

## **Annex XV Report**

**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: Lead chromate**  
EC Number: 231-846-0  
CAS Number: 7758-97-6

**Submitted by: FRANCE**

**Version: August 2009**

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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:** Lead chromate

**EC number:** 231-846-0

**CAS number:** 7758-97-6

- *It is proposed to identify the substance as a CMR according to Article 57 (a) and (c).*

## **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**

According to Article 57 of Regulation 1907/2006 (the REACH Regulation), substances meeting the criteria for classification as carcinogen (category 1 or 2) or as toxic for reproduction (category 1 or 2) in accordance with Directive 67/548/EEC may be included in Annex XIV. Lead chromate has been classified as a carcinogen (Carc. Cat. 2) and as toxic to reproduction (Repr. Cat. 1) according to Directive 67/548/EEC by Commission Directive 2008/58/EC amending, for the purpose of its adaptation to technical progress, for the 30th time, Council Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances.

Therefore, lead chromate met the criteria for classification as carcinogenic category 1 or 2 and as toxic for reproduction category 1 or 2 under Directive 67/548/EEC and accordingly may be included in Annex XIV.

This classification as Carc.Cat. 2 and as Repr. Cat. 1 will also be included in Annex VI, part 3, Table 3.2 (the list of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC) of Regulation (EC) No 1272/2008 by a Commission Regulation amending, for the purposes of its adaptation to technical progress, for the first time Regulation 1272/2008. This Commission Regulation was adopted on 10 August 2009 (publication and entry into force of this Regulation is expected to be in September/October 2009).

The corresponding classification in Annex VI, part 3, Table 3.1 of Regulation (EC) No 1272/2008 (list of harmonised classification and labelling of hazardous substances) will be Carc. 1B and Repr. 1A.

## **Registration number(s) of the substance or of substances containing the substance:**

*Not relevant*

# JUSTIFICATION

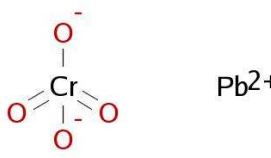
## 1 IDENTITY OF THE SUBSTANCE AND PHYSICAL AND CHEMICAL PROPERTIES

### 1.1 Name and other identifier of the substance

Chemical Name:	lead chromate
EC Number:	231-846-0
CAS Number:	7758-97-6
Deleted CAS Numbers:	8049-64-7, 181768-98-9 <sup>1</sup>
IUPAC Name:	Lead(2+) chromate

Synonyms for lead chromate (IARC, *vol.* 49): Chromic acid (H<sub>2</sub>CrO<sub>4</sub>), lead (2+) salt (1:1); C.I. 77600; **C.I. Pigment Yellow 34<sup>2</sup>**; crocoite; lead chromium oxide; phoenicochroite; plumbous chromate; Canary Chrome Yellow 40-2250; Chrome Green; Chrome Green UC61; Chrome Green UC74; Chrome Green UC76; Chrome Lemon; Chrome Yellow; Chrome Yellow 5G; Chrome Yellow GF; Chrome Yellow LF; Chrome Yellow Light 1066; Chrome Yellow Light 1075; Chrome Yellow Medium 1074; Chrome Yellow Medium 1085; Chrome yellow Medium 1295; Chrome Yellow Medium 1298; Chrome Yellow Primrose 1010; Chrome Yellow Primrose 1015; Cologne Yellow; Dainichi Chrome Yellow G; LD Chrome Yellow Supra 70 FS; Leipzig Yellow; Paris Yellow; Pigment Green 15; Primrose Chrome Yellow; Pure Lemon Chrome L3GS

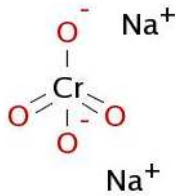
### 1.2 Composition of the substance

Chemical Name:	<b>lead chromate</b>
EC Number:	231-846-0
CAS Number:	7758-97-6
IUPAC Name:	Lead(2+) chromate
Molecular Formula:	CrH <sub>2</sub> O <sub>4</sub> .Pb
Structural Formula:	

<sup>1</sup> These CAS numbers have been deleted from the CA index, but may still be in use.

<sup>2</sup> See discussion in chapter related to Information on uses, exposure, alternatives and risks and discussion on the Annex XV dossier of C.I. Pigment Yellow 34

Molecular Weight:	323.18 g/mol (NTP, 1992)
Typical proportion %	> 99
Real proportion (range) in %	-

Chemical Name:	<b>sodium chromate</b>
EC Number:	231-889-5
CAS Number:	7775-11-3
IUPAC Name:	disodium chromate
Molecular Formula:	CrH <sub>2</sub> O <sub>4</sub> .2Na
Structural Formula:	
Molecular Weight:	161.97 g/mol
Typical proportion %	around 0.14 % (Eurocolour, 2004)
Real proportion (range) in %	-

Chemical Name:	<b>unknown</b>
Typical proportion %	Less than 1%

### 1.3 Physico-Chemical properties

Table 1 Summary of physico-chemical properties

REACH ref Annex, §	Property	Value	Comment/reference
VII, 7.1	Physical state at 20 C and 101.3 KPa	Yellow or orange-yellow powder (crystalline powder)	(Budavari, 1996)
VII, 7.2	Melting / freezing point	844°C (1551.0 ° F)	(Budavari, 1996)
VII, 7.3	Boiling point	No information found	
VII, 7.5	Vapour pressure	Not applicable	
VII, 7.7	Water solubility	0.2 mg/l water 0.0000058 g/100 ml at 25°C	(Budavari, 1996) (Windholz, 1983; Weast, 1985)
VII, 7.8	Partition coefficient n-octanol/water (log value)	No information found	
IX, 7.16	Dissociation constant	No information found	

## 2 MANUFACTURE AND USES

Lead chromate occurs in nature as crocoite, an orange-red mineral. Lead chromate can be produced by reacting sodium chromate with lead nitrate, or by reacting lead monoxide with

chromic acid solution. Details of various commercial procedures for lead chromate are not generally revealed by producers (HSDB 2009). Consultations with French pigments producers indicate that producer of lead chromate does not exist anymore in France (CETIM, 2008). No additional information through literature search has been found at European level.

*Information on uses are summarised under Section 1 in the second part of this dossier (Information on uses, exposure, alternatives and risks).*

### **3 CLASSIFICATION AND LABELLING**

#### **3.1 Classification in Annex VI of Regulation (EC) No 1272/2008**

According to Article 57 of the REACH Regulation, substances meeting the criteria for classification as carcinogenic (category 1 or 2) or as toxic for reproduction (category 1 or 2) in accordance with Directive 67/548/EEC may be included in Annex XIV. The classification of lead chromate according to Directive 67/548/EEC was updated by the 30th Adaptation to Technical Progress (30th ATP; Commission Directive 2008/58/EC<sup>3</sup>) as follows:

Index Number: 082-004-00-2

Carc. Cat. 2; R45 (May cause cancer)

Repr. Cat. 1; R61 (May cause harm to the unborn child)

Repr. Cat. 3; R62 (Possible risk of impaired fertility)

R33 (Danger of cumulative effects)

N: R50-53 (Dangerous for the environment: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment).

This classification will be included in Annex VI, part 3, Table 3.2 (the list of harmonised classification and labelling of hazardous substances from Annex I to Directive 67/548/EEC) of Regulation (EC) No 1272/2008<sup>4</sup> by a Commission Regulation amending, for the purposes of its adaptation to technical progress, for the first time Regulation 1272/2008. This Commission Regulation has been adopted on 10 August 2009 (publication and entry into force of this first ATP is expected to be in September/October 2009<sup>5</sup>).

According to the first ATP to Regulation (EC) No 1272/2008, the corresponding classification in Annex VI, part 3, Table 3.1 of this Regulation (EC) No 1272/2008 (list of harmonised classification and labelling of hazardous substances) will be as follows:

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<sup>3</sup> COMMISSION DIRECTIVE 2008/58/EC of 21 August 2008 amending, for the purpose of its adaptation to technical progress, for the 30th time, Council Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances.

<sup>4</sup> Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006

<sup>5</sup> Pursuant to Article 53(1) of Regulation 1272/2008 this Commission Regulation was adopted in accordance with the regulatory procedure with scrutiny involving both the Council of the EU and the European Parliament.

Index Number: 082-004-00-2

Carc. 1B; H351

Repr. 1A; H360Df

STOT RE 2; H373

Aquatic Acute 1; H400

Aquatic Chronic 1; H410

### **3.2 Self classification(s)**

*Not relevant*

## **4 ENVIRONMENTAL FATE PROPERTIES**

*Not relevant for this proposal*

## **5 HUMAN HEALTH HAZARD ASSESSMENT**

*Not relevant for this proposal*

## **6 HUMAN HEALTH HAZARD ASSESSMENT OF PHYSICOCHEMICAL PROPERTIES**

*Not relevant for this proposal*

## **7 ENVIRONMENTAL HAZARD ASSESSMENT**

*Not relevant for this proposal*

## **8 PBT, VPVB AND EQUIVALENT LEVEL OF CONCERN ASSESSMENT**

*Not relevant for this proposal*

# INFORMATION ON USE, EXPOSURE, ALTERNATIVES AND RISKS

Considering the general approach used by ECHA to develop the priority setting<sup>6</sup>, where the ‘regulatory effectiveness’ of including the substance into the authorisation process should also be taken into account, and the grouping approach proposed in section 1 of the “other information” part of this report, information on uses and exposure should be considered globally for the three “Lead chromates”: Lead chromate, C.I. pigment yellow 34 and C.I. pigment red 104. Please refer also to the information provided in the relevant annex XV reports.

## 1 INFORMATION ON USES

Lead chromate occurs in nature as crocoite, an orange-red mineral. Lead chromate can be produced by reacting sodium chromate with lead nitrate, or by reacting lead monoxide with chromic acid solution. Details of various commercial procedures for lead chromate are not generally revealed by producers (HSDB 2009).

“Lead chromates” or “chrome yellows” are usually employed to designate the yellow lead chromate pigments family<sup>7</sup> which is composed of the pure lead chromates, the mixed phase pigment of lead chromate and lead sulphate (lead sulfochromate pigment) and the mixed phase pigment of lead chromate, lead sulphate and lead molybdate (lead chromate molybdate sulphate pigment).

In fact, the manufacturing process of these 3 substances illustrates this nearness between them: it uses the same process of chemical precipitation of various lead and chromium salts. Pure lead chromate is usually prepared by the addition of a sodium dichromate solution to a solution of lead salt or a suspension of a less soluble lead compound. The colour varies for green-yellow to yellow-red **depending on the proportions of each constituent and on the crystal form**. Co-precipitation with lead sulphate gives primrose and lemon hues; precipitation in alkaline conditions gives rise to a basic salt  $PbO \cdot PbCrO_4$  with a redder shade. Co-precipitation with lead molybdate produces a scarlet pigment (see “lead chromate molybdate sulphate pigment” annex XV dossier and Armitage, 1967).

Very few information (provided hereafter) is available on pure lead chromate. According to the European colourants industry pure lead chromate was never of important technical use and only the two lead chromate pigments (C.I. Pigment Yellow 34 and Red 104) have now been used commercially for several decades (Eurocolour, 2004). Furthermore, none of the adherents of the French federation of paints, inks, colours, pastes and adhesives (FIPEC) declares using pure lead chromate.

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<sup>6</sup> [http://echa.europa.eu/doc/consultations/recommendations/gen\\_approach\\_prioritisation.pdf](http://echa.europa.eu/doc/consultations/recommendations/gen_approach_prioritisation.pdf)

<sup>7</sup> For example, see National environmental health forum, 1998



***The main uses identified in the literature and through consultation for pure lead chromate are:***

*- Manufacture of pigment and dyes*

A french survey conducted by INRS in 2005 (INRS, 2005) indicated the use of lead chromate in the manufacture of pigment and dyes. The literature search failed to reveal the use of pure lead chromate as a raw material in the synthesis of other pigments.

*- Use as pigment in paint and varnishes*

Use of lead chromate as a pigment in paint and varnishes is the major use found in the literature and numerous surveys and publications. Lead chromates have excellent properties as pigment. Lead chromate based paints are found in all industrial sectors in products requiring protection against corrosion or bright colours, with a good resistance: automotive (body), construction equipment, agricultural machinery, cladding (coil coating), road signs, marine naval etc. Instead of being used as pigment base, lead chromate use might mainly be linked to its anticorrosive property for primary coating (CETIM, 2008). According to Danish EPA, lead chromate is primarily used in maritime and industrial paint products (Danish EPA, 2003). Today lead chromate is used in car touch-up paints as a pigment in yellow and orange paints where it is not been possible to develop alternatives with same the shade of colour and coverage (Kemi, 2007).

***Other uses identified (more anecdotic):***

*- Use in formulation of detergents and bleaches:*

In 2005, INRS (INRS, 2005) reported a consumption of 0.8 tons of lead chromate (ie 1.63% of total consumption in France) for the manufacture of soaps, detergents and cleaning products, and especially the formulation of detergents and bleaching agents. Literature search failed to confirm this use. According to industrial French experts in the formulation of such products lead chromate is not used and has never been used in the formulation of detergents and bleaches (CETIM, 2008). Contacts with the French association of industries of detergents, cleaning products and industrial hygiene (AFISE) have remained unanswered (CETIM, 2008).

*- Use in the manufacture of pyrotechnic powder (in retardants detonators)*

A survey conducted by INRS in 2005 revealed the use of lead chromate in the manufacture of armaments. Patents analysis and literature search indicate that lead chromate may intervene in the composition of pyrotechnic powder, as an oxidation agent (CETIM, 2008). The use of lead chromate in the synthesis of pyrotechnic elements has been confirmed by the French ministry of defence after consultation of industry. No more data has been brought by French industry nor by the Union of Manufacturers of Explosives, Pyrotechnics and Fireworks.

According to the same sources, there would be no use of lead chromate in fireworks for entertainment (CETIM, 2008).

*- Use as an additive (pigment) in embalming/restorative art products*

Spray skin restorative used by embalmers should contain lead chromate where it is used as a pigment additive in embalming/restorative art products (Bedino, 2005). This use is forbidden in France based on the article R.5132-61 of the French code of public health. A first consultation of embalmers tends to show that products used in UK and probably in the rest of Europe do not contain lead chromate.

*- Use in photosensitive materials*

Several patents, including Japanese, revealed possible uses of lead chromate in the composition of photosensitive materials. No trace of uses for this purpose has been found in France in 2008 (CETIM, 2008).

## **2 INFORMATION ON VOLUMES**

Consumption of pure lead chromate in France was estimated by INRS as a volume of about 50 tonnes in 2005 (INRS, 2005). In Sweden, the use of lead chromate has fallen sharply from 76 tonnes in 1992 to 3.5 tonnes in 2004 (Kemi, 2007). In 2007, total use of Lead chromate in preparations was about 2 tons for both Denmark and Sweden (SPIN database). No data was available in the database for Finland and Norway for the year 2007.

In the frame of the grouping approach proposed in section 1 of the “other information” part of the report, the information on volumes used for priority setting for Annex XIV inclusion should be considered globally for the three substances proposed by France (C.I. Pigment yellow 34, C.I. Pigment red 104 and lead chromate). Then please refer also to the information available in the relevant reports.

## **3 INFORMATION ON ALTERNATIVES**

All the information available concerning substitution of “Lead chromates” refers to the uses as pigment. Please refer to the C.I. Pigment yellow 34 annex XV report for more information.

## **4 RISK-RELATED INFORMATION**

No information on exposure and risks related to lead chromate were available.

# OTHER INFORMATION

## 1 GROUPING APPROACH

Grouping makes sense in the authorisation process at the time of a potential prioritisation of candidate substances for inclusion in annex XIV.

However, the original justification is technical as the three substances “lead chromate” (CAS n°7758-97-6), “lead sulfochromate pigment” (CAS n°1344-37-2) and “lead chromate molybdate sulphate pigment – C.I. pigment red 104” (CAS n°12656-85-8) are proposed for SVHC candidate identification in a grouping approach since they chemically belong to the same family and they share similar hazard profile, similar classification and labelling, similar technical performances and similar uses.

Grouping in prioritisation promotes effective substitution toward safer alternatives by avoiding or limiting possibility to use another hazardous substance as a substitute. Substitution between these 3 substances (especially between lead chromate and lead sulfochromate pigment) can be envisaged for some limited uses such as yellow shade paints or colouring. However, significant difference of colour (especially between yellow and red pigments) doesn't allow a systematic substitution for all uses. No more available substitutes with same hazard profile have been identified than the 3 grouped lead chromate substances.

## 2 CONSULTATION OF INDUSTRY

Consultation: please refer to the related information in the annex XV report for C.I. Pigment yellow 34 and C.I. pigment Red 104, as the consultation for the lead chromate has been conducted in parallel.

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