20 June 2012

Draft background document for arsenic acid

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:	arsenic acid
EC Number:	231-901-9
CAS Number:	7778-39-4
IUPAC Name:	arsenic acid

2. Background information

2.1. Intrinsic properties

Arsenic acid 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 1A[1] (H350: "May cause cancer") and was therefore included in the candidate list for authorisation on 19 December 2011, following ECHA's decision ED/77/2011.

[1] This corresponds to a classification as carcinogen cat. 1 ; 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.

2.2. Imports, exports, manufacture and uses

2.2.1. Volume(s), imports/exports

According to information provided in the registrations the substance is imported in a tonnage of 100 – 1000 t/y. There is no manufacture within the EU.

No information on export is available.

The tonnage allocated to uses in the scope of authorisation is between 100 – 1000 t/y.

2.2.2. Manufacture and uses

2.2.2.1. Manufacture and releases from manufacture

Arsenic acid was manufactured previously but as of June 2011 there is no manufacture in the EU (Annex XV, 2011).

2.2.2.2. Uses and releases from uses

According to information provided in the registrations and in the Annex XV dossier (2011) there are two current uses of arsenic acid:

- Use as fining agent in the manufacture of speciality glass;
- Use in the production of copper foil for printed circuit boards

Both uses are considered to be in the scope of authorisation.

Use #1: Use as fining agent in the manufacture of speciality glass

About 97 % of the total tonnage is used as fining agent in the manufacture of speciality glass for removing bubbles from the glass melt. The addition of arsenic acid releases oxygen late in the fining process which makes the bubbles more easily absorbed by the melt (Annex XV, 2011).

Arsenic acid is used in the industrial Special Glass Sector, in particular in the manufacture of black and white ceramic glass. The available registration data indicate closed processes for the use in glass making (PROC 1 and PROC 3), but also include transfer processes (PROCs 8a and 8b) where the opportunity for exposure could arise.

Although in the registrations considered as use of the substance as an intermediate, this use of arsenic acid rather appears to be as a "processing agent", similar to the use of diarsenic trioxide (As_2O_3) in glass making (Annex XV, 2011; ECHA, 2010).

In glass production arsenic acid has the same function as diarsenic trioxide (As_2O_3), i.e. fining agent. Both substances can and appear to be used interchangeably in the glass sector. For As_2O_3 it was concluded that there seem to be problems regarding occupational exposure control in (parts of) the glass industry although there is uncertainty about the extent[2] (ECHA, 2010). Although no specific information indicating the use of arsenic acid in the artisanal glass sector has been obtained, such use cannot be excluded given the interchangeability of the substances for use as fining agent.

Use #2: Use in the production of copper foil for printed circuit boards

The second known use is in the manufacture of copper foil for printed circuit boards (electronic components sector). The printed circuit boards are used in a variety of electronic equipment.

Arsenic from arsenic acid is present in the final article (not the arsenic acid itself). Release of arsenic from the article is considered insignificant as the surface of the circuit boards is lacquered.

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

Special glass tends to be produced in a few large facilities (Annex XV, 2011). According to industry referenced in the Annex XV (2011) arsenic is used by a limited number of industrial glass manufacturers in the EU. However, it is known that special glass containing arsenic (compounds), e.g. artisan glass, is also manufactured by many smaller manufactories. Although no specific information indicating the use of arsenic acid in the artisanal glass sector has been obtained, this use cannot be excluded since arsenic acid is a suitable fining agent that can be used interchangeably with As_2O_3 in the glass sector.

There are several glass manufacturing facilities across the EU, each with arsenic emissions to the environment in the range from 0.1 to 0.7 t/y. The sources are various arsenic compounds used in the glass making, e.g. arsenic acid and diarsenic trioxide (and possibly others).

Regarding the use in the production of copper foil for printed circuit boards, there is no information on geographical distribution of sites and the supply chain structure available.

[2] About 150 t/y As_2O_3 are used in the glass sector. In the Murano region, about 80 manufactories with ca. 800 – 1,000 workers manufacture arsenic-containing art glass. The annual consumption of As_2O_3 for art glass manufacture is 8.2 t in the Murano district. Extrapolation from Italian data to EU suggests that a considerable number of workers could be exposed and that the use of As_2O_3 for art glass should be considered wide-dispersive.

2.3. Availability of information on alternatives[3]

The following information is taken from the Annex XV dossier (2011). Please refer to this dossier for references cited below.

Glass making

Fining agents
Arsenic acid and diarsenic trioxide are used as fining agents to remove bubbles from the glass melt. Due to concerns over the use of arsenic compounds, there are various other established alternative substances including (RPA, 2009):

· Sodium sulphate (used in lead crystal);
· Antimony trioxide (used in lead crystal);
· Sodium/potassium nitrates with antimony trioxides (used in special glasses);
· Cerium oxide.

The European Glass Industry (CPIV) has for the consultation for diarsenic trioxide highlighted a number of applications where there are technical difficulties in replacing arsenic in special glass (ECHA, 2010a). The industry states that although some glass-ceramic hobs (cooker tops) are now arsenic-free, producing clear glass hobs remains a difficult challenge.

Many of the alternatives to the use of arsenic in glass/enamel processing, e.g. antimony trioxide, may be considered potentially harmful to human health and the environment (ECHA, 2010a).

Production of copper foil

According to the questionnaire response from one manufacturer of copper foil, an alternative to arsenic acid has been tested successfully. The alternative is considered confidential.

According to the manufacturer, no additional work would be needed to develop the alternative, but the alternative has to be further tested by the customers to ensure that the foil comply with the technical requirements. The manufacturer of the foils suggests that the arsenic containing boards could be replaced within a timeframe of 5 years.

2.4. Existing specific Community legislation relevant for possible exemption

There seems to be no specific Community legislation in force that would allow considering the exemption of (categories of) uses from the authorisation requirement on basis of Article 58(2) of the REACH Regulation.

[3] Please note that this information was not used for prioritisation.

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

Not available.

3. Conclusions and justification

3.1. Prioritisation

The volume of the substance supplied to uses in the scope of authorisation is relatively high. Consumer exposure via articles resulting from the uses is considered to be insignificant but there might be potentially significant occupational exposure.

Verbal-argumentative approach

On the basis of the criteria, arsenic acid has a relatively high priority for inclusion in Annex XIV.

Scoring approach

Score			Total Score
Inherent properties (IP)	Volume (V)	Uses - wide dispersiveness (WDU)	(= IP + V + WDU)
Score: 1 Art. 57 (a) Carc 1A	Score: 5 (Relatively high annual volume in the scope of authorisation.)	Overall score: 3 * 3 = 9 Site-#: 3 (Substance used at a high number of sites) Release: 3 (potentially significant worker exposure in parts of the glass industry)	15

Conclusion, taking regulatory effectiveness considerations into account

On the basis of the prioritisation criteria arsenic acid gets relatively high priority for inclusion in Annex XIV.

Arsenic acid can be used to replace As_2O_3 in some of its applications. As_2O_3 has already been included in Annex XIV. This further supports recommending arsenic acid for inclusion in Annex XIV.

Therefore, it is proposed to recommend arsenic acid for inclusion in Annex XIV.

4. References

Annex XV (2011): Arsenic Acid. Proposal for identification of a substance as a Cat 1A or 1B CMR, PBT, vPvB or a substance of an equivalent level of concern. Submitted by Norway, August 2011.

http://echa.europa.eu/documents/10162/8b5f5335-eb8c-42f0-a387-673b495d23aa

ECHA (2010): Background document for Diarsenic trioxide. Document developed in the context of ECHA's second Recommendation for the inclusion of substances in Annex XIV, 17 December 2010.

http://echa.europa.eu/documents/10162/46eb55f6-b2ba-43e6-ad28-3064b89e93a5

RCOM (2011): "Responses to comments" document. Document compiled by the Norwegian CA from the commenting period 29/08/2011 – 13/10/2011 on the identification of Arsenic Acid as SVHC.

http://echa.europa.eu/web/guest/identification-of-svhc/-/substance/333/search/231-901-9/term