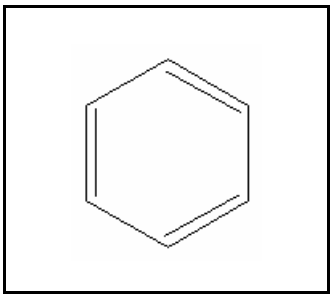
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

BENZENE

CAS RN: 71-43-2
Water Solubility: 0.18 g/100 mL



Standard

The procedures described in the Tier II methodology indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be affected unacceptably if the four (4) day average concentration of benzene does not exceed 98 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 880 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 12,312 µg/L
SAF = 7.0

SAV = 12,312/7 = 1759 µg/L

SMC = SAV/2 = 1759/2 = **880 µg/L**

Chronic Aquatic Life:

SCC = SAV/SACR

SACR = 18
SCC = 1759/18 = **98 μg/L**

Data

Table 1. GMAVs and SMAVs for benzene

Genus Mean Acute Value (μg/L)	Species	Species Mean Acute Value (μg/L)	Acute-Chronic Ratio	Reference Number
336,526	Cladoceran Daphnia magna	375,000		1,2,3
	Cladoceran Daphnia pulex	302,000		1
12,312	Rainbow Trout Oncorhynchus mykiss	12,312		1,4
33,000	Fathead Minnow Pimephales promelas	33,000		1
36,600	Guppy Poecilia reticulata	36,600		1
22,000	Bluegill Lepomis macrochirus	22,000		1
386,000	Mosquitofish Lepomis macrochirus	386,000		1

References

1. USEPA 1980. Ambient water quality criteria for benzene. EPA 440/5-80-018.

2. Eastmond, D.A., G.M. Booth, and M.L. Lee 1984. Toxicity accumulation and elimination of polycyclic aromatic sulfur heterocycles in Daphnia magna.

3. LeBlanc, G.A. 1980. Acute toxicity of priority pollutants to the water flea (Daphnia magna). Bull. Environ. Contam. Toxicol. 24: 684-691.

4. Galassi, S., M. Mingazzine, L. Vigano, et al. 1988. Approaches to modeling toxic responses of aquatic organisms to aromatic hydrocarbons. Ecotoxicol. Environ. Saf. 16: 158-169.

Acronyms/Abbreviations

CAS RN	Chemical Abstract Service Registry Number
K_{ow}	Octanol-Water Partition Coefficient
P (superscript)	Predicted value
SAV	Secondary Acute Value
GMAV	Genus Mean Acute Value
SAF	Secondary Acute Factor
SMC	Secondary Maximum Concentration
SCC	Secondary Continuous Concentration
SACR	Secondary Acute-Chronic Ratio
FT	Flow-through
S	Static
U	Unmeasured
M	Measured

EVISTRA	Evaluation and Interpretation of Suitable Test Results in AQUIRE (EPA quality checking method/database)

Revision History

January 17, 1997 Values first developed
August 22, 2000 New search for data. No new studies added.

Contact Information

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