# Cyclohexene

| CAS number: | 110-83-8 |
| --- | --- |
| Synonyms: | Tetrahydrobenzene, cyclohex-1-ene, benzenetetrahydride, hexanaphthylene |
| Chemical formula: | C6H10 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **300 ppm (1,010 mg/m3)** |
| --- | --- |
| STEL: | — |
| Peak limitation: | — |
| Notations: | — |
| IDLH: | **2,000 ppm** |
| Sampling and analysis: The recommended value is quantifiable through available sampling and analysis techniques. | |

## Recommendation and basis for workplace exposure standard

A TWA of 300 ppm (1,010 mg/m3) is recommended to protect for eye and mucous membrane irritation in exposed workers.

Given the limited data available from the primary sources, it is recommended that a review of additional sources be conducted at the next scheduled review.

## Discussion and conclusions

Cyclohexene is used in organic synthesis, as a catalyst solvent, in the manufacture of adipic and maleic acids, in oil extraction and is found in motor vehicle exhaust.

Limited toxicological evidence exists in humans and animals. Cyclohexene is considered to have low toxicity following oral, inhalation and dermal exposure (HCOTN, 2004). In a six month animal study, exposure *via* inhalation at 600 ppm produced a decrease in body weight gain not observed at 300 ppm or lower concentrations (ACGIH, 2018; HCOTN, 2004). The ACGIH recommended a TLV-TWA of 300 ppm based on analogy to the irritant effects observed on exposure to cyclohexane combined with the results of the six month study (ACGIH, 2018).

Given the limited available data, the current TWA of 300 ppm is retained in line with the ACGIH recommendation. The recommended TWA is considered sufficiently low to protect for eye and mucous membrane irritation in exposed workers. Further assessment is recommended to identify any relevant toxicological data in the literature at the next scheduled review.

## 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 not recommended based on the available evidence.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 300 ppm (1,010 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 300 ppm (1,010 mg/m3) |
| TLV-TWA recommended to minimise the potential for eye and mucous membrane irritation.  Summary of data:  Animal data:   * In an acute toxicity study 8,850 ppm caused serious effect (no specific symptoms mentioned), with one-time exposure to 14,800 ppm proving fatal * Inhalation exposure to 150, 300 and 600 ppm over 6 mo (rats, guinea pigs, rabbits, 6 h/d, 5 d/wk): * increased serum alkaline phosphatase observed in all groups * 600 ppm: decrease in bw gain * other hematologic and biochemical parameter within normal limits * Insufficient data available to assign a skin, sensitiser or carcinogen notation.   TVL-TWA recommendation based on results of above inhalation study and in part by analogy to the irritant effect of cyclohexane. |
| DFG NA NA |
| No report. |
| SCOEL 2011 NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2004 TWA: 300 ppm (1,010 mg/m3) |
| Summary of additional data:   * Dermal application studies on rabbits and guinea pigs produced erythema, oedema, induration and necrosis, no systematic effects observed * 3 similar oral studies produced an LD50 of 1,960–2,880 mg/kg (rats), symptoms at non-lethal doses included behavioural changes, bloodshot eyes, convulsions, paralysis, nasal discharge, rapid breathing and lung, liver, kidney and spleen abnormalities * A reproductive study in which mice were exposed to 140 and 615 mg/kg (intraperitoneal) for 30 d; no ovotoxicity observed * Negative results in mutagenicity assay. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| OECD |  | 2002 | * LD50: 1,000–2,000 mg/kg (rats, oral) * LD50: 16,200 (guinea pigs, dermal). |

### 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 | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | NA |
| DFG | NA |
| SCOEL | NA |
| HCOTN | NA |
| IARC | NA |
| 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 |
| --- |
| |  |  |  |  | | --- | --- | --- | --- | | Adverse effects in human case study: |  |  |  | | Dermal LD50 ≤1000 mg/kg: | no |  |  | | 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 not warranted** | |

### IDLH

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

## Additional information

| Molecular weight: | 82.14 |
| --- | --- |
| 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.

Health Council of the Netherlands (HCOTN) (2004) Cyclohexene. Health-based Reassessment of Administrative Occupational Exposure Limits. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/100.

Organisation for Economic Cooperation and Development (OECD) (2002) SIDS initial assessment profile – Cyclohexene.

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