DIISOBUTYL KETONE

CAS number: 108-83-8

Synonyms: 2,6-Dimethyl-4-heptanone

Chemical formula: $C_9H_{18}O$

Workplace exposure standard (retained)

TWA: **25 ppm (145 mg/m^3)**

STEL: **—**

Peak limitation: **—**

Notations: **—**

IDLH: **500 ppm**

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

Recommendation and basis for workplace exposure standard

A TWA of 25 ppm (145 mg/m^3) is recommended to protect for eye, nose and throat irritation in exposed workers.

Discussion and conclusions

Diisobutyl ketone is used as a diluent for epoxy resins, as a textile-treating agent and as a chlorinated organic compound stabiliser.

The critical effects of exposure include eye, nose and throat irritation. In a human acute exposure study, slight eye, nose and throat irritation was observed in subjects exposed at 50 ppm (ACGIH, 2018). Sub-chronic animal inhalation exposure at 250 ppm was marginally toxic as evidenced by increased liver and kidney weight with a NOAEC of 125 ppm reported (ACGIH, 2018). Some reproductive effects are reported in animals studies with NOAELs starting at 300 mg/kg/day (ECHA, 2011; OECD, 1998).

The current TWA of 25 ppm (145 mg/m^3) adopted from ACGIH (2018) is recommended and considered sufficiently low to minimise the potential for eye, skin and respiratory tract irritation in acute exposures and sub-chronic effects including those reported in reproductive organs.

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 warranted based on the available evidence.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	***1991***	***TWA: 25 ppm (145 mg/m^3)***
ACGIH	***2001***	***TLV-TWA: 25 ppm (145 mg/m^3)***
TLV-TWA recommended to minimise the risk of eye, noise, and throat irritation in exposed workers. Summary of data: Human data: • LOAEC: 50 ppm (1 x 3 h, inhalation); slight irritation to the eyes, nose and throat of 3 volunteers • 12 subjects exposed >25 ppm had some eye irritation and complained of unpleasant odour. Animal data: • Exposure at ≈3,200 ppm (rats and guinea pigs, 7–16 h, inhalation) reported no fatalities • Exposure at 2,000 ppm (rats, 8 h, inhalation) killed 5/6 subjects, narcosis reported • LD_{50}: >20 mL/kg (rabbits, dermal) • LD_{50}: 5,800 mg/kg (rat, oral) • NOAEL: 125 ppm (rats and guinea pigs, 7 h, 30 exposures), 250–1,650 ppm produced increased kidney and liver weights. Insufficient data to recommend a skin, sensitiser or carcinogenicity notation.		
DFG	***2002***	***Not assigned***
Due to limited human studies and insufficient information available for the effects of long-term exposure the previous MAK withdrawn. Summary of additional data: • Previous MAK of 0.1 ppm established in 1958 in analogy to the TLV value at the time • LD_{50}: 16,000 mg/kg (rabbits, dermal), no evidence of systematic toxicity • Negative results in mutagenicity assays.		
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
ECHA	✓	2011	• LC_{50}: 14,500 ppm (rats, 4 h) • No skin sensitisation reported in guinea pigs • NOAEC: 1,000 ppm (rats, 2-gen, inhalation) for parental systemic toxicity and neonatal toxicity.
OECD	✓	1998	• NOAEC: 534 ppm (rats, 7 h/d, 5 d/wk, 6 wk, inhalation) • NOAEL: 300 and 1000 mg/kg/d (rats, oral) for parental and reproductive effects.

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	—
ACGIH	—
DFG	—
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:	no
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:	142.24
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 5.81 mg/m^3; 1 mg/m^3 = 0.172 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.

Deutsche Forschungsgemeinschaft (DFG) (2002) Diisobutyl ketone – MAK value documentation.

European Chemicals Agency (ECHA) (2011) 2,6-dimethylheptan-4-one – REACH assessment.

Organisation for Economic Cooperation and Development (OECD) (1998) SIDS initial assessment profile – DI-ISO-BUTYLKETONE.

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