

Mapping of decabromodiphenyl- ether (decaBDE) in other products than electrical and electronic products

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Introduction

The project "Mapping of decabromodiphenylether (decaBDE) in other products than electrical and electronic products" was completed during the period May to November 2006. The project was completed for the Danish Environmental Protection Agency in connection with the Agency's initiatives on the consumer project area.

The project was completed by a cross-functional project group at Eurofins Miljø A/S. MSc Peter Mortensen has acted as project manager and contact with the Danish EPA. Moreover, MSc Jane Pors and BSc Søren Brødsgaard have executed the project.

The purpose of the project was to map the use of decaBDE in products that are not included in the RoHS Directive, including e.g. cables, furniture, and textiles, together with an assessment of which substances or techniques that are used instead. The project is divided into 2 phases. This report describes the result of the first part of the project. A possible second part will include chemical analyses of selected consumer products for decaBDE content.

Summary and conclusions

DecaBDE is not produced in Denmark; however, in theory the compound may access the Danish market through import of the chemical agent as part of semi-finished products or as content in finished products. All three methods are investigated separately.

Information on imported chemical agents and semi-finished products are collected through public registers and contact to trade organization, while information on import of finished products are collected through the same channels supplemented by contact to companies associated in relevant trades. A detailed questionnaire has been sent to approximately 1,000 Danish companies with questions relating to decaBDE content in imported products and knowledge to alternatives, trends, and so on.

The collected information has documented decaBDE import within a number of trades.

5 ton of the compound as chemical agent or part of semi-finished products has been documented. The documented cases have all been import to the plastics industry. The investigation has proven that the major part is re-exported after processing. Import seems connected to isolated specialized contracts and there are no determined indications that decaBDE is used regularly in Danish production.

Data for import of chemical agents or semi-finished products are estimated valid and credible for Danish import from these channels.

As part of finished products decaBDE has been detected in tents, cars, and heat-shrink tubing. Import of decaBDE has not been detected in product groups as upholstered furniture, bedroom articles, cables, furnishing fabrics, glue, nursing articles, baby and children's articles, paints and joint fillers.

Information on decaBDE import as part of a finished product is subjected to considerable uncertainty. The uncertainty is attached to the selection of product groups, response rate from companies, and the fact that many of the companies in question are unaware of a potential decaBDE content in their products.

It is estimated that the investigation covers so widely that it is unlikely that there are larger product groups using decaBDE that have not been involved. However, the response rate and the lacking knowledge of the products' content are a larger problem. It is thus a question whether it is possible at this stage to gain an accurate scenario of the import through finished products.

During the project there have been many contacts to companies and centres of excellence. The obtained knowledge as compared to conclusions in formerly published investigations indicates that the greatest uncertainty is attached to the results within the area of imported means of transportation (cars) and upholstered furniture.

The mapping provides information on the fact that decaBDE is generally attempted replaced with other fire-retardant compounds or other methods. It is a general impression from the investigation that there is no demand for products with decaBDE fire-retardant properties in Denmark. In 1999 the Environmental Protection Agency concluded that the use of decaBDE seemed declining. This investigation confirms this assumption.

Sammenfatning og konklusioner

DecaBDE produceres ikke i Danmark, og stoffet kan derfor teoretisk få adgang til det danske marked via import af kemikaliet, som en del af halvfabrikata eller som indhold i færdigvarer. De tre ruter er undersøgt separat.

Oplysninger om importerede kemikalier og halvfabrikata er indsamlet via offentlige registre og kontakt til brancheforeninger mens oplysninger om import af færdigvarer er indsamlet via de samme kanaler suppleret med henvendelse til virksomheder i de relevante brancher. Der er udsendt detaljerede spørgeskemaer til ca. 1000 danske virksomheder med spørgsmål om indhold af decaBDE i importerede produkter samt kendskab til alternativer og trends mv.

De indsamlede oplysninger har dokumenteret import af decaBDE indenfor en række brancher.

Der er påvist import af skønsmæssigt 5 tons af stoffet som kemikalie eller som del af halvfabrikata. I de påviste tilfælde har der været tale om import til plastbranchen. Undersøgelsen har vist, at størstedelen eksporteres igen efter forarbejdning. Importen synes knyttet til enkeltstående specialordrer, og der er ikke fundet indikationer på, at decaBDE bruges regelmæssigt til produktion i Danmark.

Data for import som kemikalie eller som halvfabrikata skønnes at være valide og troværdige for den danske import ad disse ruter.

Som del af færdigvarer er der påvist import af decaBDE i telte, biler og krympeflex. Der er ikke påvist import af decaBDE i produktgrupper som polstermøbler, sengeartikler, kabler, boligtekstiler, lime, sygeplejeartikler, baby- og børneartikler samt malinger og fugemasser.

Oplysningerne om import af decaBDE som en del af en færdigvare er forbundet med betydelig usikkerhed. Usikkerheden knytter sig til udvælgelsen af produktgrupper, svarprocenten fra virksomhederne samt det forhold, at mange af virksomhederne mangler kendskab til et eventuelt indhold af decaBDE i deres produkter.

Det skønnes, at undersøgelsen er så bredt dækkende, at der næppe er større produktgrupper med brug af decaBDE, som ikke er inddraget. Svarprocenten og det manglende kendskab til produkternes indhold er imidlertid et større problem. Det er således et spørgsmål om det på nuværende tidspunkt er muligt at få et præcist billede af importen via færdigvarer.

Der har i løbet af projektet været mange kontakter til virksomheder og videnscentre. Den opnåede viden sammenholdt med konklusionerne i tidligere publicerede undersøgelser indikerer, at den største usikkerhed knytter sig til undersøgelsens resultater indenfor import af transportmidler (biler) og polstermøbler.

Kortlægningen har givet oplysninger om, at decaBDE generelt søges erstattet med andre brandhæmmende stoffer eller metoder, hvor det er muligt. Det er et generelt indtryk fra undersøgelsen, at der ikke er efterspørgsel efter produkter, som er brandhæmmet med decaBDE i Danmark. Miljøstyrelsen konkluderede i 1999, at forbruget af decaBDE syntes at være faldende. Denne undersøgelse bekræfter denne formodning.

1 Introduction and purpose

The Danish EPA has instigated the project " Mapping of decabromodiphenylether (decaBDE) in other products than electrical and electronical products" in connection with a call for tenders of the project in the consumer project area.

The project's purpose is described in the tender documents as follows:

"To map the use of decaBDE in products that are not included in the RoHS Directive, including cables, furniture, and textiles, together with an assessment of which substances or techniques that are used instead."

The Danish EPA background for this project has been a desire to obtain information on the use of decaBDE outside the product groups that are already regulated through the RoHS Directive (Regulation no 1008 of 12.10.2004).

In the tender documents the Danish EPA has set the stage that the project be completed in two phases.

The first phase is a mapping and collection of present knowledge of the use of decabromodiphenylether (decaBDE) in products that are not included in the RoHS Directive, whereas a second phase consists of a completion of chemical analyses of selected product groups with the purpose of procuring deficient knowledge of occurrence and amounts of decaBDE in these product types.

The purpose is clarified in the following manner in the associated description of the project:

1. A mapping of use of and trend in use of decaBDE in Danish produced and imported products that are not included in the RoHS Directive
2. An assessment (and description) of present alternatives to decaBDE
3. As required possible chemical analyses for decaBDE in selected consumer products.

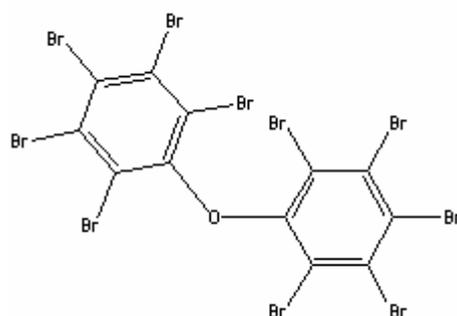
This report describes the result of the abovementioned items 1-2. As mentioned item 3 is completed at a possible later stage.

DecaBDE used as additive to obtain a fire-retardant effect. Thus normally these are concentrations in percentage level in the products. In connection with this investigation this means that concentrations on trace level, due to accidental contamination are uninteresting and thus not included in this mapping.

2 Introduction to decaBDE

2.1 Introduction to decaBDE

Decabromdiphenylether (decaBDE) is a polybromsubstituted diphenylether (CAS no 1163-19-5).



The substance belongs to the group of brominated flame-retardants. This group of substances have found great use to fire protection of inflammable materials. The substances have in particular become increasingly popular for fire protection of electrical products where the combination of inflammable materials (often plastics) and heat from the electrical parts form an ignition risk. Furthermore, the substance is used for fire protection of other inflammable materials.

A Danish investigation from 1999 (the Danish EPA 1999) estimated that the annual Danish use of brominated flame-retardants at 300-600 ton. Hereof it was estimated that the group of polybrominated diphenylether (PBDE), as decaBDE is a part of, accounted for approximately 12%.

Brominated flame-retardants accumulate in nature and thus in the food chain. Some brominated flame-retardants are furthermore, suspected of having negative health effects. DecaBDE is thus e.g. on the EU's list of substances that are regarded potentially hormone-disrupting. During the recent years the group of brominated flame-retardants, including decaBDE have be subjected to a number of investigations for this reason, and regulations and measures have been introduced with the purpose of limiting the use of the most critical brominated flame-retardants.

2.2 Regulations

According to the RoHS Directive and the associated Danish regulation (Danish Ministry of the Environment 2004a) DecaBDE is banned in electrical and electronical products. However, this ban is invalidated for

decaBDE's at the Commission's decision from the 13th October 2005 (EU Commission 2005). Denmark has appealed this decision to the European Court of Justice with a view to make the decision void.

The substance is used as brominated flame-retardants in other consumer products than electrical articles. Currently, there is no further regulation of the use of the substance in Denmark.

Sweden has introduced a total ban on use of decaBDE in all products effective January 1, 2007, however, the regulations in the ROHS directive are observed with the provisional exception.

Other examples of brominated diphenylethers are pentabromdiphenylether and octabromdiphenylether that are both banned marketed according to Regulation no 76 of 9 February 2004 (Danish Ministry of the Environment 2004b).

DecaBDE is not manufactured within the EU; however, it is imported as both a chemical, part of semi-finished products, and as content in finished products.

3 Former mappings

3.1 Denmark

In 1999 the Danish EPA carried out a mass flow analysis for brominated flame-retardants in Denmark (the Danish EPA 1999).

The mapping was concerned with all brominated flame-retardants. There was no separate specification for decaBDE as all polybrominated diphenylethere (PBDE) were processed as one item as a group.

The mapping concluded:

- That the total import of PBDE as chemicals or plastic raw material at the time of testing accounted for approximately 1 ton.
- That PBDE is imported to Denmark in a number of finished good. The specification of the total amount was associated with great uncertainty, however, with an estimated total consumption of PDBE of 30-120 tons annually.
- That content of brominated flame-retardants in imported products constituted approximately 90% of the total use of brominated flame-retardants.
- That the PBDE consumption was in decline.

The results of the investigation are summarized in the tables below (table 3.1 and 3.2).

Table 3.1: Import of PBDE as chemicals or plastic raw material in Denmark in 1997 (the Danish EPA 1999)

Product group	PBDE (tons)
Chemical	1
Semi-finished good (plastic raw material)	0.1- 0.2
Totals	1.1-1.2

Table 3.2: Consumption of PBDE in Denmark in 1997 (the Danish EPA 1999)

Product group	PBDE (tons)
Configured circuit board	0.3-5.2
Card cages	3-10
Other parts of electric apparatuses and machines	5-14
Lighting	1-7
Installations and industrial automatics	7-29
Textiles, carpets, and furniture	0-5

Building materials	1-5
Paints and joint fillers	0.1-0.5
Means of transportation	13-46
Other	0.2
Totals	30-120

If products comprised by RoHS and transportation means are disregarded the total consumption of decaBDE was estimated at 1.3 –11 tons per year.

Keep in mind that decaBDE is one of more polybrominated diphenylethers. The above mentioned results thus express the absolute maximum consumption of decaBDE in Denmark at the time of the investigation.

3.2 Nordic countries

During recent years both Norway and Sweden have published investigations regarding use of brominated flame retardants and including decaBDE.

In 2005 the Norwegian Statens Forurensningstilsyn (SFT) published a mass flow analysis for brominated flame retardants (SFT 2003). The investigation was based on data from 2001.

SFT concluded that the total Norwegian consumption of brominated flame retardants was in the range of 400-500 tons per year. Hereof decaBDE comprise 12-25 tons that are exclusively derived from synthetic rubber production (cellular rubber) for isolation of refrigerating installations in houses, ships, and offshore. There is no registered use of decaBDE for other purposes.

In 2004 the chemical inspection (Sweden) published a waste study of decaBDE (Chemical Inspection 2004). The study contained e.g. a review of the environmental and health risks associated with the substance and an estimate over application and applied amounts.

The report states that decaBDE is primarily used in electronic products (approximately 80%). The remaining 20% are distributed on the following product groups:

- Textiles
- Upholstery
- Cables
- Protective clothing
- Products relating to beds
- Cushions
- Hot-melt glue

The total import of decaBDE as chemical or raw material to Sweden in 2003 was estimated at 5.2 tons.

There is no specification over the import of decaBDE in finished goods.

3.3 EU

There are no manufacturers of decaBDE within the EU; however, EU has estimated that a total amount of 7300 tons (2003) is used for production of goods in EU. 80% of this amount is used for production of electrical products, while 20% (1460 tons) is used for a number of other product types.

The United Kingdom accounts for 50% of this last part corresponding to approximately 730 tons. This is due to strict national regulations for fire protection of furniture (EBFRIP 2004).

The same source indicates that 1300 tons decaBDE was imported in 2003 to the EU in finished goods. If it is assumed that these finished goods are distributed equally between the member states according to population this would in the case of Denmark correspond to 17 tons decaBDE imported through finished goods.

4 Method description

4.1 Introduction

The mapping of the consumption decaBDE in Denmark has been completed in accordance to the Danish EPA's paradigm for mass flow analyses (the Danish EPA 2000). The mapping covers according to the project description only the 2 initial parts of the paradigm (1.1– 2.3) and 4.1. The volume of waste products will thus not be included in the analysis.

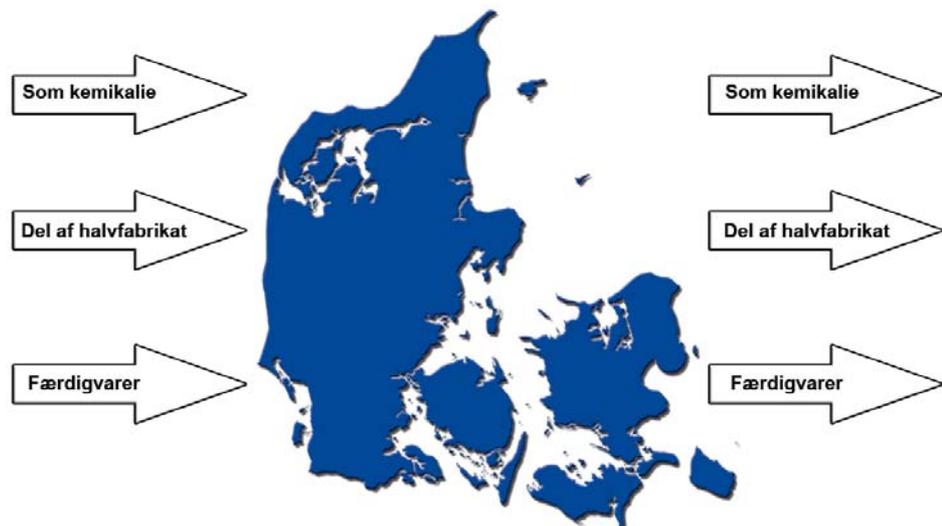
The newest possible data has been searched for in connection with this survey. This means that the contacted manufacturers and suppliers have delivered data from 2005. The public registers have delivered data from 2004 and 2005 respectively depending on the latest update.

The mapping is based on the mapping work that is available from e.g. the other Nordic countries. The result is moreover, compared with data from the Danish EPA's mass flow analyses for brominated flame retardants from 1997 (the Danish EPA 1999).

The used sources are described in details in the following sections.

4.2 Strategy

DecaBDE is not manufactured in Denmark and thus the substance may enter the Danish market in three different ways. The figure below illustrates that correspondingly there may be export of decaBDE abroad.



Figur 4.1.: DecaBDE import and export to and from Denmark

The three import ways were treated separately in the survey and are described one by one in the following.

4.2.1 Import as chemical

Import of pure chemicals, including brominated flame-retardants must be reported to the Denmark's Statistics Office (Foreign Trade). The reporting is performed through the 2 following channels:

1. Via Intrastat that describes Denmark's trade flow with the EU. Companies with an annual EU-import above 1.6 million DKK are obligated to report their import to Intrastat (EU 2004).
2. Via the Danish Customs and Tax Authorities. If the import takes place from a country outside the EU the reporting will be automatic through the imported goods' customs clearance documents contrary to Intrastat. There is no lower threshold limit for when the goods are included (LBK 2005).

Information from the two mentioned sources is gathered at the Denmark's Statistics Office (Foreign Trade) to one specification titled: Foreign Trade Distributed on Goods and Countries.

Import and export of goods distributed on KN-product number are listed on this specification (Customs tariff). The specification also specifies import and export countries. The customs tariff is used to map the import of decaBDE as chemical. DecaBDE is listed on the specification under customs tariff no 2909.30.38: ***Bromine derivatives of aromatic ethers, except pentabromodiphenylether (penta-BDE), tetrabromine(pentabrominephenoxy)-benzene, and tribrominephenoxy.***

In this mapping it is assumed that the imported amounts under the mentioned customs tariff are comprised of decaBDE. Another alternative could be octaBDE, however, as octaBDE together with pentaBDE have been banned since 2004, it is most likely that the reported amounts are comprised of decaBDE and no other substance.

4.2.2 Import as part of semi-finished products

DecaBDE may also enter the country as a component in semi-finished products (plastic raw material), if so it will be evident from the import register. This opportunity is thus been investigated partly through contacts to the trade association for plastic manufacturers partly at contact to the Danish Product Register.

Labelling obligatory substances and materials must be reported to the Product Register at import. DecaBDE is not included of this labelling obligation duty, however, nevertheless it may still be reported if the substance is included in a labelling obligated product or material. Reporting of decaBDE to the product register was mapped through the SPIN-database (SPIN 2006).

4.2.3 Import as part of finished goods

4.2.3.1 *Gross list of product types*

The information collection was initiated with examination of potential applications of decaBDE in products that are not included in the RoHS directive.

The following sources are primarily used for disclosing potential products with decaBDE content.

- Internet
- Published reports
- Search in product register (SPIN database)
- Common knowledge to chemical/technical products

The Internet was used to search information on potential application of decaBDE. The information was searched through websites for decaBDE manufacturers and for the European trade association from manufacturers of brominated flame-retardants (EBFRIP).

A number of published reports (including recent year's Nordic reports), the Danish EPA's own mapping projects and chemical-technical reference were reviewed for information on product types that may contain decaBDE.

Based on the above-mentioned sources a gross list of product types that potentially might contain decaBDE were identified. Table 4.1 shows the product groups that the test identified as interesting.

Table 4.1: Product types with potential decaBDE presence

<ul style="list-style-type: none">• Transportation means• Furniture• Furnishing and wholesale textiles• Cables and other electrical equipment• Glues• Plastic products• Outdoor products• Health care articles• Baby and children's products• Paints and joint fillers

4.2.3.2 *Collection of information*

The gross list was used by means of the NACE code system to select Danish companies within the identified product areas. The selection was performed through a database that is published by the Danish Grocery Industry's information agency (KOB).

In order to limit the amount of companies all one-man businesses were discarded.

The table below shows the number of companies in the selected product groups (table 4.2.).

Table 4.2: Number of companies that have received a questionnaire in connection with the investigation

Product group	Number of companies
Means of transportation	37
Furniture industry	395
Furnishing textiles	120
Wholesale textiles	208
Cables and other electrical equipment	9
Plastics industry	77
Outdoor products	40
Outdoor	58
Glues	16
Totals	960

Moreover, 2 Danish suppliers/manufacturers of paints and joint fillers were contacted.

A questionnaire was sent to all companies in June 2006 containing questions on potential content of decaBDE in the goods that the companies market. The questionnaire is enclosed in appendix B. The auto industry was given customized questionnaire that is enclosed as appendices C and D (English version).

After the response deadline's expiry in July 2006 all non-respondents were contacted by phone. In that connection the response deadline was extended with further 3 weeks.

The average response rate for all categories was 18.5% after the initial deadline. The telephone contact and extended response deadline resulted in further 1.5% response.

Appendix A contains a list of the single companies that were contacted in connection with this investigation.

With the responses of the additional questions in mind and the clarification of conditions in the industry a number of companies within the selected product areas were contacted directly.

4.2.4 Other sources

The analytical laboratory Eurofins Gfa GmbH in Hamburg was contacted in connection with the testing. This laboratory has offered analyses for brominated flame-retardants for many years. The analyses are primarily

carried out in environmental samples (sludge, sediment etc.), however, during recent years the analyses have been performed on consumer products.

The laboratory was asked about:

- Number of analyses for decaBDE in consumer products over the past 2 years
- Number and result of analyses of products outside the RoHS directive's area

During the last 2 years the laboratory has analysed to the extent of 50 consumer products for decaBDE content. The major part has been electrical products.

Several non-electrical products contained traces of decaBDE. The content presumably originates from other applied flame-retardants (impurities).

The laboratory database only contains one non-electrical product with a content of decaBDE above 1%. The actual example was seating foam for chairs with a content of 7.4 in percentage.

During the completion of this report Eurofins GfA GmbH analysed a sample of a polystyrene isolation plate from the German market. The analysis indicated a decaBDE content of 11 weight percentage. The contact to the Danish manufacture of polystyrene isolation plates indicated that this type of material formerly was added flame-retardant agents, however, Danish manufactured polystyrene isolation plates are not added flame retardant agents anymore. The manufacturer cannot dismiss that German construction companies takes flame-retardant polystyrene plates with them to Denmark in connection with concrete construction assignments, but this was considered to be of an insignificant extent.

5 Mapping of decaBDE in Denmark

5.1 Import of decaBDE as a chemical

From Statistics Denmark 2006 it appears that under customs tariff 2909.30.38 covering imports of bromine derivatives of aromatic esters, including decaBDE, 2 tons were imported in 2005. As earlier mentioned, it is likely that these imports were imports of decaBDE.

Furthermore, it appears from statistics that the materials were imported from Sweden. It has not been possible to track the importing company, for which reason it is not possible to determine whether the material was used for products covered by the RoHS Directive or was re-exported. It is therefore assumed that the 2 tons are in fact products covered by this mapping and that consumption of the products has taken place in Denmark.

Through a contact in the plastics industry the project group got in touch with a company that imported 3 tons of decaBDE from the Netherlands in 2005. This material was used for the production of a master batch. After production, the master batch was re-exported to Germany where it has not been possible to trace the use. This amount is not included in the calculation of the total Danish consumption, as the entire amount was re-exported.

Furthermore, the company informs that the import in question and the following re-export of the master batch with decaBDE was an isolated order in 2005 based on some special competitive circumstances abroad. The company has not been met with any demand for master batch with decaBDE in Denmark. The same answer is given by a number of other Danish suppliers of raw materials for the plastics industry.

5.2 Import as content in semi-finished products

From the SPIN database it appears that 300 kg of decaBDE was imported in 2004 via products that are subject to a duty of notification. No amounts are stated for 2005.

Neither products nor importers appear from the part of the SPIN database that is open to the public. Through the Danish EPA, however, contacts were established with such companies. The two companies responsible for the above-mentioned notification have informed that:

- 250 kg decaBDE was imported as fire-retardant in casting resins for mounting in transformers – i.e. use for electronic and electrical products covered by the RoHS Directive
- 50 kg decaBDE was imported as a component in epoxy paint for a special job in England. It has not been possible to obtain further information. The whole amount was re-exported.

5.3 Import as content in finished products

5.3.1 The plastics industry etc.

5.3.1.1 Plastic raw materials

The group of suppliers of plastic raw materials was identified by reference to www.krak.dk.

Table 5.1: Result of the questionnaire survey for the product group Plastic Raw Materials

Number of businesses	77
Number of respondents	22
Response rate	29%
Number of businesses stating use of decaBDE	0

As it appears from the above, none of the respondents has used decaBDE the last year. This confirms the general information from the plastics industry that there is no demand in Denmark for master batch with decaBDE content.

Note, however, that the supplier of plastic raw materials mentioned earlier who made the import of the 3 tons of decaBDE for the master batch did not respond to the questionnaire.

Two businesses inform that they use flame-retardants in their products, but not decaBDE. Alternatives include aluminium hydroxide and tris(1-chloro-2-propyl)phosphate.

5.3.1.2 Stadium seats

Internet search has revealed that decaBDE can be used for fire protection of seats for sports centres and stadiums.

Therefore, two Danish importers of this type of products were contacted by telephone. These two importers cover more than 50% of the market in Denmark.

Both inform that fire protected seats are not produced in Denmark and that, so far, none of the two companies have supplied fire protected seats to Danish stadiums.

One of the suppliers informed that the latest tenders for projects on public stadiums include requirements for use of fire protected seats and that; consequently, this type of seats will presumably be installed in future. More concise information on the nature of fire protection of such future seats was not available.

5.3.2 Means of transport

This group consists of importers and manufacturers of cars, trucks, buses, and trains. The NACE codes for this group are 15.10.10., 60.21.00 and 51.47.30. At the request of several of the respondents, the questionnaire used for this group was also sent in an English version with a view to obtaining information from the foreign manufacturer.

Table 5.2: Result of the questionnaire survey for the product group Means of Transport

Number of businesses	37
Number of respondents	14
Response rate	38%
Number of businesses stating use of decaBDE	1

One importer of cars from the East says that decaBDE is used in wire lugs for the electric system in the marque of cars that he imports. The amount used for one individual car is of the order of 1-5 gram. The car marque in question is a common marque on the Danish market. The marque covers many types of cars for private as well as business purposes and is therefore representative of the Danish fleet of cars.

Information was received from a supplier of one make of cars (Western European) that with certainty their cars do not contain decaBDE. Thus, the same content in all makes of cars marketed in Denmark cannot be presupposed.

In 1999 the Danish EPA stated that Northern European car manufacturers are supposed to have completely substituted poly brominated diphenyl ethers, including decaBDE, while cars with decaBDE are still imported from the East and the USA to Europe. On the assumption that at present this conclusion is correct for all cars manufactured in Europe and that the average amount of decaBDE in cars from other countries (primarily the East and USA) is 3 gram per car analogous to the details in this survey, this gives an average annual import of 240 kilos (table 5.3). In this table an estimate of the uncertainty of this number is stated in brackets. The uncertainty is estimated on the basis of the concentration interval stated (1-5 gram per car), the number of imported cars of the make in question and the total import of cars to Denmark from the East and the USA (2005), respectively.

Table 5.3: Annual import of decaBDE in cars

Amount of decaBDE per car (one importer)	1-5 gram
Estimated import of decaBDE to Denmark (2005)	240 kg (18-1000 kg)

Several of the respondents are not sure, though, whether there is decaBDE in the cars they market. The Danish EPA (1999) states that a number of manufacturers use decaBDE for fire protection in parts of the car cabins. Verification of this has not been possible in this survey. In the affirmative case, however, the amounts in one car will be considerably larger than 1-5 gram and, as a consequence, the above-mentioned figures for consumption in Denmark are underestimated, if cars with decaBDE in cabin parts are still being imported.

A number of the responds received mention that since, at present, the use of decaBDE is not subject to any restrictions, suppliers make no demands on their sub-suppliers as regards the use of decaBDE.

One car manufacturer states that they primarily seek to use materials that already possess natural fire retardant qualities rather than add fire retardant materials.

5.3.3 The furniture industry

5.3.3.1 Upholstered furniture

Upholstered furniture is one of the product groups most often referred to, when it comes to the use of decaBDE in other than electronic products. The reason is that among others England and Ireland have specific rules laying down procedures for fire protection of this type of furniture.

Table 5.4 shows the result of an enquiry made among potential Danish manufacturers and suppliers of upholstered furniture. The NACE code system does not have a specific category for upholstered furniture alone, so the questionnaire was sent to a number of manufacturers and importers of furniture that do not include upholstered furniture in their assortment. The NACE codes for the businesses in this group are 36.11.00., 36.11.20., 36.15.00., 51.47.05. and 51.47.10.

Table 5.4 Result of the questionnaire survey for the product group Upholstered Furniture

Number of businesses	395
Number of respondents	53
Response rate	13%
Number of businesses stating use of decaBDE	0

The response rate is very low, which of course affects the validity of data negatively. In order to obtain supplementary information three Danish manufacturers of upholstered furniture were contacted by telephone. One has the furniture manufactured in Denmark, whereas the other two have the furniture manufactured in Eastern Europe and Asia.

Two of the three companies state that they definitely do not market FR treated (FR; Flame Retardant) upholsteries in Denmark. Both businesses produce FR treated upholstered furniture for sale in England. In one case the furniture is shipped directly from the foreign manufacturer to England without passing through Denmark. The other case is a special product not for sale in Denmark.

The third manufacturer informs that the production takes place in Eastern Europe and that FR treated furniture is imported to Denmark. E.g. Belgian companies carry out the FR treatment of textiles and cushions. In spite of repeated reminders it was not possible to obtain information on the type of FR treatment or on amounts imported. Presumably, decaBDE is still used for fire protection in furniture textiles in a number of countries, and therefore Danish imports of decaBDE in upholstered furniture cannot be ruled out. A calculation of amounts, however, is not possible.

One consultant, who has a long and detailed knowledge of the Danish furniture industry, claims that he is not aware of any cases of use of decaBDE in Danish furniture.

EUROPUR, the European trade association of foam manufacturers, has been contacted. EUROPUR has no knowledge of any use of decaBDE in PU (polyurethane) foam in Europe.

5.3.4 Cables and electronic accessories

5.3.4.1 Power cables

Cables used for alternating current of more than 1000 volts and direct current of more than 1500 volts are excepted from the regulations of the RoHS Directive and thereby covered by this survey.

Danish manufacturers and suppliers of cables were identified by means of contacts within the industry, references to guides and references to wholesale catalogues. A total of 1 manufacturer and 8 importers of cables were contacted. Sources within the industry have stated that the 9 businesses contacted cover more than 90% of the Danish market.

Table 5.5: Result of the questionnaire survey for the product group Cables

Number of businesses	9
Number of respondents	2
Response rate	22%
Number of businesses stating use of decaBDE	0

One Danish manufacturer of cables of this type was contacted by telephone. This manufacturer informed that brominated flame-retardants are used in no cables produced in Denmark, at all.

5.3.4.2 Heat shrinkable material

Information was found on the Internet that decaBDE can be used for fire protection of heat shrinkable material (flexible polymer material shrinkable by means of heat - used for e.g. insulation of live joints). A few multinational companies produce most heat shrinkable materials.

Heat shrinkable material is covered by the RoHS Directive, in so far as it is used for/mounted in connection with electric installations, but not if it is sold separately e.g. for other electrical purposes. Therefore it was chosen to include heat shrinkable material in this survey.

Such products are sold in all small and large electronics stores and in many hobby shops. As there are numerous retail shops in Denmark that sell heat shrinkable materials, and as the number of manufacturers worldwide is limited, enquiries about sale of decaBDE-containing products were made to the manufacturers instead of the retailers. Thus the three largest suppliers to the Danish market were approached.

Table 5.6 below summarizes the result.

Table 5.6: Result of the questionnaire survey for the product group Heat Shrinkable Material

Number of businesses	3
Number of respondents	1
Response rate	33%
Number of businesses stating use of decaBDE	1

Import of decaBDE was identified through the one manufacturer that responded. The material in question was a special product; of which the total annual amount sold was barely 200 m heat shrinkable material. The content of decaBDE was stated to be barely 10 percent by weight.

On this basis, the annual amount of decaBDE imported by this manufacturer can be calculated to be less than 1 kg. If we assume that the other manufacturers of heat shrinkable materials use the same amount of decaBDE, this implies a total annual import of less than 5 kg.

Table 5.7: Annual import of decaBDE in heat shrinkable products

Import – annual amount as informed by respondent	Less than 1 kg
Estimate of total annual amount imported to Denmark*	Maximum 5 kg

*: the estimate results from an assumption of the same relative share of decaBDE in imported products.

5.3.5 Furnishing fabrics

Flame retardants can be used in a number of furnishing fabrics, such as carpets and curtains. The group covers wholesale and manufacturing of all textiles for the home, except clothing. Fixed and movable carpets, curtains, cushions, tablecloths, bed linen etc. are all included under this group. The NACE codes for the group are 17.40.20., 17.51.00., and 17.40.90.

Table 5.8: Result of the questionnaire survey for the product group Furnishing Fabrics

Number of businesses	120
Number of respondents	24
Response rate	20%
Number of businesses stating use of decaBDE	0

The completed questionnaires and telephone contact to selected companies in the group of respondents gave the following information on the product group:

There are no general requirements regarding fireproofing of furnishing fabrics in Denmark apart from mattress covers.

None of the manufacturers or dealers mentions use of decaBDE. One respondent describes use of another brominated flame-retardant, and others use inorganic flame-retardants. According to the questionnaires we have received, a number of manufacturers/dealers use materials with inherent flame retardant qualities, such as the polyester fabric Trevira CS with integrated metal compounds.

Brominated flame-retardants are not used in carpets manufactured in Denmark.

5.3.6 Wholesale textiles

Furnishing fabrics are also available through dealers registered as “wholesale textiles”. This group also covers textiles sold for later use in clothing, upholstery etc. However, the group cannot be split up further under the

NACE code 51.41.00. Thus, the products include textiles sold directly as well as textiles sold for further manufacture.

Table 5.9: Result of the questionnaire survey for the product group Wholesale Textiles

Number of businesses	208
Number of respondents	32
Response rate	15%
Number of businesses stating use of decaBDE	0

The completed questionnaires together with telephone contacts to selected businesses in the group gave a good deal of information about the product group.

As was the case with the previous product group, there are no general European requirements regarding fire applying to this product group. However, a few countries, e.g. England, have specific rules regarding fire protection.

One answer indicates the use of halogenated flame-retardants, but not decaBDE. This manufacturer, though, works at phasing out this type of flame-retardants. Several manufacturers report using materials such as Trevira CS, Duraflam, and Duracote. The fire retardant qualities of the two last-mentioned products are based on organic and inorganic phosphorus compounds, including ammonium phosphates.

Dealers of large textiles for sports centres, such as nets, room dividers etc., were contacted by telephone. This product group is not subject to any fire requirements, but one type of material frequently used for room dividers is a material with inherent flame-retardant qualities. None of the respondents acknowledge having used decaBDE.

5.3.7 Camping

To investigate the product group Camping, wholesale businesses selling sports items and/or camping equipment were contacted. The NACE code of this group is 51.40.10 and this covers manufacturers/importers of sunblinds, other types of sunscreens, Venetian blinds, tents etc. Excepted are businesses that could be immediately identified as irrelevant in this connection, such as sail makers, rope makers and flag factories.

Table 5.10: Result of the questionnaire survey for the product group Camping

Number of businesses	40
Number of respondents	7
Response rate	18%
Number of businesses stating use of decaBDE	1

The completed questionnaires together with telephone calls to selected companies from the group gave the following information on the product group:

Large party tents within this group are subject to requirements for fire safety, but no one uses decaBDE for the purpose. Many of the products within this

group use PVC canvas that is inherently fire retardant due to the large content of chlorine. The content of plasticizers in plasticized PVC may necessitate extra fire protection.

A large Danish manufacturer/importer informs that treatment with flame-retardants have become more common in camping tents. This manufacturer uses decaBDE as flame-retardant, thereby accounting for the only confirmative answer in the group. Production takes place in China. The majority of the imported tents are re-exported. Part of the import goes to England. The business has provided information on expected sales for 2007 as data for the investigation.

Table 5.11 shows the actual figures that are based on information on the consumption of decaBDE. The figures in brackets show the estimate range for the consumption of decaBDE in tents in Denmark. The estimate is based on the information received from the one importer about the average content of decaBDE in tents and from Statistics Denmark: Im- and exports January-December 2005.

To convert imports of synthetic tents from tons to number of tents, the project group has based their calculation on an assumption that an average tent weighs 15 kg. Based on this assumption, annual imports will amount to 160.000 tents. This seen in combination with the actual data leaves a maximum import of 190 kg to Denmark via tents. According to market information and data from Statistics Denmark a large part is being re-exported, leaving the share of decaBDE for use in Denmark at less than 190 kg, as seen in table 5.11 below.

Table 5.11: Annual imports of decaBDE in tents

Amount of decaBDE per tent	2 gram
Estimate of decaBDE imported to Denmark	100 kg (100-190 kg)
Estimate of decaBDE consumption in Denmark	10 kg (10-100 kg)

Regardless of the uncertainties of this estimation, the amounts accessing Denmark through imports of tents are still limited.

5.3.8 Outdoor life

To include all tents, the group Outdoor Life is also covered. The NACE code for this group is 51.47.35. and it includes tarpaulins and camping and sports equipment. Excepted from the group are businesses manufacturing or dealing in equipment for golf, riding, horse racing, and yachting

Table 5.12: Result of the questionnaire survey for the product group Outdoor Life

Number of businesses	58
Number of respondents	9
Response rate	16%
Number of businesses stating use of decaBDE	0

Together with the questionnaire responses, a few businesses in the group were contacted. No respondents had stated a use of decaBDE or other flame-retardants. Awnings were stated as containing no fire retardants, and

taraulins, in general, were made of PVC, which has natural fire retardant qualities.

5.3.9 Glues

A source (Kemikalieinspektionen 2004) has stated that hot melt glues may contain decaBDE. The NACE code for this group is 24.62.00 and comprises glue factories.

Table 5.13: Result of the questionnaire survey for the product group Glues

Number of businesses	16
Number of respondents	6
Response rate	38%
Number of businesses stating use of decaBDE	0

Subsequent contact to Kemikalieinspektionen confirms that decaBDE is no longer used in hot melt glues. Thus, the project group considers glues to be completely decaBDE free.

5.3.10 Nursing requisites

Requisites to be used by sick, weak or disabled consumers need more safety in case of fire. Products such as cushion seats/wheelchair cushions, mattresses, duvets/pillows and bed linen are available with flame-retardants for this particular consumer group.

The products constitute a grey zone when it comes to legislation on medical equipment. The products are only subject to the Order (BEK no 1268 of 12/12/2005) when marketed directly as equipment for disabled persons. The buyers on the market, however, demand fire protection of these products.

Countries like England, France, the Netherlands, and Belgium also step up their focus on fire safety in order to satisfy more players on the market.

No information was found regarding any use of decaBDE in this type of products.

One supplier states that duvets/pillows are fire protected by means of Trevira CS, cotton/linen fire protected by means of Pyrovatex, and that smoking aprons are made of glassfibre material. Pyrovatex is based on inorganic phosphorous compounds (Environmental guidance for work clothing). Other actors inform that they use Fyrol FR2 (tris-(1,3-dichloro-2-propyl)phosphate) for fire protection of textiles.

5.3.11 Commodities for babies and children

Consumer products intended for children and babies were investigated, particularly car seats, bicycle trailers, prams, and push chairs.

The largest actors on the market within the four product groups were contacted by telephone.

The calls revealed that no flame-retardants are added to neither bicycle trailers, prams, pushchairs, nor car seats in Denmark.

5.3.12 Paints and joint sealing compounds

As earlier paints have been said to contain PBDE (Table 3.2), three actors on the market were contacted, two of who practically cover the market for fire protecting paints and joint sealing compounds. Both state that flame retardant substances are not added to their products. Instead, their products swell or expand when exposed to heat (structural fire protection).

5.4 Total statement of decaBDE

All facts demonstrated in this investigation are gathered and shown in table 5.14.

Table 5.14: Summary of the findings with regard to annual imports of decaBDE (2005)

Area	Year	Application	Imports	Exports	Ref.
Chemical ¹	2005	Unknown	2000 kg	Unknown	5.1
Chemical ²	2005	Master batch	3000 kg	3000 kg	5.1
Semi-finished products ³	2004	Epoxy paint	50 kg	50 kg	5.2
Cars	2005	Wire lugs	240 kg (18-1000 kg)	No	5.3.2
Heat shrinkable material ⁴	2005	Heat shrinkable material	< 5 kg	No	5.3.4.2
Tents	2007	Surface treatment.	100 kg (100-190 kg)	90 kg	5.3.7

1 Covers a group of chemicals including decaBDE; most likely it is decaBDE. Use of the chemical is unknown

2 Stated as an isolated export order

3 Stated as an isolated export order

4 Annual imports to Denmark can be estimated at < 5 kg

When decaBDE is imported as a chemical or as semi-finished products we often speak of single, isolated orders. Nothing indicates a regular use of decaBDE in Denmark. Isolated cases, however, will most likely happen every year in an amount estimated at less than 5 tons. Apparently, most of the material is being re-exported, leaving only a small amount for consumption in Denmark.

Imports of cars constitute the major uncertainty, as only two car manufacturers have submitted detailed answers, one of which uses decaBDE. Other car manufacturers could perhaps be using decaBDE in man-made materials or fabrics for the cabin, as indicated in other investigations. As the total potential amount from such materials by far exceeds the other amounts, cars constitute a field that should be studied more closely in order to throw light on the actual present use of decaBDE.

Three large actors, of whom only one has submitted information for this project, dominate the market for heat shrinkable material. If their use of decaBDE is representative of the other manufacturers, the total consumption of decaBDE in Denmark within this product group will amount to less than 5 kg.

One tent importer and dealer using flame-retardants as surface treatment of the tents have been identified. This does not exclude the possibility that other importers use flame-retardants, but the contact to the other large importers on the market has shown that they do not use fire retardant additives. In any case, within this product group the total import is therefore limited and will hardly exceed 50 kg as net consumption (imports minus exports) for Denmark.

No use of decaBDE has been demonstrated within the product group Upholstery Furniture. The investigation has shown that furniture with fire retardants are still being imported to Denmark to a certain degree, but knowledge about decaBDE as a flame retardant component is very insufficient. There is reason to assume that furniture with content decaBDE is being imported to Denmark, because the component is still being used worldwide for the purpose, and because hardly any special products are being made only for the Danish market.

Foreign laboratory analyses have demonstrated use of decaBDE in polystyrene boards. Insulation boards of polystyrene produced in Denmark do not contain decaBDE, and nothing indicates any import of decaBDE through these materials.

5.4.1 Comparison with EU

As mentioned earlier, the total import through finished products to EU has been calculated to be 1300 tons corresponding to 17 tons for Denmark when distributed proportionally by number of inhabitants. As it appears from the previous sections, it has not been possible by this survey to demonstrate imports of this volume.

However, it is doubtful whether the European data can be applied proportionally within the individual countries, the reason being, partly, national regulations as known from England and Ireland and, partly, national differences in the use of fire protective products. That national differences can be considerable appears from the fact that it has not been possible for this investigation to demonstrate the same consumption of decaBDE for cellular rubber as was demonstrated in a Norwegian investigation (SFT 2003).

6 Alternatives

Due to presumably negative health and environmental impacts at brominated flame-retardants (including decaBDE) usable alternatives have been searched for systematically over the recent years. In this connection detailed catalogues containing alternative have been prepared – e.g. the Chemical Inspection (Kemikalieinspektionen) 2005 and the Danish EPA 1999.

In principle a reduction in the application of decaBDE may be in one of the following ways:

1. Substitution of decaBDE with another and less problematic connection without changing the material that needs protection (substance substitution).
2. Change to another material that does not require flame protection or use of other less problematic flame retardant chemicals (material substitution)
3. Substitution of the product with another product or another technology that does not presuppose use of decaBDE (design changes)

There are a number of alternatives for decaBDE available today and the previously mentioned reference contains besides a listing of possible alternatives also concrete examples of the three principles mentioned above.

The alternative selection depends on a number of factors. Besides the alternative's health and environmental properties the "right" choice is also determined from a number of factors linked to the production and properties at the finished product. The Danish EPA 1999 summarized these significant properties in the headings listed in table 6.1.

Table 6.1: Basic significant conditions when selecting alternatives to decaBDE (The Danish EPA 1999)

- Physical/chemical properties at the selected alternative in the production phase
- Physical/chemical properties during the product's use
- Health and environmental properties in the entire product's life from production to disposal
- The price of the alternative (the flame-retardant)
- Financial consequences due to a change to an alternative flame retardant or due to transitions in the production conditions

As mentioned the Danish EPA 1999 and the Chemical Inspection (Kemikalieinspektionen) 2005 contain comprehensive lists over alternatives to decaBDE in a number of different materials and product types. The reader is thus referred to these lists for inspiration to possible alternatives for concrete materials/products.

In connection with the completed questionnaire study the participant were asked of their knowledge to potential alternatives to decaBDE in their products just as trends in use of decaBDE were asked for.

The same question was sought answered at direct contact in the project stages and especially in the three cases if actual use of decaBDE that was identified.

6.1 Alternatives to decaBDE – summary of questionnaire responses

It is practically identical feedback from the contacted companies that decaBDE is sought replaced with other flame retardant substances or methods if possible.

The following substances and substance groups are represented in case of decaBDE substitution with other substances:

- Metal hydroxides – e.g. magnesium hydroxide
- Metal hydrates – e.g. aluminium trihydrate
- Organic phosphorus compounds – e.g. tris(1-chloro-2-propyl)phosphate
- Inorganic phosphorus compounds – e.g. ammonium phosphates
- Other brominated flame-retardants – e.g. ethane-1,2-bis(pentabromophenyl)
- Metal compounds – e.g. silver (in woven or as nanotechnology)

The use of brominated flame-retardants within paints and joint fillers has been substituted by structural flame-retardant properties, where the flame-retardant effect is obtained by the materials increasing in extent effect at heat impact, thus avoiding or delaying the heat impact of the protected parts.

In other situations the potentially inflammable materials have been substituted with non-flammable materials e.g. use of woven glass fibre materials smoke aprons for senior citizens and disabled persons.

6.2 Trends in the use of decaBDE

The completed mapping has only demonstrated limited or sporadic use of decaBDE in Denmark.

There has only been a determined total import under 300 kg decaBDE as part of finished goods in the present mapping and 5 tons as chemical/semi-finished products. The Danish EPA (Miljøstyrelsen) 1999 has a registered use of 30-120 tons per year for polybrominated diphenylethers. The two mappings have applied different method of assessment and can thus not be immediately compared – however, there is reason to assume that the total use of PBDE and thus decaBDE has decreased since the mapping in the late 1990s. The Danish EPA (Miljøstyrelsen) 1999 concludes that the use of decaBDE seems

to have decreased since the late 1990s. Present mapping confirms this assumption.

It is a general assumption from contacts with companies and trade organizations that there is no demand for products that have been flame-retardant treated with decaBDE in Denmark and that the companies seek to substitute decaBDE with other substances or methods if possible.

There is thus no reason to assume that the use of decaBDE will increase in Denmark in the future unless new product types with decaBDE content are introduced.

7 Conclusion and summary

This report presents the result of the project "Mapping of decabromodiphenylether (decaBDE) in other products than electrical and electronic products". The project is part of the Danish EPA's continuous initiatives on the consumer product area.

The project was purposed to map the use of decaBDE in products that are not covered by the RoHS Directive and give an assessment of trends and alternatives to use of decaBDE in this type of products.

The project's initial phase is mapping and collection of present knowledge on use of decaBDE in products that are not covered by the RoHS Directive, while a potential second phase will consist of a number of chemical analyses of selected product groups with the purpose to procure missing knowledge occurrence and amounts of decaBDE in these product types.

DecaBDE is used as an additive to obtain a flame-retardant effect. Normally this would mean concentrations in percentage levels in the products. In connection with this project this means that concentrations on trace levels due to unintentional contaminations are uninteresting and thus not included in this mapping.

7.1 Method

The mapping of the use of decaBDE in Denmark has been completed in accordance to the Danish EPA's paradigm for mass flow analyses (item 1.1-2.3 and 4.1).

DecaBDE is not produced in Denmark and the substance may thus theoretically enter the Danish market through import of the chemical or as part of semi-finished products or finished goods. The three routes are investigated separately. The information on imported chemicals and semi-finished products are collected through public registers and contact to trade associations, while the information of finished goods are collected through identical channels added inquiry to companies in the relevant trades. A detailed questionnaire containing questions on decaBDE content in imported products and knowledge of alternatives and trends has been sent to approximately 1000 Danish companies.

The total response rate is approximately 20% from the contacted companies. Naturally the low response rate has an impact on the validity of the results – not least due to the few "findings" of decaBDE in the material.

Furthermore, the project group has found that most importers of finished goods know very little of potential decaBDE content in the imported goods. It is thus likely that there are false negative responses in the material.

7.2 Imported amounts of decaBDE to Denmark as chemical or semi-finished products

The collected information has documented import of decaBDE within several trades.

There is a determined import of estimated 5 tons as chemical or part of semi-finished products. The determined cases have been import to the plastic industry. The investigation has shown that the major part is reexported following processing. The import seems connected to single special orders and there are no indicators that decaBDE is used regularly in Danish production.

The collected information on import of decaBDE as chemical and semi-finished product is assessed to provide a credible image of this import to Denmark. It is, however, notable that the investigation documented import of 3 tons chemical that was not registered in the public registers.

7.3 Imported amounts of decaBDE to Denmark as part of finished products

There is a determined import of decaBDE in finished products as tents, cars, and heat-shrink tubes. The use for tents is estimated to 32 kg (23-110 kg), while the heat-shrink tubes are estimated at less than 5 kg per year.

The estimated import for cars is 240 kg per year (18-1000 kg) that originates from flame retardant connectors. Besides the uncertainty that is attached to the estimate for these components, the estimate for cars is connected with uncertainty due to potential use of decaBDE for the interior of the car. This investigation has not been able to determine a considerable use for this purpose as former investigations have.

There is no determined import of decaBDE in the product groups upholstery, bedding articles, cables, furnishing textiles, glues, health articles, baby and children's articles, and paints and joint fillers.

The investigation of the import of finished products is connected with considerable uncertainty. The uncertainty is connected with the selection of product groups, response rates from companies, and the companies' knowledge of potential decaBDE content in their products.

It is assessed that the selection of product groups in this investigation is adequately comprehensive to the fact that it is unlikely that there are product groups with considerable use of decaBDE that are not represented.

As mentioned the average response rate was approximately 20%. Naturally the remaining 80% represents a certain uncertainty, and there is no doubt that this group contains companies that import finished products with decaBDE content.

The third source of uncertainty is the companies' actual knowledge to potential decaBDE content. As the substance is not regulated many importers' knowledge is presently insufficient. A number of the contacted companies have made a huge effort to clarify whether decaBDE is part of their products in connection with the questionnaire. However, there are also companies that

refer to the fact that the substance is not regulated for which reason detailed knowledge is not necessary.

During the course of the project there have been many contacts to companies and centres of excellence. The obtained knowledge as related to the conclusions in the formerly published Nordic mappings indicates that the greatest uncertainty is connected to the investigation's results within import of transportation means (cars) and upholstery.

7.4 Alternatives and trends in the use of decaBDE

Companies and trade associations inform that decaBDE is sought substituted with other flame-retardant substances or methods if possible. It is a general impression from the investigation that there is no demand for products that are flame-retardant treated with decaBDE in Denmark.

A wide variety of methods and substances are used to substitute decaBDE and the investigation has determined use of structural flame retardant properties as well as substitution with substances that are regarded less problematic in terms of health and environment relations.

The completed mapping has only limited and sporadically mentioned use of decaBDE as chemical and semi-finished products in Denmark just as the import through finished products seems limited to no more than a few tons a year.

As it appears from the above mentioned the estimated use is connected with great uncertainty and the question is whether it is possible to obtain a precise estimate of the total use in Denmark. When the investigation's results are joined the result is that use of decaBDE for flame-retardant purposes is limited in Denmark. In 1999 the Danish EPA (Miljøstyrelsen) concluded that the use of decaBDE seems to be decreasing. This investigation confirms this assumption. Thus there seems to be a clear tendency towards a minor use of decaBDE.

There is no reason to assume that the use of decaBDE will increase in Denmark over the coming years unless new product types with decaBDE content are introduced.

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Miljøvejledning for arbejdsbeklædning med værneegenskaber. Udkast nr. 03 af 2005-03-10. Udarbejdet af HHK, IPU

SFT 2003: Bruken af bromerte flammehemmere i produkter. Statens Forurensningstilsyn, Oslo 2003.

SPIN 2006: Substances in Preparations in Nordic Countries, Arbejdstilsynet, Register for stoffer og materialer, 2006

Appendix A – List of companies

List of the companies to which the questionnaire was sent and/or that the project group has been in telephone contact with.

Auto importers

Arriva Danmark A/S	K.W. Bruun Import A/S
BMW Danmark A/S	KIA Automobiler A/S
Bombardier Transportation Denmark A/S	Lada Danmark A/S
C. Reinhardt A/S	Land Rover Danmark A/S
Carl Andersen Motorcykler A/S	MAN Last & Bus A/S
Citroen Danmark A/S	Mazda Motor Danmark
DAF Trucks Danmark A/S	MMC Danmark A/S
DaimlerChrysler Danmark A/S	Nissan Nordic
Dankor Autoimport A/S	Renault Trucks Danmark A/S
DSB A/S	Scania Danmark A/S
Evobus Danmark A/S	Skandinavisk Motor Compagni A/S
Fiat Automobiler Danmark A/S	Ssangyong Danmark A/S
Ford Motor Company A/S	Suzuki Bilimport Danmark A/S
General Motors Danmark	SAAB Danmark A/S
Honda Motor Europe – Denmark	Toyota Danmark A/S
Hyundai Bil Import A/S	Vilh. Nellesmann Handelsselskab A/S
International Motors	Volvo Personvogne Danmark A/S
Iveco Danmark A/S	Yamaha Motor Denmark A/S
Jaguar Danmark A/S	

Plastic raw material supplier

3 Complast	DNP Denmark A/S
A.V. Pehrsson A/S	DuPont Danmark ApS
A/S Nordica	E. Callsen & Co. A/S
Albis Plastic Scandinavia Ab	Edufan A/S
Arkema A/S	Erland Nielsen
Asicomo A/S	Expladan A/S
Asicomo A/S	ExxonMobil Biomedical Sciences
AWL Kemi ApS	Ge Plastics ApS
BASF A/S	Gel-Top A/S
Bayer Danmark A/S	Granudan ApS
Bjørn Thorsen A/S	Hammel Plast A/S
Borealis Danmark A/S	Hanias A/S
Bruno Weile Chemicals ApS	Hanja Plast ApS
Brøste A/S	Hans Lautrup Chemicals A/S
Chemapol Scandinavia A/S	HH Plastkombi A/S
Color System DK A/S	Hvidtco ApS
Commodity Trading	Icom Composites A/S
Comoco ApS	Inatech ApS
Dafa A/S	K. BALLING-ENGELSEN A/S
Danbeck	Kemi-Schou A/S
Dankalk A/S	Kemitura Handel ApS
Danrec Aps	Kibo Teknik

Dasico A/S

Plastic raw material supplier (continued)

Lundtek
Medical Silicones

Melitek A/S

Monocon ApS
Monofiber A/S
Neoplastics ApS
Nordalim A/S
Papyrus A/S
Plastbørsen
Plastcom A/S
Plasteel
Polimeri Europa Norden A/S
Polyfa Consultants A/S
Polyfoss Plastic A/S
Polyone Denmark
Polyteam Plastic ApS

Kunststof-Kemi Skandinavia A/S

POLYTEX SKUMPLASTFABRIK A/S
Rationel Isoleringselementer &
Celleplastfabrik A/S
Rationel Isoleringselementer &
Celleplastfabrik A/S
Reichhold Danmark A/S
Repsol Brønderslev A/S
Rhodia Danmark A/S
Sabic Nordic A/S
Siemens Flow Instruments A/S
Teknisk Agentur A/S
Ticona Norden Danmark A/S
Trinch
United Foam ApS
USB Danmark A/S
Wavex ApS
Wilfert Chemical Denmark A/S

Upholstery

2B International ApS
2M Polstring Middelfart ApS
3 W Engineering ApS
A & T Møbeldesign I/S
A Trend ApS
A/S Anton Dam Møbeleksport
A/S Fredericia Stolefabrik
A/S Hammel Møbelfabrik
A/S MK Furniture
A/S Nordfjeld Products
A/S Scandinova
A/S Scandinova
AB Components ApS
AB Kontormontering ApS
AB Møbler
Abbo Furniture ApS
Actona Company A/S
AIM International ApS
Air Spring I/S
Aktieselskabet J.L. Møllers Møbelfabrik
Allan Toft ApS
Ama'r Møbel Hal ApS
Ambiente Furniture A/S
Ansager Møbler International A/S
AP Møbepolstring ApS
Arkifurn A/S
Arki-Kontorindretning ApS
Arkitektstudio I/S
Art Style
Associated Weavers International
Scandinavia ApS
AT Møbeldesign ApS
Atleve ApS
Avani Design I/S
B&B Interiør ApS
B.B.C. International ApS
B.E.B. Furniture Style ApS

Basta Kontorindretning ApS
BA-Trading I/S
Bennick Of Scandinavia ApS
Bennick Of Scandinavia ApS
Bent Krogh A/S
Best Buy Products A/S
Bevo Design ApS
BI Wood and Furniture ApS
Bino A/S
Birk Møbler ApS
Bjergtrolden ApS
Boa Design ApS
Boconcept
Boel Denmark ApS
Bo-Ex Furniture ApS
Boli ApS
Bolighuset Vinderup I/S
Bondo Kontormøbler A/S
Bork - Eppers Trading ApS
Botium A/S
Bowi Møbelindustri A/S
Bred Møbelfabrik A/S
BT Gulve Køge ApS
Bøgh/Lisberg ApS
C. Bøjstrup & Søn ApS
Cabinett ApS
Canett Furniture A/S
Carl P.
Carl Thøgersen A/S
Casa Danica A/S
Center Furniture A/S
CH 2 ApS
Chairman ApS
Charnelle Furniture ApS
Christiansfeld Autopolstring ApS
Cicci ApS

B.K. 2003 ApS

Upholstery (continued)

Cinal ApS
Cinas A/S
Claudius Foam ApS
Clausens Møbepolstring ApS
Clauser A/S
Club 8 Company A/S
CMP Furniture A/S
Coco Interior ApS
Cococarpet ApS
Collection Creative ApS
Colorit Osted A/S
Combi-Industri A/S
Combi-Logistik
Compfitt A/S
Compfitt Glas A/S
Complete Office A/S
Conlink Furniture ApS
Constructor Danmark A/S
Copenhagen Furniture ApS
CP Møbler A/S
Crival Products Denmark ApS
D&K Furniture A/S
Da'Core A/S
Dadema Trading ApS
Dan Garden ApS
Danclock ApS
Danerka A/S International
Dan-Foam ApS
Danish Design Group 2000 A/S
Danish Vietnamese Company ApS
Danish Woodflooring ApS
Dannor Hass & Berg A/S
Dansani A/S
Dansk Engros I/S
Dansk Totalindretning ApS

Dansk Tæppestormarked ApS
Danstore Interieur A/S
Darum Butiksinventar ApS
Design M. H.
Detra System A/S
Dica A/S
Dobolo.com ApS
Domus Interieur I/S
Duba Møbelindustri A/S
Duba-B8 A/S
E. L. T. Quilt
Eastline Connect ApS
Ege Contract A/S
Egetæpper A/S
Elfa Lumi A/S
Elo Møbel ApS
EM Design Møbler ApS
EM Design Møbler ApS
Engelbrechts Furniture A/S
Ergo Star Interieur A/S
Ergo-Furniture ApS
Ergovision ApS

Cimber-Scan-Wood A/S

Erik & Ole Mortensen A/S
Eriksen Randers A/S
Euroform Danmark A/S
E-Way ApS
Expo Natura
F.S.T. Møbelagentur ApS
Fabula Living ApS
Farsø Stolefabrik A/S
FJ Trading A/S Bolig- og Institutionsinventar
FK Møbeldesign A/S
FL-Buur ApS
Flexa Møbler Hornsyld A/S
Flextek Ståltreoler A/S
Flora Patricia ApS
FM Møbler ApS
For Resten A/S
Forbo Flooring A/S
Form 75 Design ApS
Four Design ApS
Freddy August Nørregren
Fritz Hansen A/S
Fuglsang Interior ApS
Furn Consult ApS
Furniture A/S
Furnillu ApS
Futon House ApS
Gammelstrup Møbelfabrik ApS
Gangsø Møbler A/S
Garant Brich Tæpper og Gulve
Gazzel Trading ApS
Getama Danmark A/S
Gima Line I/S
Giorgetti Scandinavia A/S
Globe Furniture A/S
Godiksen Jr. Dænische Møbel/ Danish Furniture ApS
Grønbjerg Møbelindustri A/S
Guldborg Møbler A/S
H. J. Kontorcenter A/S
H.H. Furniture A/S
H.J. Production ApS
Hakimco Import & Export ApS
Hanbjerg Møbelfabrik A/S
Handelskompagniet Henrik Steen A/S
Hansen & Sørensen ApS
Hansen Living ApS
Haslev Møbelsnedkeri A/S
HC Tæpper A/S
Helene Lorenzen A/S
Hemmingsen & Jacobsen A/S
Henning Wilstrup ApS
Hillerød Møbler
HJ Møbler A/S
Home Sweet Home
Homestyling ApS
House Of Dreams A/S
Houseofmodus A/S
HP Møbler

Ergoweb ApS

Upholstery (continued)

Højbro Kontormontering A/S

Højer Textile A/S

I.K. A/S

Ide Design ApS

Ikast Industripolstring Aps

Image Collection ApS

In House Europe ApS

In Life ApS

Indeco ApS

Indo Partner ApS

Ingabo af 2002 A/S

Inside ApS

Instyle A/S

Instyle Europe A/S

Int. Trading Company ApS

Interiør Gruppen ApS

International Furniture A/S

Interstudio A/S

Inventarland A/S

Ivan Farsø Rasmussen

J P H Concept A/S

J T Components ApS

J. Luckmann ApS

J.E. Ekornes ApS

Jansens Møbelsnedkeri A/S

Japan Denmark Trade Centre A/S

JD Home Collection A/S

Jens Brinch International ApS

Jens Erik Maarbjerg ApS

Jens Thorn A/S

Jensen Madrasser ApS

Jesper Holm Copenhagen A/S

Jesper Office DK A/S

Johny Larsen Snedkerier A/S

Joma A/S

Jul. Nielsen Entreprise A/S

Juroni I/S

Juroni ApS

Jydsk Polstring A/S

Jysk Interieur A/S

Jørck og Larsen A/S

KJ Møbler A/S

K. Kulby Stilmøbler ApS

K. Silberg Møbler ApS

K.E. Agentur ApS

Kaj Holmen Møbelpolstring ApS

Kalejdo 2 ApS

Karatas A/S

Karup Møbelfabrik A/S

Kay-Jay ApS

Kidslinje I/S

Koefoed Danmark ApS

Kokkedal Drift ApS

Kontorland A/S

Kopty Kunstauktioner A/S

Krea A/S

Kumo A/S

Kurt Rasmussen Møbler A/S

Labofa A/S

Laue Mathiesen Møbelagentur ApS

Leika Danmark A/S

Lien Import ApS

Lind Møbler Bramming A/S

Linden Design ApS

Lindved Engros

Living Art A/S

Living Room A/S

Lobo Møbler ApS

Lorentz Nielsen Kontorcenter ApS

LT Collection A/S

Lædergaarden ApS

M. H. Polstermøbler

M. Schack Engel A/S

M.J. Mortensens Farvehandel

M2 Trading

Mandalay Furniture A/S

Marsk Møbler A/S

Martin Christensen & Søn I/S

Maskinfabrikken Laasby A/S

Mellany ApS

Merif Engros ApS

Migadan A/S

Miranda A/S

Mobili By Fredericia A/S

Mondus

Multifurn A/S

Møbelfabriken Trekanten ApS

Møbelfabrikken "Toften" A/S Randers

Møbel-Gruppen A/S

Møbel-Gruppen A/S

Møbelpolster Lissi Gormsen ApS

Møbelpolstreren.dk ApS

Møller & Rothe A/S

Møllers Bolighus

N.J. Design Polstermøbler I/S

New Living Furniture ApS

NI CA Line Denmark A/S

Nina og Erik Løjborg ApS

Nippon A/S

NJOY ApS

Nomess Copenhagen ApS

Nordic Home Collection A/S

Nordiscan ApS

Notio Living A/S

Notio Møbler A/S

O. Østergaard Jensen ApS

Office Nordic ApS

Olrikka I/S

Optima ApS

Orang Denmark ApS

P. Sannemann Collection ApS

Patina Møbler A/S

PD Hotelmontering

Pebo Møbler ApS

Perfor International

Pergo A/S

Kvist Industries A/S
Upholstery (continued)

Peter Kjær
Peter Nordin ApS
Pinea ApS
PK Netto Møbler ApS
Prana Home A/S
Profound A/S
Pronova ApS
Prostyle ApS
Punktum
R. B. Kontormontering A/S
Radius Møbler ApS
Reflex Møbler
Resolut ApS
Ricoma Inc. ApS
Riis Retail A/S
Rud. Rasmussens Snedkerier A/S
Rustic Furniture A/S
S M W Møbler A/S
S. Burchardt Nielsen Møbler ApS
S.C. Møbler
Sakwa A/S
Saxo Living A/S
Scan Office Logistic A/S
Scanbib ApS
Scandi Sleep A/S
Scandinavia Production Group A/S
Scanmark Danish Design Viborg A/S
Scannip ApS
Scanvia
Schou Rasmussen & Vedelsby A/S
Semi-Stål A/S
SI Montering ApS
Simon M. Madsen ApS
Shalma A/S
Skanlife ApS
Skippers Møbler
Skærum Import og Export ApS
S-Line ApS
Small World By Marlip A/S
Smith & Co. ApS
Sonesson Indretning ApS
Sorø Stolefabrik A/S
Spanart ApS
SR Furniture Group ApS
Stablers A/S

Furnishing fabrics

A/S Nordfjeld Products
Ado-Gardiner Danmark A/S
Autofin A/S
B. Heckmann I/S
B6 A/S
B6 A/S
Bentzon Carpets ApS
Best Buy Products A/S
Bolig-Art ApS
Bo-Stil

Perimax A/S

Stanley Design ApS
Steens Furniture A/S
Stokke Danmark ApS
Stübert Collection I/S
Sydkystens Boligmontering ApS
Symphonea ApS
Sølund Exterieur ApS
Sømo A/S
Søren Gude A/S
Søren Kristian Færk
T.M. Boligstil
Taifo Buying Agencies A/S
Tangsø ApS
Teak Bazaar ApS
Teok Design ApS
Therp Import
Thorengaard Poxlim A/S
Tignum Clear Wood A/S
TM-Line
Tommy Hansen Boligmontering ApS
Travanco ApS
Trend Bazaar A/S
Trendforum A/S
Trendline A/S
Trip Trap Denmark A/S
Troels Møbler
Træ Design A/S
Twenty 1 ApS
Ungt Miljø
Uniq Style ApS
Uniq - Design Til Børn ApS
Uptown Copenhagen A/S
Valcom ApS
Vest-Vind ApS
Viking Trading ApS
Vimotec ApS Of Scandinavia
Vines Erhvervsmøbler A/S
Vivanatura A/S
VM Madrasser A/S
Woodman A/S
X-Design A/S
Zanz ApS
Zederkof A/S
Aafod Import ApS
Åse Agerskov ApS

Carl Thøgersen A/S
Carl J. Permin A/S
Carla F
Carla F
Cartex Autofashion ApS
Christiansfeld Autopolstring ApS
Clean-Carpet A/S
Colours
Da'Core A/S
Dan Group Textile ApS

Bramming Plast-Industri A/S
Furnishing fabrics (continued)

Danfjer A/S
Danish Art Weaving A/S
Danish Colour Design Textile Print A/S
Danish Match Design A/S
Dansk Dynekoncept A/S
Dansk Wilton A/S
Decolux New-Line ApS
Drops of Gold I/S
Egetæpper A/S
Egetæpper a/s
Ejnar Debel A/S
Fibertex A/S
Fischer International A/S
Fletco Tæpper A/S
Fossfill ApS
Fraster ApS
Fred B. Balsløw A/S
From the Heart
Gabriel A/S
Gardicon ApS
Gardin-Lavgesen Botex ApS
Gardinmontering
Gardinstuen ApS
Gardinsyning Danmark ApS
Geismars Væverier A/S
Getama Danmark A/S
Green-Tex ApS
Gåsdal Bygningsindustri A/S
H.M.T. Design ApS
Hammer Tæpper A/S
High Style ApS
High Style Two ApS
Hjertebuser ApS
Holmen Copenhagen ApS
Højer Textile A/S
Højer Tæppefabrik A/S
Højgaard Gardiner ApS
Højgaard Gardiner ApS Systue
IFS Envifilter
J. Mørup Stof ApS
Jaki
Jaksland ApS
Jany A/S
JD Home Collection A/S
Jens Thorn A/S
John Hansens Møbelhåndværks Eff. ApS
Jørck og Larsen A/S
KE Fibertec Filter A/S
Kirsten Jensens Systue ApS

Dan Miljø Boligtekstiler

Kjellerup Væveri A/S
Kjøbenhavns Tekstil Tryk & Broderi A/S
Kurage A/S
L.S. Konfektion ApS
LC Gardiner ApS
Lene Bjerre Design A/S
Lika-Newline A/S
Limotex ApS
Linette ApS
Lite Flite ApS
Ludvig Svensson ApS
Martin Sales Company I/S Nygade
MGC Holding ApS
Milliken Denmark A/S
Mr. T. Handel A/S
Newell Rubbermaid Scandinavia A/S
Newell Rubbermaid Scandinavia A/S
Nordisk Tekstil Produktion A/S
Nortex A/S
OTD Packing Service ApS
P.N. Filter ApS
Pana Gardinkonfektion ApS
PHJ Glas & Klima A/S
Preben Kipper Thau
Pro-Safe Reflection A/S
Quilts Logistics ApS
Quilts Production ApS
Resolut ApS
Rune Tæpper A/S
Sejs Dyner ApS
Skumhuset
Skumhuset
Skumhuset ApS
SP SY ApS
Spentrup Maskinfabrik ApS
St. Design I/S
Stabell Presenninger ApS
Sunesens Tekstilforædling ApS
Systuen Gima ApS
Sytex ApS
Søms Fjerindustri
Toproset ApS
Tytex A/S
Universal Color and Chemical ApS
Ureflex A/S
Væveriet Randtex ApS
Wernerfelt Textiles A/S
Wise Innovative Holding ApS
Østmars Måtter

Wholesale textiles

A & E International Consulting ApS
A/S Vest-Tex
Abovo ApS
ADD Mikkelsen A/S
Ailer Hørmann ApS
All Trade ApS

Amico Markisefabrik
Arctic A/S
Artefina Design I/S
Artex af 1999 ApS
Asligruppen ApS
Atlas Group I/S

All-Vital A/S

Wholesale textiles (continued)

B.W. Wernerfelt Industri A/S
Becksøndergaard ApS
Bee-Com ApS
Bent Laage ApS
Bentsen & Hornbeck
Benzo Textile Solutions ApS
Boftex ApS
Bomholtz-Larsen ApS
Borch Textile Group A/S
Borås Cotton ApS
Breckling Trade Company ApS
C. Olesen Tylstrup ApS
C.E. Schmidt & Co. ApS
C.L. Seifert A/S
Capricorn Equipment ApS
Carl J. Permin A/S
Carsten Spliid Trading ApS
Cavan Import A/S
Cewec ApS
Chadar A/S
Charlotte Sparre A/S
Cicero ApS
Cilic ApS
CKI Produktion A/S
Coats Danmark A/S
Colorit Osted A/S
Company House
Comteck ApS
Creativ Textil Copenhagen ApS
Cyberfact ApS
Da'Core A/S
Dahetra A/S
Dakattun ApS
Danabeta ApS
Danish Art Weaving A/S
Danish Match Design A/S
Danitex A/S
Dansk Dun Produktion ApS
Deco-Tex ApS
Degn Agentur ApS
Delta Fashion Trade ApS
D-Func.ApS
Dice Co. ApS
Drapilux Of Scandinavia ApS
Dreamware ApS
Duratex A/S
Edge Form ApS
Ejnar Debel A/S
Eurotex Danmark ApS
Eurotrade Impex ApS
Fabrixs ApS
Fanny Aronsen A/S
Fazon A/S
Female
Fiberpartner ApS
Fibertex A/S
Fibrodan International ApS
Filcolana A/S

Aug. Olsens Efft. A/S

Frebia Bolig Textil ApS
Freudenberg Danmark A/S
Fridorf Møllers Efft. ApS
Frølund Textil ApS
Fuglsang Interior ApS
Furn-Tex
Gabriel A/S
Gartex A/S
Gobi Design ApS
GreenGate Interiors A/S
H. Dahls Efft. ApS
Hanne Falkenberg
Hansen Textile ApS
HB Textil Support A/S
Hegnetto ApS
Helge Fleischer ApS
Hilden Scandinavia A/S
Hjemtex ApS
HJM Hammel ApS
Holleskov Stof
HS Group A/S
Hugo Kragh A/S
I. W. Hvidberg ApS
IK Interior ApS
IMP Textile ApS
Inter-Connect ApS Team Ellegaard
Interior Collection Denmark A/S
Invenstar ApS
IT Textiles
J & P Winkel ApS
Jaeger Danmark A/S
Jemtex ApS
JF Boligtexiler A/S
JL-Textil ApS
JTH Tekstil ApS
Jydsk Stoftryk ApS
Jørnæs Productions I/S
Kaiser ApS
Katsuki ApS
Keld A. Johansen ApS
Kilroy Indbo A/S
Kim Sass-Petersen Holding ApS
Kingswear ApS
Klaus Overgaard ApS
Knit-Trade ApS
KS Fashion ApS
Kunstmann Textiles ApS
Kvadrat A/S
Lars Bo ApS
Lars Brunborg A/S
Levinsky International A/S
Lise Sandahl A/S
Litoral ApS
Logidos ApS
Ludvig Svensson ApS
Luka Collection ApS
Lund P Agentur ApS
Lyntex

Fimex Danmark ApS
Wholesale textiles (continued)

Madsen Design Of Denmark ApS
Marks & Kattens ApS
Max Mortensen & Co.
Max Trading A/S
Menda A/S
Mind Companies A/S
Mindtag ApS
Mingh Clothes ApS

Minus A/S
Molteni & C. ApS
Mongul ApS
Mono ApS
Netmark A/S
Nevotex Danmark A/S
Nielsen Textil A/S
Niloras ApS
Nordic Craft
Nortex A/S
Nur Rock I/S
O. Foss Fabrikker
O. Foss Fabrikker
Oriental Suzhou Branch ApS
Ormstrup Company ApS
Otin ApS
Ozoto Noto ApS
Pagunette A/S
Per Ingemann Textil A/S
PKM-Tex Denmark ApS
Poly Knap
Porse A/S
Poul Madsen en Gros A/S
Primotex A/S
PRO TEX
Quilts of Denmark A/S
Rex og Rømer I/S
Richter A/S
Romo Danmark ApS
Rue Deco ApS

Outdoor

A. P. Industri ApS
A.M. Corporation ApS
A/S Bent Neergaard
A/S Unifit
A-Camping.Dk I/S
Aceline ApS
Acushnet Danmark ApS
Amazonas A/S
ApS Kragh Andersen
Bagger & Co
Camping-Art ApS
Castanie ApS
Chalmer Sport ApS
Dansk Caravan Tilbehør A/S
Dansprint ApS
Faktotum Sport ApS

M W Mørch & Søns Efft ApS

S. Thygesen A/S
Sen-Sen
Sette Fashion ApS
Simconic ApS
Skylak ApS
Soultrade Europe ApS
Stila A/S
Sven Hecht-Johansen Industri- &
Boligtekstiler En
T.T.C. - Denmark ApS
Textiles Denmark ApS
Th. Ellebye ApS
Thomsen Textil ApS
Tinima Denmark
Tinta
Torben Kristoffersen Invest ApS
Trademark Textiles A/S
Trekan Handel A/S
Trendforum A/S
T-Wear A/S
Tønnesen A/S
Ulma Casa ApS
Ulrik Højriis Textilingeniør ApS
Unitrade ApS
Unland Skandinavien A/S
Uno Image A/S
V. Fraas Of Scandinavia A/S
Vagn Balslev ApS
Vebi A/S
Vestergaard Frandsen A/S
Viking Markiser A/S
Weba Danmark ApS
Wernerfelt A/S
Windfeld ApS
Wow Innovation ApS
Xbrands ApS
X-Design A/S
YKK Danmark A/S
Åse Agerskov ApS

Gasbjerg Sport
Grand Canyon ApS
HD Camp I/S
Heat Europe A/S
H-H Sport Erhverv ApS
Image 2000 ApS
Intercamp A/S
Jacob Bojsen-Møller
JL Sport A/S
Jonik Trading ApS
JP Haderslev ApS
Knaus Scandinavia A/S
Knut Dalset ApS
KPM Sport ApS
Leika Danmark A/S
Liquid Force Dk

Frede Egelund ApS
Outdoor (continued)

Maan International ApS
NEFA A/S
Nordisk Company A/S
P2 Sport ApS
Pro Line A/S
Proconex ApS
Scanlab I/S
Scansport A/S
Sellmore A/S
Skizma ApS
Sport Danmark A/S
Sportn' Hunt I/S

Outdoor activities

A.G. Poulsens Eftf. ApS
Acrimo Solafskærmning A/S
Acrimo Solafskærmning A/S
Aktieselskabet Presenco
Alux A/S
Amico Markisefabrik
Animum ApS
ApS Stig Jørgensen
Bella Persiennefabrik A/S
BN Markiser I/S
Centrum Markiser ApS
Chas. Mortensen I/S
Folmer Interiør & Presenningsløsninger
Frederiksborg Markisefabrik ApS
Garditec A/S
Gudmann & Søn ApS
Hans Aa og Sønner A/S
Jydsk Camping Industri A/S
Jyllands Markisefabrik A/S
Jysk Presenning-Fabrik A/S

Glue factories

A/S Magnus Holm
A/S Magnus Holm
Agroplast ApS
BHJ A/S
BHJ
Dana Lim A/S
Danexport A/S
Frede Andersens Fabriker A/S

Cables

Otra Danmark A/S
Waskönig & Walther Danmark Aps
ABB A/S
Areva A/S
Hans Følsgaard A/S

Made & Trade ApS

Sportsmate ApS
Sportspeople Trading I/S
Stabell Presenninger ApS
STM Sport A/S
Studsgaard Sejl
T & L Trading I/S
The Fly Company I/S
Tinghøj Trading ApS
Torspo Danmark ApS
Tristar A/S
Wiberg & Wiberg
Winco Import ApS

Kibæk Presenning A/S
L & S A/S
Mogens Clausen & Co. ApS
MP Sejl ApS
Oase Outdoors ApS
Ocean Presenning A/S
Olympic A/S
Protra A/S
Sailmaker 2000 ApS
Sara Telte ApS
Stabell Presenninger ApS
Studsgaard Sejl
Sæby Markiser I/S
Sækko Presenning A/S
Thyge Stabell ApS
U.K. Presenninger ApS
Vejle Teltfabrik ApS
Viking Markiser A/S
West Presenning ApS
Ørsted Telte A/S

Gludan A/S
Gluemaster ApS
Lip Bygningsartikler A/S
New-Coat A/S
Nordalim A/S
Nordcoll A/S
NORDCOLL A/S
Sika Danmark A/S

S. Tygesen Energi A/S
Nexans Jydsk Denmark A/S
Louis Nielsen A/S
NKT Cables A/S

Miscellaneous

3M A/S
A. Winther A/S
A/S Harald Nyborg
Abena A/S
Acalor Scandinavia A/S
BabyDan A/S
Babysam A.m.b.A
Belden A/S
Brandteknisk Institut
Carpenter ApS
Condor kemi A/S
Danmarks Statistik
Dansk Supermarked A/S
European Nursery Group Denmark A/S
EUROPUR
Hempel A/S
Immedia A/S
Invacare A/S
Isabella A/S
Kemikalieinspektionen
Kildemoes Cykelfabrik A/S
Løkken Sportsnet
Nullifire Danmark
Odder Barnevognsfabrik A/S
Plastindustrien i Danmark
Protac A/S
Raychem Danmark A/S
TopToy A/S
Trafomo A/S
Trevira Nechelmann A/S

Appendix B – Questionnaire 1, DK

Below questionnaire was sent to the following product groups:

Plastics raw material suppliers, Upholstery, Furnishing fabrics, Wholesale textiles, Outdoor life, Outdoor activities, Glue factories, and Cables.

Questionnaire

Mapping of the consumption of brominated flame retardants in Denmark – primarily decabrominated diphenylether (decaBDE) in other than electric and electronic products

Please return questionnaire and appendix to
Eurofins Miljø AS, Søren Brødsgaard, Smedeskovvej 38, 8464 Galten
not later than 5 July 2006

Questionnaire – mapping of decaBDE		
1. Information about company		
Company name:		
Address:		
Phone no.:		
E-mail:	Website:	
Contact person(s):		
Type of company (please tick off):		
Production <input type="checkbox"/>	Import <input type="checkbox"/>	Export <input type="checkbox"/>
<input type="checkbox"/> The company does not produce/import the type of products dealt with in this study: <ul style="list-style-type: none">• All types of furnishing fabrics• Only power cables within the group of cables• All tents – including outdoor life tents, awnings and party tents, tarpaulins and sunshades• All upholstery – including fabrics and foam• Mattresses – including fabrics and foam• Plastics raw material suppliers or importers		
Thus, you do not need to answer the following questions, but please return the questionnaire to the above-mentioned address anyway.		
2. Product information/overview		
What kind of products does your company produce or import?		
Where is your production located?		

<p>Are your products subject to special requirements concerning fire safety performance? <i>If yes, which ones?</i></p>
<p>3. Use/consumption of flame retardants</p> <p>Does your company produce or import products that include flame-retardants? <i>(Yes/no)?</i></p> <p>If yes, which types of flame-retardants are included in your product? <i>(If decaBDE is applied as flame-retardant, please go on to paragraph 4).</i></p>
<p>4. Use/consumption of decaBDE (quantities, trends of development)</p> <p>Which of your products (also raw materials and semi-manufactures, if applicable) include decaBDE?</p> <p>Which is the weight percentage of decaBDE in these products?</p> <p>Please state the approximate quantity of these products exported per year (0-100%).</p> <p>What development has your company experienced in the consumption of decaBDE over the last 5-10 years? <i>(Please describe.)</i></p> <p>Which trend of development do you foresee for the next 5-10 years? <i>(Please describe.)</i></p>
<p>5. Alternatives to decaBDE</p> <p>Are you aware of any alternatives that you could use in your products instead of decaBDE? <i>(If yes, please describe.)</i></p> <p>Has your company considered any alternatives (chemicals that are less harmful to the environment)? Do you</p>

6. Other remarks of relevance to the use/consumption of decaBDE

Do you have any other remarks to the above descriptions? *If yes, please state.*

7. Appendices

Do you have any product sheets, technical data sheets, analytical certificates, etc. that describe the products mentioned? *If yes, please attach relevant information.*

Annual report attached (yes/no):

8. Additional information

Questions, if any, can be addressed to:

Søren Brødsgaard
Eurofins Miljø A/S
Phone.: 70 22 42 66
Fax: 70 22 42 55
E-mail: sb@eurofins.dk

Jane Pors
Eurofins Miljø A/S
Phone.: 70 22 42 66
Fax: 70 22 42 55
E-mail: jp@eurofins.dk

Appendix C – Questionnaire 2, UK

Below questionnaire was sent to the following product groups:
Auto importer

Questionnaire

Mapping of the consumption of brominated flame retardants in Denmark – primarily decabrominated diphenylether (decaBDE) in other than electric and electronic products

Please return questionnaire and appendix to
Eurofins Miljø AS, Søren Brødsgaard, Smedeskovvej 38, 8464 Galten
not later than 5 July 2006

Questionnaire – mapping of decaBDE	
1. Information about company	
Company name:	
Address:	
Phone no.:	
E-mail:	Website:
Contact person(s):	
Type of company (please tick off): Production <input type="checkbox"/> Import <input type="checkbox"/> Export <input type="checkbox"/>	
<input type="checkbox"/> The company does not produce/import the type of products dealt with in this study: <ul style="list-style-type: none">• Motorized vehicles	
Thus, you do not need to answer the following questions, but please return the questionnaire to the above-mentioned address anyway.	
2. Product information/overview	
What kind of products does your company produce or import?	
Where is your production located?	

<p>Are your products subject to special requirements concerning fire safety performance? <i>If yes, which ones?</i></p>
<p>3. Use/consumption of flame retardants</p> <p>Does your company produce or import products that include flame retardants? <i>(Yes/no)?</i></p> <p>If yes, which types of flame retardants are included in your product? <i>(If decaBDE is applied as flame retardant, please go on to paragraph 4).</i></p>
<p>4. Use/consumption of decaBDE (quantities, trends of development)</p> <p>Which of your products (also raw materials and semi-manufactures, if applicable) include decaBDE?</p> <p>Which is the weight percentage of decaBDE in these products?</p> <p>Please state the approximate quantity of these products exported per year (0-100%).</p> <p>What development has your company experienced in the consumption of decaBDE over the last 5-10 years? <i>(Please describe.)</i></p> <p>Which trend of development do you foresee for the next 5-10 years? <i>(Please describe.)</i></p>
<p>5. Alternatives to decaBDE</p> <p>Are you aware of any alternatives that you could use in your products instead of decaBDE? <i>(If yes, please describe.)</i></p> <p>Has your company considered any alternatives (chemicals that are less harmful to the environment)? Do you</p>

What consequences would a prohibition of decaBDE have to your company?
Has your company assessed other ways of reducing the fire risk (alternative fire protection technologies)? <i>If yes, which ones?</i>
6. Other remarks of relevance to the use/consumption of decaBDE
Do you have any other remarks to the above descriptions? <i>If yes, please state.</i>
7. Appendices
Do you have any product sheets, technical data sheets, analytical certificates, etc. that describe the products mentioned? <i>If yes, please attach relevant information.</i>
Annual report attached (yes/no):
8. Additional information
Questions, if any, can be addressed to:
Søren Brødsgaard Eurofins Miljø A/S Phone.: 70 22 42 66 Fax: 70 22 42 55 E-mail: sb@eurofins.dk
Jane Pors Eurofins Miljø A/S Phone.: 70 22 42 66 Fax: 70 22 42 55 E-mail: jp@eurofins.dk

Bilag D – Questionnaire 2, UK

Below questionnaire is the English version of the questionnaire in appendix C. The questionnaire was sent to auto importers.

Questionnaire

Mapping of the consumption of brominated flame retardants in Denmark – primarily decabrominated diphenylether (decaBDE) in other than electric and electronic products

Please return questionnaire and appendix to
Eurofins Miljø AS, Søren Brødsgaard, Smedeskovvej 38, 8464 Galten
not later than 5 July 2006

Questionnaire – mapping of decaBDE	
1. Information about company	
Company name:	
Address:	
Phone no.:	
E-mail:	Website:
Contact person(s):	
Type of company (please tick off): Production <input type="checkbox"/> Import <input type="checkbox"/> Export <input type="checkbox"/>	
<input type="checkbox"/> The company does not produce/import the type of products dealt with in this study: <ul style="list-style-type: none">• Motorized vehicles	
Thus, you do not need to answer the following questions, but please return the questionnaire to the above-mentioned address anyway.	
2. Product information/overview	
What kind of products does your company produce or import?	
Where is your production located?	

<p>Are your products subject to special requirements concerning fire safety performance? <i>If yes, which ones?</i></p>
<p>3. Use/consumption of flame retardants</p> <p>Does your company produce or import products that include flame retardants? <i>(Yes/no)?</i></p> <p>If yes, which types of flame retardants are included in your product? <i>(If decaBDE is applied as flame retardant, please go on to paragraph 4).</i></p>
<p>4. Use/consumption of decaBDE (quantities, trends of development)</p> <p>Which of your products (also raw materials and semi-manufactures, if applicable) include decaBDE?</p> <p>Which is the weight percentage of decaBDE in these products?</p> <p>Please state the approximate quantity of these products exported per year (0-100%).</p> <p>What development has your company experienced in the consumption of decaBDE over the last 5-10 years? <i>(Please describe.)</i></p> <p>Which trend of development do you foresee for the next 5-10 years? <i>(Please describe.)</i></p>
<p>5. Alternatives to decaBDE</p> <p>Are you aware of any alternatives that you could use in your products instead of decaBDE? <i>(If yes, please describe.)</i></p>
<p>Has your company considered any alternatives (chemicals that are less harmful to the environment)? Do you</p>

What consequences would a prohibition of decaBDE have to your company?										
Has your company assessed other ways of reducing the fire risk (alternative fire protection technologies)? <i>If yes, which ones?</i>										
6. Other remarks of relevance to the use/consumption of decaBDE										
Do you have any other remarks to the above descriptions? <i>If yes, please state.</i>										
7. Appendices										
Do you have any product sheets, technical data sheets, analytical certificates, etc. that describe the products mentioned? <i>If yes, please attach relevant information.</i>										
Annual report attached (yes/no):										
8. Additional information										
Questions, if any, can be addressed to:										
<table> <tr> <td>Søren Brødsgaard</td> <td>Jane Pors</td> </tr> <tr> <td>Eurofins Miljø A/S</td> <td>Eurofins Miljø A/S</td> </tr> <tr> <td>Phone.: 70 22 42 66</td> <td>Phone.: 70 22 42 66</td> </tr> <tr> <td>Fax: 70 22 42 55</td> <td>Fax: 70 22 42 55</td> </tr> <tr> <td>E-mail: sb@eurofins.dk</td> <td>E-mail: jp@eurofins.dk</td> </tr> </table>	Søren Brødsgaard	Jane Pors	Eurofins Miljø A/S	Eurofins Miljø A/S	Phone.: 70 22 42 66	Phone.: 70 22 42 66	Fax: 70 22 42 55	Fax: 70 22 42 55	E-mail: sb@eurofins.dk	E-mail: jp@eurofins.dk
Søren Brødsgaard	Jane Pors									
Eurofins Miljø A/S	Eurofins Miljø A/S									
Phone.: 70 22 42 66	Phone.: 70 22 42 66									
Fax: 70 22 42 55	Fax: 70 22 42 55									
E-mail: sb@eurofins.dk	E-mail: jp@eurofins.dk									