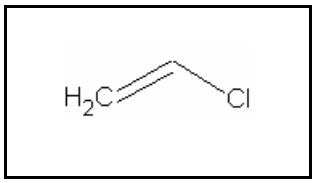
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER I HUMAN HEALTH CANCER CRITERIA

VINYL CHLORIDE

CAS RN:	75-01-4
Water Solubility:	0.11 g/100 mL at 25 deg C
Log K_{ow}:	1.36^{P}
Risk Associated Dose:	7.14 x 10^{-6} mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class A; Known Human Carcinogen



Standard

The human health cancer vinyl chloride criterion for drinking water sources is 0.25 µg/L. The human health cancer criterion for nondrinking water sources is 14 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} (from Stephan 1993)
Log K_{ow} = 1.36 (CLOGP), K_{ow} = 22.91
Trophic level 3 FCM = 1.0; trophic level 4 FCM = 1.0

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

Baseline BAF_{T3} = (FCM)(K_{ow}) = (1.0)(22.91) = 22.91

Baseline BAF_{T4} = (1.000)(22.91) = 22.91

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:

$RAD = 0.00001/q1^{*} = 0.00001/1.4$
$= 7.14 \times 10^{-6}$

Where:

RAD = Risk Associated Dose (mg/kg/day)
$q1^{*}$ = Cancer Slope Factor

Calculation of Criteria:

Non Drinking Water HCC =[(7.14×10^{-6})(70)]/0.01+[(0.0036)(1.417)+(0.0114)(1.710)]

= **14 μg/L**

Drinking Water HCC = [(7.14×10^{-6})(70)]/2+[(0.0036)(1.417)+(0.0114)(1.710)]

= **0.25 μg/L**

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. Updated oral slope factor from 2.5 to 1.4.

Contact Information

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