

MATERIAL SAFETY DATA SHEET  
AMMONIUM DICHROMATE

ELEMENTIS

CHROMIUM

1. PRODUCT AND COMPANY IDENTIFICATION

COMMON NAME: Ammonium Dichromate  
CHEMICAL FAMILY: Salt  
SYNONYMS: Chromic Acid, diammonium salt; Ammonium Bichromate  
CHEMICAL FORMULA:  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$   
PRODUCT CAS NO.: 7789-09 -5 Ammonium dichromate RTECS: HX7650000  
10588-01-9 Sodium dichromate, anhydrous RTECS: HX7700000  
7732-18-5 Water RTECS: ZC0110000  
COMPANY: Elementis Chromium LP  
ADDRESS: PO Box 9912  
CITY, STATE, ZIP: Corpus Christi, TX 78469  
PHONE: (361) 880-7725 FAX: (361) 866-1462  
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2. INGREDIENTS: COMPOSITION/INFORMATION

| INGREDIENT                      | WEIGHT % | PEL-OSHA   | TLV -ACGIH                                  | LD <sub>50</sub> /LC <sub>50</sub><br>ROUTE/SPECIES |
|---------------------------------|----------|--|---|---|
| Ammonium dichromate             | 99.9     | 0.1 mg/m <sup>3</sup> as CrO <sub>3</sub><br>(ceiling) | 0.05 mg/m <sup>3</sup> as Cr<br>(8 hr. TWA) | LD <sub>50</sub> : 54mg/kg oral/rat                 |
| Sodium dichromate,<br>dihydrate | <0.1     | 0.1 mg/m <sup>3</sup> as CrO <sub>3</sub><br>(ceiling) | 0.05 mg/m <sup>3</sup> as Cr<br>(8 hr. TWA) | LD <sub>50</sub> : 51mg/kg oral/rat                 |

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Odorless, orange-red crystals which may be fatal if ingested. Skin and eye contact may cause severe irritation. **CANCER HAZARD** by inhalation – Contains hexavalent chromium. Decomposition begins at 180°C becoming self-sustaining at 225°C. Material swells greatly with the evolution of heat and nitrogen. 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 or smoke in areas where ammonium dichromate is being used or stored. Keep containers closed when not in use.

## ELEMENTIS CHROMIUM: MSDS FOR AMMONIUM DICHROMATE

### 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: Ammonium dichromate is irritating to the skin and mucous membranes. Poisoning by ammonium 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, 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. 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 ammonium dichromate may cause nasal perforation, skin ulceration, chronic rhinitis, pharyngitis, kidney and liver damage, inflammation of the larynx, and increased risks of developing lung cancer.

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 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).

## ELEMENTIS CHROMIUM: MSDS FOR AMMONIUM DICHROMATE

### 4. FIRST AID MEASURES

**EYE CONTACT:** Flush eyes with large quantities of water for at least 15 minutes. Seek immediate medical attention.

**SKIN:** Immediately wash affected area(s) with large quantities of soap and water for at least 15 minutes while removing contaminated clothing. If irritation occurs, **SEEK IMMEDIATE MEDICAL ATTENTION**. 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 airway clear and give more water. **SEEK MEDICAL ATTENTION IMMEDIATELY**. Immediate administration of 5-10 grams ascorbic acid (dissolved in water) by mouth or intravenously is recommended. **Note to Physician:** Massive overexposure to ammonium dichromate 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 immediate 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

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

**FIRE AND EXPLOSION HAZARDS:** Ammonium dichromate may react strongly with materials, which are readily oxidized especially at elevated temperatures. Reaction may be rapid enough to cause ignition. May exhibit explosive properties. Combustion can be violent with finely divided oxidizable substances. Oxidizing capability may also sustain a fire involving easily oxidizable material. Material swells greatly with the evolution of heat and nitrogen. Thermal decomposition may produce nitrogen, chromic oxides and other oxides of chromium.

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

## ELEMENTIS CHROMIUM: MSDS FOR AMMONIUM DICHROMATE

### 6. ACCIDENTAL RELEASE MEASURE

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 ammonium dichromate 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 if dust is generated. Clean spills using wet clean up methods (i.e., misting, etc.) or with a vacuum equipped with a High Efficiency Particulate Air (HEPA) filter. 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 ammonium dichromate is being used or stored. Open under local exhaust. 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 re-use. DO NOT recycle or reuse empty container.

### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: NIOSH - approved filter type dust respirator in accordance with the requirements of 29 FR 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 ammonium dichromate 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.

PERSONAL SAMPLING: Air sampling for hexavalent chromium: 5.0µm polyvinyl chloride filter (OSHA 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 ammonium dichromate should wash hands thoroughly with soap and water if skin becomes contaminated and before eating, smoking, or using toilet facilities.

## ELEMENTIS CHROMIUM: MSDS FOR AMMONIUM DICHROMATE

### 9. PHYSICAL AND CHEMICAL PROPERTIES

|                       |                                 |
|-----------------------|---------------------------------|
| APPEARANCE:           | Red-orange crystals             |
| ODOR:                 | None                            |
| pH:                   | ~ 4 at 10g/l @ 20°C             |
| BOILING POINT:        | Not Applicable                  |
| MELTING POINT:        | Decomposition begins at 180°C   |
| VAPOR PRESSURE:       | Not Applicable                  |
| VAPOR DENSITY:        | Not Applicable                  |
| BULK DENSITY:         | 1,300 kg/m <sup>3</sup> at 20°C |
| SOLUBILITY IN WATER:  | 27%w/w at 20°C                  |
| DENSITY:              | 2.5 g/cm <sup>3</sup> at 20°C   |
| % VOLATILE BY VOLUME: | Not Applicable                  |
| EVAPORATION RATE:     | Not Applicable                  |

### 10. STABILITY AND REACTIVITY

**STABILITY:** Thermal decomposition begins at 180° C becoming self-sustaining at 225°C. Material swells greatly with evolution of heat and nitrogen.

**INCOMPATIBILITIES:** Readily oxidizes combustible, organic or other readily oxidizable materials (wood, paper, sulfur, aluminum, plastics, etc.). May react with strong alkalis or acids emitting heat.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Thermal decomposition may produce chromic oxides or other oxides of chromium. Thermal decomposition begins at 180 °C and becomes self sustaining at 225 ° C.

**HAZARDOUS POLYMERIZATION:** Will not occur.

### 11. TOXICOLOGICAL INFORMATION

|                 |                               |          |  |
|-----------------|-------------------------------|----------|--|
| ACUTE TOXICITY: | Oral LD <sub>50</sub> :       | (rat)    | 54 mg/kg (both sexes)                  |
|                 | Inhalation LC <sub>50</sub> : | (rat)    | 0.156 mg/l (4 H exposure - both sexes) |
|                 | Dermal LD <sub>50</sub> :     | (rabbit) | 1170 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:** 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.

## ELEMENTIS CHROMIUM: MSDS FOR AMMONIUM DICHROMATE

### 11. TOXICOLOGICAL INFORMATION (CONTINUED)

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: A LC<sub>50</sub> of 0.156 mg//4H was reported for inhalation of ammonium 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.

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 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 lowers 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. The organic matter present in soil is expected to reduce soluble chromate to insoluble chromic oxide (Cr<sub>2</sub>O<sub>3</sub>).

ECOTOXICITY: 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 LC<sub>50</sub>: *Gambussia affinis* ( Mosquito fish) 136 mg/l as Cr

### 13. DISPOSAL CONSIDERATIONS

DO NOT DISCHARGE AMMONIUM DICHROMATE INTO SEWERS OR WATERWAYS. 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 ammonium dichromate in plenty of water and add sulfuric acid to bring solution to 2.5 pH. 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.

## ELEMENTIS CHROMIUM: MSDS FOR AMMONIUM DICHROMATE

### 14. TRANSPORTATION INFORMATION

DOT CLASSIFICATION:

NAME: Ammonium Dichromate, Toxic, (Ammonium Bichromate), RQ  
HAZARD CLASS/DIVISION: 5.1  
PACKING GROUP: II  
UN NUMBER: 1439  
LABEL: Oxidizer, Toxic

### 15. REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION RULE, 29 CFR 1910.1200: Ammonium dichromate 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:

Acute Health Hazards  
Chronic Health Hazards

SARA 313 INFORMATION: Ammonium 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: Ammonium 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.

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

CALIFORNIA PROPOSITION 65: Ammonium 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

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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