

US EPA ARCHIVE DOCUMENT

Technical Factsheet on: ETHYLBENZENE

[List of Contaminants](#)

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards

MCLG: 0.7 mg/L
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HAL(child): 1 day: 30 mg/L; 10-day: 3 mg/L

Health Effects Summary

Acute: EPA has found ethylbenzene to potentially cause drowsiness, fatigue, headache and mild eye and respiratory irritation from short-term exposures at levels above the MCL.

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day: a one-day exposure to 30 mg/L; a ten-day exposure to 3 mg/L.

Chronic: Ethylbenzene has the potential to cause damage to the liver, kidneys, central nervous system and eyes from long-term exposure at levels above the MCL.

Cancer: There is inadequate evidence to state whether or not ethylbenzene has the potential to cause cancer from a lifetime exposure in drinking water.

Usage Patterns

Production of ethylbenzene has increased: from 6.9 billion lbs. in 1982 to 11.8 billion lbs in 1993. The greatest use - over 99 percent - of ethylbenzene is as an intermediate for styrene monomer production.

Other uses include: a solvent for coatings, and in the production of synthetic rubber and cellulose acetate.

Release Patterns

Ethylbenzene will enter the atmosphere primarily from fugitive emissions and exhaust connected with its use in gasoline. More localized sources will be emissions, waste water and spills from its production and industrial use.

From 1987 to 1993, according to EPA's Toxic Chemical Release Inventory, ethylbenzene releases to water totalled over 47,293 lbs., while releases to land totalled over 714,000 lbs. These releases were primarily from petroleum refining industries. The largest releases occurred in Texas. The largest direct releases to water occurred in Virginia.

Environmental Fate

If ethylbenzene is released to the atmosphere, it will exist predominantly in the vapor phase, based on its vapor pressure. There it will photochemically degrade by reaction with hydroxyl radicals (half-life 0.5 to 2 days) and partially return to earth in rain. It will not be subject to direct photolysis.

Evaporation and biodegradation are significant in water. Ethylbenzene will evaporate rapidly from water: a half-life for evaporation from moving, shallow water is 3.1 hr. After a period of inocula adaptation, ethylbenzene is biodegraded fairly rapidly by sewage or activated sludge inoculua. As a component of gas oil, it is completely degraded in groundwater in 8 days and seawater in 10 days. No degradation was observed in anaerobic reactors or at low concentrations in batch reactors under denitrifying conditions. Ethylbenzene is resistant to hydrolysis. Some ethylbenzene may be adsorbed by sediment.

Ethylbenzene is only adsorbed moderately by soil. The measured Koc for silt loam was 164. Its presence in bank infiltrated water suggests that there is a good probability of its leaching through soil. It will not significantly hydrolyze in water or soil.

Significant bioconcentration in fish is not expected to occur. Experimental data on the bioconcentration of ethylbenzene include a log BCF of 1.9 in goldfish and 0.67 for clams exposed to the water-soluble fraction of crude oil. This, with a calculated log BCF of 2.16 in fish, indicate that ethylbenzene should not significantly bioconcentrate in aquatic organisms.

The primary source of exposure is from the air especially in areas of high traffic. However, ethylbenzene is a contaminant in many drinking water supplies and levels can be quite high for wells near leaking gasoline storage tanks and for many drinking waters taken from surface waters.

Chemical/Physical Properties

CAS Number: 100-41-4

Color/ Form/Odor: Colorless liquid with a sweet, gasoline-like odor

M.P.: -95 C B.P.: 136.2 C

Vapor Pressure: 10 mm Hg at 25.9 C

Density/Spec. Grav.: 0.87 at 20 C

Octanol/Water Partition (Kow): Log Kow = 3.15

Solubility: 0.14 g/L of water at 15 C; low solubility in water

Soil sorption coefficient: Koc measured at 164 silt loam; moderate mobility in soil

Odor/Taste Thresholds: Taste and odor threshold in water is 0.029 mg/L

Bioconcentration Factor: Measured log BCF values of 0.67 to 1.9 in fish; not expected to bioconcentrate in aquatic organisms.

Henry's Law Coefficient: 0.0084 atm-cu m/mole; rapid evaporation from water

Trade Names/Synonyms: Ethylbenzol, Phenylethane

Other Regulatory Information

Monitoring:

-- For Ground/Surface Water Sources:

Initial Frequency- 4 quarterly samples every 3 years

Repeat Frequency- Annually after 1 year of no detection

-- Triggers - Return to Initial Freq. if detect at > 0.0005 mg/L

Analysis

Reference Source
EPA 600/4-88-039

Method Numbers
502.2; 524.2

Treatment/Best Available Technologies: Granular Activated Charcoal and Packed Tower Aeration

Toxic Release Inventory - Releases to Water and Land, 1987 to 1993 (in pounds):

TOTALS (in pounds)		Water	Land
		47,293	714,580
Top Ten States			
TX	9,870	480,164	
VI	1,233	72,245	
IL	31	44,789	
PR	0	23,980	
VA	17,997	1,950	
DE	3,460	13,324	
NJ	1,892	11,510	
NM	0	13,076	
WY	250	12,755	
LA	4,383	4,552	
Major Industries			
Petroleum refining		55,201	718,884
Plastics, resins		12,384	9,212
Indust. Organics		10,683	9,781
Pharmaceuticals		14,090	0
Metal containers		0	11,510

* Water/Land totals only include facilities with releases greater than a certain amount - usually 1000 to 10,000 lbs.

For Additional Information

EPA can provide further regulatory or other general information:
EPA Safe Drinking Water Hotline - 800/426-4791

Other sources of toxicological and environmental fate data include:
Toxic Substance Control Act Information Line - 202/554-1404
Toxics Release Inventory, National Library of Medicine - 301/496-6531
Agency for Toxic Substances and Disease Registry - 404/639-6000