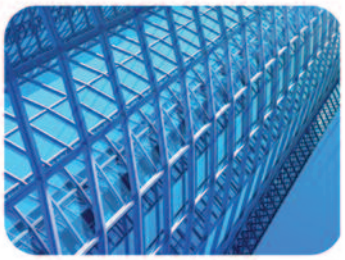






HBCD Factsheet

Brominated Flame Retardant

October 2012

Hexabromocyclododecane

BSEF

Bromine Science and Environmental Forum

HBCD Factsheet

Hexabromocyclododecane

> Introduction

Hexabromocyclododecane (HBCD)[1] is a brominated flame retardant used for many years mainly in thermal insulation foams and in textile coatings. In these applications, HBCD is a unique flame retardant protecting human lives and property from fire.

Summary:

- **HBCD is used in industrial applications with proven socio-economic benefits due to their key role in both fire safety and energy efficiency.**
- **HBCD has undergone an EU scientific assessment which identified no risk to consumers.**
- **At European level, HBCD is currently being reviewed under the REACH procedure. In this context, HBCD has been identified as a Substance of Very High Concern (SVHC)[2] and is subject to the Authorisation procedure (REACH Annex XIV)[3].**
- **HBCD is also being reviewed under the UNEP Stockholm Convention on Persistent Organic Pollutants and the UNECE Convention on Long-Range Transboundary Air Pollution on Persistent Organic Pollutants.**
- **Given the risks identified for the environment, HBCD producers and users are committed to ensuring a responsible use of HBCD and have launched voluntary programmes aiming at controlling and reducing emissions to the environment.**

> Applications and Fire Safety

POLYSTYRENE (PS) INSULATION FOAMS

- HBCD's main use is in Expanded and Extruded Polystyrene (EPS and XPS) insulation foam boards which are widely used by the construction sector.
- EPS and XPS insulation foams play a key role in helping governments meet a significant part of global, regional and national energy efficiency targets.
- In Europe, PS insulation foams are indispensable for the implementation of the EU Directive on energy performance in buildings (2010/31/EU)[4].
- EPS and XPS foams are processed to meet stringent fire safety regulations. The use of flame retarded EPS and XPS insulation foams is essential for achieving these standards in construction.
- HBCD provides a high degree of flame retardancy when used at very low concentrations.
- While alternatives to HBCD in EPS and XPS have been identified, these are at variously advanced development stages. It will take several years before a sufficient volume of HBCD alternatives covering the needs of the market becomes commercially available.

TEXTILES

- HBCD is also applied in the back-coating of textiles, mainly for upholstered furniture.
- It is one of the flame retardant technologies used to meet the highest levels of fire safety required by legislation for furniture and other textile applications in public places in several EU Member States.

HIGH IMPACT POLYSTYRENE (HIPS)

- A minor application of HBCD is in HIPS which is used in electrical and electronic equipment and appliances (e.g. audio visual equipment).

> Health and Environmental Profile

HBCD has undergone an EU Risk Assessment (RA)[5] for environment and human health[6] initiated in 1996 and finalised in May 2008. The RA conclusions identified no risk to consumers, and no risk was found for workers when standard industrial hygiene measures are applied (current EU practice).

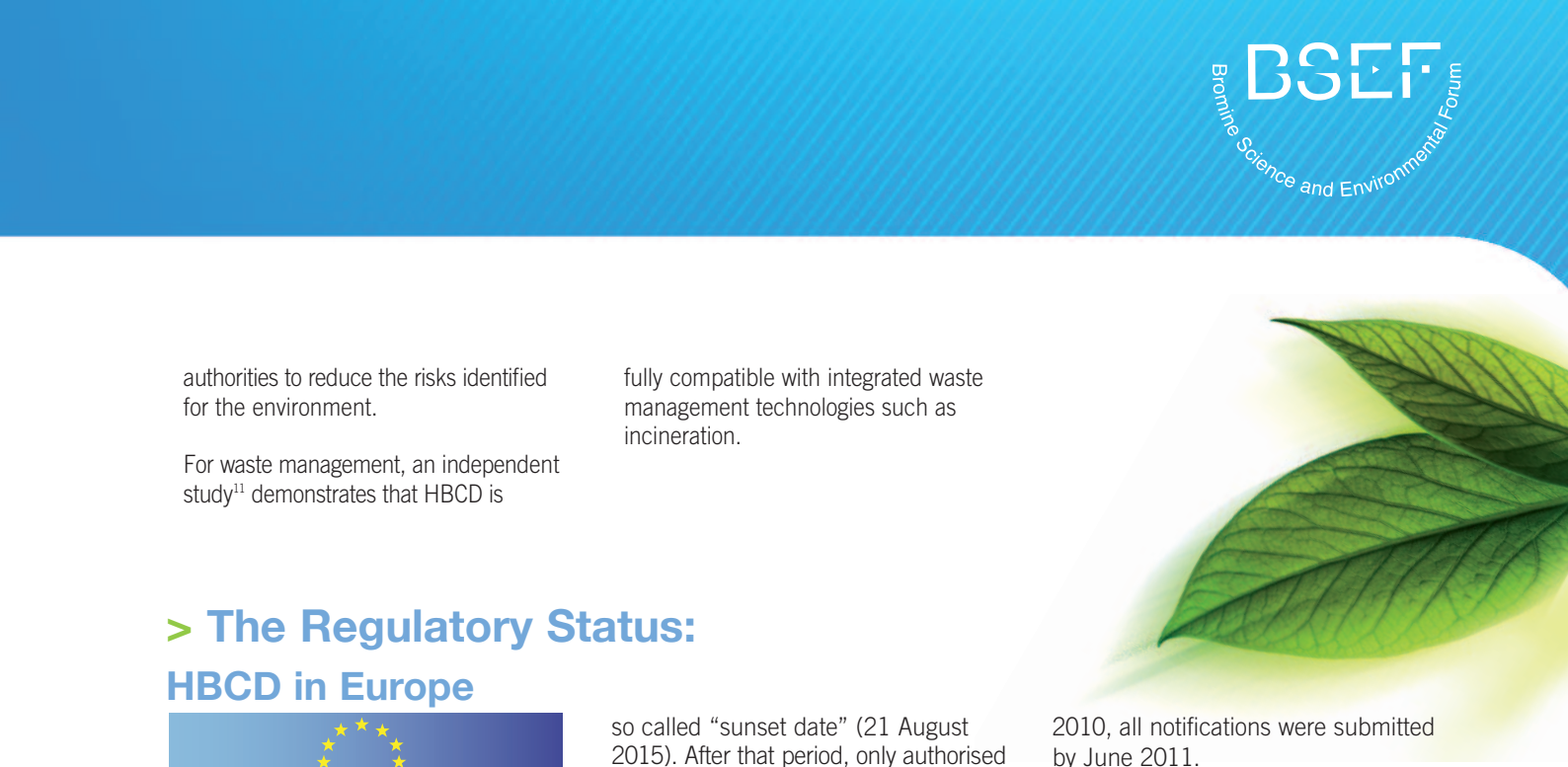
The RA concluded that HBCD has PBT[7] properties, due to the concern linked to the increase of environmental concentrations in past years.

HBCD is classified as H410[8] for risk to the aquatic environment[9], and as category 2 for reproductive toxicity[10].

Given the risks identified for the environment, and in order to ensure a responsible use of the chemical, HBCD producers and users are implementing voluntary programmes to control and reduce emissions to the environment (see section 4). In this respect, the industry is cooperating closely with all the relevant European

authorities to reduce the risks identified for the environment.

For waste management, an independent study[11] demonstrates that HBCD is fully compatible with integrated waste management technologies such as incineration.



> The Regulatory Status:

HBCD in Europe

Based on the conclusions of the Risk Assessment (RA), the Swedish Chemicals Agency (KemI) submitted an Annex XV dossier proposing to include HBCD in the Candidate List for Authorisation under REACH, identifying HBCD as a Substance of Very High Concern (SVHC).

On the basis of ECHA's recommended substances for prioritisation, the European Commission included HBCD in the amended Annex XIV of substances for Authorisation under REACH, published 21 February 2011[12].

According to the amended Annex XIV, applications for Authorisation for the use of HBCD should be submitted by 21 February 2014. If no application for Authorisation of HBCD is made, HBCD can be used until the so called "sunset date" (21 August 2015). After that period, only authorised applications for HBCD will continue to be allowed.

The inclusion of HBCD in Annex XIV does not have any legal impact on the manufacturing and marketing of products containing HBCD until the "sunset date".

Two legal obligations result from the inclusion of a substance on the Candidate List. These obligations are not linked only to the listed substance on its own or in preparations but also to its presence in articles.

Firstly, producers or importers of articles have to notify ECHA if their article contains a substance from the Candidate List no later than 6 months after the inclusion of the substance in the List (art. 7.2 of REACH)[13]. As HBCD was listed in the Candidate List before 1 December 2010, all notifications were submitted by June 2011.

Secondly, the inclusion of a substance in the Candidate List involves a "duty to inform" (art.33 of REACH). In particular, EU and EEA[14] suppliers of beads, insulation foams, textile and plastics containing HBCD must provide sufficient information, available to them, to their customers and on request to a consumer within 45 days of the receipt of this request. This information must ensure safe use of the article and, as a minimum, include the name of the substance.

1 CAS number n° 25637-99-4 and 3194-55-6.

2 Substances identified as SVHC are included in the Candidate List for Authorisation under REACH.

3 Commission Regulation (EU) No 143/2011 of 17 February 2011 amending Annex XIV to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals ('REACH') and Corrigendum to Commission Regulation (EU) No 143/2011 of 17 February 2011 amending Annex XIV to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals ('REACH') (OJ L 44, 18.2.2011).

4 In the EU, almost 40% of the energy consumption goes in cooling and heating in buildings; Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings.

5 Risk Assessment for Hexabromocyclododecane, Final report, May 2008.

6 RA conducted under Council Regulation (EEC) No 793/93 of 23 March 1993 on the evaluation and control of the risks of existing substances. OJ L 84, 5.4.1993, p. 1–75.

7 Persistent, Bioaccumulative and Toxic.

8 H410: Very toxic to aquatic organisms / May cause long term adverse effects in aquatic environment.

9 Risks identified for aquatic (freshwater and marine) and terrestrial compartments, sewage treatment plants and secondary poisoning

10 As per Regulation EC 1272/2008 the classification titles changed for substances as of 1 December 2010, the former category 3 (R50/53) is renamed category 2 (H410). The regulatory status of a category 2 classification for reproductive toxicity today is the same as that of a category 3 classification prior to 1 December 2010.

11 Co-combustion of building insulation foams with municipal solid waste - Summary Report - J. Vehlow, Forschungszentrum Karlsruhe, Institut für Technische Chemie & Bereich Thermische Abfallbehandlung, Franck E. Mark Dow Europe (1996)

12 The amended Annex XIV was published in the European Official Journal on 18 February 2011.

13 Any producer or importer of articles has to notify ECHA if their article contains a substance on the Candidate List. This obligation applies if the substance is present above 0.1% (w/w) and its quantities in the produced/imported articles are above 1 tonne in total per year per company.

14 The European Economic Area (EEA) unites the 27 EU Member States and the three EEA EFTA States (Iceland, Liechtenstein, and Norway.) into an Internal Market governed by the same basic rules.

HBCD in Japan

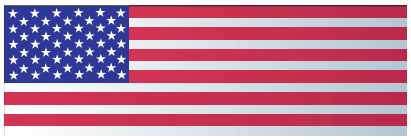
The Law Concerning the Examination and Regulation of Manufacture of Chemical Substances (the Chemical Substances Control Law - CSCL) adopted in the 1970s aims to control and manage the environmental risks posed by any chemicals produced in Japan or imported.

Under the CSCL, HBCD is vPvB (not PBT) and classified as a Type I Monitoring Chemical Substances since September 2004. Such classification requires mandatory reporting to the national authorities of actual quantities of manufacturing, import and uses and, if a certain potential for risk is presented according to preliminary toxicity evaluation by the government, guidance and advice shall be given to businesses on measures for risk reduction to minimise release into the environment.

Studies carried out by the Japanese Environment Ministry in the CSCL framework demonstrate that HBCD emissions are controlled effectively in the EPS and XPS sector. As tests in textiles manufacturing identified potential concern on emissions, the flame retardant industry (FRCJ) established an emission control programme in co-operation with the supply chain (i.e. finishers and home textile manufacturers - NIF).

In Japan, each step of an emissions control programme is reported to the Ministry of Economy, trade and industry (METI) to ensure that CSCL requirements are met. A similar programme was launched in the EPS and XPS sector in early 2006.

HBCD in North America



In the US, a National Academy of Sciences' toxicological study concluded that HBCD was one of the 8 substances that could be used as flame retardant in upholstered furniture to meet the Californian flammability standards[16].

In August 2010, the US Environmental Protection Agency (EPA) published an Action Plan for HBCD which provides an overview of activities that could be undertaken to manage potential risks from the use and production of HBCD.

Within this context, in March 2012 the EPA proposed a Significant New Use Rule covering the use of HBCD in textiles. A final rule is expected by end 2012. Furthermore, under the US Environmental Protection Agency programme Design for the Environment a review of HBCD and its alternatives for use in polystyrene foam was launched; this should be finalised in end 2012.

In Canada, a risk assessment of HBCD is ongoing and a final risk management evaluation is expected to be published by the end of 2013.

HBCD at UN level

HBCD is currently being reviewed under two parallel regulatory processes at UN level: the UNECE[17] Convention on Long-range Transboundary Air Pollution (LRTAP)[18] and the UNEP[19] Stockholm Convention on Persistent Organic Pollutants[20] (POPs).

The decision on a potential listing of HBCD will be taken at the earliest in end 2012 at UNECE level and mid-2013 at UNEP level. As theses process are not finalised yet, there is no legal implication for the manufacturing and marketing of HBCD containing products so far.

Industry will continue to participate actively in the regulatory process at both the UNECE and UNEP levels.

> Voluntary programmes to control and reduce emissions of HBCD into the environment

- HBCD producers and users are committed to control and reduce emissions both at production site and downstream users' level.
- Since 2006, the use of HBCD is covered by two voluntary emission management programmes.
  - VECAP[21] is addressed to producers and downstream users. The programme involves the possibility of a certification procedure based on ISO 9001 and 14001 principles.
  - SECURE[22] is addressed to downstream users in the EPS and XPS (PlasticsEurope and EXIBA[23]) sector. PlasticsEurope and EXIBA members that committed to SECURE represent 95% of the total HBCD consumption of PlasticsEurope and EXIBA.

■ As a result of the implementation of best practices through VECAP and SECURE, potential emissions of HBCD to the environment have been reduced by 80% since 2008.

■ More specifically, the 2011 VECAP report demonstrates a reduction of 11% in the potential emissions of HBCD to the environment compared to 2010, while at the same time the total sales volume covered by the programme increased[23].

■ Within the context of these programmes, a "Code of Good Practice" was developed to support users in their effort to reduce emissions, including advice on the best ways to store, handle and use products and waste.

VOLUNTARY MEASURES UNDERTAKEN AT THE SOLE PRODUCTION PLANT IN EUROPE

■ HBCD is produced in one European plant located in the Netherlands. Under the VECAP framework, this HBCD production plant uses state of the art technology and has developed methods to control air, water and solid waste emissions:

- Air emissions from production units are captured by a dust filter and catalytic burner.
- Wastewater from the production process is treated at the plant by an advanced wastewater treatment facility including filtration, active carbon treatment and bio membrane reactor, resulting in effluents that can be safely discharged.
- Organic waste is treated on site in a state-of-the-art hazard waste incinerator specially designed for high bromine content waste. This process allows the plant to recover bromine from all waste and reuse it for production of HBCD. The plant has been certified under VECAP since 2009.

VECAP (Voluntary Emissions Control Action Programme) for textile applications

■ In 2006, VECAP was extended to HBCD emissions from the textiles sector in Europe. Since then, HBCD users who represent more than 90% of the HBCD volume supplied by BSEF member companies in the EU have signed up to VECAP[25].

In 2007, the VECAP and SECURE programmes combined forces to identify and adopt common methodologies.

CHALLENGES AHEAD

■ Industry's aim is to ensure that all European users of HBCD are covered by VECAP or SECURE.

■ Both VECAP and SECURE are based on the continuous improvement principle. As such, actions are undertaken to identify sources of emissions and share best practices to minimise HBCD losses in plant. For example, residues in empty bags were identified as a possible source of emission and consequently a best available technology for emptying bags was developed and communicated to downstream users[26].

[16] "Toxicological Risks of Selected Flame-Retardant Chemicals", Subcommittee on Flame-Retardant Chemicals Committee on Toxicology, Board on Environmental Studies and Toxicology, Commission on Life Sciences, National Research Council, National Academy Press, Washington, D.C., 2000.

[17] UNECE: United Nations Economic Commission for Europe.

[18] The Convention on Long-range Transboundary Air Pollution was signed in 1979 and entered into force in 1983, under the auspices of UNECE to reduce and prevent long-range transboundary air pollution.

[19] UNEP: United Nations Environment Programme

[20] The Stockholm Convention on POPs is an international agreement signed in 2001 – entered into force in 2004 - under the auspices of the United Nations Environment Programme (UNEP) to restrict and eliminate POPs.

[21] Voluntary Emissions Control Action Programme: www.vecap.info

[22] Self Enforced Control of Use to Reduce Emissions

[23] PlasticsEurope (www.plasticseurope.org) and EXIBA (www.exiba.org) are CEFIC sector Groups.

[24] Sustainable Improvement: European Annual Progress Report 2011 – VECAP. Published March 2012 http://www.vecap.info/flipbook/vecap-sustainable-2/HTML/index.html#/1/

[25] All VECAP reports are available here: http://www.vecap.info/publications-2/

[26] See factsheet on "Best Available Technique for Emptying Bags containing BFRs" available at www.bsef.com.

For further information on Brominated Flame Retardants, please visit:

www.bsef.com

BSEF is the international organisation of the bromine chemical industry, whose remit is to inform stakeholders and commission science on brominated chemicals such as flame retardants

Secretariat
37 Square de Meeûs
1000 Brussels
Belgium
Tel. +32 2 733 93 70
Fax. +32 2 735 60 63
E-mail: mail@bsef.com