

Annex XV dossier

Substance Name: TRIETHYL ARSENATE

EC Number: 427-700-2

CAS Number: 15606-95-8

**PROPOSAL FOR IDENTIFICATION OF A SUBSTANCE
(CARCINOGENIC, CAT 1) AS SVHC**

Submitted by Norway

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Substance Name: Triethyl arsenate

EC Number: 427-700-2

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- *It is proposed to identify the substance (carcinogenic, category 1) according to Article 57 (a).*

Summary of how the substance meets the CMR (Cat 1 or 2), PBT or vPvB criteria, or is considered to be a substance of an equivalent level of concern:

According to the 29th ATP to Directive 67/548/EEC, triethyl arsenate has been classified as a carcinogen Cat 1/ R45: May cause cancer and has been included in the Annex I of the Directive 67/548/EEC.

JUSTIFICATION

1 IDENTITY OF THE SUBSTANCE AND PHYSICAL AND CHEMICAL PROPERTIES

[click here to insert text]

1.1 Name and other identifiers of the substance

Chemical Name: Triethyl arsenate

EC Name: Triethyl arsenate

CAS Number: 15606-95-8

IUPAC Name: Triethyl arsenate

1.2 Composition of the substance

For each constituent/ impurity/ additive, fill in the following table (which should be repeated in case of more than one constituent). The information is particularly important for the main constituent(s) and for the constituents (or impurity) which influence the outcome of the dossier.

Chemical Name: Triethyl arsenate

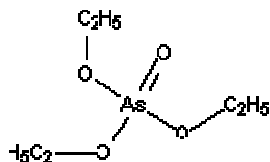
EC Number: 427-700-2

CAS Number: 15606-95-8

IUPAC Name: Triethyl arsenate

Molecular Formula: (C₂H₅O)₃AsO

Structural Formula:



Molecular Weight: 226.102 g/mol

Typical concentration (% w/w):

Concentration range (% w/w):

1.3 Physico-chemical properties

| REACH ref Annex, § | Property | IUCLID section | Value | [enter comment/reference or delete column] |
|---------------------------|---|---------------------------------|--------------|---|
| VII, 7.1 | Physical state at 20°C and 101.3 kPa | 3.1 | liquid | |
| VII, 7.2 | Melting/freezing point | 3.2 | | |
| VII, 7.3 | Boiling point | 3.3 | | |
| VII, 7.5 | Vapour pressure | 3.6 | | |
| VII, 7.7 | Water solubility | 3.8 | | |
| VII, 7.8 | Partition coefficient n-octanol/water (log value) | 3.7 partition coefficient | | |
| XI, 7.16 | Dissociation constant | 3.21 | | |
| | [enter other property or delete row] | | | |

Table 1: Summary of physico- chemical properties

2 MANUFACTURE AND USES

Not relevant for this type of dossier. See section on information on uses and exposure.

3 CLASSIFICATION AND LABELLING

3.1 Classification in Annex I of Directive 67/548/EEC

According to the 29th ATP to Directive 67/548/EEC, triethyl arsenate has been classified as a carcinogen Cat 1/ R45: May cause cancer and then has been included in the Annex I of the Directive 67/548/EEC.

Its Annex I to Directive 67/548/EEC index number is 601-067-00-4

Classification of triethyl arsenate according to Directive 67/548/EEC as:

- Carc. Cat. 1; R45; May cause cancer
- T; R23/25; Toxic by inhalation and if swallowed
- N; R50-53; Very toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment

Safety phrases:

- S53: Avoid exposure - obtain special instructions before use.
- S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S60: This material and its container must be disposed of as hazardous waste.
- S61: Avoid release to the environment. Refer to special instructions/Safety data sheets.

3.2 Self classification(s)

Not relevant

INFORMATION ON USE, EXPOSURE, ALTERNATIVES AND RISKS

1 INFORMATION ON EXPOSURE

Restrictions relating to arsenic compounds in general;

According to Directive 2005/90/EC, the 29th amendment of Council Directive 76/769/EC on Restriction on the Marketing and Use of Certain Substances and Preparation (substances classified as carcinogenic, mutagenic or toxic to reproduction) triethyl arsenate is inserted under point 29-carcinogens category 1. Triethyl arsenate as such and triethyl arsenate in preparations containing 0.1 % or more is prohibited for sale to consumers due to the properties as a substance classified as a carcinogenic substance in category 1.

Existing regulation of arsenic and its compounds in other consumer products is i.a. the cosmetic directive. The use of substances classified as carcinogenic, mutagenic or toxic to reproduction of category 1 and 2 according to Directive 67/548/EEC is prohibited in cosmetic products according to Directive 76/768/EEC concerning cosmetic products. Arsenic and its compounds are listed in annex II (the list of substances which cosmetics must not contain) and must therefore not form part of the composition of cosmetic products. Trace quantities permitted: in cosmetics 5 mg/kg, in toothpaste 0.5 mg/kg (laid down by the Ministry of Health and Care Services (formerly the Ministry of Health and Social Affairs)).

Commission Directive 2006/139/EC amending Council Directive 76/796 /EEC as regards restrictions on the marketing and use of arsenic compounds for the purpose of adapting its Annex I to technical progress. This directive restricts the use of arsenic compounds as biocides for the treatment of wood and lays down rules for the marketing and use of arsenic treated wood.

Annex I to Directive 76/769/EEC, point 20 is replaced by the following:

| | |
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| 20. Arsenic Compounds | <ol style="list-style-type: none"> 1. Shall not be placed on the market or used as substances and constituents of preparations intended for use to prevent the fouling by micro-organisms, plants or animals of: <ul style="list-style-type: none"> — the hulls of boats, — cages, floats, nets and any other appliances or equipment used for fish or shellfish farming, — any totally or partly submerged appliances or equipment; 2. Shall not be placed on the market or used as substances and constituents of preparations intended for use in the treatment of industrial waters, irrespective of their use. 3. Shall not be used in the preservation of wood. Furthermore, wood so treated shall not be placed on the market; 4. However, by way of derogation: <ol style="list-style-type: none"> (a) Relating to the substances and preparations for the preservation of wood: these may only be used in industrial installations using vacuum or pressure to impregnate wood if they are solutions of inorganic compounds of the copper, chromium, arsenic (CCA) type C and if they are authorised in accordance with Article 5(1) of Directive 98/8/EC. Wood so treated shall not be placed on the market before fixation of the preservative is completed. (b) Wood treated with CCA solutions in industrial installations according to point (a) may be placed on the market for professional and industrial use provided that the structural integrity of the wood is required for human or livestock safety and skin contact by the general public during its service life is unlikely: <ul style="list-style-type: none"> — as structural timber in public and agricultural buildings, office buildings, and industrial premises, — in bridges and bridgework, — as constructional timber in freshwater areas and brackish waters e.g. jetties and bridges, — as noise barriers, — in avalanche control, — in highway safety fencing and barriers, — as debarked round conifer livestock fence posts, — in earth retaining structures, — as electric power transmission and telecommunications poles, — as underground railway sleepers. (c) Without prejudice to the application of other Community provisions on the classification, packaging and labelling of dangerous substances and preparations, all treated wood placed on the market shall be individually labelled "For professional and industrial installation and use only, contains arsenic". In addition, all wood placed on the market in packs shall also bear a label stating "Wear gloves when handling this wood. Wear a dust mask and eye protection when cutting or otherwise crafting this wood. Waste from this wood shall be treated as hazardous by an authorised undertaking". |
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| | |
|--|--|
| | <p>(d) Treated wood referred to under point (a) shall not be used:</p> <ul style="list-style-type: none"> — in residential or domestic constructions, whatever the purpose, — in any application where there is a risk of repeated skin contact, — in marine waters, — for agricultural purposes other than for livestock fence posts and structural uses in accordance with point (b), — in any application where the treated wood may come into contact with intermediate or finished products intended for human and/or animal consumption. <p>5. Wood treated with arsenic compounds that was in use in the Community before 30 September 2007, or that was placed on the market in accordance with the rules of this Directive may remain in place and continue to be used until it reaches the end of its service life.</p> <p>6. Wood treated with CCA type C that was in use in the Community before 30 September 2007, or that was placed on the market in accordance with the rules of this Directive:</p> <ul style="list-style-type: none"> — may be used or reused subject to the conditions pertaining to its use listed under point 4(b), (c) and (d), — may be placed on the second hand market subject to the conditions pertaining to its use listed under point 4(b), (c) and (d). <p>7. Member States may allow wood treated with other types of CCA solutions that was in use in the Community before 30 September 2007:</p> <ul style="list-style-type: none"> — to be used or reused subject to the conditions pertaining to its use listed under point 4 (b), (c) and (d), — to be placed on the second hand market subject to the conditions pertaining to its use listed under point 4(b), (c) and (d). |
|--|--|

The marketing and use of biocidal products are also regulated by Directive 98/8/EC concerning the placing of biocidal products on the market. The effect of Directive 98/8/EC read in conjunction with Commission Regulation (EC) No 2032/2003 and amending Regulation (EC) No 1896/2000, is that from 1 September 2006 the placing on the market and the use of biocidal products containing arsenic and arsenic compounds for wood preservation purposes is not possible unless those substances are authorised in accordance with Article 5(1) of Directive 98/8/EC. However, triethyl arsenate will not be evaluated under the Biocidal Products Directive (98/8/EEC), as no data submissions were made within the deadlines set under the Review Program of the Directive. Hence, any potential biocidal use of triethyl arsenate under Annex I of Biocides Directive is not foreseen. In the review of the Biocidal Products Directive, the biocide use of 'non-notified' substances should cease before 1 September 2006. The Biocidal Products directive does, however, not apply to imported preparations that may contain an active biocide substance, if the preparation is not within the definition of a biocidal product, nor does it apply to imported articles treated with a substance as a biocide.

Arsenic compounds are listed in Annex I (list of chemicals subject to export notification procedure) of Council Regulation No (EC) 304/2003, concerning the export and import of dangerous chemicals.

The RoHS directive (Directive 2002/95/EC) on the restriction of the use of certain hazardous substances in electrical and electronic equipment was adopted in January 2003. Member States shall ensure that, from 1 July 2006, new electrical and electronic equipment put on the market does not contain any of the six banned substances: lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE), in quantities exceeding maximum concentration values. The list of the restricted substances can according to article 6 be adapted on the basis of scientific facts and taking the precautionary principle into account. A revision process regarding the RoHS directive has started.

Use of arsenic compounds in general

Inorganic arsenic compounds were widely used as pesticides from the mid 1800s to the mid 1900s and in medicine up to the 1970s. Since then the major use area has been wood preservatives, but this use is now in the process of being phased-out (RoC, 2005).

An impact assessment of a proposal for prohibition on certain hazardous substances in consumer products has been performed (SFT 2007). Identified application areas (or occurrence as impurities) for arsenic and arsenic compounds were:

Arsenic:

Arsenical brass

Ammunition (lead shot)

Arsenic compounds:

- Glass goods (window glass, crystal, lead glass)
- Glass beads for road markings
- Plastic/PVC products (including garden articles, travel/leisure time articles, construction materials and wallpapers)
- Lead accumulators
- Electrical and electronic equipment (EEE).
- Grouts
- Textiles
- Cosmetics
- Ship-bottom paint
- Mineral fertiliser

Arsenic/ arsenic compounds can occur in imported products, especially products based on recycled materials such as glass and plastic. It also appears as impurities in other products, particularly those containing lead (lead shot).

An important current use area of arsenic/arsenic compounds is in electrical and electronic equipment (EEE) .

In electronics, an integrated circuit (also known as IC, microcircuit, microship, silicon chip, or chip) is a miniaturized electronic circuit (consisting mainly of semiconductor devices, as well as passive components) that has been manufactured in the surface of a thin substrate of semiconductor material (Wikipedia, 2008). A “Study on Hazardous Substances in Electrical and Electronic Equipment (EEE), not Regulated by the RoHS Directive” has been carried out by Öko-Institut (2008) an inventory of hazardous substances used in EEE is set up. The inventory is based on declarations provided by suppliers and manufacturers of EEE, existing studies, XRF-analyses and other information. In this context arsenic/arsenic compounds, gallium arsenide and diarsenic trioxide are

listed. Gallium arsenide is used as semiconductor substrate and arsenic compounds may also be used as flame retardants in electronic equipment according to the inventory of Öko-Institut (2008). Indium arsenide and gallium arsenide (GaAs) are important materials in the semiconductor industry due to their superior electronic properties in comparison with the older silicon-based materials according to Bustamante et al., 1997. We have identified that arsenic acid and triethyl arsenate may potentially be used in this industry as well (see reference below and reference in Annex XV document on arsenic acid and its salts).

Use of triethyl arsenate (CAS 15606-95-8)

Triethyl arsenate may potentially be used in the fabrication of integrated circuits (WO, 1999).

Use volumes;

The substance is a new chemical notified according to Directive 92/32/EEC.

No quantities have been reported in the SPIN database (Substances in Preparations In Nordic countries; i.e. Sweden, Denmark, Finland and Norway).

Monitoring;

2 INFORMATION ON ALTERNATIVES

The two sub-sections on alternatives should be used as appropriate

2.1 Alternative substances

2.2 Alternative techniques

3 RISK-RELATED INFORMATION

Information such as PNEC and DNEL values may be useful in priority setting for Annex XIV inclusion.

OTHER INFORMATION

It is suggested to include here information on any consultation which took place during the development of the dossier. This could indicate who was consulted and by what means, what comments (if any) were received and how these were dealt with. The data sources (e.g registration dossiers, other published sources) used for the dossier could also be indicated here.

REFERENCES

Bustamante J.; Dock L.; Vahter M.; Fowler B.; Orrenius S. The semiconductor elements arsenic and indium induce apoptosis in rat thymocytes, in [Toxicology](#), Volume 118, Number 2, 28 March 1997 , pp. 129-136(8).

ECB ClassLab database <http://ecb.jrc.it/classification-labelling/search-classlab/>

ESIS : European Chemical Information System.<http://ecb.jrc.it/esis/>

List of Gases with Quantitative Spectra for ACM 100 (by Chemical Name): http://www.mst-technology.com/pdf/acm100/ACM_100_Gaslist.pdf

Report on Carcinogens, eleventh edition, U.S. Department of Health and Human Services Public Health Service, National Toxicology Program, 2005.

SFT, 2007: Impact assessment of a proposal for prohibition on certain hazardous substances in consumer products.

Substances in Preparations in Nordic Countries database (SPIN)

Wikipedia The Free Encyclopedia, http://en.wikipedia.org/wiki/Main_Page

World Intellectual Property Organization, WO/1999/064780, Chemical delivery system having purge system utilizing multiple purge techniques, 1999.

<http://www.wipo.int/pctdb/en/wo.jsp?IA=US1999012648&DISPLAY=DESC>

Öko- Institut e.V, Institute of applied ecology, Freiburg: http://hse-rohs.oeko.info/fileadmin/user_upload/Documents/RoHS_High_priority_substances_in_EEE.doc.