

## Dimethyl phthalate; CASRN 131-11-3

Human health assessment information on a chemical substance is included in the IRIS database only after a comprehensive review of toxicity data, as outlined in the [IRIS assessment development process](#). Sections I (Health Hazard Assessments for Noncarcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) present the conclusions that were reached during the assessment development process. Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the [guidance documents located on the IRIS website](#).

### STATUS OF DATA FOR Dimethyl phthalate

**File First On-Line 09/07/1988**

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	not evaluated	
Inhalation RfC (I.B.)	message	09/01/1990
Carcinogenicity Assessment (II.)	yes	09/07/1988

## I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

### I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name — Dimethyl phthalate  
CASRN — 131-11-3

Not available at this time.

### I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name — Dimethyl phthalate  
CASRN — 131-11-3

The health effects data for dimethylphthalate were reviewed by the U.S. EPA RfD/RfC Work Group and determined to be inadequate for derivation of an inhalation RfC.. For additional information on health effects of this chemical, interested parties are referred to the EPA documentation listed below.

U.S. EPA. 1987. Drinking Water Criteria Document for Phthalic Acid Esters Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Drinking Water, Washington, DC. (External Review Draft)

Agency Work Group Review — 07/26/1990

EPA Contacts:

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or [hotline.iris@epa.gov](mailto:hotline.iris@epa.gov) (internet address).

Screening-Level Literature Review Findings — A screening-level review conducted by an EPA contractor of the more recent toxicology literature pertinent to the RfC for Dimethyl phthalate conducted in August 2003 did not identify any critical new studies. IRIS users who know of important new studies may provide that information to the IRIS Hotline at [hotline.iris@epa.gov](mailto:hotline.iris@epa.gov) or 202-566-1676.

---

## II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — Dimethyl phthalate  
CASRN — 131-11-3  
Last Revised — 09/07/1988

Section II provides information on three aspects of the carcinogenic assessment for the substance in question; the weight-of-evidence judgment of the likelihood that the substance is a human carcinogen, and quantitative estimates of risk from oral exposure and from inhalation exposure. The quantitative risk estimates are presented in three ways. The slope factor is the result of application of a low-dose extrapolation procedure and is presented as the risk per (mg/kg)/day. The unit risk is the quantitative estimate in terms of either risk per ug/L drinking water or risk per ug/cu.m air breathed. The third form in which risk is presented is a drinking water or air

concentration providing cancer risks of 1 in 10,000, 1 in 100,000 or 1 in 1,000,000. The rationale and methods used to develop the carcinogenicity information in IRIS are described in The Risk Assessment Guidelines of 1986 (EPA/600/8-87/045) and in the IRIS Background Document. IRIS summaries developed since the publication of EPA's more recent Proposed Guidelines for Carcinogen Risk Assessment also utilize those Guidelines where indicated (Federal Register 61(79):17960-18011, April 23, 1996). Users are referred to Section I of this IRIS file for information on long-term toxic effects other than carcinogenicity.

## **II.A. Evidence for Human Carcinogenicity**

### **II.A.1. Weight-of-Evidence Characterization**

Classification — D; not classifiable.

Basis — Pertinent data regarding carcinogenicity was not located in the available literature.

### **II.A.2. Human Carcinogenicity Data**

None.

### **II.A.3. Animal Carcinogenicity Data**

Inadequate. A 2-year dietary study in rats by Lehman (1955) was not designed to measure carcinogenic effects.

### **II.A.4. Supporting Data for Carcinogenicity**

DMP was found to be a weak direct-acting mutagen in forward and reverse mutation assays in *Salmonella typhimurium* (Seed, 1982; Rubin et al., 1979, Kozumbo et al., 1982). DMP was active in the mouse lymphoma forward mutation assay only in the presence of metabolic activation (CMA, 1986). Negative results were found in a mouse dominant lethal test (Yurchenko and Gleiberman, 1980).

In vitro assays showed that liver homogenate-associated esterases hydrolyzed DMP to methanol and to the monoester which has been shown to be a nonmutagenic compound in *Salmonella* assay and to methanol (Kozumbo et al., 1982). Other research also indicates that DMP is hydrolyzed to monoesters (Kaneshima et al., 1978; Rowland, 1977; Albro and Moore, 1974).

## **II.B. Quantitative Estimate of Carcinogenic Risk from Oral Exposure**

Not available.

---

## **II.C. Quantitative Estimate of Carcinogenic Risk from Inhalation Exposure**

Not available.

---

## **II.D. EPA Documentation, Review, and Contacts (Carcinogenicity Assessment)**

### **II.D.1. EPA Documentation**

Source Document — U.S. EPA, 1980, 1987

The 1987 Drinking Water Criteria Document for Phthalic Acid Esters has received OHEA review.

### **II.D.2. EPA Review (Carcinogenicity Assessment)**

Agency Work Group Review — 08/26/1987

Verification Date — 08/26/1987

Screening-Level Literature Review Findings — A screening-level review conducted by an EPA contractor of the more recent toxicology literature pertinent to the cancer assessment for Dimethyl phthalate conducted in August 2003 did not identify any critical new studies. IRIS users who know of important new studies may provide that information to the IRIS Hotline at [hotline.iris@epa.gov](mailto:hotline.iris@epa.gov) or 202-566-1676.

### **II.D.3. EPA Contacts (Carcinogenicity Assessment)**

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or [hotline.iris@epa.gov](mailto:hotline.iris@epa.gov) (internet address).

**III. [reserved]**

**IV. [reserved]**

**V. [reserved]**

---

## **VI. Bibliography**

Substance Name — Dimethyl phthalate  
CASRN — 131-11-3

### **VI.A. Oral RfD References**

None

---

### **VI.B. Inhalation RfC References**

U.S. EPA. 1987. Drinking Water Criteria Document for Phthalic Acid Esters Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Drinking Water, Washington, DC. (External Review Draft)

---

### **VI.C. Carcinogenicity Assessment References**

Albro, P.W. and B. Moore. 1974. Identification of the metabolites of simple phthalate diesters in rat urine. *J. Chromatogr.* 94: 209-218.

CMA (Chemical Manufacturers Association). 1986. Mutagenicity of 1C (di-n-butyl phthalate) in a mouse lymphoma mutation assay. Final report. Submitted to Hazleton Biotechnologies Company. HB Project No. 20989. September, 1986.

Kaneshima, H., T. Yamaguchi, T. Okui and M. Naitoh. 1978. Studies on the effects of phthalate esters on the biological system (Part 2) -- In vitro metabolism and biliary excretion of phthalate esters in rats. *Bull. Environ. Contam. Toxicol.* 19: 502-509.

Kozumbo, W.J., R. Kroll and R.J. Rubin. 1982. Assessment of the mutagenicity of phthalate esters. *Environ. Health Perspect.* 45: 103-109.

Lehman, A.J. 1955. Insect repellants. *Food Drug Office Q. Bull.* 19: 87-99.

Rowland, I.R., R.C. Cottrell and J.C. Phillips. 1977. Hydrolysis of phthalate esters by the gastrointestinal contents of the rat. *Food Cosmet. Toxicol.* 15: 17-21.

Rubin, R.J., W. Kozumbo and R. Kroll. 1979. Ames mutagenic assay of a series of phthalic acid esters: Positive response of the dimethyl and diethyl esters in TA100. Soc. Toxicol. Ann. Meet., New Orleans, March 11-15. p. 11. (Abstract)

Seed, J.L. 1982. Mutagenic activity of phthalate esters in bacterial liquid suspension assays. Environ. Health Perspect. 45: 111-114.

Yurchenko, V.V. and S. Gleiberman. 1980. Study of long-term effects of repellent use. Part III. Study of mutagenic properties of dimethyl phthalate and phenoxyacetic acid N,N-diethylamide by dominant lethal mutations. Med. Parazitol. Parazit. Boleani. 49: 58-61. (Abstract) (Rus.)

U.S. EPA. 1980. Ambient Water Quality Criteria for Phthalate Esters. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Water Regulations and Standards, Washington, DC. EPA 440/5-80-067. NTIS PB 81-11- 117780.

U.S. EPA. 1987. Drinking Water Criteria Document for Phthalic Acid Esters. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Drinking Water, Washington, DC. External Review Draft.

## VII. Revision History

Substance Name — Dimethyl phthalate

CASRN — 131-11-3

Date	Section	Description
09/07/1988	II.	Carcinogen summary on-line
09/01/1990	I.B.	Not verified; data inadequate
10/28/2003	I.B.6., II.D.2.	Screening-Level Literature Review Findings message has been added.

---

## VIII. Synonyms

Substance Name — Dimethyl phthalate

CASRN — 131-11-3

Last Revised — 09/07/1988

- 131-11-3
- 1,2-benzenedicarboxylic acid, dimethyl ester
- dimethyl 1,2-benzenedicarboxylate
- dimethyl benzene-o-dicarboxylate
- Dimethyl phthalate
- DMP
- methyl phthalate
- phthalic acid, dimethyl ester