

The ToxGuide™ is developed to be used as a pocket guide. Tear off at perforation and fold along lines.

Sources of Exposure

General Populations

- Exposure to ethylbenzene is possible through contact with gasoline, automobile emissions, solvents, printing inks, varnishes, coatings, and paints.
- Cigarette smoke is also a source of ethylbenzene exposure.
- Ground water from sources near manufacturing and processing facilities, petroleum refineries, and leaking underground storage tanks may also be contaminated with ethylbenzene.

Occupational Populations

- Occupational exposures are expected within the petroleum industry, industries using solvents, paints, and coatings, and during the manufacture and handling of ethylbenzene and styrene.

Toxicokinetics and Normal Human Levels

Toxicokinetics

- Ethylbenzene is well absorbed from the lungs, gastrointestinal tract, and through the skin.
- Absorbed ethylbenzene is rapidly eliminated by metabolism and excretion of metabolites; the half-time in blood is less than 1 hour.
- The major metabolic pathways are side-chain and ring hydroxylation with subsequent formation of glucuronide and sulfate conjugates.
- Ethylbenzene metabolites (primarily conjugates, mandelic acid, and phenylglyoxylic acid) are excreted in the urine.

Normal Human Levels

- No data available.

Biomarkers/Environmental Levels

Biomarkers

- Ethylbenzene can be measured in blood, subcutaneous fat, and in expired air.
- Expired air concentrations have been correlated with levels of ethylbenzene in ambient air.
- Urinary levels of mandelic acid and/or phenylglyoxylic acid can be used to assess ethylbenzene exposure; however, these compounds are also elevated following exposure to styrene.

Environmental Levels

Air

- Median concentration in urban and suburban air samples is 0.62 ppb.
- Median concentration in rural air samples is 0.013 ppb.

Sediment and Soil

- Ethylbenzene is rarely detected in soil.

Water

- Ethylbenzene is rarely detected in drinking water samples.

Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Ethylbenzene (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

ToxGuide™ for Ethylbenzene



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U.S. Department of Health and
Human Services
Public Health Service
Agency for Toxic Substances
and Disease Registry
www.atsdr.cdc.gov

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Chemical and Physical Information

Ethylbenzene is a liquid

- Ethylbenzene is a colorless liquid with an aromatic odor.
- Ethylbenzene is flammable and combustible.
- It is naturally found in crude petroleum.
- It is a high production volume chemical primarily used for the production of styrene.

Routes of Exposure

- Inhalation – Predominant route of exposure for general population and workers.
- Oral – Minor route of exposure via ingestion of contaminated water.
- Dermal – Skin contact may occur during showering or bathing with contaminated water or from contact with contaminated soil

Ethylbenzene in the Environment

- Ethylbenzene partitions primarily to air and removal via photochemically generated hydroxyl radicals is an important degradation mechanism. The half-life in air is approximately 1-2 days.
- In surface water, most of the ethylbenzene will evaporate. The remaining ethylbenzene is broken down through photooxidation and biodegradation.
- Ethylbenzene is moderately mobile in soil.
- Ethylbenzene does not appear to bioconcentrate in aquatic food chains.

Relevance to Public Health (Health Effects)

Health effects are determined by the dose (how much), the duration (how long), and the route of exposure.

Minimal Risk Levels (MRLs)

Inhalation

- An MRL of 10 ppm has been derived for acute-duration inhalation exposure (≤ 14 days).
- An MRL of 0.7 ppm has been derived for intermediate-duration inhalation exposure (15-364 days).
- An MRL of 0.3 ppm has been derived for chronic-duration inhalation exposure (≥ 1 year).

Oral

- No acute-duration oral MRL was derived for ethylbenzene.
- An MRL of 0.5 mg/kg/day has been derived for intermediate-duration oral exposure (15-364 days).
- No chronic-duration oral MRL was derived for ethylbenzene.

Health Effects

- Exposure to high levels of ethylbenzene can result in eye and throat irritation, vertigo, and dizziness.
- The most sensitive effects observed in animals is potentially irreversible damage to cochlear hair cells and hearing loss which has been observed following acute and intermediate inhalation exposure and acute oral exposure.
- Chronic inhalation exposure can result in an increased severity of progressive nephropathy in rats.
- Intermediate-duration oral exposure to ethylbenzene can result in liver damage in animals.
- Eye and skin irritation were observed in animals dermally exposed to liquid ethylbenzene.
- In general, animal studies have found developmental effects (decreases in growth and increased skeletal variations) following inhalation exposure to ≥ 1000 ppm).
- IARC has assigned ethylbenzene to Group 2B, possibly carcinogenic to humans.

Children's Health

- Children are expected to be affected by ethylbenzene poisoning in the same manner as adults.