# Chlorodifluoromethane

| CAS number: | 75-45-6 |
| --- | --- |
| Synonyms: | Difluoromonochloromethane, FC-22,  fluorocarbon 22 (freon 22), genetron-22, monochlorodifluoromethane, difluoro chloromethane |
| Chemical formula: | CHClF2 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **1,000 ppm (3,540 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **—** |
| Sampling and analysis: | The recommended value is readily quantifiable through currently available sampling and analysis techniques. |

## Recommendation and basis for workplace exposure standard

The TWA of 1,000 ppm (3,540 mg/m3) is recommended to protect for cancer in exposed workers.

## Discussion and conclusions

Chlorodifluoromethane is used as an aerosol propellant, a refrigerant, a low-temperature solvent and as a component of fluorocarbon resins.

Chlorodifluoromethane is considered to exhibit low toxicity. Limited human data are available. A NOAEL of 10,000 ppm (36,000 mg/m3) is reported in rats (DFG, 1992; SCOEL, 1993). The recommended TWA is derived using the NOAEL of 10,000 ppm and applying an uncertainty factor of 10 for interspecies differences.

## 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: 1,000 ppm (3,540 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 1,000 ppm (3,540 mg/m3) |
| TLV-TWA is recommended as a guide for occupational hygiene practice for vapours of low toxicity.  Summary of data:  Used as an aerosol propellant, a refrigerant, a low-temperature solvent, and as a component of fluorocarbon resins.  Human data:   * Epidemiologic study reported 3.5-fold excess incidence of cardiac palpitations in individuals exposed to an average of 300 ppm (no further information) * Another epidemiologic study reported no increased mortality due to heart, circulatory or malignant disorders in exposed workers (no further information).   Animal data:   * High concentrations reported to produce stimulation followed by depression of the CNS and subsequent asphyxiation (no further information) * 11,000–20,000 ppm reported as minimal concentration capable of altering reflex response in rabbits * No clinical, biochemical or pathological effects in a 4 wk study in rats, guinea pigs, dogs and cats exposed to 20 exposures of 3.5 h each at 50,000 ppm.   Insufficient evidence to recommend a skin or sensitisation notation. |
| DFG 1992 MAK: 500 ppm (1,800 mg/m3) |
| Summary of additional data:   * The results of available human data for carcinogenic effects not considered confirmed; it is concluded that data cannot be used to derive a MAK * NOEL of ≈10,000 ppm in rats and mice for carcinogenic effects (long-term inhalational study); considered indicative of very low toxicity * MAK established based on safety factor (no further details) * Not mutagenic in the Ames test for most strains of *Salmonella typhimurium*. |
| SCOEL 1993 TWA: 1,000 ppm (3,600 mg/m3) |
| TWA based on NOAEL of 10,000 ppm (36,000 mg/m3) for chronic toxicity and teratogenicity in rats (same study as DFG) and an uncertainty factor of 10 for absence of human data. |
| 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? | No |
| --- | --- |
| Is the chemical carcinogenic with a mutagenic mechanism of action? | No |
| **The chemical is not a non-threshold based genotoxic carcinogen.** |  |

## Notations

| Source | Notations |
| --- | --- |
| SWA | NA |
| HCIS | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | Carcinogenicity – A4 |
| DFG | NA |
| SCOEL | NA |
| HCOTN | NA |
| IARC | Carcinogenicity – Group 3 |
| 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 data to assign a skin notation. |

### IDLH

| Is there a suitable IDLH value available? | No |
| --- | --- |

## Additional information

| Molecular weight: | 86.47 |
| --- | --- |
| 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.

Deutsche Forschungsgemeinschaft (DFG) (1992) Chlorodifluoromethane – MAK value documentation.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (1993) Recommendation from the Scientific Expert Group on Occupational Exposure Limits for Chlorodifluoromethane. SEG/SUM/36.

International Agency for Research on Cancer (IARC) (1999) Volume 71 re-evaluation of some organic chemicals, hydrazine and hydrogen peroxide. IARC Monographs on the evaluation of the carcinogenic risk to humans.