



## **Polybrominated Diphenyl Ethers (PBDEs) and Polybrominated Biphenyls (PBBs)**

Polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyls (PBBs) belong to a class of chemicals that are added to certain manufactured products in order to reduce the chances that the products will catch on fire. Finished products that may contain PBDEs are furniture foam padding; wire insulation; rugs, draperies, and upholstery; and plastic cabinets for televisions, personal computers, and small appliances. PBBs were used in the past, and one in particular, BB-153, has not been produced in the U.S. since the 1970's.

These chemicals can get into the air, water, and soil during their manufacture; they can leak from products that contain them or escape when the products that contain them break down. They do not dissolve easily in water; they stick to particles and settle to the bottom of rivers or lakes. Some PBDEs can build up in certain fish and mammals when they eat contaminated food or water.

### **How People Are Exposed to PBDEs and PBBs**

People can be exposed to PBDEs and PBBs by eating contaminated foods, especially those with a high fat content, such as fatty fish. Another source of exposure results from breathing contaminated air or swallowing contaminated dust. Working in industries that make these chemicals or that make, repair, or recycle products containing these chemicals flame retardants can result in exposure.

### **How PBDEs and PBBs Affect People's Health**

Human health effects from PBDEs and PBBs at low environmental exposures are unknown. In animal studies, these chemicals have shown some effects on the thyroid and liver, as well as on brain development. More research is needed to assess the human health effects of exposure to PBDEs and PBBs.

### **Levels of PBDEs and PBBs in the U.S. Population**

In the *Fourth National Report on Human Exposure to Environmental Chemicals (Fourth Report)*, CDC scientists measured ten different PBDEs in the blood serum (the clear portion of blood) of at least 1,985 participants aged 12 years and older who took part in the National Health and Nutrition Examination Survey (NHANES) during 2003–2004. In addition, BB-153, which is one of the PBBs, was measured in 2,032 participants aged 12 years and older. By measuring PBDEs and PBBs in blood serum scientists can estimate the amounts of these chemicals that have entered people's bodies.

- In the *Fourth Report*, scientists found that one PBDE, BDE-47, demonstrated the highest levels of the ten different PBDEs measured in the *Report*. These levels for the U.S.

population are roughly 3 to 10 times higher than levels seen in participants of various studies from European countries.

- The following PBDEs were detected in greater than 60 percent of participants: BDE-28, BDE-99, BDE-100, and BDE-153. Also, BB-153 was detected in greater than 60 percent of participants.

Finding measurable amounts of PBDEs and/or PBBs in serum does not mean that the levels of these chemicals cause an adverse health effect. Biomonitoring studies of serum PBDEs and PBBs can provide physicians and public health officials with reference values so that they can determine whether people have been exposed to higher levels of PBDEs and/or PBBs than are found in the general population. Biomonitoring data can also help scientists plan and conduct research on exposure and health effects.

### **For More Information**

- Agency for Toxic Substances and Disease Registry  
**Polybrominated Diphenyl Ethers (PBDEs)**  
<http://www.atsdr.cdc.gov/tfacts68-pbde.html>

**ToxFAQs for Polybrominated Biphenyls (PBBs)**  
<http://www.atsdr.cdc.gov/tfacts68.pdf>

- Environmental Protection Agency  
**Polybrominated Diphenyl Ethers (PBDEs)**  
<http://www.epa.gov/oppt/pbde/>

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