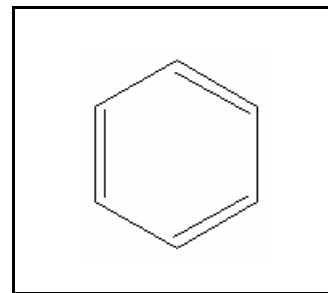




TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

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:

$$\text{SAV} = \text{lowest GMAV}/\text{SAF}$$

$$\begin{aligned}\text{Lowest GMAV} &= 12,312 \text{ } \mu\text{g/L} \\ \text{SAF} &= 7.0\end{aligned}$$

$$\text{SAV} = 12,312/7 = 1759 \text{ } \mu\text{g/L}$$

$$\text{SMC} = \text{SAV}/2 = 1759/2 = \mathbf{880 \text{ } \mu\text{g/L}}$$

Chronic Aquatic Life:

$$SCC = SAV/SACR$$

$$SACR = 18$$

$$SCC = 1759/18 = \mathbf{98 \mu g/L}$$

Data

Table 1. GMAVs and SMAVs for benzene

<u>Genus Mean Acute Value ($\mu\text{g/L}$)</u>	<u>Species</u>	<u>Species Mean Acute Value ($\mu\text{g/L}$)</u>	<u>Acute- Chronic Ratio</u>	<u>Reference Number</u>
336,526	Cladoceran <u>Daphnia magna</u>	375,000		1,2,3
	Cladoceran <u>Daphnia pulex</u>	302,000		1
12,312	Rainbow Trout <u>Oncorhynchus mykiss</u>	12,312		1,4
33,000	Fathead Minnow <u>Pimephales promelas</u>	33,000		1
36,600	Guppy <u>Poecilia reticulata</u>	36,600		1
22,000	Bluegill <u>Lepomis macrochirus</u>	22,000		1
386,000	Mosquitofish <u>Lepomis macrochirus</u>	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)
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Revision History

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

Contact Information

David B. Kallander
Water Quality Standards Section
Indiana Department of Environmental Management
100 North Senate Ave., P.O. Box 6015
Indianapolis, IN 46206-6015
(317) 233-2472
Email: dkalland@dem.state.in.us