# DDT (Dichlorodiphenyl-trichloroethane)

| CAS number: | 50-29-3 |
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| Synonyms: | Dichlorodiphenyltrichloroethane, Agritan,  2,2-bis(p-Chlorophenyl)-1,1,1-trichloro-ethane, chlorophenothane, Chlorine phenothane; ENT 1506, Gesarol, Neocid |
| Chemical formula: | C14H9Cl5 |

Workplace exposure standard (retained)

| TWA: | **1 mg/m3** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Carc 2.** |
| IDLH: | **500 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 1 mg/m3 is recommended to protect for eye irritation, acute central nervous system (CNS) effects and adverse liver effects in exposed workers.

## Discussion and conclusions

Dichlorodiphenyl-trichloroethane (DDT) is an organochloride pesticide previously used in the agricultural industries and for mosquito control. Its use is heavily restricted across the world, with a ban on use in Australia.

DDT can accumulate in the body, has the potential for eye irritation and acute CNS effects and tumours have been reported in mice (ACGIH, 2018). Human males were reported to endure a dose of 35 mg per day without ill effects. At this dose, an average of 281 ppm is reported to be stored in fat with one example reaching 648 ppm without ill effects (ACGIH, 2018). Liver tissue damage and liver cancers with a significant increase in malignancy are reported in mice at up to 250 ppm of DDT. A NOAEL of 1 ppm (0.05 mg/kg/day) is reported in rats in a 27 week feeding study. The LOAEL was identified at a dose of 5 ppm for liver effects (US EPA, 2002).

The current TWA of 1 mg/m3 is recommended to be retained on weight of evidence. This TWA is expected to be protective of irritation of the eyes and systemic effects on the CNS and liver.

## Recommendation for notations

Classified as a 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.

There are insufficient data to recommend a skin notation.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1995 TWA: 1 mg/m3 | |
|  |
| ACGIH 2001 TLV-TWA: 1 mg/m3 |
| TLV-TWA recommended to protect against accumulation in the body, potential for eye irritation, possible acute CNS effects and possible liver tumours reported in animal studies.  Summary of human data:  Human data   * + Eye irritation following inhalation at 423 mg/m3 1 h/d, for 6 d.   + Males receiving a dose of 35 mg/d displayed no illness (no duration provided); an average of 281 ppm stored in fat at this dose; one report of 648 ppm stored in fat   + Acute toxic effects including excessive perspiration, nausea, vomiting, convulsions, headache, tremors and cyanosis reported for 11 members of a family who ingested ~16.3‑120.5 mg/kg in contaminated food; symptoms resolved after 2 wk   + CNS induced convulsions reported ≥10 mg/kg   + Males reported to tolerate 35 mg/d without any ill effect detectable by themselves or by careful examination   + No ill effects reported in workers exposed to ≤18 mg/d for 11-19 yr; no further information available.   Animal data   * LD50: 250 mg/kg (rats, oral) * LD50: 2500 mg/kg (rats, dermal) * Liver tissue damage reported in male (but not female) rats for dietary level of 5 ppm  (≡17.5 mg/d) although females may be more susceptible to toxic effects due to storage in fatty tissues * Hepatocarcinogenesis with a significant increase in malignant liver tumours reported in male mice fed up to 250 ppm. * Topical application <8 mg/kg for 80 wk failed to produce any tumours.   Low exposure value recommended due to possible accumulation; TLV-TWA supported by analogy to lindane.  Data was insufficient to recommend a skin or SEN notation or STEL. |
| DFG 1969 MAK: 1 mg/m3 |
| No additional information. |
| 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 |
| --- | --- | --- | --- |
| US EPA |  | 2002 | Summary of additional data:  Human data:   * Classified as probable human carcinogen based on reported liver tumours in mice and rats * Oral Slope Factor: 3.4E-01 mg/kg/d * IUR: 9.7E-05 µg/m3 * Oral RfD: 5E-04 mg/kg/d based on protection against liver lesions and derived from NOEL of 1 ppm diet (0.05 mg/kg/d) and LOAEL 5 ppm (rats, 27 wk) * Positive and negative responses reported for genotoxicity * Insufficient human data on exposed workers to assess carcinogenicity. |

### 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 | Carcinogenicity – category 2 |
| NICNAS | NA |
| EU Annex | Carcinogenicity – category 2 |
| ECHA | NA |
| ACGIH | Carcinogenicity – A3 |
| DFG | H (skin) |
| SCOEL | NA |
| HCOTN | NA |
| IARC | Carcinogenicity – Group 2A |
| 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 evidence to recommend a skin notation. |

### IDLH

| Is there a suitable IDLH value available? | Yes |
| --- | --- |

## Additional information

| Molecular weight: | 354.50 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 14.5 mg/m3; 1 mg/m3 = 0.069 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 |
| --- | --- |
| 1995 | 1 mg/m3 (0.069 ppm) |

## 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) DDT – 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) (2018) DDT, Lindane, and 2,4-D. IARC Monographs on the evaluation of the carcinogenic risk to humans.

US Environmental Protection Agency (US EPA). (2002). Chemical Assessment Summary – p,p’-Dichlorodiphenyltrichloroethane (DDT); CASRN 50-29-3. Integrated Risk Information System (IRIS).

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