



Spotlight on Polybrominated Diphenyl Ethers and Polybrominated Biphenyls

Brominated flame retardants are a class of man-made chemicals that are added to plastics and foam products to make it more difficult for them to burn. They are found in furniture foam; consumer electronics; wire insulation; back coatings for draperies and upholstery; and plastics for television cabinets, personal computers, and small appliances.

The brominated flame retardants include polybrominated diphenyl ethers (PBDEs), polybrominated biphenyls (PBBs), and others. Three formulations of PBDEs (penta-, octa-, and deca- BDE) have been used in consumer products; each formulation has different properties and uses. The makers of penta-BDE and octa-BDE voluntarily stopped making those chemicals at the end of 2004. Thus, deca-BDE is the only formulation of these flame retardants still used today. The United States discontinued the production and use of PBBs in the mid-1970s.

Brominated flame retardants can get into the air, water, and soil during their manufacture; when they leach from products that contain PBDEs; or when the products that contain these chemicals degrade. These retardants do not dissolve easily in water; they stick to particles and settle to the bottom of rivers or lakes. Some brominated flame retardants can build up in certain fish and mammals.

How People Are Exposed to Brominated Flame Retardants

People can be exposed to brominated flame retardants by—

- Eating contaminated foods, particularly those with a high fat content such as fatty fish.

- Breathing air or ingesting dust contaminated with brominated flame retardants. Some brominated flame retardants have been detected in air and dust samples, indicating that people may be exposed by inhalation.

- Working in industries that make brominated flame retardants or that make, repair, or recycle products containing brominated flame retardants.

How Brominated Flame Retardants Affect People's Health

- Nothing definite is known about the effect of brominated flame retardants on a person's health.
- Laboratory animal studies have shown effects on the thyroid and liver in doses much higher than people would encounter.
- The Environmental Protection Agency (EPA) has classified certain PBDEs as possible carcinogen because of animal studies.

Levels of PBDEs and PBB in the U.S. Population

The Centers for Disease Control and Prevention (CDC) measured levels of 10 chemically related PBDEs and one PBB (BB-153) in the serum of 2,040 people aged 12 years and older who took part in CDC's National Health and Nutrition Examination Survey (NHANES) from 2003 through 2004. CDC published results of this national study in 2007.

- Among the PBDEs, BDE-47 (a PBDE contained in penta-BDE) was detected in almost all of the people in the study, and at higher levels than the other PBDEs measured. These levels of BDE-47 in the U.S. population are greater than levels measured in smaller studies from European countries.
- CDC scientists detected BDE-28, BDE-99, BDE-100, and BDE-153 in more than 60 percent of the population. These four levels of PBDEs, as well as BDE-47 decreased with increasing age groups. The levels rose slightly among people aged 60 years and older.
- Levels of BB-153, the discontinued PBB, increased with age. . This finding may be due to the longer time that BB-153 stays in the body or to past exposures that were greater among older people than in other age groups. Mexican Americans and those born in other countries who took part in the study had lower levels of BB-153 than other groups.
- PBDEs contained within deca-BDE formulations were not measured in this study; however, CDC plans to measure them in the future.

For More Information

- **Agency for Toxic Substances and Disease Registry**
Public Health Statement for Polybrominated Diphenyl Ethers
<http://www.atsdr.cdc.gov/toxprofiles/tp68-pbde-c1-b.pdf>
ToxFAQs for Polybrominated Diphenyl Ethers (PBDEs)
<http://www.atsdr.cdc.gov/tfacts68-pbde.pdf>
Public Health Statement for Polybrominated Biphenyls
<http://www.atsdr.cdc.gov/toxprofiles/tp68-c1-b.pdf>
ToxFAQs for Polybrominated Biphenyls
<http://www.atsdr.cdc.gov/tfacts68.pdf>

- **Environmental Protection Agency, Office of Pollution Prevention and Topics**
Polybrominated Diphenyl Ethers
<http://www.epa.gov/oppt/pbde>

- **Washington State Department of Ecology**
Frequently Asked Questions about PBDE Flame Retardants
■ http://www.ecy.wa.gov/programs/eap/pbt/pbde/PBDE_faq.htm **Washington State**
- **Department of Labor and Industries**
Workplace Exposure to Polybrominated Diphenyl Ethers (PBDEs)
<http://www.lni.wa.gov/Safety/Topics/AtoZ/polybrom/default.asp>

- **U.S. Environmental Protection Agency**
PCBs
<http://www.epa.gov/opptintr/pcb/>

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The Centers for Disease Control and Prevention (CDC) protects people's health and safety by preventing and controlling diseases and injuries; enhances health decisions by providing credible information on critical health issues; and promotes healthy living through strong partnerships with local, national, and international organizations.