# 1,2-Dichloroethylene

| CAS number: | 540-59-0 |
| --- | --- |
| Synonyms: | Acetylene dichloride, dichloroacetylene, 1,2-dichloroethene, sym-dichloroethylene |
| Chemical formula: | C2H2Cl2 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **200 ppm (793 mg/m3)** |
| --- | --- |
| STEL: | — |
| Peak limitation: | — |
| Notations: | — |
| IDLH: | **1,000 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 200 ppm (793 mg/m3) is recommended to protect for the risk of eye irritation and narcosis in exposed workers.

## Discussion and conclusions

1,2-Dichloroethylene is commonly used as a solvent, chemical intermediate, fermentation retardant, in organic synthesis and as a germicidal fumigant.

Limited human studies exist. Inhalation exposure to the trans-isomer at 2,200 ppm caused burning in the eyes, vertigo and nausea in humans. A long-term inhalation study in rats suggests a NOAEL of 200 ppm for reduced serum albumin, urea nitrogen and alkaline phosphatase activity (ACGIH, 2018). There are several short-term animal studies that suggest symptoms at 200 ppm, however these symptoms are minor, reversible and inconsistent with the finding of the long-term study (DFG, 2012).

The current TWA is retained and is considered sufficiently low to minimise the potential for eye irritation and narcosis in exposed workers.

## 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.

There are insufficient data to recommend a skin notation.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 200 ppm (793 mg/m3) | |
|  |
| ACGIH 2001 TWA: 200 ppm (793 mg/m3) |
| TLV-TWA recommended to minimise the risk of ocular irritation and narcosis in exposed workers.  Summary of data:  Human data:   * Inhalation exposure to the trans-isomer at 2,200 ppm caused burning in the eyes, vertigo and nausea * Fatality reported from vapour exposure in enclosed space, concentration and symptoms unknown.   Animal data:   * LC50: 21,723 ppm (mice, 6 h) * Inhalation exposure to 200 ppm (rats, mice, 8 h) caused histopathological organ changes * Inhalation exposure to 1,000 ppm (rats, 8 h) caused serum albumin, urea nitrogen and alkaline phosphatase activity were diminished, NOEL 200 ppm * LD50: 1,275 mg/kg (rats, oral) * Inhalation exposure to 500 or 1,000 ppm (rats, rabbits, dogs and guinea pigs, 7 h/d, 5 d/wk) for 6 mo produced no changes to growth, mortality, organ and body weights, haematology, clinical chemistry, gross and microscopic pathology.   Insufficient data to recommend a carcinogen, skin or sensitisation notation. |
| DFG 2001 MAK: 200 ppm (800 mg/m3) |
| The current MAK value is considered "likely to be low enough to prevent intoxication".  Summary of additional data:   * Human exposure is linked to minor functional disorders of the liver, kidneys or lungs, plasma and liver enzymes activity is reduced, loss of appetite and weight occurs * 8 h exposure to 200 ppm prolong hexobarbital dormancy and zoxazolamine paralysis duration and retard N-demethylation of aminophenazone in rats. |
| 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 | — |
| HCIS | — |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | — |
| DFG | Carcinogenicity – 2 |
| SCOEL | NA |
| HCOTN | NA |
| IARC | NA |
| US NIOSH | — |

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 data to assign a skin notation |

### IDLH

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

## Additional information

| Molecular weight: | 96.95 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 3.97 mg/m3; 1 mg/m3 = 0.252 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) (2012) 1,2-Diclorethen, sym – MAK value documentation.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – 1,2-Dichloroethylene.