

MATERIAL SAFETY DATA SHEET

CHROMITE, CHROME ORE

AMERICAN MINERALS
901 East Eighth Avenue - Suite 200
King of Prussia, PA, 19406

EMERGENCY PHONE NUMBERS:
AM Health & Safety: (610) 337-8030
CHEMTREC (24-hrs): (800) 424-9300

SECTION 1: PRODUCT AND COMPANY INFORMATION

HMIS (NPCA)	
HEALTH	2
FLAMMABILITY	0
REACTIVITY	0
PERSONAL PROTECTION	E

CHROMITE, CHROME ORE

PRODUCT ID: AM017
PRODUCT NUMBER: N/A
MSDS NUMBER: AMCHROMITE
PREPARATION DATE: 02/1992
REVISION DATE: 05/2002

DESCRIPTION: Chromite is a mineral composed of a natural oxide of ferrous iron and chromium, with varying amounts of magnesium and aluminum substituting for the iron and chromium respectively. It has the general formula of $(Fe,Mg)O \cdot (Cr,Fe,Al)_2O_3$.

PRODUCT INFORMATION:

CAS NUMBER: 1308-31-2
SYNONYMS: Chrome Ore, Chromite, Chromite Ore, Iron Chromite, Iron Chromite.

SECTION 2: COMPOSITION / INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS PLUS OTHER SIGNIFICANT COMPONENTS:

COMPONENT	SYNONYMS AND TRADE NAMES	CAS #	% BY WT.
Chrome Ore (Cr_2FeO_4) or Cr_2O_3 ¹	Chromite, Ferrochromite (III), Chromite [Cr_2FeO_4]; Chromite Mineral; Iron Chromite	1308-31-2	100

NOTES:

1. Typical Chemical Analysis (Wt.%): SiO_2 = 1-5, FeO = 15-25, Al_2O_3 = 10-20, MgO = 10-20, CaO = 0-1, Cr_2O_3 = 35-45. The oxides shown in the "Typical Chemical Analysis" do not exist as free, uncombined oxides, but exist in complex mineralogical combinations.

SECTION 3: HAZARDS IDENTIFICATION

COMPONENT	CAS #	% BY WT.	OSHA PEL [mg/m ³]	OSHA CEILING [mg/m ³]	ACGIH TLV [mg/m ³]	ACGIH STEL [mg/m ³]	LISTED CARCINOGEN (YES/NO)		
							NTP	IARC	OSHA
Chrome Ore (Cr_2FeO_4) or Cr_2O_3	1308-31-2	100	1 (as Cr)	N/A	0.05 (as Cr)	N/A	NO	YES ²	NO

NOTES:

T = Total dust; R = Respirable dust; F = Fume

1. Exposure limits listed for each ingredient is for exposure to dust that may be generated during product transfer and handling.
2. IARC Group 3: Not classifiable as to carcinogenicity to humans.

EMERGENCY OVERVIEW: Not a fire or spill hazard. Low toxicity; dry dust is a nuisance particulate. Generally, health effects are provided for exposure to dust that may be generated during product transfer and handling.

POTENTIAL HEALTH EFFECTS:

Primary Route of Exposure: Inhalation

Relevant Route(s) of Exposure

Eye Contact: Contact with particulate may cause slight to moderate eye irritation. Abrasive action of dust particulate can damage eye.

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Skin Contact: Prolonged or repeated contact may cause slight to moderate skin irritation.

Inhalation: Overexposure by inhalation of airborne particulate, dust, or fumes is irritating to the nose, throat, and respiratory tract. Inhalation of excessive levels of dust or fumes may be harmful.

Ingestion: Ingestion is an unlikely route of exposure; no hazard in normal industrial use. Small amounts (< tablespoonful) swallowed during normal handling operations are not likely to cause injury, however, swallowing larger amounts may cause injury. If ingested in sufficient quantity, may cause gastrointestinal disturbances. Symptoms may include irritation, nausea, vomiting, abdominal pain, and diarrhea.

Target Organs: Respiratory system, eyes.

Acute Effects of Exposure: Excessive, short-term exposure to airborne mineral dusts and particulate may cause upper respiratory and eye irritation.

Chronic Effects of Exposure: Excessive, long-term inhalation of airborne mineral dusts and particulate may contribute to the development of bronchitis, reduced breathing capacity, and may lead to the increased susceptibility to lung disease.

Signs and Symptoms of Exposure: (Dust) tearing of eyes, burning sensation in the throat, cough, chest discomfort.

Medical Conditions Generally Known to be Aggravated by Exposure: The excessive inhalation of mineral dust may aggravate pre-existing chronic lung conditions such as, but not limited to, bronchitis, emphysema, and asthma.

Reproductive Hazards: Not a reproductive hazard.

POTENTIAL ENVIRONMENTAL EFFECTS: Derived from natural ores; no adverse environmental effects known. However, prevent spilled product from entering streams, water bodies, and wastewater systems. This material is used as an agricultural product.

SECTION 4: FIRST AID MEASURES

FIRST AID PROCEDURES:

Eye Contact: Remove material by immediately flushing eyes with clean, flowing, lukewarm water (low pressure) for at least 15 minutes. Get medical attention if pain or irritation persists.

Skin Contact: Immediately wash affected area with mild soap and water to remove any dust adhering to the skin. Get medical attention if irritation develops or persists.

Inhalation: If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel, and get medical attention.

Ingestion: Ingestion is an unlikely route of exposure. If ingested in sufficient quantity and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

NOTE TO PHYSICIANS: None.

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SECTION 5: FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: Material will not burn. No unusual fire or explosion hazards.

EXTINGUISHING MEDIA: Use extinguishing media appropriate to combustibles in the surrounding area.

PROTECTION FOR FIREFIGHTERS: Wet material should be kept out of eyes and off skin. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Material does not give off toxic fumes in a fire unless molten.

SECTION 6: ACCIDENTAL RELEASE MEASURES

CONTAINMENT: Product is dry solid (granular or powder) and not readily soluble in water. However, prevent spilled product from entering streams, water bodies, and wastewater systems.

CLEANUP: Vacuum or sweep up dry material and place in a container for reuse. Avoid creating excessive airborne dust. Cleanup personnel need to wear approved respiratory protection (air-purifying or air-supply), gloves, long sleeved clothing and goggles to prevent irritation from contact and inhalation.

COLLECTION: If possible, collect and reuse spilled product.

REPORTING: SEE SECTION 15: REGULATORY INFORMATION

EVACUATION: Isolate hazard area. Keep unnecessary and unprotected personnel from entering.

SECTION 7: HANDLING AND STORAGE

HANDLING: Minimize dust generation and accumulation. Avoid breathing dust. Avoid contact with skin and eyes.

STORAGE: Store in a cool, dry area. Keep container closed when not in use.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: If user operations generate dust, fume, or mist, use ventilation to keep exposure to airborne contaminants below the exposure limits listed in SECTION 2.

PERSONAL PROTECTIVE EQUIPMENT:

Eye & Face Protection: Corrosive to eyes. Wear protective safety goggles when dust generation is likely.

Skin Protection: Wear clothing sufficient to cover the skin, safety shoes, and leather gloves for hand protection against dry material.

Respiratory Protection: Use NIOSH/MSHA approved respiratory protection (air purifying or air supplying) when concentrations are above exposure limit value. A respiratory protection program that meets OSHA 29 CFR part 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respirator.

General Hygiene Considerations: Wash thoroughly after using product. Wash contaminated clothing. Wash hands before eating or drinking.

EXPOSURE GUIDELINES: See SECTION 2.

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SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Chrome ore is usually black, but does show some variation from iron-black to brownish black with some brown streaks. Various grades can vary from large pieces down to fine powders.

ODOR: Odorless.

PHYSICAL/CHEMICAL PROPERTIES:

Bulk density:	~275 lbs/ft ³	Freeze Point:	Solid at STP	% volatile by vol:	0% H ₂ O
Water solubility:	Insoluble	Melting Point:	>3400 °F	Vapor Density:	N/A
pH: (10% aqueous slurry)	N/A	Boiling Point:	N/A	Vapor Pressure:	N/A

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable under normal conditions of storage.

CONDITIONS TO AVOID: None under normal conditions.

MATERIALS TO AVOID: Chrome ore can react at high temperature with molten alkalis and alkali vapors forming water-soluble chromium salts.

HAZARDOUS DECOMPOSITION PRODUCTS: None under normal conditions.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11: TOXICOLOGICAL PROPERTIES

RTECS TOXICITY DATA FOR PRODUCT COMPONENTS:

COMPONENT	CAS #	RTECS TOXICITY DATA
Chrome Ore (Cr ₂ FeO ₄) or Cr ₂ O ₃	1308-31-2	Mutagenic: Human Cytogenetic Analysis, Dose: 500 mg/L; Microorganisms-Salmonella typhimurium Test, Tissue Tested: Body Fluid Assay, Dose /plate (+S9); Hamster DNA Inhibition Test, Tissue Tested: Kidney, Dose: 500 mg/L; Hamster Cytogenetic Analysis, Tissue Tested: Ovary, Dose: 5 mg/L; Hamster Sister Chromatid Exchange Test, Tissue Tested: Ovary, Dose: 10 mg/L.

SECTION 12: ECOLOGICAL INFORMATION

Derived from mineral ores. No data available on any adverse effects of this material on the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

RCRA: This product, as manufactured, is not a RCRA listed hazardous waste and does not exhibit any characteristics of a hazardous waste, including toxicity (by EPA TCLP method.)

DISPOSAL METHOD: This product is generally suitable for landfill disposal. Follow all applicable Federal, State, and local laws, rules, and regulations regarding the proper disposal of this material. If this product has been altered or contaminated with other hazardous materials, appropriate waste analysis may be necessary to determine proper method for disposal. A qualified environmental professional should determine waste characterization, disposal, and treatment methods for this material in accordance with applicable Federal, State and local regulations and requirements.

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SECTION 14: TRANSPORTATION INFORMATION

USDOT INFORMATION: This product is not regulated by USDOT as a hazardous material (49 CFR part 172.101). No UN code assigned. No placard required for transportation.

LABEL:

CAUTION:

Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling and use. Keep in a closed container in a well-ventilated area.

FIRST AID MEASURES:

Eye Contact: Remove material by immediately flushing eyes with clean, flowing, lukewarm water (low pressure) for at least 15 minutes. Get medical attention if pain or irritation persists.

Skin Contact: Immediately wash affected area with mild soap and water to remove any dust adhering to the skin. Get medical attention if irritation develops or persists.

Inhalation: If exposed to excessive levels of dusts or fumes, remove to fresh air and get medical attention if cough or other symptoms develop. If not breathing, give artificial respiration or give oxygen by trained personnel, and get medical attention.

Ingestion: Ingestion is an unlikely route of exposure. If ingested in sufficient quantity and victim is conscious, give 1-2 glasses of water or milk. Never give anything by mouth to an unconscious person. Leave decision to induce vomiting to qualified medical personnel, since particles may be aspirated into the lungs. Seek immediate medical attention.

SECTION 15: REGULATORY INFORMATION

COMPONENTS LISTED IN FEDERAL REGULATIONS AND STATE "RIGHT-TO-KNOW" LAWS:

COMPONENT	CAS #	FEDERAL					STATE (Right-to-Know)			
		RCRA	CERCLA	SARA	SARA EHS	TSCA	PA	NJ	MA	CA
Chrome Ore (Cr ₂ FeO ₄) or Cr ₂ O ₃	1308-31-2	NO	NO	NO	NO	NO	NO	NO	YES	NO

Note: American Minerals, Inc.'s chromite ore is mined from the Transvaal Region of South Africa. This ore and the unreacted ore component of the chromite ore processing residue are exempt from the reporting requirements under Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA) and Section 6607 of the Pollution Prevention Act of 1990 (PPA). See 66FR24066 for complete citation.

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SECTION 16: OTHER INFORMATION

HAZARDOUS MATERIALS IDENTIFICATION SYSTEM of the National Paint & Coatings Association

HEALTH

- 0 - Normal Material
- 1 - Slightly Hazard/Significant irritation
- 2 - Hazardous/Temporary incapacitation or residual injury
- 3 - Extreme Danger/Serious or permanent injury
- 4 - Deadly

REACTIVITY

- 0 - Stable
- 1 - Unstable under heat or pressure
- 2 - Violent chemical change under heat or pressure
- 3 - Shock and heat may detonate
- 4 - Capable of Detonation or Explosion

FLAMMABILITY

- 0 - Will not burn
- 1 - Must be preheated before ignition will occur (Flash point greater than 200°F)
- 2 - Must be moderately heated before ignition will occur (Flash point 100°F to 200°F)
- 3 - Can be ignited under almost all ambient temperatures (Flash point 73°F to 100°F)
- 4 - Will rapidly or completely vaporize at atmospheric pressure and normal ambient temperature, or will burn readily when dispersed in air (Flash point below 73°F)

PERSONAL PROTECTION

- A - Safety Glasses
- B - Safety Glasses + Gloves
- C - Safety Glasses + Gloves + Apron
- D - Face Shield + Gloves + Apron
- E - Safety Glasses + Gloves+ Dust Respirator
- F - Safety Glasses + Gloves + Apron + Dust Respirator
- G - Safety Glasses + Gloves + Vapor Respirator
- H - Splash Goggles + Gloves + Apron + Vapor Respirator
- I - Safety Glasses + Gloves + Dust and Vapor Respirator
- J - Splash Goggles + Gloves + Apron + Dust and Vapor Respirator
- K - Air Line Hood or Mask + Gloves + Full Suit Boots
- X - Ask supervisor or safety specialist for handling instructions.

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ACRONYMS AND ABBREVIATIONS USED IN THIS MSDS:

ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
CA	California Right-to-Know Law; <i>CCR TITLE 8 - Division 1 - Chapter 3.2 - Subchapter 1 - Article 5 - §339 The Hazardous Substances List</i>
CAA	Clean Air Act; 40 CFR SUBCHAPTER C - AIR PROGRAMS (Parts 50-99)
CAS	Chemical Abstract Service
CAS#	CAS Registration Number is an assigned number to identify a material
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act, <i>40 CFR part 302.4 - Designation, Reportable Quantities, and Notification (Table 302.4)</i>
CWA	Clean Air Act; 40 CFR SUBCHAPTER D - WATER PROGRAMS (Parts 100-149)
EPA	United States Environmental Protection Agency
HMIS	Hazardous Materials Identification System of the National Paint & Coatings Association
IARC	International Agency for Research on Cancer
MA	Massachusetts Right-to-Know Law; <i>MGL PART I - TITLE XVI - CHAPTER 111F Hazardous Substances Disclosure By Employers</i>
mg/m ³	Milligrams per cubic meter
MSHA	Mine Safety and Health Administration
N/A	Not applicable
NFPA	National Fire Protection Association
NIOSH	National Institute of Occupational Safety and Health
NJ	New Jersey Right-to-Know Law; <i>NJAC 8:59 - Worker and Community Right to Know Act</i>
NTP	U.S. National Toxicology Program
OSHA	Occupational Safety and Health Administration
PA	Pennsylvania Right-to-Know Law; <i>34 PA Code § 323. Hazardous Substance List (Appendix A)</i>
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act (EPA), <i>40 CFR part 261 - Identification and Listing of Hazardous Waste</i>
REL	Recommended Exposure Limit (NIOSH)
RQ	Reportable Quantity
RTECS	<i>Registry of Toxic Effects of Chemical Substances:</i> This database contains toxic effects data on some 140,000 chemicals. It is built and maintained by NIOSH.
SARA	Superfund Amendments and Reauthorization Act, <i>40 CFR part 372.65 - Toxic Chemical Release Reporting: Community Right-to-Know</i>
SARA EHS	<i>(SARA Extremely Hazardous Substances) 40 CFR part 355 - Emergency Planning and Notification (Appendices A & B)</i>
STEL	Short-term exposure limit (ACGIH)
STP	Standard temperature and pressure (T = ~70°F, P = 1 atm)
TCLP	Toxicity Characteristic Leaching Procedure (EPA Method 1311)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act, <i>40 CFR 716.120 - Health and Safety Data Reporting</i>
TWA	Time Weighted Average
USDOT	United States Department of Transportation

DISCLAIMER:

This Material Safety Data Sheet (MSDS) is to be used only for this product in its present form. If this product is altered or used as a component in another material, the information on this MSDS may not be applicable. This document is generated for the purpose of distributing health, safety, and environmental data. This MSDS is not a specification sheet, nor should any displayed data be construed as a specification. Some of the information presented and conclusions drawn herein are obtained from sources other than direct test data on the product.

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