Position Paper of the European Glass Industry on the Proposed Inclusion of Boron Trioxide on the candidate list for authorization

April 2012

Glass manufacturers support the REACH Regulation and believe that a reduction of the risk associated with worker exposure and the environmental impact of dangerous substances is welcome in the EU Market.

Glass Alliance Europe welcomes the opportunity to provide its contribution to the public consultation on the inclusion of boron trioxide in the candidate list for authorization of the REACH Regulation.

CONTRIBUTION TO THE CONSULTATION PROCESS

Germany submitted to ECHA an Annex XV dossiers for the identification of boron trioxide as a Substance of Very High Concern to be included in the candidate list for authorization. The rationale for this identification is the classification of boron trioxide as toxic for reproduction category 1B in Regulation (EC) No 1272/2008, as amended and adapted to technical and scientific progress by Regulation (EC) No 790/2009.

Notwithstanding the rationale being perfectly in line with the REACH Regulation, the glass industries believe that the introduction of boron trioxide on the candidate list for authorization could lead to future misunderstanding.

The glass industries do not want to engage in any discussion on the right classification of boron trioxide, which is outside of our competence. However, it is very well known that there are still a lot of discussions going on at EU and International level on the correct classification of boron trioxide.

For example Poland has indicated its intention to submit borate reclassification dossiers under CLP. This is based on their review of the data arising from new studies on worker exposure (in China and Turkey) and concluded that a reclassification of these substances is warranted.

Recital (2) of the 30th ATP (Commission Directive 2008/58/EC of 21 August 2008), which added certain borates to the Dangerous Substances Directive as toxic to reproduction category 2 (now 1B) and which was inserted by the European Commission, states that “special attention should be paid to further results of epidemiological studies on the Borates concerned by this Directive including the ongoing study conducted in China”, underlining that some uncertainty is still on the table.

In this context the Glass Industry believes that the introduction of boron trioxide on the candidate list is premature, since it would lead to more damage with “further obligations and cost” for downstream users without generating a “certain” public health benefit.

It should also be considered that the introduction of boron trioxide on the candidate list for authorization would have a negative impact on the downstream production chain by association. This is particularly so for final articles which require boron compounds to be produced, whereby these compounds are consumed in the production process and no longer present in the final article. These products are definitely safe as in the case of borosilicate glass articles, as, for example, pharmaceutical containers and laboratory ware, which are produced using boron compounds, and are today considered as the most inert material from chemical point of view.
To conclude, the Glass Industries believe that before taking any decision concerning the introduction of boron trioxide on the SVHC list, it is necessary to clarify at EU level the classification of boron trioxide and to envisage only after this clarification the possibility of introducing boron trioxide on the candidate list.

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GLASS and REACH REGULATION

The nature of glass

Glass is a substance of variable composition, which for simplicity is expressed by convention in terms of oxide of the constituent elements (SiO₂, Na₂O, CaO, B₂O₃, etc). Although conventionally glass compositions are expressed as oxides of the different elements, glass is a non-crystalline or vitreous inorganic macromolecular structure, which does not show behaviour of the individual different raw materials. The individual raw materials undergo chemical reaction and are transformed into glass.

The raw materials used to manufacture glass react to create a new chemical substance, totally different from the starting materials. Glass is not a mixture of compounds such as metals or oxides. The physico-chemical, toxicological and ecotoxicological properties of the substance glass are totally different from those of the individual raw materials.

Under REACH glass is classified as a UVCB substance (substance of unknown or variable composition, complex reaction products or biological materials – Annex V (11) REACH). It is exempted from the registration requirement under REACH under certain conditions laid down in Annex V (11) REACH.

The function of boron trioxide in the production of glass

Boron trioxide is used as intermediate for the production (synthesis) of borosilicate glass. Borosilicate glass is a UVCB substance used for the manufacturing of glass products that require increased mechanical and chemical resistance and thermal shock resistance, like continuous filament glass fibres, glass wool, domestic glass (cookware), ophthalmic glasses, nuclear shielding protection and special applications.

The flow chart of the production can be described as follows:

Boron trioxide, as all the other raw materials used in the production (synthesis) of glass, reacts with other raw materials (substances) at high temperature to produce the new substance glass. During this process, raw materials form a new random network, where different elements are linked together by oxygen bridges. Boron trioxide is completely consumed during this chemical reaction and no longer contained in the final substance glass.
The general chemical reaction for borosilicate glass can be illustrated by the following simplified formula where glass has the molecular formula \([Si_{(m)}B_{(n)}Na_{(o)}Al_{(p)}....}\):

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aSiO_2 [\text{sand}] + bB_2O_3 [\text{boron trioxide}] + cNa_2CO_3 [\text{soda}] + dAl_2O_3 [\text{alumina}] + .... \rightarrow xSi_{(m)}B_{(n)}Na_{(o)}Al_{(p)}.... O_{(s)} [\text{glass}] + yCO_2 \uparrow + ....
\]

Please note that the composition of glass is expressed by convention as oxides of the elements constituting the network. This does not mean that glass is a mixture of the different oxides.

The physico-chemical properties of the new substance glass (chemical resistance, mechanical resistance, transmittance, colour, etc.) are a function of the composition and the network formed. Different composition leads to different glass chemical structures and consequently different physico-chemical properties of the final product.

The main function of the element boron in a borosilicate glass is to increase the mechanical and chemical resistance and thermal shock resistance of the glass.

**Intermediate status of boron trioxide**

Raw materials that are used in the manufacture of glass meet the definition of transported isolated intermediates as they are produced elsewhere and transformed into a new substance (glass) at the glass manufacturers ‘site.

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**About Glass Alliance Europe**

**Glass Alliance Europe (former CPIV)** is the European Alliance of Glass Industries. It is composed of 19 national glass associations and of the main sectors of the glass industries: container glass, flat glass, special glass, domestic glass and continuous filament glass fibres.

Over Europe the glass industry represents ca. 1.200 companies and about 150.000 workers. The size of the glass companies range from small furnaces (SME) to big multinationals present in several countries.

The European glass industry is very diverse and covers a variety of very different types of products and technologies, investing in research and developing glass products fit for a sustainable, resource-efficient and low-carbon society such as fully recyclable bottles & jars, energy efficient windows, weight-lightening continuous filament glass fibres (CFGF), flaconnage, tableware, optical fibres and special glass (Photovoltaic glass modules, glass for televisions and monitors, lighting glass, optical glass, laboratory and technical glassware, borosilicate and glass ceramic (cookware), etc).

In 2010, total EU-27 glass production reached a volume of more than 34 million tonnes, making the EU-27 the largest glass producer in the world. The production value amounted to ca. € 36 billion.

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