United States Environmental Protection Agency | Office of Water 4601 | EPA 811-F-95-004m-T October 1995

National Primary Drinking Water Regulations

Ethylbenzene

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 evapporation from water

Trade Names/Synonyms: Ethylbenzol, Phenylethane

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

Toxic Release Inventory - Releases to Water and Land: 1987 to 1993

	Water	Land
TOTALS (in pounds)	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.

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.

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	Method Numbers
EPA 600/4-88-039	502.2; 524.2

Treatment:

Best Available Technologies

Granular Activated Charcoal and Packed Tower Aeration

For Additional Information:

- EPA can provide further regulatory and 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