

## Sweden prepared a restriction report on cadmium and its compounds in artists' paints<sup>1</sup>

### SUMMARY

Sweden has submitted a report proposing a restriction on the placing on the market and use of: cadmium and its compounds in artists' paints covered by TARIC code [3213]<sup>2</sup>; and pigments, covered by TARIC code [3212]<sup>3</sup>, that could be used for the manufacture of artists' paints. Therefore, we would like to call for any information or comment concerning generally cadmium and its compounds in artists' paints or specifically cadmium pigments that could be used for the manufacture of artists' paints.

The reason for the proposed action is a concern for cadmium intake via food. The report states the margin between the average weekly intake of cadmium from food by the general population and the health-based guidance values to be too small. The reduction in the cadmium intake is explained to lead to a reduction in the number of fractures affecting women and men over 50 years of age, and in the number of women over 50 afflicted with breast cancer. Several other possible negative health effects of cadmium exposure via food are mentioned, however, those have not been quantified in this report.

During use and cleaning procedures cadmium based artists' paints are released to the waste water. When the resulting sewage sludge is applied as fertiliser in the agriculture, the cadmium compounds used in artists' paints will eventually end up in the foodstuffs. Cereals and root vegetables contribute the most to the general population exposure to cadmium via food.

The report argues that overall, the proposed restriction is effective and practical and that the restriction would effectively reduce the emissions from artists' paints with benefits to society. The monetary costs of this restriction option are told likely to be small or negative.

ECHA today opens the public consultation on this restriction report, which will end on 19 September 2014. However, ECHA's Committees on Risk Assessment (RAC) and Socio-economic Analysis (SEAC) would welcome any earlier comments by 29 May 2014 to assist them in the first discussion of the restriction proposal in the committee's meetings of June 2014.

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<sup>1</sup> The information note has been prepared based on the Annex XV report submitted by Sweden.

<sup>2</sup> Taric code [3213] - ARTISTS', STUDENTS' OR SIGNBOARD PAINTERS' COLOURS, MODIFYING TINTS, AMUSEMENT COLOURS AND THE LIKE, IN TABLETS, TUBES, JARS, BOTTLES, PANS OR IN SIMILAR FORMS OR PACKINGS.

<sup>3</sup> Taric code [3212] - PIGMENTS (INCLUDING METALLIC POWDERS AND FLAKES) DISPERSED IN NON-AQUEOUS MEDIA, IN LIQUID OR PASTE FORM, OF A KIND USED IN THE MANUFACTURE OF PAINTS (INCLUDING ENAMELS); STAMPING FOILS; DYES AND OTHER COLOURING MATTER PUT UP IN FORMS OR PACKINGS FOR RETAIL SALE

## **SUGGESTED RESTRICTION**

The proposed restriction concerns placing on the market and use of cadmium and its compounds in artists' paints, TARIC code [3213] and pigments TARIC code [3212] that could be used for the manufacture of artists' paints. An exemption on restoration and maintenance of works of art and historic buildings and their interior with reference to cultural-historical values from the restriction is proposed. A transitional period of 1 year after entry into force of the restriction is proposed.

The restriction report in B.1.1 underlines that due to the large number of CAS numbers and synonyms of cadmium pigments it is important not to exclude any compounds by limiting the proposal to only cover a few most commonly used cadmium pigments today.

Compared to the current restriction in REACH Annex XVII, Entry 23, the proposed modification would extend the coverage of the entry by proposing two additional TARIC codes to be included in the restriction and by proposing a restriction on the placing on the market.

## **CADMIUM COMPOUNDS IN ARTISTS' PAINTS**

Naturally-occurring cadmium-sulfide based pigments were used as early as 1850 because of their brilliant red, orange and yellow colors, and appeared prominently in the paintings of Vincent Van Gogh in the late 1800s.

The pigments are based upon cadmium sulphide which produces a golden yellow pigment. Cadmium pigments are stable inorganic colouring agents which can be produced in a range of brilliant shades of yellow, orange, red and maroon. The report explains their greatest use to be in plastics but they also have significant application in ceramics, glasses and specialist paints. Cadmium zinc sulphide and cadmium sulphoselenide are used as bright yellow to deep red pigments in plastics, ceramics, glasses, enamels and artists colours.

Cadmium pigments are characterised by their particular brilliant shades, high hiding power, good intensities of colour, good temperature stability (up to 600 °C) and absolute migration resistance.

The cadmium compounds most frequently used in artists' paints are cadmium sulphoselenide red, cadmium sulphoselenide orange and cadmium zinc sulphide yellow. However, other combinations exist.

The report says alternative substances to be available, and that cadmium based pigments are mainly substituted by organic pigments. The alternatives are reported to be generally less costly per volume unit but require larger volumes than cadmium based paints.

## **REASONS FOR ACTION**

During use and cleaning procedures, cadmium based artists' paints are released to the waste water. At the waste water treatment plant (WWTP) the cadmium pigments will predominantly end up in the sewage sludge, which is then applied as fertiliser in agricultural activities. The report explains that the cadmium compounds used in artists' paints will eventually dissolve in the soil and hence there is a potential crop uptake and therefore exposure to humans via food.

The general population in Europe are exposed to levels of cadmium that, already today, may cause effects on kidney and bone for a significant part of the population. According to the report the margin between the average weekly intake of cadmium from food by the general population and the health-based guidance values is too small. Cereals and root vegetables contribute the most to the general population exposure to cadmium via food.

The toxicity of all cadmium compounds is related to the  $\text{Cd}^{2+}$  ion. For long-term effects, also less soluble cadmium compounds can contribute to the pool of cadmium that humans are exposed to. The biological half-life of cadmium in humans is extremely long (10-30 years). This means that most toxic effects occur in the later part of life, when the body burden of cadmium has reached a critical level and these are in practice irreversible due to a continued internal exposure. Cadmium is further considered to cause cancer. In the general population increased risks have mainly been shown in hormone-related organs, such as breast, endometrium and prostate.

## CONSEQUENCES OF THE ACTION

The report argues that the proposed restriction will lead to a reduction in cadmium intake via food which in turn will lead to a reduction in the number of fractures affecting women and men over 50 years of age, and in the number of women over 50 afflicted with breast cancer. The effects on fracture and breast cancer cases in the EU 27 from a full restriction on the use of cadmium based artists' paints will grow linearly from zero at the time of implementation to the following levels after 150 years:

- Female fractures: 47 fewer cases/year
- Male fractures: 13 fewer cases/year
- Breast cancers: 16 fewer cases/year

The socio-economic benefits of the proposed restriction depend on the time frame chosen for the analysis. The (present value of) annual benefits are continually increasing throughout the 150 years analysed. The cumulative benefits are estimated to be €18 million after 50 years and €113 million after 150 years. This does not take into account other possible negative health effects of cadmium exposure via food – such as kidney damage, endometrial cancer, and developmental neurotoxicity – that have not been quantified in this report.

According to the report, the monetary costs of this restriction option are likely to be small or negative. If expected losses in consumer utility are accounted for, then the quantified economic costs are larger – in aggregate terms – than the estimated benefits for the first 74 years after the restriction is implemented. In the longer term the benefits do however outweigh the cost.

Two Union-wide restriction options analysed in the report differ in two ways. The complete ban in restriction option 1 will cause losses in public good values related to the historical art works in need of restoration and also the value related to the sustenance of historical forms of art. In option 2 (the proposed restriction), an exemption is included to allow for the use of cadmium based artists' paints for the purpose of restoration of pieces of art that are considered to be of cultural-historical value. The exemption would avoid most of the losses in public good values experienced under option 1, but would on the other hand lead to some additional administrative costs. Since the differences in risk reduction, cost, practicality and monitorability is relatively small between the two options,

## **PUBLIC CONSULTATION**

and since an exemption for restorative activities would moderate the losses in public good values associated with a restriction, option 2 is proposed in the report as the risk management option.

### **COMMENTS PREFERABLY BY 29 MAY**

The opinion forming process of RAC and SEAC begins with a public consultation on 19 March 2014. Interested parties can comment on the proposal and the restriction report using the ECHA website. Although the public consultation concludes on 19 September 2014, the rapporteurs of RAC and SEAC would appreciate receiving comments by 29 May 2014 to assist them in the detailed discussion of the restriction proposal in the Committee meetings June 2014.

The opinion of the Committee for Risk Assessment (RAC) is scheduled to be available by 19 December 2014 and of the Committee for Socio-Economic Analysis Socio-economic Analysis (SEAC) by 19 March 2015. ECHA will send these two opinions to the European Commission, which will take the decision whether to include the proposed restriction in Annex XVII of the REACH Regulation.