# 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: | C10H6Cl8 |
| 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 | 4.00 |  | | Dermal LD50 ≤1000 mg/kg: |  |  |  | | Dermal repeat-dose NOAEL ≤200 mg/kg: |  |  |  | | Dermal LD50/Inhalation LD50 <10: |  |  |  | | *In vivo* 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/m3; 1 mg/m3 = 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*](http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations) on the ACGIH website.

Deutsche Forschungsgemeinschaft (DFG) (2002) Chlordan – 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.