# Dichlorodifluoromethane

| CAS number: | 75-71-8 |
| --- | --- |
| Synonyms: | Fluorocarbon 12, freon 12, genetron 12, halon |
| Chemical formula: | CCl2F2 |

Workplace exposure standard (retained)

| TWA: | **1,000 ppm (4,950 mg/m3)** |
| --- | --- |
| STEL: | — |
| Peak limitation: | — |
| Notations: | — |
| IDLH: | **15,000 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 1,000 ppm (4,950 mg/m3) is recommended to protect for cardiac sensitisation and arrhythmia in exposed workers.

## Discussion and conclusions

Dichlorodifluoromethane is an ozone-depleting CFC that was previously used as an aerosol propellant, refrigerant and polymeric foam blowing agent.

Critical effects are cardiac sensitisation and arrhythmia (ACGIH, 2018). No adverse effects are observed in study of eight male workers exposed at 1,000 ppm for eight hours per day for three weeks. A NOAEC of 1,500 ppm and a LOAEC of 2,500 ppm are reported in a 12 week inhalation study involving volunteer human exposure (DFG, 2002).

Based on the weight of evidence, the current TWA of 1,000 ppm (4,950 mg/m3) is recommended to be retained and is considered sufficiently low to minimise the potential for cardiac sensitisation and arrhythmia 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: 1,000 ppm (4,950 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 1,000 ppm (4,950 mg/m3) |
| TLV-TWA recommended to minimise the risk of cardiac sensitisation and arrhythmia in exposed workers.  Summary of data:  Human data:   * Inhalation at 10,000 ppm (2.5 h, single exposure) showed a 7% reduction in psychomotor test score, no other adverse effects.   Animal data:   * Exposure at 600,000 ppm (2 h, inhalation) lead to fatalities in rats but not in guinea pigs * in another study rats, guinea pigs and cats survived several hours of exposure to 300,000–800,000 ppm * 5/12 dogs exposed to 50,000 ppm (5 min, inhalation) in conjunction with IV epinephrine resulted in cardiac arrhythmia * Dogs, monkeys, rats, rabbits and guinea pigs exposed at 810 ppm (24 h/d, 90 d, inhalation) lead to no fatalities, microscopic liver injury was reported in guinea pigs, no other symptoms reported * Dogs, monkeys and guinea pigs exposed at 200,000 ppm (40 h/wk, 10–12 wk, inhalation) exhibited signs of milt narcosis and mild blood changes * Dogs, cats, rats and guinea pigs exposed at 100,000 ppm (3.5 h/d, 4 wk, inhalation) produce no pathological changes * No adverse effects in various reproductive and developmental tests * Negative results in mutagenicity assays.   Assigned an A4, not classified as human carcinogen.  Insufficient data available to assign neither a sensitiser or skin notation. |
| DFG 2002 MAK: 1,000 ppm (5,000 mg/m3) |
| Results of studies on volunteers and animals demonstrate that the MAK value be retained.  Summary of additional data:  Human data:   * Inhalation at 200,000 ppm causes eye irritation and dizziness, symptoms are rapidly reversible * Inhalation at 40,000 ppm (80 min) causes tingling sensations, ringing in the ears, encephalogram changes, deterioration in the results of psychological tests and indistinct speech * Inhalation exposure at 1,000 and 10,000 ppm (2.5 h, 2 exposures in 3 wk) resulted in no observable effect at 1,000 ppm and slight deterioration in the results of the psychomotor tests at 10,000 ppm * NOAEC: 1,500 ppm (90 min/d, 5 d/wk, 12 wk, inhalation) * LOAEC: 2,500 ppm (90 min/d, 5 d/wk, 12 wk, inhalation), symptoms included reduced dexterity, sleepiness and reduced ability to concentrate * 8 male subjects’ exposure to 1,000 ppm (8 h/d, 3 wk, inhalation), extensive medical examinations revealed no evidence of exposure-related effects. |
| 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? | No |
| --- | --- |
| **The chemical is not a non-threshold based genotoxic carcinogen.** |  |

## Notations

| Source | Notations |
| --- | --- |
| SWA | — |
| HCIS | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | Carcinogenicity – A4 |
| DFG | — |
| 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 |
| --- |
| Insufficient data to assign a skin notation. |

### IDLH

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

## Additional information

| Molecular weight: | 120.91 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 4.95 mg/m3; 1 mg/m3 = 0.202 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) (2002) Dichlorodifluoromethane – MAK value documentation.

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