MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**CHLORIDE COLOR REAGENT, MERCURIC THIOCYANATE 0.06% SOLUTION**
Version #	03
Issue date	May-30-2012
Revision date	May-30-2012
Supersedes date	August-05-2011
CAS #	Mixture
CAS #	592-85-8
Product code	1991
Synonym(s)	MERCURIC THIOCYANATE SOLUTION
Manufacturer information	GFS Chemicals, Inc. P.O. Box 245 Powell, OH 43065 United States www.gfschemicals.com Fax 740-881-5989 Phone 740-881-5501 Toll Free 800-858-9682 Emergency Assistance Chemtrec 800-424-9300

2. Hazards Identification

Emergency overview	FLAMMABLE LIQUID AND VAPOR. Will be easily ignited by heat, spark or flames. DANGER -- POISON VAPOR HARMFUL. May be fatal or cause blindness if swallowed. Cannot be made nonpoisonous. Harmful in contact with eyes. Harmful if inhaled or absorbed through skin. Causes skin and eye irritation. May cause central nervous system effects. May cause damage to the liver. Prolonged exposure may cause chronic effects.
OSHA regulatory status	This product is considered hazardous under 29 CFR 1910.1200 (Hazard Communication).
Potential health effects	
Routes of exposure	Inhalation. Ingestion. Skin contact. Eye contact.
Eyes	Eye contact may result in corneal injury. Contact may irritate or burn eyes. Do not get this material in contact with eyes.
Skin	Irritating to skin. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis. Avoid contact with the skin.
Inhalation	Toxic effects exerted upon nervous system, particularly the optic nerve. Prolonged inhalation may be harmful. Avoid breathing dust/fume/gas/mist/vapors/spray. Symptoms of overexposure may include headache, drowsiness, nausea, vomiting, blurred vision, blindness, coma and death. Once absorbed into the body, it is very slowly eliminated. A person may get better but then worse again up to 30 hours later.
Ingestion	Components of the product may be absorbed into the body by ingestion. Even small amounts (30-250 ml methanol) may be fatal. Symptoms are stomach ache, nausea, vomiting, dullness, visual disorder and blindness. Do not ingest.
Target organs	Central nervous system. Eyes. Gastro-intestinal tract. Respiratory system. Skin.
Chronic effects	Conjunctiva. May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion and blurred vision) and/or damage. Frequent or prolonged contact may defat and dry the skin, leading to discomfort and dermatitis.
Signs and symptoms	Corneal damage. Narcosis. Decrease in motor functions. Behavioral changes. Conjunctivitis. Irritating to mouth, throat, and stomach. Defatting of the skin. Skin irritation. Rash.

Potential environmental effects Components of this product are hazardous to aquatic life. May cause long-term adverse effects in the environment.

3. Composition / Information on Ingredients

Hazardous components	CAS #	Percent
FERRIC NITRATE, NONAHYDRATE	7782-61-8	2.5 - 10
METHYL ALCOHOL	67-56-1	2.5 - 10

Non-hazardous components	CAS #	Percent
WATER	7732-18-5	80 - 90
NITRIC ACID	7697-37-2	0.1 - 1
MERCURIC THIOCYANATE	592-85-8	0 - 0.1

4. First Aid Measures

First aid procedures

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Skin contact Take off immediately all contaminated clothing. Wash off with warm water and soap. Get medical attention if irritation develops and persists.

Inhalation If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.

Ingestion IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Rinse mouth thoroughly. If swallowed, induce vomiting immediately as directed by medical personnel.

Notes to physician Symptoms may be delayed.

General advice Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. If you feel unwell, seek medical advice (show the label where possible).

5. Fire Fighting Measures

Flammable properties Flammable by OSHA criteria. Heat may cause the containers to explode. Runoff to sewer may cause fire or explosion hazard.

Extinguishing media

Suitable extinguishing media Water fog. Foam, carbon dioxide or dry powder.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Protection of firefighters

Specific hazards arising from the chemical Fire may produce irritating, corrosive and/or toxic gases.

Protective equipment and precautions for firefighters Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Structural firefighters protective clothing will only provide limited protection.

Fire fighting equipment/instructions In case of fire and/or explosion do not breathe fumes. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also consider initial evacuation for 800 meters (1/2 mile) in all directions. ALWAYS stay away from tanks engulfed in flame. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Move containers from fire area if you can do so without risk. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if possible. If not, withdraw and let fire burn out.

Specific methods In the event of fire and/or explosion do not breathe fumes. Self-contained breathing apparatus and full protective clothing must be worn in case of fire. Use standard firefighting procedures and consider the hazards of other involved materials. Move container from fire area if it can be done without risk.

Hazardous combustion products May include oxides of nitrogen.

6. Accidental Release Measures

Personal precautions

Keep unnecessary personnel away. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep people away from and upwind of spill/leak. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering them.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not contaminate water.

Methods for containment

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up

Extinguish all flames in the vicinity. Should not be released into the environment. This product is miscible in water.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills in original containers for re-use. For waste disposal, see section 13 of the MSDS.

7. Handling and Storage

Handling

Vapors may form explosive mixtures with air. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Do not smoke. All equipment used when handling the product must be grounded. Do not get this material in contact with eyes. Avoid contact with skin. Use only in area provided with appropriate exhaust ventilation. Avoid prolonged exposure. Wash thoroughly after handling. Avoid release to the environment.

Storage

The pressure in sealed containers can increase under the influence of heat. Keep away from heat and sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. Prevent electrostatic charge build-up by using common bonding and grounding techniques. Store in cool place. Refrigeration recommended. Store in a well-ventilated place. Keep container tightly closed. Keep in an area equipped with sprinklers. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children. Use care in handling/storage.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components	Type	Value
FERRIC NITRATE, NONAHYDRATE (7782-61-8)	TWA	1 mg/m3
MERCURIC THIOCYANATE (592-85-8)	TWA	0.025 mg/m3
METHYL ALCOHOL (67-56-1)	STEL	250 ppm
	TWA	200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
NITRIC ACID (7697-37-2)	STEL	4 ppm
	TWA	2 ppm

U.S. - OSHA

Components	Type	Value
FERRIC NITRATE, NONAHYDRATE (7782-61-8)	TWA	1 mg/m3
METHYL ALCOHOL (67-56-1)	PEL	260 mg/m3
		200 ppm
	STEL	325 mg/m3
		250 ppm

U.S. - OSHA

Components	Type	Value
	TWA	260 mg/m3 200 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
NITRIC ACID (7697-37-2)	PEL	5 mg/m3 2 ppm

Exposure guidelines

US ACGIH Threshold Limit Values: Skin designation

MERCURIC THIOCYANATE (CAS 592-85-8)	Can be absorbed through the skin.
METHYL ALCOHOL (CAS 67-56-1)	Can be absorbed through the skin.

Engineering controls Ensure adequate ventilation, especially in confined areas.

Personal protective equipment

Eye / face protection Do not get in eyes. Chemical goggles are recommended. Eye wash fountains are required.

Skin protection Avoid contact with the skin. Wear appropriate chemical resistant clothing. Chemical resistant gloves.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

General hygiene considerations When using do not smoke. Do not get in eyes. Avoid contact with skin. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice.

9. Physical & Chemical Properties

Appearance Clear.

Physical state Liquid.

Form Aqueous solution.

Color Pale red-brown.

Odor Slight.

Odor threshold Not available.

pH Not available.

Vapor pressure 169.316 hPa estimated

Vapor density Not available.

Boiling point 212 °F (100 °C) approximately.

Melting point/Freezing point 14.1 °F (-9.9 °C) estimated

Solubility (water) Miscible.

Specific gravity 1

Relative density Not available.

Flash point 73.4 - 140.0 °F (23.0 - 60.0 °C)

Flammability limits in air, upper, % by volume Not available.

Flammability limits in air, lower, % by volume 6 % estimated

Auto-ignition temperature Not available.

VOC < 10 %

Percent volatile > 95 %

Other data

Density 1.00 g/cm3

Flammability class Flammable IC estimated

Flash point class Combustible IIIA

10. Chemical Stability & Reactivity Information

Chemical stability Decomposes at elevated temperatures and over time, use within 6 months. Risk of ignition.

Conditions to avoid Heat, flames and sparks. Avoid temperatures exceeding the flash point.

Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Nitrogen oxides (NOx).
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Toxicological data

Product	**Species**	**Test Results**
CHLORIDE COLOR REAGENT, MERCURIC THIOCYANATE 0.06% SOLUTION (Mixture)		
Acute		
Dermal		
LD50	Rat	99999 mg/kg
Inhalation		
LC50	Mouse	25597 mg/l
	Rat	32140 mg/l
Oral		
LD50	Mouse	40833 mg/kg
	Rat	23653 mg/kg

Components	**Species**	**Test Results**
FERRIC NITRATE, NONAHYDRATE (7782-61-8)		
Acute		
Oral		
LD50	Rat	3250 mg/kg
MERCURIC THIOCYANATE (592-85-8)		
Acute		
Dermal		
LD50	Rat	685 mg/kg
Oral		
LD50	Mouse	24.5 mg/kg
	Rat	46 mg/kg
Other		
LD50	Mouse	3.5 mg/kg
METHYL ALCOHOL (67-56-1)		
Acute		
Oral		
LD50	Rat	5628 mg/kg
NITRIC ACID (7697-37-2)		
Acute		
Inhalation		
LC50	Mouse	244 mg/l, 30 Minutes
		67 mg/l, 4 Hours
	Rat	334 mg/l, 30 Minutes
		244 mg/l, 30 Minutes
		138 mg/l, 30 Minutes
		65 mg/l, 4 Hours

* Estimates for product may be based on additional component data not shown.

Local effects Components of the product may be absorbed into the body through the skin. Irritating to skin. Contact may irritate or burn eyes.

Chronic effects Hazardous by OSHA criteria. Prolonged inhalation may be harmful. Repeated absorption may cause disorder of central nervous system, liver, kidneys and blood. Prolonged exposure may cause chronic effects.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

ACGIH Carcinogens

MERCURIC THIOCYANATE (CAS 592-85-8) A4 Not classifiable as a human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

MERCURIC THIOCYANATE (CAS 592-85-8) 3 Not classifiable as to carcinogenicity to humans.

Skin corrosion/irritation Irritating to skin.

Neurological effects Hazardous by OSHA criteria.

Further information Symptoms may be delayed.

12. Ecological Information

Ecotoxicological data

Product			Species	Test Results
CHLORIDE COLOR REAGENT, MERCURIC THIOCYANATE 0.06% SOLUTION (Mixture)				
	Crustacea	EC50	Daphnia	99999 mg/l, 24 hours
				99999 mg/l, 48 hours
		LC50	Daphnia	66701 mg/l, 96 hours
				49347 mg/l, 24 hours
				14268 mg/l, 48 hours
	Fish	LC50	Fish	99999 mg/l, 24 hours
				99999 mg/l, 72 hours
				99999 mg/l, 96 hours
				28826 mg/l, 48 hours

Components			Species	Test Results
FERRIC NITRATE, NONAHYDRATE (7782-61-8)				
	Aquatic			
	Other	LC50	Nematode (Caenorhabditis elegans)	0.0003 mg/l, 24 hours
METHYL ALCOHOL (67-56-1)				
	Aquatic			
	Crustacea	EC50	Water flea (Daphnia magna)	20450 - 29350 mg/l, 48 hours
				> 10000 mg/l, 24 hours
				> 10000 mg/l, 48 hours
			Water flea (Daphnia obtusa)	22800 - 24400 mg/l, 24 hours
				21100 - 23400 mg/l, 48 hours
		LC50	Brine shrimp (Artemia salina)	> 10000 mg/l, 24 hours
				1463.3 - 1703.5 mg/l, 24 hours
				794.8 - 1020.7 mg/l, 24 hours
				703.7 - 1723.9 mg/l, 24 hours
			Cockle (Cerastoderma edule)	3300 - 10000 mg/l, 96 hours
				1000 mg/l, 48 hours
			Common bay mussel,blue mussel (Mytilus edulis)	15900 - 17300 mg/l, 96 hours
				13400 - 17300 mg/l, 96 hours
			Common shrimp, sand shrimp (Crangon crangon)	2500 mg/l, 48 hours
				1700 mg/l, 96 hours
			Harpacticoid copepod (Nitocra spinipes)	12000 mg/l, 96 hours

Components		Species	Test Results
			11500 - 12500 mg/l, 96 hours
		Mussel (Anodonta imbecillis)	37.02 mg/l, 48 hours
		Oligochaete, worm (Lumbriculus variegatus)	> 100 mg/l, 96 hours
		Ramshorn snail (Helisoma trivolvis)	> 100 mg/l, 96 hours
		Scud (Gammarus fasciatus)	> 100 mg/l, 96 hours
		Water flea (Daphnia magna)	> 10000 mg/l, 24 hours
			3616 - 6414 mg/l, 24 hours
			2461 - 4395 mg/l, 48 hours
			> 100 mg/l, 96 hours
Fish	LC50	Bleak (Alburnus alburnus)	28000 mg/l, 96 hours
			> 28000 mg/l, 96 hours
		Bluegill (Lepomis macrochirus)	17400 - 21000 mg/l, 24 hours
			17300 - 21100 mg/l, 48 hours
			15510 - 20240 mg/l, 72 hours
			13500 - 17600 mg/l, 96 hours
		Carp (Leuciscus idus melanotus)	> 10000 mg/l, 48 hours
		Fathead minnow (Pimephales promelas)	29000 - 30500 mg/l, 24 hours
			29000 - 30500 mg/l, 48 hours
			28500 - 30400 mg/l, 96 hours
			28200 mg/l, 96 hours
			27600 - 29200 mg/l, 72 hours
			> 100 mg/l, 96 hours
		Medaka, high-eyes (Oryzias latipes)	> 10000 mg/l, 24 hours
			> 10000 mg/l, 48 hours
			1400 mg/l, 48 hours
		Rainbow trout,donaldson trout (Oncorhynchus mykiss)	19800 - 20700 mg/l, 24 hours
			19500 - 20700 mg/l, 48 hours
			19500 - 20700 mg/l, 96 hours
			18000 - 20000 mg/l, 96 hours
Other	LC50	Turbellarian, flatworm (Dugesia tigrina)	> 100 mg/l, 96 hours
NITRIC ACID (7697-37-2)			
Crustacea	LC50	Green or Europeon shore crab (Carcinus maenas)	180 mg/l, 48 hours
Aquatic			
Crustacea	LC50	Cockle (Cerastoderma edule)	330 - 1000 mg/l, 48 hours
Fish	LC50	Starfish (Asterias rubens)	100 - 330 mg/l, 48 hours

* Estimates for product may be based on additional component data not shown.

Ecotoxicity Components of this product are hazardous to aquatic life.

Environmental effects Harmful to aquatic organisms. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Persistence and degradability Not available.

Bioaccumulation / Accumulation

Bioaccumulative potential

Octanol/water partition coefficient log Kow

METHYL ALCOHOL	-0.77

Partition coefficient

METHYL ALCOHOL	-0.77

Mobility in environmental media This product is miscible in water.

13. Disposal Considerations

Waste codes D001: Waste Flammable material with a flash point <140 F
D009: Waste Mercury

US RCRA Hazardous Waste U List: Reference

METHYL ALCOHOL (CAS 67-56-1)	U154

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. Do not allow this material to drain into sewers/water supplies. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose in accordance with all applicable regulations.

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport Information

DOT

Basic shipping requirements:

UN number	UN1993
Proper shipping name	Flammable liquids, n.o.s. (METHYL ALCOHOL RQ = 51546 LBS)
Hazard class	3
Packing group	III
Special precautions	Read safety instructions, MSDS and emergency procedures before handling.

Additional information:

Special provisions	B1, B52, IB3, T4, TP1, TP29
Packaging exceptions	150
Packaging non bulk	203
Packaging bulk	242

IATA

UN number	UN1993
UN proper shipping name	Flammable liquid, n.o.s. (METHYL ALCOHOL)
Transport hazard class(es)	3
Packing group	III
ERG code	3L

IMDG

UN number	UN1993
UN proper shipping name	FLAMMABLE LIQUID, N.O.S. (METHYL ALCOHOL)
Transport hazard class(es)	3
Packing group	III
EmS No.	F-E, S-E

DOT

IATA; IMDG

15. Regulatory Information

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

Drug Enforcement Administration (DEA). List 2, Essential Chemicals (21 CFR 1310.02(b) and 1310.04(f)(2)

Not regulated.

DEA Essential Chemical Code Number

Not regulated.

Drug Enforcement Administration (DEA). List 1 & 2 Exempt Chemical Mixtures (21 CFR 1310.12(c))

Not regulated.

DEA Exempt Chemical Mixtures Code Number

Not regulated.

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Spill: Reportable quantity

NITRIC ACID (CAS 7697-37-2)	1000 LBS

US EPCRA (SARA Title III) Section 302 - Extremely Hazardous Substance: Threshold Planning Quantity

NITRIC ACID (CAS 7697-37-2)	1000 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

FERRIC NITRATE, NONAHYDRATE (CAS 7782-61-8)	1.0 % N511
MERCURIC THIOCYANATE (CAS 592-85-8)	1.0 % N458 Substance is not eligible for the de minimis exemption except for the purposes of supplier notification requirements.
METHYL ALCOHOL (CAS 67-56-1)	1.0 %
NITRIC ACID (CAS 7697-37-2)	1.0 %

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Reportable threshold

MERCURIC THIOCYANATE (CAS 592-85-8)	10 LBS N458

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: Listed substance

FERRIC NITRATE, NONAHYDRATE (CAS 7782-61-8)	Listed. N511
MERCURIC THIOCYANATE (CAS 592-85-8)	Listed. N458
METHYL ALCOHOL (CAS 67-56-1)	Listed.
NITRIC ACID (CAS 7697-37-2)	Listed.

CERCLA (Superfund) reportable quantity

FERRIC NITRATE, NONAHYDRATE: 1000.0000
NITRIC ACID: 1000.0000
MERCURIC THIOCYANATE: 10.0000

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - Yes Delayed Hazard - Yes Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No
Section 302 extremely hazardous substance	No
Section 311 hazardous chemical	No

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

State regulations WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

US - California Proposition 65 - CRT: Listed date/Developmental toxin

MERCURIC THIOCYANATE (CAS 592-85-8)	Listed: July 1, 1990 Developmental toxin.

US - New Jersey RTK - Substances: Listed substance

FERRIC NITRATE, NONAHYDRATE (CAS 7782-61-8)	Listed.
MERCURIC THIOCYANATE (CAS 592-85-8)	Listed.
METHYL ALCOHOL (CAS 67-56-1)	Listed.
NITRIC ACID (CAS 7697-37-2)	Listed.

US - Pennsylvania RTK - Hazardous Substances: Listed substance

FERRIC NITRATE, NONAHYDRATE (CAS 7782-61-8)	Listed.
MERCURIC THIOCYANATE (CAS 592-85-8)	Listed.
METHYL ALCOHOL (CAS 67-56-1)	Listed.
NITRIC ACID (CAS 7697-37-2)	Listed.

16. Other Information

Further information HMIS® is a registered trade and service mark of the NPCA.

HMIS® ratings
Health: 2*
Flammability: 3
Physical hazard: 0

NFPA ratings
Health: 2
Flammability: 3
Instability: 0

Disclaimer The information in the sheet was written based on the best knowledge and experience currently available. The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

This data sheet contains changes from the previous version in section(s): This document has undergone significant changes and should be reviewed in its entirety.