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Background document for potassium dichromate

Document developed in the context of ECHA's third Recommendation for the inclusion of substances in Annex XIV

Information comprising confidential comments submitted during public consultation, or relating to content of Registration dossiers which is of such nature that it may potentially harm the commercial interest of companies if it was disclosed, is provided in a confidential annex. This confidential annex is not included in the public version of this background document.

1. Identity of the substance

Chemical name:	potassium dichromate
EC Number:	231-906-6
CAS Number:	7778-50-9
IUPAC Name:	potassium dichromate

2. Background information

2.1. Intrinsic properties

Potassium dichromate was identified as a Substance of Very High Concern (SVHC) according to Article 57(a), (b) and (c) as it is classified according to Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) of Regulation (EC) No 1272/2008 as a carcinogen category 1B¹ (H350: "May cause cancer"), as mutagen category 1B² (H340: "May cause genetic defects") and as toxic for reproduction category 1B³ (H360-FD: "May damage fertility. May damage the unborn child"), and was therefore included in the candidate list for authorisation on 18 June 2010, following ECHA's decision ED/30/2010.

¹ This corresponds to a classification as carcinogen category 2 (R45 : May cause cancer) 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) N° 1272/2008

² This corresponds to a classification as mutagen category 2 (R46 : May cause heritable genetic damage) 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) N° 1272/2008

³ This corresponds to a classification as toxic for reproduction category 2 (R60-61: May impair fertility. May cause harm to the unborn child) 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) N° 1272/2008

2.2. Imports, exports, manufacture and uses

2.2.1. *Volume(s), imports/exports*

According to the Risk Assessment Report (RAR), potassium dichromate was manufactured in quantities of 1,500 t in the EU in 1997 (EC, 2005). Communication with industry indicated a lower EU production volume in 2004 (reference cited in RPA, 2005).

France assumed that the last EU producer closed down in 2009 (Annex XV, France 2010). According to registration information there is still some potassium dichromate manufactured in the EU although the majority seems to be imported. The substance has been registered in the range of 1,000 - 10,000 t/y.

The tonnage allocated to uses within the scope of authorisation is between 1 – 10 t/y.

2.2.2. *Manufacture and uses*

2.2.2.1. Manufacture and releases from manufacture

According to registration information there seems to be still some manufacture of potassium dichromate in EU however no further details on releases were provided. The descriptors given in the registration dossiers indicate the possibility of (significant) occupational exposure, by for example PROC4.

ERC1 (Manufacture of chemicals) and ERC2 (Formulation of mixtures) were given in the registration dossiers corresponding to the default environmental release rates of 5 and 2.5 % to air, 6 and 2 % to water and 0.01 and 0.01 % to soil, respectively.

2.2.2.2. Uses and releases from uses

According to registration information the majority of potassium dichromate is used as intermediate in the synthesis of fine and bulk large scale chemicals. Furthermore it is used as intermediate in the manufacture of basic metals and as laboratory chemical.

The use as laboratory chemical was further detailed by industry; for example, the use for analysis of the COD in control of surface and waste water (RCOM, 2011, also mentioned in Annex XV, France 2010), or the use for analysis of milk preserving samples (RCOM, 2011). During the same consultation it was mentioned that potassium dichromate is listed in the European Pharmacopeia as substance used to prepare pharmaceutical products (RCOM, 2011).

Uses within the scope of authorisation according to registration information are in metal surface treatment products, formulation of mixtures and as processing aid. The main area for use of potassium dichromate in metal surface treatment seems

to be for corrosion protection in the aeronautic sector (Annex XV, France 2010; RCOM, 2011).

There is no measured data on releases of $K_2Cr_2O_7$ from uses within scope of authorisation. Recent exposure information reported by Germany (Annex XV Germany, 2010) shows that workers in metal surface treatment sector might be exposed to significant concentrations of chromium (VI) compounds at some installations.

2.2.2.3. Geographical distribution and conclusions in terms of (organisation and communication in) supply chain

There is no specific information available regarding the geographical distribution for the non-intermediate uses of $K_2Cr_2O_7$. As the volume allocated to uses within scope of authorisation is low, they presumably do not take place at a high number of sites. These uses of the substance might therefore not be considered as widespread. Metal finishing might however bear a potential for significant worker exposure in a number of applications and process steps.

2.3. Availability of information on alternatives⁴

Some information is available on alternatives for metal surface treatment in the Annex XV report on potassium dichromate (Annex XV, France 2010). The conclusions from the Annex XV (France 2010) are that alternatives exist but most of them are more expensive and are protected by patents. Those alternatives provide anti-corrosive properties which do not seem to be sufficient in all applications. However, for applications in less corrosive environments certain alternative substances appear to be suitable replacements. Research in the aeronautic and military sectors on alternatives is ongoing for several years already. However some more research is still needed as none of the presently known possible alternatives appear to fulfil the technical and airworthiness safety that is required for aircrafts. In addition, all existing fleets may require chromates to maintain operability due to material compatibility reasons for the next years/decades (RCOM, 2011).

2.4. Existing specific Community legislation relevant for possible exemption

There seems to be no specific Community legislation in force that would allow to consider exemption of (categories of) uses from the authorisation requirement on the basis of Article 58(2) of the REACH Regulation (see sections 'D' and in particular 'E' of RCOM, 2011).

2.5. Any other relevant information (e.g. for priority setting)

Not available.

⁴ Please note that this information was not used for prioritisation.

3. Conclusions and justification

3.1. Prioritisation

A low volume is allocated to uses in the scope of authorisation. Some process steps in metal finishing are considered to bear potential for significant worker exposure.

Verbal-argumentative approach

On the basis of the criteria the priority for recommending this substance for inclusion in Annex XIV is low.

Scoring approach

Score			Total Score
Inherent properties (IP)	Volume (V)	Uses - wide dispersiveness (WDU)	(= IP + V + WDU)
1	1	Overall score: 2 * 3 = 6	8
Art. 57 (a), (b) & (c); Carc 1B, Muta 1B, Repro 1B	(Low volume in the scope of authorisation)	Site-#: 2 (Substance used at a medium number of sites) Release: 3 (potentially significant worker exposure)	

Conclusion, taking regulatory effectiveness considerations into account

On the basis of the prioritisation criteria, potassium dichromate gets low priority for inclusion in Annex XIV.

However, this substance could be used to replace other hexavalent chromium compounds with similar hazard profile and similar uses.

Therefore, it is proposed to recommend potassium dichromate for inclusion in Annex XIV.

4. References

Annex XV (France 2010): Potassium dichromate. Proposal for identification of a substance as a CMR Cat 1 or 2, PBT, vPvB or a substance of an equivalent level of concern. Submitted by France, February 2010.

<http://echa.europa.eu/documents/10162/5cb45ed3-ae49-4b66-b792-b6786c0e6e04>

Annex XV (Germany 2010): Chromium trioxide. Proposal for identification of a substance as a CMR Cat 1 or 2, PBT, vPvB or a substance of an equivalent level of concern. Submitted by Germany, August 2010.

<http://echa.europa.eu/documents/10162/20ee121d-0db9-4c97-ae32-d18d1f4b3ff4>

EC (2005): European Union Risk Assessment Report: chromium trioxide, sodium chromate, sodium dichromate, ammonium dichromate, potassium dichromate. 3rd Priority List, Volume 53. European Commission, Joint Research Centre.

RCOM (2011): "Responses to comments" document. Document compiling comments and respective answers from commenting period 15/06/2011 – 14/09/2011 on ECHA's 3rd draft recommendation of priority substances for inclusion in the list of substances subject to authorisation (Annex XIV).

http://echa.europa.eu/documents/10162/17232/rcom_chromium_compounds_en.pdf

RPA (2005): Environmental risk reduction strategy and analysis of advantages and drawbacks for hexavalent chromium. Risk & Policy Analysis Ltd. Prepared for Department for Environment, Food and Rural Affairs. October 2005.