

ETHYL ACETATE

CAS number: 141-78-6

Synonyms: Acetic acid ethyl ester, acetic ester, acetic ether, ethyl ethanoate

Chemical formula: C₄H₈O₂

Workplace exposure standard (retained)

TWA: 200 ppm (720 mg/m³)

STEL: 400 (1,440 mg/m³)

Peak limitation: —

Notations: —

IDLH: 2,000 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 (720 mg/m³) is recommended to protect for irritation of the eyes, nose and upper airways in exposed workers.

A STEL of 400 ppm is recommended to protect for acute irritation of the eyes, nose and upper airways in exposed workers.

Discussion and conclusions

Ethyl acetate is used as a solvent for varnishes, lacquers and nitrocellulose and artificial essences.

Critical effects of exposure are irritation of the eyes, nose and upper respiratory tract. Data from animal studies and worker exposure experience indicate that ethyl acetate toxicity is low.

Unacclimatised subjects found the odour objectionably strong at 200 ppm and experienced mild irritation of eye, nose and throat at 400 ppm (ACGIH, 2018). Mild irritation of the eyes was reported at 400 ppm in separate study of 24 volunteers (DFG, 2017). No adverse chemosensory effects are observed at 400 ppm with peaks of 800 ppm in humans. Exposure at 400 ppm for up to eight hours is reported as tolerable in several studies in humans (SCOEL, 2008). A LOAEC of 350 ppm is reported for minimal degradation of the olfactory mucosa in rats (DFG, 2017). Motor activity was decreased in mice exposed for 20 minutes at 2000 ppm (SCOEL, 2008).

The TWA of 200 ppm is recommended to be retained based on the evidence presented. This concentration is cited by the DFG as being protective of irritant effects. Based on reversible acute neurological effects in mice, a STEL of 400 ppm is recommended.

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.

There are insufficient data to recommend a skin notation.

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APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 200 ppm (720 mg/m³); STEL: 400 ppm (1,440 mg/m³)
ACGIH	2001	TLV-TWA: 400 ppm (1,440 mg/m³)
<p>TLV-TWA recommended to minimise the potential for irritation of the eyes, nose and upper airways.</p> <p>Summary of Human data:</p> <ul style="list-style-type: none"> Limited data in humans Unacclimatised subjects found the odour objectionably strong at 200 ppm and mild eye, nose and throat irritation was experienced at 400 ppm. <p>Animal data:</p> <ul style="list-style-type: none"> LC₅₀: 16,000 ppm (rats) Repeated exposure of rabbits at 4,450 ppm resulted in secondary anaemia with leucocytosis, hyperaemia and damage to the liver (no further information) 65 x 4 h exposures of 2,000 ppm without apparent ill effects in animals (no further information). 		
DFG	2017	MAK: 200 ppm (730 mg/m³)
<p>Summary of additional data:</p> <ul style="list-style-type: none"> Due to rapid elimination, the exposure concentration appears more important for the occurrence of effects than the duration of exposure Odour implicated as an influencer to perceived irritation in eyes and throat of eyes of humans at 400 ppm in single exposure for 5 min; study from 1943 Following exposure to 400 ppm for 8 h, the symptoms reported by test persons (physical well-being, malaise with and without physical symptoms); severity of symptoms not significantly different from control group No changes in the blinking frequency or eye redness in 6 volunteers after exposure at 400 ppm for 4 h Adverse effects reported among 24 volunteers exposed continuously at 400 ppm or at an average of 400 ppm with peaks of 800 ppm; odour intensity and annoyance were rated as strong; eye irritation and other trigeminal perceptions were rated as slight to moderate; basis for lowering previous MAK of 400 ppm to 200 ppm Rats exposed at 0, 350, 750 and 1,500 ppm for 6 h/d, 5 d/wk for 94 d <ul style="list-style-type: none"> Local LOAEC of 350 ppm for minimal degradation of the olfactory mucosa (8/20) Systemic NOAEC of 350 ppm based on reduced body weight gains, reduced feed consumption and acute sedation in the next-higher concentration group 		

Source	Year set	Standard
SCOEL	2008	TWA: 200 ppm (734 mg/m³); STEL: 400 ppm (1440 mg/m³)
Summary of additional data:		
<ul style="list-style-type: none"> • RD₅₀ 600 ppm in mice; no further information • 400 ppm ≤8 h well tolerated in several studies in humans • In humans, no adverse chemosensory effects at 400 ppm with peaks of 800 ppm (Cited by DFG, 2017) • Reduced body weight gain in male and not female rats to a small extent at 350 ppm in 13 wk study in rats • Mice exposed at 0, 500, 1000 or 2,000 ppm for 20 min; produced significant decreases in locomotor activity, arousal, rearing and handling-induced convulsions at 2,000 ppm; clonic movements were observed at concentrations ≥500 ppm; recovery from the acute effects was rapid and began within minutes after exposure ceased 		
OARS/AIHA	NA	NA
No report.		
HCOTN	NA	NA
No report.		

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	—
HCIS	—
NICNAS	—
EU Annex	NA
ECHA	—
ACGIH	—
DFG	—
SCOEL	—
HCOTN	NA
IARC	NA

Source	Notations
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

Insufficient data to assign a skin notation.

IDLH

Is there a suitable IDLH value available? Yes, based on LEL

Additional information

Molecular weight:	88.11
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 3.60 mg/m ³ ; 1 mg/m ³ = 0.278 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) (1999) Ethyl acetate – MAK value documentation.

European Chemicals Agency (ECHA) (2019) Ethyl acetate – REACH assessment.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2008) Recommendation from the Scientific Committee on Occupational Exposure Limits for ethyl acetate. SCOEL/SUM/1.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2014) Acetate esters (C2-C4): Human health tier II assessment – IMAP report.

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

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