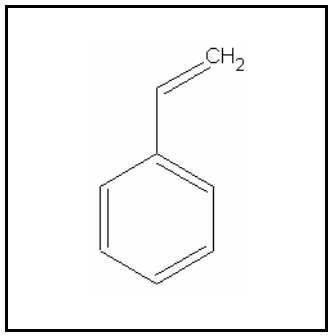
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER I HUMAN HEALTH NONCANCER CRITERIA

STYRENE

CAS RN:	100-42-5
Water Solubility:	0.032 g/100 mL
Log K_{ow}:	2.89[p]
Reference Dose:	0.2 mg/kg/d
Carcinogenicity Weight-of-Evidence Classification:	



Standard

The human health noncancer styrene criterion for drinking water sources is 5,000 µg/L. The human health noncancer criterion for nondrinking water sources is 32,000 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow}

Log K_{ow} = 2.89 (CLOGP program), K_{ow} = 776.2

Trophic level 3 FCM = 1.028; trophic level 4 FCM = 1.007

$f_{fd} = 1/(1+(0.00000024\ kg/L)(K_{ow})) = 1.0$

Baseline $BAF_{T3} = (FCM)(K_{ow}) = (776.2)(1.0) = 776.2$

Baseline $BAF_{T4} = (776.2)(1.0) = 776.2$

Human health $BAF_{T3} = [(776.2)(0.0182)+1](1.0) = 15.52$

Human health BAF_{T4} = [(776.2)(0.0310)+1](1.0) = 25.23

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: Red blood cell and liver effects

$$ADE = \frac{NOAEL}{UF} = \frac{200\ mg/kg\text{-}day}{1000} = 0.2\ mg/kg/d$$

Calculation of Criteria:

NonDrinking Water HNC = [(0.2)(70)(0.8)]/0.01+[(0.0036)(15.52)+(0.0114)(25.23)]

= **32,000 μg/L**

Drinking Water HNC = [(0.2)(70)(0.8)]/2+[(0.0036)(15.52)+(0.0114)(25.23)]

= **5,000 μg/L**

References

1. USEPA 1990. Integrated Risk Information System (IRIS database) chemical file for styrene (CAS # 100-42-5).

2. 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/Abbreviations

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
UF	Uncertainty factor

Revision History

December 3, 1998 - Criteria first developed.
September 18, 2000 – Fact sheet updated. No new data available.

Contact Information

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