Dimethyl Phthalate

131-11-3

Hazard Summary

Dimethyl phthalate has many uses, including in solid rocket propellants, plastics, and insect repellants. Acute (short-term) exposure to dimethyl phthalate, via inhalation in humans and animals, results in irritation of the eyes, nose, and throat. No information is available on the chronic (long-term), reproductive, developmental, or carcinogenic effects of dimethyl phthalate in humans. Animal studies have reported slight effects on growth and on the kidney from chronic oral exposure to the chemical. EPA has classified dimethyl phthalate as a Group D, not classifiable as to human carcinogencity.

Please Note: The main source of information for this fact sheet is EPA's Health and Environmental Effects Profile for Phthalic Acid Alkyl, Aryl, and Alkyl/Aryl Esters. (1) Other secondary sources include the Hazardous Substances Data Bank (HSDB), a database of summaries of peer-reviewed literature (2), and the Registry of Toxic Effects of Chemical Substances (RTECS), a database of toxic effects that are not peer reviewed.(4)

Uses

- Dimethyl phthalate is used in solid rocket propellants, lacquers, plastics, safety glasses, rubber coating agents, molding powders, insect repellants, and pesticides. (1)

Sources and Potential Exposure

- Exposure to dimethyl phthalate may occur from food, from the use of hemodialysis tubing and polyvinylchloride bags containing intravenous solutions, and from drinking water. (1)
- Occupational exposure to dimethylphthalate may occur for those workers in factories that manufacture or use the chemical. (1)

Assessing Personal Exposure

- No information is available on measurement of personal exposure to dimethyl phthalate.

Health Hazard Information

Acute Effects:

- Acute exposure to dimethyl phthalate, via inhalation in humans and animals, results in irritation of the eyes, nose, and throat. (2,3)
- Acute animal tests in rats have shown dimethyl phthalate to have moderate acute toxicity from oral and dermal exposures. (4)

Chronic Effects (Noncancer):

- No information is available on the chronic effects of dimethyl phthalate in humans.
- Animal studies have reported slight effects on growth and on the kidney from chronic oral exposure to dimethyl phthalate. (1,2)
- EPA has not established a Reference Concentration (RfC) or a Reference Dose (RfD) for dimethyl phthalate.(5)

Reproductive/Developmental Effects:

- No information is available on the reproductive or developmental effects of dimethyl phthalate in humans.
- In one animal study, exposure to dimethyl phthalate via gavage had no effects on reproduction. (1,6)

Cancer Risk:

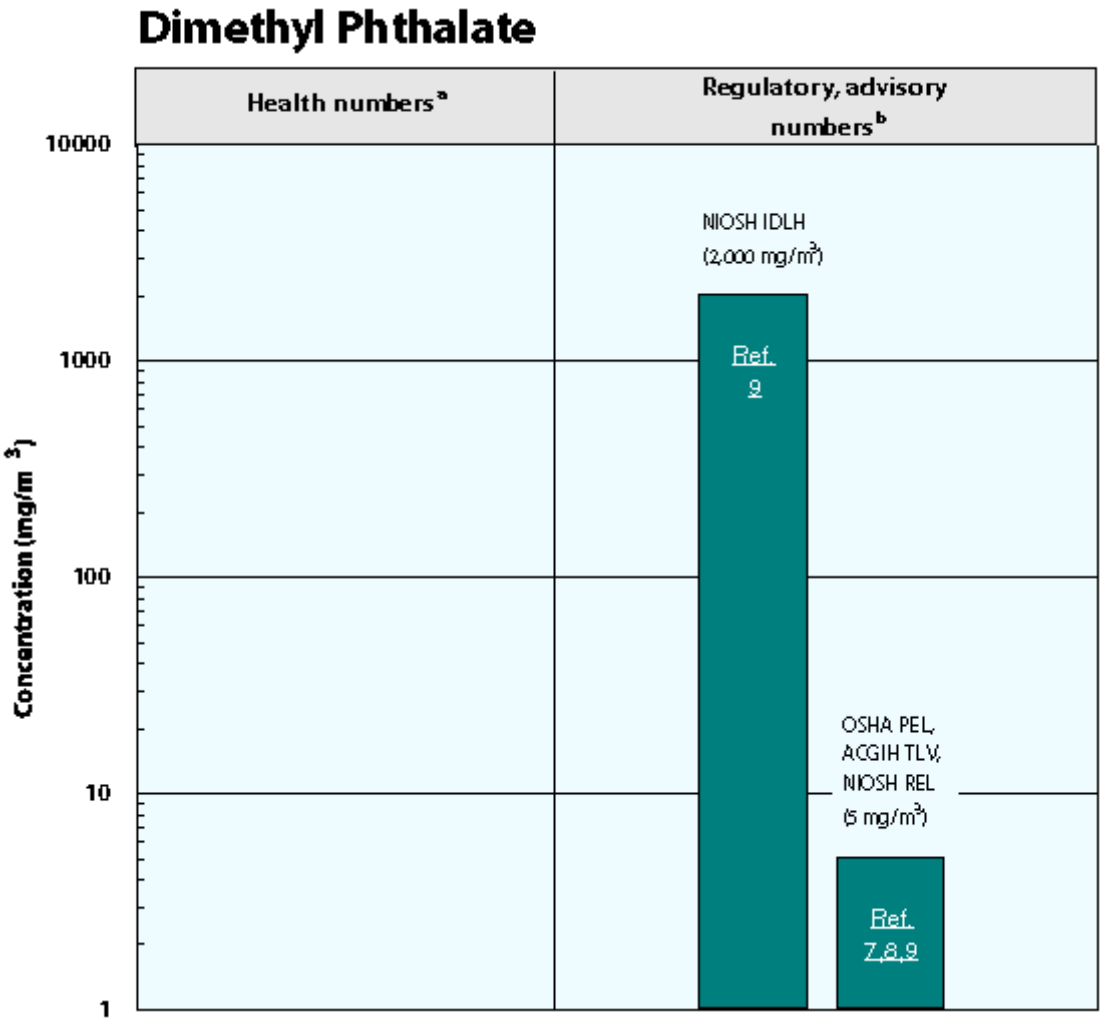
- No information is available on the carcinogenic effects of dimethyl phthalate in humans or animals.
- EPA has classified dimethyl phthalate as a Group D, not classifiable as to human carcinogenicity. (5)

Physical Properties

- Dimethyl phthalate is a colorless oily liquid with a slightly sweet odor. (3)
- The chemical formula for dimethyl phthalate is $C_{10}H_{10}O_4$, and the molecular weight is 194.19 g/mol. (1)
- The vapor pressure for dimethyl phthalate is 4.19×10^{-3} mm Hg at 20 °C, and it has a log octanol/water partition coefficient (log K_{ow}) of 1.56. (1)
- It is slightly soluble in water. (1)

Conversion Factors:
To convert concentrations in air (at 25 °C) from ppm to mg/m^3: mg/m^3 = (ppm) × (molecular weight of the compound)/(24.45). For dimethyl phthalate: 1 ppm = 7.94 mg/m^3.

Health Data from Inhalation Exposure



ACGIH TLV --American Conference of Governmental and Industrial Hygienists' threshold limit value expressed as a time-weighted average; the concentration of a substance to which most workers can be exposed without adverse effects.
NIOSH IDLH --National Institute of Occupational Safety and Health's immediately dangerous to life or health limit; NIOSH recommended exposure limit to ensure that a worker can escape from an exposure condition that is likely to cause death or immediate or delayed permanent adverse health effects or prevent escape from the environment.
NIOSH REL --NIOSH's recommended exposure limit; NIOSH-recommended exposure limit for an 8- or 10-h time-weighted-average exposure and/or ceiling.
OSHA PEL --Occupational Safety and Health Administration's permissible exposure limit expressed as a time-weighted average; the concentration of a substance to which most workers can be exposed without adverse effect averaged over a normal 8-h workday or a 40-h workweek.
The health and regulatory values cited in this factsheet were obtained in December 1999.
[a] Health numbers are toxicological numbers from animal testing or risk assessment values developed by EPA.
[b] Regulatory numbers are values that have been incorporated in Government regulations, while advisory numbers are nonregulatory values provided by the Government or other groups as advice. OSHA numbers are regulatory, whereas NIOSH and ACGIH numbers are advisory.

Summary created in April 1992, updated January 2000

References

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2. U.S. Department of Health and Human Services. Hazardous Substances Data Bank (HSDB, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
3. New Jersy Department of Health. Hazardous Substance Fact Sheet on Dimethyl Phthalate. New Jersey Department of Health, Trenton, NJ. 1986.
4. U.S. Department of Health and Human Services. Registry of Toxic Effects of Chemical Substances (RTECS, online database). National Toxicology Information Program, National Library of Medicine, Bethesda, MD. 1993.
5. U.S. Environmental Protection Agency. Integrated Risk Information System (IRIS) on Dimethyl Phthalate. National Center for Environmental Assessment, Office of Research and Development, Washington, DC. 1999.
6. U.S. Environmental Protection Agency. Health Effects Assessment for Selected Phthalic Acid Esters. EPA/600/8-88/053. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Office of Research and Development, Cincinnati, OH. 1987.
7. Occupational Safety and Health Administration (OSHA). Occupational Safety and Health Standards, Toxic and Hazardous Substances. Code of Federal Regulations. 29 CFR 1910.1000. 1998.
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9. National Institute for Occupational Safety and Health (NIOSH). Pocket Guide to Chemical Hazards. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention. Cincinnati, OH. 1997.