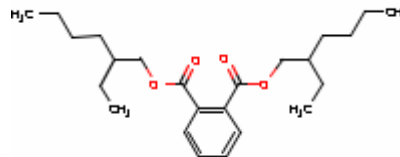




Lake Michigan Basin Water Quality Standards

Di(2-ethylhexyl)phthalate (DEHP)

CAS: 117-81-7
Water Solubility: 0.27 mg/L
Log K_{ow}: 7.6



Derived Criteria

Aquatic Life: Where no standard is applicable for a chemical substance within waters of the Lake Michigan Basin, acute and chronic numeric values or criteria may be calculated pursuant to 35 IAC 302.540. Tier II methodology (35 IAC 302.563-565) indicate that, except possibly where a locally important species is very sensitive, aquatic organisms should not be adversely affected providing the four (4) day average concentration of DEHP does not exceed 17 µg/L, and if 76 µg/L is not exceeded at any time.

Aquatic Life Calculations

Acute Aquatic Life:

$$\text{LMAATV} = \text{lowest GMAV} / \text{SAF}$$

$$\text{LMAATV} = 0.79 / 10.4 = \mathbf{76 \mu\text{g/L}}$$

Chronic Aquatic Life:

$$\text{LMCATV} = \text{SAV} * 2 / \text{SACR}$$

$$\text{LMCATV} = 0.076 * 2 / 8.9 = \mathbf{17 \mu\text{g/L}}$$

Calculation of SACR:

Calculated with *Daphnia magna* LC50, LOEC, and NOEC¹

$$\text{ACR} = \text{LC50} / \text{MATC}$$

$$\text{LC50} = 2.0 \text{ mg/L}$$

$$\text{MATC} = \text{geometric mean of LOEC (1.3 mg/L) and NOEC (0.64 mg/L)}$$

$$\text{ACR} = 2 / 0.912 = 2.2$$

$$\text{SACR} = \text{geometric mean of } (18 * 18 * 2.2) = \mathbf{8.9}$$

Table 1. GMAVs and SMAVs for DEHP, referenced toxicity values are denoted in superscript

Species	GMAV (mg/L)	SMAV (mg/L)	ACR	Concentration (mg/L)
Rainbow trout <u>Oncorhynchus mykiss</u>	>100	>100	-	>100 ²
Bluegill <u>Lepomis macrochirus</u>	>280	>280	-	>100 ² , >770 ³
Channel catfish <u>Ictalurus punctatus</u>	>100	>100	-	>100 ²
Water flea <u>Daphnia magna</u>	0.79	4.69	2.2	2 ¹ , 11 ⁴
Water flea <u>Daphnia pulex</u>	0.79	0.133	-	0.133 ⁵
Midge <u>Chironomus plumosa</u>	>18	>18	-	>18 ⁶
Northern spring amphipod <u>Gammarus pseudolimnaeus</u>	>10	>10	-	>10 ⁷

References

1. Adams, WJ and BB Heidolph. 1985. Short-cut chronic toxicity estimates using *Daphnia magna*. In RD Cardwell, R Purdy and RC Bahner, eds., *Aquatic Toxicology and Hazard Assessment. Seventh Symposium*. STP 854. American Society for Testing and Materials, Philadelphia, PA, pp. 87-103.
 - Species Name: Daphnia magna, water flea
 - Data Value: 2,000 µg/L
Dose metric: 48 hr LC50
Comments: Static renewal, measured
 - Species Name: Daphnia magna, water flea
 - Data Value: 1,300 µg/L
Dose metric: 21 day survival/growth/reproduction LOEC
Comments: Static renewal, measured
 - Species Name: Daphnia magna, water flea
 - Data Value: 640 µg/L
Dose metric: 21 day survival/growth/reproduction NOEC
Comments: Static renewal, measured
2. Johnson, WW and MT Finley. 1980. Handbook of acute toxicity of chemicals to fish and aquatic invertebrates. *U.S. Fish Wildl. Serv. Resour. Publ. 137*.
 - Species Name: Oncorhynchus mykiss, rainbow trout
 - Data Value: >100,000 µg/L
Dose metric: 96 hr LC50
Comments: Static, unmeasured
3. Buccafusco, RJ, SJ Ells, and GA LeBlanc. 1981. Acute toxicity of priority pollutants to bluegill (*Lepomis macrochirus*). *Bull. Environ. Contam. Toxicol.* 26(4): 446-452.
 - Species Name: Lepomis macrochirus, bluegill
 - Data Value: >770,000 µg/L
Dose metric: 96 hr LC50
Comments: Static, unmeasured
4. LeBlanc, GA. 1980. Acute toxicity of priority pollutants to water flea (*Daphnia magna*). *Bull. Environ. Contam. Toxicol.* 24(5): 684-691.
 - Species Name: Daphnia magna, water flea
 - Data Value: 11,000 µg/L
Dose metric: 48 hr LC50
Comments: Static, unmeasured.
5. Passino, DRM and SB Smith. 1987. Acute bioassays and hazard evaluation of representative contaminants detected in Great Lakes fish. *Environ. Toxicol. Chem.* 6:901-907.
 - Species Name: Daphnia pulex, water flea

- Data Value: 133 µg/L
Dose metric: 48 hr LC50
Comments: Static, nominal
6. Suggatt, RH and K Foote. 1981. Comprehensive review of acute aquatic toxicity data on phthalate esters. Contract SRC TR 81-537. Final Report. Syracuse Research Corporation, Syracuse, NY, USA.
- Species Name: Chironomus plumosa, midge
 - Data Value: >18,000 µg/L
Dose metric: 96 hr LC50
Comments: Nominal
7. Mayer, FL and HO Sanders. 1973. Toxicology of phthalic acid esters in aquatic organisms. Environ. Health Perspect. 3:153-157.
- Species Name: Gammarus pseudolimnaeus, Northern spring amphipod
 - Data Value: >10,000 µg/L
Dose metric: 96 hr LC50
Comments:

Derivation History

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Contact Information

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