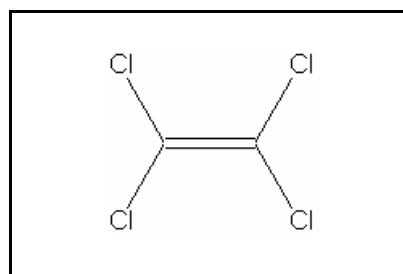




## TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

### TETRACHLOROETHYLENE

CAS RN: 127-18-4  
Water Solubility: 0.015 g/100 mL at 25 °C  
Log K<sub>ow</sub>: 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:

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

$$\begin{aligned}\text{Lowest GMAV} &= 5840 \text{ } \mu\text{g/L} \\ \text{SAF} &= 6.1\end{aligned}$$

$$\text{SAV} = 5840/6.1 = 957.4 \text{ } \mu\text{g/L}$$

$$\text{SMC} = \text{SAV}/2 = 957.4/2 = \mathbf{480 \text{ } \mu\text{g/L}}$$

### Chronic Aquatic Life:

$$SCV = SAV/SACR$$

$$SACR = 16 \quad (\text{Geometric mean of 11, 16 and 23})$$

$$SCV = 957.4/16 = \mathbf{60 \mu g/L}$$

### Calculation of ACR's

#### Daphnia magna

$$NOEC = 510 \mu g/L$$

$$LOEC = 1,100 \mu g/L$$

$$CV = \text{Geometric Mean of 510 and 1,100} = 749$$

$$ACR = 8,500/749 = 11$$

### **Notes:**

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

### **Data**

Table 1. GMAVs and SMAVs for tetrachloroethylene

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

Oncorhynchus mykiss

12,369	Cladoceran <u>Daphnia magna</u>	12,369	11	6,7
8,430	Americian Flagfish <u>Jordanella floridae</u>	8,430		8
	Mysid Shrimp <u>Mysidopsis bahia</u>		23	

## References

1. Alexander, H.C., W.M. McCarty and E.A. Bartlett 1978. Toxicity of perchloroethylene, trichloroethylene, 1,1,1-trichloroethane and methylene chloride to fathead minnows. Bull. Environ. Contam. Toxicol. 20: 344-352.
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.
4. Call, D.J., L.T. Brooke, N. Ahmad, et al. 1982. Toxicity and Metabolism Studies with EPA Priority Pollutants and Related Chemicals in Freshwater Organisms. Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, WI.
5. Geiger, D.L., C.E. Northcott, D.J. Call, et al. 1985. Acute toxicities of organic chemicals to fathead minnows (Pimephales promelas), Vol 2. Center for Lake Superior Environmental Studies, University of Wisconsin-Superior, Superior, WI. 326 p.
6. LeBlanc, G.A. 1980. Acute toxicity of priority pollutants to water flea (Daphnia magna). Bull. Environ. Contam. Toxicol. 24(5): 684-691.
7. Richter, J.E., S.F. Peterson, and C.F. Kleiner 1983. Acute and chronic toxicity of some chlorinated benzenes, chlorinated ethanes and tetracholoroethylene to Daphnia magna. Arch. Environ. Contam. Toxicol. 12(6): 679-684.
8. Smith, A.D., A. Bharath, C. Mallard, et al. 1991. The acute and chronic toxicity of ten chlorinated organic compounds to the American flagfish (Jordanella floridae). Arch. Environ. Contam. Toxicol. 20: 94-102.
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

Assessment, Sixth Symposium. ASTM STP 802. W.E. Bishop, R.D. Cardwell and B.B. Heidolph (Eds.) American Society for Testing and Materials, Philadelphia.

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 <sub>ow</sub>	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.

## 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](mailto:dkalland@dem.state.in.us)