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MATERIAL SAFETY DATA SHEET
SODIUM DICHROMATE, DIHYDRATE

ELEMENTIS

CHROMIUM

1. PRODUCT AND COMPANY IDENTIFICATION

COMMON NAME: Sodium Dichromate, dihydrate; Sodium Dichromate Crystal
CHEMICAL FAMILY: Salt
SYNONYMS: Sodium Bichromate
CHEMICAL FORMULA: $\text{Na}_2\text{Cr}_2\text{O}_7 \cdot 2\text{H}_2\text{O}$
PRODUCT CAS NO.: 7789-12-0 Sodium dichromate, dihydrate
10588-01-9 Sodium dichromate, anhydrous
7732-18-5 Water
COMPANY: Elementis Chromium LP
ADDRESS: 5408 Holly Shelter Road
CITY, STATE, ZIP: Castle Hayne, NC 28429
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2. INGREDIENTS: COMPOSITION/INFORMATION

INGREDIENT	WEIGHT %	PEL-OSHA	ACTION LEVEL - OSHA	TLV -ACGIH	LD 50/LC 50 ROUTE/SPECIES
Sodium dichromate, dihydrate	100	5 $\mu\text{g}/\text{M}^3$ Cr^{+6} (8 hr TWA)	2.5 $\mu\text{g}/\text{M}^3$ Cr^{+6} (8 hr TWA)	0.05 mg/M^3 as Cr^{+6} (8 hr TWA)	LD50: 51mg/kg oral/rat

3. HAZARDS IDENTIFICATION

This is a hexavalent chromium containing material and must be used in accordance with 29 CFR 1910.1026

EMERGENCY OVERVIEW

Odorless, orange nonflammable crystals which may be fatal via skin contact, inhalation, or ingestion. Skin and eye contact may cause severe irritation. **CANCER HAZARD** by inhalation – Contains hexavalent chromium. Degrades above 400 °C. Product can act as an oxidizing agent. May react explosively with organic materials to sustain fire. **AVOID DIRECT CONTACT WITH THIS MATERIAL.** Do not eat, drink, smoke or apply make-up in areas where sodium dichromate is being used or stored. Keep containers closed when not in use.

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3. HAZARDS IDENTIFICATION - (CONTINUED)

POTENTIAL HEALTH EFFECTS

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

TARGET ORGANS: Eyes, skin, respiratory system, kidneys, liver

ACUTE EFFECTS:

SIGNS AND SYMPTOMS: Sodium dichromate is irritating to the skin and mucous membranes. Poisoning by sodium dichromate may cause vomiting, pain in the 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 may produce eye irritation with associated redness, swelling, tears, and pain. Direct contact may also cause severe damage including burns and blindness.

SKIN: Direct contact may cause skin irritation, sensitization or dermatitis. Contact with skin can cause external ulcers, "Chrome Sores". Chrome sores most commonly occur at breaks in the skin, nail roots, 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. Systemic poisoning may follow ingestion with ensuing kidney and liver damage. Ingestion can cause irritation of the upper gastro-intestinal tract.

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

CHRONIC EFFECTS: Repeated or prolonged inhalation of sodium dichromate may cause nasal perforation, skin ulceration, chronic rhinitis, pharyngitis, kidney and liver damage, inflammation of the larynx, and increased risks of developing nasopharyngeal cancer and lung cancer.

CARCINOGENICITY: IARC: Yes

NTP: Yes

OSHA: Yes

IARC classifies hexavalent chromium compounds as agent(s) which are carcinogenic to humans. NTP classifies chromium (hexavalent) and certain chromium (hexavalent) 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, gentle stream of water for 15 minutes. Remove contact lenses, if present and continue flushing. **SEEK IMMEDIATE MEDICAL ATTENTION.**

SKIN: Remove any contaminated clothing and immediately wash affected area(s) with large quantities of soap and water for at least 15 minutes. If irritation occurs, **SEEK IMMEDIATE MEDICAL ATTENTION.** Thoroughly clean contaminated clothing and shoes before reuse or discard.

INHALATION: Remove to fresh air. If the exposed person has difficulty breathing, ensure that the airways are clear, and 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 airway clear and give more water. **SEEK MEDICAL ATTENTION IMMEDIATELY.** **Note to Physician:** Massive over-exposure to sodium dichromate can lead to kidney failure and death. Death has been avoided in several such cases through the use of early renal dialysis. Administration of 5-10 grams of ascorbic acid by mouth or intravenously may be effective in reducing the dichromate to less toxic trivalent chromium. However, large doses of ascorbic acid given parenterally can be nephrotoxic. If in doubt, consult the Poison Control Center ((800) 222-1222) regarding the dose and route of ascorbic acid in relation to the time since exposure. Skin ulcers can be treated by removal of the individual from further exposure, daily cleaning and debridement and wound dressing to prevent further exposure and contamination. Antibiotic cream may be considered if there is a likelihood of secondary wound infection.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLAMMABLE LIMITS: LEL: Not applicable UEL: Not applicable

HMIS HAZARD CLASSIFICATION: HEALTH: 3 FLAMMABILITY: 0 REACTIVITY: 1

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

FIRE AND EXPLOSION HAZARDS: METAL CONTAINERS MAY EXPLODE WHEN INVOLVED IN FIRE. Sodium dichromate 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 oxygen, Na₂O, and chromic oxides.

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.

6. ACCIDENTAL RELEASE MEASURES

CONTAIN SPILL AND CLEAN AREA IMMEDIATELY TO PREVENT DISPERSION OF AIRBORNE MISTS AND DUSTS. Isolate hazard area and deny entry to unauthorized and/or unprotected personnel. Use only qualified, trained responders with the regulatory required level of PPE (See Section 8). Carefully scoop as much dry material as possible in a manner that minimizes exposure to chromium (VI) and place recovered material in a separate clean, dry, labeled container for use, recycling or disposal.

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6. ACCIDENTAL RELEASE MEASURES - (CONTINUED)

To avoid creating airborne release, DO NOT DRY SWEEP OR DRY BRUSH. Dike spilled liquid material with suitable inert sorbent (i.e., sand, soil, vermiculite) and place recovered liquid in a closed, labeled container for later recycle or disposal. Clean spill residual using wet clean-up method (i.e., misting, etc.) or by a vacuum equipped with a High Efficiency Particulate (HEPA) filter. Waste, scrap, debris, and any other materials contaminated with chromium (VI) and consigned for disposal are collected and disposed of in sealed, impermeable bags or other closed, impermeable containers. RUN OFF WATER IS TOXIC. Dispose of wastes through an approved Waste Contractor and in accordance with all applicable regulations. CAUTION: Treatment of recovered product, contaminated soil and debris may be considered "hazardous waste treatment" and must only be done with appropriate regulatory agency approval and permits. Dry shoveling may be used only where HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure to chromium (VI) have been tried and found not to be effective.

The Reportable Quantity (RQ) for sodium dichromate under CERCLA (see Section 15) is 10 pounds.

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 or carry items associated with these activities into areas where sodium dichromate is being used or stored. Keep containers closed when not in use. Wash hands and face 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 in accordance with 29 CFR 1910.1026 before re-use. DO NOT recycle or reuse empty container. Dispose of empty container in accordance with federal, state and local regulations.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: Use MSHA/NIOSH - Approved respiratory protection commensurate with potential exposure level 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: Wear safety glasses. Wear close fitting chemical safety goggles when dust or mist is present.

ENGINEERING CONTROLS: Ventilation as necessary to control sodium dichromate levels to below regulatory limits. Local exhaust ventilation and other engineering controls 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.

PERSONAL SAMPLING: See 29 CFR 1910.1026 for specific requirements.

OTHER: Cover cuts, grazes or broken skin with impervious dressings to avoid contamination. Closed impermeable 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

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION - (CONTINUED)

contaminated should be immediately removed. Areas in which exposure may occur should be limited to authorized personnel. Workers who handle sodium dichromate should wash hands and face thoroughly with soap and water if skin becomes contaminated and before eating, smoking, applying cosmetics or using toilet facilities.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Red-orange crystals
ODOR:	None
pH:	3.6-4.4 (at 25 °C of 400 gm/liter)
BOILING POINT	Not Applicable
MELTING POINT:	357 °C
VAPOR PRESSURE:	Not Applicable
VAPOR DENSITY:	Not Applicable
BULK DENSITY:	70-80 lbs/ft ³
SOLUBILITY IN WATER:	73 % (at 20 °C)
SPECIFIC GRAVITY:	2.35 (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. Sodium dichromate can react explosively with hydrazine and acetic anhydride. Minor explosions have occurred during preparation of acetic acid by acid dichromate oxidation of ethanol.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may produce oxygen, toxic Na₂O and chromic oxides.

THERMAL DECOMPOSITION: Decomposition begins at 400 °C.

HAZARDOUS POLYMERIZATION: Will not occur.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:	Oral LD50:	(rat)	51 mg/kg (both sexes)
	Inhalation LC50:	(rat)	124 mg/M ³ (4 Hr. exposure - both sexes)
	Dermal LD50:	(rabbit)	1.0 g/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).

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11. TOXICOLOGICAL INFORMATION - (CONTINUED)

SKIN: 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: Solid - No corrosion, but caused well-defined erythema in two of six animals tested. Solid moistened with physiological saline - No corrosion. Caused well-defined erythema in all six animals tested, 5 of which showed edema and one of which showed a superficial necrotic focal point.

EYE: A 0.08M solution of sodium dichromate produced severe reaction when injected into corneal stroma or applied to the corneas of rabbits after removal of epithelium (Reaction graded 70 on scale of 1 to 100).

INHALATION: An LC50 of 124 mg/M³/4Hr was reported for inhalation of sodium dichromate as an aerosol (rat).

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

OSHA regulates all hexavalent-containing chromium compounds as carcinogenic under 29 CFR 1910.1026

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 soluble 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).

Chromium may be transported from soil through runoff and leaching of water and through aerosol formation. Organic matter present in soil is expected to reduce small amounts of chromate to insoluble chromic oxide (Cr₂O₃).

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 Hr. LC50: *Salmo gairdneri* (rainbow trout) 69,000 µg/l as Cr
96 Hr. LC50: *Pimephales promelas* (fathead minnow) 37,000 µg/l as Cr

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13. DISPOSAL CONSIDERATIONS

DO NOT DISCHARGE SODIUM DICHROMATE INTO SEWERS OR WATERWAYS. DO NOT INCINERATE OR LANDFILL.
Reclaim if possible.

Recycle, reclaim and dispose of in accordance with applicable local, state, and federal regulations. Dispose per 40 CFR Part 261 and 262. See also **15. REGULATORY INFORMATION** under RCRA.

14. TRANSPORTATION INFORMATION

DOT CLASSIFICATION

NAME:	Toxic solid, inorganic, n.o.s. (Sodium bichromate) RQ
HAZARD CLASS/DIVISION:	6.1
PACKING GROUP:	III
UN NUMBER:	3288
LABEL:	Toxic

15. REGULATORY INFORMATION

OSHA WORKPLACE EXPOSURE RULE FOR HEXAVALENT CHROMIUM, 29 CFR 1910.1026: Workplace exposures must be maintained below $5\mu\text{g}/\text{M}^3$ (8 hr TWA). See 29 CFR 1910.1026 for the other specific requirements of this rule.

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

TSCA SECTION 12(b) – EXPORT NOTIFICATION REQUIREMENTS. This chemical is a hexavalent chromium containing chemical that can be used for water treatment (either alone or in combination with other chemical substances) and triggers the export notification requirements of TSCA Section 12(b). Refer to 59 FR 42773 and 40 CFR 749.68.

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:

- Acute Health Hazards
- Chronic Health Hazards

SARA 313 INFORMATION: Sodium dichromate 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: Sodium dichromate 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.

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15. REGULATORY INFORMATION – (CONTINUED)

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

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

16. OTHER INFORMATION

KEY:

ACGIH:	American Conference of Governmental Industrial Hygienists
CFR	Code of Federal Regulations
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

Elementis provides information through its sodium dichromate dihydrate product specification information and material safety data sheets. Because conditions of use and suitability of the product for particular uses are beyond our control; all risks of use of the product are therefore assumed by the user and ELEMENTIS EXPRESSLY DISCLAIMS ALL WARRANTIES OF EVERY KIND AND NATURE, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE IN RESPECT TO THE USE OR SUITABILITY OF THE PRODUCT FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. Given the variety of factors that can affect the use and application of a product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the product to determine whether it is fit for a particular purpose and suitable for user's method of use or application. Appropriate warnings and safe handling procedures should be provided to handlers and users..