

FACT sheet

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HBCD

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 used to protect 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.
- 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.
- Given the risks identified for the environment, HBCD producers and users are committed to ensure a responsible use of HBCD and launched voluntary programmes aiming at controlling and reducing emissions into 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 contribution in helping governments to 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 (2002/91/EC)³.

■ 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.

■ HBCD has currently no technically and commercially feasible alternative for EPS and XPS applications despite intensive research.

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) for environment and human health⁴. The Swedish government was assigned as the lead (rapporteur).

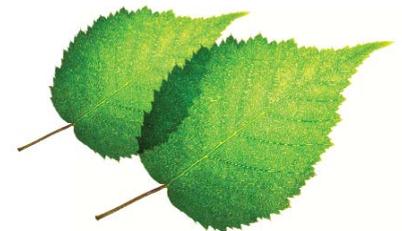
■ The RA was initiated in 1996 and was finalised in May 2008. The RA conclusions identified no risk to consumers. Furthermore, no risk was found for workers when standard industrial hygiene measures are applied (current EU practice).

■ The RA concluded that HBCD has PBT⁵ properties, due to the concern

linked to the increase of environmental concentrations in past years.

■ Due to the identification of several specific risks to the aquatic environment⁶, HBCD was classified as R50/53⁷.

■ 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 last section). 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 study⁸ demonstrates that HBCD is fully compatible with integrated waste management technologies such as incineration.

⁰¹ CAS number n° 25637-99-4 and 3194-55-6.

⁰² Substances identified as SVHC are included in the Candidate List for Authorisation under REACH.

⁰³ In the EU, almost 40% of the energy consumption goes in cooling and heating in buildings.

⁰⁴ 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.

⁰⁵ Persistent, Bioaccumulative and Toxic.

⁰⁶ Risks identified for aquatic (freshwater and marine) and terrestrial compartments, sewage treatment plants and secondary poisoning

⁰⁷ R50/53: Very toxic to aquatic organisms / May cause long term adverse effects in aquatic environment.

⁰⁸ 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)

> The regulatory status

HBCD IN EUROPE



■ As of June 2008, HBCD has entered a screening procedure under the new legislation REACH⁹.

■ In this context, the ECHA¹⁰'s Member States Committee¹¹ agreed to include HBCD in the candidate list for Authorisation¹² under REACH. This decision follows a proposal¹³ presented by the Swedish Chemicals Agency (KemI) identifying HBCD as a substance of very high concern (SVHC) and based on the Risk Assessment Report which concluded that HBCD is a PBT¹⁴ substance.

■ In May 2009, HBCD has been included in the ECHA recommendation list of priority substances to be subject to Authorisation under REACH.

■ On 1st June 2009 ECHA's recommendation list has been sent to the Commission, that will take the final decision on which substances should be submitted to Authorisation at this stage.

■ 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, any producer or importer of an article containing HBCD has to notify

ECHA of the presence of HBCD by June 2011 (art. 7.2 of REACH)¹⁵.

■ Furthermore, the inclusion of a substance in the candidate list involves a "duty to inform" (art.33 of REACH). In particular, EU and EEA¹⁶ 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.

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 April 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 VECAP 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 standards¹⁷.

■ Furthermore, the US Environmental Protection Agency has launched a review of HBCD that should be finalised in 2012.

■ In Canada, a risk assessment of HBCD is ongoing and a final draft is expected to be published in 2009.

⁹ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

¹⁰ The European Chemicals Agency (ECHA) is in charge of managing the registration, evaluation, authorisation and restriction processes for chemical substances to ensure consistency across the European Union.

¹¹ According to Regulation (EC) 1907/2006, one of the primary tasks of the Member State Committee is to seek agreement on the identification of substances to be included on the candidate list for eventual inclusion in Annex XIV (list of substances subject to Authorisation) (Art. 59(7-8))

¹² REACH Annex XIV

¹³ Annex XV Dossier

¹⁴ See note 5

¹⁵ 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.

¹⁶ 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.

¹⁷ "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.

> 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.

• VECAP¹⁸, is addressed to producers and downstream users. The programme involves the possibility of a certification procedure based on principles that are equivalent to those in ISO 9001 and 14001.

• SECURE¹⁹ is addressed to downstream users in the EPS and XPS sector.

■ 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 which is located in the Netherlands. Under the framework of VECAP this HBCD production plant has developed methods and use state of the art technology 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.

• These measures have resulted in a reduction in 2008 of total HBCD emissions to less than 2 kg per year, a negligible quantity.

■ The plant has been audited and certified under VECAP in 2009.

VOLUNTARY PROGRAMMES IMPLEMENTED FOR HBCD DOWNSTREAM USERS

SECURE (Self Enforced Control of Use to Reduce Emissions) for EPS and XPS insulation foams applications.

■ In 2006, the bromine industry together with EPS and XPS insulation foams producers (PlasticsEurope and EXIBA²⁰) committed to reduce emissions to the environment through a voluntary emissions reduction programme, SECURE.

■ PlasticsEurope and EXIBA members that committed to SECURE represent 95% of the total HBCD consumption of PlasticsEurope and EXIBA.

VECAP (Voluntary Emissions Control Action Programme) for textile applications

■ In 2004, the BSEF member companies launched VECAP for Deca-BDE in order to manage, monitor and minimise industrial emissions into the environment through a partnership with the supply chain including Small and Medium-sized Enterprises (SMEs)²¹.

■ In 2006, VECAP was extended to HBCD emissions from the textiles sector in Europe. Since then, HBCD users representing more than 87% of the HBCD volume supplied by BSEF member companies to the textiles sector in the EU signed up to VECAP.

CHALLENGES AHEAD

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

■ Both SECURE and VECAP 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 have been identified as a possible source of emission and consequently a best available technology for emptying bags was developed and communicated to downstream users²².

¹⁸ Voluntary Emissions Control Action Programme: www.vecap.info

¹⁹ Self Enforced Control of Use to Reduce Emissions

²⁰ PlasticsEurope (www.plasticseurope.org) and EXIBA (www.exiba.org) are CEFIC sector Groups.

²¹ Further information including the VECAP Annual Progress Reports is available at www.vecap.info.

²² 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