UK Health Security Agency

Sodium dichromate

Incident management

This document provides information needed for response to a chemical incident, such as physicochemical properties, health effects and decontamination advice.

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Contents

Main points

General

Sodium dichromate exists in the form of red to bright orange crystals at room temperature. It is non-combustible but it enhances the combustion of other substances. Solution in water is a weak acid.

Health

Highly toxic by all routes of exposure.

Irritating tothe respiratory tract. Acute inhalation exposure can cause hoarseness, persistent cough, chest pain, rhinitis, bronchospasm, dyspnoea, pleural effusion, and persistent chest pain.

Ingestion can cause corrosive damage to the gastrointestinal tract, nausea, vomiting, abdominal pain, haematemesis, and bloody diarrhoea.

Exposure to the eyes can cause severe injury characterised by infiltration, vascularisation, and opacification of the corena. Pain, blepharospasm, lacrimation, conjunctivitis, palpebral oedema, and photophobia may occur.

Exposure to the skin may cause skin irritation, ulceration, and burns. These lesions can become necrotic.

Systemic toxicity, notably renal failure, can occur following severe chromic acid burns, Methaemoglobinaemia has been reported.

Casualty decontamination at the scene

Sodium dichromate is corrosive. Therefore, following disrobe, improvised wet decontamination should be considered.

Environment

Inform the Environment Agency where appropriate and avoid release into the environment.

Hazard identification

Table 1. Standard (UK) dangerous goods emergency action codes

UN		No values specified
EAC		
APP		
Hazards	**Class**	
	Sub-risks	
HIN		

Table 2a. The GB classification, labelling and packaging (CLP) regulation for sodium dichromate

Hazard class and category	Ox. Sol. 2	Oxidising solids, category 2	
	Acute Tox. 3	Acute toxicity (oral), category 3	
	Acute Tox. 4	Acute toxicity (dermal), category 4	
	Skin Corr. 1B	Skin corrosion, category 1B	
	Skin Sens. 1	Skin sensitisation, category 1	
	Acute Tox. 2	Acute toxicity (inhalation), category 2	
	Resp. Sens. 1	Respiratory sensitisation, category 1	

	Muta. 1B	Germ cell mutagenicity, category 1B	
	Carc. 1B	Carciogenicity, category 1B	
	Repr. 1B	Reproductive toxicity, category 1B	
	STOT RE 1	Specific target organ toxicity following repeated exposure, category 1	
	Aquatic Acute 1	Acute hazards to the aquatic environment, category 1	
	Aquatic Chronic 1	Chronic hazards to the aquatic environment, category 1	
Hazard statement	H272	May intensify fire; oxidiser	
	H301	Toxic if swallowed	
	H312	Harmful incontact with skin	
	H314	Causes severe skin burns and eye damage	
	H317	May cause an allergic skin reaction	
	H330	Fatal if inhaled	
	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled	

	H340	May cause genetic defects
	H350	May cause cancer
	H360FD	May damage fertility. May damage the unborn child
	H372	Causes damage to organs through prolonged or repeated exposure
	H400	Very toxic to aquatic life
	H410	Very toxic to aquatic life with long-lasting effects
Signal words	DANGER	

References

The Health and Safety Executive (HSE). 'GB CLP Regulation' (viewed on 21 February 2025).

Table 2b. Specific concentration limits for sodium dichromate

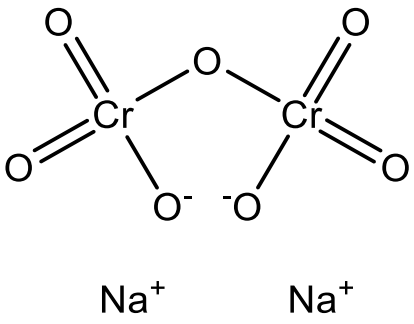
Concentration	**Hazard class and category**	**Hazard statement**	
C ≥ 0.2%	Resp. Sens. 1	H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
	Skin Sens. 1	H317	May cause an allergic skin reaction
C ≥ 5%	STOT SE 3	H335	May cause respiratory irritation

References

The Health and Safety Executive (HSE). 'GB CLP Regulation' (viewed on 21 February 2025)

Physicochemical properties

Table 3. Physicochemical properties

CAS number	10588-01-9
Molecular weight	262
Formula	$Na_2Cr_2O_7$
Common synonyms	Disodium dichromate (VI), dichromic acid, disodium salt, disodium dichromium heptaoxide
State at room temperature	Red to bright orange hygroscopic crystals
Volatility	-
Specific gravity	2.5 g/cm^3
Flammability	Non-conbustible but enhances the combustion of other substances
Lower explosive limit	-
Upper explosive limit	-
Water solubility	Very soluble in water
Reactivity	Strong oxidising agent. It reacts with combustible and reducing materials. Solution in water is a weak acid. Decomposes above 400°C forming sodium monochromate(VI), chromium(III) oxide, and oxygen.
Odour	Odourless
Structure	

References

World Health Organization. International Programme on Chemical Safety ‘International Chemical Safety Card entry for Sodium Dichromate’ ICSC 1369, 2013 (viewed on 21 February 2025)

PubChem. Bethesda (MD): National Library of Medicine (US), National Center for Biotechnology Information. ‘PubChem Compound Summary for CID 25408, Sodium Dichromate’ (viewed on 21 February 2025)

Reported effect levels from authoritative sources

Table 4. Exposure by ingestion

g	Signs and symptoms	Reference
10	Nauesa, abdominal pain, diarrhoea and acute renal failure in an adult.	a
mL		
50 (10% solution)	Vomiting, letharygy, pale skin, excessive perspiration in a 2 year old child.	a

These values give an indication of levels of exposure that can cause adverse effects. They are not health protective standards or guideline values.

References

a. National Poisons Information Service (NPIS). TOXBASE ‘Sodium Dichromate’ 2019 (viewed on 21 February 2025)

Published emergency response guidelines

Table 5. Acute exposure guideline levels (AEGLs)

	Concentration				
	10 minutes	**30 minutes**	**60 minutes**	**4 hours**	**8 hours**
AEGL-1 [note 1]	No values specified				
AEGL-2 [note 2]					
AEGL-3 [note 3]					

Notes to Table 5

Note 1: Level of the chemical in air at or above which the general population could experience notable discomfort.

Note 2: Level of the chemical in air at or above which there may be irreversible or other serious long-lasting effects or impaired ability to escape.

Note 3: Level of the chemical in air at or above which the general population could experience life-threatening health effects or death.

Exposure standards, guidelines or regulations

Table 6. Occupational standards

	LTEL (8-hour reference period)		STEL (15-min reference period)	
	ppm	**mg/m³**	**ppm**	**mg/m³**
WEL	No values specified			

Abbreviations

WEL = workplace exposure limit.
LTEL = long-term exposure limit.
STEL = short-term exposure limit.

Table 7. Public health standards and guidelines

Drinking water standard	No value specified
WHO guideline for drinking water quality	No value specified
UK indoor air quality guideline	No value specified
WHO indoor air quality guideline	No value specified
WHO air quality guideline	No value specified

Health effects

Highly toxic by all routes of exposure.

Table 8. Signs or symptoms of acute exposure

Route	Signs and symptoms
Inhalation	Irritating to the respiratory tract. Acute exposure can cause hoarseness, persistent cough, chest pain, rhinitis, bronchospasm, dyspnoea, pleural effusion and persistent chest pain.
Ingestion	Initial features are due to corrosive damage to the gastrointestinal tract and include nausea and vomiting, abdominal pain, haematemesis and bloody diarrhoea. This may lead to hypovolaemia and hypotension. Acute kidney injury is a common feature. Hepatic failure, convulsions, encephalopathy, methaemoglobinaemia, pancreatitis, anemia, neutropenia, thrombocytopenia, and disseminated intravascular coagulation may occur. ECG changes may include prolongation of the PR and QRS interval.
Eyes	Acute exposure can cause severe injury characterised by infiltration, vascularisation and opacification of the cornea. Pain, blepharospasm, lacrimation, conjunctivitis, palpebral oedema, and photophobia may occur.
Dermal	Acute exposure causes skin irritation, ulceration and burns. These lesions can become necrotic. Systemic toxicity, notably renal failure, can occur following severe chromic acid burns. Methaemoglobinaemia has been reported.

Reference

National Poisons Information Service (NPIS). TOXBASE ‘Sodium Dichromate’ 2019 (viewed on 21 February 2025)

Decontamination at the scene

Chemical specific advice

The approach used for decontamination at the scene will depend upon the incident, location of the casualties and the chemicals involved. Therefore, a risk assessment should be conducted to decide on the most appropriate method of decontamination.

Sodium dichromate is corrosive. Therefore, following disrobe, improvised wet decontamination should be considered (see below for details).

People who are processed through improvised decontamination should subsequently be moved to a safe location, triaged and subject to health and scientific advice. Based on the outcome of the assessment, they may require further decontamination.

Emergency services and public health professionals can obtain further advice from the UK Health Security Agency (UKHSA) Radiation, Chemicals, Climate and Environmental Hazards Directorate using the 24-hour chemical hotline number: 0344 892 0555.

Disrobe

The disrobe process is highly effective at reducing exposure to HAZMAT/CBRN material when performed within 15 minutes of exposure.

Therefore, disrobe must be considered the primary action following evacuation from a contaminated area.

Where possible, disrobing should be conducted at the scene and by the casualty themselves. Disrobing should be systematic to prevent transfer of contaminant from clothing to skin. Clothing should not be pulled over the head if possible.

Clothing stuck to the casualty by the contaminant should not be forcefully removed, as this risks causing further harm.

Consideration should be given to ensuring the welfare and dignity of casualties as far as possible. Immediately after decontamination the opportunity should be provided to dry and dress in clean robes or clothes.

Improvised decontamination

Improvised decontamination is an immediate method of decontamination prior to the use of specialised resources. This should be performed on all contaminated casualties unless medical advice is received to the contrary. Improvised dry decontamination should be considered for an incident involving chemicals unless the agent appears to be corrosive or caustic.

Unprotected first responders and members of the public should not approach casualties incapacitated by exposure to administer improvised decontamination, as they may be exposed to contaminants and become a casualty themselves.

Important note: Improvised decontamination should continue until a more structured intervention, such as an Interim Operational Response is conducted, or Specialist Operational Response are present.

Improvised dry decontamination

Any available dry absorbent material can be used such as kitchen towel, paper tissues (for example blue roll) and clean cloth.

Exposed skin surfaces should be blotted first and then rubbed, starting with the face, head, and neck, and moving down and away from the body.

Blotting and rubbing should not be too aggressive, as it could drive contamination further into the skin.

Casualties should also blow their nose to remove contaminants from the nasal cavities.

All waste material arising from decontamination should be left in situ, and ideally bagged, for disposal at a later stage.

Improvised wet decontamination

Wet decontamination should be used if contamination with a caustic chemical substance is suspected.

Wet decontamination may be performed using copious amounts of water from any available source such as taps, showers, water bottles, fixed installation hose-reels and sprinklers to gently rinse the affected skin. Other natural sources of water may be considered unless this creates greater risks to the individuals affected. Wet wipes or baby wipes may be used as an effective alternative.

Improvised decontamination should not involve overly aggressive methods to remove contamination as this could further damage affected tissues and drive the contamination further into the skin.

Where appropriate, seek professional advice on how to dispose of contaminated water and prevent run-off going into the water system.

Additional notes

Following improvised decontamination, remain cautious and observe for signs and symptoms in the decontaminated person and in unprotected staff.

If water is used to decontaminate casualties this may be contaminated, and therefore hazardous, and a potential source of further contamination spread.

All materials (paper tissues and so on) used in this process may also be contaminated and, where possible, should not be used on new casualties.

The risk from hypothermia should be considered when disrobe and any form of wet decontamination is carried out.

People who are contaminated should not eat, drink or smoke before or during the decontamination process and should avoid touching their face.

When vulnerable people are affected by a hazardous substance, they may need additional support to remove themselves, their clothing or the substance.

Casualties should remain in the area and should not leave to seek care at a hospital, as this presents a contamination risk. Further care will be administered on site by the appropriate emergency services.

Interim wet decontamination

Interim decontamination is the use of standard Fire and Rescue Service equipment to provide a planned and structured decontamination process prior to the availability of purpose-designed decontamination equipment.

Decontamination at the scene references

Home Office. 'Initial operational response to a CBRN incident' Version 2.0 2015 (viewed on 21 February 2025)

National Health Service England. 'Emergency Preparedness, Resilience and Response (EPRR): Guidance for the initial management of self-presenters from incidents involving hazardous materials' 2019 (viewed on 21 February 2025)

Joint Emergency Service Interoperability Programme. 'Initial Operational Response (IOR) to Incidents Suspected to Involve Hazardous Substances or CBRN Materials' 2024 (viewed on 21 February 2025)

Clinical decontamination and first aid

Clinical decontamination is the process where trained healthcare professionals, using purpose-designed decontamination equipment, treat contaminated persons individually.

Detailed information on clinical management can be found on TOXBASE.

Important notes

Once body surface contaminants have been removed or if the patient was exposed by ingestion or inhalation, the risk that secondary care givers may become contaminated is very low. Secondary carers should wear standard hospital PPE as a precaution against secondary contamination from vomit and body fluids.

If the patient has not been decontaminated following surface contamination, secondary carers must wear appropriate NHS PPE for chemical exposure to avoid contaminating themselves.

The area should be well ventilated.

For comprehensive clinical advice consult TOXBASE directly.

Clinical decontamination following surface contamination

Avoid contaminating yourself.

Carry out decontamination after resuscitation. This should be performed in a well-ventilated area, preferably with its own ventilation system.

Contaminated clothing should be removed, double-bagged, sealed and stored safely.

Decontaminate open wounds first and avoid contamination of unexposed skin. Any particulate matter adherent to skin should be removed and the patient washed with copious amounts of water under low pressure for at least 10 to 15 minutes, or until pH of skin is normal (pH of the skin is 4.5 to 6 although it may be closer to 7 in children, or after irrigation). The earlier irrigation begins, the greater the benefit.

Pay special attention to skin folds, fingernails and ears.

Dermal exposure

Decontaminate (as above) the patient following surface contamination.

Management of systemic chromium poisoning is as for ingestion.

Treat as a thermal burn.

There are clinical data to support the topical application of 10% ascorbic acid to increase the rate of healing of hexavalent chromium-induced dermatitis and ulceration. See TOXBASE for further advice. .

Carry out other supportive measures as indicated by the patient's clinical condition.

Ocular exposure

Remove contact lenses if present.

Anaesthetise the eye with a topical local anaesthetic (for example, oxybuprocaine, amethocaine or similar). However, do not delay irrigation if local anaesthetic is not immediately available.

Immediately irrigate the affected eye thoroughly with 1,000 mL 0.9% saline or equivalent crystalloid (for example, by an infusion bag with a giving set) for a minimum of 10 to 15 minutes irrespective of initial conjunctival pH. A Morgan Lens may be used if anaesthetic has been given.

Aim for a neutral conjunctival pH of 7 to 7.2. The conjunctivae may be tested with indicator paper. Retest at 15 to 30 minutes after irrigation and use further irrigation if necessary.

Any particles lodges in the conjunctival recesses should be removed.

Repeated instillation of local anaesthetics may reduce discomfort and help more thorough decontamination. However, prolonged use of concentrated local anaesthetics is damaging to the cornea.

Patients with corneal damage, those who have been exposed to strong acids or alkalis and those whose symptoms do not resolve rapidly should be discussed urgently with an ophthalmologist.

Carry out other supportive measures as indicated by the patient's clinical condition.

Ingestion

Maintain a clear airway and ensure adequate ventilation.

Early discussion with critical care is advised.

Gut decontamination is contraindicted.

Do not attempt gastric lavage. Do not give neutralising chemicals as heat produced during neutralisation reactions may increase injury.

Monitor vital signs and cardiac rhythm; check the capillary blood glucose.

Check and record pupil size.

Pulse oximetry is unreliable in the presence of methaemoglobinaemia.

Perform a 12-lead ECG in all patients who require assessment.

Other supportive measures as indicated by the patient's clinical condition.

Inhalation

Maintain a clear airway and ensure adequate ventilation.
Give oxygen as required.

If appropriate, remove from exposure and decontaminate patient.

Monitor vital signs and cardiac rhythm; check the capillary blood glucose.

Check and record pupil size.

Pulse oximetry is unreliable in the presence of methaemoglobinaemia.

Perform a 12-lead ECG in all patients who require assessment.

Carry out other supportive measures as indicated by the patient's clinical condition.

Clinical decontamination and first aid references

National Poisons Information Service (NPIS). TOXBASE 'Sodium Dichromate' 2019 (viewed on 21 February 2025)

National Poisons Information Service (NPIS). TOXBASE 'Chemicals Splashed or Sprayed into the Eyes - features and clinical management' 2020 (viewed on 21 February 2025)

National Poisons Information Service (NPIS). TOXBASE 'Skin decontamination – corrosives' 2020 (viewed on 21 February 2025)

About the UK Health Security Agency

UKHSA is responsible for protecting every member of every community from the impact of infectious diseases, chemical, biological, radiological and nuclear incidents and other health threats. We provide intellectual, scientific and operational leadership at national and local level, as well as on the global stage, to make the nation health secure.

UKHSA is an executive agency, sponsored by the Department of Health and Social Care.

This document from the UKHSA Radiation, Chemicals, Climate and Environmental Hazards Directorate reflects understanding and evaluation of the current scientific evidence as presented and referenced here.

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