



**The Voluntary
Emissions
Control Action
Programme**



Sound results from a proactive industry

EUROPEAN ANNUAL PROGRESS REPORT 2013

CONTENTS

Highlights

Foreword

| | | |
|-----------|------------------------------|-----------|
| 01 | Introduction to VECAP | 05 |
| 02 | VECAP REPORT 2013 | 08 |
| | Deca-BDE | 10 |
| | HBCD | 12 |
| | TBBPA | 14 |
| | EBP | 16 |
| 03 | Vision for the Future | 18 |
| 04 | How VECAP Works | 20 |

This report is designed to provide transparent and concise information on the progress of the Voluntary Emission Control Action Programme (VECAP) on an annual basis. Any feedback or comments are welcome and will be considered for future editions.

HIGHLIGHTS

- ▶ Additional brominated flame retardant, EBP, reported on for the first time
- ▶ Significant decline of potential emissions of the three brominated flame retardants surveyed since 2008
- ▶ 93% coverage of the total volume of the four brominated flame retardants sold in common by EFRA member companies
- ▶ Zero potential emissions of HBCD to land on nearly 100% of volume sold
- ▶ Reporting on EBP revealed that potential emissions to water and air are already at default values, those obtained when VECAP best practices are applied
- ▶ Potential emissions of TBBPA remain very low
- ▶ Consistent decrease of potential emissions to land of flame retardant Deca-BDE
- ▶ All HBCD, Deca-BDE and TBBPA empty packaging managed responsibly, according to the survey

FOREWORD



In 2009 Bureau Veritas Certification Belgium NV was honoured to help develop and launch an independent certification scheme for the VECAP programme. Based on ISO 9001/14001 principles, the VECAP certification allows manufacturers and users to prove their commitment and successful implementation of best practices via an independent periodical audit. Today 11 manufacturing and user sites worldwide are VECAP certified.

The certification scheme is driven by continuous improvement, which distinguishes this highly successful voluntary industry product stewardship programme. The programme itself was launched in 2004, when the UK Textiles Finishing Association committed to a Code of Good Practice to reduce potential emissions of Deca-BDE into the environment. In the 10 years since, the programme has continuously improved for example in identifying significant sources of potential emissions of flame retardants and developing recommended practices to avoid such emissions.

The programme has gone from strength to strength in expanding its scope and geographical reach. VECAP now includes many more products and involves both textile and polymer users across four continents – in Asia, North America and Europe. Recent survey results and the continuing increase in certified sites are testament to the returns that adhering to the programme bring.

This 2013 annual report shows great results and evidence that the programme helps producers and users to reach very low levels of potential emissions towards the environment, even in some cases achieving no potential emissions. This early industry initiative started with flame retardants but the standards and recommended practices put in place in the VECAP programme can and should be applied to other substances.

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INTRODUCTION

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 retardants⁴ 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

The programme does not currently deal with potential emissions during the service life of products or after their disposal; however, the flame retardant industry is actively involved in end-of-life issues management⁵.

A CODE OF GOOD PRACTICE

The programme helps users to implement best practices and to make continuous improvements by encouraging the user to adopt the industry's Code of Good Practice, outlining Best Available Techniques (BATs). The Code of Good Practice⁶ and BATs^{7/8} help to make health, safety and the protection of the environment an integral part of all day-to-day activities of processes involving flame retardants.

1

Voluntary Emission Control Action Programme
www.vecap.info

2

EFRA is a sector group of the European Chemical Industry Council (CEIC) 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.greattakes.com, www.icl-ip.com

5

EFRA, End-of-Life section
http://www.cefic-efra.com/index.php?option=com_content&view=article&id=97&Itemid=242&lang=en

6

Available at
http://www.vecap.info/uploads/Managing%20Emissions_light_UK%28new%20picture%29.pdf

7

Best Available Techniques for emptying bags containing polymer additives http://www.vecap.info/uploads/Empty_bags_UK_04-04_v2.pdf

8

Best Available Techniques for emptying Intermediate Bulk Containers (IBC) drums or small containers containing chemicals
http://www.vecap.info/uploads/IBC%20brochure_EN-final_30-8-13.pdf



EVOLUTION

VECAP was initiated by some EFRA member companies and the UK Textile Finishers Association (TFA), who introduced a Code of Good Practice in 2004. The TFA called on the UK textiles industry to audit their processes and take action to reduce emissions of the flame retardant Deca-BDE. Over the years, the voluntary initiative has expanded to include the potential for emissions from flame retardants to air, water and land for HBCD, TBBPA and EBP.

Ten years after the launch of the programme in 2004, EFRA member companies and users continue to adhere to the good environmental practices encouraged by the scheme in order to reduce potential emissions of flame retardants. The initiative is now a globally recognised product stewardship scheme that enables flame retardant producers and users to go beyond regulatory requirements to control the potential for emissions of flame retardants.

FLAME RETARDANTS

Flame retardants are substances incorporated into materials such as plastics and textiles to prevent or slow down the spread of fire and to make materials self-extinguishing from fires. Flame retardants play a crucial role in providing people with more time to escape from fires, and fire-fighters with additional time to respond.

Modern homes, offices and public spaces contain highly flammable materials⁹. While the increased use of plastics, composites, foams and synthetic fibre-based fillings has transformed our spaces into practical, comfortable and more energy efficient living environments, it has brought with it an increased risk of fire as many of these polymers can be highly flammable. Brominated flame retardant technologies work efficiently in a wide range of materials and have become an important component in products to improve reaction to fire in plastic cables used in electronics, cars and public transport, in polyurethane foam in furniture, in synthetic textiles used in cinemas and theatres and insulation foams in housing and public buildings.

A GLOBAL PROGRAMME

The programme has now been adopted by users in Europe and across the world who commit to the scheme by signing up, responding to the survey questionnaires and implementing the recommendations to reduce emissions. Best practice documentation¹⁰ is supplied to users to help with the implementation of best practices on site.

► North America

A significant number of Deca-BDE, HBCD, and TBBPA users have committed to implementing the VECAP programme

The VECAP programme has been promoted by individual BSEF members to users of brominated flame retardants in Mexico

► Asia Pacific Region

General commitment in the region to implement VECAP for brominated flame retardants

The programme is being actively promoted by BSEF members in Japan, for HBCD and also for other brominated flame retardants

Individual BSEF members also took on the initiative in China, Singapore, Thailand, Indonesia, South Korea and Taiwan

More information on the global programme is available on **www.vecap.info**

More details on how the programme works are available in Chapter 4.



Now available in more than seven languages

9

Fast Facts on Fire Safety and Flame Retardants
<http://bit.ly/1i6dkvx>

10

VECAP best practice material:
<http://www.vecap.info/publications-2/>

Brominated Flame Retardants

An Essential Part of Modern Life

Brominated flame retardants play a critical role in reducing the impact fires have on people and property.

They are incorporated in materials to prevent or slow down the growth of a fire, giving people more time to escape and for the fire brigade to arrive before it is too late.

Did you know?

The addition of brominated flame retardants in upholstered furniture can delay the spread of the fire to the rest of the room.



Now engineers can use new materials, which would have otherwise been avoided for their high fire risk, to develop innovative products that make our lives easier.



TRANSPORT



- Brominated flame retardants make sure that innovative materials used in modern transport vehicles can be used safely and meet the strict international fire safety standards.

HOMES



- Brominated flame retardants can make the plastic used in TV casings more resistant to ignition and slow the progress of any fire.
- The use of brominated flame retardants in sofas and armchairs plays a key role in delaying the development of fires.

PUBLIC SPACES



- Many countries have strict standards to ensure the fire safety of furniture and fittings in public places, such as cinemas and theatres.

OVERVIEW OF 2013 PROGRAMME 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 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 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.

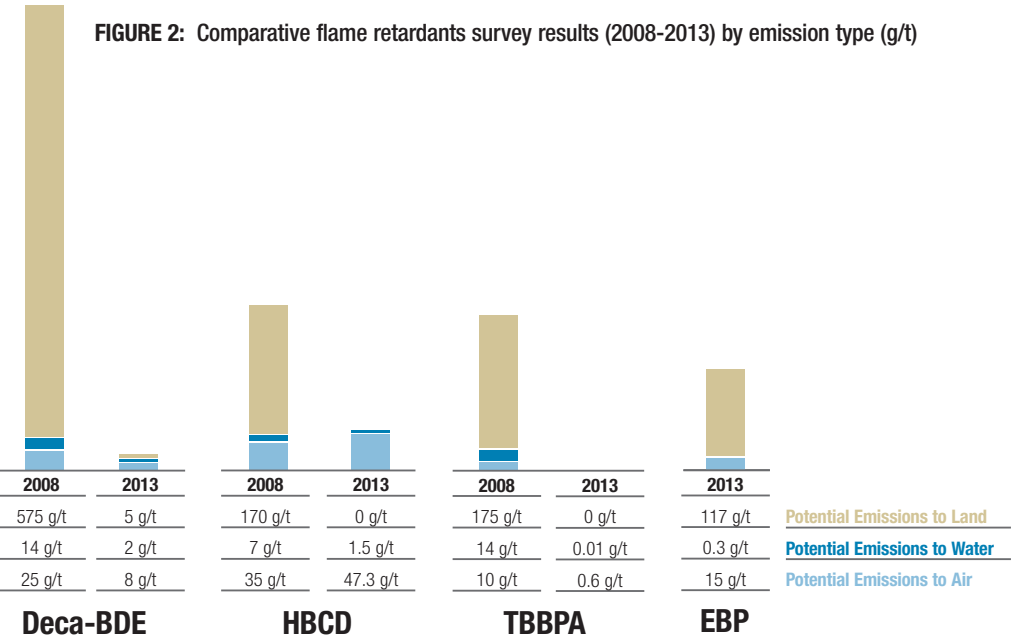
In 2012, Everkem¹¹, an EFRA member supplying brominated flame retardants based in Italy, committed to joining the VECAP programme. The company is planning to promote best practices among users in order to carry out surveys to report in 2014.



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

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).

2013 SURVEY RESULTS FOR DECA-BDE

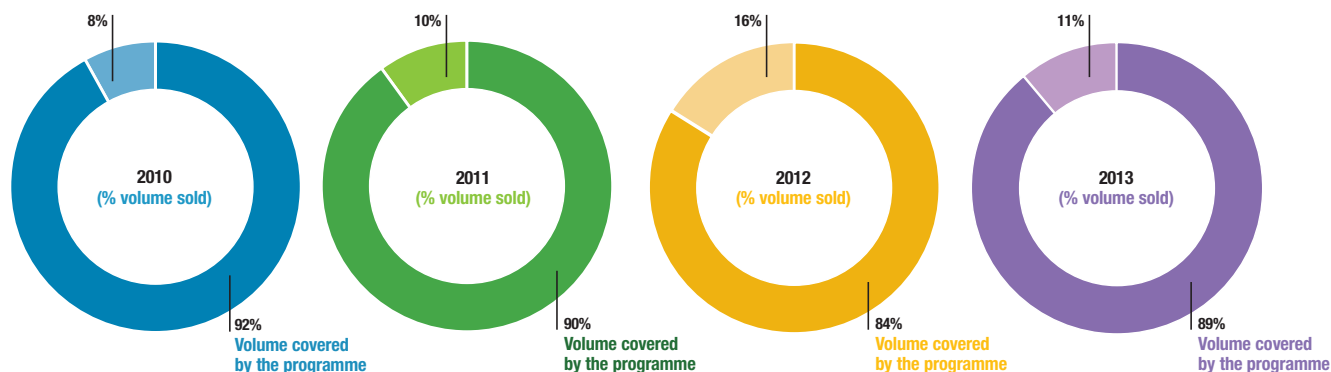
The results from the latest survey undertaken in 2013 were based on 89% coverage of the total volume sold by EFRA member companies the previous year (figure 4).

Compared to the 2012 survey, the total potential emissions of Deca-BDE were further reduced to less than 0.1 metric tonnes, demonstrating the practical benefits of using the programme's best practices.

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 |

FIGURE 4: Percentage of volume covered by the programme



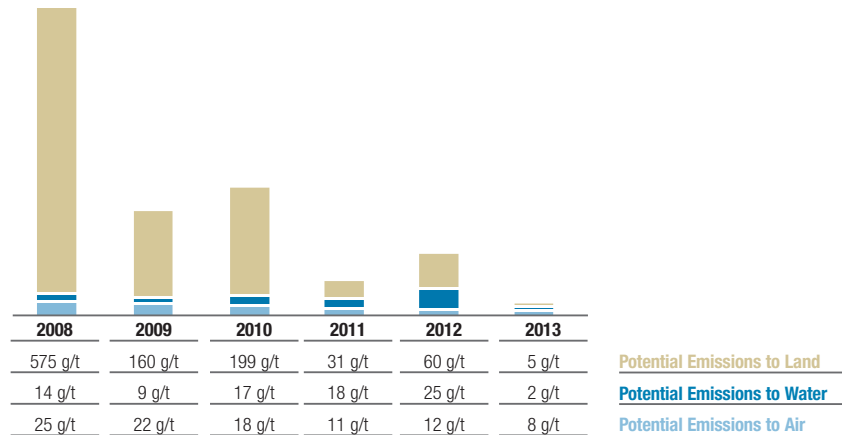
POTENTIAL EMISSIONS TO AIR, WATER AND LAND

The 2013 survey results indicated a continued steady decrease in potential emissions to air, which dropped from 12 g/t in 2012 to 8 g/t.

Similarly, survey results showed a steady decline in the potential for emissions to water which were reduced to 2 g/t following a better understanding of the processes for handling Deca-BDE as well as the successful implementation of best practices.

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. Remaining potential emissions are understood to be due to disposal of filter dust and sludge from water treatment plants using non VECAP compliant practices.

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



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

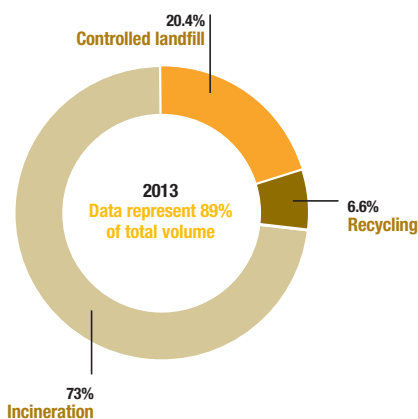
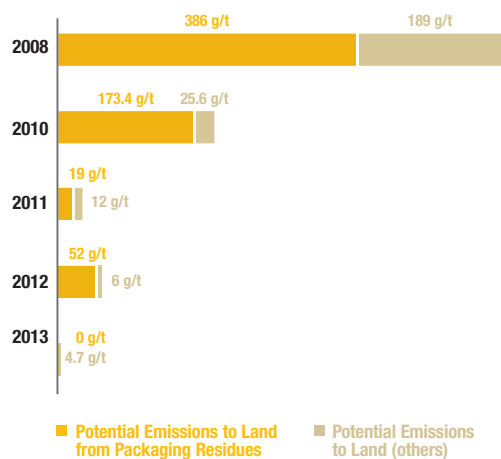


FIGURE 7: Deca-BDE potential land emissions from packaging waste residues



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).

2013 SURVEY RESULTS FOR HBCD

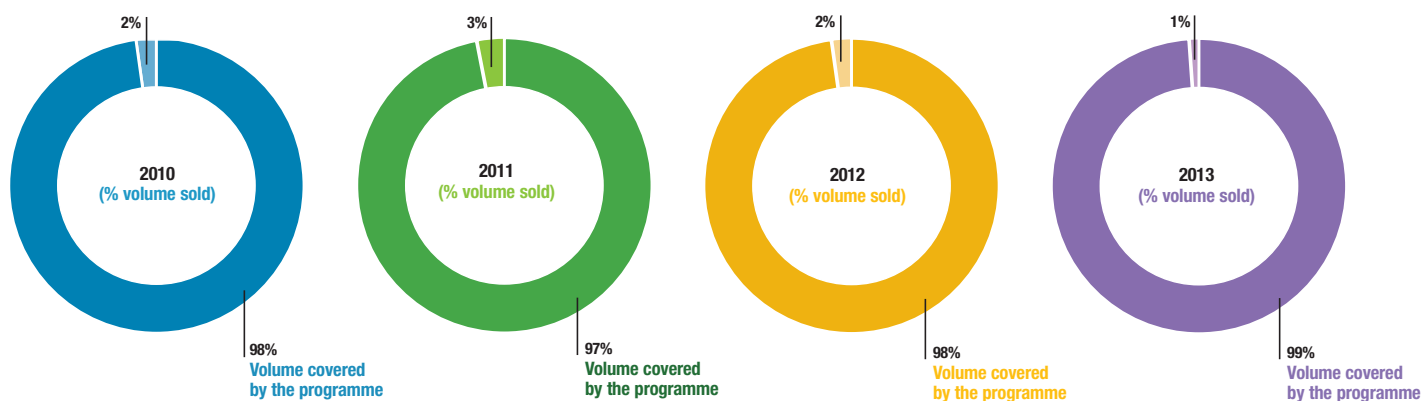
The following results are from the survey carried out in 2013, based on the total volume sold by EFRA member companies the previous year. Overall participation in the programme continued to increase to cover almost 100% of volume sold, remaining the highest of the four product groups (figure 9).

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. The VECAP team will focus on working with new users on implementation of VECAP best practices.

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 |

FIGURE 9: Percentage of volume covered by the programme



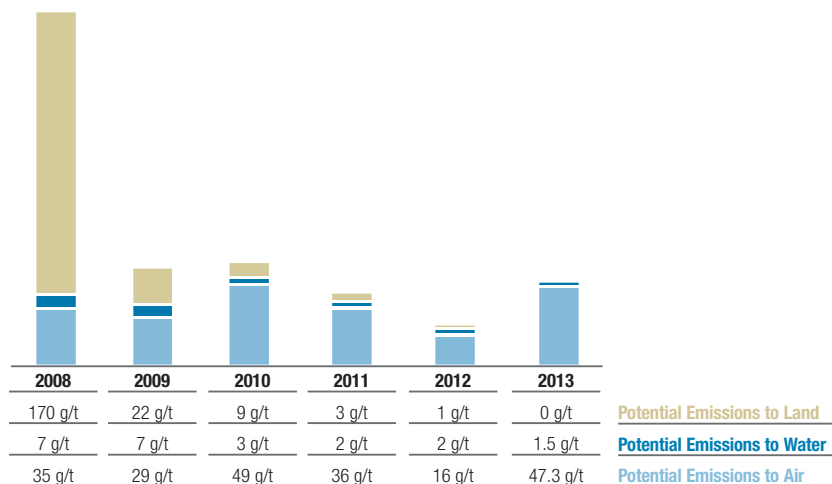
POTENTIAL EMISSIONS TO AIR, WATER AND LAND

Survey 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 and will continue to encourage the uptake of low-dust granular material among users, particularly where filters are not in place.

Reporting potential emissions to water decreased from 2 g/t in 2012 to 1.5 g/t in 2013, which is well below the default value of 3 g/t, meaning that some users go beyond the recommended best practices to reduce their emissions.

Thanks to excellent implementation of the programme 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 10: Comparative HBCD survey results (2008-2013) by emission type (g/t)



DESTINATION OF HBCD PACKAGING

As figure 11 demonstrates, participating sites reported that 100% of packaging waste covered by the survey in 2013 was handled responsibly; either through incineration or by disposal to controlled landfill.

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

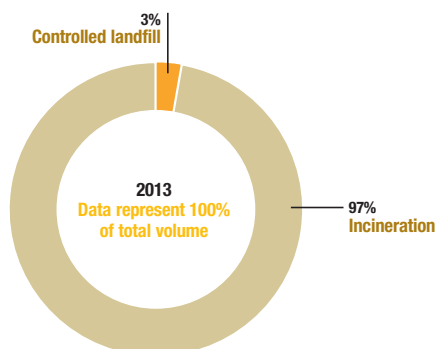
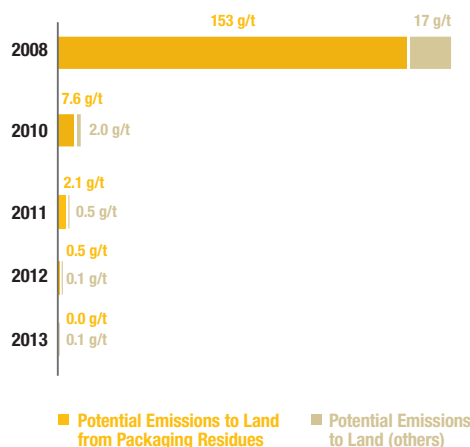


FIGURE 12: HBCD potential land emissions from packaging waste residues



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.

2013 SURVEY RESULTS FOR TBBPA

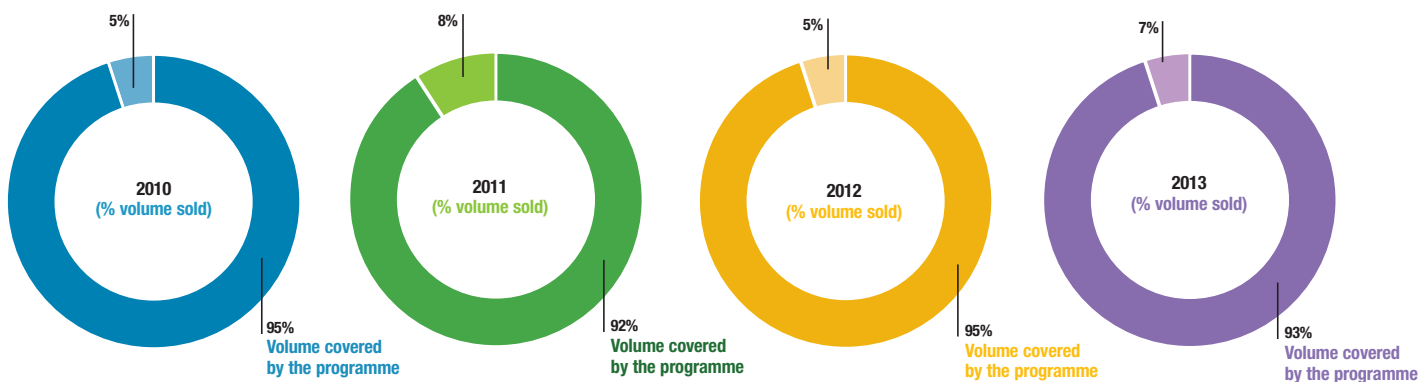
The following results relate to the survey conducted in 2013 based on 93% of the volume of TBBPA that EFRA member companies sold the previous year (figure 14).

The volume covered during the 2013 survey remains high while potential emissions dropped even further to less than 0.002 metric tonnes per year.

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 |

FIGURE 14: Percentage of volume covered by the programme

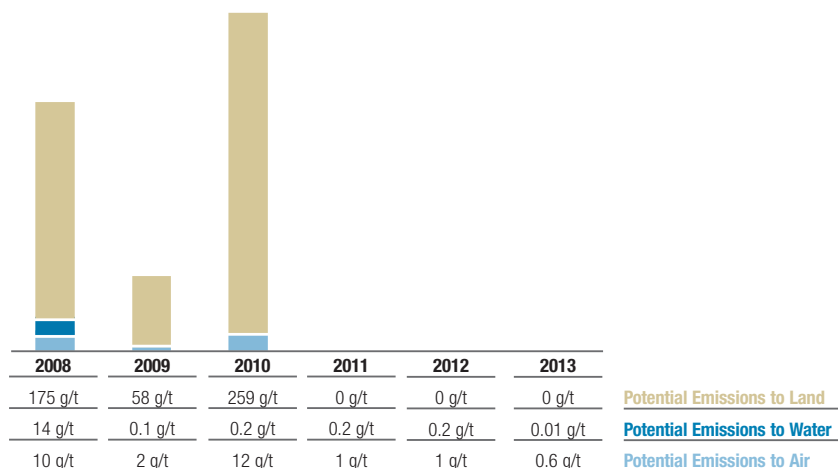


POTENTIAL EMISSIONS TO AIR, WATER AND LAND

Potential emissions to air, water and land remained significantly low. The survey results report 0.6 g/t potential emissions to air showing a drop of 40% compared to the previous year. Reporting potential emissions to water were 0.01 g/t. Since 2011, potential emissions to land have been reduced to zero; this was maintained throughout 2012 and 2013.

This demonstrates the dedication of participating sites that have continuously reduced potential emissions of TBBPA since the beginning of the programme.

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



DESTINATION OF TBBPA PACKAGING

Results from the 2013 survey show that as with other products 100% of the empty packaging of TBBPA sold was responsibly disposed of, either through incineration or sent to controlled landfill sites, as demonstrated in figure 16.

FIGURE 16: Survey 2013 (volume 2012) destination of TBBPA packaging

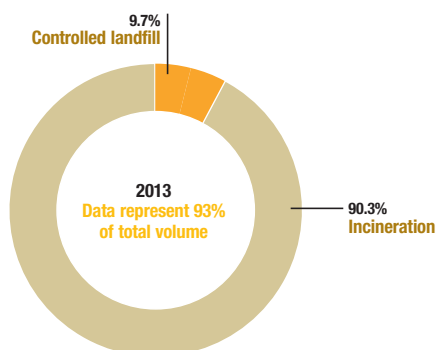
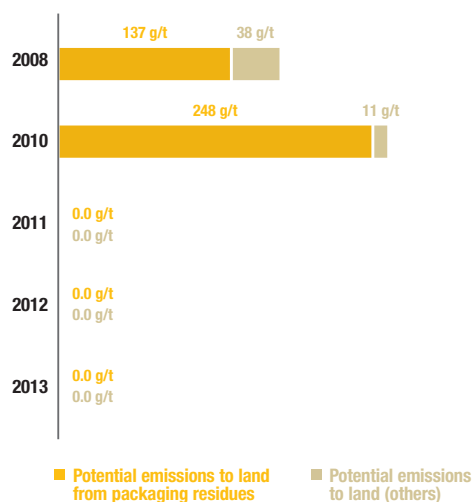


FIGURE 17: TBBPA potential land emissions from packaging waste residues



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).

2013 SURVEY RESULTS FOR EBP

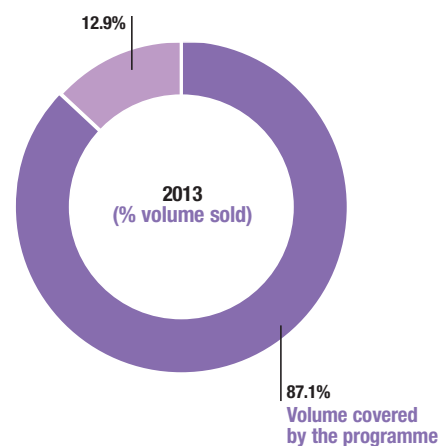
The 2013 survey included for the first time an assessment of potential emissions of EBP. The survey was based on 87.1% of the total volume sold by EFRA member companies in 2012 (figure 19). This high participation rate shows already a strong commitment to the programme.

The survey results reported total potential emissions of less than 0.3 metric tonnes in a tonnage band of 0 to 2500 metric tonnes sold, proving that participants are already keen to commit to and implement the programme's best practices.

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 |

FIGURE 19: Percentage of volume covered by the programme



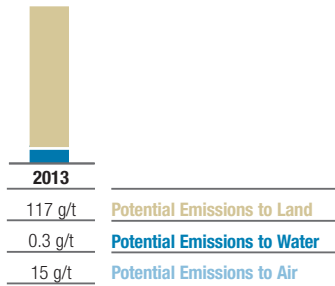
Over the course of the last two years, the VECAP product stewardship team has been actively looking into the practices of paper recycling companies, taking paper packaging waste from customers, in order to gain a better understanding of the process of recycling which requires a lot of water. The VECAP team requests that paper packaging waste is handled according to the programme's Best Available Techniques.

POTENTIAL EMISSIONS TO AIR, WATER AND LAND

The first VECAP survey on EBP revealed that potential emissions to water and air are already at default values obtained when best practices are applied, respectively 0.3 g/t and 15 g/t.

As is often the case in the first year of the programme, potential emissions to land were reported to be higher than for the other reported brominated flame retardants. However, the VECAP team is working to ensure new users will fully embrace the VECAP best practices on packaging waste disposal in the future, relying on the principle of continuous improvement that distinguishes the programme.

FIGURE 20: EBP survey results 2013 by emission type (g/t)



CASE STUDY

Recycling of paper packaging

During visits to sites across Europe, the team inquired about the destination of paper packaging waste and what happens to pulp sludge after it has gone through waste water treatment at recycling facilities. The investigation revealed widely differing practices by recyclers between countries. Some European countries were generally found to dispose of sludge according to recommended VECAP best practice (incineration or controlled landfill) while other European countries were found to do so less often.

The European Union (EU) is in the process of revising its waste legislation. Currently, the main European Directives that address packaging waste set targets for the percentage of paper to be recycled and reused but allow Member State's national authorities to decide which measures can best help them achieve these targets.

Research by the VECAP Product Stewardship Team has enabled the team to gain a better understanding of how paper recyclers operate, which in turn will help the team in their efforts to approach recyclers to encourage the uptake of best practices. Going forward the team will focus on educating recyclers of all EU countries about VECAP to ensure that pulp sludge is not used for agricultural composting nor used as fertilizers on land but rather sent for incineration or controlled landfill.

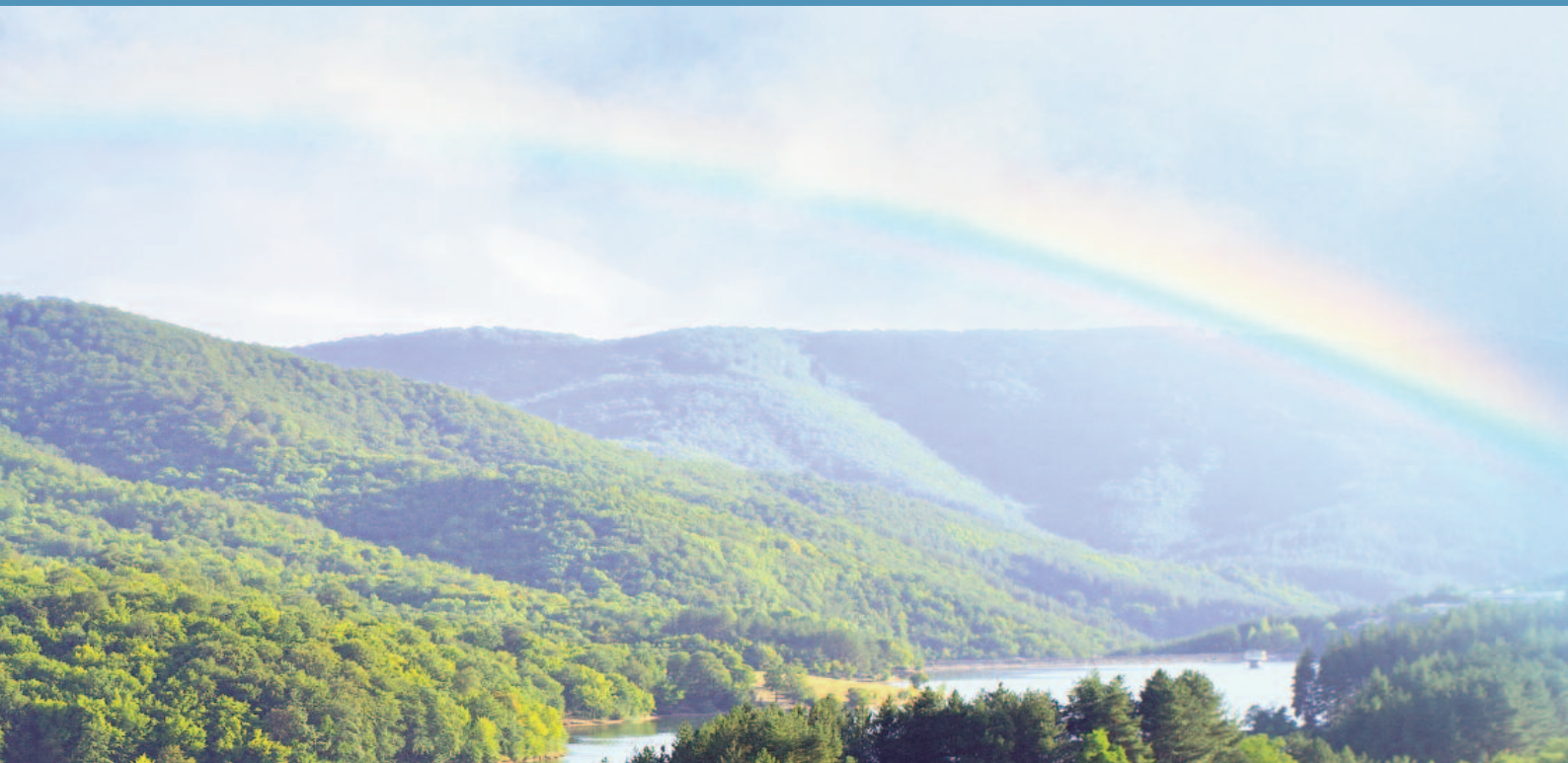
VISION FOR THE FUTURE

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.

FURTHER REDUCTION IN POTENTIAL EMISSIONS TO LAND

The VECAP team was successful in its commitment to reduce potential emissions to land of Deca-BDE which, as a matter of fact, decreased from 60 g/t in 2012 to 5g/t in 2013. This accomplishment, together with the low potential emissions to land from HBCD and TBBPA confirms that the full value chain cooperation with best practice is achievable with the right commitment and determination. While still encouraging the overall reduction of potential emissions from all covered substances, the VECAP team is now also determined to focus on emissions to land of EBP to ensure new users will fully embrace the best practices in this area in the future.



INCREASE VECAP COVERAGE WITH NEW SUPPLIERS

The VECAP programme has actively been promoted across other regions worldwide as well as between other flame retardant producers beyond EFRA. The VECAP team is committed to encourage a further increase in the volume covered, which this year stood at 93% of the overall volume of the reported substances sold by EFRA member companies.

BROADENING THE SCOPE TO INCLUDE NEW SUBSTANCES AND ADDRESS THE 'END OF LIFE' OF FLAME RETARDANT CONTAINING PRODUCTS

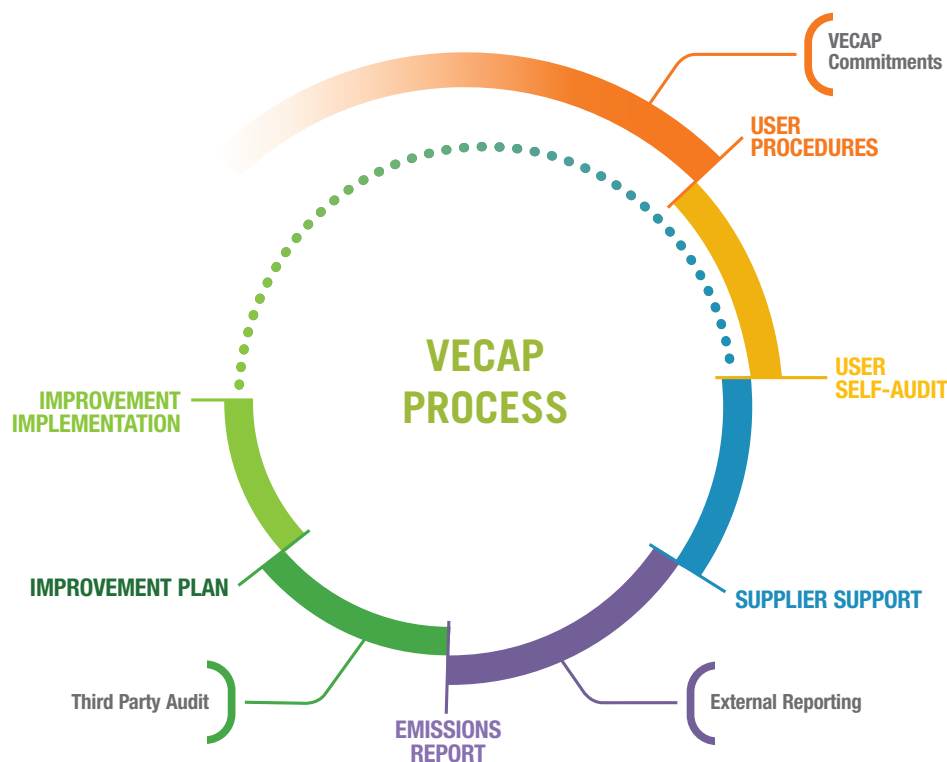
This year's inclusion of EBP as a new reported substance is a success story that shows the industry's commitment to embrace the VECAP best practices. Yet the VECAP team is also encouraging users to apply the VECAP methodology to more substances by further simplifying and generalising its survey tools. In parallel, there will be a determined effort by the VECAP team to establish how to include the end-of-life process of flame retardant containing products in the scope of future VECAP surveys.

COLLABORATION OF SECOND-LINE USERS

In its effort to encourage the uptake of VECAP best practices, the VECAP team is constantly focusing on new potential collaborations with second-line users, including textile finishers and EPS foam producers.

HOW VECAP WORKS

The VECAP process is driven by the principle of continuous improvement, namely using the experience gained by adapting the methodology to better address any new issues that may arise. The VECAP programme focuses on the producers and downstream users of brominated flame retardants. However, in principle, the VECAP methodology can be applied to encourage the reduction of emissions of any type of solid or liquid chemical substance.



The VECAP programme calculates an estimation of potential emissions associated with user and producer processes and practices, as opposed to physically measuring emissions from chemical production processes. Users can however submit their own values in the emissions calculation tool, whenever they have available physical measurements or more accurate data than the default values.

VECAP CERTIFICATION

Over a decade of running the programme, the independent certification of participating users has been the ultimate step in the continuous improvement process. Certification was officially recognised in 2009 when a certification scheme was first launched based on ISO 9000/14001 principles. The scheme was developed in association with Bureau Veritas, with environmental audits carried out by independent auditors. The certification process has been designed in a way that can be easily implemented so as to encourage new users' participation. For SMEs it only applies to the process and use of best practices, while for larger companies it can be extended to include their management system, in line with other standards such as ISO 14001 or Responsible Care® management systems. There are currently 11 VECAP certified manufacturing and user sites worldwide.



THE VECAP TEAM AND EMISSIONS SURVEY TOOL

VECAP achievements over the last 10 years can be traced back to the combined efforts of a team of professionals with knowledge of flame retardants production and application processes, and of the industry's commitment to take responsibility for environmental concerns. Members of the Product Stewardship Team currently include the brominated flame retardants suppliers within EFRA, as well as Cefic and a representative of the European polystyrene foams industry.

The VECAP Product Stewardship Team, supported by Cefic's Statistical department, develops the tools needed for the methodology, including the questionnaire used for the estimation of potential environmental emissions.

The Product Stewardship team develops the questionnaire in collaboration with downstream users, considering every step of the user process in order to cover all potential emission points. Once the user has completed the questionnaire, a survey report is issued by the VECAP team highlighting sources of potential emissions. Based on the survey results, users receive recommendations on how to best achieve emission reductions. If these recommendations are implemented, an updated emission report is issued and sent to the user which, in some cases, can be followed by further recommendations, since continuous improvement is key to the success of the programme.

A full survey of every user is not undertaken each year, as the VECAP team focuses on 'new' participants and areas where the greatest emission reductions may be expected based on analysis of the previous year's survey.

EMISSIONS DATA COLLECTION & REPORTING

The questionnaire is first collated by each supplier, who highlights potential emissions identified, and enters them in a dedicated database. Cefic's Statistical Services then consolidate, compile and analyse the answers. Data are then treated to obtain estimated potential emissions in g/t sold in Europe for each product.

Although working in close cooperation, Cefic's Statistical Service and the other VECAP team members act independently. Cefic's Statistical Service is the only party with access to confidential data of individual potential emissions of all participants. The rest of the team only sees the compiled and anonymized results as required by the strict rules of the Statistical Service.

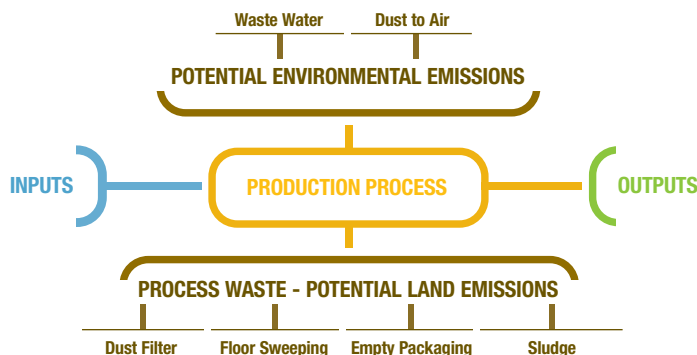
IMPLEMENTING BEST PRACTICES

The VECAP team supports companies in the implementation of best practices and in the continuous improvement process by encouraging the user to adopt the Industry's Code of Good Practice which is regularly updated. As an annex to the Code, best available technique (BAT) guidance documents have been developed for emptying bags and intermediate bulk containers efficiently. The table below shows examples of where flame retardants emissions can occur and what the VECAP recommended practices are to reduce these emissions.

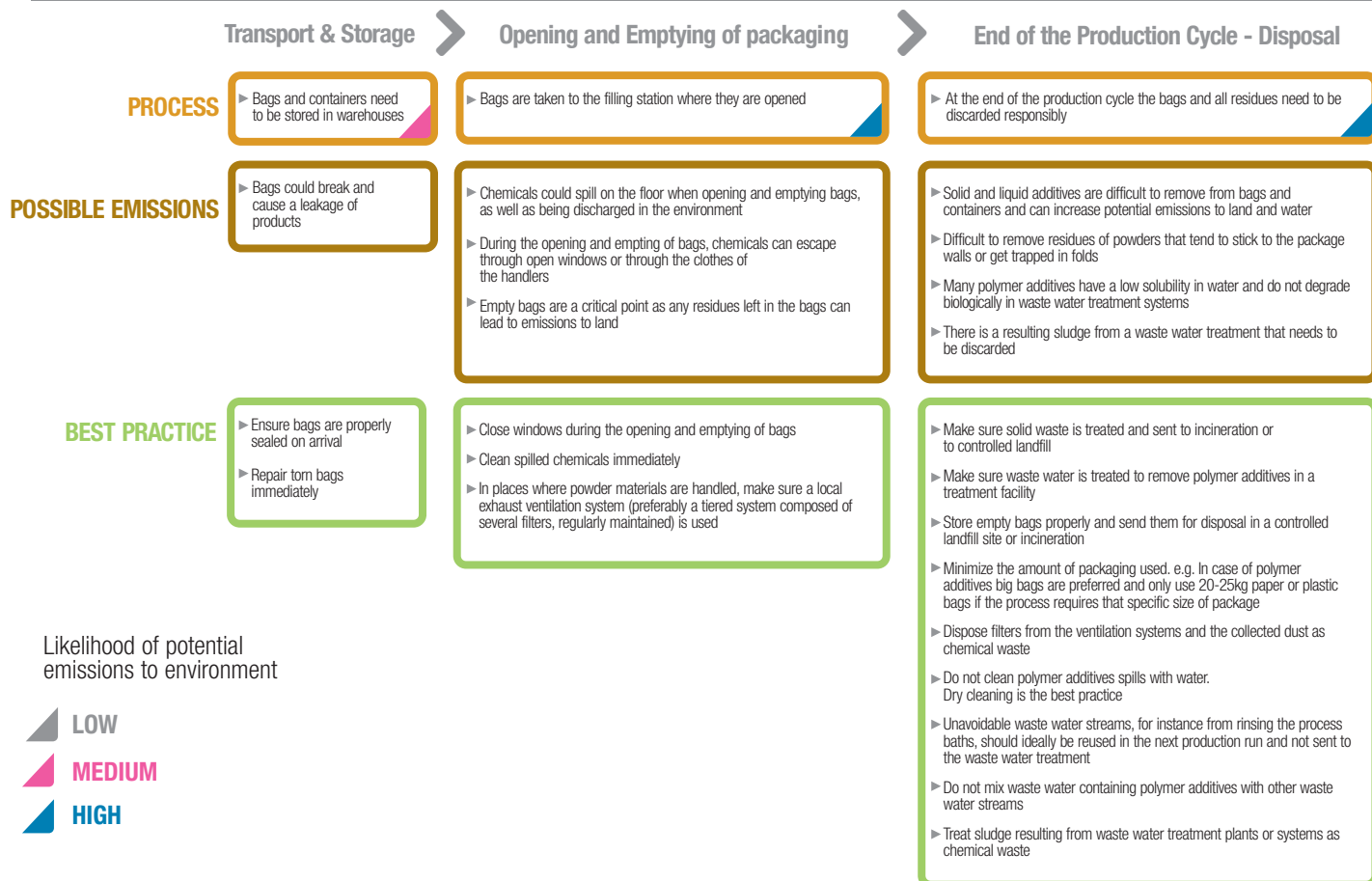
HANDLING AND TREATING CHEMICALS

Listed below are examples of where flame retardant emissions can occur, highlighting critical points in the process of handling and treating chemicals:

- | MANUFACTURING | PROCESSING | WASTE DISPOSAL |
|---------------|---|---|
| 1 Production | 1 Dust from unloading and feed operations | 1 Residues in packaging |
| 2 Packaging | 2 Leaks in feed equipment on production lines | 2 Poorly treated wastewater from system wash-outs |
| 3 Shipping | 3 Inadequate or missing air filters | 3 Waste not reprocessed |
| | 4 Improper clean-up of spills | 4 Use of uncontrolled landfills |



LINKING POTENTIAL EMISSIONS TO VECAP BEST PRACTICE



Likelihood of potential emissions to environment



ABBREVIATIONS

| | |
|-----------------|---|
| BAT | Best Available Technique |
| BSEF | Bromine Science and Environmental Forum |
| Cefic | European Chemical Industry Council |
| Deca-BDE | Decabromodiphenyl ether |
| EBP | 1,1'-(ethane-1,2-diyl)bis [pentabromobenzene] |
| EFRA | European Flame Retardants Association |
| HBCD | Hexabromocyclododecane |
| TBBPA | Tetrabromobisphenol-A |
| VECAP | Voluntary Emissions Control Action Programme |

FOR FURTHER INFORMATION

www.vecap.info

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The European Flame Retardants Association (EFRA) brings together the leading companies which manufacture or market flame retardants in Europe. EFRA covers all types of flame retardants: chemicals based on bromine, chlorine, phosphorus, nitrogen and inorganic compounds. EFRA is a sector group of Cefic, the European Chemical Industry Council.

www.flameretardants.eu

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The Bromine Science and Environmental Forum (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

www.bsef.org

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VECAP is a voluntary programme of member companies of the European Flame Retardants Association (EFRA) together with the industry's global organisation, the Bromine Science and Environmental Forum (BSEF).

