SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 03/03/2004
Date Updated: 09/02/2002
Version 1.3

Section 1 - Product and Company Information

Product Name	CHROMIUM(VI) OXIDE, 99.9%
Product Number	232653
Brand	ALDRICH
Company	Sigma-Aldrich
Street Address	3050 Spruce Street
City, State, Zip, Country	SAINT LOUIS MO 63103 US
Technical Phone:	314 771 5765
Emergency Phone:	414 273 3850 Ext. 5996
Fax:	800 325 5052

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
CHROMIUM (VI) OXIDE	1333-82-0	Yes

Formula: CrO_3

Synonyms: Anhydride chromique (French) * Anidride cromica (Italian) * Chrome (trioxyde de) (French) * Chromia (CrO_3) * Chromic anhydride * Chromium oxide (Cr_4O_{12}) * Chromium trioxide * Chromium(6+) trioxide * Chromium(VI) oxide * Chromsaeureanhydrid (German) * Chromtrioxid (German) * Chroomtrioxyde (Dutch) * Chroomzuuranhydride (Dutch) * Cromo(triossido di) (Italian) * Monochromium trioxide * Puratronic chromium trioxide

RTECS Number: GB6650000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Oxidizing. Toxic.
May cause cancer by inhalation. Contact with combustible material may cause fire. Toxic if swallowed. Causes severe burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Target organ(s): Lungs. Kidneys.

HMIS RATING

HEALTH: 3*
FLAMMABILITY: 0
REACTIVITY: 3
SPECIAL HAZARD(S): Oxidizer

NFPA RATING

HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 3
SPECIAL HAZARD(S): Oxidizer

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Carbon dioxide, dry chemical powder, or appropriate foam. Use water spray to cool fire-exposed containers.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions. Contact with other material may cause fire. May accelerate combustion.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL
Evacuate area.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING
User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE
Suitable: Keep tightly closed. Keep away from combustible materials, heat, sparks, and open flame.

SPECIAL REQUIREMENTS
Hygroscopic.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS
Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Government approved respirator.
Hand: Compatible chemical-resistant gloves.
Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling. Remove and wash contaminated clothing promptly. Discard contaminated shoes.

EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	TWA	0.05 MG(CR)/M3
USA	MSHA Standard-air	TWA	0.5 MG(CR)/M3
USA	OSHA.	PEL	CL 0.1 MG(CRO3)/M3
New Zealand OEL			
Remarks: check ACGIH TLV			
USA	NIOSH	TWA	0.001 MG(CR)/M3

Section 9 - Physical/Chemical Properties

Appearance
Physical State: Solid
Color: Violet
Form: Fine crystals

Property	Value	At Temperature or Pressure
Molecular Weight	99.99 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	196 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	2.7 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	

Flash Point	N/A
Explosion Limits	N/A
Flammability	N/A
Autoignition Temp	N/A
Refractive Index	N/A
Optical Rotation	N/A
Miscellaneous Data	N/A
Solubility	N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Conditions of Instability: Chromium(VI) oxide produces incandescence when mixed with: As; ammonia; hydrogen sulfide; phosphorus; potassium; sodium; and selenium. Mixtures of chromium(VI) oxide and DMF can explode violently. Chromium(VI) oxide decomposes at 250°C to chromium(III) oxide and oxygen
Conditions to Avoid: Heat. Protect from moisture.
Materials to Avoid: Phosphorus, Organic materials, Finely powdered metals.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Nature of decomposition products not known.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes burns.
Inhalation: Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if inhaled.
Ingestion: Toxic if swallowed.

SENSITIZATION

Sensitization: May cause allergic respiratory and skin reactions

TARGET ORGAN(S) OR SYSTEM(S)

Kidneys. Lungs. Liver. Nerves.

SIGNS AND SYMPTOMS OF EXPOSURE

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin.
Inhalation may result in spasm, inflammation and edema of the larynxand bronchi, chemical pneumonitis, and pulmonary edema.
Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

TOXICITY DATA

Skin
Rabbit
20 < C > 200 MG/KG
LD50
Inhalation

Rat
21.7 mg/m3
LC50

Oral
Rat
80 mg/kg
LD50
Remarks: Lungs, Thorax, or Respiration:Cyanosis. Gastrointestinal:Hypermotility, diarrhea. Skin and Appendages: Other: Hair.

Intraperitoneal
Rat
58400 UG/KG
LD50

Intravenous
Rat
9260 UG/KG
LD50

Oral
Mouse
127 mg/kg
LD50

Intraperitoneal
Mouse
14 MG/KG
LD50

Intravenous
Mouse
17100 UG/KG
LD50

CHRONIC EXPOSURE - CARCINOGEN
Result: This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Species: Human
Route of Application: Inhalation
Dose: 110 UG/M3
Exposure Time: 3Y-
Frequency: C
Result: Tumorigenic:Carcinogenic by RTECS criteria. Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Olfaction:Tumors. Lungs, Thorax, or Respiration:Tumors.

Species: Rat
Route of Application: Implant
Dose: 125 MG/KG
Result: Tumorigenic:Carcinogenic by RTECS criteria. Tumorigenic:Tumors at site or application.

Species: Mouse
Route of Application: Inhalation
Dose: 3480 UG/M3
Exposure Time: 2H/1Y-
Frequency: I

Result: Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Olfaction:Tumors.

IARC CARCINOGEN LIST

Rating: Group 1

NTP CARCINOGEN LIST

Rating: Known to be carcinogenic.

ACGIH CARCINOGEN LIST

Rating: A1

CHRONIC EXPOSURE - TERATOGEN

Species: Mouse
Dose: 20 MG/KG
Route of Application: Subcutaneous
Exposure Time: (8D PREG)
Result: Effects on Embryo or Fetus: Extra embryonic structures (e.g., placenta, umbilical cord). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Hamster
Dose: 5 MG/KG
Route of Application: Intravenous
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Homeostasis Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Central nervous system.

Species: Hamster
Dose: 8 MG/KG
Route of Application: Intravenous
Exposure Time: (8D PREG)
Result: Specific Developmental Abnormalities: Body wall.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 100 NMOL/L
Cell Type: fibroblast
Mutation test: Morphological transformation.

Species: Human
Dose: 2 MG/L
Cell Type: leukocyte
Mutation test: Cytogenetic analysis

Species: Mouse
Route: Oral
Dose: 20 MG/KG
Mutation test: Cytogenetic analysis

Species: Mouse
Dose: 1 UMOL/L
Exposure Time: 48H
Cell Type: mammary gland

Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 1 UMOL/L
Cell Type: ovary
Mutation test: Micronucleus test

Species: Hamster
Dose: 68 UG/L
Cell Type: Embryo
Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 250 UG/L
Cell Type: ovary
Mutation test: Cytogenetic analysis

Species: Hamster
Dose: 250 UG/L
Cell Type: ovary
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 320 UG/L
Cell Type: fibroblast
Mutation test: Sister chromatid exchange

Species: Hamster
Dose: 6 UMOL/L
Cell Type: ovary
Mutation test: Mutation in mammalian somatic cells.

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Hamster
Dose: 7500 UG/KG
Route of Application: Intravenous
Exposure Time: (8D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Hamster
Dose: 7500 UG/KG
Route of Application: Intravenous
Exposure Time: (8D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Homeostasis

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Chromium trioxide, anhydrous
UN#: 1463
Class: 5.1
Packing Group: Packing Group II
Hazard Label: Oxidizer
Hazard Label: Corrosive
PIH: Not PIH

IATA
Proper Shipping Name: Chromium trioxide, anhydrous
IATA UN Number: 1463
Hazard Class: 5.1
Packing Group: II

Section 15 - Regulatory Information

EU DIRECTIVES CLASSIFICATION
Symbol of Danger: O T C N
Indication of Danger: Oxidizing. Toxic. Corrosive. Dangerous for the environment.
R: 49 8 25 35 43 50/53
Risk Statements: May cause cancer by inhalation. Contact with combustible material may cause fire. Also toxic if swallowed. Causes severe burns. May cause sensitization by skin contact. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 53 45 60
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). This material and its container must be disposed of as hazardous waste.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Oxidizing. Toxic.
Risk Statements: May cause cancer by inhalation. Contact with combustible material may cause fire. Toxic if swallowed. Causes severe burns. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Keep away from combustible material. After contact with skin, wash immediately with plenty of water. Take off immediately all contaminated clothing. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Wear suitable protective clothing, gloves, and eye/face protection. Do not breathe dust.
US Statements: Target organ(s): Lungs. Kidneys.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: Yes
DEMINIMIS: 0.1 %
NOTES: This product is subject to SARA section 313 reporting requirements - chromium compounds.
TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65
California Prop - 65: This product is or contains chemical(s)

known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.