

This fact sheet answers the most frequently asked health questions (FAQs) about PBDEs. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Polybrominated diphenyl ethers (PBDEs) are man-made chemicals found in plastics used in a variety of consumer products to make them difficult to burn. Very little is known about the health effects of PBDEs in people, but effects have been reported in animals. PBDEs have not been found in any of the 1,647 current or former National Priority List (NPL) sites identified by the Environmental Protection Agency (EPA).

What are PBDEs?

Polybrominated diphenyl ethers (PBDEs) are flame-retardant chemicals that are added to plastics and foam products to make them difficult to burn. There are different kinds of PBDEs; some have only a few bromine atoms attached, while some have as many as ten bromine attached to the central molecule.

PBDEs exist as mixtures of similar chemicals called congeners. Because they are mixed into plastics and foams rather than bound to them, PBDEs can leave the products that contain them and enter the environment.

What happens to PBDEs when they enter the environment?

- PBDEs enter air, water, and soil during their manufacture and use in consumer products.
- In air, PBDEs can be present as particles, but eventually settle to soil or water.
- Sunlight can degrade some PBDEs.
- PBDEs do not dissolve easily in water, but stick to particles and settle to the bottom of river or lakes.
- Some PBDEs can accumulate in fish but usually at low concentrations.

How might I be exposed to PBDEs?

- The concentrations of PBDEs in human blood, breast milk, and body fat indicate that most people are exposed to low levels of PBDEs.
- You may be exposed to PBDEs from eating foods or breathing air contaminated with PBDEs.
- Workers involved in the manufacture of PBDEs or products that contain PBDEs may be exposed to higher levels than usual.
- Occupational exposure can also occur in people who work in enclosed spaces where PBDE-containing products are repaired or recycled.

How can PBDEs affect my health?

There is no definite information on health effects of PBDEs in people. Rats and mice that ate food with moderate amounts of PBDEs for a few days had effects on the thyroid gland. Those that ate smaller amounts for weeks or months had effects on the thyroid and the liver. Large differences in effects are seen between highly-brominated and less-brominated PBDEs in animal studies.

Preliminary evidence suggests that high concentrations of PBDEs may cause neurobehavioral alterations and affect the immune system in animals.

ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

How likely are PBDEs to cause cancer?

We do not know whether PBDEs can cause cancer in humans. Rats and mice that ate food with decabromodiphenyl ether (one type of PBDE) throughout their lives, developed liver tumors. Based on this evidence, the EPA has classified decabromodiphenyl ether as a possible human carcinogen. PBDEs with fewer bromine atoms than decabromodiphenyl ether are listed by the EPA as not classifiable as to human carcinogenicity due to the lack of human and animal cancer studies.

How can PBDEs affect children?

Children are exposed to PBDEs in generally the same way as adults, mainly by eating contaminated food. Because PBDEs dissolve readily in fat, they can accumulate in breast milk and may be transferred to babies and young children.

Exposure to PBDEs in the womb and through nursing has caused thyroid effects and neurobehavioral alterations in newborn animals, but not birth defects. It is not known if PBDEs can cause birth defect in children.

How can families reduce the risk of exposure to PBDEs?

- Children living near hazardous waste sites should be discouraged from playing in the dirt near these sites. Children should also be discouraged from eating dirt and should wash their hands frequently.
- People who are exposed to PBDEs at work should shower and change clothes before going home each day. Work clothes should be stored and laundered separately from the rest of the family's clothes.

Is there a medical test to show whether I've been exposed to PBDEs?

There are tests that can detect PBDEs in blood, body fat, and breast milk. These tests can tell whether you have been exposed to high levels of the chemicals, but cannot tell the exact amount or type of PBDE you were exposed to, or whether harmful effects will occur. Blood tests are the easiest and safest for detecting recent exposures to large amounts of PBDEs. These tests are not routinely available at the doctor's office, but samples can be sent to laboratories that have the appropriate equipment.

Has the federal government made recommendations to protect human health?

The EPA requires that companies that transport, store, or dispose p-bromodiphenyl ether (a particular PBDE compound) follow the rules and regulations of the federal hazardous waste management program. The EPA requires that industry tell the National Response Center each time 100 pounds or more of p-bromodiphenyl ether are released to the environment.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR) 2004. Toxicological Profile for Polybrominated Biphenyls and Polybrominated Diphenyl Ethers. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

