

POTASSIUM DICHROMATE

GHS Safety Data Sheet

Version No:4

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

POTASSIUM DICHROMATE

OTHER NAMES

K₂-Cr₂-O₇, "dichromic acid, potassium salt", "bichromate of potash", "chromic acid, dipotassium salt", "chromium potassium oxide", "dipotassium dichromate", "potassium bichromate", "potassium dichromate (VI)", "potassium dichromate (VI)"

PROPER SHIPPING NAME

TOXIC SOLID, INORGANIC, N.O.S.
(contains potassium dichromate)

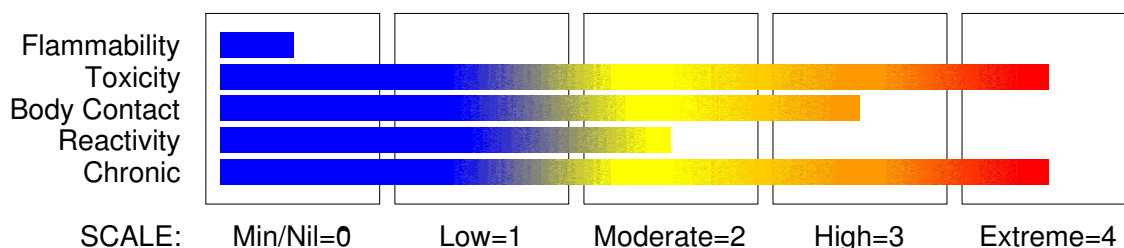
PRODUCT USE

In tanning leather, dyeing, decorating porcelain, printing.
Photolithography, pigment-prints, staining wood, pyrotechnics, safety matches; for bleaching palm oil, wax. Water proofing fabrics.
As oxidisers in the manufacture of organic chemicals.
In electrical batteries; as depolarisers for dry cells.
As corrosion inhibitor in cooling systems where lower solubility is advantageous in preference to sodium dichromate.

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



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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Dermal) Category 4
Acute Toxicity (Inhalation) Category 3
Acute Toxicity (Oral) Category 2
Carcinogen Category 1B
Chronic Aquatic Hazard Category 1
Germ Cell Mutagen Category 1A
Organ Damage Category 1
Oxidizing Solid Category 3
Reproductive Toxicity Category 1B
Respiratory Sensitizer Category 1
Skin Corrosion/Irritation Category 1C
Skin Sensitizer Category 1



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H272 H300 H331 H312 H334 H317 H340 H350 H360 H360 H372 H314 H410

May intensify fire; oxidizer

Fatal if swallowed

Toxic if inhaled

Harmful in contact with skin

May cause allergic or asthmatic symptoms or breathing difficulties if inhaled

May cause allergic skin reaction

May cause genetic defects

May cause CANCER

May damage fertility

May damage the unborn child

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

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

Wear protective gloves/clothing and eye/face protection.

Use only outdoors or in a well ventilated area.

Wear protective gloves/clothing

Do not breathe dust/fume/gas/mist/vapours/spray.

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Use personal protective equipment as required.

Contaminated clothing should not be allowed out of the workplace.

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Section 2 - HAZARDS IDENTIFICATION

Wash thoroughly after handling.
Do not breathe dust or mist.
In case of inadequate ventilation wear respiratory protection.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Response

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

Storage

Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
potassium dichromate	7778-50-9	>99

Section 4 - FIRST AID MEASURES

SWALLOWED

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.
 - For advice, contact a Poisons Information Centre or a doctor.
- Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:
- Induce vomiting with fingers down the back of the of the throat, ONLY IF CONSCIOUS.
 - Lean patient forward or place on left side (head-down position if possible) to maintain open airway and prevent aspiration.
- NOTE: Wear a protective glove when inducing vomiting by mechanical means.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
 - If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided.
- Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient

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Section 4 - FIRST AID MEASURES

to a hospital together with a copy of the MSDS.

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.
- 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

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 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, without delay.

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.
- Establish airway, breathing and circulation. Assist ventilation.
- Induce emesis with Ipecac Syrup if patient is not convulsing, in coma or obtunded and if the gag reflex is present.
- Otherwise use gastric lavage with endotracheal intubation.
- Fluid balance is critical. Peritoneal dialysis, haemodialysis or exchange transfusion may be effective although available data is limited.
- British Anti-Lewisite, ascorbic acid, folic acid and EDTA are probably not effective.
- There are no antidotes.
- 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. [ILO Encyclopedia]

[Ellenhorn and Barceloux: Medical Toxicology].

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.

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Section 5 - FIRE FIGHTING MEASURES

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- Do not approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- 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.

FIRE INCOMPATIBILITY

Oxidising agents as a class are not necessarily combustible themselves, but can increase the risk and intensity of fire in many other substances.

Personal Protective Equipment

Gas tight chemical resistant suit.

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.
- Wear breathing apparatus and protective gloves.
- Prevent, by any means available, spillage from entering drains or water courses.
- 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 or cloth.
- Use spark-free and explosion-proof equipment.
- Collect any recoverable product into labelled containers for possible recycling.

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Section 6 - ACCIDENTAL RELEASE MEASURES

- Avoid contamination with organic matter to prevent subsequent fire and explosion.
- 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:

potassium dichromate 40 mg/m³

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

potassium dichromate 2.5 mg/m³

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

potassium dichromate 0.25 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:

potassium dichromate 0.125 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

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

- Glass container.
- Lined metal can, lined metal pail/ can.
- Plastic pail.
- Polyliner drum.

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Section 7 - HANDLING AND STORAGE

- Packing as recommended by manufacturer.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

Avoid storage with reducing agents.

Oxidising agents as a class are not necessarily combustible themselves, but can increase the risk and intensity of fire in many other substances.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific preventions

X: Must not be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- potassium dichromate: CAS:7778- 50- 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 2 Probable Human Carcinogen.

PERSONAL PROTECTION



continued...

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- 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].

HANDS/FEET

Suitability and durability of glove type is dependent on usage. Factors such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity,

are important in the selection of gloves.

Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

NOTE: The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.

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.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

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

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

your
Occupational Health and Safety Advisor.

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

APPEARANCE

Bright orange/red odourless crystals; soluble in water. Oxidising agent and corrosive; causes burns. Contact with many organic materials may cause a fire.

PHYSICAL PROPERTIES

Mixes with water.
Toxic or noxious vapours/gas.

Molecular Weight: 294.2
Melting Range (°C): 398
Solubility in water (g/L): Miscible
pH (1% solution): 4.0 (5% soln)
Volatile Component (%vol): Not applicable.
Relative Vapour Density (air=1): Not applicable.
Lower Explosive Limit (%): Not applicable
Autoignition Temp (°C): Not applicable
State: DIVIDED SOLID

Boiling Range (°C): 500 (decomposes)
Specific Gravity (water=1): 2.68 @ 25 C
pH (as supplied): Not applicable
Vapour Pressure (kPa): Negligible
Evaporation Rate: Not applicable
Flash Point (°C): Not combustible
Upper Explosive Limit (%): Not applicable
Decomposition Temp (°C): Not available
Viscosity: Not available

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Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- 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 chemical burns within the oral cavity and gastrointestinal tract following ingestion.

Chromate salts are corrosive because of their oxidising potency and produce tissue injury similar to acid burns. Ingestion may produce violent gastroenteritis, severe circulatory collapse and toxic nephritis. Peripheral vascular shock may also ensue.

Acute potassium poisonings following ingestion are rare because large doses usually induce vomiting and a healthy kidney ensures rapid excretion. Potassium poisoning disturbs the rhythm of the heart (a slow, weak pulse, heightened T waves on the ECG, arrhythmias heart block) and eventually produces a fall in blood pressure (due to weakened cardiac contractility). Respiration is initially accelerated but skeletal muscle weakness may bring to the stage of paralysis. Orally poisoned animals die from respiratory failure, sometimes following convulsion and gastroenteritis, dehydration of organs and early kidney damage (renal tubular necrosis). Survivors may develop loss of appetite (anorexia), excessive thirst (polydipsia), increase volumes of urine (polyuria), fever, convulsive movements and gastric disturbances within the first 24 hours; rapid recovery occurs thereafter.

EYE

The material can produce 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 be harmful; systemic effects may result following absorption.

The material can produce chemical burns following direct contact with the skin.

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.

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.

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 sensitiser, the fume may cause dermatoses to appear suddenly and without warning. Absorption of chrome VI compounds through the skin can cause systemic poisoning affecting the kidneys and liver.

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INHALED

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation. Inhalation of dusts, generated by the material, during the course of normal handling, may produce severely toxic effects; these may be fatal.

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

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.

There is sufficient evidence to provide a strong presumption that human exposure to the material may result in the development of heritable genetic damage, generally on the basis of

- appropriate animal studies,
- other relevant information.

There is sufficient evidence to provide a strong presumption that human exposure to the material may result in impaired fertility on the basis of: - clear evidence in animal studies 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 is not a secondary non-specific consequence of other toxic effects.

There is sufficient evidence to provide a strong presumption that human exposure to the material may result in developmental toxicity, generally on the basis of:

- clear results in appropriate animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.

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 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

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Section 11 - TOXICOLOGICAL INFORMATION

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.

Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur. Chronic exposures may result in dermatitis and/or conjunctivitis.

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 of epidemiological data, the material is regarded as carcinogenic to humans. There is sufficient data to establish a causal association between human exposure to the material and the development of cancer.

Toxic: danger of serious damage to health by prolonged exposure through inhalation.

Serious damage (clear functional disturbance or morphological change which may have toxicological significance) is likely to be caused by repeated or prolonged exposure. As a rule the material produces, or contains a substance which produces severe lesions. Such damage may become apparent following direct application in subchronic (90 day) toxicity studies or following sub-acute (28 day) or chronic (two-year) toxicity tests.

There is some evidence to provide a presumption that human exposure to the material may result in impaired fertility on the basis of: some evidence in animal studies 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 is not a secondary non-specific consequence of other toxic effects.

There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.

TOXICITY AND IRRITATION

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (human) LD50: 26 mg/kg Highly irritating & corrosive

IRRITATION

Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria

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Section 11 - TOXICOLOGICAL INFORMATION

or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. Allergic reactions which develop in the respiratory passages as bronchial asthma or rhinoconjunctivitis, are mostly the result of reactions of the allergen with specific antibodies of the IgE class and belong in their reaction rates to the manifestation of the immediate type. In addition to the allergen-specific potential for causing respiratory sensitisation, the amount of the allergen, the exposure period and the genetically determined disposition of the exposed person are likely to be decisive. Factors which increase the sensitivity of the mucosa may play a role in predisposing a person to allergy. They may be genetically determined or acquired, for example, during infections or exposure to irritant substances. Immunologically the low molecular weight substances become complete allergens in the organism either by binding to peptides or proteins (haptens) or after metabolism (prohaptens). Particular attention is drawn to so-called atopic diathesis which is characterised by an increased susceptibility to allergic rhinitis, allergic bronchial asthma and atopic eczema (neurodermatitis) which is associated with increased IgE synthesis. 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. 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.

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

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant:Not Determined

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

continued...

POTASSIUM DICHROMATE

Section 12 - ECOLOGICAL INFORMATION

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	-	-
trivalent chrome	vertebrate	acute	17.6- 249	fathead minnow
		long- term	0.265- 2.0	rainbow trout
	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).

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

The material is classified as an ecotoxin* because the Daphnia EC50 (48 hours) is less than or equal to 0.1 mg/l

* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993

Commission of the European Communities.

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.

POTASSIUM DICHROMATE

Section 13 - DISPOSAL CONSIDERATIONS

- Recycle containers if possible, or dispose of in an authorised landfill.
- Containers may still present a chemical hazard/ danger when empty.
- Return to supplier for reuse/ recycling if possible.

Otherwise:

- If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.
- Where possible retain label warnings and MSDS and observe all notices pertaining to the product.

WASTE DISPOSAL PROCEDURES

- Wear eye protection, protective clothing and nitrile rubber gloves to control personal contact from small quantities of potassium dichromate. Work in a well ventilated area. Add solid potassium dichromate to a container of water.

Acidify

by adding 3M sulphuric acid to obtain a pH of 1. With stirring add solid sodium thiosulfate until a blue and cloudy solution forms. Neutralise by adding sodium carbonate. Allow a blue grey flocculent to form. Filter the mixture or allow to stand for one week. After one week, decant the supernatant. Remove the remaining

liquid by filtration or allow it to evaporate. Empty the liquid into the drain with copious amounts of water. Wash the solid residue with hot water to remove the sodium sulfate. Dry, package and label the residue and send to a secured landfill site [Armour 1996].

SPILLAGE DISPOSAL

- Wear eye protection, protective clothing and nitrile rubber gloves to control personal contact from potassium dichromate. Cover and contain the spill with a 1:1:1 mixture by weight of sodium carbonate or calcium carbonate, bentonite and sand. Collect the absorbed mixture and transfer into a container of water in the

fume hood. Acidify with 3M sulfuric acid to obtain a pH of 1. Slowly and with stirring add solid sodium thiosulfate until the solution is blue and cloudy. Neutralise the solution with sodium carbonate. Allow a blue grey flocculent to form. Allow the mixture to stand for one week or filter immediately. Decant the supernatant into the drain with water. Filter the remaining liquid or allow to evaporate. Collect the filtered solid residue and wash with hot water to remove any traces of sodium sulfate. Dry, package and label the solid and send to a secured landfill site. Wash the area of the spill thoroughly with water. Contaminated clothing should be washed thoroughly with detergent and water to remove the oxidant [Armour 1996].

Section 14 - TRANSPORTATION INFORMATION



Labels Required: TOXIC
HAZCHEM: 2X

UNDG:

Dangerous Goods Class: 6.1
UN Number: 3288

Subrisk:
Packing Group:

None
III

continued...

POTASSIUM DICHROMATE

GHS Safety Data Sheet

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Section 14 - TRANSPORTATION INFORMATION

Shipping Name: TOXIC SOLID, INORGANIC, N.O.S.
(contains potassium dichromate)

Air Transport IATA:

ICAO/IATA Class: 6.1 ICAO/IATA Subrisk: None
UN/ID Number: 3288 Packing Group: III
Special provisions: A3A5
Shipping Name: TOXIC SOLID, INORGANIC N.O.S.

Maritime Transport IMDG:

IMDG Class: 6.1 IMDG Subrisk: None
UN Number: 3288 Packing Group: III
EMS Number: F- A, S- A Special provisions: 274
Marine Pollutant: Not Determined
Shipping Name: TOXIC SOLID, INORGANIC, N.O.S.

Section 15 - REGULATORY INFORMATION

REGULATIONS

potassium dichromate (CAS: 7778-50-9) is found on the following regulatory lists;
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals

Section 16 - OTHER INFORMATION

MSDS SECTION CHANGES

The following table displays the version number of and date on which each section was last changed.

Section Name	Version	Date	Section Name	Version	Date	Section Name	Version	Date
First Aid (inhaled)	4	9- Feb- 2007	Storage (suitable container)	4	9- Feb- 2007	Acute Health (inhaled)	4	9- Feb- 2007
First Aid (skin)	4	9- Feb- 2007	Engineering Control	4	9- Feb- 2007	Acute Health (skin)	4	9- Feb- 2007
First Aid (swallowed)	4	9- Feb- 2007	Personal Protection (eye)	4	9- Feb- 2007	Acute Health (swallowed)	4	9- Feb- 2007
Fire Fighter (extinguishing media)	4	9- Feb- 2007	Personal Protection (hands/feet)	4	9- Feb- 2007	Chronic Health	4	9- Feb- 2007
Fire Fighter (fire fighting)	4	9- Feb- 2007	Personal Protection (other)	4	9- Feb- 2007	Toxicity and Irritation (Other)	4	9- Feb- 2007
Storage (storage incompatibility)	4	9- Feb- 2007	Instability Condition	4	9- Feb- 2007	Environmental	4	9- Feb- 2007
Storage (storage requirement)	4	9- Feb- 2007	Acute Health (eye)	4	9- Feb- 2007	Disposal	4	9- Feb- 2007

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: 9-Feb-2018