



TIER I HUMAN HEALTH NONCANCER CRITERIA

BERYLLIUM

CAS RN: 7440-41-7
Water Solubility:
Log K_{ow} :
Reference Dose: 0.0015 mg/kg/day
Carcinogenicity Weight-of-
Evidence Classification: Class B2; Probable human
Carcinogen

Standard

The human health noncancer beryllium criterion for drinking water sources is 40 $\mu\text{g/L}$. The human health noncancer criterion for nondrinking water sources is 300 $\mu\text{g/L}$.

Calculations

Bioaccumulation Factor:

BAF for inorganics is equal to the BCF (from Stephan 1993)

$$\text{BCF} = 19; \text{FCM} = 1.0$$

$$\text{Human health BAF}_{T3} = 19$$

$$\text{Human health BAF}_{T4} = 19$$

Acceptable Daily Exposure:

From the IRIS database:

Critical Effect: Small intestinal lesions

$$\text{BMD}_{10} = \frac{\text{NOAEL}}{\text{UF}} = \frac{0.46 \text{ mg/kg-day}}{300} = 0.001533 \text{ mg/kg/d}$$

Calculation of Criteria:

$$\begin{aligned} \text{Non Drinking Water HNC} &= [(0.001533)(70)(0.8)]/0.01 + [(0.0036)(19) + (0.0114)(19)] \\ &= 300 \text{ } \mu\text{g/L} \end{aligned}$$

$$\begin{aligned} \text{Drinking Water HNC} &= [(0.001533)(70)(0.8)]/2 + [(0.0036)(19) + (0.0114)(19)] \\ &= 40 \text{ } \mu\text{g/L} \end{aligned}$$

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 1998. Integrated Risk Information System (IRIS database) chemical file for beryllium (7440-41-7).

Acronyms

ADE	Acceptable Daily Exposure
BAF	Bioaccumulation Factor
BMD ₁₀	Benchmark Dose
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

April 6, 1999 - Criteria first developed

March 28, 2000 – Criteria rechecked (no modifications). Fact sheet updated.

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