

METHYL ACETATE

CAS number: 79-20-9

Synonyms: Methyl ethanoate, acetic acid methyl ester, ethyl ester of monoacetic acid, methyl acetate (natural), methyl acetic ester, tereton.

Chemical formula: $C_3H_6O_2$

Structural formula: —

Workplace exposure standard (retained)

TWA: 200 ppm (606 mg/m³)

STEL: 250 ppm (757 mg/m³)

Peak limitation: —

Notations: —

IDLH: 3,100 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 200 ppm (606 mg/m³) is recommended to protect for upper respiratory tract and sensory irritation, headaches and nausea in exposed workers.

A STEL of 250 ppm (757 mg/m³) is recommended to protect for acute upper respiratory tract and sensory irritation, headaches and nausea in exposed workers.

Discussion and conclusions

Methyl acetate is used as a solvent, flavouring, biodegradation catalyst and in the manufacture of perfume, dyes, lacquers, plastics and artificial leather.

Critical effects include upper respiratory tract and sensory irritation, headaches, nausea and visual disturbances. In humans, short term inhalational exposure at 165 to 290 ppm over two two-hour exposures on four separate days produced no ill effects. NOAEC of 350 ppm is reported in a 28-day nose-only study in rats for respiratory tract irritation and minor systemic effects (ACGIH 2018).

Based on the evidence presented in humans and supported by NOAEC reported in rat studies the TWA of 200 ppm (606 mg/m³) and STEL of 250 ppm (757 mg/m³) are recommended to be retained and considered protective of upper respiratory tract and sensory irritation, headaches, nausea 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 not recommended based on the available evidence.

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APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 200 ppm (606 mg/m³); STEL: 250 ppm (757 mg/m³)
ACGIH mg/m³)	2013	TLV-TWA: 200 ppm (606 mg/m³); TLV-STEL: 250 ppm (757 mg/m³)
<p>TLV-TWA and STEL recommended to minimise the risk of upper respiratory tract and sensory irritation, headaches, nausea and visual disturbances in exposed workers and at higher concentrations optic neuropathy, metabolic acidosis, narcosis and respiratory depression.</p> <p>Summary of data:</p> <p>TLV-TWA and STEL are largely by analogy to methanol because methyl acetate rapidly metabolises to methanol in the human body.</p> <p>Human data:</p> <ul style="list-style-type: none"> Negative for sensitisation in maximisation test of 25 volunteers Exposure at 165–290 ppm (2 h, twice/d, for 4 d, inhalation) produced an increase in urinary methanol which was normal each morning with no ill effects noted Reported lowest toxic concentration: 15,000 mg/m³ Occupational exposure symptoms include headache, somnolence, corneal irritation, intoxication, temporary blindness, bilateral optic nerve atrophy, field of vision changes. <p>Animal data:</p> <ul style="list-style-type: none"> LD₅₀: 22,000 ppm (cats, 2–3 h), 11,220 ppm (mice, 3.5–5 h), 32,000 ppm (rats) LD₅₀: 4,800 mg/kg (rats, oral), 3,700 mg/kg (rabbits, oral) LD₅₀: >5,000 mg/kg (rabbits, dermal) A NOAEC of 350 ppm was reported in a rat study exposure at 0, 75, 350 and 2,000 ppm (6 h/d, 5 d/wk, 28 d, nose inhalation, symptoms included degradation and necrosis of the olfactory epithelium, reduced body weight and food intake at higher concentrations. Negative result in <i>Salmonella</i> mutagenicity test Caused aneuploidy in yeast cell assay, suspected due to tubulin interference Negative result in <i>in vivo</i> erythromicronucleus assay in rats. <p>Insufficient data to recommend skin, sensitiser or carcinogenicity notations.</p>		
DFG	2005	MAK: 100 ppm (310 mg/m³)
<p>Summary of additional data:</p> <ul style="list-style-type: none"> The calculated NAEC for long-term exposure is in the range of 125 to 167 ppm based on 28 d inhalation study in rats with a NOAEC of 350 ppm (same study as ACGIH). 		
SCOEL	NA	NA
No report.		
OARS/AIHA	NA	NA
No report.		

Source	Year set	Standard
HCOTN	2004	TWA: 200 ppm (610 mg/m³)
<p>A health-based OEL (HBROEL) of 100 mg/m³ was recommended as an 8 h TWA by applying an overall uncertainty factor of 12 to the NOAEC of 335 ppm (1035 mg/m³) reported in the 28 d inhalation study in rats (same study as ACGIH) and rounded according to HCOTN methodology.</p> <p>Summary of additional data:</p> <ul style="list-style-type: none"> <i>In vitro</i> experiment using developing chicken embryos, no teratogenic effects. 		

Secondary source reports relied upon

Source	Year	Additional information
ECHA	✓ 2011	<ul style="list-style-type: none"> LC₅₀: 49,200 mg/m³ (rats, 4 h) LD₅₀: >2,000 mg/kg (rats, dermal).

Carcinogenicity — non-threshold based genotoxic carcinogens

Is the chemical mutagenic? Insufficient data

Is the chemical carcinogenic with a mutagenic mechanism of action? Insufficient data

Insufficient data are available to determine if the chemical is a non-threshold based genotoxic carcinogen.

Notations

Source	Notations
SWA	—
HCIS	—
NICNAS	NA
EU Annex	NA
ECHA	NA
ACGIH	—
DFG	—
SCOEL	NA
HCOTN	—
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 LD₅₀ ≤1000 mg/kg: No
Dermal repeat-dose NOAEL ≤200 mg/kg:
Dermal LD₅₀/Inhalation LD₅₀ <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, based on LEL

Additional information

Molecular weight: 74.08
Conversion factors at 25°C and 101.3 kPa: 1 ppm = 3.03 mg/m³; 1 mg/m³ = 0.33 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
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[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) (2018) Methyl acetate – 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) (2004) Methyl acetate. Health-based Reassessment of Administrative Occupational Exposure Limits. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/103.

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

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