# Chlorine trifluoride

| CAS number: | 7790-91-2 |
| --- | --- |
| Synonyms: | Chlorotrifluoride |
| Chemical formula: | ClF3 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **—** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **0.1 ppm (0.38 mg/m3)** |
| Notations: | **—** |
| IDLH: | **20 ppm** |
| Sampling and analysis: | The recommended value is quantifiable through available sampling and analysis techniques. |

## Recommendation and basis for workplace exposure standard

A peak limitation of 0.1 ppm (0.38 mg/m3) is recommended to protect for irritation of the eyes, skin and mucous membranes in exposed workers.

## Discussion and conclusions

Chlorine trifluoride is used as a fluorinating agent, as an igniter and propellant for rockets, in nuclear reactor fuel processing and as a pyrolysis inhibitor for fluorocarbon polymers.

There is limited toxicological information available. No human exposure data are available. Data from animals indicates that chlorine trifluoride is highly irritating to the skin, eyes and mucous membranes. Chronic inhalational exposure of approximately 1.2 ppm (4.5 mg/m3) caused mortality in one out of two dogs and six out of 20 rats. Accordingly, a peak limitation of 0.1 ppm is 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.

There are insufficient data to recommend a skin notation.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 Peak limitation: 0.1 ppm (0.38 mg/m3) | |
|  |
| ACGIH 2001 TLV-Ceiling: 0.1 ppm (0.38 mg/m3) |
| TLV-Ceiling recommended to minimise the potential for adverse ocular, mucous membrane and respiratory tract irritation.  Summary of data:  No human data available.  Animal data:   * All rats were killed following inhalational exposure at 800 ppm for 15 min * rats survived at 800 ppm for 13 min * rats exposed to 400 ppm for 35 minutes also died * Exposures resulted in inflammation of mucosal surfaces, burning of the skin and corneal ulceration and lung damage * Chronic inhalation study in 2 dogs and 20 rats exposed to 1.17 ppm for 6 h/d, 5 d/wk for 6 mo: * early effects in dogs were coughing, sneezing, rhinorrhoea, salivation, panting respiration and occasional expulsion of frothy fluid from the mouth and nose * both dogs had recurrent pneumonia and one dog died after 115 d * 6 rats died during the experiment.   Insufficient data to recommend skin sensitiser or carcinogen notations. |
| DFG 2000 Not assigned |
| Insufficient evidence available.  No further additional information. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2001 Ceiling value: 0.1 ppm (0.4 mg/m3) |
| The current TWA Ceiling value is considered an administrative occupational exposure limit.  Toxicological data base is considered too poor to recommend a health-based occupational exposure limit.  No further additional information. |

### 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 | 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 |
| --- |
| Insufficient data to recommend a skin notation. |

### IDLH

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

## Additional information

| Molecular weight: | 92.45 |
| --- | --- |
| 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) (2000) Chlortrifluorid – MAK value documentation.

Health Council of the Netherlands (HCOTN) (2001) Chlorine trifluoride. Health-based reassessment of administrative occupational exposure limits. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/019.