

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 1 of 16

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

CHROMIUM TRIOXIDE

OTHER NAMES

Cr-O₃, "EINECS # 215-607-8", "chromium (6+) trioxide", "chromium (VI) oxide", "monochromium oxide", "chromic (VI) chromic acid", "oxidising agent", oxidiser, "British Chrome"

PROPER SHIPPING NAME

CHROMIUM TRIOXIDE, ANHYDROUS

PRODUCT USE

Chromium plating; copper stripping; aluminium anodizing; corrosion inhibitor; photography; lithography; textile printing; tanning and dyeing. Manufacture of dyes, pigments, electric cells, explosives, matches.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,
MUMBAI- 400030.INDIA.

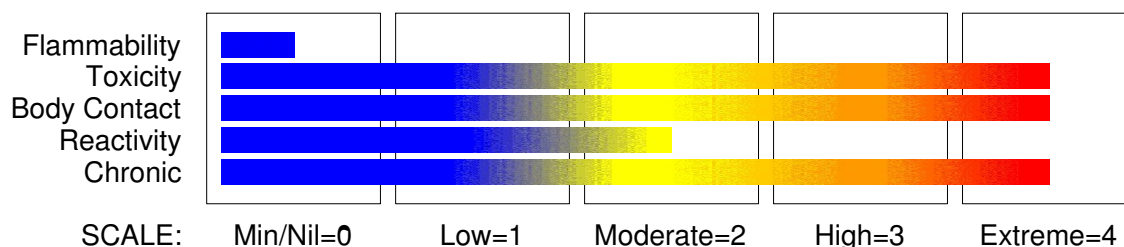
technical@sdfine.com

Telephone: 91- 22- 24959898

Telephone: 91- 22- 24959899

Fax: 91- 22- 24937232

HAZARD RATINGS



continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 2 of 16

Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Dermal) Category 3
Acute Toxicity (Inhalation) Category 2
Acute Toxicity (Oral) Category 3
Carcinogen Category 1B
Chronic Aquatic Hazard Category 1
Organ Damage Category 1
Oxidizing Solid Category 2
Reproductive Toxicity Category 2
Respiratory Sensitizer Category 1
Skin Corrosion/Irritation Category 1C
Skin Sensitizer Category 1



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H273 H330 H311 H301 H334 H317 H350 H361 H372 H314 H410

May intensify fire; oxidizer

Fatal if inhaled

Toxic in contact with skin

Toxic if swallowed

May cause allergic or asthmatic symptoms or breathing difficulties if inhaled

May cause allergic skin reaction

May cause CANCER

Suspected of damaging fertility

Causes damage to organs through prolonged or repeated exposure by inhalation.

Causes severe skin burns and eye damage

Very toxic to aquatic life with long lasting effects

PRECAUTIONARY STATEMENTS

Prevention

Wash hands thoroughly after handling.

In case of inadequate ventilation wear respiratory protection.

Do not eat, drink or smoke when using this product.

Wash thoroughly after handling.

Wear protective gloves/clothing and eye/face protection.

Wear protective gloves/clothing

Avoid breathing dust/fume/gas/mist/vapours/spray.

Do not breathe dust or mist.

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 3 of 16

Section 2 - HAZARDS IDENTIFICATION

Use personal protective equipment as required.
Use only outdoors or in a well ventilated area.
Do not handle until all safety precautions have been read and understood.
Obtain special instructions before use.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wear respiratory protection.
Contaminated clothing should not be allowed out of the workplace.
Keep away from heat.
Take any precaution to avoid mixing with combustible or incompatible materials.

Response

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Keep container tightly closed.
If experiencing respiratory symptoms call a POISON CENTER or doctor/physician.
IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing.
If exposed or concerned: Get medical attention advice.
If skin irritation or rash occurs, seek medical advice/attention.
Wash contaminated clothing before reuse.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Specific treatment: refer to Label or MSDS.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Get medical advice/attention if you feel unwell.
If on skin or hair: remove/take off immediately all contaminated clothing. Rinse with water/shower.
Absorb spillage to prevent material damage.
IF ON SKIN: Gently wash with plenty of soap and water.
Immediately call a POISON CENTER or doctor/physician.
Wash/Decontaminate removed clothing before reuse.
Remove/Take off immediately all contaminated clothing

Storage

Store away from combustibles and incompatible materials
Store locked up.
Store in a corrosive resistant container with a resistant liner.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
chromium trioxide	1333-82-0	> 99.8
* also known as chromic acid, anhydrous		

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 4 of 16

Section 4 - FIRST AID MEASURES

SWALLOWED

DO NOT delay. Rinse mouth out with plenty of water.

For advice, contact a Poisons Information Centre or a doctor.

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

DO NOT delay. 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.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

DO NOT delay. 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.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

INHALED

- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear breathing passages.
- Ask patient to rinse mouth with water but to not drink water.
- Seek immediate medical attention.
- or · If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN

- Acute chromic acid ingestion causes acute gastroenteritis, hepatic necrosis, bleeding and acute tubular necrosis with renal failure. The efficacy of British Anti-Lewisite haemodialysis and exchange transfusion has not been established.
- Primary irritation, including chrome ulceration, may be treated with ointments

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 5 of 16

Section 4 - FIRST AID MEASURES

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) or Cr (III) and subsequent chelation; the irritant effect of Cr (III) / protein complexes is thus avoided.
[ILO Encyclopedia]

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Sampling time	Index	Comments
Total chromium in urine	Increase during shift	(10ug/g creatinine)	(B)
"	End of shift at end of workweek	(30ug/g creatinine)	(B)

B: Background levels occur in specimens collected from subjects NOT exposed.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Use extinguishing media suitable for surrounding area.

FIRE FIGHTING

Alert Fire Brigade and tell them location and nature of hazard.

- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water courses.

Cool fire exposed containers with water spray from a protected location.

Use water delivered as a fine spray to control the fire and cool adjacent area. If safe to do so, remove containers from path of fire.

FIRE/EXPLOSION HAZARD

Non combustible . · Will not burn but increases intensity of fire.

- Heating may cause expansion or decomposition leading to violent rupture of containers.
- Heat affected containers remain hazardous.
- Contact with combustibles such as wood, paper, oil or finely divided metal may produce spontaneous combustion or violent decomposition.
- May emit irritating, poisonous or corrosive fumes., i.e. metal oxides.

FIRE INCOMPATIBILITY

Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.

Avoid mixing with combustible materials and reducing agents.

Personal Protective Equipment

Breathing apparatus.

Gas tight chemical resistant suit.

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 6 of 16

Section 5 - FIRE FIGHTING MEASURES

Limit exposure duration to 1 BA set 30 mins.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Clean up all spills immediately.
- No smoking, naked lights, ignition sources.
- Avoid all contact with any organic matter including fuel, solvents, sawdust, paper or cloth and other incompatible materials, as ignition may result.
- Avoid breathing dust or vapours and all contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with dry sand, earth, inert material or vermiculite.
- DO NOT use sawdust as fire may result.
- Scoop up solid residues and seal in labelled drums for disposal.
- Neutralise/decontaminate area.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- No smoking, flames or ignition sources.
- Increase ventilation.
- Contain spill with sand, earth or other clean, inert materials.
- NEVER use organic absorbents such as sawdust, paper, cloth; as fire may result.
- Avoid any contamination by organic matter.
- Use spark-free and explosion-proof equipment.
- Collect any recoverable product into labelled containers for possible recycling.
- DO NOT mix fresh with recovered material.
- Collect residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- Decontaminate equipment and launder all protective clothing before storage and re-use.
- If contamination of drains or waterways occurs advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

chromium trioxide 30 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

chromium trioxide 0.2 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

chromium trioxide 0.2 mg/m³

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 7 of 16

Section 6 - ACCIDENTAL RELEASE MEASURES

The threshold concentration below which most people will experience no appreciable risk of health effects:
chromium trioxide 0.1 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%
R51	>= 2.5%		
else	>= 10%		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid personal contact and inhalation of dust, mist or vapours.
- Provide adequate ventilation.
- Always wear protective equipment and wash off any spillage from clothing.
- Keep material away from light, heat, flammables or combustibles.
- Keep cool, dry and away from incompatible materials.
- Avoid physical damage to containers.
- DO NOT repack or return unused portions to original containers. Withdraw only sufficient amounts for immediate use.
- Contamination can lead to decomposition leading to possible intense heat and fire.
- When handling NEVER smoke, eat or drink.
- Always wash hands with soap and water after handling.
- Use only good occupational work practice.
- Observe manufacturer's storing and handling directions.

SUITABLE CONTAINER

- Packaging as recommended by manufacturer.
 - Check that containers are clearly labelled.
- Steel drum or Glass container.

STORAGE INCOMPATIBILITY

- Avoid contamination of water, foodstuffs, feed or seed.
- Store away from sawdust, finely divided combustible materials and organic materials / compounds.
- DO NOT use aluminium, galvanised or tin-plated containers.

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 8 of 16

Section 7 - HANDLING AND STORAGE

STORAGE REQUIREMENTS

Observe manufacturer's storing and handling recommendations.
Store in original containers. Keep containers securely sealed.
Store in a cool, dry place. Store away from incompatible materials.
Keep storage area free of debris, waste and combustibles.
Protect containers against physical damage.
Check regularly for spills and leaks.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- chromium trioxide:

CAS:1333- 82- 0 CAS:12324- 08- 2 CAS:12324- 05- 9

MATERIAL DATA

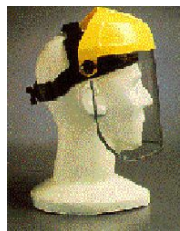
Some jurisdictions require that health surveillance be carried on workers occupationally exposed to inorganic chromium. Such surveillance should emphasise

- demography, occupational and medical history and health advice
- physical examination with emphasis on the respiratory system and skin
- weekly skin inspection of hands and forearms by a "responsible person".

WARNING: This substance is classified by the NOHSC as Category 1 ESTABLISHED HUMAN CARCINOGEN.

NOTE: Detector tubes for chromic acid, measuring in excess of 0.1 mg/m³ (as CrO₃), are commercially available.

PERSONAL PROTECTION



OR

EYE

- Full face shield.
 - Safety glasses. or • Chemical goggles.
- DO NOT wear contact lenses.

• Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

- Ensure that there is ready access to eye wash unit.

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 9 of 16

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

HANDS/FEET

DO NOT handle directly. Wear gloves and use scoop / tongs / tools.
Elbow length PVC gloves or Rubber Gloves.
Protective footwear.

OTHER

Overalls and Rubber apron or · Impervious protective clothing.
Ensure there is ready access to an emergency shower.
· Ensure that there is ready access to eye wash unit.

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:
" Forsberg Clothing Performance Index" .
The effect(s) of the following substance(s) are taken into account in the
computer- generated selection: chromium trioxide

Protective Material:

BUTYL	A
NATURAL RUBBER	A
NITRILE+PVC	A
PVC	A
NITRILE	B

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove,
a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis,
factors such as "feel" or convenience (e.g. disposability), may dictate a choice
of gloves which might otherwise be unsuitable following long-term or frequent use.
A qualified practitioner should be consulted.

RESPIRATOR

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	E P1 Air- line*	- -	E PAPR- P1 -
50 x ES	Air- line**	E P2	E PAPR- P2
100 x ES	-	E P3	-
		Air- line*	-
100+ x ES	-	Air- line**	E PAPR- P3

* - Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of
personal protective equipment required.
For further information consult your
Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Use in a well-ventilated area.

· Local exhaust ventilation is required where solids are handled as powders or crystals;

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 10 of 16

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

even when particulates are relatively large, a certain proportion will be powdered by mutual friction.

- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:
 - (a): particle dust respirators, if necessary, combined with an absorption cartridge;
 - (b): filter respirators with absorption cartridge or canister of the right type;
 - (c): fresh-air hoods or masks
- Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.
- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:

direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).

Air Speed:

1- 2.5 m/s (200- 500 f/min.)

2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

- 1: Room air currents minimal or favourable to capture
- 2: Contaminants of low toxicity or of nuisance value only
- 3: Intermittent, low production.
- 4: Large hood or large air mass in motion

Upper end of the range

- 1: Disturbing room air currents
- 2: Contaminants of high toxicity
- 3: High production, heavy use
- 4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 11 of 16

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

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.

PHYSICAL PROPERTIES

Solid.
Mixes with water.
Corrosive.
Acid.

Molecular Weight: 100.0
Melting Range (°C): 197
Solubility in water (g/L): Miscible
pH (1% solution): < 1 @ 10%
Volatile Component (%vol): Nil @ 38 C.
Relative Vapour Density (air=1): Not applicable.
Lower Explosive Limit (%): Not available.
Autoignition Temp (°C): Not applicable
State: Divided solid

Boiling Range (°C): Not applicable.
Specific Gravity (water=1): 2.7 (1.0 Bulk D)
pH (as supplied): Not applicable
Vapour Pressure (kPa): Not applicable.
Evaporation Rate: Non Volatile
Flash Point (°C): Not applicable
Upper Explosive Limit (%): Not available.
Decomposition Temp (°C): Not available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Avoid contamination with combustible materials as ignition may result.
Presence of incompatible materials . Storage in unsealed containers.
Product is considered stable under normal handling conditions.
Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

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.
Considered an unlikely route of entry in commercial/industrial environments.

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 12 of 16

Section 11 - TOXICOLOGICAL INFORMATION

EYE

The material can produce severe chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating. When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.

SKIN

Skin contact with the material may produce toxic effects; systemic effects may result following absorption. The material can produce severe chemical burns following direct contact with the skin. Symptoms of exposure may be delayed. Toxic effects may result from skin absorption. Skin contact may result in severe irritation particularly to broken skin. Ulceration known as "chrome ulcers" may develop. Chrome ulcers and skin cancer are significantly related.

INHALED

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation. Not normally a hazard due to non-volatile nature of product. Chronic inhalation exposure may result in nasal ulceration and/or perforation of nasal septum. Chromium VI exposures have been related to higher incidence of lung cancer. 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

Practical evidence shows that inhalation of the material is capable of inducing a sensitisation reaction in a substantial number of individuals at a greater frequency than would be expected from the response of a normal population. Pulmonary sensitisation, resulting in hyperactive airway dysfunction and pulmonary allergy may be accompanied by fatigue, malaise and aching. Significant symptoms of exposure may persist for extended periods, even after exposure ceases. Symptoms can be activated by a variety of nonspecific environmental stimuli such as automobile exhaust, perfumes and passive smoking. Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals. On the basis, primarily, of animal experiments, the material may be regarded as carcinogenic to humans. There is sufficient evidence to provide a strong presumption that human exposure to the material may result in cancer on the basis of:

- appropriate long-term animal studies
- other relevant information.

Exposure to the material may cause concerns for human fertility, generally on the basis that results in animal studies provide sufficient evidence to cause a strong suspicion of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects, but which are not a secondary non-specific consequence of other toxic effects. Principal routes of exposure are usually by skin contact eye contact with the material and inhalation of generated dust. Sensitisation may give severe responses to very low levels of exposure, in situations where exposure may occur. Chromium(III) is considered an essential trace nutrient serving as a component of the "glucose tolerance factor" and a cofactor for insulin action. High concentrations of

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 13 of 16

Section 11 - TOXICOLOGICAL INFORMATION

chromium are also found in RNA. Trivalent chromium is the most common form found in nature.

Chronic inhalation of trivalent chromium compounds produces irritation of the bronchus and lungs, dystrophic changes to the liver and kidney, pulmonary oedema, and adverse effects on macrophages. Intratracheal administration of chromium(III) oxide, in rats, increased the incidence of sarcomas, and tumors and reticulum cell sarcomas of the lung. There is inadequate evidence of carcinogenicity of chromium(III) compounds in experimental animals and humans (IARC).

Chronic exposure to hexavalent chromium compounds reportedly produces skin, eye and respiratory tract irritation, yellowing of the eyes and skin, allergic skin and respiratory reactions, diminished sense of smell and taste, blood disorders, liver and kidney damage, digestive disorders and lung damage. There is sufficient evidence of carcinogenicity of chromium(VI) compounds in experimental animals and humans to confirm these as Class 1 carcinogens (IARC).

Exposure to chromium during chrome production and in the chrome pigment industry is associated with cancer of the respiratory tract. A slight increase in gastrointestinal cancer following exposure to chromium compounds has also been reported. The greatest risk is attributed to exposure to acid-soluble, water-insoluble hexavalent chromium which occurs in roasting and refining processes. Animal studies support the idea that the most potent carcinogenic compounds are the slightly soluble hexavalent compounds. The cells are more active in the uptake of the hexavalent forms compared to trivalent forms and this may explain the difference in occupational effect. It is the trivalent form, however, which is metabolically active and binds with nucleic acid within the cell suggesting that chromium mutagenesis first requires biotransformation of the hexavalent form by reduction.

Hexavalent chromes produce chronic ulceration of skin surfaces (quite independent of other hypersensitivity reactions exhibited by the skin). Water-soluble chromium(VI) compounds come close to the top of any published "hit list" of contact allergens (eczematogens) producing positive results in 4 to 10% of tested individuals. On the other hand only chromium(III) compounds can bind to high molecular weight carriers such as proteins to form a complete allergen (such as a hapten). Chromium(VI) compounds cannot. It is assumed that reduction must take place for such compounds to manifest any contact sensitivity. The apparent contradiction that chromium(VI) salts cause allergies to chromium(III) compounds but that allergy to chromium(III) compounds is difficult to demonstrate is accounted for by the different solubilities and skin penetration of these compounds. Water-soluble chromium(VI) salts penetrate the horny layer of the skin more readily than chromium(III) compounds which are bound by cross-linking in the horny layer ("tanning", as for leather) and therefore do not reach the cells involved in antigen processing.

TOXICITY AND IRRITATION

TOXICITY

Oral (rat) LD50: 80 mg/kg

Inhalation (human) TCLo: 0.11 mg/m³

IRRITATION

Skin (human): corrosive

WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 14 of 16

Section 12 - ECOLOGICAL INFORMATION

Hazardous Air Pollutant: Yes

Log Pow: Not relevant

Chromium in the oxidation state +3 (the trivalent form) is poorly absorbed by cells found in microorganisms, plants and animals. Chromate anions (CrO_4^- , oxidation state +6, the hexavalent form) are readily transported into cells and toxicity is closely linked to the higher oxidation state.

Chromium Ecotoxicology:

Toxicity in Aquatic Organisms:

Chromium is harmful to aquatic organisms in very low concentrations. Fish food organisms are very sensitive to low levels of chromium. Chromium is toxic to fish although less so in warm water. Marked decreases in toxicity are found with increasing pH or water hardness; changes in salinity have little if any effect. Chromium appears to make fish more susceptible to infection. High concentrations can damage and/or accumulate in various fish tissues and in invertebrates such as snails and worms.

Reproduction of *Daphnia* is affected by exposure to 0.01 mg/kg hexavalent chromium/litre

Toxicity of chromium in fresh-water organisms (50% mortality)*

Compound	Category	Exposure	Toxicity Range (mg/litre)	Most sensitive species
hexavalent chrome	invertebrate	acute	0.067- 59.9	scud
		long- term	-	-
	vertebrate	acute	17.6- 249	fathead minnow
		long- term	0.265- 2.0	rainbow trout
trivalent chrome	invertebrate	acute	2.0- 64.0	cladoceran
		long- term	0.066	cladoceran
	vertebrate	acute	33.0- 71.9	guppy
	invertebrate	long- term	1.0	fathead minnow

* from Environmental Health Criteria 61: WHO Publication.

Toxicity in Microorganisms:

In general, toxicity for most microorganisms occurs in the range of 0.05-5 mg chromium/kg of medium. Trivalent chromium is less toxic than the hexavalent form. The main signs of toxicity are inhibition of growth and the inhibition of various metabolic processes such as photosynthesis or protein synthesis. Gram-negative soil bacteria are generally more sensitive to hexavalent chromium (1-12 mg/kg) than the gram-positive types. Toxicity to trivalent chromium is not observed at similar levels. The toxicity of low levels of hexavalent chromium (1 mg/kg) indicates that soil microbial transformation, such as nitrification, may be affected. Chromium should not be introduced to municipal sewage treatment facilities.

Toxicity in Plants: Chromium in high concentrations can be toxic for plants. The main feature of chromium intoxication is chlorosis, which is similar to iron deficiency.

Chromium affects carbohydrate metabolism and leaf chlorophyll concentration decreases with hexavalent chromium concentration (0.01-1 mg/l). The hexavalent form appears to more toxic than the trivalent species.

Biological half-life: The elimination curve for chromium, as measured by whole-body counting, has an exponential form. In rats, three different components of the curve have been identified, with half-lives of 0.5, 5.9 and 83.4 days, respectively.

Water Standards: Chromium is identified as a hazardous substance in the Federal (U.S.) Water Pollution Control Act and further regulated by Clean Air Water Act Amendments (US). These regulations apply to discharge. The US Primary drinking water Maximum Contaminant Level (MCL), for chromium, is 0.05 mg/l (total chromium).

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 15 of 16

Section 12 - ECOLOGICAL INFORMATION

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible. Special hazard may exist - specialist advice may be required.
- Consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Treat and neutralise residue at an approved site.
- Decontaminate empty containers. Observe all label safeguards until containers are cleaned and destroyed.
- Puncture containers to prevent re-use and bury at an authorised landfill. Reduce Cr (VI) to Cr (III) using meta-bisulfite, neutralise with lime and reclaim sludge.

WASTE DISPOSAL PROCEDURES

- Collect and package recoverable quantities of chromium trioxide and place in separate labelled containers for disposal at a hazardous landfill site. Wear nitrile rubber gloves, eye protection and protective clothing to control personal contact. In a well ventilated area, add the solid chromium trioxide (5g) to 100mL of water. Acidify the solution with 3M sulphuric acid to obtain a pH of 1. Add sodium thiosulphate (20g) until the solution becomes cloudy and blue coloured. Neutralise the contents of the solution with sodium carbonate. Allow a blue grey flocculent precipitate to form. Allow to stand for one week, or filter the contents immediately. Wash the liquid into the drain. Wash the solid residue with hot water to remove the sodium sulfate. Dry, package and label the solid and dispose of at a secured landfill site [Armour 1996].

SPILLAGE DISPOSAL

- Wear eye protection, protective clothing and nitrile rubber gloves to control personal contact from chromium trioxide. To control airborne dust particles forming, cover and contain the spill with a 1:1:1 mixture by weight of sodium carbonate or calcium carbonate, calcium bentonite and sand. Collect the absorbed mixture in a beaker and transfer to a well ventilated area. Acidify with 3M sulphuric acid to obtain a pH of 1. Slowly add solid sodium thiosulphate until a blue- coloured and cloudy solution forms. Neutralise with sodium carbonate and allow a blue- grey flocculent precipitate to form. Allow to stand for one week, or filter the immediately. Decant the liquid o allow the remaining liquid to evaporate. Wash the liquid into the drain. Allow the recoverable solid to dry. Package and label and dispose of at a secured landfill site [Armour 1996].

Section 14 - TRANSPORTATION INFORMATION



Labels Required: OXIDIZING AGENT,CORROSIVE

continued...

CHROMIUM TRIOXIDE

GHS Safety Data Sheet

Version No:2.0

Page 16 of 16

Section 14 - TRANSPORTATION INFORMATION

HAZCHEM: 2W

UNDG:

Dangerous Goods Class:	5.1	Subrisk:	8
UN Number:	1463	Packing Group:	II
Shipping Name:CHROMIUM TRIOXIDE, ANHYDROUS			

Air Transport IATA:

ICAO/IATA Class:	5.1	ICAO/IATA Subrisk:	8
UN/ID Number:	1463	Packing Group:	II
ERG Code:	5C		
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		
Shipping name:CHROMIUM TRIOXIDE, ANHYDROUS			

Section 15 - REGULATORY INFORMATION

REGULATIONS

chromium trioxide (CAS: 1333-82-0) is found on the following regulatory lists;
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals

No data available for chromium trioxide as CAS: 12324-08-2, CAS: 12324-05-9.

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
chromium trioxide	1333- 82- 0, 12324- 08- 2, 12324- 05- 9

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 13-Oct-2017