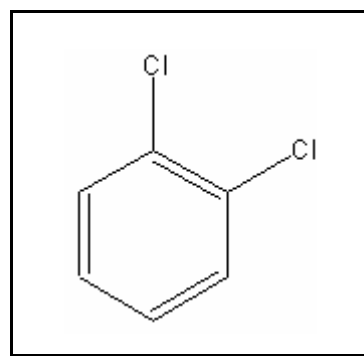




TIER I HUMAN HEALTH NONCANCER CRITERIA

1,2-DICHLOROBENZENE

CAS RN:	95-50-1
Water Solubility:	84 mg/L
Log K _{ow} :	3.433
Reference Dose:	0.0857 mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class D; Not Classifiable



Standard

The human health noncancer 1,2-dichlorobenzene criterion for drinking water sources is 1,700 µg/L. The human health noncancer criterion for nondrinking water sources is 6,000 µg/L.

Calculations

Bioaccumulation Factor:

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

Log K_{ow} = 3.433 (Slow Stir Method), K_{ow} = 2710, BCF = 89, Percent lipid = 4.8

Trophic level 3 FCM = 1.067; trophic level 4 FCM = 1.014

$$f_{fd} = 1/(1+(0.00000024 \text{ kg/L})(K_{ow})) = 0.999$$

$$\text{Baseline BAF}_{T3} = (1.067)[(89/0.999)-1](1/0.048) = 1957.454$$

$$\text{Baseline BAF}_{T4} = (1.014)[(89/0.999)-1](1/0.048) = 1860.223$$

$$\text{Human health BAF}_{T3} = [(1957.454)(0.0182)+1](0.999) = 36.6018$$

$$\text{Human health BAF}_{T4} = [(1860.223)(0.0310)+1](0.999) = 58.6288$$

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: no adverse effects

$$\text{ADE} = \frac{\text{NOAEL}}{\text{UF}} = \frac{85.7 \text{ mg/kg-day}}{1000} = 0.0857 \text{ mg/kg/d}$$

Calculation of Criteria:

$$\begin{aligned} \text{Non Drinking Water HNC} &= [(0.0857)(70)(0.8)]/0.01+[(0.0036)(36.6018)+(0.0114)(58.6288)] \\ &= \mathbf{6,000 \mu\text{g/L}} \end{aligned}$$

$$\begin{aligned} \text{Drinking Water HNC} &= [(0.0857)(70)(0.8)]/2+[(0.0036)(36.6018)+(0.0114)(58.6288)] \\ &= \mathbf{1,700 \mu\text{g/L}} \end{aligned}$$

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 1991. Integrated Risk Information System (IRIS database) chemical file for 1,2-dichlorobenzene (CAS #106-46-7).
3. de Bruijn, J., F. Busser, W. Seinen, and J. Hermens 1989. Determination of Octanol/Water Partition Coefficients for hydrophobic organic chemicals with the "slow-stirring" method. Environ. Toxicol. Chem. 8: 449-142.

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

September 14, 1998 - Criteria first developed

April 13, 2000 – Fact sheet updated. No modifications made to criteria.

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