

The following list contains the Material Safety Data Sheets you requested. Please scroll down to view the requested MSDS(s).

Product	MSDS	Distributor	Format	Language	Quantity
2125815	N/A	Hach Company	OSHA	English	1
2125815	N/A	Hach Company	ROWGHS	English	1

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Total Enclosures: 2

World Headquarters  
Hach Company  
P.O.Box 389  
Loveland, CO USA 80539  
(970) 669-3050

MSDS No: M00486

# MATERIAL SAFETY DATA SHEET

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Digestion Solution for COD 3-150 mg/l Range

**Catalog Number:** 2125815

Hach Company  
P.O.Box 389  
Loveland, CO USA 80539  
(970) 669-3050

Emergency Telephone Numbers:  
(Medical and Transportation)  
(303) 623-5716 24 Hour Service  
(515)232-2533 8am - 4pm CST

**MSDS Number:** M00486

**Chemical Name:** Not applicable

**CAS No.:** Not applicable

**Chemical Formula:** Not applicable

**Chemical Family:** Not applicable

**Hazard:** Toxic. Causes severe burns. Cumulative poison. Causes asthma Causes damage to the nasal epithelia and skin  
Causes lung cancer Contains a substance of very high concern (EU REACH) Chromic acid

**Date of MSDS Preparation:**

**Day:** 08

**Month:** February

**Year:** 2013

## 2. COMPOSITION / INFORMATION ON INGREDIENTS

### Mercuric Sulfate

**CAS No.:** 7783-35-9 Contains Mercury. Dispose Per Local, State or Federal Laws.

**TSCA CAS Number:** 7783-35-9

**Percent Range:** 0.1 - 1.0

**Percent Range Units:** weight / weight

**LD50:** Oral rat LD<sub>50</sub> = 57 mg/kg; Oral mouse LD<sub>50</sub> = 25 mg/kg.

**LC50:** None reported

**TLV:** 0.05 mg/m<sup>3</sup> (Hg)

**PEL:** 0.1 mg/m<sup>3</sup> (Hg)

**Hazard:** Poison.Cumulative poison.Causes burns.Experimental teratogen.

### Demineralized Water

**CAS No.:** 7732-18-5

**TSCA CAS Number:** 7732-18-5

**Percent Range:** 15.0 - 25.0

**Percent Range Units:** weight / weight

**LD50:** LD50 oral rat = >89,800 mg/kg

**LC50:** None reported

**TLV:** Not established

**PEL:** Not established

**Hazard:** No effects anticipated.

### Chromic Acid

**CAS No.:** 13530-68-2

**TSCA CAS Number:** 13530-68-2

**Percent Range:** 0.01 - 0.1

**Percent Range Units:** weight / weight

**LD50:** Oral rat = 80 mg/kg

**LC50:** Inhalation human TCLo = 110 µg/m<sup>3</sup>

**TLV:** 0.05 mg/m<sup>3</sup> (0.0235 ppm as Cr<sup>+6</sup>)

**PEL:** 5 µg/m<sup>3</sup> (0.00235 ppm Cr<sup>+6</sup>), 8 Hr TWA; Action Level is 2.5 µg/m<sup>3</sup> (0.00117 ppm), 8 Hr TWA

**Hazard:** Highly toxic. Causes severe burns. Oxidizer. Causes asthma. Causes damage to the nasal epithelia and skin. Causes lung cancer

#### **Silver Sulfate**

**CAS No.:** 10294-26-5

**TSCA CAS Number:** 10294-26-5

**Percent Range:** 0.5 - 3.0

**Percent Range Units:** weight / weight

**LD50:** Oral Rat = 1280 mg/kg/bw

**LC50:** None reported

**TLV:** 0.01 mg/m<sup>3</sup> (Ag)

**PEL:** 0.01 mg/m<sup>3</sup> (Ag)

**Hazard:** Toxic properties unknown. May cause irritation.

#### **Sulfuric Acid**

**CAS No.:** 7664-93-9

**TSCA CAS Number:** 7664-93-9

**Percent Range:** 80.0 - 90.0

**Percent Range Units:** weight / weight

**LD50:** Oral rat LD50 = 2140 mg/kg

**LC50:** Inhalation rat LC50 = 87 ppm/4 hr

**TLV:** 1 mg/m<sup>3</sup> (TWA); 3 mg/m<sup>3</sup> (STEL)

**PEL:** 1 mg/m<sup>3</sup>

**Hazard:** Causes severe burns. Harmful if inhaled. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER

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### **3. HAZARDS IDENTIFICATION**

#### ***Emergency Overview:***

**Appearance:** Turbid, light orange liquid

**Odor:** Not determined

MAY BE FATAL IF SWALLOWED CAUSES SEVERE BURNS HARMFUL IF INHALED OR ABSORBED THROUGH SKIN

CANCER HAZARD CONTAINS MATERIAL WHICH CAN CAUSE CANCER CAN CAUSE KIDNEY AND CENTRAL NERVOUS SYSTEM EFFECTS

#### ***HMIS:***

**Health:** 3\*

**Flammability:** 0

**Reactivity:** 2

**Protective Equipment:** X - See protective equipment, Section 8.

#### ***NFPA:***

**Health:** 3

**Flammability:** 0

**Reactivity:** 2

**Symbol:** Water Reactive

#### ***Potential Health Effects:***

**Eye Contact:** Causes severe burns

**Skin Contact:** Causes severe burns

**Skin Absorption:** Will be absorbed through the skin. Effects similar to those of ingestion

**Target Organs:** Central nervous system Kidneys

**Ingestion:** Causes: severe burns May cause: abdominal pain circulatory disturbances diarrhea loosening of the teeth nausea vomiting rapid pulse and respirations toxic nephritis (inflammation of the kidneys) shock collapse kidney damage death

**Target Organs:** Central nervous system Kidneys

**Inhalation:** Toxic. Causes: severe burns May cause: difficult breathing mouth soreness teeth erosion Effects similar to those of ingestion. Inhalation of mists / sprays: Causes asthma Causes damage to the nasal epithelia Causes lung cancer

**Target Organs:** Central nervous system Kidneys Lungs Teeth Nasal cavity

**Medical Conditions Aggravated:** Pre-existing: Eye conditions Skin conditions Respiratory conditions Allergies or sensitivity to chromates or chromic acid. Allergies or sensitivity to mercury.

**Chronic Effects:** Chronic overexposure may cause destruction of any tissue contacted erosion of the teeth mouth soreness chronic irritation or inflammation of the lungs accumulation of silver in body tissues which causes a slate-gray to bluish discoloration. Chromate and dichromate salts may cause ulceration and perforation of the nasal septum, severe liver damage, central nervous system effects, and lung cancer. Mercury is a general protoplasmic poison; it circulates in the blood and is stored in the liver, kidneys, spleen and bones. Main symptoms are sore mouth, tremors and psychic disturbances.

**Cancer / Reproductive Toxicity Information:**

An ingredient of this product is an OSHA listed carcinogen.

Hexavalent chromium (Cr<sup>6</sup>) compounds

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Hexavalent Chromium Compounds Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

An ingredient of this mixture is: NTP Listed Group 1: Recognized Carcinogen

Hexavalent Chromium Compounds

**Additional Cancer / Reproductive Toxicity Information:** Contains: an experimental teratogen.

**Toxicologically Synergistic Products:** None reported

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## 4. FIRST AID

**Eye Contact:** Immediately flush eyes with water for 15 minutes. Call physician.

**Skin Contact (First Aid):** Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

**Ingestion (First Aid):** Do not induce vomiting. Give large quantities of water. Never give anything by mouth to an unconscious person. Call physician immediately.

**Inhalation:** Remove to fresh air. Give artificial respiration if necessary. Call physician.

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## 5. FIRE FIGHTING MEASURES

**Flammable Properties:** Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

**Flash Point:** Not applicable

**Method:** Not applicable

**Flammability Limits:**

**Lower Explosion Limits:** Not applicable

**Upper Explosion Limits:** Not applicable

**Autoignition Temperature:** Not applicable

**Hazardous Combustion Products:** This material will not burn.

**Fire / Explosion Hazards:** Contact with metals gives off hydrogen gas which is flammable May react violently with: strong bases water

**Static Discharge:** None reported.

**Mechanical Impact:** None reported

**Extinguishing Media:** Use media appropriate to surrounding fire conditions

**Fire Fighting Instruction:** As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance. Water runoff can cause environmental damage. Dike and collect water used to fight fire.

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## 6. ACCIDENTAL RELEASE MEASURES

**Spill Response Notice:**

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

**Containment Technique:** Releases of this material may contaminate the environment. Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment. Dike the spill to contain material for later disposal.

**Clean-up Technique:** Mercury and its compounds are extremely toxic! Be extremely careful not to contact the spill or breathe any vapors. If permitted by regulation, Absorb spilled liquid with non-reactive sorbent material. Dispose of all mercury contaminated material at a government approved hazardous waste facility. Otherwise, Dispose of material in

government approved hazardous waste facility. Decontaminate area with commercially available mercury absorbing compounds.

**Evacuation Procedure:** Evacuate general area (50 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. Deny access to unnecessary and unprotected personnel. Remain up-wind from spilled material. If conditions warrant, increase the size of the evacuation.

**Special Instructions (for accidental release):** Product is regulated as RCRA hazardous waste in the U.S. Product is regulated as a hazardous air pollutant in the U.S. Product is regulated as a hazardous water pollutant in the U.S.

**304 EHS RQ (40 CFR 355):** Sulfuric Acid - RQ 1000 lbs.

**D.O.T. Emergency Response Guide Number:** 137

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## 7. HANDLING / STORAGE

**Handling:** Avoid contact with eyes skin clothing Do not breathe mist or vapors. Use with adequate ventilation. Maintain general industrial hygiene practices when using this product.

**Storage:** Protect from: light contamination by organic materials (will affect product stability) heat

**Flammability Class:** Not applicable

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## 8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

**Engineering Controls:** Use a fume hood to avoid exposure to dust, mist or vapor. Maintain adequate ventilation to keep exposure levels below the published exposure limits for chemicals in this product. Refer to the OSHA Standard at 29CFR1910.1026 for Cr (VI) (See Federal Register 28 February 2006 Page 10100.)

**Personal Protective Equipment:**

**Eye Protection:** chemical splash goggles

**Skin Protection:** disposable latex gloves In the EU, the selected gloves must satisfy the specifications of EU Directive 89/686/EEC and standard EN 374 derived from it. lab coat

**Inhalation Protection:** laboratory fume hood

**Precautionary Measures:** Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Use with adequate ventilation. Protect from: light organic materials heat Keep away from: alkalies metals other combustible materials oxidizers reducers

**TLV:** Not established. 0.05 mg/m<sup>3</sup> (0.0235 ppm as Cr<sup>+6</sup>).

**PEL:** Not established. 5 µg/m<sup>3</sup> (0.00235 ppm Cr<sup>+6</sup>), 8 Hr TWA; Action Level is 2.5 µg/m<sup>3</sup> (0.00117 ppm), 8 Hr TWA.

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## 9. PHYSICAL / CHEMICAL PROPERTIES

**Appearance:** Turbid, light orange liquid

**Physical State:** Liquid

**Molecular Weight:** Not applicable

**Odor:** Not determined

**pH:** < 0.5

**Vapor Pressure:** Not determined

**Vapor Density (air = 1):** Not determined

**Boiling Point:** ~ 105°C (~ 221°F)

**Melting Point:** Not applicable

**Specific Gravity/ Relative Density (water = 1; air =1):** ~ 1.78

**Evaporation Rate (water = 1):** Not determined

**Volatile Organic Compounds Content:** Not applicable

**Partition Coefficient (n-octanol / water):** Not applicable

**Solubility:**

**Water:** Miscible

**Acid:** Not determined

**Other:** Not determined

**Metal Corrosivity:**

**Steel:** 0.192 in/yr (4.88 mm/yr)

**Aluminum:** 2.18 in/yr (55.4 mm/yr)

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## 10. STABILITY / REACTIVITY

**Chemical Stability:** Stable when stored under proper conditions.

**Conditions to Avoid:** Exposure to light or contamination by organic materials will affect this product's stability.

**Reactivity / Incompatibility:** May react violently in contact with: caustics Incompatible with: metals  
**Hazardous Decomposition:** Heating to decomposition releases toxic and/or corrosive fumes of: mercury compounds  
sulfur oxides  
**Hazardous Polymerization:** Will not occur.

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## 11. TOXICOLOGICAL INFORMATION

**Product Toxicological Data:**

**LD50:** Oral rat (male) LD<sub>50</sub> = 428 mg/kg; Oral rat (female) LD<sub>50</sub> = 360 mg/kg.

**LC50:** None reported

**Dermal Toxicity Data:** None reported

**Skin and Eye Irritation Data:** None reported

**Mutation Data:** None reported

**Reproductive Effects Data:** None reported

**Ingredient Toxicological Data:** Sulfuric Acid: Oral rat LD<sub>50</sub> = 2140 mg/kg; Mercuric Sulfate: Oral rat LD<sub>50</sub> = 57 mg/kg, Oral mouse LD<sub>50</sub> = 25 mg/kg.

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## 12. ECOLOGICAL INFORMATION

**Product Ecological Information:** Calculated: Crustacea 48 hr EC50 = 0.0045 mg/L.

Mobility in soil: No data available

**Ingredient Ecological Information:** Silver sulfate: Crustacea 48 hr EC50 = 0.0045 mg/L; mercuric sulfate: Algae: EC50 - Pseudokirchneriella subcapitata - 0.033 mg/L - 14 d; chromic acid: Daphnia magna (Water flea) 48 hr EC50 = 0.8 mg/L.

Mercuric Sulfate: LC50 - Oncorhynchus gorbuscha - 0.14 mg/l - 7 d. Mercury will ultimately reside in the bottom sediments.

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## 13. DISPOSAL CONSIDERATIONS

**EPA Waste ID Number:** D002, D007, D009, D011

**Special Instructions (Disposal):** Dispose of all mercury contaminated material at an E.P.A. hazardous waste facility.

Dispose of material in an E.P.A. approved hazardous waste facility.

**Empty Containers:** Rinse three times with an appropriate solvent. Dispose of empty container as normal trash. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste in countries other than the US.

**NOTICE (Disposal):** These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

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## 14. TRANSPORT INFORMATION

**D.O.T.:**

**D.O.T. Proper Shipping Name:** Sulphuric Acid

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**DOT Hazard Class:** 8

**DOT Subsidiary Risk:** NA

**DOT ID Number:** UN1830

**DOT Packing Group:** II

**I.C.A.O.:**

**I.C.A.O. Proper Shipping Name:** Sulphuric Acid

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**ICAO Hazard Class:** 8

**ICAO Subsidiary Risk:** NA

**ICAO ID Number:** UN1830

**ICAO Packing Group:** II

**I.M.O.:**

**I.M.O. Proper Shipping Name:** Sulphuric Acid

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**I.M.O. Hazard Class:** 8

**I.M.O. Subsidiary Risk:** NA

**I.M.O. ID Number:** UN1830

**I.M.O. Packing Group:** II

**Additional Information:** There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

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## 15. REGULATORY INFORMATION

### **U.S. Federal Regulations:**

**O.S.H.A.:** This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

### **E.P.A.:**

**S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370):** Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard Reactive

**S.A.R.A. Title III Section 313 (40 CFR 372):** This product contains a chemical(s) subject to the reporting requirements of Section 313 of Title III of SARA.

Mercury compounds, Silver compounds, Sulfuric acid (acid aerosols including mists, vapors, gas, fog and other airborne forms).

**302 (EHS) TPQ (40 CFR 355):** Sulfuric Acid 1000 lbs.

**304 CERCLA RQ (40 CFR 302.4):** Chromic acid and Mercuric sulfate (each) = 10 lbs. Sulfuric Acid 1000 lbs.

**304 EHS RQ (40 CFR 355):** Sulfuric Acid - RQ 1000 lbs.

**Clean Water Act (40 CFR 116.4):** Chromic acid - RQ 10 lbs. Mercuric sulfate - RQ = 10 lbs. (4.54 kgs.) Sulfuric acid - RQ 1000 lbs.

**RCRA:** Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

**C.P.S.C.:** The label for this product bears the signal word "POISON" because the concentration of Sulfuric Acid in the product is greater than/equal to 10%.

### **State Regulations:**

**California Prop. 65:** WARNING - This product contains a chemical known to the State of California to cause cancer. WARNING - This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

**Identification of Prop. 65 Ingredient(s):** Chromium (hexavalent compounds); Mercury and mercury compounds.

**California Perchlorate Rule CCR Title 22 Chap 33:**

**Trade Secret Registry:** Not applicable

### **National Inventories:**

**U.S. Inventory Status:** All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

**TSCA CAS Number:** Not applicable

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## 16. OTHER INFORMATION

**Intended Use:** Determination of Chemical Oxygen Demand Laboratory Use

**References:** 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. Cassaret and Doull's Toxicology, 3rd Ed. New York: Macmillan Publishing Co., Inc., 1986. CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Association, 1991. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Outside Testing. Sixth Annual Report on Carcinogens, 1991. U.S. Department of Health and Human Services. Rockville, MD: Technical Resources, Inc. 1991. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Verschueren, Karel. Handbook of Environmental Data on Organic Chemicals. New York: Van Nostrand Reinhold Co., 1977.

**Revision Summary:** Updates in Section(s) European MSDS Only

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### **Legend:**

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

**USER RESPONSIBILITY:** Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

**THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE.  
HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA  
OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.**

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World Headquarters  
Hach Company  
P.O.Box 389  
Loveland, CO USA 80539  
(970) 669-3050

MSDS No: M00486

# MATERIAL SAFETY DATA SHEET

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Digestion Solution for COD 3-150 mg/l Range  
**Catalog Number:** 2125815

Hach Company  
P.O.Box 389  
Loveland, CO USA 80539  
(970) 669-3050

Emergency Telephone Numbers:  
(Medical and Transportation)  
(303) 623-5716 24 Hour Service  
(515)232-2533 8am - 4pm CST

**MSDS Number:** M00486  
**Chemical Name:** Not applicable  
**CAS Number:** Not applicable  
**Additional CAS No. (for hydrated forms):** Not applicable  
**Chemical Formula:** Not applicable  
**Chemical Family:** Mixture  
**Intended Use:** Determination of Chemical Oxygen Demand Laboratory Use

## 2. HAZARDS IDENTIFICATION

### GHS Classification:

**Hazard categories:** Acute Toxicity: Acute Tox. 4-Orl Acute Toxicity: Acute Tox. 3-Derm Skin Corrosion/Irritation: Skin Corr. 1A Hazardous to the Aquatic Environment: Aquatic Chronic 1 Corrosive to Metals: Met. Corr. 1

### GHS Label Elements:

DANGER



**Hazard statements:** May be corrosive to metals. Harmful if swallowed. Toxic in contact with skin. Causes severe skin burns and eye damage. Very toxic to aquatic life with long lasting effects.

**Precautionary statements:** Wear protective gloves / protective clothing / eye protection / face protection. IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. P234: Keep only in original container. Wash contaminated clothing before reuse. Collect spillage. Store in a well-ventilated place, locked up. Handle environmental release according to local, state, federal, provincial requirements. Do not breathe dust/fume/gas/mist/vapours/spray. IF INHALED: Remove victim/person to fresh air and keep at rest in a position comfortable for breathing. IF SWALLOWED: rinse mouth. Do NOT induce vomiting. Dispose of contents/container according to state, local, federal or national regulations. Wear eye protection. Do not eat, drink or smoke when using this product. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician. P390 Absorb spillage to prevent material damage.

### HMIS:

**Health:** 3

**Flammability:** 0

**Reactivity:** 2

**Protective Equipment:** X - See protective equipment, Section 8.

### NFPA:

**Health:** 3

**Flammability:** 0

**Reactivity:** 2

**Symbol:** Water Reactive  
**WHMIS Hazard Classification:** Class D, Division 1, Subdivision A - Very toxic materials (immediate effects) Class D, Division 2, Subdivision A - Very toxic materials (other toxic effects) Class E - Corrosive material  
**WHMIS Symbols:** Acute Poison Corrosive

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### 3. COMPOSITION / INFORMATION ON INGREDIENTS

#### *Hazardous Components according to GHS:*

##### Sulfuric Acid

**CAS Number:** 7664-93-9  
**Chemical Formula:** H<sub>2</sub>SO<sub>4</sub>  
**GHS Classification:** Met. Corr. 1 H290; Skin Corr. 1A, H314; Aquatic Acute 3, H402  
**Percent Range:** 80.0 - 90.0  
**Percent Range Units:** weight / weight  
**PEL:** 1 mg/m<sup>3</sup>  
**TLV:** 1 mg/m<sup>3</sup>

**WHMIS Symbols:** Acute Poison Corrosive

##### Mercuric Sulfate

**CAS Number:** 7783-35-9  
**Chemical Formula:** HgSO<sub>4</sub>  
**GHS Classification:** Acute Tox. Inh. 2, H330; Acute Tox. Der. 1, H310; Acute Tox. Orl. 2, H300; Skin Irrit. 2, H315; Eye Irrit. 2A, H319; STOT RE 2, H373X; Aquatic Chron. 1, H410  
**Percent Range:** < 1.0  
**Percent Range Units:** weight / weight  
**PEL:** 2 mg Hg/m<sup>3</sup>  
**TLV:** Skin: 0.025 mg Hg/m<sup>3</sup>

**WHMIS Symbols:** Acute Poison Corrosive

##### Silver Sulfate

**CAS Number:** 10294-26-5  
**Chemical Formula:** Ag<sub>2</sub>SO<sub>4</sub>  
**GHS Classification:** Acute Tox. Orl 4, H302; Skin Irrit. 3, H316; Eye Dam. 1, H318; STOT Single 3, H335; Aquatic Chronic 1, H410  
**Percent Range:** < 1.0  
**Percent Range Units:** weight / weight  
**PEL:** 0.01 mg/m<sup>3</sup> (Ag)  
**TLV:** 0.01 mg/m<sup>3</sup> (Ag)

**WHMIS Symbols:** Not applicable

##### Chromic Acid

**CAS Number:** 13530-68-2  
**Chemical Formula:** H<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>  
**GHS Classification:**  
**Percent Range:** < 0.1  
**Percent Range Units:** weight / weight  
**PEL:** 5 µg/m<sup>3</sup> (0.00235 ppm Cr<sup>+6</sup>), 8 Hr TWA; Action Level is 2.5 µg/m<sup>3</sup> (0.00117 ppm), 8 Hr TWA  
**TLV:** 0.05 mg/m<sup>3</sup> (0.0235 ppm as Cr<sup>+6</sup>)

**WHMIS Symbols:** Corrosive Oxidizing Acute Poison

#### *Hazardous Components according to GHS: No*

##### Demineralized Water

**CAS Number:** 7732-18-5  
**Chemical Formula:** H<sub>2</sub>O  
**GHS Classification:** Not hazardous  
**Percent Range:** 10-15  
**Percent Range Units:** weight / weight

**PEL:** Not established

**TLV:** Not established

**WHMIS Symbols:** Not applicable

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## 4. FIRST AID MEASURES

**General Information:** In the event of exposure, show this Material Safety Data Sheet and label (where possible) to a doctor.

**Advice to doctor:** Treat symptomatically.

**Eye Contact:** Immediately flush eyes with water for 15 minutes. Call physician.

**Skin Contact (First Aid):** Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.

**Inhalation:** Remove to fresh air. Give artificial respiration if necessary. Call physician.

**Ingestion (First Aid):** Never give anything by mouth to an unconscious person. Do not induce vomiting. Give large quantities of water. Call physician immediately.

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## 5. FIRE FIGHTING MEASURES

**Flammable Properties:** Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

**Fire Fighting Instruction:** As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance. Water runoff can cause environmental damage. Dike and collect water used to fight fire.

**Extinguishing Media:** Use media appropriate to surrounding fire conditions

**Extinguishing Media NOT To Be Used:** Not applicable

**Fire / Explosion Hazards:** Contact with metals gives off hydrogen gas which is flammable. May react violently with: strong bases, water

**Hazardous Combustion Products:** This material will not burn.

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## 6. ACCIDENTAL RELEASE MEASURES

### **Spill Response Notice:**

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

**Containment Technique:** Releases of this material may contaminate the environment. Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment. Dike the spill to contain material for later disposal.

**Clean-up Technique:** Mercury and its compounds are extremely toxic! Be extremely careful not to contact the spill or breathe any vapors. If permitted by regulation, Absorb spilled liquid with non-reactive sorbent material. Dispose of all mercury contaminated material at a government approved hazardous waste facility. Otherwise, Dispose of material in government approved hazardous waste facility. Decontaminate area with commercially available mercury absorbing compounds.

**Evacuation Procedure:** Evacuate general area (50 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. Deny access to unnecessary and unprotected personnel. Remain up-wind from spilled material. If conditions warrant, increase the size of the evacuation.

**DOT Emergency Response Guide Number:** 137

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## 7. HANDLING AND STORAGE

**Handling:** Avoid contact with eyes, skin, clothing. Do not breathe mist or vapors. Use with adequate ventilation. Maintain general industrial hygiene practices when using this product.

**Storage:** Protect from: light, contamination by organic materials (will affect product stability), heat

**Flammability Class:** Not applicable

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## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering Controls:** Use a fume hood to avoid exposure to dust, mist or vapor. Maintain adequate ventilation to keep exposure levels below the published exposure limits for chemicals in this product. Refer to the OSHA Standard at 29CFR1910.1026 for Cr (VI) (See Federal Register 28 February 2006 Page 10100.)

**Personal Protective Equipment:**

**Eye Protection:** chemical splash goggles

**Skin Protection:** nitrile gloves In the EU, the selected gloves must satisfy the specifications of EU Directive 89/686/EEC and standard EN 374 derived from it. lab coat

**Inhalation Protection:** laboratory fume hood and / or adequate ventilation

**Precautionary Measures:** Avoid contact with: eyes skin clothing Do not breathe: mist/vapor Wash thoroughly after handling. Use with adequate ventilation. Protect from: light organic materials heat Keep away from: alkalies metals other combustible materials oxidizers reducers

**TLV:** Not established

**PEL:** Not established

**For Occupational Exposure Limits (OEL) for ingredients, see section 3 - Composition/Information on Ingredients.:**

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** Turbid, light orange liquid

**Physical State:** Liquid

**Molecular Weight:** Not applicable

**Odor:** Odorless

**Odor Threshold:** Not applicable

**pH:** < 0.5

**Metal Corrosivity:**

**Corrosivity Classification:** Classified as corrosive to metals.

**Steel:** 0.192 in/yr (4.88 mm/yr)

**Aluminum:** 2.18 in/yr (55.4 mm/yr)

**Specific Gravity/ Relative Density (water = 1; air =1):** ~ 1.78

**Viscosity:** ~ 25 cP

**Solubility:**

**Water:** Miscible

**Acid:** Not determined

**Other:** Not determined

**Partition Coefficient (n-octanol / water):** Not applicable

**Coefficient of Water / Oil:** Not applicable

**Melting Point:** ~ 4 °C (40 °F)

**Decomposition Temperature:** Sulfuric acid slowly decomposes above 300 °C (572 °F)

**Boiling Point:** ~ 232 °C (~ 450 °F)

**Vapor Pressure:** Not determined

**Vapor Density (air = 1):** Not determined

**Evaporation Rate (water = 1):** Not determined

**Volatile Organic Compounds Content:** Not applicable

**Flammable Properties:** Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.

**Flash Point:** Not applicable

**Method:** Not applicable

**Flammability Limits:**

**Lower Explosion Limits:** Not applicable

**Upper Explosion Limits:** Not applicable

**Autoignition Temperature:** Not applicable

**Explosive Properties:**

Not classified according to GHS criteria.

**Oxidizing Properties:**

Not classified according to GHS criteria.

**Reactivity Properties:**

Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria.

**Gas under Pressure:**

Not classified according to GHS criteria.

Not classified as gas under pressure according to GHS.

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## 10. STABILITY AND REACTIVITY

**Chemical Stability:** Stable when stored under proper conditions.

**Mechanical Impact:** None reported

**Static Discharge:** None reported.

**Reactivity / Incompatibility:** May react violently in contact with: caustics Incompatible with: metals

**Hazardous Decomposition:** Heating to decomposition releases toxic and/or corrosive fumes of: mercury compounds sulfur oxides

**Conditions to Avoid:** Exposure to light or contamination by organic materials will affect this product's stability.

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## 11. TOXICOLOGICAL INFORMATION

**Toxicokinetics, Metabolism and Distribution:** No information available for mixture.

**Toxicologically Synergistic Products:** None reported

**Acute Toxicity:** Acute Toxicity Estimate (ATE) - Calculated from Ingredient Toxicity Data Route Data Given Below

Outside testing: Oral Rat (male) LD50 = 428 mg/kg; Oral Rat (female) LD50 = 360 mg/kg

Dermal Rat LD50 = 611 mg/kg

Inhalation Rat LC50 = 22 mg/L

**Specific Target Organ Toxicity - Single Exposure (STOT-SE):** Based on classification principles, the classification criteria are not met.

**Specific Target Organ Toxicity - Repeat Exposure (STOT-RE):** Based on classification principles, the classification criteria are not met.

**Skin Corrosion/Irritation:** Corrosive to skin.

**Eye Damage:** Corrosive to eyes.

**Sensitization:** Based on classification principles, the classification criteria are not met.

**CMR Effects/Properties (carcinogenic, mutagenic or toxic to reproduction):** Based on classification principles, the classification criteria are not met. Contains Listed Carcinogen Contains a reproductive toxin.

Contains Chromic acid

An ingredient of this mixture is: IARC Group 1: Recognized Carcinogen

Hexavalent Chromium Compounds Sulfuric Acid - The IARC evaluation was based on exposure to the mist or vapor of concentrated sulfuric acid generated during chemical processes.

An ingredient of this mixture is: NTP Listed Group 1: Recognized Carcinogen

Hexavalent Chromium Compounds Sulfuric Acid Mist or Vapor

An ingredient of this product is an OSHA listed carcinogen.

Hexavalent chromium (Cr<sup>+6</sup>) compounds

**Symptoms/Effects:**

**Ingestion:** Harmful Causes: severe burns May cause: abdominal pain circulatory disturbances diarrhea loosening of the teeth nausea vomiting rapid pulse and respirations toxic nephritis (inflammation of the kidneys) shock collapse kidney damage death

**Inhalation:** Causes: burning sensation May cause: severe burns difficult breathing mouth soreness teeth erosion Effects similar to those of ingestion. Inhalation of mists / sprays: Can cause: asthma cancer

**Skin Absorption:** Toxic Will be absorbed through the skin. Effects similar to those of ingestion

**Chronic Effects:** Chronic overexposure may cause destruction of any tissue contacted erosion of the teeth mouth soreness chronic irritation or inflammation of the lungs accumulation of silver in body tissues which causes a slate-gray to bluish discoloration. Chromate and dichromate salts may cause ulceration and perforation of the nasal septum, severe liver damage, central nervous system effects, and lung cancer. Mercury is a general protoplasmic poison; it circulates in the blood and is stored in the liver, kidneys, spleen and bones. Main symptoms are sore mouth, tremors and psychic disturbances.

**Medical Conditions Aggravated:** Pre-existing: Eye conditions Skin conditions Respiratory conditions Allergies or sensitivity to chromates or chromic acid. Allergies or sensitivity to mercury.

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## 12. ECOLOGICAL INFORMATION

**Product Ecological Information:**

No ecological data available for this product. Mobility in soil: Highly mobile Do not place in landfill. Recycle appropriately. Do not release into the environment.

Method Used for Estimation of Aquatic Toxicity of Mixture Summation Method M-factor (Multiplier) for highly toxic ingredients: 100

**Ingredient Ecological Information:** Silver sulfate: 48 hr Crustacean EC50 = 0.0045 mg/L; 48 hr Daphnia magna EC50 = 0.8 mg/L. Chromic acid: LC50 = 0.0031 mg/L. Mercuric sulfate: Pseudokirchneriella subcapitata ErC50 = 0.033 mg/L/14 d; Oncorhynchus gorbuscha LC50 = 0.14 mg/L/7 d

CEPA categorization for ingredients are as follows:

Chromic acid, Silver sulfate, Mercuric sulfate: Persistent and inherently toxic to aquatic organisms.

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## 13. DISPOSAL CONSIDERATIONS

**EPA Waste ID Number:** D002 D007 D009 D011

**Special Instructions (Disposal):** Dispose of all mercury contaminated material at an E.P.A. hazardous waste facility.

Dispose of material in an E.P.A. approved hazardous waste facility.

**Empty Containers:** Rinse three times with an appropriate solvent. Collect rinsate and dispose of according to local, state or federal regulations. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste. In the US, rinsate from empty containers is classified as hazardous waste and should be disposed of at an E.P. A. approved facility.

**NOTICE (Disposal):** These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information. In Europe: Chemical and analysis solutions must be disposed of in compliance with the respective national regulations. Product packaging must be disposed of in compliance with the country-specific regulations or must be passed to a packaging return system.

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## 14. TRANSPORT INFORMATION

**D.O.T.:**

**D.O.T. Proper Shipping Name:** Sulphuric Acid

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**Hazard Class:** 8

**Subsidiary Risk:** 6.1

**ID Number:** UN1830

**Packing Group:** II

**T.D.G.:**

**Proper Shipping Name:** Sulphuric Acid Solution

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**Hazard Class:** 8

**Subsidiary Risk:** 6.1

**UN Number/PIN:** 1830

**Packing Group:** II

**I.C.A.O.:**

**I.C.A.O. Proper Shipping Name:** Sulphuric Acid

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**Hazard Class:** 8

**Subsidiary Risk:** 6.1

**ID Number:** UN1830

**Packing Group:** II

**I.M.O.:**

**Proper Shipping Name:** Sulphuric Acid

--

**Hazard Class:** 8

**Subsidiary Risk:** 6.1

**ID Number:** UN1830

**Packing Group:** II

**Additional Information:** There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

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## 15. REGULATORY INFORMATION

**U.S. Federal Regulations:**

**O.S.H.A.:** This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

**E.P.A.:**

**S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370):** Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard Reactive

**S.A.R.A. Title III Section 313 (40 CFR 372):** This product contains a chemical(s) subject to the reporting requirements of Section 313 of Title III of SARA.

Mercury compounds, Silver compounds, Sulfuric acid (acid aerosols including mists, vapors, gas, fog and other airborne forms).

**302 (EHS) TPQ (40 CFR 355):** Sulfuric Acid 1000 lbs.

**304 CERCLA RQ (40 CFR 302.4):** Chromic acid and Mercuric sulfate (each) = 10 lbs. Sulfuric Acid 1000 lbs.

**304 EHS RQ (40 CFR 355):** Sulfuric Acid - RQ 1000 lbs.

**Clean Water Act (40 CFR 116.4):** Chromic acid - RQ 10 lbs. Mercuric sulfate - RQ = 10 lbs. (4.54 kgs.) Sulfuric acid - RQ 1000 lbs.

**RCRA:** Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

**State Regulations:**

**California Prop. 65:** WARNING - This product contains a chemical known to the State of California to cause cancer. WARNING - This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

**Identification of Prop. 65 Ingredient(s):** Chromium (hexavalent compounds); Mercury and mercury compounds.

**California Perchlorate Rule CCR Title 22 Chap 33:** No

**Trade Secret Registry:** Not applicable

**National Inventories:**

**U.S. Inventory Status:** All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

**CAS Number:** Not applicable

**Canadian Inventory Status:** All ingredients of this product are DSL Listed.

**EEC Inventory Status:** All ingredients used to make this product are listed on EINECS / ELINCS.

**Australian Inventory (AICS) Status:** All ingredients are listed.

**New Zealand Inventory (NZIoC) Status:** All components either listed or exempt.

**Korean Inventory (KECI) Status:** All components of this product are either listed, listed as the anhydrous compound or exempt.

**Japan (ENCS) Inventory Status:** All components either listed or exempt.

**China (PRC) Inventory (MEP) Status:** All components either listed or exempt.

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## 16. OTHER INFORMATION

**References:** 29 CFR 1900 - 1910 (Code of Federal Regulations - Labor). Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. Cassaret and Doull's Toxicology, 3rd Ed. New York: Macmillan Publishing Co., Inc., 1986. CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993. Fire Protection Guide on Hazardous Materials, 10th Ed. Quincy, MA: National Fire Protection Association, 1991. IARC Monographs on the Evaluation of the Carcinogenic Risks to Humans. World Health Organization (Volumes 1-42) Supplement 7. France: 1987. List of Dangerous Substances Classified in Annex I of the EEC Directive (67/548) - Classification, Packaging and Labeling of Dangerous Substances, Amended July 1992. Outside Testing. Sixth Annual Report on Carcinogens, 1991. U.S. Department of Health and Human Services. Rockville, MD: Technical Resources, Inc. 1991. Technical Judgment. TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Verschueren, Karel. Handbook of Environmental Data on Organic Chemicals. New York: Van Nostrand Reinhold Co., 1977.

**Complete Text of H phrases referred to in Section 3:** H290 May be corrosive to metals. H302 Harmful if swallowed. H311 Toxic in contact with skin. H314 Causes severe skin burns and eye damage. H373 May cause damage to organs through prolonged or repeated exposure. H410 Very toxic to aquatic life with long lasting effects.

**Revision Summary:** Substantial revision to comply with EU Reg 1272/2008, Reg 1907/2006 and UN GHS (ST/SG/AC.10/36/Add.3).

**Date of MSDS Preparation:**

**Day:** 27

**Month:** March

**Year:** 2014

**MSDS Prepared:** MSDS prepared by Product Compliance Department extension 3350

**CCOHS Evaluation Note:** This product has been classified and labeled in accordance with the requirements of GHS (ST/SG/AC.10/36/Add.3). It is offered under the interim policy that was established by Health Canada permitting use of GHS-formatted safety data sheets in Canada prior to revision of CPR to GHS. It is offered under exemption from WHMIS labeling as specified in the Controlled Products Regulation (CPR) Section 17.

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**Legend:**

NA - Not Applicable

w/w - weight/weight

ND - Not Determined  
NV - Not Available

w/v - weight/volume  
v/v - volume/volume

**USER RESPONSIBILITY:** Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

**THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE.  
HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA  
OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.**

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