

O-METHYLCYCLOHEXANONE

CAS number: 583-60-8

Synonyms: 2-Methylcyclohexanone, 1-methylcyclohexan-2-one

Chemical formula: $C_7H_{12}O$

Structural formula: —

Workplace exposure standard (retained)

TWA: 50 ppm (229 mg/m³)

STEL: 75 ppm (344 mg/m³)

Peak limitation: —

Notations: Sk.

IDLH: 600 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 50 ppm (229 mg/m³) is recommended to protect for irritant effects in exposed workers.

A STEL of 75 ppm (344 mg/m³) is recommended to protect for acute irritant effects in exposed workers.

Discussion and conclusions

Methylcyclohexanone has been used as a solvent in the production of lacquers, varnishes and plastics. It has also been used in the leather industry and as a rust remover.

The critical effect of exposure is irritation of the eyes and mucous membranes.

Data in humans not available. No irritation reported in rabbits exposed at 182 ppm for 10 weeks; however, conjunctival congestion noted at 514 ppm (next high concentration). Irritation of mucous membranes reported in mice acutely exposed at 450 ppm; however, details of exposure durations and frequency were not reported. Rabbits and cats became drowsy following exposure at 2,500 ppm for 1 hour (ACGIH, 2018).

The SWA TWA of 50 ppm and STEL of 75 ppm are recommended to be retained. The recommended TWA is same as TLV-TWA by ACGIH (2018) and TWA by HCOTN (2002). These recommendations are considered protective for irritation effects in exposed workers.

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 recommended based on evidence suggesting dermal absorption and adverse systemic effects and death in animals.

DRAFT

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 50 ppm (229 mg/m³); STEL: 75 ppm (344 mg/m³)
ACGIH	2001	TLV-TWA: 50 ppm (229 mg/m³); TLV-STEL: 75 ppm (344 mg/m³)
<p>TLV-TWA is recommended to minimise the potential for irritation of the eyes and mucous membranes in workers.</p> <p>Summary of data:</p> <p>Derivation of the OEL not explained.</p> <p>No human data reported.</p> <p>Animal data:</p> <ul style="list-style-type: none"> Irritation of mucous membranes of mice acutely exposed at 450 ppm; no further information Rabbits and cats exposed at 2,500 ppm for 1 h became somnolent/drowsy; no further information No irritation in rabbits exposed at 182 ppm 6 h/d, 5 d/wk for 10 wk; slight conjunctival congestion at 514 ppm (next high concentration) Lethargy, conjunctival irritation, lacrimation and salivation in rabbits exposed at 1,139 ppm 6 h/d, 5 d/wk for 3 wk. Daily, topical application for 6 d with large doses to intact skin of rabbits caused irritation, tremor, narcosis, and death; minimum LD 4.9–2 g/kg; basis for skin notation. 		
DFG	2002	Not assigned
<p>Database insufficient to recommend a MAK value.</p> <p>No additional data.</p>		
SCOEL	NA	NA
No report.		
OARS/AIHA	NA	NA
No report.		
HCOTN	2002	TWA: 50 ppm (230 mg/m³)
<p>Current administrative occupational exposure TWA.</p> <p>Summary of additional data:</p> <ul style="list-style-type: none"> Insufficient data to recommend a health-based TWA LD₅₀: 1,637 mg/kg (rabbit, dermal). 		

Secondary source reports relied upon

NIL.

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	Skin
HCIS	—
NICNAS	NA
EU Annex	NA
ECHA	—
ACGIH	Skin
DFG	—
SCOEL	NA
HCOTN	Skin
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
<p>Adverse effects in human case study:</p> <p>Dermal LD₅₀ ≤ 1000 mg/kg: no</p> <p>Dermal repeat-dose NOAEL ≤ 200 mg/kg:</p> <p>Dermal LD₅₀/Inhalation LD₅₀ < 10:</p> <p><i>In vivo</i> dermal absorption rate > 10%:</p> <p>Estimated dermal exposure at WES > 10%:</p> <p style="text-align: right;">a skin notation is not warranted</p>

IDLH

Is there a suitable IDLH value available?

Yes

Additional information

Molecular weight:	98.19
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 4.58 mg/m ³ ; 1 mg/m ³ = 0.218 ppm
This chemical is used as a pesticide:	<input type="checkbox"/>
This chemical is a biological product:	<input type="checkbox"/>
This chemical is a by-product of a process:	<input type="checkbox"/>
A biological exposure index has been recommended by these agencies:	<input type="checkbox"/> ACGIH <input type="checkbox"/> DFG <input type="checkbox"/> 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) 1-Methylcyclohexan-2-on – MAK value documentation.

European Chemicals Agency Regulation (ECHA) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Health Council of the Netherlands (HCOTN) (2002) 2-Methylcyclohexanone. Health-based Reassessment of Administrative Occupational Exposure Limits. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/049.

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