

1 June 2009

Background document for cobalt dichloride

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

1. Identity of the substance

Chemical name:	cobalt dichloride
EC Number:	231-589-4
CAS Number:	7646-79-9
IUPAC Name:	cobalt (2+) dichloride

2. Background information

2.1. Intrinsic properties

Cobalt dichloride was identified as a Substance of Very High Concern (SVHC) pursuant to Article 57(a) as it is classified as Carcinogenic Category 2¹ and was therefore included in the candidate list for authorisation following ECHA's decision ED/67/2008 on 28 October 2008.

2.2. Imports, exports, manufacture and uses

2.2.1. Volume(s), imports/exports

According to consultation with industry the European manufacturing of cobalt dichloride was 10,000 t in 2007. Both import and export reached 60 t in 2006 (Entec, 2008).

2.2.2. Manufacture and uses

2.2.2.1. Manufacture and releases from manufacture

According to the available information, the manufacture of cobalt dichloride in the EU takes place at five sites.

¹ This document refers (here and in its other parts) to classification in accordance with Directive 67/548/EEC to keep the references in line with the entry in the published Candidate list. ECHA will update the Candidate list to follow the CLP Regulation ((EC) No 1272/2008) in future.

The total EU emissions from the manufacturing of CoCl_2 are estimated as 45.8 t/y to waste water and 0 t/y to air, based on emission factors from TGD (2003) (Entec, 2008).

2.2.2.2. Uses and releases from uses

The main use of cobalt dichloride is as an intermediate, accounting to 99% of all uses in the EU according to information provided by the Cobalt Development Institute (CDI) (Entec, 2008).

Of the 10,000 t/y of cobalt dichloride supplied, 88% is used as intermediate in the synthesis of other inorganic cobalt compounds (e.g. cobalt dihydroxide, cobalt oxalate). For the majority of these uses (approximately 95%), the cobalt dichloride is used as an on-site isolated intermediate. Another 10% of cobalt dichloride is used as an intermediate in the synthesis of organic cobalt compounds (cobalt carboxylates) either by the manufacturer or by downstream users. Again, cobalt dichloride is either used as an on-site isolated intermediate or as a transported isolated intermediate. Further intermediate uses are the synthesis of vitamin B12 (<1%, i.e. <100 t/y) as well as the synthesis of pigments. (Entec, 2008)

As regards non-intermediate uses, small tonnages may be used for electroplating, animal food and veterinary products². No indicative figures for quantifying these small uses are available, however, including the synthesis of pigments (an intermediate use), these small uses might represent less than 1 % (i.e. <100 t/y) of the total use (Entec, 2008).

Further non-intermediate use of CoCl_2 takes place in humidity indicators used for military purposes³ and in standard solutions to determine colour in liquids⁴. The total volume of CoCl_2 in both of these non-intermediate uses is << 1 t/y (Entec, 2008).

Research is been carried out for use of cobalt salts (and in particular cobalt dichloride) in electrodeposition processes in the aerospace and automotive sectors (Entec, 2008). This research aims at reducing Cr (VI) electroplating by promoting use of cobalt salts. Tonnages used at present in electroplating are not known. However, depending on the outcome of the research, the use of CoCl_2 in electrodeposition processes could be an emerging use.

An overview of the uses is given in Table 1.

² Uses in veterinary products and animal food might be exempted from the authorisation requirement in accordance with Articles 2(5(a)) and 2(5(b)).

³ It should be noted that the use of cobalt dichloride in humidity indicator cards for military purposes may be exempted from REACH by the Member States in accordance with Article 2(3).

⁴ The use of cobalt dichloride in standard solutions to determine colour in liquids can be considered falling under research and development and hence may be exempted from authorisation according to Article 56(3). In addition, the concentration of CoCl_2 in these solutions is < 0.01 %, which is below the lowest concentration limit specified in Annex I of Directive 67/548/EEC resulting in the classification of the preparation as dangerous. Consequently, this use may be exempted from authorisation according to Article 56(5b).

Table 1: Uses of CoCl₂ in EU and downstream uses (Entec, 2008)

Use	Tonnage (t)	Downstream activities	Potential exemptions
Synthesis of inorganic Co compounds	8,800	Cutting tools *	On-site or transported isolated intermediates
Synthesis of organic Co compounds	1,000	Adhesive for tyres, drying agents in paints *	On-site or transported isolated intermediates
Synthesis of vitamin B12	<100	Vitamin B12 *	On-site or transported isolated intermediates Use in medicinal products
Manufacture of pigments	Small #	Textiles *	Use as intermediate for pigment synthesis
Production of veterinary products	Small #	*	Veterinary use
Production of animal food	Small #	*	Use in food or feedstuffs
Electroplating	Small #	*	
Humidity indicator cards	Confidential ##	Export packaging, electronic, military	Military exemptions
Colour standard solutions	Confidential ##	Liquid purity testing	Use in scientific research and development Low concentration

* for these activities, cobalt dichloride is not expected to be present in the final product.

the total tonnage supplied to all these uses together is presumably less than 100 t/y.

the total tonnage supplied to these two uses is << 1 t/y.

No information on releases from non-intermediate uses to the environment is available. Similarly, no information regarding number of workers involved and releases to the working environment is available.

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

As already mentioned above, the manufacture of cobalt dichloride in the EU takes place at five sites in France, Belgium, Finland and the United Kingdom.

There is no information on geographical distribution of the sites where non-intermediate uses not exempted from authorisation requirement take place. However, since these are specialised uses and since only low tonnages are involved, it can be assumed that non-intermediate use takes place only in professional environments at a limited, but unknown number of sites, with presumably small numbers of actors involved.

It can be concluded that the supply chains related to the uses of cobalt dichloride that would be relevant for authorisation seem to be fairly short, not very complicated and associated with a relatively limited number of downstream users.

2.3. Availability of information on alternatives⁵

Consultation with industry (Entec, 2008) regarding alternatives for use of CoCl₂ as humidity indicator showed that alternatives to cobalt dichloride (e.g. other metal salts, such as iron or copper salts, as recommended by France in their Annex XV dossier (Annex XV Dossier, 2008)) did not allow the same range of humidity indication and therefore these substances were not considered to be technically suitable.

According to industry, the only alternative substance identified so far allowing humidity indicator cards to fulfil all quality and performance requirements specified in military and industrial standards is cobalt bromide, which probably has a similar hazard profile to cobalt dichloride.

No alternative substances or techniques to cobalt dichloride have been identified for the other uses (Entec, 2008).

2.4. Existing specific Community legislation relevant for possible exemption

No data available.

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

No data available.

3. **Conclusions and justification**

3.1. Prioritisation

The European production of cobalt dichloride amounted to 10,000 t in 2007. More than 99% of the substance is thought to be used as intermediate in the synthesis of other cobalt compounds and vitamin B12. The quantity supplied to non-intermediate uses is relatively low (<100 t/y).

Non-intermediate uses of cobalt dichloride may take place in electroplating, production of animal food and veterinary products. Confirmed are uses in humidity indicators and as agent to determine colours in liquids. Except of the uses for electroplating and humidity indicators, these uses are exempted from the authorisation requirement. As the humidity indicators are used in the military sector, this use may as well be exempted by Member States in the interest of defence.

No consumer use has been identified for the substance. The uses covered by a potential authorisation requirement (electroplating and humidity indicators) are specialised ones and therefore might take place at a limited (but unknown) number of sites. Because the tonnage used for the humidity indicators is very low and only a limited number of trained persons will come into contact (if at all) with these indicator cards, this use is not considered wide dispersive. As regards electroplating, no

⁵ Please note that this information was not used for prioritisation.

conclusion on the nature of this use can be drawn without supplementary information about releases and more precise information on the tonnage supplied to this use.

The regulatory effectiveness of subjecting the use of the dichloride salt alone to the authorisation requirement can be considered questionable because it might in many cases be easy to bypass the authorisation requirement by replacing the dichloride salt by another cobalt compound with a similar hazard potential.

Therefore, ECHA recommends not to prioritise cobalt dichloride for inclusion in Annex XIV.

3.2. Recommendation for Annex XIV entry

As the substance was not prioritised for inclusion in Annex XIV no recommendation for its Annex XIV entry has been developed.

4. References

TGD (2003): Technical Guidance Document on Risk Assessment in support of Commission Directive 93/67/EEC on risk assessment for new notified substances, Commission Regulation (EC) No. 1488/94 on risk assessment for existing substances and Directive 98/8/EC of the European Parliament and of the Council concerning the placing of biocidal products on the market. 2nd edition. European Commission, Joint Research Centre EUR 20418 EN. European Chemicals Bureau, Ispra, Italy.

Annex XV Dossier (2008): Cobalt dichloride. 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, 2.06.2008.

Entec (2008): Data on manufacture, import, export, uses and releases of cobalt dichloride as well as information on potential alternatives to its use. Report prepared for ECHA.