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

TIER II ACUTE AND CHRONIC AQUATIC LIFE VALUES

THALLIUM

CAS RN: 7440-28-0
Water Solubility:
Log K_{ow}:

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 thallium does not exceed 6 µg/L more than once every three (3) years on the average and if the one (1) hour average concentration does not exceed 54 µg/L more than once every three (3) years on the average.

Calculations

Acute Aquatic Life:

SAV = lowest GMAV/SAF

Lowest GMAV = 860 µg/L
SAF = 8.0

SAV = 860/8.0 = 107.5 µg/L

SMC = SAV/2 = 107.5/2 = **54 µg/L**

Chronic Aquatic Life:

SCV = SAV/SACR

SACR = 18

SCV = 107.5/18 = **6 μg/L**

Data

Table 1. GMAVs and SMAVs for thallium

Genus Mean Acute Value (μg/L)	Species	Species Mean Acute Value (μg/L)	Acute-Chronic Ratio	Reference Number
142,829	Bluegill Lepomis macrochirus	120,000		1
	Bluegill Lepomis macrochirus	170,000		2
1,415	Cladoceran Daphnia magna	910		3
	Cladoceran Daphnia magna	2,200		4
860	Fathead Minnow Pimephales promelas	860		5

References

1. 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.

2. Dawson, G.W., A.L. Jennings, and D. Drozdowski 1977. The acute toxicity of 47 industrial chemicals to fresh and saltwater fishes. J. Haz. Mater. 1(4): 303-318.

3. Kimball, G. 1985. The effects of lesser known metals and one organic on fathead minnows (Pimephales promelas) and Daphnia magna. Manuscript, Dept. of Entomology, Fisheries and Wildlife, University of Minnesota, Minnesota, MN: 88 p.

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

5. LeBlanc, G.A. and J.W. Dean 1984. Antimony and thallium toxicity to embryos and larvae of fathead minnows (Pimephales promelas). Bull. Environ. Contam. Toxicol. 32: 565-569.

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

March 17, 1999 Values first developed
September 20, 2001 New search for data. No studies added.

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