29 November 2012

Background document for strontium chromate

Document developed in the context of ECHA's fourth 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 to this document.

1. Identity of the substance

Chemical name:	Strontium chromate
EC Number:	232-142-6
CAS Number:	7789-06-2
IUPAC Name:	Strontium chromate

2. Background information

2.1. Intrinsic properties

Strontium chromate was identified as a Substance of Very High Concern (SVHC) in accordance with Article 57(a) as it is classified in Annex VI, part 3, Table 3.1 (the list of harmonised classification and labelling of hazardous substances) of Regulation (EC) No 1272/2008 as carcinogen 1B[1] (H350: "May cause cancer") and was therefore included in the candidate list for authorisation on 20 June 2011, following ECHA's decision ED/31/2011.

2.2. Imports, exports, manufacture and uses

2.2.1. Volume(s), imports/exports

[1] This corresponds to a classification as carcinogen cat. 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) No 1272/2008.

According to information provided in the registrations strontium chromate is manufactured or imported in the EU in a tonnage range of 1,000 – 10,000 t/y. The volume imported (range 100 - 1,000 t/y) is quite low compared to the volume manufactured. No information on exports is available. The entire manufactured or imported amount of 1,000 – 10,000 t/y of strontium chromate is allocated to uses in the scope of authorisation.
Consultation of stakeholders in the context of preparation of the Annex XV dossier (2011), performed in late 2010 and early 2011, revealed that a maximum of 4,000 t/y of strontium chromate is manufactured within the EU by two manufacturers. One of the manufacturers exported approximately 75% of its production[2], which may thus represent 1,500 t/y for export and 500 t/y for use within the EU. The Volume exported by the second manufacturer is not known.

2.2.2. Manufacture and uses

2.2.2.1. Manufacture and releases from manufacture

According to registration information and the Annex XV dossier (2011), strontium chromate is manufactured within Europe by two companies that are located in Austria and in France.

The Annex XV dossier (2011) reports the manufacturing process of strontium chromate as follows: strontium carbonate is reacted under controlled conditions by precipitation in a wet chemical process with water-soluble chromate solution and a strontium salt or with chromic acid and strontium hydroxide solution. The water dispersion is then dried to form the final strontium chromate powder. Strontium chromate may also be prepared from strontium chloride and sodium chromate or by precipitation of strontium carbonate and sodium dichromate.

Manufacture of strontium chromate takes place in closed systems. However, occupational exposure cannot be excluded and exposure can arise from raw material handling during the manufacture of strontium chromate (wet process) and from handling the substance (as powder) during packaging and cleaning activities (for example: PROC 26) (Annex XV dossier (2011) and Registrations).

2.2.2.2. Uses and releases from uses

As set out in the Annex XV and registration dossiers, the main application of strontium chromate is in coil coated galvanised steel (for the protection of steel and zinc). Coil coated metal produced in Europe is mainly used in buildings (for wall cladding or roofing). Strontium chromate is also used in much smaller quantities in primers, sealants, jointing compounds and top coat paints for aerospace applications (RCOM, 2011) but also in anti-corrosion primers, in fillers and sealants for the construction and maintenance of vehicles (such as heavy duty vehicles and trucks, military vehicles and agricultural equipment (excluding personal vehicles)). According to information provided in the registrations, applications of the substance comprise:

- formulation of coatings and sealants,
- industrial use of coatings in:
  - coil coating sector,
  - aerospace sector and

[2] Based on the assumption that the European production is equally shared between both manufacturers i.e. 2000 t/y for each one.

  - vehicle sector.
- industrial use of sealants in:
  - aerospace sector.

In addition, it seems that strontium chromate can be used in artist paints; however, the quantities involved are expected to be very low.

The use of strontium chromate as component of electroplating baths (where it acts as a chemical concentration regulator) has been reported in the Annex XV dossier (2011) as not confirmed and also is not confirmed in the registration dossiers.

Information provided in the registrations and the Annex XV dossier (2011) indicates that potential for exposure is given in uses or process steps such as

- raw material handling (during charging/mixing/dispersing of strontium chromate (as powder) in liquids),
- mixing or blending for formulation of preparations,
- application of coatings or sealants to the support (by dipping, brushing, roller application and manual spraying, which can generate aerosols) and
- manual stripping of coatings/sealants with abrasive techniques (e.g. sanding during maintenance activities of aircrafts and vehicles).

In the Annex XV dossier (2011) recent monitoring results regarding exposure to chromium (VI) via air at the workplace in different metal working sectors in France, among them the "metal treatment and surface finishing" sector, are reported. The data indicate that French workers in the metal treatment and surface finishing sector are exposed via the respiratory route to non-negligible concentrations of chromium (VI) compounds (25^{th}, 75^{th} and 90^{th} percentile of 8 h average monitoring values, respectively: 0.5, 1.0 and 3.0 µg CrVI/m^3).

Furthermore, recent exposure information reported in the Annex XV dossier for chromium trioxide (2010) prepared by Germany shows that also German workers are exposed to significant concentrations of chromium (VI) in workplace air[3] in sectors such as "formulation of metal treatment products" and "surface treatment".

Based on this recent information on exposure of French and German workers to Cr(VI) resulting from uses and processes in which also strontium chromate is used, it can be assumed that other European workers are also likely to be exposed to non-negligible concentrations of Cr(VI) compounds, among them strontium chromate.

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

Regarding the geographical distribution of uses of strontium chromate, it is at least used in 16 EU Member States in the aerospace sector. For the other applications, there is no specific information available (RCOM, 2012).

[3] The exposure values provided in tables 7 – 19 of the Annex XV dossier for chromium trioxide are expressed in µg CrO_3/m^3 air (and not as µg CrVI/m^3 as erroneously stated in the dossier; by division of the given values by 2 an approximate transformation of CrO_3/m^3 to CrVI/m^3 can be achieved).

As reported in the registrations, the formulation of strontium chromate containing coatings/sealants is carried out at a medium number (10 - 100) of sites. Coil coating takes place in large industrial installations at presumably < 100 sites.
As regards application of the substance in surface treatment activities (coating) supplying the aerospace sector, >100 industrial sites are involved (RCOM, 2012). Indeed, the Annex XV dossier (2011) suggests a supply chain which horizontally involves a high number of small and medium size enterprises. Comments received during public consultation on the SVHC identification of the substance and on ECHA's draft 4th recommendation confirm the information available on the supply chain structure in the aerospace industry (RCOM, 2011; RCOM, 2012). Regarding vehicle coating, including repair/refurbishment of coating, it can be expected that the surface treatment itself is performed at a high number of sites in the EU (in larger industrial installations but also in small workshops).

Based on this information, the uses of the substance in the scope of authorisation are considered to be widespread.

2.3. Availability of information on alternatives[4]

Some information is available on alternatives for metal surface treatment in the Annex XV dossier on strontium chromate (2011).
The conclusions from the Annex XV dossier (2011), as confirmed by comments received during the public consultation (RCOM, 2011; RCOM, 2012), are that in the aeronautic and military sectors, research for alternatives has been ongoing for several years already. However, further research is still needed as none of the presently known possible alternatives appear to fulfil the technical and airworthiness safety requirements for aircrafts. However, for some applications (e.g. exterior decorative paint/primer) alternatives seem to be available (RCOM, 2012). For the automotive sector, based on information provided in the Annex XV dossier (2011), there seem to be efficient substitutes already on the market. For the coil coating sector, alternatives seem to be available for indoor applications while for outdoor applications (in harsh weathering conditions, e.g. coastal areas) the corrosion protection performance of chromate-free primers is considered insufficient. Extensive test programmes to replace chromates in all types of products are on-going (RCOM, 2012).

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.

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

Prioritisation

The volume of strontium chromate supplied to uses in the scope of authorisation is high. Uses of the substance take place at a high number of industrial sites but also in workshops during vehicle and equipment repair and refurbishing activities. Although exposure of workers might be controlled in most industrial applications, there is potential for significant worker exposure, in particular during repair and refurbishing activities.

Verbal-argumentative approach

On the basis of the criteria, strontium chromate has high priority.

Scoring approach

Score			Total Score
Inherent properties (IP)	Volume (V)	Uses - wide dispersiveness (WDU)	(= IP + V + WDU)
Sore: 1 Art. 57 (a); Carc 1B	Score: 7 High volume allocated to uses in the scope of authorisation (1,000 – 10,000 t/y)	Overall score: 3 * 3 = 9 Site-#: 3 Used at a high number of sites (>100) Release: 3 Although exposure of workers might be controlled in most industrial applications, there is potential for significant worker exposure, in particular during repair and refurbishing activities.	17

Conclusion, taking regulatory effectiveness considerations into account

On the basis of the prioritisation criteria, strontium chromate gets high priority for inclusion in Annex XIV. There are other chromium (VI) compounds on the Candidate List, such as potassium hydroxyoctaoxodizincatedichromate and pentazinc chromate octahydroxide, which could be replaced by strontium chromate in (some of) their uses (and vice versa).

Therefore, it is proposed to recommend strontium chromate for inclusion in Annex XIV.

4. References

Annex XV (2010) – Chromium trioxide. Proposal for identification of a substance as a Category 1A or 1B CMR, 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

Annex XV (2011) – Strontium chromate. Proposal for identification of a substance as a Category 1A or 1B CMR, PBT, vPvB or a substance of an equivalent level of concern. Submitted by France, February 2011.

http://echa.europa.eu/documents/10162/13640/svhc_axvrep_fr_cmr_srcro4_publ_en.pdf

RCOM (2011) – "Responses to comments" documents. Document compiled by the French CA from the commenting period 21/02/2011 - 07/04/2011 on the identification of strontium chromate as SVHC.

http://echa.europa.eu/web/guest/identification-of-svhc

RCOM (2012) – "Responses to comments" document. Document compiling comments and respective answers from commenting period 20/06/2012 – 19/09/2012 on ECHA's draft 4th recommendation of priority substances for inclusion in the list of substances subject to authorisation (Annex XIV).

http://echa.europa.eu/documents/10162/13640/axiv_4th_recommendation_chromiumvi_substances_rcom_en.pdf