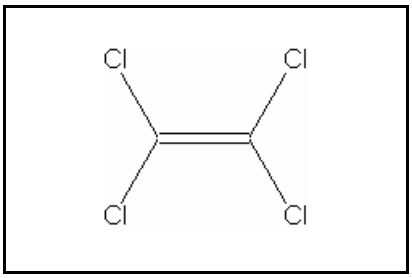
Indiana Department of Environmental Management
Office of Water Quality - Water Quality Standards Section

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

TETRACHLOROETHYLENE

CAS RN: 127-18-4
Water Solubility: 0.015 g/100 mL at 25 ^{0}C
Log K_{ow}: 2.53



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 tetrachloroethylene does not exceed 60 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 480 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 5840 µg/L
SAF = 6.1

SAV = 5840/6.1 = 957.4 µg/L

SMC = SAV/2 = 957.4/2 = **480 µg/L**

Chronic Aquatic Life:

SCV = SAV/SACR

SACR = 16 (Geometric mean of 11, 16 and 23)

SCV = 957.4/16 = **60 µg/L**

Calculation of ACR's

Daphnia magna

NOEC = 510 µg/L
LOEC = 1,100 µg/L

CV = Geometric Mean of 510 and 1,100 = 749

ACR = 8,500/749 = 11

Notes:

Acute-chronic ratios for fathead minnows and mysid shrimp were taken from USEPA 1980.

Data

Table 1. GMAVs and SMAVs for tetrachloroethylene

Genus Mean Acute Value (µg/L)	Species	Species Mean Acute Value (µg/L)	Acute-Chronic Ratio	Reference Number
30,800	Midge *Tanytarsus dissimilis*	30,800		4
13,000	Bluegill *Lepomis macrochirus*	13,000		3
17,286	Fathead Minnow *Pimephales promelas*	17,286	16	1,2,5,9,10
5,840	Rainbow Trout	5,840		4

	Oncorhynchus mykiss			
12,369	Cladoceran Daphnia magna	12,369	11	6,7
8,430	Amercian Flagfish Jordanella floridae	8,430		8
	Mysid Shrimp Mysidopsis bahia		23	

References

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2. Broderius, S. And M. Kahl 1985. Acute toxicity of organic chemical mixtures to the fathead minnow. Aquat. Toxicol. 6: 307-322.

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

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6. LeBlanc, G.A. 1980. Acute toxicity of priority pollutants to water flea (Daphnia magna). Bull. Environ. Contam. Toxicol. 24(5): 684-691.

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9. Veith, G.D., D.J. Call, L.T. Brooke 1983. Estimating the acute toxicity of narcotic industrial chemicals to fathead minnows. In: Aquatic Toxicology and Hazard

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

11. USEPA 1980. Ambient water quality criteria for tetrachloroethylene. EPA 440/5-80-073.

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 20, 1997 Values first developed
September 19, 2001 New search for data. No studies added.

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