

PICRIC ACID

CAS number: 88-89-1

Synonyms: Carbazotic acid, picronitric acid, 2,4,6-trinitrophenol

Chemical formula: $C_6H_2(NO_2)_3OH$

Structural formula: —

Workplace exposure standard (retained)

TWA: 0.1 mg/m³

STEL: —

Peak limitation: —

Notations: —

IDLH: 75 mg/m³

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

Recommendation and basis for workplace exposure standard

A TWA of 0.1 mg/m³ is recommended to protect for irritation of the eyes and skin, skin sensitisation and systemic effects in exposed workers.

Discussion and conclusions

Picric acid is used as an explosive, in match and battery manufacturing, in the leather, glass and copper industry, in textiles, as a laboratory chemical and for medicinal purposes.

Critical effects of exposure include irritation of the eyes and skin, skin sensitisation and systemic effects.

Limited toxicological data are available, but no inhalation data is available. Case reports of poisoning in workers describe symptoms such as headache, vertigo, nausea, vomiting and diarrhoea. Irritation of the eyes, corneal injury and visual effects described as yellow-tainted vision are reported following dust exposure to the eyes of workers. Skin sensitising potential is described in case reports and antiquated experiments in animals. In dogs, non-lethal doses of up to 50 mg/kg resulted in transitory changes in the kidneys (ACGIH, 2018).

Given the limited available data, the TWA of 0.1 mg/m³ by ACGIH (2018) is recommended to be retained to protect for potential irritant and systemic effects in exposed workers. An evaluation of additional sources is recommended at the next scheduled review to evaluate sensitising potential.

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 reports suggesting skin sensitising potential and therefore, a review of this classification is recommended.

There are insufficient data to recommend a skin notation.

DRAFT

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 0.1 mg/m³
ACGIH	2001	TLV-TWA: 0.1 mg/m³
<p>TLV-TWA recommended to minimise the potential for eye and skin irritation, possible skin sensitisation and systemic effects (headache, vertigo, visual effects, nausea, vomiting and diarrhoea).</p> <p>Summary of data:</p> <ul style="list-style-type: none"> Limited data available No specific derivation of TWA provided. <p>Human data:</p> <ul style="list-style-type: none"> Ingestion of 1–2 g caused severe poisoning. No further information Skin contact with dry powder of picric acid or ammonium picrate powder reported to cause sensitisation dermatitis in workers; oedema, papules, vesicles and finally desquamation developed; no further information Reported to cause irritation of the eyes, corneal injury and visual effects described as yellow-tainted vision. No further information Systemic poisoning caused symptoms of headache, vertigo, nausea, vomiting and diarrhoea. No further information. <p>Animal data:</p> <ul style="list-style-type: none"> In dogs, non-lethal doses of ≤50 mg/kg resulted in transitory changes in the kidneys including glomerulitis. <p>Insufficient data to recommend a skin, sensitiser or carcinogenicity notation or TLV-STEL.</p>		
DFG	1958	Not assigned
<p>Insufficient data therefore MAK from 1988 withdrawn.</p> <p>Summary of additional data:</p> <ul style="list-style-type: none"> Older evidence using techniques no longer used showed sensitisation of skin in animals. 		
SCOEL	2010	Not assigned
<p>Available toxicological data do not provide a scientific basis for establishment of a health-based OEL.</p>		
OARS/AIHA	NA	NA
<p>No report.</p>		
HCOTN	2002	TWA: 0.1 mg/m³
<p>Administrative OEL; toxicological database insufficient to derive a health-based OEL.</p>		

Secondary source reports relied upon

Source	Year	Additional information
NICNAS	* ND	• Human health tier I assessment; no further information.
ECHA	✓ 2019	• No additional information.

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	—
ACGIH	NA
DFG	Sh (dermal sensitiser), H (skin), Carcinogenicity – 3B
SCOEL	Sensitisation (dermal)
HCOTN	Skin sensitiser
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

Insufficient data to assign a skin notation.

IDLH

Is there a suitable IDLH value available? Yes

Additional information

Molecular weight:	229.10
Conversion factors at 25°C and 101.3 kPa:	1 ppm = Number mg/m ³ ; 1 mg/m ³ = Number 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) Picric acid – MAK value documentation.

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

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2010) Recommendation from the Scientific Committee on Occupational Exposure Limits for picric acid. SCOEL/SUM/92.

Health Council of the Netherlands (HCOTN) (2002) Picric acid. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/052.

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