



PROPIONIC ACID

CAS number: 79-09-4

Synonyms: Ethylformic acid, methylacetic acid

Chemical formula: $C_3H_6O_2$

Workplace exposure standard (retained)

TWA: 10 ppm (30 mg/m³)

STEL: —

Peak limitation: —

Notations: —

IDLH: —

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

Recommendation and basis for workplace exposure standard

A TWA of 10 ppm (30 mg/m³) is recommended to protect for skin, eye, mucous membrane and upper respiratory tract irritation in exposed workers.

Discussion and conclusions

Propionic acid is used as a mould inhibitor, fungicide, herbicide, preservative and emulsifier. It is also used in perfumes, drugs, plastics and occurs naturally in cheese.

Critical effects of exposure are skin, eye, mucous membrane and upper respiratory tract irritation. It also causes severe burns on contact with skin.

Due to the limited data from human and animal studies, ACGIH (2018), DFG (2010) and SCOEL (1993) assign TLV-TWA partially by analogy to acetic acid (TLV-TWA 10 ppm). No significant changes in physiological indicators of trigeminally-mediated irritation identified in humans exposed up to 10 ppm for four hours (DFG 2010). Slight irritation of the skin and mucous membranes is reported in workers exposed for seven to twelve years at average concentrations of 60 ppm, plus one hour daily exposure at 100 to 260 ppm (SCOEL 1993).

The recommended TWA of 10 ppm is consistent across the primary sources and based on the weight of evidence is expected to limit irritant effects.

A STEL is not recommended due to the lack of acute adverse effects evident within 10 times the TWA concentration.

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.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 10 ppm (30 mg/m³)
ACGIH	2001	TLV-TWA: 10 ppm (30 mg/m³)
TLV-TWA recommended to minimise the risk of skin, eye, mucous membrane and upper respiratory tract irritation in exposed workers. Summary of data: TLV-TWA recommended by analogy to acetic acid (TLV-TWA 10 ppm). Human data: - Acute worker exposure symptoms include skin burns, red eyes and in 1 case coughing and asthma response - No irritation observed at 0.25 ppm TWA with excursions at 2.1 ppm through the workday. Animal data: - LD₅₀: 4,300 mg/kg (rats, oral) - LD₅₀: 500 mg/kg (rabbits, dermal) - Rats exposed for 8 h to a saturated environment caused no deaths (concentration not noted) - Dermal exposure to 10 mg of undiluted solution (rabbits, 24 h) resulted in tissue necrosis - Negative results in genotoxicity assay. Insufficient data to recommend a skin, sensitiser or carcinogen notation.		
DFG	2010	MAK: 10 ppm (30.8 mg/m³)
Summary of additional data: - Used as a model substance in olfactory research studies in humans - No significant changes in physiological indicators of trigeminally-mediated irritation in humans exposed at 0.3, 5 and 10 ppm (4 h, inhalation) - Exposure at 225, 750 and 2,250 mg/kg (rats and dogs, 90 d, oral): - NOAEL: 225 mg/kg 750 mg/kg: activity of ALA, AST and ALP reduced, as were total protein and globulin concentrations in blood 2,250 mg/kg: spontaneous epithelial hyperplasia, sporadically pronounced, observed in the mucosa of the oesophagus - RD₅₀: 384 ppm (mice) - Exposure at 264 and 2,640 mg/kg (rats, 25 wk, oral) resulted in pre-cancerous stages in the forestomach; these are regarded as local irritative effects and not relevant to the exposure situation at the workplace.		

Source	Year set	Standard
SCOEL	1993	TWA: 10 ppm (31 mg/m³); STEL: 20 ppm (62 mg/m³)
TWA considered sufficient by analogy to acetic acid. STEL derived from the TWA, is recommended to limit peaks of exposure which could result in irritation.		
Slight irritation of the skin and mucous membranes reported in workers exposed for 7–12 yr at average concentrations of 60 ppm, plus 1 h/d to 100–260 ppm (no further information provided).		
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? 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	—
EU Annex	NA
ECHA	—
ACGIH	—
DFG	—
SCOEL	—
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

Insufficient data to assign a skin notation.

IDLH

Is there a suitable IDLH value available? No

Additional information

Molecular weight:	74.08
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 3.03 mg/m ³ ; 1 mg/m ³ = 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
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) (2010) Propionic acid – MAK value documentation.

European Chemicals Agency (ECHA) (2019) Propionic acid – REACH assessment.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (1993) Recommendation from the Scientific Committee on Occupational Exposure Limits for Propionic acid. SCOEL/SUM/48.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2016) Propanoic acid: Human health tier II assessment – IMAF report.