# Perchloromethyl mercaptan

| CAS number: | 594-42-3 |
| --- | --- |
| Synonyms: | Clairsit (war gas), methane sulfenyl chloride, PCM, perchloromethanethiol, trichloromethylsulfenyl chloride |
| Chemical formula: | CCl4S |
| Structural formula: | — |

Workplace exposure standard (amended)

| TWA: | **—** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **10 ppm** |
| **Sampling and analysis:** N/A | |

## Recommendation and basis for workplace exposure standard

This chemical has been nominated for removal from the *Workplace exposure standards for airborne contaminants* due to a lack of evidence that it is used or generated in Australian workplaces or that it presents a potential for legacy exposure. Therefore, a TWA is not recommended.

## Discussion and conclusions

Perchloromethyl mercaptan is used as an intermediate in the manufacture of dyes and fungicides. There is lack of evidence that this chemical is used or generated in Australian workplaces or that it presents a potential for legacy exposure.

The critical effects of exposure are eye, nose and respiratory tract irritation. Human and animal exposure data are limited. NOAEC of 0.13 and 0.5 ppm for irritant effects and respiratory distress reported in two sub‑chronic inhalation studies in rats (ACGIH, 2018). An irritation threshold of 0.3 ppm was identified in humans, but details were not provided (ACGIH, 2018). A NOAEC of 0.01 ppm is identified for histological effects on the respiratory tract epithelium in a sub-chronic inhalation study in rats (HCOTN, 2002).

This chemical has been nominated for removal from the WES list. A TWA is not recommended.

## 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: 0.1 ppm (0.76 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 0.1 ppm (0.76 mg/m3) |
| TLV-TWA recommended to minimise the risk of ocular and nasal irritation in exposed workers.  Summary of data:  Used as an intermediate for manufacture of dyes and fungicides.  Human data:   * Odour threshold: 0.001 ppm * Irritation threshold: 0.03 ppm * Acute inhalation exposure symptoms include coughing, dyspnoea, lacrimation, pallor, vomiting, tachycardia, cyanosis, convulsions and death caused by lung oedema (concentration not noted) * Occupational exposure at lower concentrations produced irritation symptoms (concentration not noted) * No reported symptoms in production plants at exposures below 0.1 ppm.   Animal data:   * LD50: 83 mg/kg (rats, oral) * LD50: 1,410 mg/kg (rabbits, dermal) * LC50: 11 ppm (rats, 1 h) * LC50: 9 ppm (mice, 3 h) * Exposure to 0.017, 0.13 and 1.14 ppm (rats, 6 h/d, 5 d/wk, 2 wk), NOAEC: 0.13 ppm, 1.14 ppm produced laboured breathing, tremors and nasal irritation * NOAEC 0.5 ppm (rats, 6 h/d, 5 d/wk, 4 wk): * 2 ppm produced respiratory distress and lung congestion on autopsy * DNA polymerase deficient in *E. coli* assay * Inhibited DNA synthesis in isolated bovine liver nuclei.   Insufficient data to recommend skin, sensitiser or carcinogen notation. |
| DFG 1988 Not assigned |
| The limited published data from accidental exposure of persons and the scant results of animal studies insufficient either to confirm the MAK or to provide the basis for establishing a new value. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2002 TWA: 0.1 ppm (0.8 mg/m3) |
| The NOAEC of 0.11 mg/m3 (0.01 ppm) as a starting point in deriving a HBROEL. An overall assessment factor of 8 applied covering intra- and interspecies variation, differences between experimental conditions and exposure pattern of the worker and type of critical effect. HBROEL of 0.01 mg/m3 (≈0.001 ppm) recommended.  Summary of additional data:   * NOAEC: 0.01 ppm for histological effects on the respiratory tract epithelium; exposure at 0, 0.01, 0.08 and 0.6 ppm (rats, 6 h/d, 5 d/wk, 14 wk) * Mutagenic in *S. typhimurium* strains TA1535, TA1537, TA1538, TA98, TA100 * DNA-polymerase-deficient *E. coli* assay * Positive results in the mouse lymphoma L5178Y TK+/- forward mutation assay * Inhibited DNA polymerase activity in isolated bovine liver nuclei * Positive results in morphological transformation assay in BALB/3T3 cells * Negative results in *in vivo* assay on micronuclei in the bone marrow of mice. |

### Secondary source reports relied upon

NIL.

### Carcinogenicity — non-threshold based genotoxic carcinogens

| Is the chemical mutagenic? | Yes |
| --- | --- |
| 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 | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | — |
| DFG | — |
| SCOEL | NA |
| HCOTN | — |
| 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: | no |  |  | | 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: | 185.9 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 761 mg/m3; 1 mg/m3 = 0.132 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) (1990) Perchloromethylmercaptan – MAK value documentation.

Health Council of the Netherlands (HCOTN) (2002) Perchloromethyl mercaptan. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/037.

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