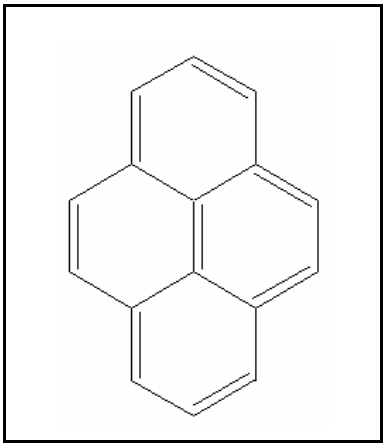
Indiana Department of Environmental Management
Office of Water - Water Quality Standards Section

TIER II HUMAN HEALTH NONCANCER VALUES

PYRENE



CAS RN:	129-00-0
Water Solubility:	0.0000013 g/100 mL
Log K_{ow}:	5.18
Reference Dose:	0.025 mg/kg/day
Carcinogenicity Weight-of-Evidence Classification:	Class D; not classifiable

Standard

The human health noncancer pyrene value for drinking water sources is 15 µg/L. The human health noncancer value for nondrinking water sources is 15 µg/L.

Calculations

Bioaccumulation Factor:

BAF predicted based on Log K_{ow} and measured BCF (from Stephan 1993)
Log K_{ow} = 5.18 (generator-column method), K_{ow} = 151,356, BCF = 2,445,
Percent lipid = 4.4; Trophic level 3 FCM = 4.188; Trophic level 4 FCM = 3.873

f_{fd} = 1/(1+(0.00000024 kg/L)(K_{ow})) = 0.965

Baseline BAF_{T3} = (4.188)[(2,445/0.965)-1](1/0.044) = 241,065

Baseline BAF_{T4} = (3.873)[(2,445/0.965)-1](1/0.044) = 222,933

Human health BAF_{T3} = [(241,065)(0.0182)+1](0.965) = 4,235

Human health BAF_{T4} = [(222,933)(0.0310)+1](0.965) = 6,670

Acceptable Daily Exposure:

From the IRIS database:

$$ADE = \frac{NOAEL}{UF} = \frac{75\ mg/kg\text{-}day}{3000} = 0.025\ mg/kg/d$$

Calculation of Criteria:

Non Drinking Water HNV = [(0.025)(70)(0.8)]/0.01+[(0.0036)(4,235)+(0.0114)(6,670)]

= **15 μg/L**

Drinking Water HNV = [(0.025)(70)(0.8)]/2+[(0.0036)(4,235)+(0.0114)(6,670)]

= **15 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 1993. Integrated Risk Information System (IRIS database) chemical file for pyrene (129-00-0).

3. Miller, M.M., S.P. Wasik, G.-L. Huang, W.-Y. Shiu, and D. Mackay 1985. Relationships between octanol-water coefficient and aqueous solubility. Environ. Sci. Technol. 19: 522-529. (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

July 9, 1997 - Values first developed.
September 15, 2000 – Fact sheet updated. No new data available.

Contact Information

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