PERACETIC ACID

CAS number: 79-21-0

Synonyms: Acetic peroxide, peroxyacetic acid, acetyl hydroperoxide, ethaneperoxoic acid

Chemical formula: $C_2H_4O_3$

Structural formula: —

Workplace exposure standard (new)

TWA: —

STEL: —

Peak limitation: **0.4 ppm (1.24 mg/m^3)**

Notations: —

IDLH: —

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

Recommendation and basis for workplace exposure standard

A peak limitation of 0.4 ppm (1.24 mg/m^3) is recommended to protect for irritation of the eyes, skin and upper respiratory tract in exposed workers.

Discussion and conclusions

Peracetic acid is used to sterilise reusable medical and dental devices. Commercial uses include oxidising agents, water treatment and beverage and food production.

The critical effects of exposure are irritation of eyes, skin and the upper respiratory tract. It is a strong organic acid, an oxidizing agent and is highly corrosive.

Exposure at 5 ppm (15.58 mg/m^3) produces lacrimation and immediate extreme discomfort and irritation of nasal membranes in workers. Concentrations between 0.5 and 1.5 ppm (1.56–4.68 mg/m^3) caused mild discomfort of the mucous membranes while no discomfort is reported below 0.5 ppm (1.56 mg/m^3). Severe cough, lacrimation, salivation, decreased coordination and alertness, laboured breathing and fatalities reported in rats exposed at 103 ppm (320 mg/m^3) for 60 minutes (ACGIH, 2018).

Given the evidence of immediate and intolerable effects following acute exposure, a peak limitation of 0.4 ppm (1.24 mg/m^3) based on the STEL by ACGIH (2018) is recommended to protect for irritation effects in 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 evidence in animals suggesting limited dermal absorption.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	***NA***	***NA***
No report.		
ACGIH	***2014***	***TLV-STEL: 0.4 ppm (1.24 mg/m^3)***

TLV-STEL recommended to be protective for irritation of eyes, skin and the upper respiratory tract.

Summary of data:

Human data:

- Unpublished study examining effects in worker following inhalation; fogging of poultry house; measurement of concentration and irritation effects over 23 min:
  - 5 ppm produced lacrimation and immediate extreme discomfort and irritation of nasal membranes
  - 2 ppm produced extreme or unbearable discomfort for mucous membranes of nose and eyes in 1 worker; tolerable for only 1–2 min
  - 0.5–1.5 ppm slight or mild discomfort of mucous membranes
  - <0.5 ppm no discomfort
- Unpublished study assessed the effects due to vapour exposure in 2 workplaces; measured over 3 h;
  - 0.5–0.6 not immediately irritating but would be considered unpleasant over extended duration
  - 0.13–0.17 ppm detectable but not unpleasant
- Reports of discomfort of skin, eyes and respiratory tract from 247 hospital participants exposed via disinfection spraying; no further exposure information.

Animal data:

- RD_{50}: 5.4 ppm (mice)
- LC_{50}: 168 ppm (mice, inhalation)
- Symptoms of irritation, eye closing, nose rubbing, salivation and lacrimation and gasping in animals exposed for 60 min; lesions in the lungs, with severity of lesions increasing with exposure concentrations reported on histological examination of tissues
- Rats exposed at 0, 150, 320, 390 or 1450 mg/m^3 by nose-only inhalation for 15, 30 or 60 min:
  - severe cough, lacrimation, salivation, decreased coordination and alertness, laboured breathing and death at 320 mg/m^3 (103 ppm)
  - LC_{50} for 60 min exposure was 476 mg/m^3 (153 ppm)
  - no mortality at 150 mg/m^3 (48 ppm)
- Carcinogenicity only studied via dermal application; skin tumour promoter in female mice; no evidence in rabbits; not relevant for human occupational exposure scenarios.

Insufficient data to recommend a Skin or sensitiser notation.

Insufficient chronic data to recommend a TWA.

Source	Year set	Standard
DFG	***1993***	***Not assigned***
Inadequate data to recommend a MAK. • Strong organic acid, an oxidising agent with marked biocidic and virucidic properties • Main toxic effect is local irritation especially of the mucous membranes of the respiratory tract and the skin • Inadequately documented report of irritation of the respiratory passages tolerable during exposure at 2 mg/m^3; intense at concentrations of 3–5 mg/m^3.		
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
NICNAS	✓	2013	• LD_{50}: 1,147–1,957 mg/kg (rabbits, dermal) • Extreme irritation and severe irreversible corneal opacity, conjunctivitis, ulceration and iritis demonstrated in animal eye studies • No skin sensitisation potential in guinea pigs.

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	NA
HCIS	NA
NICNAS	NA
EU Annex	NA
ECHA	NA
ACGIH	Carcinogenicity – A4
DFG	Carcinogenicity – 3B

Source	Notations
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:	
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?	No

Additional information

Molecular weight:	76.05
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 3.12 mg/m^3; 1 mg/m^3 = 0.321 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

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Deutsche Forschungsgemeinschaft (DFG) (1996) Peracetic acid – MAK value documentation.