Personnel with proper protective equipment should contain spill. Recover material if possible. Dilute small spills or leaks cautiously with plenty of water. Neutralize residue with alkali such as soda ash or lime. Good ventilation is required for soda ash due to release of carbon dioxide gas.

**WASTE DISPOSAL METHOD:** Waste disposal is to be in accordance with all Federal, State, and Local regulations and by an approved hazardous waste management facility.

### SECTION X - SPECIAL PROTECTION INFORMATION

**RESPIRATORY PROTECTION:** NIOSH- approved respirator for sulfuric acid or mist, as applicable.

**VENTILATION:** Local exhaust sufficient to reduce vapor and acid mist to permissible levels.

**PROTECTIVE GLOVES:** Gauntlet gloves. **EYE PROTECTION:** Chemical splash goggles, full-face plastic shield.

**OTHER PROTECTIVE EQUIPMENT:** Acid resistant chemical suit. Eye wash fountain and safety shower.

### SECTION XI - SPECIAL PRECAUTIONS

**PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:** Keep sources of ignition away. Store in a cool, well-ventilated area away from combustibles and reactive chemicals.

**OTHER PRECAUTIONS:** Wear proper safety equipment when handling. Wash thoroughly after handling. Do not get in eyes, on skin or clothing. Do not breathe mist or fumes.

HAZARD RATING: Health 3

Fire 0

Reactivity 2

### SECTION XII - D.O.T. SHIPPING INFORMATION

**PROPER SHIPPING NAME:** Sulfuric Acid (with more than 51% acid)

**HAZARD CLASS:** 8 (Corrosive)

**UN/NA:** UN1830

**PACKING GROUP:** PG II

**D.O.T. LABEL REQUIRED:** Corrosive Material

**REPORTABLE QUANTITY OF PRODUCT:** 1000 lbs as H<sub>2</sub>SO<sub>4</sub>

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center and to your local Emergency Planning Committee.



**BRENNTAG MID-SOUTH, INC.**  
**MATERIAL SAFETY DATA SHEET**  
Effective Date: June 11, 2008

**SULFURIC ACID**  
(With more than 51% acid)

**SECTION XIII – REGULATORY INFORMATION**

TSCA (Toxic Substance Control Act): All components of this product are listed on the TSCA inventory.

SARA TITLE III: HAZARD CLASSIFICATIONS: Acute: Yes Chronic: Yes Fire: No Pressure: No Reactivity: Yes

NAME	CAS/313 Category Codes	Section 302 (EHS) TPQ	Section 304 EHS RQ	CERCLA RQ	Section 313	RCRA CODE	CAA 112(R) TQ
Sulfuric Acid	7664-93-9	1000	1000	1000	----	----	---

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