# Aldrin

| CAS number: | 309-00-2 |
| --- | --- |
| Synonyms: | 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-1,4:5,8-dimethanonaphthalene, HHDN, octalene |
| Chemical formula: | C12H8Cl6 |
| Structural formula: |  |

Workplace exposure standard (amended)

| TWA: | **0.05 mg/m3** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Carc. 2, Sk.** |
| IDLH: | **25 mg/m3** |
| Sampling and analysis: | There is uncertainty regarding quantification of the recommended value with currently available sampling and/or analysis techniques. |

## Recommendation and basis for workplace exposure standard

A TWA of 0.05 mg/m3 is recommended to protect for central nervous system (CNS), kidney and liver effects in exposed workers.

## Discussion and conclusions

Aldrin is an insecticide similar in toxicity to dieldrin, with critical effects on CNS, liver and kidneys. Workers exposed to 1 to 3 mg/m3 at the workplace for up to three years reported no adverse health effects. Similarly, various historic worker studies with intakes of 90 to 1,019 µg/kg have not demonstrated adverse effects on life expectancy or cancer incidence (ACGIH, 2018). No adverse effects were reported in 36 male manufacturing plant workers exposed to 5 mg/m3 for three years. Toxic effects from accidental acute exposures have been reported to reverse rapidly (DFG, 1973). Toxicokinetic information indicates rapid dermal absorption is likely to contribute to systemic toxic effects (ACGIH, 2018).

A NOAEL of 0.1 mg/m3 was reported in a one-year feeding study dogs and a NOAEL of 4 mg/m3, reported from a two-year feeding study in rats.

The recommended TWA is based on the NOAELs reported in animal studies and supported by observations of no adverse effects between 1 and 3 mg/m3 in exposed worker studies. The TWA is considered protective of CNS, kidney and liver effects.

## 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.

A skin notation is recommended as evidence indicates rapid absorption through the skin in animals and dermal absorption by skin contact at the workplace.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1990 TWA: 0.25 mg/m3 | |
| Exposure standard adopted from the ACGIH TLVs list.   * Limited evidence for carcinogenicity in experimental animals * Carcinogenicity through inhalation not demonstrated in animals * Inadequate human evidence for carcinogenicity. |
| ACGIH 2007 TLV-TWA 0.05 mg/m3 (0.003 ppm) |
| TLV-TWA recommended to minimise the potential for CNS, kidney and liver (summed particulate and vapour phase).  Summary of data:  Human data:   * No adverse effects were noted in 22 workers exposed to ≈1–3 mg/m3 (1–3 yr); primarily through inhalation with some skin contact * Various worker studies with intakes of 90–1,019 µg/d for 24, 35 and 40 yr reported no effect on life expectancy or cancer incidence.   Animal data:   * NOAEL: 0.025 mg/kg (dogs, 1 yr); ≡ 0.1–0.2 mg/m3 * NOAEL: 0.6 mg/kg (rats, 2 yr); ≡ 4 mg/m3 * LD50: 150–1250 mg/kg (rabbits, dermal) * Reports of rapid dermal absorption leading to systemic effects * Poor offspring survival reported in dogs orally exposed * Negative results in genotoxicity assays. |
| DFG 1973 MAK 0.25 mg/m3 |
| MAK recommended to protect for effects on the CNS, kidney and liver in exposed workers.  Summary of additional data:   * No adverse effects in 36 male manufacturing plant workers exposed to 5 mg/m3 for 3 yr * Toxic effects (central nervous excitement, restlessness, muscle twitching, convulsions) from accidental acute exposures were reported to reverse rapidly. |
| 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 |
| --- | --- | --- | --- |
| APVMA |  | 2016 | * Traditional ADI not maintained as no longer used in agricultural practice with no industrial sponsors. |

### 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 | Carc.2; Skin |
| HCIS | Carcinogenicity – category 2 |
| NICNAS | NA |
| EU Annex | Carcinogenicity – category 2 |
| ECHA | NA |
| ACGIH | Carcinogenicity – A3; Skin |
| DFG | 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: | yes | 3.00 |  |  | | Dermal repeat-dose NOAEL ≤200 mg/kg: |  |  |  |  | | Dermal LD50/Inhalation LD50 <10: |  |  |  |  | | *In vivo* dermal absorption rate >10%: |  |  |  |  | | Estimated dermal exposure at WES >10%: |  |  |  |  | |  |  | 3 | **a skin notation is warranted** | | |

### IDLH

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

## Additional information

| Molecular weight: | 364.9 |
| --- | --- |
| 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.

Australian Pesticides and Veterinary Medicines Authority (2016) Acceptable Daily Intakes for Agricultural and Veterinary Chemicals

Deutsche Forschungsgemeinschaft (DFG) (1973) Aldrin – MAK value documentation in German language.

International Agency for Research on Cancer (IARC) (2019) Dieldrin and aldrin. IARC Monographs on

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).

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

US National Institute for Occupational Safety and Health (NIOSH) (2015) NIOSH Skin Notation Profiles: Aldrin