MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name	**WATERMARK® KARL FISCHER COULOMETRIC VESSEL SOLUTION, FOR KETONES AND ALDEHYDES**
Catalog #	1619
Version #	02
Revision date	11-Aug-2011
CAS #	Mixture
Manufacturer information	GFS Chemicals, Inc. P.O. Box 245 Powell, OH 43065 US 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	WARNING FLAMMABLE LIQUID AND VAPOR. Cancer hazard. Can cause adverse reproductive effects - such as birth defects, miscarriages, or infertility. 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	Ingestion. Inhalation. Skin contact. Eye contact.
Eyes	Avoid contact with eyes.
Skin	Avoid contact with the skin.
Inhalation	May cause cancer by inhalation. Avoid breathing dust/fume/gas/mist/vapors/spray.
Ingestion	Harmful if swallowed. Components of the product may be absorbed into the body by ingestion. Do not ingest.
Target organs	Blood. Eyes. Liver. Respiratory system. Skin. Kidneys.
Chronic effects	Unconsciousness. Edema. Jaundice. Cyanosis (blue tissue condition, nails, lips, and/or skin). Sterility. Liver injury may occur. Kidney injury may occur. Pregnant women or women of child-bearing age should not be exposed to this product. Can cause adverse reproductive effects - such as birth defects, miscarriages, or infertility.
Signs and symptoms	Unconsciousness. Cyanosis (blue tissue condition, nails, lips, and/or skin). Edema. Liver enlargement. Jaundice. Proteinuria. Birth defects. Sterility.
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

Components	CAS #	Percent
TRADE SECRET	Proprietary	2.5 - 10
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	20 - 40
CHLOROFORM	67-66-3	20 - 40
2,2,2-TRIFLUOROETHANOL	75-89-8	20 - 40
SULFUR DIOXIDE	7446-09-5	1 - 2.5
IODINE	7553-56-2	<2.2

Composition comments

US ACGIH Threshold Limit Values: Short Term Exposure Limit (STEL): mg/m3 & ppm

IODINE	7553-56-2	Vapor and aerosol. PPM 0.1

US ACGIH Threshold Limit Values: Time Weighted Average (TWA): mg/m3 & ppm

IODINE	7553-56-2	Inhalable fraction and vapor. 0.01 PPM

US OSHA Table Z-1-A: Ceiling Limit Value (mg/m3 & ppm)

IODINE	7553-56-2	PPM 0.1 MGM3 - 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 if irritation develops and persists.

Skin contact Take off immediately all contaminated clothing. Immediately flush skin with plenty of water. Get medical attention if irritation develops and persists. For minor skin contact, avoid spreading material on unaffected skin. Wash clothing separately before reuse.

Inhalation Move to fresh air. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician if symptoms develop or persist.

Ingestion Rinse mouth thoroughly. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

Notes to physician In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General advice IF exposed or concerned: Get medical advice/attention. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

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. Water spray. Foam. Dry powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use a solid water stream as it may scatter and spread 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 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. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. 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. Use water spray to cool unopened containers. 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. In the event of fire, cool tanks with water spray. Use water spray to cool unopened containers.

6. Accidental Release Measures

Personal precautions

Keep unnecessary personnel away. Keep upwind. Keep out of low areas. Keep people away from and upwind of spill/leak. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Ventilate closed spaces before entering them. Ensure adequate ventilation. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

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. Use water spray to reduce vapors or divert vapor cloud drift. Prevent entry into waterways, sewer, basements or confined areas.

Methods for cleaning up

Should not be released into the environment.

Large Spills: Dike far ahead of spill for later disposal.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Following product recovery, flush area with water.

Never return spills in original containers for re-use.

7. Handling and Storage

Handling

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. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid contact with skin. Avoid contact with eyes. Wear personal protective equipment. Use only in area provided with appropriate exhaust ventilation. Avoid prolonged exposure. Wash thoroughly after handling. Avoid release to the environment.

Storage

Store locked up. The pressure in sealed containers can increase under the influence of heat. Keep away from heat, sparks and open flame. 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 a well-ventilated place. Keep container tightly closed. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Components	CAS #	Type	Value	Form
CHLOROFORM	67-66-3	TWA	10 ppm	
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	TWA	0.1 ppm	
IODINE	7553-56-2	Ceiling	0.1 ppm	
SULFUR DIOXIDE	7446-09-5	STEL	5 ppm	
		TWA	2 ppm	

U.S. - OSHA

Components	CAS #	Type	Value	Form
CHLOROFORM	67-66-3	Ceiling	240 mg/m3	
			50 ppm	
		TWA	2 ppm	
			9.78 mg/m3	
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	PEL	25 ppm	
			80 mg/m3	
		TWA	80 mg/m3	
			25 ppm	
IODINE	7553-56-2	Ceiling	1 mg/m3	
			0.1 ppm	
SULFUR DIOXIDE	7446-09-5	PEL	5 ppm	
			13 mg/m3	
		STEL	5 ppm	
			13 mg/m3	
		TWA	2 ppm	
			5 mg/m3	

Engineering controls Ensure adequate ventilation, especially in confined areas.

Personal protective equipment

Respiratory protection If permissible levels are exceeded use NIOSH mechanical filter / organic vapor cartridge or an air-supplied respirator.

Hand protection Wear protective gloves.

Eye / face protection Chemical goggles are recommended. Face-shield.

Skin protection Wear chemical protective equipment that is specifically recommended by the manufacturer. Wear appropriate chemical resistant clothing. Wear protective gloves.

General hygeine considerations When using do not smoke. Keep away from food and drink. Handle in accordance with good industrial hygiene and safety practice.

General Eye wash fountains are required. Emergency showers are required.

9. Physical & Chemical Properties

Appearance Clear.

Color Yellow.

Odor Characteristic.

Odor threshold Not available.

Physical state Liquid.

Form Liquid.

pH 5 approximately

Melting point Not available.

Freezing point Not available.

Boiling point 140 °F (60 °C)

Flash point 120.2 °F (48.74 °C) estimated

Evaporation rate Not available.

Flammability Not available.

Flammability limits in air, upper, % by volume 15.904 % estimated

Flammability limits in air, lower, % by volume 2.041 % estimated

Vapor pressure	206 hPa estimated
Vapor density	Not available.
Specific gravity	1.2
Relative density	1.2 g/cm3
Solubility (water)	Miscible
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	701.6 °F (372 °C) estimated
Decomposition temperature	Not available.
VOC	> 65 %
Percent volatile	> 65 %

10. Chemical Stability & Reactivity Information

Chemical stability	Risk of ignition. Material is stable under normal conditions.
Conditions to avoid	Heat, flames and sparks.
Incompatible materials	Strong oxidizing agents. Caustics.
Hazardous decomposition products	Upon decomposition, this product emits oxides of sulfur, carbon monoxide, carbon dioxide and/or low molecular weight hydrocarbons.
Possibility of hazardous reactions	Hazardous polymerization does not occur.

11. Toxicological Information

Sensitization

US ACGIH Threshold Limit Values: Skin designation

ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Can be absorbed through the skin.

Acute effects

Acute Dermal: LD 50

ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Rabbit 1280 mg/kg

Acute Inhalation: LC 50

CHLOROFORM	67-66-3	Rat 47.702 mg/l 4 h
SULFUR DIOXIDE	7446-09-5	Guinea pig 1000 mg/l 20 h
SULFUR DIOXIDE	7446-09-5	Mouse 150 mg/l 847 h
SULFUR DIOXIDE	7446-09-5	Mouse 1000 mg/l 4 h
SULFUR DIOXIDE	7446-09-5	Guinea pig 130 mg/l 154 h

Acute Oral: LD 50

CHLOROFORM	67-66-3	Rabbit 9827 mg/kg
CHLOROFORM	67-66-3	Mouse 36 mg/kg
CHLOROFORM	67-66-3	Rat 444 mg/kg
CHLOROFORM	67-66-3	Dog 2250 mg/kg
CHLOROFORM	67-66-3	Rat 2180 mg/kg
CHLOROFORM	67-66-3	Rat 1117 mg/kg Female
CHLOROFORM	67-66-3	Mouse 118 mg/kg
CHLOROFORM	67-66-3	Rat 908 mg/kg
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Mouse 2.8 g/kg
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Guinea pig 950 mg/kg
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Rat 2460 mg/kg
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Rabbit 890 mg/kg
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Mouse 2560 mg/kg
IODINE	7553-56-2	Rat 14 g/kg
IODINE	7553-56-2	Rabbit 10 g/kg
IODINE	7553-56-2	Mouse 22 g/kg

Acute Toxicity other routes: LD 50

CHLOROFORM	67-66-3	Mouse 704 mg/kg Subcutaneous
CHLOROFORM	67-66-3	Mouse 623 mg/kg Intraperitoneal
CHLOROFORM	67-66-3	Dog 1000 mg/kg Intraperitoneal
CHLOROFORM	67-66-3	Rat 2000 mg/kg Intragastric
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Rat 2140 mg/kg Intravenous
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Rat 2500 mg/kg Intraperitoneal
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Mouse 2147 mg/kg Intraperitoneal

Toxicology data for the preparation

Acute LC50: 25682 mg/l, Guinea pig, Inhalation, estimated
Acute LC50: 26136 mg/l, Mouse, Inhalation, estimated
Acute LC50: 6.21 mg/l, Rat, Inhalation, estimated
Acute LD50: 6706 mg/kg, Dog, Oral, estimated
Acute LD50: 109 mg/kg, Mouse, Oral, estimated
Acute LD50: 28342 mg/kg, Rabbit, Oral, estimated
Acute LD50: 748 mg/kg, Rat, Oral, estimated

Local effects Blood disorder may occur after ingestion. Liver toxicity.

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

Subchronic effects Blood disorder may occur after prolonged inhalation. Blood disorder may occur after ingestion. Blood disorder may occur after prolonged skin contact. Kidney injury may occur.

Carcinogenicity Hazardous by OSHA criteria. Risk of cancer cannot be excluded with prolonged exposure.

IARC Monographs: Evidence of carcinogenicity in humans

CHLOROFORM	67-66-3	Inadequate data.
SULFUR DIOXIDE	7446-09-5	Inadequate data.

US ACGIH Threshold Limit Values: A3 carcinogen

CHLOROFORM	67-66-3	A3 Confirmed animal carcinogen with unknown relevance to humans.

US ACGIH Threshold Limit Values: A4 carcinogen

IODINE	7553-56-2	A4 Not classifiable as a human carcinogen.
SULFUR DIOXIDE	7446-09-5	A4 Not classifiable as a human carcinogen.

US NTP Report on Carcinogens: Anticipated carcinogen

CHLOROFORM	67-66-3	Anticipated carcinogen.

Reproductive effects Hazardous by OSHA criteria. Can cause adverse reproductive effects - such as birth defects, miscarriages, or infertility.

Further information Reproductive toxicity. Symptoms may be delayed.

12. Ecological Information

Ecotoxicity Components of this product are hazardous to aquatic life.

Invertebrate Toxicity: EC 50

CHLOROFORM	67-66-3	Brine shrimp (Artemia salina) 28.6 - 33.8 mg/l 24 h Static Intoxication
CHLOROFORM	67-66-3	Brine shrimp (Artemia salina) 34.3 - 39.9 mg/l 24 h Static Intoxication
CHLOROFORM	67-66-3	Water flea (Daphnia magna) 602 mg/l 24 h Not reported Intoxication
CHLOROFORM	67-66-3	Water flea (Daphnia magna) 79 mg/l 24 h Static Intoxication
CHLOROFORM	67-66-3	Brine shrimp (Artemia salina) 27.29 - 33.42 mg/l 24 h Static Intoxication

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

Persistence and degradability Not available.

13. Disposal Considerations

Waste codes D001: Waste Flammable material with a flash point <140 F
D022: Waste chloroform

US RCRA Hazardous Waste U List: Reference

CHLOROFORM	67-66-3	U044

Disposal instructions Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not incinerate sealed containers. If discarded, this product is considered a RCRA ignitable waste, D001. Dispose in accordance with all applicable regulations.

14. Transport Information

DOT

Basic shipping requirements:

Proper shipping name	Flammable liquids, toxic, n.o.s. (CHLOROFORM RQ=30 LBS)
Hazard class	3
Subsidiary hazard class	6.1
UN number	UN1992
Packing group	III
Additional information:	
Special provisions	B1, IB3, T7, TP1, TP28
Packaging exceptions	150
Packaging non bulk	203
Packaging bulk	242
ERG number	131

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.

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

CHLOROFORM	67-66-3	10 LBS
SULFUR DIOXIDE	7446-09-5	500 LBS

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

CHLOROFORM	67-66-3	10000 LBS
SULFUR DIOXIDE	7446-09-5	500 LBS

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

CHLOROFORM	67-66-3	0.1 %
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	1.0 %

CERCLA (Superfund) reportable quantity

None

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 Yes

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 New and Existing Chemicals (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)	No
New Zealand	New Zealand Inventory	Yes
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 cancer and birth defects or other reproductive harm.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

CHLOROFORM	67-66-3	Listed.
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Listed.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

CHLOROFORM	67-66-3	Listed: October 1, 1987 Carcinogenic.

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

CHLOROFORM	67-66-3	Listed: August 7, 2009 Developmental toxin.
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Listed: January 1, 1989 Developmental toxin.

US - California Proposition 65 - CRT: Listed date/Male reproductive toxin

ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Listed: January 1, 1989 Male reproductive toxin.

US - New Jersey Community RTK (EHS Survey): Reportable threshold

CHLOROFORM	67-66-3	500 LBS
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	500 LBS
SULFUR DIOXIDE	7446-09-5	500 LBS

US - Pennsylvania RTK - Hazardous Substances: Listed substance

CHLOROFORM	67-66-3	Listed.
ETHYLENEGLYCOLMONOMETHYL ETHER	109-86-4	Listed.
IODINE	7553-56-2	Listed.
SULFUR DIOXIDE	7446-09-5	Listed.

US - Pennsylvania RTK - Hazardous Substances: Special hazard

CHLOROFORM	67-66-3	Special hazard.

16. Other Information

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

HMIS® ratings
Health: 2*
Flammability: 2
Physical hazard: 1

NFPA ratings
Health: 2
Flammability: 2
Instability: 1

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.

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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.