# Dimethyl carbomoyl chloride

| CAS number: | 79-44-7 |
| --- | --- |
| Synonyms: | Chloroformic acid, dimethylamide, Dimethylcarbamic chloride, Dimethylcarbamyl chloride, DMCC |
| Chemical formula: | C3H6ClNO |
| Structural formula: | — |

Workplace exposure standard (interim)

| TWA: | **0.005 ppm (0.2 mg/m3)** |
| --- | --- |
| STEL: | — |
| Peak limitation: | — |
| Notations: | **Carc. 1B, Sk.** |
| IDLH: | — |
| **Sampling and analysis:** The recommended value is likely to be below the current limit of detection for standard sampling and analysis techniques. | |

## Recommendation and basis for workplace exposure standard

A TWA of 0.005 ppm is recommended to protect for cancer in exposed workers.

Given the limited data available from the primary sources, it is recommended that a review of additional sources be conducted at the next scheduled review.

## Discussion and conclusions

Dimethyl carbamoyl chloride is used as a chemical intermediate in the manufacture of carbamate pesticides, dyes and drugs.

Based on evidence in animals, critical effects include nasal irritation and nasal cancer. It is characterised as a non-threshold based genotoxic carcinogen (ACGIH, 2018; NICNAS, 2015; DFG, 2004). Carcinogenicity is likely to act *via* a mutagenic mode of action. At present, Inhalation Unit Risk or Oral Slope Factors could not be identified to derive a TWA. ACGIH recommended a TLV-TWA of 0.005 ppm based on the reports of cancer in rodents at 0.5 ppm (ACGIH, 2018). A TWA of 0.005 ppm is recommended in line with the ACGIH TLV-TWA. This TWA is recommended to minimise the potential for cancer in exposed workers.

## Recommendation for notations

Classified as a category 1B 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 recommended based on evidence of dermal absorption and systemic carcinogenic effects in animals.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA NA NA | |
| No report. |
| ACGIH 2018 TLV-TWA: 0.005 ppm (0.02 mg/m3) |
| TLV-TWA recommended to reduce the risk of nasal cancers and irritation in workers.  Summary of data:  Human data:   * Limited toxicological data are available in humans * No cancers found in small, exposed population.   Animal data:   * Rats exposed by inhalation 6 h/d, 5 d/wk for 6 wk; 0.5, 1.0, or 2.0 ppm; dose–response relationship for both the development of morphological lesions and for tumour incidences; squamous cell carcinomas occurring in the anterior portion of the nasal cavity and nasopharyngeal areas * Rats exposed at 1 ppm by inhalation 6 h/d, 5 d/wk for 6 wk; cumulative incidence of nasal cancer corrected for mortality was 12% after 480 d and 17% after 600 d after the start of exposures * Nasopharyngeal and upper airway tumours reported in rodents following inhalation, injection or dermal administration; injection site sarcomas also reported * Repeated dermal application produced tumours in mice; local skin papillomas, local squamous cell carcinomas, papillary lung tumours.   Positive in a variety of genetic toxicity studies, including *Salmonella typhimurium, Escherichia coli.* |
| DFG 2004 Not assigned |
| MAK not assigned due to carcinogenicity.  No further data. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN NA NA |
| No report. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| NICNAS |  | 2015 | * Critical effects: systemic long-term effects, carcinogenicity and mutagenicity * Eye irritation was observed in exposed workers * Direct-acting alkylating agent that can react with DNA. Reported as 'wide spectrum genotoxic activity'. |

### Carcinogenicity — non-threshold based genotoxic carcinogens

| Is the chemical mutagenic? | Yes |
| --- | --- |
| Is the chemical carcinogenic with a mutagenic mechanism of action? | Yes |
| **The chemical is a non-threshold based genotoxic carcinogen.** |  |
| Is a cancer slope factor or inhalation unit risk value available? | No |

## Notations

| Source | Notations |
| --- | --- |
| SWA | NA |
| HCIS | Carcinogenicity – category 1B |
| NICNAS | Carc. Cat 2 |
| EU Annex | Carcinogenicity – category 1B |
| ECHA | Carc. 1B |
| ACGIH | Skin |
| DFG | Carcinogenicity – 2, H (skin) |
| SCOEL | NA |
| HCOTN | NA |
| IARC | Carcinogenicity – Group 2A |
| 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 available to recommend a skin notation.  However, repeated dermal application produces tumours in the lungs of mice and as such a skin notation is recommended. |

### IDLH

| Is there a suitable IDLH value available? | No, the chemical is a genotoxic carcinogen |
| --- | --- |

## Additional information

| Molecular weight: | 107.54 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 4.4 mg/m3; 1 mg/m3 = 0.23 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.

European Chemicals Agency (ECHA) (2019) Dimethyl carbomoyl chloride – REACH assessment.

Deutsche Forschungsgemeinschaft (DFG) (2004) Dimethylcarbamidsäurechlorid – MAK value documentation.

International Agency for Research on Cancer (IARC) (1999) Dimethylcarbamoyl chloride. IARC Monographs on the evaluation of the carcinogenic risk to humans.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2015) Carbamic chloride, dimethyl-: Human health tier II assessment – IMAP report.

Tenth Adaptation to Technical Progress Commission Regulation (EU) No 2017/776 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (the CLP Regulation).