DIMETHYLPHTHALATE

CAS number: 131-11-3

Synonyms: 1,2-Benzenedicarboxylic acid dimethyl ester, DMP, Methyl phthalate, Phthalic acid dimethyl ester, Palatinol M, Fermine, Avolin, Mipax

Chemical formula: $C_{10}H_{10}O_4$

Structural formula: —

Workplace exposure standard (interim)

TWA: **5 mg/m^3**

STEL: —

Peak limitation: —

Notations: —

IDLH: **2,000 mg/m^3**

Sampling and analysis: The recommended value is quantifiable through available sampling and analysis techniques.

Recommendation and basis for workplace exposure standard

A TWA of 5 mg/m^3 is recommended to protect for potential kidney and liver effects and irritation in exposed workers.

A priority evaluation is recommended at the next scheduled review.

Discussion and conclusions

Dimethylphthalate (DMP) is used in industrial and in consumer products, for example as a fragrance ingredient in cosmetics, domestic and personal care products, as a solvent and plasticiser for cellulose acetate compositions, and in insect repellents, lacquers, paints, plastics and rubbers.

Limited evidence available in humans and animals. DMP exhibits low acute toxicity in animals. A LOAEC of 2,000 mg/m^3 (250 ppm) for membrane irritation is reported in cats in an acute inhalation study (ACGIH, 2018). A NOAEL of 800 mg/kg/d is reported in rats for increased liver weight and decreased body weight gain in a reproductive study.

The current TWA of 5 mg/m^3 adopted from ACGIH (2018) is recommended to be retained in interim and is cited as protective for potential effects in the kidneys and liver and irritation in exposed workers. Given the lack of evidence, a priority evaluation of the available data is recommended at the next scheduled review.

Recommendation for notations

Not classified as a carcinogen according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

Not classified as a skin sensitiser or respiratory sensitiser according to the GHS.

A skin notation is not recommended based on available evidence.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	***1991***	***TWA: 5 mg/m^3***
ACGIH	***2006***	***TLV-TWA: 5 mg/m^3***
TLV-TWA recommended to prevent upper respiratory irritation and potential systemic liver and kidney effects. Summary of data: Available data indicate low toxicity by all routes. Human data: • Very few reports of signs or symptoms following exposure despite widespread usage as insect repellent • Contact of liquid with the eye causes intense pain; no damage or mild, reversible disturbance of the corneal epithelium • No occupational epidemiology studies presented. Animal data: • LD_{50}: 10 mL/kg • LOAEC: 2,000 mg/m^3 (250 ppm); cats acute inhalation; severe mucous membrane irritation • NOAEL: 1.6 g/kg/d; rats, oral; effects in kidneys; no further information provided • NOAEL: 0.8 g/kg/d (800 mg/kg/d); rats, reproductive, oral; maternal toxicity; increased liver weight and decreased bw gain. TLV-TWA based on 10-fold difference from LOAEC of 250 ppm in cats; low toxicity with effects in kidneys at high doses (NOAEL of 1.6 g/kg/d); lowest NOAEL of 0.8 g/kg/d for maternal toxicity, based on increased liver weight and decreased body weight gain; no derivation of TLV-TWA provided. Insufficient data to recommend a sensitiser, skin or carcinogenicity notation or STEL.		
DFG	***NA***	***NA***
No report.		
SCOEL	***NA***	***NA***
No report.		
OARS/AIHA	***NA***	***NA***
No report.		
HCOTN	***NA***	***NA***
No report.		

Secondary source reports relied upon

Source		Year	Additional information
NICNAS	✓	2014	• LD_{50}: >2,000 mg/kg in rats, rabbits and guinea pigs • Available data do not support a mutagenic, genotoxic or carcinogenic potential • Not expected to have eye or skin irritation, or skin sensitising potential in humans • Toxic effects related to repeated exposure relevant to a human health include those in the liver and reproductive system.

Carcinogenicity — non-threshold based genotoxic carcinogens

Is the chemical mutagenic? No

The chemical is not a non-threshold based genotoxic carcinogen.

Notations

Source	Notations
SWA	—
HCIS	NA
NICNAS	NA
EU Annex	NA
ECHA	NA
ACGIH	—
DFG	NA
SCOEL	NA
HCOTN	NA
IARC	NA
US NIOSH	NA

NA = not applicable (a recommendation has not been made by this Agency); — = the Agency has assessed available data for this chemical but has not recommended any notations

Skin notation assessment

Calculation	
Adverse effects in human case study:	no
Dermal LD_{50} ≤1000 mg/kg:	no
Dermal repeat-dose NOAEL ≤200 mg/kg:	
Dermal LD_{50}/Inhalation LD_{50} <10:	
In vivo dermal absorption rate >10%:	
Estimated dermal exposure at WES >10%:	
	a skin notation is not warranted

IDLH

Is there a suitable IDLH value available?	Yes

Additional information

Molecular weight:	194.18
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 7.93 mg/m^3; 1 mg/m^3 = 0.126 ppm
This chemical is used as a pesticide:	☐
This chemical is a biological product:	☐
This chemical is a by-product of a process:	☐
A biological exposure index has been recommended by these agencies:	☐ ACGIH ☐ DFG ☐ SCOEL

Workplace exposure standard history

Year	Standard
Click here to enter year	

References

American Conference of Industrial Hygienists (ACGIH®) (2018) TLVs® and BEIs® with 7th Edition Documentation, CD-ROM, Single User Version. Copyright 2018. Reprinted with permission. See the *TLVs® and BEIs® Guidelines section* on the ACGIH website.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2014) Dimethylphthalate: PEC report no 37.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – Dimethylphthalate.