

MATERIAL SAFETY DATA SHEET

CHROMIUM TRIOXIDE

ELEMENTIS

CHROMIUM

1. PRODUCT AND COMPANY IDENTIFICATION

COMMON NAME: Chromium Trioxide, Chromic acid
CHEMICAL FAMILY: Metal oxide
SYNONYMS: Chromic acid, chromic anhydride
CHEMICAL FORMULA: CrO₃
PRODUCT CAS NO.: 1333-82-0 Chromium Trioxide **RTECS:** GB6650000
COMPANY: Elementis Chromium LP
ADDRESS: 3800 Buddy Lawrence Drive
PO Box 9912
CITY, STATE, ZIP: Corpus Christi, TX 78469
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2. INGREDIENTS: COMPOSITION/INFORMATION

INGREDIENT	WEIGHT %	PEL-OSHA	TLV-ACGIH	LD 50/LC 50 ROUTE/SPECIES
Chromium Trioxide	99	0.1 mg/m ³ as CrO ₃ (ceiling)	0.05 mg/m ³ as Cr (8 hr TWA)	LD50:52 mg/kg oral/rat

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Odorless, dark red, nonflammable crystals which may be fatal via skin contact, inhalation, or ingestion. **OXIDIZER – USE AND STORE AWAY FROM INCOMPATIBLE MATERIALS. CORROSIVE– CAN CAUSE SEVERE BURNS TO EYES, SKIN, AND MUCOUS MEMBRANES, CANCER HAZARD** by inhalation – Contains hexavalent chromium. May react explosively with organic materials to sustain fire. **AVOID DIRECT CONTACT WITH THIS MATERIAL.** Do not eat, drink or smoke in areas where chromic acid is being used or stored. Keep containers closed when in use.

3. HAZARDS IDENTIFICATION (CONTINUED)

POTENTIAL HEALTH EFFECTS

PRIMARY ROUTE(S) OF ENTRY: Skin and eye contact, inhalation, ingestion.

TARGET ORGANS: Eye, skin, kidneys, respiratory system, liver.

ACUTE EFFECTS:

SIGNS AND SYMPTOMS: Chromic acid can damage the skin and mucous membranes. Chromic acid poisoning may cause vomiting, pain in the esophagus and stomach, and metallic taste. Circulatory collapse may follow with weak and rapid pulse, shallow respiration, and clammy skin. Early deaths are generally associated with shock. Late deaths are usually due to renal or hepatic failure.

EYE: Contact can cause corrosive burns, corneal damage, and blindness. Direct contact may also cause severe damage including burns and blindness.

SKIN: Direct contact with chromic acid can cause sensitization, severe burns, and external ulcers, "Chrome Sores". Chrome sores most commonly occur at breaks in the skin, nailroots, creases over knuckles, finger webs, backs of hands, and on forearms. Massive overexposure could lead to toxic quantities being absorbed through the skin causing systemic poisoning and/or kidney or liver damage.

INGESTION: May be fatal if swallowed. Ingestion of chromic acid can be fatal due to corrosive burns as well as systemic effects. Chromic acid causes violent gastrointestinal irritation and vomiting. Systemic poisoning may follow ingestion with ensuing kidney and liver damage.

INHALATION: Inhalation of dusts and mists can burn the mucous membranes, irritate the respiratory tract and/or cause bronchospasms and mucous membrane ulceration. Repeated or prolonged inhalation may cause ulceration and perforation of the nasal septum.

CHRONIC EFFECTS: Repeated inhalation of chromic acid causes nasal perforation, skin ulceration, chronic rhinitis, pharyngitis, kidney and liver damage, inflammation of the larynx, changes in the blood and lung cancer. Transfer of chromic acid to the eyes from the fingers or droplets in the air can cause chronic conjunctival inflammation and occasionally a brown band in the cornea.

CARCINOGENICITY: IARC: Yes (1) NTP: Yes(1) OSHA: No

IARC classifies hexavalent chromium compounds as agent(s) which are carcinogenic to humans. NTP classifies chromium (hexavalent) and certain hexavalent chromium compounds as a group of substances which is known to be carcinogenic.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Persons with skin, liver, kidney, and respiratory disorders may be more susceptible to the effects of chromates. Persons with known sensitization to chromic acid or chromates or with a history of asthma may be at increased risk from exposure (acute asthmatic attacks).

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4. FIRST AID MEASURES

EYE CONTACT: Immediately hold eyes open and flush with a steady, gently stream of water for 15 minutes. Remove contact lenses, if present. **SEEK IMMEDIATE MEDICAL ATTENTION.**

SKIN: Immediately flush affected area(s) with water for at least 15 minutes while removing contaminated clothing and shoes. **SEEK MEDICAL ATTENTION IMMEDIATELY.** Thoroughly clean contaminated clothing and shoes before reuse or discard.

INHALATION: Remove to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. **SEEK MEDICAL ATTENTION IMMEDIATELY. Note to physician:** Continue to monitor for respiratory distress for 72 hours.

INGESTION: NEVER give anything by mouth to an unconscious person. **DO NOT INDUCE VOMITING.** Give large quantities of water. If available, give several glasses of milk. If vomiting occurs spontaneously, keep airways clear and give more water. **SEEK MEDICAL ATTENTION IMMEDIATELY.** Immediate administration of ascorbic acid (dissolved in water) by mouth or intravenously is recommended. (See Notes to Physician.) **Note to Physician:** Massive overexposure to chromic acid could lead to kidney failure and death. Death has been avoided in several such cases through the use of early renal dialysis. An effective treatment has been shown to be administration of ascorbic acid by mouth or intravenously. Skin ulcers may be treated by removal from exposure, daily cleansing and debridement, and application of antibiotic cream and dressing to prevent further exposure or contamination.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLAMMABLE LIMITS: LEL: Not applicable UEL: Not applicable

HMS HAZARD CLASSIFICATION: HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 1 OXIDIZER

EXTINGUISHING MEDIA: Product is nonflammable. Use media appropriate for surrounding fire.

FIRE AND EXPLOSION HAZARDS: CONTAINERS MAY EXPLODE WHEN INVOLVED IN FIRE. Chromic acid reacts strongly with materials which are readily oxidized. Reaction may be rapid enough to cause ignition. Combustion can be violent with finely divided oxidizable substances. Oxidizing capability may also sustain a fire involving easily oxidizable material. Thermal decomposition may produce chromic oxide and oxygen.

FIRE FIGHTING EQUIPMENT: Firefighters should wear a NIOSH/MSHA-approved self-contained breathing apparatus in positive pressure mode and bunker gear. Additional chemical protective clothing may be necessary to prevent exposure.

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6. ACCIDENTAL RELEASE MEASURES

SPILLS SHOULD BE CLEANED IMMEDIATELY TO PREVENT DISPERSION OF AIRBORNE MISTS AND DUSTS. Isolate hazard area and deny entry to unauthorized and/or unprotected personnel. Clean up personnel should wear appropriate protective equipment including respiratory protection as necessary (See Section 8). Any spilled chromic acid should be placed in a separate clean dry closed container. Dike spilled liquid material with suitable inert sorbent (i.e., sand, soil, vermiculite) and place in a clean dry container for later recycle or disposal. DO NOT DRY SWEEP. Clean spills using wet clean up methods (i.e., misting, etc.) or with a vacuum equipped with a High Efficiency Particulate Air(HEPA) filter. RUN OFF WATER IS CORROSIVE AND TOXIC. Dispose of small quantities through an approved Waste Contractor or reduce hexavalent chromium to trivalent (See Section 13). Dispose of in accordance with all local, state, and federal regulations.

7. HANDLING AND STORAGE

PROTECT CONTAINERS FROM PHYSICAL DAMAGE AND CONTAMINATION. Store in cool, dry location away from ignition sources, combustible, organic or other readily oxidizable materials. Do not eat, drink or smoke in areas where chromic acid is being used or stored. Keep containers closed when not in use. Wash hands thoroughly after handling, before leaving the work area, and before meals or breaks. Wear appropriate personal protective equipment (See Section 8. EXPOSURE CONTROLS/ PERSONAL PROTECTION) to avoid contact with skin, eyes, and clothing. Wear respiratory protection where there is risk of exposure to this product. Remove any contaminated clothing and launder before reuse. DO NOT reuse empty containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: MSHA/ NIOSH - Approved filter type dust respirator in accordance with the requirements of 29 CFR 1910.134.

SKIN PROTECTION: Impervious coveralls, gloves, and footwear or other full-body protective clothing should be worn when the possibility of exposure exists.

EYE PROTECTION: Safety glasses, close fitting chemical safety goggles are recommended when dust or mist is present.

ENGINEERING CONTROLS: Ventilation as necessary to control chromic acid levels to below acceptable exposure guidelines. Local exhaust ventilation with partial enclosure should be employed for processes likely to generate dust, fume or mist/spray. Emergency showers and quick drench eye wash stations should be in close proximity to work area.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

PERSONAL SAMPLING: Air sampling for hexavalent chromium: 5.0 µm polyvinyl chloride filter (OSHA ID 103).

OTHER: Cover cuts, grazes or broken skin with impervious dressings to avoid contamination. Containers should be provided for work clothing discarded at the end of the shift or after a contamination incident. Contaminated clothing should be held in these containers until removed for disposal or decontamination. Non-impervious clothing which becomes contaminated should be immediately removed. Areas in which exposure may occur should be limited to authorized personnel. Workers who handle chromic acid should wash hands thoroughly with soap and water if skin becomes contaminated and before eating, smoking, or using toilet facilities.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Dark red crystals
ODOR:	None
pH:	Approx. 1.0 for 1% aqueous solution
BOILING POINT:	Decomposes
MELTING POINT:	196 °C
VAPOR PRESSURE:	Not Applicable
VAPOR DENSITY:	Not Applicable
BULK DENSITY:	100 lbs/ft ³
SOLUBILITY IN WATER:	62.5% (@ 20°C)
SPECIFIC GRAVITY:	2.70 (H ₂ O = 1)
% VOLATILE BY VOLUME:	Not Applicable
EVAPORATION RATE:	Not Applicable

10. STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions and use. Keep away from incompatible materials.

INCOMPATIBILITIES: Readily oxidizes combustible, organic or other readily oxidizable materials (wood, paper, sulfur, aluminum, plastics, etc.). Corrosive to metals.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may produce chromic oxide and oxygen.

HAZARDOUS POLYMERIZATION: Will not occur.

THERMAL DECOMPOSITION: Decomposition begins at 196°C.

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11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:	Oral LD50:	(rat)	52 mg/kg (both sexes)
	Inhalation LC50:	(rat)	217 mg/m ³ (4 H exposure - both sexes)
	Dermal LD50:	(rabbit)	57 mg/kg (both sexes)

INGESTION: Human ingestion of 0.5 g of hexavalent chromium has resulted in serious toxicity. Death has resulted from ingestion of 1 to 8 g of hexavalent chromium and survival has been reported following ingestion of 15 g (human).

SKIN: Chromic acid is toxic via skin absorption. Cr(VI) penetrates undamaged skin and reduces to Cr(III) which forms a skin allergen by combining with proteins or other skin components (human).

SKIN CORROSION: Moistened material causes corrosion to the skin.

EYE: Chromic acid injury is characterized by infiltration, vascularization, and opacification of the cornea.

INHALATION: LC50: 217 mg/m³/4H; rat

CHRONIC: Epidemiological studies in the chromate production, chromate pigment and chromium plating industries indicate that long term exposure to dust and mist containing hexavalent (CrVI) compounds are associated with increased risk of respiratory tract cancer in humans.

Specific soluble compounds of hexavalent chromium that may reasonably be anticipated to be carcinogenic include calcium chromate, chromic acid, lead chromate, strontium chromate and zinc chromate (NTP, *Seventh Annual Report on Carcinogens*, pg. 46, 1994).

SUBCHRONIC: No Data

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL FATE: Cr(VI) may react with particulate matter or pollutants to form Cr(III). Generally chromium is removed from the atmosphere through wet and dry deposition.

The major stable form of chromium in seawater is Cr(VI). Hexavalent chromium may remain unchanged or change slowly in many natural waters due to the low concentration of reducing matter. The oxidizing ability of Cr(VI) in aqueous solution increases at lower pHs. Cr(VI) in water will eventually be reduced to Cr(III) by organic matter. The residence time of chromium in lake water has been estimated to be 4.6 to 18 years. Most chromium released into water will ultimately be deposited in the sediment as the hydroxide after being reduced to Cr(III).

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12. ECOLOGICAL INFORMATION (CONTINUED)

Chromium may be transported from soil through runoff and leaching of water and through aerosol formation. The organic matter present in soil is expected to reduce soluble chromate to insoluble chromic oxide (Cr_2O_3).

ECOTOXICITY: This product is toxic to wildlife and aquatic invertebrates. Bioaccumulation of chromium from soil to above ground parts of plants is unlikely. There is no indication of biomagnification of chromium along the terrestrial food chain (soil-plant-animal).

Aquatic Toxicity: 96 H LC50: *Salmo gairdneri* (rainbow trout) 69,000 $\mu\text{g/l}$ as Cr
 96 H LC50: *Pimephales promelas* (fathead minnow) 37,000 $\mu\text{g/l}$ as Cr

13. DISPOSAL CONSIDERATIONS

DO NOT DISCHARGE CHROMIC ACID INTO SEWERS OR WATERWAYS. DO NOT INCINERATE OR LANDFILL. Reclaim if possible. If reclamation is not possible, reduce to trivalent Cr(III) by the methods described below or dispose of via an approved Waste Contractor to a licensed disposal site.

1. Slowly and carefully dissolve chromic acid in plenty of water. SOLUTION CAN CAUSE SEVERE BURNS - HANDLE CAREFULLY.
2. Mix with reducing agents (i.e., ferrous sulfate) to reduce to trivalent chromium.
3. Precipitate trivalent chromium as chromium hydroxide by adjusting pH to 8.5 with sodium carbonate.
4. Filter and dry precipitated chromium hydroxide. Dispose of in accordance with local, state and federal regulations.

Recycle, reclaim and dispose of in accordance with applicable local, state, and federal regulations. Dispose per 40 CFR Part 261 and 262.

14. TRANSPORT INFORMATION

DOT CLASSIFICATION:

NAME: Chromium trioxide, anhydrous, toxic (Chromic Acid) RQ
HAZARD CLASS/DIVISION: 5.1
PACKING GROUP: II
UN NUMBER: 1463
LABEL: Oxidizer, Corrosive, Toxic

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15. REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200: Chromic acid is hazardous under criteria of this rule.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA Hazard Categories promulgated under

Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

- Fire Hazard
- Acute Health Hazards
- Chronic Health Hazards

SARA 313 INFORMATION: Chromic acid is subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 under the broad class of chromium compounds.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT, 40 CFR Part 117, Part 304: Chromic acid is a CERCLA hazardous substance with a reportable quantity (RQ) of 10 pounds. Releases in excess of this amount should be reported to the National Response Center, Washington, D.C. (1-800-424-8802).

RESOURCE CONSERVATION AND RECOVERY (RCRA) ACT 40 CFR 261 SUBPART C: If this product becomes a waste, it may be characterized as a hazardous waste following testing as prescribed by the Resource Conservation and Recovery Act (RCRA) regulations for D007 wastes.

CLEAN AIR ACT (CAA): Chromium is designated as a hazardous air pollutant under Section 112 of the CAA.

CALIFORNIA PROPOSITION 65: Chromic Acid is covered under Proposition 65 for hexavalent chromium. Appropriate warnings should be given.

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16. OTHER INFORMATION

KEY:	
ACGIH:	American Conference of Governmental Industrial Hygienists
IARC:	International Agency for Research on Cancer
NIOSH:	National Institute for Occupational Safety and Health
NTP:	National Toxicology Program
MSHA:	Mine Safety and Health Administration
OSHA:	Occupational Safety and Health Administration
RTECS:	Registry of Toxic Effects of Chemical Substances
TLV:	Threshold Limit Value
PEL:	Permissible Exposure Limit

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