



Toxicological Summary for: Fluoranthene

CAS: 206-44-0

Synonyms: Benzo(j,k)fluorine, 1,2-Benzacenaphthene **Acute Non-Cancer Health Based Value**

(nHBV_{Acute}) = Not Derived (Insufficient Data)

Short-term Non-Cancer Health Based Value (nHBV_{Short-term}) = Not Derived (Insufficient Data)

Subchronic Non-Cancer Health Based Value (nHBV_{Subchronic}) = 200 µg/L

(Reference Dose, mg/kg-d) x (Relative Source Contribution) x (Conversion Factor)
(Subchronic Intake Rate, L/kg-d)

$$= \frac{(0.053 \text{ mg/kg-d}) \times (0.2^*) \times (1000 \text{ µg/mg})}{(0.070^{**} \text{ L/kg-d})}$$

$$= 151 \text{ rounded to } \mathbf{200 \text{ µg/L}}$$

*Relative Source Contribution: MDH 2008, Section IV.E.1.

**Intake Rate: MDH 2008, Section IV.E.1 and US EPA 2011, Exposure Factors Handbook, Tables 3-1 and 3-81.

Reference Dose/Concentration: 0.053 mg/kg-d (CD-1 mice)
Source of toxicity value: MDH, 2015
Point of Departure (POD): 124 mg/kg-d (BMDL₁₀, derived by MDH, based on U.S. Environmental Protection Agency, 2012)
Human Equivalent Dose (MDH, 2011): POD x DAF = 124 x 0.13 = 16 mg/kg-d
Total uncertainty factor: 300
Uncertainty factor allocation: 3 for interspecies differences (for toxicodynamics); 10 for intraspecies variability; 10 for database uncertainty due to lack of reproductive and developmental studies
Critical effect(s): Nephropathy
Co-critical effect(s): Increased relative liver weight, increased SGPT
Additivity endpoint(s): Hepatic (liver) system, Renal (kidney) system

Chronic Non-Cancer Health Based Value (nHBV_{Chronic}) = 70 µg/L

(Reference Dose, mg/kg-d) x (Relative Source Contribution) x (Conversion Factor)
(Chronic Intake Rate, L/kg-d)

$$= \frac{(0.016 \text{ mg/kg-d}) \times (0.2^*) \times (1000 \text{ µg/mg})}{(0.044^{**} \text{ L/kg-d})}$$

= 72.7 rounded to **70 µg/L**

*Relative Source Contribution: MDH 2008, Section IV.E.1.

**Intake Rate: MDH 2008, Section IV.E.1 and US EPA 2011, Exposure Factors Handbook, Tables 3-1 and 3-81.

Reference Dose/Concentration: 0.016 mg/kg-d (CD-1 mice)
Source of toxicity value: MDH, 2015
Point of Departure (POD): 124 mg/kg-d (BMDL₁₀, derived by MDH, based on U.S. Environmental Protection Agency, 2012, subchronic study)
Human Equivalent Dose (MDH, 2011): $POD \times DAF = 124 \times 0.13 = 16 \text{ mg/kg-d}$
Total uncertainty factor: 1000
Uncertainty factor allocation: 3 for interspecies differences (for toxicodynamics); 10 for intraspecies variability; 3 for extrapolation from a subchronic to chronic study; and 10 for database uncertainty due to lack of reproductive and developmental studies
Critical effect(s): Nephropathy
Co-critical effect(s): Increased relative liver weight, increased SGPT
Additivity endpoint(s): Hepatic (liver) system, Renal (kidney) system

Cancer Health Based Value (cHBV) = Not Applicable

Cancer classification: Class D, not classifiable as to human carcinogenicity (EPA, 1990)
Slope factor: N/A
Source of slope factor: N/A
Tumor site(s): N/A

EPA's finding (EPA, 1990) that fluoranthene cannot be classified (class D) for oral carcinogenicity is due to a lack of suitable data. No oral cancer study or EPA slope factor for fluoranthene is available and MDH has determined that a cancer health based guidance value cannot be developed.

Fluoranthene often occurs in environmental mixtures that are evaluated for carcinogenicity. To evaluate the cancer potency of mixtures, including fluoranthene, please consult the MDH RPF guidance document. <http://www.health.state.mn.us/divs/eh/risk/guidance/pahguidance.pdf>

Volatile: Yes (low)

Summary of Guidance Value History:

Fluoranthene has a chronic HRL of 300 µg/L from 1993. In addition, a Pesticide Rapid Assessment of 10 µg/L was derived in 2014 and was lower than the HRL due to the conservative rapid assessment method (MDH 2014). Subchronic and Chronic HBVs of 100 µg/L and 70 µg/L were derived in 2015. The 2015 chronic HBV is 4 times lower than the 1993 HRL as a result of: 1) the use of new methodology, including benchmark dose analysis, body weight scaling, and updated water intake rates, and 2) the rounding of values to one significant digit. In 2016 MDH updated the intake rate values used to derive guidance values. Due to rounding to one significant digit the updated intake rates resulted in a revised Subchronic nHBV of 200 µg/L

but did not result in any change to the Chronic nHBV value derived in 2015. MDH intends to re-evaluate guidance values on a five year cycle in order to keep guidance values current with scientific knowledge. Under this process fluoranthene would undergo re-evaluation in 2020.

Summary of toxicity testing for health effects identified in the Health Standards Statute (144.0751):

Even if testing for a specific health effect was not conducted for this chemical, information about that effect might be available from studies conducted for other purposes. MDH has considered the following information in developing health protective guidance.

	Endocrine	Immunotoxicity	Development	Reproductive	Neurotoxicity
Tested for specific effect?	No	No	No	No	Yes
Effects observed?	No	Yes ¹	No	No	Yes ²

Comments on extent of testing or effects:

¹ Although the immunotoxicity of fluoranthene has not been studied, effects have been reported in a number of studies. In a single dose study, significantly decreased white blood cell counts were observed in rats at a dose nearly 8000 times the subchronic RfD. White blood cell counts were also decreased in longer studies in rats at a dose 5900 times the subchronic RfD. In addition, white blood cell numbers were decreased in female mice at a dose more than 1200 times the subchronic RfD.

² In one study, the following parameters were reported as significantly changed at doses more than 800 times the subchronic RfD: motor activity, neuromuscular, sensorimotor, autonomic, physiological, and excitability. However, none of these effects were replicated in any other study.

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