

CHLORDANE

CAS number: 57-74-9

Synonyms: Octachlor, 1,2,4,5,6,7,8,8-octachloro-3a,4,7,7a-tetrahydro-4,7-methanoindan

Chemical formula: $C_{10}H_6Cl_8$

Structural formula: —

Workplace exposure standard (retained)

TWA: 0.5 mg/m³

STEL: —

Peak limitation: —

Notations: Sk.

IDLH: 100 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 0.5 mg/m³ is recommended to protect for liver effects in exposed workers.

Discussion and conclusions

Chlordane is a contact pesticide that used for termite control, as an insecticide in homes and gardens and in corn and citrus production.

Long-term feeding studies in rats report liver damage as the critical adverse effect; other effects in these studies included weight loss, anorexia, nervous disorders and vision and respiratory disturbances (ACGIH, 2018). An 80-week feeding study in mice reported a significant incidence of liver cancer. Workers exposed at 5 mg/m³ for up to three years did not report adverse effects. A case study reported the death of an individual following topical skin exposure to 30 grams of chlordane (ACGIH, 2018; DFG, 2002).

Based on the available animal studies and supported by no adverse effects reported in workers exposed at 5 mg/m³ in a long-term study, the current TWA of 0.5 mg/m³ is considered protective of liver and other effects in humans.

Recommendation for notations

Classified as category 2 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 based on evidence of systemic effects following dermal exposure in humans.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 0.5 mg/m³
ACGIH	2001	TLV-TWA: 0.5 mg/m³
TLV-TWA recommended to minimise the potential for hepatotoxicity and neurotoxicity in exposed workers. Summary of data: Human data: - Workers exposed at 5 mg/m³ for 1–3 yr did not develop illness or effects reported in animal studies (see below) - Topical skin contact of approximately 30 grams resulted in death of an adult in 40 min. Animal data: - Effects reported include loss of weight, anorexia, nervous disorders and disturbances of vision and respiration - Long term feeding studies in rats identified liver damage and to some extent myocardial damage - A dietary dose of 2.5 ppm produced tissue damage in rats (no further information) ≈9 mg/kg for 2 yr in humans - Significant incidence of liver cancer reported in mice at ≥30 mg/kg/d (80 w, feeding study). Conflicting results in genotoxicity assays between chlordane (negative) and technical grade chlordane (positive). Insufficient evidence to assign sensitiser notations or STEL.		
DFG	2002	MAK: 0.5 mg/m³
MAK recommended to protect for liver changes in exposed workers. Summary of additional data: - Subacute inhalation of chlorine-saturated air caused no detectable damage in experimental animals - MAK based on dietary dose of 2.5 ppm in rats (same as ACGIH, 2018); ≈9 mg/kg for 2 yr in humans.		
SCOEL	NA	NA
No report.		
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	NA
HCIS	Carcinogenicity – category 2
NICNAS	NA
EU Annex	Carcinogenicity – category 2
ECHA	NA
ACGIH	Carcinogenicity – A3, Skin
DFG	Carcinogenicity – 3B, H (skin)
SCOEL	NA
HCOTN	NA
IARC	Carcinogenicity – Group 2B
US NIOSH	SK:SYS

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:	yes
Dermal LD ₅₀ ≤ 1000 mg/kg:	
Dermal repeat-dose NOAEL ≤ 200 mg/kg:	
Dermal LD ₅₀ /Inhalation LD ₅₀ < 10:	
<i>In vivo</i> dermal absorption rate > 10%:	
Estimated dermal exposure at WES > 10%:	
a skin notation is warranted	

IDLH

Is there a suitable IDLH value available? Yes

Additional information

Molecular weight:	409.78
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) (2002) Chlordane – MAK value documentation.

Tenth Adaptation to Technical Progress Commission Regulation (EU) No 2017/776 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (the CLP Regulation).

International Agency for Research on Cancer (IARC) (2001) Volume 79 some thyrotropic agents. IARC Monographs on the evaluation of the carcinogenic risk to humans.

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

US National Institute for Occupational Safety and Health (NIOSH) (2015) Skin Notation Profiles: Chlordane and Technical Grade Chlordane.