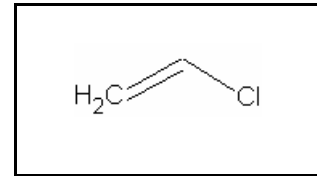




TIER I HUMAN HEALTH NONCANCER CRITERIA

VINYL CHLORIDE

CAS RN:	75-01-4
Water Solubility:	0.11 g/100 mL at 25 °C
Log K _{ow} :	1.36 ^P
Reference Dose:	0.003 mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class A; Known Human Carcinogen



Standard

The human health noncancer vinyl chloride criterion for drinking water sources is 83 µg/L. The human health noncancer criterion for nondrinking water sources is 4,900 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} (from Stephan 1993)

$$\text{Log } K_{ow} = 1.36 \text{ (CLOGP)}, K_{ow} = 22.91$$

$$\text{Trophic level 3 FCM} = 1.0; \text{ trophic level 4 FCM} = 1.0$$

$$f_{fd} = 1/(1+(0.00000024 \text{ kg/L})(K_{ow})) = 1.00$$

$$\text{Baseline BAF}_{T3} = (\text{FCM})(K_{ow}) = (1.0)(22.91) = 22.91$$

$$\text{Baseline BAF}_{T4} = (1.000)(22.91) = 22.91$$

$$\text{Human health BAF}_{T3} = [(22.91)(0.0182)+1](1.00) = 1.417$$

Human health $BAF_{T4} = [(22.91)(0.0310)+1](1.00) = 1.710$

Acceptable Daily Exposure:

From the IRIS database:

$$ADE = \frac{NOAEL}{UF} = \frac{0.09 \text{ mg/kg-day}}{30} = 0.003 \text{ mg/kg}$$

Calculation of Criteria:

$$\begin{aligned} \text{Non Drinking Water HNC} &= [(0.003)(70)(0.8)]/0.01 + [(0.0036)(1.417) + (0.0114)(1.710)] \\ &= 4,900 \text{ } \mu\text{g/L} \end{aligned}$$

$$\begin{aligned} \text{Drinking Water HNC} &= [(0.003)(70)(0.8)]/2 + [(0.0036)(1.417) + (0.0114)(1.710)] \\ &= 83 \text{ } \mu\text{g/L} \end{aligned}$$

References

1. Stephen, C.E. 1993. Derivation of Proposed Human Health and Wildlife Bioaccumulation Factors for the Great Lakes Initiative. Environmental Research Laboratory, Office of Research and Development, U.S. EPA, Duluth, MN.
2. USEPA 2000. Integrated Risk Information System (IRIS database) chemical file for vinyl chloride (CASRN 75-01-4).
3. Leo, A. and D. Weininger 1997. Daylight Software CLogP Version 3.15+ for Unix Pomona Medical Chemistry Project, Pomona College, Claremont, CA. Distributed by Daylight Chemical Information Systems, Inc., 3952 Claremont St., Irving, CA 92714 (Reference for the Log K_{ow}).

Acronyms

ADE	Acceptable Daily Exposure
BAF	Bioaccumulation Factor
CAS RN	Chemical Abstract Service Registry Number
FCM	Food Chain Multiplier
IRIS	Integrated Risk Information System
K _{ow}	Octanol-Water Partition Coefficient
LOAEL	Lowest observed adverse effect level
NOAEL	No observed adverse effect level
P (superscript)	Predicted value
RPLC	Reverse-phase Liquid Chromatography
UF	Uncertainty factor

Revision History

June 17, 1999 - Criteria first developed
September 28, 2000 – Criteria rechecked. RfD updated.

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