

Annex XV Dossier

Sodium dichromate, dihydrate

EC Number: 234-190-3

CAS Number: 7789-12-0

PROPOSAL FOR IDENTIFICATION OF A SUBSTANCE AS A CMR CAT 1 OR 2, PBT, vPvB OR A SUBSTANCE OF AN EQUIVALENT LEVEL OF CONCERN

It is proposed to identify the substance as a CMR according to Article 57 (a), (b) and/or (c).

Submitted by: France

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**PROPOSAL FOR IDENTIFICATION OF A SUBSTANCE AS A
CMR CAT 1 OR 2, PBT, VPVB OR A SUBSTANCE OF AN
EQUIVALENT LEVEL OF CONCERN**

Substance Name: Sodium Dichromate, dihydrate

EC Number: 234-190-3

CAS number: 7789-12-0

Summary of how the substance meets the CMR (Cat 1 or 2), PBT or vPvB criteria, or is considered to be a substance of an equivalent level of concern

Sodium dichromate, dihydrate form, has been identified as a CMR according to the 22th ATP to Directive 67/548/EEC, updated in the 29th ATP to Directive 67/548/EEC, in which it has been classified as a **carcinogen** Cat 2/ R45 (may cause cancer), **mutagen** Cat 2/R46 (may cause heritable damage) and **reprotoxic** Cat2/R60-61 (may impair fertility, may cause harm to the unborn child) and then has been included in the Annex I of the Directive 67/548/EEC.

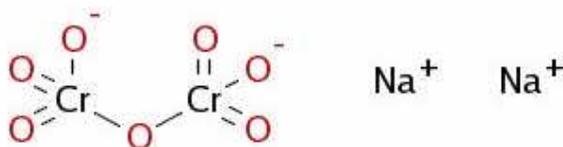
Toxicity and ecotoxicity of sodium dichromate is notably linked to its ability to generate chromium VI cations. On the basis of the CMR-2 classification and the variety of uses making difficult to guarantee that the uses of this substance is not dispersive, dihydrated sodium dichromate has been identified as of very high concern.

JUSTIFICATION

1.1.IDENTITY OF THE SUBSTANCE AND PHYSICAL AND CHEMICAL PROPERTIES

1.1.1. NAME AND OTHER IDENTIFIERS OF THE SUBSTANCE

Chemical Name: Sodium Dichromate, dihydrate
 EC Name: 234-190-3
 CAS Number: 7789-12-0
 IUPAC Name: disodium oxido-(oxido-dioxo-chromio)oxy-dioxo-chromium hydrate
 Molecular Formula: $\text{Na}_2\text{Cr}_2\text{H}_2\text{O}_7$
 Structural Formula:



Molecular Weight: 261.96

1.1.2. COMPOSITION OF THE SUBSTANCE

Typical concentration > 99.3
 (% w/w):
 Concentration range see typical concentration
 (% w/w):

1.1.3. PHYSICO-CHEMICAL PROPERTIES

Table 1: Summary of physico-chemical properties

REACH ref Annex, §	Property	IUCLID section	Value
VII, 7.1	Physical state at 20°C and 101.3 kPa	3.1	Crystals
VII, 7.2	Melting/freezing point	3.2	356°C
VII, 7.3	Boiling point	3.3	119-127°C at 1013 hPa
VII, 7.5	Vapour pressure	3.6	Not determined
VII, 7.7	Water solubility	3.8	4-10 g/l at 20°C
VII, 7.8	Partition coefficient n-octanol/water (log value)	3.7	Not available
XI, 7.16	Dissociation constant	3.21	Not available

1.2. MANUFACTURE AND USES

As information on uses may be useful for prioritisation for inclusion in annex XIV, this is summarised hereafter:

- Manufacture of other chromium compounds as chromium sulfate.
- Used for manufacture of inorganic chromate pigments: associated to lead, strontium, barium, zinc, bore for paints and plastic coloration.
- Used for metal finishing, aiding corrosion resistance: the main process is chrome plating – electroplating-, other uses are in conversion coatings - passivating and anodising - and in brightening. The electroplating sector constitutes approximately 43% of the total number of companies with metal finishing activities.
- Used in vitamin K manufactures.
- Used for preparation of coloured glass and ceramic glazes.
- Used as mordant in dyeing (Chromium in wood preservative acts as a mordant or fixative whereby it permanently fixes biocide elements such as copper and arsenic).
- Used for manufacture of essential oil and perfumes.

1.3. CLASSIFICATION AND LABELLING

1.3.1. CLASSIFICATION IN ANNEX I OF DIRECTIVE 67/548/EEC

According to the 22nd ATP to Directive 67/548/EEC, updated in the 29th ATP to Directive 67/548/EEC, the Sodium Dichromate, dihydrate has been classified as a **CARCINOGEN** Cat 2/ R45: May cause cancer, **MUTAGEN** Cat 2/R46: May cause heritable damage and **REPROTOXIC** Cat2/R60-61: May impair fertility; May cause harm to the unborn child, and has been then included to the Annex I of the Directive 67/548/EEC.

According to the Directive 67/548/EEC, the Sodium dichromate, dehydrate has been classified as:

- R45: May cause cancer.
- R46: May cause heritable genetic damage.
- R60: May impair fertility.
- R61: May cause harm to the unborn child.
- R8: Contact with combustible material may cause fire.
- R21: Harmful in contact with skin.
- R25: Toxic if swallowed.
- R26: Very toxic by inhalation.
- R34: Causes burns.

- R42/43: May cause sensitization by inhalation and skin contact.
- R48/23: Toxic: danger of serious damage to health by prolonged exposure through inhalation.
- R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SAFETY PHRASES:

- S53: Avoid exposure – obtain special instructions before use.
- S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S60: This material and its container must be disposed of as hazardous waste.
- S61: Avoid release to the environment. Refer to special instructions/Safety data sheets.

CONCENTRATION	CLASSIFICATION
$C \geq 25 \%$	T+, N ; R45-46-60-61-21-25-26-34-42/43-48/23-50/53
$10 \% \leq C < 25 \%$	T+, N ; R45-46-60-61-22-26-34-42/43-48/23-51/53
$7 \% \leq C < 10 \%$	T+, N ; R45-46-60-61-22-26-36/37/38-42/43-48/20-51/53
$5 \% \leq C < 7 \%$	T, N ; R45-46-60-61-22-23-36/37/38-42/43-48/20-51/53
$3 \% \leq C < 5 \%$	T, N ; R45-46-60-61-22-23-42/43-48/20-51/53
$2,5 \% \leq C < 3 \%$	T, N ; R45-46-60-61-23-42/43-48/20-51/53
$1 \% \leq C < 2,5 \%$	T ; R45-46-60-61-23-42/43-48/20-52/53
$0,5 \% \leq C < 1 \%$	T ; R45-46-60-61-20-42/43-52/53
$0,25 \% \leq C < 0,5 \%$	T ; R45-46-20-42/43-52/53
$0,2 \% \leq C < 0,25 \%$	T ; R45-46-20-42/43
$0,1 \% \leq C < 0,2 \%$	T ; R45-46-20

1.3.2. SELF CLASSIFICATION(S)

No self classification.

INFORMATION ON USE, EXPOSURE, ALTERNATIVES AND RISKS

1.1. INFORMATION ON EXPOSURE

Please refer to Section 2 of the Justification part of this report where there is a list of the main categories of uses. After taking into account exports and imports, the amount of dichromate (as sodium dichromate dihydrate) used in the EU is estimated to be 25,000 tonnes (RAR, EC 2005). Sodium dichromate solution is usually used pure as an on-site raw material in the manufacture of a range of both hexavalent and trivalent chromium compounds, or for the market as a solution or as a solid crystalline anhydrous or dihydrate product (RAR, EC 2005). In France all uses are estimated more than 1000 T/year in 2005 (Inrs, 2006) and global production in Europe is estimated 838 kT/year (RAR, EC 2005).

1.2. INFORMATION ON ALTERNATIVES

Regarding the variety of sectors in which sodium dichromate is used and the incomplete data available, to day it cannot be affirmed that uses are not dispersive. Therefore, alternatives should be proposed.

1.2.1. Alternative substances

- No information is publicly available to day for chromate pigments, vitamin K manufacture or for the uses in glass and ceramic industry or in dyeing.
- For metal finishing & corrosion resistance, in some cases, chromium could be replaced by electroplated nickel, by a non-nickel electroplate or electroless technique. The different alternatives to chromium plating and chromium conversion coatings were technically well documented in the Risk Reduction Strategy for hexavalent chromium (RPA, 2005 – page 221-232).
- In the sector of essential oils, certain substitutions were made, even technical details still confidential.

1.2.2. Alternative techniques

- For metal finishing & corrosion resistance, the reference is the same as in paragraphe 2.1 (RPA, 2005).

1.3.RISK-RELATED INFORMATION

It should be pay attention that the transformation of sodium dichromate (CAS number 10588-01-9) into di-hydrated sodium dichromate (CAS number 7789-12-0) is relatively easy as sodium dichromate has high water solubility (~2,355 g/l). Therefore, expositions could be underestimated. Under existing substance Regulation (EEC) 793/93, a Risk Assessment Report on compounds generating Chromium VI ions and including the anhydrous form of sodium dichromate was finalized in 2005 by UK (European Commission, 2005). According to this report, chromium VI compounds, including sodium dichromate, are considered to be in vivo mutagens with the potential to induce both somatic and germ cell mutations. It is not possible to identify a threshold level of exposure below which there would be no risk to human health making this substance of special concern.

REFERENCES

- ESIS data for sodium dichromate dihydrate <http://ecb.jrc.it/esis>
- Inventaire 2005 des agents CMR, INRS
- Fiche Toxicologique, Chromates et dichromates de sodium et de potassium FT180, INRS, 2006.
- European Union Risk Assessment Report on Chromium VI compounds, JRC, European Commission, 2005.
- Environmental Risk Reduction Strategy and Analysis of Advantages and Drawbacks for Hexavalent Chromium, Final Report, UK Dept for Environment Food and Rural Affairs (RPA), October 2005.