EBP

1,1'-(ethane-1,2-diyl)bis [pentabromobenzene], or "EBP" is a flame retardant used in Europe in particular for plastic and textile applications to meet fire safety regulations (e.g. in transport, furnishing, E&E equipment and construction).

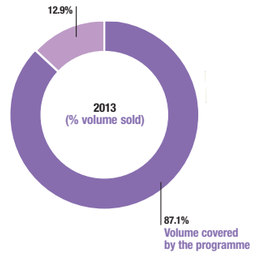
FIGURE 18: EBP 2013 survey results

FIGURE 18: EBP 2013 survey results

Survey year	2013
Total Volume Sold the previous year (metric tonnes per year)	0-2500
Total Potential Emissions (metric tonnes per year)	< 0.3

Total potential emissions of less than 0.3 metric tonnes in a tonnage band of 0 to 2500 metric tonnes sold proves that participants are already keen to commit to and implement the programme's best practices.

FIGURE 19: Percentage of volume covered by the programme



Participation rate was already high covering 87.1% of the total volume sold by EFRA member companies

TBBPA

Tetrabromobisphenol A (TBBPA) is applied to improve fire safety, mainly in electrical and electronic equipment. It is used in more than 80% of cases in reactive applications such as flame retardant-4 printed circuit boards, the most commonly used board in electronic devices.

FIGURE 13: TBBPA 2013 survey results

Survey year	2008	2009	2010	2011	2012	2013
Total Volume Sold the previous year (metric tonnes per year)	2500-5000	2500-5000	1000-2500	1000-2500	1000-2500	1000-2500
Total Potential Emissions (metric tonnes per year)	< 1	< 0.25	< 0.5	< 0.005	< 0.003	< 0.002

Total potential emissions dropped to less than 0.002

FIGURE 14: Percentage of volume covered by the programme

Participation rate remained high with 93% of the total volume covered

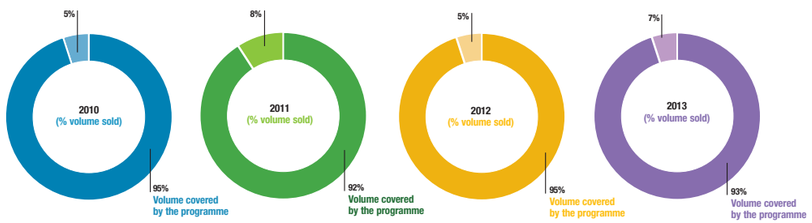
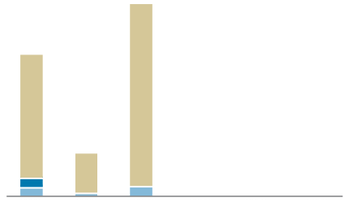


FIGURE 15: Comparative TBBPA survey results (2008-2013) by emission type (g/t)



	2008	2009	2010	2011	2012	2013
Potential Emissions to Land	175 g/t	58 g/t	259 g/t	0 g/t	0 g/t	0 g/t
Potential Emissions to Water	14 g/t	0.1 g/t	0.2 g/t	0.2 g/t	0.2 g/t	0.01 g/t
Potential Emissions to Air	10 g/t	2 g/t	12 g/t	1 g/t	1 g/t	0.6 g/t

Potential emissions to air and land have been maintained at the owest achievable level when VECAP techniques apply

VISION FOR THE FUTURE

2014 marks the 10th anniversary of the start of the VECAP programme with a substantial success in the reduction of potential emissions to air, water and land of the brominated flame retardants covered. The increase in the volume covered by the programme and the inclusion of EBP as a new substance reported shows the significant commitment of industry to take responsibility for environmental concerns. This year's positive results confirm the high achievements of the programme and encourage potential improvements in the future.

The VECAP team will continue to focus on the distribution network to enhance collaboration with second-line users and on the expansion of the programme to involve new suppliers and cover new substances. The team will also continue to actively promote the extension of the scheme to other regions of the world.

FOR FURTHER INFORMATION

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VECAP™

The Voluntary Emissions Control Action Programme

Sound results from a proactive industry

EUROPEAN ANNUAL PROGRESS REPORT 2013

The Voluntary Emissions Control Action Programme (VECAP)[1], a successful environmental management initiative, is run by the European Flame Retardants Association (EFRA)[2] under the principles of Responsible Care®[3]. This pioneering product stewardship scheme was established in 2004 by the three main producers of flame retardants[4] and the UK Textile Finishers Association (TFA) in partnership with their users in order to ensure the environmentally sound management of chemicals through the value chain.

THE PROGRAMME

VECAP aims to reduce the potential for emissions of flame retardants during the manufacturing stage by promoting environmental good practice among producers and downstream users. The programme reduces emissions to the environment by:

- **Increasing understanding of chemicals management in the value chain**
- **Promoting and facilitating open and constructive dialogue with industry, regulators and other stakeholders**
- **Raising awareness among all those involved throughout the process, from site personnel to company top management**
- **Applying and promoting best practices identified through the programme**

2013 RESULTS

The 2013 survey results show that VECAP remains an integral part of environmental best practices among those companies committed to the programme. Participation in the scheme continues to be high; reporting covers 93% of the total volume of four brominated flame retardants sold in common by EFRA member companies. The VECAP team continues to make steady progress with improvements to the programme and in raising awareness of environmental management among users.

Potential emissions of the three flame retardants surveyed over the course of several years declined and in most cases reached default levels, meaning that potential emissions are at the lowest level achievable by applying the Best Available Techniques described in the VECAP tools. This was the case for potential emissions to air and water for Deca-BDE, while the survey results reported zero emissions to land for HBCD, demonstrating that it is possible for the programme to help users reduce emissions to land completely.

First time reporting of flame retardant EBP revealed that potential emissions to water and air are at default values, those obtained when VECAP best practices are applied, indicating that best practices are already being introduced. The VECAP team will work closely with new users to encourage the uptake of best practices for packaging waste disposal in order to ensure that potential emissions from this source are addressed going forward. Participation in the programme was already high among EBP users, covering 87.1% of the volume sold and sets a good starting point for implementation and future reporting.

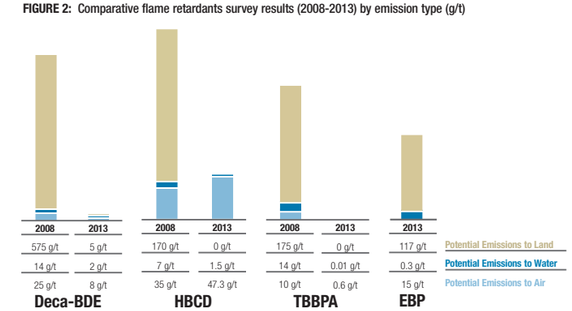
Although brominated flame retardants supplied by non-EFRA members cannot be included in this report, it is reasonable to assume that users who procure volumes from different sources will also handle these materials with the same best practices as those supplied by EFRA member companies. In 2012, Everkem[5], an EFRA member supplying brominated flame retardants based in Italy, committed to joining the VECAP programme. The company is planning to promote best practices among users in order to carry out surveys to report in 2014.

The low overall potential emissions from the four brominated flame retardants covered in the 2013 survey confirms that it is possible for the programme to help users improve their environmental management.

FIGURE 1: 2013 survey results for the four Brominated Flame Retardants

	Total Volume Sold the previous year (metric tonnes per year)	Total Potential Emissions (metric tonnes per year)
Deca-BDE	2500-5000	< 0.1
HBCD	10000-12500	< 0.5
TBBPA	1000-2500	< 0.002
EBP	0-2500	< 0.3

FIGURE 2: Comparative flame retardants survey results (2008-2013) by emission type (g/t)



	Deca-BDE 2008	Deca-BDE 2013	HBCD 2008	HBCD 2013	TBBPA 2008	TBBPA 2013	EBP 2013
Potential Emissions to Land	575 g/t	5 g/t	170 g/t	0 g/t	175 g/t	0 g/t	117 g/t
Potential Emissions to Water	14 g/t	2 g/t	7 g/t	1.5 g/t	14 g/t	0.01 g/t	0.3 g/t
Potential Emissions to Air	25 g/t	8 g/t	35 g/t	47.3 g/t	10 g/t	0.6 g/t	15 g/t

1 Voluntary Emission Control Action Programme www.vecap.info

2 EFRA is a sector group of the European Chemical Industry Council (CEFIC) www.flameretardants.eu

3 Responsible Care® is the global chemical industry's unique initiative to improve health, environmental performance, enhance security, and to communicate with stakeholders about products and processes www.cefic.org/Responsible-Care

4 Albemarle, Chemtura, ICL-IP www.albemarle.com, www.greatlakes.com, www.icl-ip.com

5 Everkem www.everkem.com

DECA -BDE

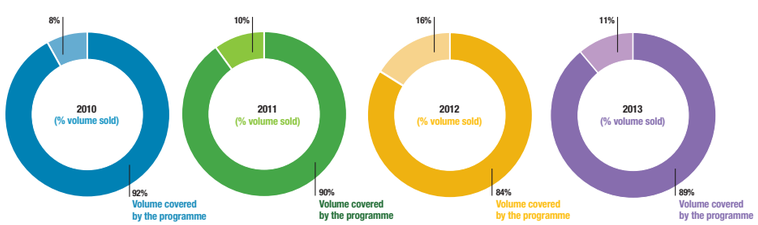
Decabromodiphenyl ether (Deca-BDE) is a highly effective brominated flame retardant which increases resistance to fire and allows more time to escape. It is used to prevent fires in textiles, in the transportation sector (e.g. automotive and aviation industries) and in construction and building (e.g. wires, cables and pipes).

FIGURE 3: Deca-BDE 2013 survey results

Survey year	2008	2009	2010	2011	2012	2013
Total Volume Sold the previous year (metric tonnes per year)	5000-7500	5000-7500	5000-7500	7500-10000	2500-5000	2500-5000
Total Potential Emissions (metric tonnes per year)	< 4	< 1.5	< 1.5	< 0.5	< 0.3	< 0.1

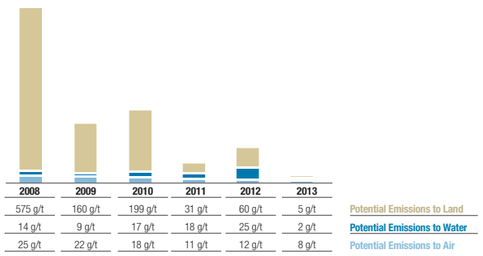
The total potential emissions were less than 0.1 metric tonnes in 2013

FIGURE 4: Percentage of volume covered by the programme



Participation rate increased to 89% of the total volume covered by the programme

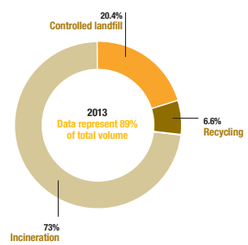
FIGURE 5: Comparative Deca-BDE survey results (2008-2013) by emission type (g/t)



The 2013 results showed a steady declined in potential emissions to air and water

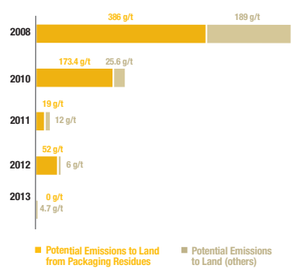
Potential emissions to land were reduced from 60 g/t in 2012 to 5 g/t in 2013. This significant reduction can be attributed to the continued commitment of users and to the effort by the VECAP product stewardship team to encourage the use of best available techniques among second line users.

FIGURE 6: Survey 2013 (volume 2012) destination of Deca-BDE packaging



Participating sites reported that 100% of used packaging covered by the survey in 2013 was handled responsibly, as shown in figure 6.

FIGURE 7: Deca-BDE potential land emissions from packaging waste residues



HBCD

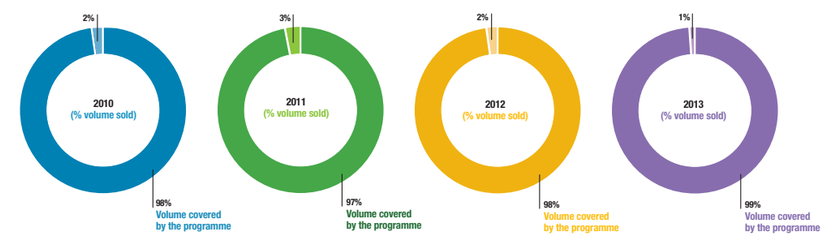
Hexabromocyclododecane (HBCD) is a flame retardant used mainly in thermal insulation foams in order to protect property from fire. Its main application in Europe is in expanded and extruded polystyrene (EPS and XPS) insulation foam boards widely employed by the construction sector. HBCD has also a minor application in electrical boxes (HIPS).

FIGURE 8: HBCD 2013 survey results

Survey year	2008	2009	2010	2011	2012	2013
Total Volume Sold the previous year (metric tonnes per year)	10000-12500	7500-10000	7500-10000	10000-12500	10000-12500	10000-12500
Total Potential Emissions (metric tonnes per year)	< 2.5	< 0.5	< 0.6	< 0.5	< 0.25	< 0.5

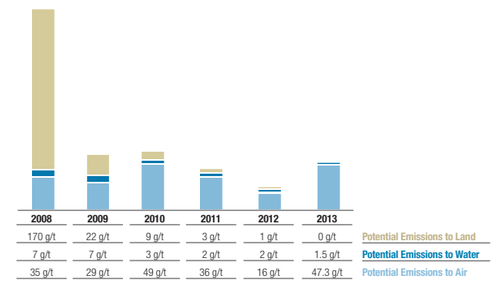
Overall participation in the programme continued to increase to cover almost 100% of volume sold, remaining the highest of the four product groups.

FIGURE 9: Percentage of volume covered by the programme



While an increase in participation is a success in the development of the programme, as is to be expected new users can result in an increase in total potential emissions.

FIGURE 10: Comparative HBCD survey results (2008-2013) by emission type (g/t)



The results indicated an increase in potential emissions to air compared to 2012. The VECAP team has identified the potential for air emissions as a priority

Potential emissions to water decreased from 2 g/t in 2012 to 1.5 g/t in 2013, reaching the default values.

The survey findings reported zero potential land emissions for HBCD, demonstrating that it is possible for the programme to reduce potential land emissions completely.

FIGURE 11: Survey 2013 (volume 2012) destination of HBCD packaging

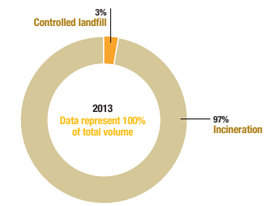
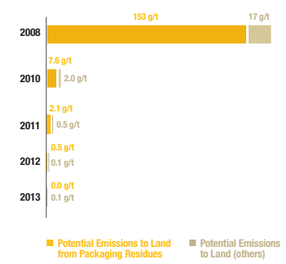


FIGURE 12: HBCD potential land emissions from packaging waste residues



100% of packaging waste covered by the survey in 2013 was handled responsibly.