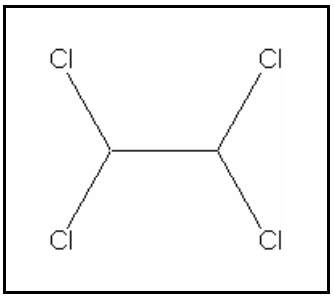
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

1,1,2,2-TETRACHLOROETHANE

CAS RN: 79-34-5
Water Solubility: 0.2962 g/100 mL
Log K_{ow}: 2.644^{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 1,1,2,2-tetrachloroethane does not exceed 100 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 900 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 14,625 µg/L
SAF = 8.0

SAV = 14,625/8.0 = 1,828 µg/L

SMC = SAV/2 = 1,828/2 = **900 µg/L**

Chronic Aquatic Life:

SCV = SAV/SACR

SACR = 9.066 (Geometric mean of 18, 18, 2.3)

SCV = 900/9.066 = **100 μg/L**

Calculation of ACR's

Fathead Minnows

NOEC = 6,900 μg/L
LOEC = 14,000 μg/L

CV = Geometric Mean of 14,000 and 6,900 = 9,829

ACR = 23,000/9,829 = 2.3

Data

Table 1. GMAVs and SMAVs for 1,1,2,2-tetrachloroethane

Genus Mean Acute Value (μg/L)	Species	Species Mean Acute Value (μg/L)	Acute-Chronic Ratio	Reference Number
14,625	Cladoceran Daphnia magna	23,000	2.3	3
	Cladoceran Daphnia magna	9,300		2
20,350	Fathead Minnow Pimephales promelas	20,300		5
	Fathead Minnow Pimephales promelas	20,400		6
20,000	Bluegill Lepomis macrochirus	20,000		1

22,254	Flagfish Jordanella floridae	26,800	4
	Flagfish Jordanella floridae	18,480	4

References

1. Buccafusco, R.J., S.J. Ells, and G.S. LeBlanc 1981. Acute toxicity of priority pollutants to bluegill (Lepomis macrochirus). Bull. Environ. Contam. Toxicol. 26(4): 446-452.

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

3. Richter, J.E., S.F. Peterson, and C.F. Kleiner 1983. Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes, and tetrachloroethylene to Daphnia magna. Arch. Environ. Contam. Toxicol. 12: 679-684.

4. Smith, A.D., A. Bharath, C. Mallard 1991. The acute and chronic toxicity of ten chlorinated organic compounds to the American Flagfish (Jordanella floridae). Arch. Environ. Contam. Toxicol. 20: 94-102.

5. Veith, G.D., D.J. Call, and L.T. Brooke 1983. Estimating the acute toxicity of narcotic industrial chemicals to fathead minnows. In: Aquatic Toxicology and Hazard Assessment: Sixth Symposium, ASTM STP 802, W.E. Bishop, R.D. Caldwell and B.B. Heidolph (Eds.). American Society for Testing and Materials, Philadelphia, PA.

6. Wallbridge, C.T., J.T. Fiandt, and G.L. Phipps 1983. Acute toxicity of ten chlorinated hydrocarbons to the fathead minnow (Pimephales promelas). Arch. Environ. Contam. Toxicol. 12: 661-666.

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

October 27, 1998 Values first developed
June 1, 2001 New search for data. No new studies added.

Contact Information

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