Chromium(VI) oxide

sc-211090

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Chromium(VI) oxide

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA


SUPPLIER
Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800
EMERGENCY:
ChemWatch
Within the US & Canada: 877-715-9305
Outside the US & Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

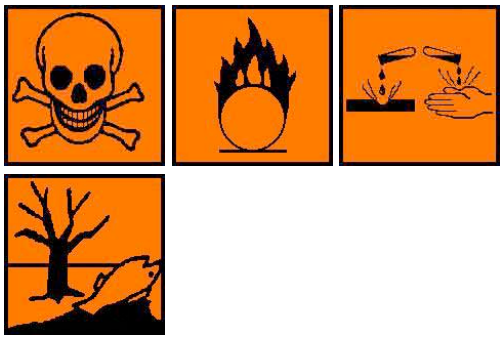
SYNONYMS
Cr-O3, "chromic anhydride", "chromium (6+) trioxide", "chromium (VI) oxide", "monochromium oxide", "chromic (VI)", acid, "chromic acid (flakes)", "chromic acid flake", "chromic acid crystals", "British Chrome", APS, AR000000157, UL00000518, TECH00001333

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	0		
Toxicity:	4		
Body Contact:	4		
Reactivity:	2		
Chronic:	4		

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW

RISK

Explosive when mixed with combustible material.
Very toxic by inhalation.
Causes severe burns.
Risk of serious damage to eyes.
May cause CANCER.
May cause SENSITISATION by inhalation and skin contact.
May cause heritable genetic damage.
Possible risk of impaired fertility.
Toxic: danger of serious damage to health by prolonged exposure through inhalation.
Toxic in contact with skin and if swallowed.
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.
■ The material can produce severe chemical burns within the oral cavity and gastrointestinal tract following ingestion.
■ Symptoms of exposure may be delayed.
■ Chromate salts are corrosive and produce cellular damage to tissue. Ingestion may produce inflammation of the digestive tract, nausea, vomiting and abdominal pain.
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EYE

■ The material can produce severe chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating.
■ If applied to the eyes, this material causes severe eye damage.

SKIN

■ Skin contact with the material may produce toxic effects; systemic effectsmay result following absorption.
■ The material can produce severe chemical burns following direct contactwith the skin.
■ Chrome fume, as the chrome VI oxide, is corrosive to the skin and may aggravate pre-existing skin conditions such as dermatitis and eczema. As a potential skin sensitizer, the fume may cause dermatoses to appear suddenly and without warning.
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■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of dusts, generated by the material, during the course of normal handling, may produce toxic effects.
■ The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.
■ Chrome fume is irritating to the respiratory tract and lungs. Toxic effects result from over-exposure. Asthmatic conditions may result as a consequence of the sensitising action of chrome VI compounds.

CHRONIC HEALTH EFFECTS

■ There is ample evidence that this material can be regarded as being able to cause cancer in humans based on experiments and other information.
■ Based on experiments and other information, there is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited.
■ Ample evidence from experiments exists that there is a suspicionthis material directly reduces fertility.
■ Toxic: danger of serious damage to health by prolonged exposure through inhalation.
This material can cause serious damage if one is exposed to it for long periods. It can be assumed that it contains a substance which can produce severe defects.
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Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
Chronic inhalation exposure may result in nasal ulceration and/orperforation of nasal septum.
Chromium(III) is an essential trace mineral. Chronic exposure to chromium(III) irritates the airways, malnourishes the liver and kidneys, causes fluid in the lungs, and adverse effects on white blood cells, and also increases the risk of developing lung cancer.
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Sensitization may give severe responses to very low levels of exposure, i.e. hypersensitivity.
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Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
chromium trioxide	1333-82-0	> 99.8

Section 4 - FIRST AID MEASURES

SWALLOWED
· For advice, contact a Poisons Information Center or a doctor at once. · Urgent hospital treatment is likely to be needed.

EYE
■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN
■ If skin or hair contact occurs: · Immediately flush body and clothes with large amounts of water, using safety shower if available. · Quickly remove all contaminated clothing, including footwear.

INHALED
· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested. Inhalation of vapors or aerosols (mists, fumes) may cause lung edema. Corrosive substances may cause lung damage (e.g. <\p>.

NOTES TO PHYSICIAN
■ For acute or short term repeated exposures to dichromates and chromates:
· Absorption occurs from the alimentary tract and lungs.
· The kidney excretes about 60% of absorbed chromate within 8 hours of ingestion. Urinary excretion may take up to 14 days.
· Acute chromic acid ingestion cause acute gastroenteritis, hepatic necrosis, bleeding and acute tubular necrosis with renal failure. The efficacy of British Anti-Lewisite hemodialysis and exchange transfusion has not been established.
· Primary irritation, including chrome ulceration, may be treated with ointments comprising calcium-sodium-EDTA. This, together with the use of frequently renewed dressings, will ensure rapid healing of any ulcer which may develop. The mechanism of action involves the reduction of Cr (VI) to Cr(III) and subsequent chelation; the irritant effect of Cr(III)/ protein complexes is thus avoided.
Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung edema often do not manifest until a few hours have passed and they are aggravated by physical effort.
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Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Not applicable.
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	2.7 (1.0 Bulk D)
Lower Explosive Limit (%):	Not available.

EXTINGUISHING MEDIA
■ FOR SMALL FIRE:
· USE FLOODING QUANTITIES OF WATER.
· DO NOT use dry chemicals, CO2 or foam.

FIRE FIGHTING
· Alert Emergency Responders and tell them location and nature of hazard.
· May be violently or explosive reactive.
When any large container (including road and rail tankers) is involved in a fire,
consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS
· Will not burn but increases intensity of fire.
· Heating may cause expansion or decomposition leading to violent rupture of containers.
Decomposition may produce toxic fumes of: metal oxides.
Decomposes at approx 200 deg C. liberating oxygen gas.

FIRE INCOMPATIBILITY
■ Avoid storage with reducing agents.
· Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.
Can produce intense heat and toxic fumes.

PERSONAL PROTECTION
Glasses:
Full face- shield.
Gloves:
1.BUTYL 2.NATURAL RUBBER 3.PVC

Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS
· Drains for storage or use areas should have retention basins for pH adjustments and dilution of spills before discharge or disposal of material.
· Check regularly for spills and leaks.
· Clean up all spills immediately.
· No smoking, naked lights, ignition sources.
MAJOR SPILLS
· Clear area of personnel and move upwind.
· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING
· Avoid personal contact and inhalation of dust, mist or vapors.
· Provide adequate ventilation.

RECOMMENDED STORAGE METHODS
■ Glass container.
· DO NOT use aluminium, galvanised or tin-plated containers.
· DO NOT repack. Use containers supplied by manufacturer only.
For low viscosity materials
· Drums and jerricans must be of the non-removable head type.
· Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE REQUIREMENTS
■ In addition, Goods of Class 5.1, packing group II should be:
· stored in piles so that
· the height of the pile does not exceed 1 metre
· the maximum quantity in a pile or building does not exceed 1000 tonnes unless the area is provided with automatic fire extinguishers
· the maximum height of a pile does not exceed 3 metres where the room is provided with automatic fire extinguishers or 2 meters if not.
· the minimum distance between piles is not less than 2 metres where the room is provided with automatic fire extinguishers or 3 meters if not.
· the minimum distance to walls is not less than 1 metre.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m³	STEL mg/m³	Peak mg/m³	Notes
Canada - Northwest Territories Occupational Exposure Limits (English)	chromium trioxide (Chromium, Sol. chromic, chromous salts (as Cr))	0.5	0.15		
Canada - Northwest Territories Occupational Exposure Limits (English)	chromium trioxide (Chromite ore processing (chromate (as Cr)))	0.05	0.15		
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	chromium trioxide (CHROMIUM(VI), AEROSOL MISTS)	5e-006			
Canada - Ontario Occupational Exposure Limits	chromium trioxide (Chromates, dichromates and other hexavalent chromium compounds (as chromium))	0.05			
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	chromium trioxide (CHROMIUM(VI), AEROSOL MISTS)	5e-006			
US - California Permissible Exposure Limits for Chemical Contaminants	chromium trioxide (Chromium (VI) compounds, as Cr (see also Sections 1532.2, 5206 & 8359))	0.005		0.1	

US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	chromium trioxide (CHROMIUM(VI), PARTICULATES)	0.0003			
US - Washington Permissible exposure limits of air contaminants	chromium trioxide (Chromium (VI) compounds (as Cr) (when the compound is covered by WAC 296-62-08003))	0.005			
US - Oregon Permissible Exposure Limits (Z-1)	chromium trioxide (Chromium (VI) compounds)	0.005			TWA (See 1910.1026)
US OSHA Permissible Exposure Levels (PELs) - Table Z1	chromium trioxide (Chromium (VI) compounds; See 1910.1026(5))	0.005			
US - Minnesota Permissible Exposure Limits (PELs)	chromium trioxide (Chromium, sol. chromic, chromous salts (as Cr))	0.5			
Canada - Northwest Territories Occupational Exposure Limits (English)	chromium trioxide (Chromium (VI) compounds (as Cr) water soluble)	0.05	0.15		
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	chromium trioxide (Chromium VI, water soluble inorganic compounds (as Cr))	0.05			
US ACGIH Threshold Limit Values (TLV)	chromium trioxide (Chromium (VI) inorganic compounds - Water soluble (as Cr))	0.05			TLV Basis: upper respiratory tract irritation; cancer. BEI
Canada - British Columbia Occupational Exposure Limits	chromium trioxide (Chromium (VI) inorganic compounds - Water soluble, as Cr)	0.025		0.1	A1, 1
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	chromium trioxide (Chromium metal and inorganic compounds, (as Cr): Water soluble Cr (VI) compounds)	0.05	0.15		T20
Canada - Nova Scotia Occupational Exposure Limits	chromium trioxide (Chromium (VI) inorganic compounds - Water soluble (as Cr))	0.05			TLV Basis: upper respiratory tract irritation; cancer. BEI
Canada - Prince Edward Island Occupational Exposure Limits	chromium trioxide (Chromium (VI) inorganic compounds - Water soluble (as Cr))	0.05			TLV Basis: upper respiratory tract irritation; cancer. BEI
US - Alaska Limits for Air Contaminants	chromium trioxide (Chromic acid and chromates (as CrO3))			0.1	
US - Hawaii Air Contaminant Limits	chromium trioxide (Chromic acid and chromates (as CrO3))			0.1	(CAS (Varies with compound))
Canada - Alberta Occupational Exposure Limits	chromium trioxide (Chromium, metal and inorganic compounds, as Cr: Water-soluble Cr VI compounds)	0.05			

ENDOELTABLE

PERSONAL PROTECTION




RESPIRATOR

Particulate

Consult your EHS staff for recommendations

EYE

· Chemical goggles.

· Full face shield.

HANDS/FEET

■ Elbow length PVC gloves.

NOTE: The material may produce skin sensitization in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
· Contaminated gloves should be replaced.
Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
· DO NOT wear cotton or cotton-backed gloves.
· DO NOT wear leather gloves.
· Promptly hose all spills off leather shoes or boots or ensure that such footwear is protected with PVC over-shoes.

OTHER

· Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area.
· Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted.
· Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.
· Prior to each exit from an area containing confirmed human carcinogens, employees should be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers must be identified with suitable labels. For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood.
· Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
· Overalls.
· PVC Apron.
· Some plastic personal protective equipment (PPE) (e.g. gloves, aprons, overshoes) are not recommended as they may produce static electricity.
· For large scale or continuous use wear tight-weave non-static clothing (no metallic fasteners, cuffs or pockets), non sparking safety footwear.

ENGINEERING CONTROLS

· Employees exposed to confirmed human carcinogens should be authorized to do so by the employer, and work in a regulated area.
· Work should be undertaken in an isolated system such as a "glove-box" . Employees should wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.
· Within regulated areas, the carcinogen should be stored in sealed containers, or enclosed in a closed system, including piping systems, with any sample ports or openings closed while the carcinogens are contained within.
· Open-vessel systems are prohibited.
· Each operation should be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation.
· Exhaust air should not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean make-up air should be introduced in sufficient volume to maintain correct operation of the local exhaust system.
· For maintenance and decontamination activities, authorized employees entering the area should be provided with and required to wear clean, impervious garments, including gloves, boots and continuous-air supplied hood. Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
· Except for outdoor systems, regulated areas should be maintained under negative pressure (with respect to non-regulated areas).
· Local exhaust ventilation requires make-up air be supplied in equal volumes to replaced air.
· Laboratory hoods must be designed and maintained so as to draw air inward at an average linear face velocity of 150 feet/ min. with a minimum of 125 feet/ min. Design and construction of the fume hood requires that insertion of any portion of the employees body, other than hands and arms, be disallowed.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Mixes with water.
Corrosive.
Acid.

State	Divided solid	Molecular Weight	100.0
Melting Range (°F)	386.6	Viscosity	Not Applicable
Boiling Range (°F)	Not applicable.	Solubility in water (g/L)	Miscible

Flash Point (°F)	Not applicable	pH (1% solution)	< 1 @ 10%
Decomposition Temp (°F)	392~	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not applicable	Vapour Pressure (mmHG)	Not applicable.
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	2.7 (1.0 Bulk D)
Lower Explosive Limit (%)	Not available.	Relative Vapor Density (air=1)	Not applicable.
Volatile Component (%vol)	Nil @ 38 C.	Evaporation Rate	Non Volatile

APPEARANCE
Dark red odourless crystals or flakes; highly corrosive. Absorbs water from air. Very soluble in water forming a very corrosive solution. Soluble in sulphuric acid. A strong oxidising agent. Decomposes at approx 200 deg C. liberating oxygen gas.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY
· Presence of incompatible materials.
· Product is considered stable under normal handling conditions.

STORAGE INCOMPATIBILITY
· WARNING: Avoid or control reaction with peroxides. All transition metal peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.
· The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono-or poly-fluorobenzene show extreme sensitivity to heat and are explosive.
· Avoid reaction with borohydrides or cyanoborohydrides.
· Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive. Their reactions with oxidizing agents may be violent.
· Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).
· Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.
· Inorganic oxidising agents can react violently with active metals, cyanides, esters, and thiocyanates.
· Metals and their oxides or salts may react violently with chlorine trifluoride and bromine trifluoride.
· These trifluorides are hypergolic oxidisers. They ignites on contact (without external source of heat or ignition) with recognised fuels - contact with these materials, following an ambient or slightly elevated temperature, is often violent and may produce ignition.
· The state of subdivision may affect the results.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

CHROMIUM TRIOXIDE

TOXICITY AND IRRITATION
■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY	IRRITATION
Oral (rat) LD50: 80 mg/kg	Skin (human): corrosive
Inhalation (human) TCLo: 0.11 mg/m³	

■ Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's edema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type.
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Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.
Allergic reactions involving the respiratory tract are usually due to interactions between IgE antibodies and allergens and occur rapidly. Allergic potential of the allergen and period of exposure often determine the severity of symptoms.
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Attention should be paid to atopic diathesis, characterized by increased susceptibility to nasal inflammation, asthma and eczema.
Exogenous allergic alveolitis is induced essentially by allergen specific immune-complexes of the IgG type; cell-mediated reactions (T lymphocytes) may be involved. Such allergy is of the delayed type with onset up to four hours following exposure.
WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

CARCINOGEN

CHROMIUM TRIOXIDE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65-MC
CHROMIUM TRIOXIDE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65-MC
CHROMIUM COMPOUNDS	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	HAZMAP, P65-MC
Chromium (hexavalent) (Oral)	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	

Section 12 - ECOLOGICAL INFORMATION

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
This material and its container must be disposed of as hazardous waste.
Avoid release to the environment.
Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
chromium trioxide			LOW	

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

A. General Product Information
Ignitability characteristic: use EPA hazardous waste number D001 (waste code I)
Corrosivity characteristic: use EPA hazardous waste number D002 (waste code C)
Toxicity characteristic: use EPA hazardous waste number D007 (waste code E) if this substance, in a solid waste, produces an extract containing greater than 5 mg/L of chromium.

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:
· Reduction
· Reuse
· Recycling
· Disposal (if all else fails)
This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.
· Recycle wherever possible.
· Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

DOT:
Symbols: None Hazard class or Division: 5.1
Identification Numbers: UN1463 PG: II
Label Codes: 5.1, 6.1, Special provisions: IB8, IP2,
8 IP4, T3,
TP33
Packaging: Exceptions: None Packaging: Non- bulk: 212
Packaging: Exceptions: None Quantity limitations: 5 kg
Passenger aircraft/rail:
Quantity Limitations: Cargo 25 kg Vessel stowage: Location: A
aircraft only:

Vessel stowage: Other: 66, 90
Hazardous materials descriptions and proper shipping names:
Chromium trioxide, anhydrous

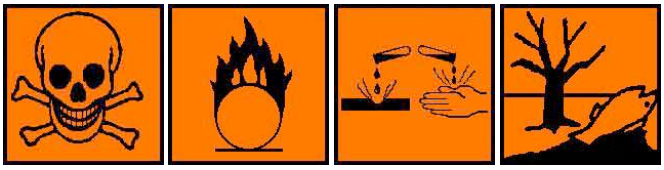
Air Transport IATA:

ICAO/IATA Class: 5.1 ICAO/IATA Subrisk: 6.1, 8
UN/ID Number: 1463 Packing Group: II
Special provisions: None
Cargo Only
Packing Instructions: 511 Maximum Qty/Pack: 25 kg
Passenger and Cargo Passenger and Cargo
Packing Instructions: 508 Maximum Qty/Pack: 5 kg
Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity
Packing Instructions: Y508 Maximum Qty/Pack: 2.5 kg
Shipping Name: CHROMIUM TRIOXIDE, ANHYDROUS

Maritime Transport IMDG:

IMDG Class: 5.1 IMDG Subrisk: 6.1, 8
UN Number: 1463 Packing Group: II
EMS Number: F-A , S-Q Special provisions: None
Limited Quantities: 1 kg Marine Pollutant: Yes
Shipping Name: CHROMIUM TRIOXIDE, ANHYDROUS

Section 15 - REGULATORY INFORMATION



REGULATIONS

chromium trioxide (CAS: 1333-82-0) is found on the following regulatory lists;
"Canada Domestic Substances List (DSL)","Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)","International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.0","OECD Representative List of High Production Volume (HPV) Chemicals","US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - Maine Chemicals of High Concern List","US - Massachusetts Oil & Hazardous Material List","US - New Jersey Right to Know Hazardous Substances","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US CERCLA Priority List of Hazardous Substances","US CWA (Clean Water Act) - Reportable Quantities of Designated Hazardous Substances","US DOE Temporary Emergency Exposure Limits (TEELs)","US NFPA 1 Annex B Typical Oxydizers","US Postal Service (USPS) Hazardous Materials Table: Postal Service Mailability Guide","US Toxic Substances Control Act (TSCA) - Inventory","US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Contact with air may produce sufficient heat to ignite combustible materials.*.
■ Cumulative effects may result following exposure*.
* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.