Fact Sheet

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What are PBDEs?
PBDEs (Polybrominated Diphenyl Ethers), also called "brominated flame retardants," are a group of flame retardant chemicals that are added to foam padding, plastics and fabrics. Flame retardants help to slow the spread of fire. The term "poly" means "many" and is used because the make-up of these flame retardants may be different from each other but they all have more than one bromine molecule. Some of the most commonly known PBDEs are pentaBDE (five bromine molecules), octaBDE (eight bromine molecules) and decaBDE (ten bromine molecules).

In what products are PBDEs used?
PBDEs are used in a wide variety of industrial and consumer products, examples include foam used in furniture, plastics used in electrical and electronic products, building materials, textiles, toys and clothing. The different types of PBDEs are used in different ways.

PentaBDE is or has been used almost exclusively in the manufacture of flexible polyurethane (PUR) foam for furniture and upholstery in homes and vehicles, packaging, and non-foamed PUR in casings and electronic equipment. They are also used to some extent in textiles and in industry. [1]

OctaBDE is primarily used in the plastic housings of office electrical equipment.[2]

DecaBDE is primarily used in televisions, printers and other electrical equipment; nylon, the plastic coatings around wires, cables, connectors and switches."[3] In addition, DecaBDE is used in building materials, automotive and aviation parts, plastic shipping pallets, and textile coatings.[4]

How do PBDEs get into the environment?
PBDEs can get into the environment in many different ways, including:

- During the chemical manufacturing process, when PBDEs are made.
- When PBDEs are added to consumer products as flame retardants.
- Through the normal wear and tear of the products that contain PDBEs.
- When products that contain PDBEs are disposed of.

Once PBDEs get into our indoor and outdoor environments they stick to particles like dust, dirt and sediment. PBDEs remain in the environment for a long time and travel great distances on dirt materials. PBDEs have been detected in remote arctic regions and in the fatty tissues of many different animals.[5]

How do PBDEs get into our bodies?

- Eating foods that are contaminated with PBDEs, especially foods with animal fats including meat, fish and dairy products;
- Breathing in or swallowing indoor dust with PBDEs that come from products within the home, workplace or anywhere else where these products may be; and,
- Working in certain jobs such as electronics recycling without adequate protection.

Studies show that most people in the U.S. have low levels of PBDEs in their blood and body fat; they have even been found in breast milk and infant formula. The U.S. and Canada use more PBDEs than any other countries in the world, and when compared to other countries, PBDEs are found at the highest levels in people who live in the U.S. and Canada.[6]

What is the health concern about PBDEs?
Animal studies show effects on brain development, including impaired abilities in learning and memory and also altered behavior [7-9]. Animal studies also show that PBDEs can disrupt the endocrine system by lowering thyroid hormone levels and impairing the reproductive and immune systems [5, 10, 11]. There is also concern that some forms of PBDEs may cause cancer.[5]

While there are no immediate symptoms from contact with PBDEs, there is a significant potential for long term health consequences.[5] It is especially important to protect children, pregnant women and nursing mothers from contact with PBDEs because they are more sensitive to chemical exposures.[5, 11]

For more information see http://www.atsdr.cdc.gov/toxfaqs/TF.asp?id=900&tid=183.

Are children at special risk from PBDE exposure?
Yes. Certain behaviors of children put them at a greater risk for coming into contact with PBDEs, for example they put their fingers and other objects into their mouths more often than adults do. A child's body is also developing more rapidly than an adult's. Chemicals that get into the body at certain stages of development can cause more harm.

Hasn't industry already stopped using PBDEs?
No, at least not yet. Some companies are moving in that general direction – for example, two U.S. decaBDE manufacturers and a U.S. decaBDE importer "have committed to end production, importation and sales of decaBDE for most uses in the United States by December 31, 2012 and to end all uses by the end of 2013."[12] In addition, some companies have announced individual goals to reduce or eliminate some types of PBDEs in some products or product components.

Are states banning PBDEs?
Yes. While the laws differ, many states have enacted or are considering proposals to ban PBDEs. For example, Maine, Vermont, Rhode Island, Illinois, Washington and Massachusetts have banned some or all the PBDEs covered in Oregon's statute.

Are there safer alternatives to PBDEs?
Yes. For most products there are safer alternatives that maintain proper fire safety standards. The type of alternative to use depends on the type of product:

- For plastic pallets, Maine's Department of Health and Human Services identified several safer alternatives with aluminum polyphosphate rising to the surface as the safest.[13]
- Washington's Departments of Ecology and Health (DOE and DOH) did a study seeking safer alternatives for computer/TV plastic housings and found that resorcinol-bis(diphenyl phosphate) (RDP) met applicable fire safety standards and is safer than PBDEs.[14]
- For upholstered furniture, the same Washington DOE and DOH report identified product designs that could meet fire safety standards without the use of any flame retardants.[14]

What can I do?
The main ways people come into contact with PBDEs is through specific food (meat and dairy) and by breathing in and swallowing household dust.[5] As products treated with flame retardants age and breakdown they shed tiny particles that stick to the dust in our homes. To prevent PBDEs from getting into your body consider taking the following daily actions. These actions are especially important in homes with infants, children, adolescents, pregnant women, nursing mothers, the elderly, and people with preexisting medical conditions.

Cleaning Practices

- Take your shoes off and wipe pet feet clean to prevent tracking unwanted chemicals often stuck to dirt throughout the house.
- Avoid stirring up dust when you clean. The way you dust and the kind of vacuum you use makes a difference. Wet cleaning with a moist cloth, mop or sponge controls dust better than dry dusting, sweeping or vacuuming. A HEPA filter vacuum sucks in and traps dust particles. A regular vacuum can kick up dust and redistribute it throughout your home.
- Wash your hands with soap and water after cleaning.

Food Choices

- Eat a diet rich in fruits, vegetables and whole grains. Foods like meat and dairy contain higher levels of PBDEs than plants.
- Wash your hands with soap and water before eating.

Consumer Actions

- Find out if the products you own or plan to buy have been treated with flame retardant chemicals. Consider e-mailing or calling the manufacturer of a product to find out what kind of chemicals were used.
- Check for a tag that indicates that the product meets the flammability requirements of California Technical Bulletin 117. Although this doesn't necessarily indicate that the product was treated with PBDEs, it does inform you that it might have been.
- Learn more about green chemistry, and designing products for minimal adverse health impacts. Check out the EPA's Design for the Environment (DfE) program and a list of products with the DfE label.

PBDE Flame Retardant Legislation

- In 2006, Oregon passed legislation to restrict penta- and octabrominated diphenyl ethers (pentaBDE and octaBDE) by weight. Then in 2009, Oregon passed more legislation (Senate Bill 596) to restrict decabrominated diphenyl ether (decaBDE) by weight. To read the law concerning all hazardous substances, please see Oregon Revised Statute (ORS) 453.

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