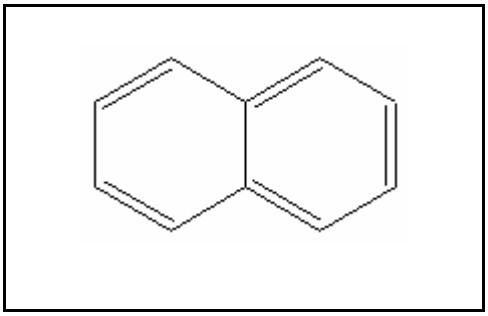
Indiana Department of Environmental Management
Office of Water Quality - Water Quality Standards Section

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

NAPHTHALENE

CAS RN: 91-20-3
Water Solubility: 0.0031 g/100 mL
Log K_{ow}: 3.25^{P}



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 naphthalene does not exceed 26 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 200 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 3216 µg/L
SAF = 8.0

SAV = 3216/8.0 = 401.9 µg/L

SMC = SAV/2 = 401.9/2 = **200 µg/L**

Chronic Aquatic Life:

SCV = SAV/SACR

SACR = 15.27 (Geometric mean of 18, 18, 11)

SCV = 401.9/15.27 = **26 μg/L**

Data

Table 1. GMAVs and SMAVs for naphthalene

Genus Mean Acute Value (μg/L)	Species	Species Mean Acute Value (μg/L)	Acute-Chronic Ratio	Reference Number
4922	Fathead Minnow Pimephales promelas	7,900		1
	Fathead Minnow Pimephales promelas	6,140		3
	Fathead Minnow Pimephales promelas	6,080		5
	Fathead Minnow Pimephales promelas	1,990	11	7,8
3216	Rainbow Trout Salmo gairdneri	1,600		1
	Rainbow Trout Salmo gairdneri	1800		2
	Rainbow Trout Salmo gairdneri	6,100		2
	Rainbow Trout Salmo gairdneri	2,600		2
	Rainbow Trout Salmo gairdneri	4,400		2
	Rainbow Trout	5,500		2

	Salmo gairdneri		
3524	Cladoceran Daphnia magna	8,600	6
	Cladoceran Daphnia magna	2,160	7
	Cladoceran Daphnia magna	2,194	9
	Cladoceran Daphnia pulex	2,920	4
	Cladoceran Daphnia pulex	4,463	10

References

1. DeGraeve, G.M., R.G. Elder, D.C. Wood 1982. Effects of naphthalene and benzene on fathead minnow and rainbow trout. Arch. Environ. Contam. Toxicol. 11: 487-490.

2. Edsall, C.C. 1991. Acute toxicities to larval rainbow trout of representative compounds detected in Great Lakes Fish. Bull. Environ. Contam. Toxicol. 46: 173-178.

3. Geiger, D.L., C.E. Northcott, D.J. Call 1985. Acute Toxicities of Organic Chemicals to Fathead Minnows (Pimephales promelas). Vol II. Center for Lake Superior Environmental Studies University of Wisconsin-Superior. 326 pp.

4. Geiger, J.G. and M. Buikema, Jr. 1982. Hydrocarbons depress growth and reproduction of D. Rilex. Can. J. Fish. Aquat. Sci. 39: 830-836.

5. Holcombe, G.W., G.L. Phipps, M.L. Knuth 1984. The acute toxicity of selected substituted phenols, benzenes and benzoic acid esters to fathead minnows. Environ. Pollut. (Series A) 35: 367-381.

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

7. Milliman, R.E., W.J. Birge, J.A. Black, R.M. Cushman, K.L. Daniels, P.J. Franco, J.M. Gidding, J.F. McCarthy, and A.S. Stewart 1984. Comparative acute toxicity to aquatic organisms of components of coal-derived synthetic fuels. Trans. Am. Fish. Soc. 113: 74-85.

8. USEPA 1980. Ambient water quality criteria for naphthalene. EPA 440/5-80-059.

9. Munoz, M.J. and J.V. Tarazona 1993. Synergistic effects of 2 and four component combinations of polycyclic armoatic hydrocarbons: Phenanthrene, anthracene, naphthalene, and acenaphthene on Daphnia magna. Bull. Environ. Toxicol. 50: 363-368.

10. Smith, S.B., J.F. Savino, and M.A. Blouin 1988. Acute toxicity to Daphnia pulex of six classes of chemical compounds potentially hazardous to Great Lakes aquatic biota. J. Great Lakes Res. 14(4): 394-404.

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

December 30, 1998 Values first developed
September 18, 2001 New search for data. No 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