TETRACHLORONAPHTHALENE

CAS number: 1335-88-2

Synonyms: Halowax®

Chemical formula: $C_{10}H_4Cl_4$

Workplace exposure standard (amended)

TWA: —

STEL: —

Peak limitation: —

Notations: Sk.

IDLH: —

Sampling and analysis: N/A

Recommendation and basis for workplace exposure standard

This chemical has been nominated for removal from the *Workplace exposure standards for airborne contaminants* due to a lack of evidence that it is used or generated in Australian workplaces or that it presents a potential for legacy exposure. Therefore, a TWA is not recommended.

Discussion and conclusions

Tetrachloronaphthalene is primarily used in electrical insulation material, in resins, polymer coatings and an additive in cutting oils and lubricant. There is lack of evidence that this chemical is used or generated in Australian workplaces or that it presents a potential for legacy exposure.

The critical effect of exposure is liver injury.

Due to the limited data from human and animal studies ACGIH (2018) assigns a TLV-TWA of 2 mg/m^3 by analogy to hexachloronaphthalene (TLV-TWA 0.2 mg/m^3). HCOTN (2000) concluded its current TWA of 2 mg/m^3 is too high based on a sub-chronic inhalation study in rats with liver damage observed at 1 mg/m^3. The relevance of this study is not clear as limited details are provided.

This chemical has been nominated for removal from the WES list. A TWA is not 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.

A skin notation is recommended due to evidence of dermal absorption and contribution to adverse systemic effects, particularly as tetrachloromethane is commonly found in mixtures and is also structurally related to polychlorinated naphthalenes known for dermal absorption.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	***1991***	***TWA: 2 mg/m^3***
ACGIH	***2001***	***TLV-TWA: 2 mg/m^3***

TLV-TWA recommended to minimise the risk of liver injury.

Summary of data:

Assigned based on analogy to hexachloronaphthalene (TLV-TWA 0.2 mg/m^3) and is based on animal experiments is at least 6 to 9 times more toxic.

Human data:

- Exposure in wire cable workers, assemblers and labourers induced hepatic dysfunction including fatalities (exposure pathway and concentration not noted)
- Determined to be non-acnegenic in volunteers
- An 18 yr old female exposed at 3.4 mg/m^3 of trichloronaphthalene during soldering of electrical condensers lead to a non-fatal case of toxic hepatitis (tetrachloronaphthalene assumed present).

Animal data:

- Exposure at 15 mg/kg/d (rabbits, 2 mo, subcutaneous or inhalation) to a mixture of tri- and tetrachloronaphthalene or tetra- and pentachloronaphthalene:
  - tri- and tetra-: no signs of poisoning
  - tetra- and penta-: hepatic necrosis and death within 12 d
- Exposure at 10.97 mg/m^3 (rats, 16 h/d, 2.5 mo, inhalation) to a mixture of tri- and tetrachloronaphthalene produced slight liver injury:
  - at 1.31 mg/m^3 very slight liver swelling observed
- Exposure at 527 mg/kg (calves, 130 d, oral) to tri-, tetra- or hexachloronaphthalene:
  - hexa-: symptoms within 5 d including lacrimation, salivation, nasal discharge, diarrhoea, alopecia, depression, polyuria, anorexia, weight loss; gross lesions included liver, pyloric and gall bladder damage
  - tetra-: mild symptoms
  - tri-: no relevant effects
  - 6-9 times more tetrachloronaphthalene than hexachloronaphthalene administered without producing severe toxic effects.

Insufficient data to recommend a skin, sensitiser or carcinogen notation.

DFG	***1999***	***Not assigned***

Due of the lack of data, the possibility cannot be excluded that even when the MAK for trichloronaphthalenes is set at 1 mg/m^3 and for pentachloronaphthalenes at 0.1 mg/m^3, liver damage may occur in individual persons. This also applies for other chlorinated naphthalenes.

Absorption through the skin is probable for all chlorinated naphthalenes and are therefore, designated with a skin notation.

Source	Year set	Standard
SCOEL	***NA***	***NA***
No report.		
OARS/AIHA	***NA***	***NA***
No report.		
HCOTN	***2000***	***TWA: 2 mg/m³***
The committee considers the toxicological data base too poor to recommend a health-based occupational exposure limit (HBROEL). Given the effects found in the inhalation study in rats, the committee concludes that the present TWA is too high: • Exposure at 1 mg/m³ (rats, 16 h/d, 6 wk, inhalation) showed damage of the liver (no further data are available).		

Secondary source reports relied upon

Source		Year	Additional information
NICNAS	✓	2002	No additional information
US NIOSH	✓	1994	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	NA
NICNAS	NA
EU Annex	NA
ECHA	NA
ACGIH	—
DFG	H(skin)
SCOEL	NA
HCOTN	Skin
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 skin notation.

IDLH

Is there a suitable IDLH value available?	No

Additional information

Molecular weight:	265.90
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:	☐
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) (1999) Chlorinated naphthalenes – MAK value documentation.

Health Council of the Netherlands (HCOTN) (2000) Tetrachloronaphthalene. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/016.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2002) Polychlorinated naphthalenes.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – tetrachloronaphthalene (as chlorinated naphthalenes).