# MATERIAL SAFETY DATA SHEET

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Version 1.6

## Section 1 - Product and Company Information

| | |
|---|---|
| Product Name | CHROMIUM(VI) OXIDE, REAGENTPLUS(TM), 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. Highly Toxic (USA) Very Toxic (EU). Dangerous for the environment.

May cause cancer. May cause heritable genetic damage. Explosive when mixed with combustible material. Toxic in contact with skin and if swallowed. Very toxic by inhalation. Causes severe burns. May cause sensitization by inhalation and skin contact. Toxic: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. 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. Heat sensitive.

## 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<br>Color: Violet<br>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

Stable: Stable.
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. Moisture.
Materials to Avoid: Organic materials, Phosphorus, 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 severe burns.
Skin Absorption: Toxic if absorbed through skin.
Eye Contact: Causes severe burns.
Inhalation: May be fatal if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: Toxic if swallowed.

SENSITIZATION

Respiratory: May cause allergic respiratory reaction.
Skin: May cause allergic skin reaction.

TARGET ORGAN(S) OR SYSTEM(S)

Kidneys. Lungs. Liver. Nerves. Blood. Eyes. Skin. Respiratory system.

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. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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
Result: May alter genetic material.

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
Result: May cause reproductive disorders.

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+ N
Indication of Danger: Oxidizing. Very toxic. Dangerous for the environment.
R: 45 46 9 24/25 26 35 42/43 48/23 62 50/53
Risk Statements: May cause cancer. May cause heritable genetic damage. Explosive when mixed with combustible material. Also toxic in contact with skin and if swallowed. Also very toxic by inhalation. Causes severe burns. May cause sensitization by inhalation and skin contact. Also toxic: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S: 53 45 60 61
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. Avoid release to the environment. Refer to special instructions/safety data sheets.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Oxidizing. Highly Toxic (USA) Very Toxic (EU). Dangerous for the environment.
Risk Statements: May cause cancer. May cause heritable genetic damage. Explosive when mixed with combustible material. Toxic in contact with skin and if swallowed. Very toxic by inhalation.

Causes severe burns. May cause sensitization by inhalation and skin contact. Toxic: danger of serious damage to health by prolonged exposure through inhalation. Possible risk of impaired fertility. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Safety Statements: Restricted to professional users. Attention - Avoid exposure - obtain special instructions before use. Keep away from combustible material. Do not breathe dust. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of soap-suds. Wear suitable protective clothing, gloves, and eye/face protection. 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. Avoid release to the environment. Refer to special instructions/safety data sheets.
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

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## Section 16 - Other Information

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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.