# Silicon carbide (non-fibrous dust)

| CAS number: | 409-21-2 |
| --- | --- |
| Synonyms: | Carborundum, Carbonite, Electroln, Moissanite, SIC |
| Chemical formula: | SiC |
| Structural formula: | — |

Workplace exposure standard (amended)

| TWA: | **3 mg/m3 (non-fibrous, as respirable)**  **10 mg/m3 (non-fibrous, as inhalable)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **—** |
| **Sampling and analysis:** The recommended value is quantifiable through available sampling and analysis techniques. | |

## Recommendation and basis for workplace exposure standard

A TWA of 3 mg/m3 (respirable dust) and 10 mg/m3 (inhalable dust) is recommended to protect for chronic respiratory conditions in exposed workers.

## Discussion and conclusions

Silicon carbide (SiC) is used as an artificial abrasive and in the refractory, foundry, ceramic and filler industries.

Based on the limited data, the critical effects of exposure to non-fibrous SiC are compromised lung function and particle overload due to dust retention with evidence of lung burden disease specific to long-term silicon carbide production workers (ACGIH, 2018). Limited and confounding data from both human and animal studies indicates non-fibrous form has negligible acute, chronic and dermal toxicity (ACGIH, 2018).

The TWA 3 mg/m3 for non-fibrous forms (angular particles) is recommended for respirable particles, as recommended by ACGIH (2018) to reduce potential for compromised lung function due to particle overload and to prevent macrophages burden in the lung. The TWA of 10 mg/m3 for inhalable particles is recommended be retained.

## 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: 10 mg/m3 | |
|  |
| ACGIH 2003 TLV-TWA: 10 mg/m3 (inhalable particulate mass)  3 mg/m3 (respirable particulate mass) |
| TLV-TWA for less toxic non-fibrous forms (angular particles) are recommended for inhalable and respirable sizes to reduce potential for compromised lung function and particle overload.  Respirable fraction preferred as best represents the burden on macrophages in lung parenchyma.  Confounding data suggests potential for some studies with non-fibrous materials may have been contaminated with fibrous “whiskers”.  Summary of data:  Human data:   * *Carborundum pneumoconiosis* is recognised disease specific to long-term silicon carbide production workers: * consists of interstitial disease including irregular, nodular lesions * accumulations of macrophage, monocytes and neutrophils containing particles * Pulmonary effect studies on plant workers identified “round opacities” on lung x-rays related to respirable particulates: * pulmonary effects (reduced FVC) observed in workers with exposures below current permissible levels suggests synergistic effects resulting from combined exposures to quartz and organic compounds   There are insufficient data to determine skin or sensitiser notations. |
| DFG 1998 NA |
| MAK value assigned to “fibre free” exposures.  No additional information available. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN NA NA |
| There are insufficient data on the non-fibrous form to classify carcinogenic properties.  Concerns whether commercial non-fibrous SiC material is sufficiently free of fibrous material.  Human data:   * Absence of long term data of non-fibrous silicon carbide carcinogenicity effect.   Animal data:   * No relevant animal studies of non-fibrous SiC particles identified * No data on mutagenicity of silicon carbide in prokaryotes and yeast identified. * No *in vivo* genotoxicity data identified. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| NICNAS |  | N.D. | * Tier I Human Health Assessment – domestic final. |
| ECHA |  | 2020 | * Inhalation Exposures (acute/short term): DNEL of 94 mg/m3 (form not provided) * No further information. |

### 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 | — |
| DFG | — |
| SCOEL | NA |
| HCOTN | Carcinogenicity – category 3 |
| IARC | — |
| 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: | 40.11 |
| --- | --- |
| 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) (2009) Siliziumcarbid (faserfrei) – MAK value documentation.

European Chemicals Agency Regulation (ECHA) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Health Council of the Netherlands (HCOTN) (2012) Silicon carbide. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2012/29.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (N.D.) Silicon Carbide: Human health tier I assessment – IMAP report.