

**Bureau of Environmental Health
and Radiation Protection**

"Protect and improve the health of all Ohioans by preventing disease, promoting good health and assuring access to quality care."

BTEX

Benzene, Toluene, Ethylbenzene, and Xylenes

What is BTEX?

BTEX is not one chemical, but are a group of the following chemical compounds: **B**enzene, **T**oluene, **E**thylbenzene and **X**ylenes.

BTEX are made up of naturally-occurring chemicals that are found mainly in petroleum products such as gasoline. Refineries will change the amounts of these chemical compounds to meet vapor pressure and octane standards for gasoline. Besides gasoline, BTEX can be found in many of the common household products we use every day.

BTEX Breakdown



■ Benzene 11%
■ Toluene 26%
■ Ethylbenzene 11%
■ Xylene 52%

**BTEX
typically
makes
up about
18% of
gasoline.**

What are some products that contain BTEX?

Benzene can be found in gasoline and in products such as synthetic rubber, plastics, nylon, insecticides, paints, dyes, resins-glues, furniture wax, detergents and cosmetics.

Auto exhaust and industrial emissions account for about 20% of the total nationwide exposure to benzene. Benzene can also be found in cigarette smoke. About 50% of the entire nationwide exposure to benzene results from smoking tobacco or from 2nd hand exposure to tobacco smoke.

Toluene occurs naturally as a component of many petroleum products. Toluene is used

as a solvent for paints, coatings, gums, oils and resins.

Ethylbenzene is used mostly as a gasoline and aviation fuel additive. It may also be present in consumer products such as paints, inks, plastics and pesticides.

There are three forms of **Xylene**: ortho-, meta-, and para-. Ortho-xylene is the only naturally-occurring form of xylene; the other two forms are man-made. Xylenes are used in gasoline and as a solvent in printing, rubber and leather industries.

BTEX are in a class of chemicals known as volatile organic compounds (VOCs). VOC chemicals easily vaporize or change from a liquid to a vapor (gas). The VOC vapors can travel through the air and/or move through contaminated groundwater and soils as vapors, possibly impacting indoor air quality in nearby homes or businesses.

How does BTEX get into the environment?

Most everyone is exposed to small amounts of BTEX compounds in the ambient (outdoor) air, at work, and in their home. As benzene is found in auto exhaust, people who live in urban areas (cities) or by major roads and highways will likely be exposed to more BTEX than someone who lives in a rural (country) setting. Besides the



common daily exposures to BTEX, larger amounts can enter the environment from leaking under-ground storage tanks (UST's), overfills of storage tanks, fuel spills from auto accidents and from landfills.

BTEX compounds easily move through soils and can make their way into the groundwater, contaminating public and private water systems and the soils in between.

How can you reduce your exposure to BTEX?

- Use adequate ventilation to reduce exposure to BTEX vapors from consumer products such as gasoline, pesticides, varnishes, paints, resins-glues and newly installed carpeting.
- Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers that children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.
- Volatile chemicals should be stored outside the home if possible – in a separate garage or shed.
- Don't smoke indoors with doors and windows closed.

Can BTEX make you sick?

Yes, you can get sick from exposure to BTEX. But getting sick will depend on:

- How much you were exposed to (dose).
- How long you were exposed (duration).
- How often you were exposed (frequency).
- General Health, Age, Lifestyle
Young children, the elderly and people with chronic (on-going) health problems are more at risk to chemical exposures.

How can BTEX affect my health?

Acute (short-term) exposure to gasoline and its components benzene, toluene and xylenes has been associated with skin and sensory irritation, central nervous system-CNS problems (tiredness, dizziness,

headache, loss of coordination) and effects on the respiratory system (eye and nose irritation).

Prolonged (chronic) exposure to BTEX compounds can affect the kidney, liver and blood systems. Long-term exposure to high levels of the benzene compound can lead to leukemia and cancers of the blood-forming organs.

Does BTEX cause cancer (carcinogen)?

In the absence of data on the cancer-causing nature of the whole mixture (benzene, toluene, ethylbenzene and xylenes), possible health hazards from exposures to BTEX are assessed using an individual component-based approach of the individual chemicals.

Benzene: The Department of Health and Human Services (HHS) has determined that benzene is a known human carcinogen (causes cancer). Workers exposed to high levels of benzene in occupational settings were found to have an increase occurrence of leukemia. Long-term exposure to high levels of benzene in the air can lead to leukemia and cancers of the blood-forming organs.

Ethylbenzene: According to the International Agency for Research on Cancer (IARC), ethylbenzene classified as a Group 2B, possibly carcinogenic to humans, based on studies of laboratory animals.

Toluene, and Xylenes have been categorized as not classifiable as to human carcinogenicity by both EPA (IRIS 2001) and IARC (1999a, 1999b), reflecting the lack of evidence for the carcinogenicity of these two chemicals.

Is there a medical test to show whether you have been exposed to BTEX?

Several tests can show if you have been exposed to BTEX. Components of BTEX can be found in the blood, urine, breath and some body tissues of exposed people. However, these tests need to be done within

a few hours after exposure because these substances leave the body very quickly. The most common way to test for ethylbenzene is in the urine. However, the urine test may not be as effective to measure benzene levels.

Note these tests will perhaps show the amount of BTEX in your body, but they cannot tell you whether you will have any harmful health problems. They also do not tell you where the benzene came from.

References:

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological profile for benzene. U.S. Department of Health and Human Services, Public Health Service.

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Where Can I Get More Information?

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