



Ethylbenzene

What is ethylbenzene?

- Ethylbenzene is a colorless, flammable liquid that smells like gasoline and evaporates quickly.
- Ethylbenzene occurs naturally in petroleum and coal.
- Chemical industries produce ethylbenzene from petroleum.

What are the uses of ethylbenzene?

- Ethylbenzene is used to make styrene, cellulose acetate, synthetic rubber and some pesticides.
- Ethylbenzene is used as a solvent in rubber adhesives, paints, inks, varnishes and other surface coatings.
- Ethylbenzene is an anti-knock agent in gasoline and a component in carpet glues.
- Ethylbenzene may be a component of fluids injected underground to aid in the recovery of natural gas.

Is ethylbenzene in the environment?

- Ethylbenzene can enter the environment at refineries during the production, transport and processing of petroleum and when oil, gas and coal are burned.
- Ethylbenzene can enter the environment after an accidental spill or a leak during storage or burial at a waste site.
- Ethylbenzene is commonly found in air as a result of automobile emissions.
- Median concentrations of ethylbenzene in city and suburban air are 0.62 parts per billion (ppb). The median concentration of ethylbenzene in country air is 0.01 ppb.
- Ethylbenzene can be found indoors during the use of tobacco and other consumer finished goods such as cleaning products and paints.
- The median concentration of ethylbenzene in indoor air is 1.0 ppb.
- Ethylbenzene breaks down in air to less harmful chemicals within about three days.
- In surface water, such as rivers and harbors, ethylbenzene breaks down by reacting with other compounds naturally present in the water. It does not accumulate in fish.

- Ethylbenzene is not commonly found in drinking water. However, sometimes it is present in residential drinking water wells near landfills, waste sites or leaking underground fuel storage tanks.
- Ethylbenzene is not commonly found in soil. When present, it is broken down by soil bacteria.
- Ethylbenzene is not normally found in food. However, it has been measured in split peas, lentils and beans at concentrations of 0.005 to 0.013 parts per million (ppm).

How are people exposed to ethylbenzene?

- Breathing contaminated air is the major route of exposure to ethylbenzene.
- Exposure to ethylbenzene in indoor air may occur from breathing vapors from household products and outdoors by breathing contaminated air.
- Exposure to ethylbenzene by metal workers, furniture refinishers and automobile garage workers may occur from breathing vapors from workplace solvents, gasoline or car exhaust.
- Exposure to ethylbenzene may occur through skin contact with the substance during the use of household or workplace products.
- Exposure to ethylbenzene can also occur by breathing cigarette smoke or by ingesting food or water contaminated with the substance.

How does ethylbenzene enter and leave the body?

- Ethylbenzene rapidly and almost completely enters the body through the gut and the lungs when ingested or inhaled.
- Ethylbenzene liquid may enter the body through intact skin.
- Ethylbenzene does not usually accumulate in the body.
- Most of the ethylbenzene in the body is rapidly broken down in the liver to non-toxic compounds. The major non-toxic breakdown products are mandelic acid and phenylglyoxylic acid.
- Most of the breakdown products leave the body in the urine within two days. Small amounts may also leave the body through the lungs and feces.

How harmful is exposure to ethylbenzene?

- Ethylbenzene is toxic when ingested or inhaled.
- Exposure to ethylbenzene vapor may cause mild irritation of the eyes, mucous membranes and skin.

- Exposure to ethylbenzene vapor at a concentration of 100 ppm may cause headache and fatigue.
- Repeated or prolonged contact with ethylbenzene liquid may cause redness and blistering of skin.
- Ethylbenzene can cause swelling and bleeding in the lungs.

Can exposure to ethylbenzene cause cancer?

- The International Agency for Research on Cancer (IARC) has classified ethylbenzene as possibly carcinogenic to humans.
- The U.S. Environmental Protection Agency (EPA) has not determined whether exposure to elevated levels of ethylbenzene causes cancer.

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

- Ethylbenzene can be measured in blood and in expired air.
- Two of its breakdown products, mandelic acid and/or phenylglyoxylic acid, can be measured in urine. However, the levels of these substances will not correlate well with the degree of exposure or to symptoms and, therefore, have little clinical relevance.
- Measurement of ethylbenzene and its breakdown products may also be limited by their rapid exit from the body. Measurement should occur within a few hours following exposure.
- The presence of mandelic acid and/or phenylglyoxylic acid in the urine might indicate exposure to ethylbenzene. However, in addition to ethylbenzene, mandelic acid and/or phenylglyoxylic acid are also present in the urine following exposure to styrene.

What is the treatment for ethylbenzene?

- There is no antidote for ethylbenzene poisoning.
- Treatment consists of support of respiratory and cardiovascular functions.

Are there recommendations to protect public health?

- The Occupational Safety Health Association's (OSHA) Permissible Exposure Limit (PEL) for ethylbenzene in air is 100 ppm averaged over an eight-hour workshift.
- The Environmental Protection Agency (EPA) has set an enforceable limit, the maximum contaminant level (MCL) of 0.7 milligrams per liter (mg/L) or 700 parts per billion (ppb) for ethylbenzene in drinking water.
- The National Institute for Occupational Safety and Health's Immediately Dangerous to Life or Health (IDLH) limit is 800 ppm.

What can I do to reduce or prevent exposure to ethylbenzene?

- Use ethylbenzene-containing products in well ventilated areas.
- Tightly seal ethylbenzene-containing products when not in use to prevent evaporation.
- Talk to your children about the dangers of sniffing products containing ethylbenzene, since children may engage in this practice to get high.

What should I do if I believe I am ill as a result of exposure to ethylbenzene?

- Terminate exposure and seek rapid emergency medical treatment in a hospital setting if your condition or history suggests ethylbenzene poisoning.

Where can I get more information?

For more information, contact:

The Pennsylvania Department of Health, Division of Environmental Health Epidemiology, P.O. Box 90, Harrisburg, Pennsylvania, 17108. Telephone number: 717-787-1708.

The U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, Atlanta, Georgia. Telephone number: 800-CDC-INFO (800-232-4636).

References

- (1) U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, ToxFAQs™; Ethylbenzene, September 2007.
- (2) U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). November 2010, Toxicological Profile for Ethylbenzene.
- (3) U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). September 2011. ToxGuide, Ethylbenzene.
- (4) U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). November 2010. Public Health Statement, Ethylbenzene.
- (5) U.S. Department of Labor, Occupational Safety and Health Administration (OSHA), Occupational Safety and Health Guideline for Ethylbenzene, searched online on April 2, 2012 @ <http://www.osha.gov/SLTC/healthguidelines/ethylbenzene/recognition.html>.
- (6) World Health Organization (WHO), Ethylbenzene in Drinking-water, Background document for development of WHO Guidelines for Drinking-water Quality, 2003.