## Rule 57 Aquatic Values Data Sheet

12/8/2003

*Chemical or product name:* Tetrachloroethylene
*Manufacturer (WTAs):* -----
*C.A.S #:* 127-18-4

*Developed by:* Christopher Hull
*Approved by:* D. Bush
*Approval date:* 5/25/04
*Literature search date:* CAS, SQUIRT: 10/29/03
*Clearinghouse search date:* 12/15/95

*FAV*:* 2,900 ug/l (Tier: 1)
*AMV*:* 1,400 ug/l (Tier: 1)
*FCV*:* 190 ug/l (Tier: 2)
*Acute CF:* ---- *Chronic CF:* ----

ACUTE DATA

| Species | Test Endpoint (EC or LC50) | Duration (hours) | Test Type (FT,M, etc.) | Hardness mg/L | Test Chemical | LC50/EC50 ug/L | SMAV ug/L | GMAV ug/L | Rank | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| Stonefly (*Peltoperla maria*) | LC50 | 96 | S,U | ----- | ----- | 3,600 | 3,600 | 3,600 | 1 | 1 |
| Rainbow Trout [1] (*Oncorhynchus mykiss*) | LC50 | 96 | FT,M | 52.5 | No carrier solvent | 4,820 [2] | 5,153 | 5,153 | 2 | 2 |
| | EC50 | 96 | FT,M | 52.5 | No carrier solvent | 4,680 | | | | 2 |
| | LC50 | 96 | FT,M | 55.0 | DMF as carrier | 5,780 [2] | | | | 2 |
| | EC50 | 96 | FT,M | 55.0 | DMF as carrier | 5,380 | | | | 2 |
| | LC50 | 96 | FT,M | 50.6-56.8 | No carrier solvent | 4,990 [2] | | | | 3,4 |
| | EC50 | 96 | FT,M | 50.6-56.8 | No carrier solvent | 4,860 | | | | 4 |
| | LC50 | 96 | FT,M | 50.6-56.8 | DMF as carrier | 5,840 [2] | | | | 3,4 |
| | EC50 | 96 | FT,M | 50.6-56.8 | DMF as carrier | 5,760 | | | | 4 |
| Midge | EC50 | 48 | S,M | 55.3 | ----- | 7,000 | 7,000 | 7,000 | 3 | 2 |
| (*Paratanytarsus dissimilis*) | LC50 | 48 | S,M | 55.3 | ----- | 30,800 [2] | | | | 2,3 |
| Water Flea | EC50 | 48 | S,M | 44 | ----- | 8,500 | 8,042 | 8,042 | 4 | 3,4,5 |
| (*Daphnia magna*) | LC50 | 48 | S,M | 44 | ----- | 18,100 [2] | | | | 3,4,5 |
| | LC50 | 48 | S,U | 100 | ----- | 3,400 | | | | 6 |
| | LC50 | 48 | S,U | 72 | ----- | 18,000 | | | | 7 |
| American Flagfish | LC50 | 96 | FT,M | 48 | ----- | 8,430 | 8,430 | 8,430 | 5 | 8 |
| (*Jordanella floridae*) | LC50 | 96 | SR,U | 48 | ----- | 4,000 [3] | | | | 8 |

(cont'd.)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Bluegill Sunfish (*Lepomis macrochirus*) | LC50 | 96 | S,U | ----- | ----- | 9,600 | 9,600 | 9,600 | 6 | 9 |
| Fathead Minnow | EC50 | 96 | FT,M | 42.0 | ----- | 8,450 | 13,811 | 13,811 | 7 | 10 |
| (*Pimephales promelas*) | LC50 | 96 | FT,M | 42.0 | ----- | 20,300 [2] | | | | 10,11 |
| | LC50 | 96 | FT,M | 45.1 | ----- | 13,400 | | | | 4,10,11,12 |
| | LC50 | 96 | FT,M | 44.6 | ----- | 23,800 | | | | 13,14,15 |
| | LC50 | 96 | FT,M | 56.3, 45.5 | ----- | 13,500 | | | | 16,17 |
| Amphipod (*Gammarus minus*) | LC50 | 96 | S,U | ----- | ----- | 28,600 | 28,600 | 28,600 | 8 | 1 |
| Snail (*Physa heterostropha*) | LC50 | 96 | S,U | ----- | ----- | 93,400 | 93,400 | 93,400 | 9 | 1 |

CHRONIC DATA

| Species | Test type (ELS, etc.) | Duration (days) | Study Conditions (FT,M etc.) | Hardness mg/L | Chemical | MATC ug/L | SMCV ug/L | GMCV ug/L | Rank | Reference |
|---|---|---|---|---|---|---|---|---|---|---|
| Water Flea (*Daphnia magna*) | LC | 28 | SR,M | 44.5 | ----- | 749 [4] | 749 | 749 | 1 | 3,4,5 |
| Fathead Minnow (*Pimephales promelas*) | ELS | 32 | FT,M | 45 | ----- | 837 [5] | 837 | 837 | 2 | 4 |

* Value rounded to 2 significant figures.

[1] References 2-4 report the same 2 USEPA tests, with slightly different results, probably due to different statistical treatments.

[2] Value not used to calculate SMAV, because EC50 preferred over LC50 from the same test.

[3] Value not used to calculate SMAV, because FT,M test preferred over other test types.

[4] See Table 1 for MATC and ACR calculations.

[5] See Table 2 for MATC and ACR calculations.

Note: A literature search conducted on 6/18/2012 revealed no additional studies that could be used for the derivation of aquatic life values (D. Bush).

Table 1. MATC and ACR calculations for *Daphnia magna*.

Reference #3:
*D. magna* 28- day NOEL $_{(growth, reproduction)}$ = 505 ug/l; LOEL = 1,110 ug/l; MATC = 749 ug/l.
ACR = 48-hr. unfed EC50 / 28-day MATC $_{(growth, reproduction)}$ = 8,500 ug/l / 749 ug/l = 11.348465.

Table 2. MATC and ACR calculations for Fathead Minnow.

Reference #4:
Fathead Minnow 32-day NOEL $_{(growth)}$ = 500 ug/l; LOEL = 1,400 ug/l; MATC = 837 ug/l.
ACR = 96-hr. LC50 / 32-day MATC $_{(growth)}$ = 13,400 ug/l / 837 ug/l = 16.009558.

## 1,2-DICHLOROETHANE REFERENCES, 9/04

References Used:


1. #QH 545.P5: Mayer, F. L. J. and M. R. Ellersieck. 1986. manual of acute toxicity: interpretation and data base for 410 chemicals and 66 species of freshwater animals. Resour.Publ.No.160, U.S.Dep.Interior, Fish Wildl.Serv., Washington, DC :505.

2. #000815: 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. Cardwell, and B.B. Heidolph, Eds. American Society for Testing and Materials. Philadelphia, 1983: 90-97.

3. #007358: Veith, G. D., D. J. Call, and L. T. Brooke. 1983. Structure-toxicity relationships for the Fathead Minnow, *Pimephales promelas*: narcotic industrial chemicals. Can. J. Fish. Aquat. Sci. 40(6):743-8.

4. #007100: Benoit, D. A., F. A. Puglisi, and D. L. Olson. 1982. A Fathead Minnow *Pimephales promelas* Early Life Stage Toxicity Test method evaluation and exposure to four organic chemicals. Environ.Pollut.Ser.A Ecol.Biol. 28(3):189-197.

5. #007098: Walbridge, C. T., J. T. Fiandt, G. L. Phipps, and G. W. Holcombe. 1983. Acute toxicity of ten chlorinated aliphatic hydrocarbons to the Fathead Minnow (*Pimephales promelas*). Arch.Environ.Contam.Toxicol. 12(6):661-666.

6. #QL 638.C94 A27: Geiger, D. L., C. E. Northcott, D. J. Call, and L. T. Brooke. 1985. Acute toxicities of organic chemicals to Fathead Minnows (*Pimephales promelas*), Vol. 2. Center for Lake Superior Environmental Studies, University of Wisconsin: Superior, WI. 326p.

7. #007906 : LeBlanc, G. A. 1980. Acute toxicity of Priority Pollutants to water flea (*Daphnia magna*). Bull. Environ. Contam. Toxicol. 24(5):684-91.

8. #007602: 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(6):679-684.

9. #SH 177 .C41: Call, D.J.; L.T. Brooke; N. Ahmad; and J. E. Richter. 1982. Toxicity and metabolism studies with EPA Priority Pollutants and related chemicals in freshwater organisms. USEPA 600 / 3-83-095.

| Min. data req. met | Acute Factor |
|---|---|
| 2 | 13 |
| 3 | 8 |
| 4 | 7 |
| 5 | 6.1 |
| 6 | 5.2 |
| 7 | 4.3 |

## Rule 57 Aquatic Values Work Sheet

*Chemical Name:* Tetrachloroethylene
*C.A.S. #:* 127-18-4

## AQUATIC MAXIMUM VALUE CALCULATIONS

A. Minimum 8 species requirement is **not** met. Minimum requirements met =
Minimum requirements missing for Tier I =
Acute factor =

1. Toxicity **is not** dependent on a water characteristic

   a. Final Acute Value (FAV) =

2. Toxicity **is** dependent on a water characteristic

   a. Slope = (Table ___)

   b. FAV equation:

3. Go to C.

B. Minimum 8 species requirement **is** met (Tier I)

1. Toxicity **is not** dependent on a water characteristic

   a. FAV calculation (Figure 1): Tier 1 FAV = 2,858.064 ug/l = 2,900 ug/L

2. Toxicity **is** dependent on a water characteristic

   a. Slope = (Table ___)

   b. Ranked genus mean acute intercepts: Table

   c. Final acute intercept = (Att. ___)

   ln of final acute intercept =

   d. FAV equation =

C. Aquatic Maximum Value (AMV) = FAV ÷ 2 = 2,858 ug/l / 2 = 1,429 ug/l = 1,400 ug/l

## FINAL CHRONIC VALUE CALCULATIONS

A. Minimum 8 species requirement is **not** met (Tier II). Minimum requirements met = 2
Minimum requirements missing for Tier I = 6

1. Acute to chronic ratio

   a. Number ACRs meeting minimum data requirements = 2 (Tables 1-2)

   b. Acute to chronic ratio = Geo. Mean of 11.34, 16, and 18 = 14.84

2. Toxicity **is not** dependent on a water characteristic

   FCV = FAV ÷ ACR = 2,858 ug/l / 14.84 = 193 ug/l = 190 ug/l

3. Toxicity **is** dependent on a water characteristic

   a. Slope = (Table _)

   b. Aquatic chronic intercept = (Table _)

   ln of aquatic chronic intercept =

   c. FCV equation =

B. Minimum 8 species requirement **is** met (Tier I)

1. Toxicity **is not** dependent on a water characteristic

   a. FCV = ___ (Att. ___)

2. Toxicity **is** dependent on a water characteristic

   a. Slope = (Table _)

   b. Ranked genus mean chronic intercepts: Table ___

   c. Final chronic intercept = ____ (Att. ___ ); ln of final chronic intercept =

   d. FCV equation =

Figure 1. Tetrachloroethylene FAV calculations.