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

Product	MSDS	Distributor	Format	Language	Quantity
TNT822	N/A	Hach Company	OSHA	English	1
TNT822	N/A	Hach Company	ROWGHS	English	1

Total Enclosures: 2

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

MSDS No: M00485

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: COD TNTPlus™ ,HR (20-1500 MG/L)
Catalog Number: TNT822

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: M00485
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Toxic. Causes severe burns. Cumulative poison. Causes damage to the nasal epithelia and skin Causes asthma Causes lung cancer Contains a substance of very high concern (EU REACH) Chromic acid
Date of MSDS Preparation:
Day: 01
Month: August
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_{50} = 57 mg/kg; Oral mouse LD_{50} = 25 mg/kg.
LC50: None reported
TLV: Skin: 0.025 mg Hg/m^3
PEL: 2 mg Hg/m^3
Hazard: Poison.Cumulative poison.Causes burns.Experimental teratogen.

Demineralized Water
CAS No.: 7732-18-57732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 10.0 - 20.0
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: 0.1 - 1.0
Percent Range Units: weight / weight
LD50: Oral rat = 80 mg/kg
LC50: Inhalation human TCLo = 110 µg/m³

TLV: 0.05 mg/m^3 (0.0235 ppm as Cr^{+6})
PEL: 5 µg/m^3 (0.00235 ppm Cr^{+6}), 8 Hr TWA; Action Level is 2.5 µg/m^3 (0.00117 ppm), 8 Hr TWA
Hazard: Highly toxic.Causes severe burns.Oxidizer.Causes asthmaCauses damage to the nasal epithelia and skinCauses lung cancer

Silver Sulfate
CAS No.: 10294-26-5
TSCA CAS Number: 10294-26-5
Percent Range: 0.5 - 2
Percent Range Units: weight / weight
LD50: Oral Rat = 1280 mg/kg/bw
LC50: None reported
TLV: 0.01 mg/m^3 (Ag)
PEL: 0.01 mg/m^3 (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^3
PEL: 1 mg/m^3
Hazard: Causes severe burns.Harmful if inhaled.STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER

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: Toxic. Will be absorbed through the skin. Effects similar to those of ingestion
Target Organs: Central nervous system Kidneys
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
Target Organs: Central nervous system Kidneys
Inhalation: 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: Respiratory conditions Eye conditions Skin 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 difficult breathing mouth soreness erosion of the teeth accumulation of silver in body tissues which causes a slate-gray to bluish discoloration. cancer 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^6) 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 Sulfuric Acid Mist or Vapor
Additional Cancer / Reproductive Toxicity Information: Contains: a recognized carcinogen a recognized teratogen.
Toxicologically Synergistic Products: None reported

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.

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.

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. Dispose of material in government approved hazardous waste facility. Decontaminate area with commercially available mercury absorbing compounds. Otherwise, Pick up spill for disposal and place in a closed container Dispose of in accordance with local, state and federal regulations or laws.

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

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

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Use a fume hood to avoid exposure to dust, mist or vapor. Maintain general industrial hygiene practices when using this product. Maintain adequate ventilation to keep vapor level below TWA 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 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: heat light organic materials Keep away from: alkalies metals other combustible materials oxidizers reducers
TLV: Chromic acid (as Cr(VI)): 0.025 mg/m^3. Mercuric sulfate (as Hg vapor): 0.05 mg/m^3 (skin). Sulfuric acid: 1 mg/m^3.
PEL: Chromic acid (as Cr(VI)): 0.005 mg/m^3. Mercuric sulfate (as Hg vapor): 0.05 mg/m^3. Sulfuric acid: 1 mg/m^3.

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: > 100 °C (> 212 °F)
Melting Point: < 0 °C (< 32 °F)
Specific Gravity/ Relative Density (water = 1; air =1): > 1.0
Evaporation Rate (water = 1): Not determined
Volatile Organic Compounds Content: Not applicable
Partition Coefficient (n-octanol / water): Not determined
Solubility:
Water: Miscible
Acid: Not determined
Other: Not determined
Metal Corrosivity:
Steel: Corrosive
Aluminum: Corrosive

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

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: mercury compounds sulfur oxides
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:
LD50: Oral rat (male) LD_{50} = 428 mg/kg; Oral rat (female) LD_{50} = 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: Chromic acid: Oral Rat LD50 = 80 mg/kg. Silver sulfate: Oral Rat LD50 = 1280 mg/kg; Mercuric sulfate: Oral Rat LD50 = 57 mg/kg; Dermal Rat LD50 = 625 mg/kg. Sulfuric acid: Oral Rat LD50 = 2140 mg/kg; Inhalation Rat LC50 = 100 mg/L/4 hr.

12. ECOLOGICAL INFORMATION

Product Ecological Information: Aquatic Toxicity Estimation - Additive Method: 48 hr Crustacea EC50 = 0.0045 mg/L. Do not place in landfill. Recycle appropriately. Do not release into the environment.
Ingredient Ecological Information: Silver sulfate: 48 hr Crustacea EC50 = 0.0045 mg/L. Mercuric sulfate: 14 d Pseudokirchneriella subcapitata = 0.033 mg/L. Chromic acid: 48 hr Daphnia magna EC50 = 0.8 mg/L.

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.

14. TRANSPORT INFORMATION

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

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, Chromium 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: Not applicable

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

16. OTHER INFORMATION

Intended Use: Laboratory Use Determination of Chemical Oxygen Demand

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. 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 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. Verschueren, Karel. Handbook of Environmental Data on Organic Chemicals. New York: Van Nostrand Reinhold Co., 1977.

Revision Summary: Format update(s) to comply with Directive 2001/58/EC Substantially Revised MSDS Substantial revision to comply with EU Reg 1272/2008, Reg 1907/2006 and UN GHS (ST/SG/AC.10/36/Add.3).

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.

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

MSDS No: M00485

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: COD TNTPlus™, HR (20-1500 MG/L)
Catalog Number: TNT822

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: M00485
Chemical Name: Not applicable
CAS Number: Not applicable
Additional CAS No. (for hydrated forms): Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Intended Use: Laboratory Use Determination of Chemical Oxygen Demand

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 Germ Cell Mutagenicity: Muta. 1B Carcinogenicity: Carc. 1A Specific Target Organ Toxicity - Repeated Exposure: STOT RE. 2 Hazardous to the Aquatic Environment: Aquatic Chronic 1
GHS Label Elements:

Hazard statements: May be corrosive to metals. Harmful if swallowed. Toxic in contact with skin. Causes severe skin burns and eye damage. May cause genetic defects. May cause cancer. May cause damage to organs through prolonged or repeated exposure. Very toxic to aquatic life with long lasting effects.
Precautionary statements: Obtain special instructions before use. Wear protective gloves / protective clothing / eye protection / face protection. IF SWALLOWED: rinse mouth. Do NOT induce vomiting. 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. IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
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

---

3. COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Components according to GHS:

Sulfuric Acid

CAS Number: 7664-93-9
Chemical Formula: H_2SO_4
GHS Classification: Met. Corr. 1 H290; Skin Corr. 1A, H314
Percent Range: 80.0 - 90.0
Percent Range Units: weight / weight
PEL: 1 mg/m^3
TLV: 1 mg/m^3 (TWA); 3 mg/m^3 (STEL)

WHMIS Symbols: Acute PoisonCorrosive

Silver Sulfate

CAS Number: 10294-26-5
Chemical Formula: Ag_2SO_4
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: 0.5 - 3.0
Percent Range Units: weight / volume
PEL: 0.01 mg/m^3 (Ag)
TLV: 0.01 mg/m^3 (Ag)

WHMIS Symbols: Not applicable

Mercuric Sulfate

CAS Number: 7783-35-9
Chemical Formula: $HgSO_4$
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: 0.1 - 1.0
Percent Range Units: weight / weight
PEL: 0.1 mg/m^3 (Hg)
TLV: 0.05 mg/m^3 (Hg)

WHMIS Symbols: Acute PoisonCorrosive

Chromic Acid

CAS Number: 13530-68-2
Chemical Formula: $H_2Cr_2O_7$
GHS Classification: Ox. Sol.2,H272; Carc.1B,H350; Muta.1B, H340; Repr.1B, H360FD; Acute Tox.2-Inh, H330; Acute Tox.3-Orl, H301; Acute Tox.4-Derm, H312; STOT RE 1, H372; Skin Corr.1B, H314; Resp. Sens.1, H334; Skin Sens.1, H317; Aquatic Acute 1, H400; Aquatic Chronic 1, H410
Percent Range: 0.1 - 1.0
Percent Range Units: weight / volume
PEL: 5 $\mu g/m^3$ (0.00235 ppm Cr^{+6}), 8 Hr TWA; Action Level is 2.5 $\mu g/m^3$ (0.00117 ppm), 8 Hr TWA
TLV: 0.05 mg/m^3 (0.0235 ppm as Cr^{+6})

WHMIS Symbols: CorrosiveOxidizingAcute Poison

Hazardous Components according to GHS: No

Demineralized Water

CAS Number: 7732-18-5
Chemical Formula: H_2O
GHS Classification: Not applicable
Percent Range: 10.0 - 20.0
Percent Range Units: weight / weight
PEL: Not established

TLV: Not established

WHMIS Symbols: Not applicable

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

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.

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. Dispose of material in government approved hazardous waste facility. Decontaminate area with commercially available mercury absorbing compounds. Otherwise, Pick up spill for disposal and place in a closed container Dispose of in accordance with local, state and federal regulations or laws.
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

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

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Use a fume hood to avoid exposure to dust, mist or vapor. Maintain general industrial hygiene practices when using this product. Maintain adequate ventilation to keep vapor level below TWA 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 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: heat light organic materials Keep away from: alkalies metals other combustible materials oxidizers reducers

TLV: Not established. 0.05 mg/m³ (0.0235 ppm as Cr^{+6}).

PEL: Not established. 5 µg/m³ (0,00235 ppm Cr^{+6}), 8 Hr TWA; Action Level is 2,5 µg/m^3 (0,00117 ppm), 8 Hr TWA

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

---

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Turbid, light orange liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: Not determined

Odor Threshold: Not applicable

pH: < 0.5

Metal Corrosivity:

Corrosivity Classification: Classified as corrosive to metals.

Steel: Corrosive

Aluminum: Corrosive

Specific Gravity/ Relative Density (water = 1; air =1): > 1.0

Viscosity: Not determined

Solubility:

Water: Miscible

Acid: Not determined

Other: Not determined

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

Coefficient of Water / Oil: Not applicable

Melting Point: Not applicable

Decomposition Temperature: Not determined

Boiling Point: > 100°C (> 212°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 classifed 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.

---

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
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.

11. TOXICOLOGICAL INFORMATION

Toxicokinetics, Metabolism and Distribution: No information available
Toxicologically Synergistic Products: None reported
Acute Toxicity: Acute Toxicity Estimate (ATE) - Calculated from Ingredient Toxicity Data
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. Target Organs Respiratory Tract Kidneys Liver Reproductive system Central nervous system
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): Contains Listed Carcinogen Data supporting mutagenicity was found. Contains a reproductive toxin.
An ingredient of this mixture is: NTP Listed Group 1: Recognized Carcinogen
Hexavalent Chromium Compounds
An ingredient of this product is an OSHA listed carcinogen.
Hexavalent chromium (Cr^6) compounds
Symptoms/Effects:
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 Toxic
Inhalation: Causes: severe burns May cause: difficult breathing mouth soreness teeth erosion Effects similar to those of ingestion. Toxic
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 difficult breathing mouth soreness erosion of the teeth accumulation of silver in body tissues which causes a slate-gray to bluish discoloration. cancer 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: Respiratory conditions Eye conditions Skin conditions Allergies or sensitivity to chromates or chromic acid. Allergies or sensitivity to mercury.

12. ECOLOGICAL INFORMATION

Product Ecological Information: Calculated: Crustacea 48 hr EC50 = 0.0045 mg/L.
Mobility in soil: No data available
Method Used for Estimation of Aquatic Toxicity of Mixture M-factor (Multiplier) for highly toxic ingredients: 100
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.

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.
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.

14. TRANSPORT INFORMATION

D.O.T.:
D.O.T. Proper Shipping Name: Sulphuric Acid
--
Hazard Class: 8
Subsidiary Risk: NA
ID Number: UN1830
Packing Group: II

T.D.G.:
Proper Shipping Name: Sulphuric Acid
--
Hazard Class: 8
Subsidiary Risk: NA
UN Number/PIN: 1830
Packing Group: II

I.C.A.O.:
I.C.A.O. Proper Shipping Name: Sulphuric Acid
--
Hazard Class: 8
Subsidiary Risk: NA
ID Number: UN1830
Packing Group: II

I.M.O.:
Proper Shipping Name: Sulphuric Acid
--
Hazard Class: 8
Subsidiary Risk: NA
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.

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): Immédiat (aigu) Danger pour la santé 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, Chromium 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: Not applicable
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.

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. 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 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. 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. H340 May cause genetic defects. H350 May cause cancer. 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: 05
Month: June
Year: 2013

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.

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.