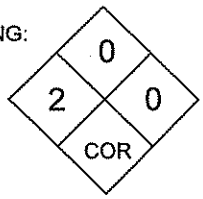
NFPA RATING:
4=Severe
3=Serious
2=Moderate
1=Slight
0=Minimal



MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY INFORMATION

PRODUCT NAME: **5412**
PRODUCT DESCRIPTION: *Closed Loop Treatment*

Revised: October 30, 2006

24-HOUR EMERGENCY TELEPHONE:
CHEMTREC 800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

				ACGIH		OSHA	
COMPONENT	CAS #	HAZARD	WT %	$TLV_{(TWA)}$	STEL	$PEL_{(TWA)}$	STEL
Sodium metaborate 8 mol	10555-76-7	Irritant	10 – 15	NE	NE	NE	NE
Sodium nitrite	7632-00-0	Hazardous	5 – 10	NE	NE	NE	NE
Sodium metasilicate	6834-92-0	Irritant	1 – 5	NE	NE	NE	NE

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous and/or present at amounts below reportable limits.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Clear, pink liquid
Musty odor
WARNING: Product is considered a corrosive material. May cause burning of eyes and irritation of skin. Harmful if swallowed. May cause severe irritation to mouth, throat, esophagus and stomach. May cause moderate irritation to mucous membranes and respiratory tract. Avoid contact. Wear a face shield, gloves and protective apron when handling. Wash thoroughly after handling.

*** In the event of incident, please refer to Emergency Response Guide 154. ***

POTENTIAL HEALTH EFFECTS ☒ Eye contact ☒ Skin contact ☒ Ingestion ☒ Inhalation

EYE CONTACT: Exposure to liquid product may cause severe irritation to eyes, and possibly burns or eye damage. Symptoms of exposure may include redness, swelling, tearing or pain. Avoid contact.

SKIN CONTACT: Exposure to liquid product may cause moderate to severe irritation to skin, and possible burns. Symptoms of exposure may include redness, itching, swelling or pain. Avoid contact.

INGESTION: Exposure to liquid product may cause moderate to severe irritation to inner linings of mouth, esophagus and gastrointestinal tract, and possible burns. Product is considered moderately toxic. Do NOT ingest.

INHALATION: Inhalation of vapors or fumes may cause slight to moderate irritation to mucous membranes and respiratory tract. Symptoms of exposure may include irritation of nose and throat. Avoid contact.

CHRONIC: Effects of chronic exposure are not expected to differ from the above-mentioned contact.

CARCINOGENS: This product and its components are not listed on NTP, IARC, OSHA or ACGIH lists as cancer-causing agents.

AGGRAVATION OF PRE-EXISTING CONDITIONS: There are no known medical conditions that would be possibly aggravated by exposure to this product.

4. FIRST AID MEASURES

EYE CONTACT: If this product contacts the eyes, immediately flush eyes with plenty of clean running water for at least fifteen (15) minutes, lifting the upper and lower eyelids occasionally. Remove contact lenses if worn. Seek medical attention if irritation persists.

SKIN CONTACT: If this product contacts the skin, immediately flush the affected area with soap and water for at least fifteen (15) minutes. If the product penetrates the clothing, promptly remove the contaminated clothing or shoes, and flush the affected area as described. Seek medical attention if irritation persists.

INGESTION: If this product is ingested, drink small amounts of water and monitor superficial effects on mouth and esophagus. If irritation is noted, seek medical attention promptly. Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

INHALATION: If this product is inhaled and symptoms occur, move the exposed person to fresh air promptly. Seek medical attention if symptoms persist.

NOTES TO PHYSICIAN: Treat as a moderately strong alkali exposure. In addition, for ingestion of larger amounts, maintain adequate kidney function and force fluids. Gastric lavage is recommended for symptomatic patients only. Hemodialysis should be reserved for massive acute ingestion or patients with renal failure.

5. FIRE FIGHTING MEAURES

FLASH POINT:	None – aqueous solution.
FLAMMABLE LIMITS:	NA
AUTOIGNITION TEMPERATURE:	NA

EXTINGUISHING MEDIA: Use water, foam, dry chemical or carbon dioxide to extinguish fire.

FIRE/EXPLOSION HAZARD: Dried residue can thermally decompose giving off irritating and possibly toxic fumes.

FIRE FIGHTING EQUIPMENT: Fire fighters should wear full protective equipment, including a self-contained breathing apparatus.

SPECIAL PROCEDURES: Use water to cool containers exposed to a fire.

HAZARDOUS COMBUSTION PRODUCTS: Oxides of nitrogen, oxides of carbon and possibly toxic phosphines. May leave a caustic residue.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Use proper personal protection (refer to Section 8).

ENVIRONMENTAL PRECAUTIONS: Run off from fire control or dilution water may cause pollution. Keep out of drains, municipal sewers, open bodies of water and water course.

CLEAN-UP METHODS: Safely stop source of spill. Clean up spills immediately. Restrict non-essential personnel from the area. Wear protective clothing, goggles and respirator if ventilation is not adequate. Dike spill area and soak up material with sand or other absorbent. Place into chemical waste container for disposal according to local, state or federal regulations. Flush spill area with water.

7. HANDLING AND STORAGE

HANDLING: Use proper personal protection when handling (refer to Section 8). Use under well-ventilated conditions. Avoid contact with eyes, skin and clothing. Avoid breathing vapors and mists. Avoid prolonged or repeated contact. Do NOT ingest. Wash thoroughly after handling. Rinse container before disposal.

SHELF LIFE: The recommended shelf life is two (2) years. It is recommended that products be retested if stored for more than two (2) years. Under ideal storage conditions, the shelf life is almost indefinite.

STORAGE TEMPERATURE: The recommended storage temperature is above 32°F, preferably at room temperature (70°F).

GENERAL: Store closed containers in a cool, dry, well-ventilated area away from incompatible materials. This product is stable under normal conditions of handling and storage. Avoid cold temperatures.

8. EXPOSURE CONTROLS / PERSONAL PROTECTIVE EQUIPMENT

Please refer to Section 2 for applicable exposure limits.

EYE PROTECTION: To avoid contact with eyes, use chemical splash goggles and a face shield. Eye wash station should be available in the work area.

HAND PROTECTION: Use rubber or plastic gloves to minimize skin contact.

BODY PROTECTION: Use a rubber apron to minimize contact. Rubber boots are recommended. Full drench shower should be available in the work area.

RESPIRATOR: Use of respirator protection is not generally required. However, if exposure is above the stated limits or ventilation is inadequate, use a NIOSH approved acid gas/organic vapor respirator to reduce potential for inhalation exposure. When using respirator cartridges, they must be changed frequently to assure breakthrough exposure does not occur.

VENTILATION: General mechanical ventilation is recommended for enclosed areas.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, pink liquid	**Boiling Point:**	100°C / 212°F
Odor:	Musty	**Freezing Point:**	0°C / 32°F
Specific Gravity @ 68°F:	~ 1.17	**Vapor Pressure:**	23.75 mmHg
pH:	> 12.5	**Vapor Density (air = 1):**	ND
Water Solubility:	Complete	**VOC Content:**	Non-volatile

10. STABILITY AND REACTIVITY

GENERAL STABILITY: This product is stable at ambient temperatures and atmospheric pressures.

INCOMPATIBLE MATERIALS: Strong acids, strong reducing agents, ammonia salts, amines, phthalic acid and cyanides.

HAZARDOUS POLYMERIZATION: Hazardous polymerization is not expected to occur under normal temperatures and pressures.

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of nitrogen. May leave a caustic residue.

11. TOXICOLOGICAL INFORMATION

	Product 5412	Metaborate	Nitrite	Metasilicate
Eye irritation:	Severe to corrosive	Slight to moderate	Slight to moderate	Corrosive
Skin irritation:	Severe to corrosive	Slight to moderate	None to slight	Corrosive
Inhalation irritation:	Slight to moderate	None to slight	None to slight	Corrosive
Oral LD_{50}, Rat:	> 1659 mg/kg	2330 mg/kg	120 mg/kg	1153 mg/kg
Dermal LD_{50}, Rabbit:	> 771 mg/kg	2000 mg/kg	NDA	NDA
Inhalation LC_{50}, Rabbit:	NDA	NDA	1.45 mg/l	NDA
Other toxicological data:	NA	See below	See below	See below

Metaborate: [Reproductive/Developmental Toxicity] Animal feeding studies in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes. Studies with the chemically related boric acid in the rat, mouse and rabbit, at high doses, demonstrate developmental effects on the fetus, including fetal weight loss and minor skeletal variations. The doses administered were many times in excess of those to which humans would normally be exposed. [Human Data] Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid dust and sodium borate dust. A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility.

Nitrite: Tests in animals demonstrate no carcinogenic activity, or reproductive or developmental toxicity. Sodium nitrite appears to cross the placenta causing methemoglobinemia in the fetus after administration to the dam. In some tests, but not in others, the compound produced genetic damage in bacterial and mammalian cell cultures, as well as in tests in animals. It does not produce heritable genetic damage.

Metasilicate: [Acute Dermal Toxicity] 250 mg/24 hr. skin human severe.

12. ECOLOGICAL INFORMATION

	Product 5412	Metaborate	Nitrite	Metasilicate
96 hr LC_{50}, Rainbow trout:	> 5565 mg/l	88 mg/l	0.19 mg/l	NDA
48 hr LC_{50}, Daphnia magna:	> 7475 mg/l	242 mg/l	66 mg/l	NDA
72 hr EC_{50}, Algae:	> 45 mg/l	24 mg/l	NDA	NDA

13. DISPOSAL CONSIDERATIONS

US EPA RCRA Status: This product is considered to be a hazardous waste.
US EPA RCRA Hazardous waste code: D002

Do NOT dump into any sewers, on the ground or into any body of water. Rinse containers before disposal. Since emptied containers contain product residue, follow label warnings even after container is emptied. Dispose in accordance with all applicable federal, state and local laws and regulations.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT

Proper Shipping Name:	Corrosive Liquid, Basic, Inorganic, n.o.s., (Sodium Metaborate Octahydrate)
Hazard Class:	8
Hazard Identification Number:	UN3266
Packing Group:	PGIII
Transport Label:	Corrosive

15. REGULATORY INFORMATION

Components:	Metaborate	Nitrite	Metasilicate
Carcinogenic Potential			
Regulated by OSHA:	No	No	No
Listed on NTP Report:	No	No	No
Listed by IARC / Group:	No	No	No
ACGIH Appendix A / Group:	Not listed	Not listed	Not listed
US EPA Release Reporting			
CERCLA (40 CFR 302):			
Listed substance:	Not listed	Sodium nitrite	Not listed
Reportable quantity:	NA	100 lbs.	NA
Category:	NA	NDA	NA
RCRA waste number:	NA	NDA	NA
Unlisted substance:	NA	NA	NA
Reportable quantity:	NA	NA	NA
Characteristic:	NA	NA	NA
RCRA waste number:	NA	NA	NA
SARA TITLE III			
Section 302 & 303 (40 CFR 355):			
Listed substance:	Not listed	Not listed	Not listed
Reportable quantity:	NA	NA	NA
Planning threshold:	NA	NA	NA
Section 311 & 312 (40 CFR 370):			
Hazard categories:	Acute	Acute, fire, reactive	Acute
Planning threshold:	NDA	NDA	NDA
Section 313 (40 CFR 372):			
Listed toxic chemical:	Not listed	Sodium nitrite	Not listed
Reporting threshold:	NA	NA	NA
US TSCA			
Listed/Exempt (40 CFR 710):	Yes	Yes	Yes
CA PROP 65			
Carcinogen:	No	No	No
Reproductive toxin:	No	No	No

16. OTHER INFORMATION

HMIS Rating

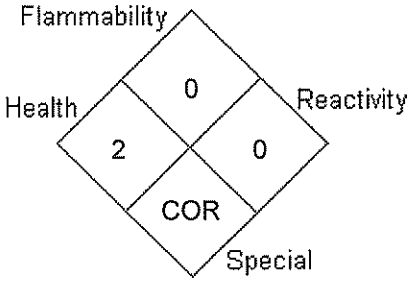
HEALTH	2
FLAMMABILITY	0
REACTIVITY	0
PROTECTION	D

D = Face shield, gloves, protective apron

KEY

4 = Severe ACID = Acid
3 = Serious ALK = Alkali
2 = Moderate COR = Corrosive
1 = Slight OX = Oxidizer
0 = Minimal W = Use NO WATER

NFPA Rating



Legend:

ACGIH:	American Conference of Governmental Industrial Hygiene
A1:	Confirmed human carcinogen
A2:	Suspected human carcinogen
A3:	Confirmed animal carcinogen
CAS #:	Chemical Abstract Service Registry number
CERCLA:	Comprehensive Environmental Response Compensation and Liability Act
DOT:	Department of Transportation
EPA:	Environmental Protection Agency
HMIS:	Hazardous Materials Identification System
IARC:	International Agency for Research on Cancer
Group 1:	Carcinogenic to humans
Group 2A:	Probably carcinogenic to humans
Group 2B:	Possibly carcinogenic to humans
Group 3:	Unclassified as carcinogenic to humans
NE:	Not established
NFPA:	National Fire Protection Association
NIOSH:	National Institute for Occupational Safety and Health
NTP:	National Toxicology Program
OSHA:	Occupational Safety and Health Administration
PEL:	Permissible Exposure Limit
RCRA:	Resource Conservation and Recovery Act
REL:	Recommended Exposure Limit
SARA TITLE III:	Superfund Amendments and Reauthorization Act
STEL:	Short Term Exposure Limit (15 minute Time Weighted Average)
TLV:	Threshold Limit Value
CEIL (C):	Ceiling Exposure Limit
TSCA:	Toxic Substance Control Act
TWA:	Time Weighted Average

NA or N/A:	Not applicable	VOC:	Volatile Organic Compound
ND:	Not determined	> / <:	Greater than / Less than
NDA:	No data available	~:	Approximately

This Material Safety Data Sheet is presented in good faith as an information source only. It should not be taken as an expressed or implied warranty or guarantee for which the Company assumes legal responsibility. While the Company believes the information contained herein is accurate and complied from sources believed to be reliable, it is the responsibility of the user to investigate and verify its validity. The Company does not accept liability for any loss or damage that may occur from the use of this information. The buyer or user accepts all responsibility of using, handling and disposing of the product in accordance with applicable federal, state and local rules, regulations and laws.

LOSED LOOP TREATMENT

5412

DESCRIPTION

5412 is a concentrated aqueous blend of organic corrosion inhibitors selected to provide maximum protection for ferrous and nonferrous metals.

APPLICATION

5412 is used in closed water systems including chilled water, hot water, and diesel engine jacket water systems. It is formulated to rapidly establish and maintain a corrosion inhibition film on clean metal surfaces. Rubber and other nonmetallic materials are not adversely affected by 5412.

PHYSICAL PROPERTIES

Color & Form	Light red liquid
Specific Gravity	1.172
Density	9.77 lbs./gal.
pH	11.4
Odor	Slightly pungent, organic

DOSAGE & FEEDING

INITIAL: Add one gallon (9.8 pounds) of 5412 for each 100 gallons of water in the system to be treated.

CONTINUING: Subsequent additions of 5412 are governed by the "M" alkalinity of the treated water and depend on the amount of water leakage from the system. When the "M" alkalinity of the treated water drops to

1,000 ppm in excess of the makeup water "M" alkalinity, add one quart (2.5 pounds) of 5412 for each 100 gallons of water in the system.

Add the required quantity of 5412 to the system using a by-pass feeder. This can be installed at any convenient location in the system.

Additional treatment will usually be needed only once or twice per year.

NOTE: New installations should be free of oil, grease, dirt, etc., prior to charging with 5412. 8483 is a proven cleaner specifically formulated for this purpose.

HANDLING & PRECAUTIONS

5412 does not deteriorate with age. It is an alkaline formulation and should be handled as such.

Avoid eye and skin contact. Flush affected areas with large quantities of water. Obtain medical attention for eyes. Refer to *Material Safety Data Sheet* for additional safe handling information.

PACKAGING

5412 liquid is available in:

5-gallon pails	net wt. 45 lbs.
30-gallon drums	net wt. 290 lbs.
55-gallon drums	net wt. 550 lbs.