

MANAGING EMISSIONS OF PERSISTENT CHEMICALS

by Proactive Commitment to Good Practice:



PLASTICS SECTOR

- > **A Code of Good Practice for the Use of the Flame Retardant Decabromodiphenylether (Deca-BDE) in the Plastics sector**

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Introduction

This voluntary Code of Good Practice is applicable to all companies using Deca-BDE in the plastics sector as well as to manufacturers and importers of Deca-BDE supplying this market.

While there is no statutory obligation to adopt this Code, in doing so companies demonstrate their commitment to go beyond compliance with current legislation as well as to continuous improvement. By following the advice in the Code, a company can make significant improvements in its environmental performance whilst reducing operating costs.

This Code has been developed jointly by the British Plastics Federation (BPF) and the Bromine Science and Environmental Forum (BSEF).

The Environment Agency (EA) in the UK and the Department of Environment Food and Rural Affairs (DEFRA) were consulted in the production of this document, however, the views expressed in it do not necessarily reflect their views.



Background

Deca-BDE is one of the High Production Volume (HPV) chemicals which, under the EU Existing Substances Regulation (793/93/EC), is subject to a comprehensive European Risk Assessment, as are a number of phosphorous and chlorine based flame retardant (FR) systems and antimony trioxide.

The EU Risk Assessment Technical Meeting has concluded that Deca-BDE presents an acceptably low risk, both to public health and the environment.

Nevertheless, there are some residual concerns due to the presence of the compound in trace levels in the environment, in particular in the eggs of certain predatory birds. There are also some scientific uncertainties with respect to public health, which are being addressed by a further study.

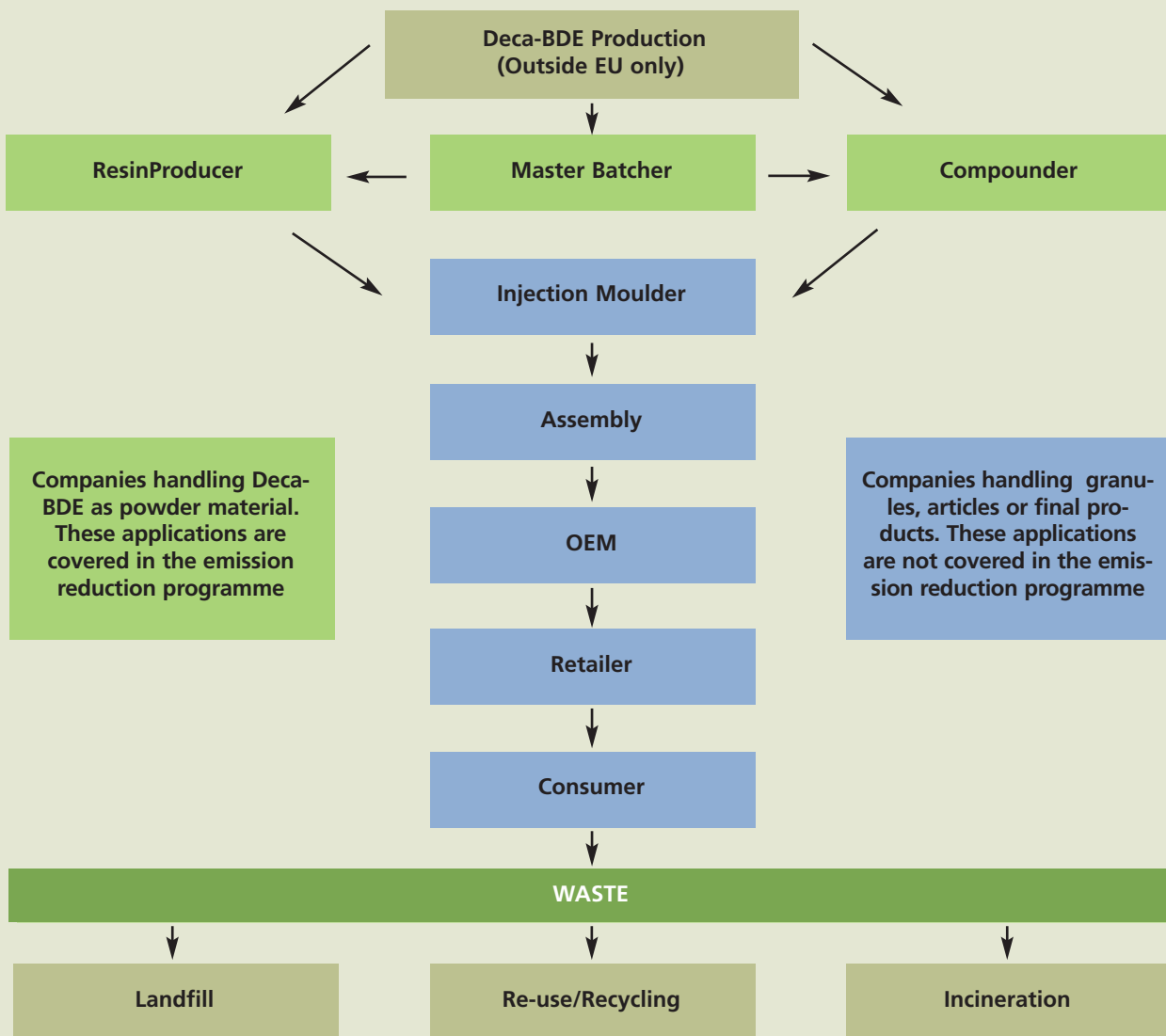
As such, the need has been perceived for continued monitoring and minimising further emissions to the environment from industry. Hence, this Code has been compiled in order to provide industry with appropriate guidance for managing and reducing emissions.

Although this Code is focused on Deca-BDE, the application of these principles will have the effect of reducing the emissions of other co-flame retardants and plastic additives used in these processes.

Signatories to this Code are accorded the following benefits:

- Providing regulators with the reassurance that precautions are being taken by industry in order to manage the residual concerns due to the compound
- Providing an opportunity for Deca-BDE users to achieve cost savings in terms of greater process efficiency, lower wastage and reduced emissions.

Deca-BDE Flowchart





Section I

Code of Good Practice for Producers and Importers of the Flame Retardant Deca-BDE

Subject to compliance with applicable competition and anti-trust law and in line with the OECD Voluntary Industry Commitment (VIC), the signatory companies to the OECD VIC commit to using:

- the Best Available Technique in production
- marketing of an average product purity of 97% or greater and
- to fulfil the agreements under the Responsible Care Product Stewardship Code. The purpose of this Code is to make health and safety aspects and the protection of the environment an integral part of designing, production, marketing, use, recycling and disposing of chemical products. As a result of this Code, different product stewardship programs have been and are being implemented.

Importers and producers of Deca-BDE will provide guidance to their customers in the EU on the correct handling and processing of Deca-BDE through the following means:

1. INFORM

Subject to compliance with applicable competition and antitrust law the producers Safety Data Sheets (SDS) for Deca-BDE will be harmonized within the EU SDS requirements and regularly updated.

Deca BDE user manuals will be developed, following a life-cycle approach to the product's use from reception, storage and handling down to waste management and will include Deca-BDE's hazard and risk profiles, its regulatory status and this Code of Good Practice.



2. EXPLAIN

Producers commit to offering individual customers regular meetings in order to provide guidance on product stewardship based on this Code of Good Practice.

3. CHECK

Producers will commit to requesting written confirmation from customers in order to ensure that the Code of Good Practice is being followed and in addition customer audits will be implemented for verification.

Subject to compliance with the applicable competition and antitrust laws, individual producers may consider not supplying a customer who does not provide the above written confirmation, or does not comply with the provisions of the Code.

4. ENVIRONMENTAL MONITORING

Producers agree to carry out environmental monitoring in line with that agreed below.

The above commitment is subject to compliance with applicable competition and antitrust law.



Section II-1

Management Information on a Code of Good Practice for the Use of the Flame Retardant Deca-BDE in the plastics sector

1. DECA-BDE USAGE

Deca-BDE is an additive powder type of flame retardant (FR) and is globally the product of choice in a very wide range of materials and applications.

Deca-BDE is used in polypropylene and polyethylene, in engineering plastics like nylon, polyesters and ABS and in high impact polystyrene.

Usage is mainly in the Electrical & Electronics equipment (E&E) like TV's, audio equipment etc, communication and office equipment (copiers and fax machines, mobile phones etc) and also in transport (seats in cars and public transport), cable and wire (coatings) and construction (foamed rubber insulation products).

In the plastics sector, Deca-BDE is normally stored in hoppers, which feed extruder lines. In the extruder the product is homogeneously mixed in with the melted plastic resin. The plastic strands emerging from the extruder are cooled in water or air and chopped mechanically into granules.

Technically there is no significant difference in the operations producing FR-resin, FR-masterbatches or FR-compounds. Typically masterbatch producers supply resin producers and compounders, whereas the latter two supply the injection moulder. In the plastics sector, additives once mixed in with the resin are not available for significant emissions to the environment. Therefore injection moulding and downstream applications are not included in the scope of this Code.



At the plastic compounding stage, reduction of emissions to the environment is feasible through responsible powder handling and implementation of good housekeeping. These aspects are therefore the focus of this Code.

2. SAFETY DATA SHEETS

Deca-BDE producers are legally obliged to keep their Safety Data Sheets (SDS) updated. They are also obliged to send updates to their customers.

Deca-BDE's SDS can also be downloaded from the following producer websites:

<http://www.albemarle.com/flameretprodselectorf.htm>

<http://www.dsbgr.com>

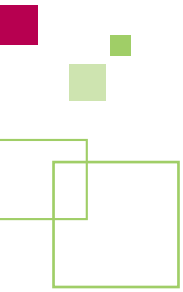
http://www.e1.greatlakes.com/corp/prodserv/jsp/flame_retardants.jsp

3. STORAGE OF DECA-BDE

The product should be stored in a designated dry, cool, well-ventilated area and stock levels should be recorded.

4. HANDLING OF DECA-BDE

The detailed handling guidelines stipulated in the SDS as regards safe handling of Deca-BDE should be followed. Containers should be tightly closed and appropriate Personal Protective Equipment (PPE) should be worn.



5. PRODUCT PURITY

As has been recognised by the OECD Voluntary Industry Commitment¹, Deca-BDE needs to contain “an average purity of 97% or greater for commercial DBDPO” in order to avoid proliferation of lower BDEs. Plastics users are encouraged to use Deca-BDE which is in conformity with the OECD Voluntary Industry Commitment.

6. GOOD HOUSEKEEPING

Good housekeeping contributes to the protection of workers as well as to the reduction of emissions to the environment.

Designated storage facilities should be made available. Stock levels should be kept up to date and recorded.

Packaging containing waste should be designated and clearly labelled. These waste streams, unless reused internally should be disposed of as chemical waste. Waste stock levels should be updated on a regular basis and documentary evidence should be available of disposal by authorised waste companies.

Protective clothing as specified in the safety data sheet should be made available for handling the product as well as for possible emergencies. Clean protective clothing should be available to personnel in a known designated location. Employees should be advised as to appropriate routes of disposal for contaminated clothing. Professional cleaning of contaminated clothing in an environmental sound manner should be used.

¹ Voluntary Industry Commitment by the US and European Producers of Selected Brominated Flame Retardants covered under OECD's Risk Reduction Programme, 30 June 1995



Guidelines for good housekeeping (Section II -2 of this Code) should be made available to all personnel and training should be implemented on a regular basis to secure responsible handling of raw materials on the work floor.

Staff should be instructed to maintain high standards of housekeeping on a frequent and regular basis. This practice should be rigorously enforced and kept up to date.

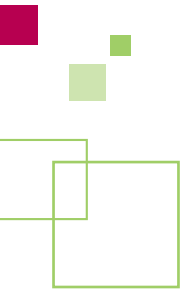
7. MEASURE, RECORD AND MANAGE, TO IMPROVE PROCESS EFFICIENCY AND TO REDUCE WASTE AND EMISSIONS

Companies are encouraged to track business efficiency using emissions and waste as key performance indicators. Neither emissions nor waste add value to the operations and in fact represent hidden costs. Indeed, to indicate possible savings by reducing waste, Envirowise (formerly the UK Environmental Technology Best Practice Programme) states that 1% of a company's turn over can be saved by implementing a systematic approach to waste minimisation, as waste costs typically are 10-20 times higher than disposal costs².

A good understanding of the process(es) should start with an attempt to close the mass balance. Product and waste flows, emissions to water and air, energy and water consumption and process parameters should be measured and recorded.

Measured and recorded data will serve to demonstrate the opportunities for process and product flow optimisation. Optimisation of process efficiency and the reduction of waste and excess emissions will lead to higher production at lower costs.

² Envirowise GG277, Finding and reducing waste in plastic processing



Additional information is available from Envirowise and can be downloaded free of charge from www.envirowise.gov.uk e.g. Envirowise EN 030 "Finding Hidden Profit - 200 Tips for Reducing Waste". Case studies on cost effective pollution control are described in Envirowise GG 109.

This Code of Good Practice on the use of Deca-BDE is intended to support (production) management in finding ways to minimise emissions, as well as to offer guidance on how to handle waste flows where appropriate.

The process of monitoring and recording will demonstrate to management where product(ion) losses, emissions and waste production can be reduced which lead to higher process efficiency, lower production loss and waste costs and to the reduction of emissions.

8. EMISSIONS TO AIR

In places where powder is handled as is the case with filling Deca-BDE in to the hopper or extruders some dust might be formed. It is suggested during filling to keep windows and doors closed.

There are several other practices which would contribute to reduced emissions to air at the workplace. These are outlined in the Section II – 2 on Good Housekeeping.



9. OTHER WASTES CONTAINING DECA-BDE

There is scope for further emission reduction from sources such as floor sweepings, off spec material, dust filter contents, filter cake, empty product packaging etc.

Users should secure environmentally sound disposal of empty packaging and maintain documented evidence of correct disposal. It is recommended that Deca-BDE empty packaging is not re-used or recycled to avoid traces of product entering the environment during cleaning of the packaging. Therefore the preferred outlet for Deca-BDE packaging is incineration rather than landfill.

Where waste flows cannot be reprocessed internally or sold as low grade material it is recommended that those containing Deca-BDE are delivered to authorized waste companies.

An additional source of emissions arise from samples for the quality control lab. It is recommended to collect these samples (plastic granules, films, test species etc.) afterwards and store them. In case samples are no longer required for quality control they should be disposed off as chemical waste.

(Note: All studies and data mentioned in this brochure have been executed with the improved minimum average 97% purity commercial Deca-BDE as produced by BSEF member companies since 1995 and the conclusions are therefore by definition not valid for the commercial grades from other suppliers.

All studies referred to in this paper are available at the BSEF secretariat or can be downloaded from www.bsef.org)

Section II-2

Guidance Document on Good Housekeeping on handling chemicals during Plastic processing

	Do make sure that it is known if and which protective clothing is needed for handling the product in both everyday and emergency cases
	Do ask your shift manager for advice and training in case something is unclear
	Do keep containers tightly closed
	Do thoroughly empty containers, don't leave product behind
	Do inform your shift manager in case you notice any product or cooling water leakage
	Do collect material spills immediately and store it in designated clearly labelled containers
	Do collect all quality control samples and store them in the designated container as chemical waste
	Do keep your workplace clean
	Do wash your hands before eating, drinking or smoking
	Do take a shower before going home



Don't overlook the details; guard against mishaps that can harm personnel and/or the environment	
Don't wear incomplete or improper clothing but report it to your shift manager directly	
Don't store containers outside	
Don't open windows or doors if you handle powder material to avoid dust spreading	
Don't treat tested quality control samples differently than other chemical waste	
Don't wash any spills into the floor or rainwater drainage	
Don't eat, drink or smoke at your work place	
Don't wear working clothes going home	



Section III

Company commitment to a Code of Good Practice for the Use of the Flame Retardant Deca-BDE in the plastics sector

Company name recognizes its obligations to comply with the law and carry out its business in as environmentally a sound manner as possible, in order to meet its responsibility to customers, shareholders, employees, neighbours and the natural environment. We are committed to promoting and maintaining an environmental policy to ensure that the impact of our operations on the environment is reduced to a level as low as practically and economically possible.

We recognise and respect the Regulators concerns with respect to the flame retardant Deca-BDE and accordingly, are committed to implementing all relevant portions of this "Code of Good Practice for the Use of the Flame Retardant Deca-BDE in the plastic sector", with a view to continuously improving our environmental performance.

Signature

Managing Director
Company name

