# Selenium hexafluoride (as Se)

| CAS number: | 7783-79-1 |
| --- | --- |
| Synonyms: | — |
| Chemical formula: | SeF6 |

Workplace exposure standard (amended)

| TWA: | **—** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **2 ppm** |
| **Sampling and analysis:** N/A | |

## Recommendation and basis for workplace exposure standard

This chemical has been nominated for removal from the *Workplace exposure standards for airborne contaminants* (WES)due to a lack of evidence that it is used or generated in Australian workplaces or that it presents a potential for legacy exposure. Therefore, a TWA is not recommended.

## Discussion and conclusions

Selenium hexafluoride is used as a gaseous insulator in the electronics industry. There is lack of evidence that this chemical is used or generated in Australian workplaces or that it presents a potential for legacy exposure.

The critical effects of exposure are pulmonary oedema and selenosis, which includes haematological and gastrointestinal tract (GIT) disturbances, central nervous system (CNS) depression and headaches.

Exposure data in the available source material are limited to acute inhalation studies in animals (ACGIH, 2018). From these studies, an exposure concentration and duration product (C∙t) of 400 ppm∙h is deduced, which is approximately half that of ozone with respect to acute lethal toxicity (C∙t=25 ppm∙h of ozone).

Based on the above information, ACGIH (2018) recommended a TLV-TWA of 0.16 mg/m3, which was adopted by SWA and also accounts for the recommended maximum tolerable daily intake of selenium for North American populations (500 µg/day). However, an effective daily oral dose at the TLV-TWA exceeds this guideline by approximately a factor of three. This discrepancy is not discussed in the available source material. An equivalent maximum tolerable daily selenium intake for Australian populations is not reported in the available source material.

This chemical has been nominated for removal from the WES list. A TWA is not 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 TWA: 0.05 ppm (0.16 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 0.05 ppm (0.16 mg/m3) |
| TLV-TWA intended to protect for pulmonary oedema and excess intake of Se (for North Americans). Assuming a respiratory volume 10 m3 during an 8 h shift, a total occupational intake of 1.6 mg may be expected at the TLV-TWA, which is above the recommended maximal daily intake of 500 µg/d; this discrepancy is not discussed in the TLV documentation.  Summary of data:  TLV-TWA based on acute exposure data in animals; indicates the substance is approximately half as acutely toxic as O3, the recommended daily Se intake for North American males (70 µg/d) and females (55 µg/d), typical daily intake of 225 µg/d in drinking water and MTDI of 500 µg/d.  Human data:   * Volatile Se compounds are less toxic than water-soluble compounds and certain halides, e.g. SeF6, are also severe irritants:   + chronic exposure expected to produce systemic effects (selenosis) comparable to other Se compounds (e.g. CNS depression, headache and haematological and GIT disturbances, cited from ACGIH, 2018 *TLV* *Documentation for* *Selenium and Compounds*).   Animal data:   * LC50: 10 ppm (mice, rats, rabbits, guinea pigs, 4 h):   + exposure concentration and time product (C∙t) of 40 ppm∙h is uniformly lethal as deduced from exposures at 1, 5, 10, 25, 50 and 100 ppm in these species   + non-lethal pulmonary oedema at 5 ppm (4 h) or C∙t= 20 ppm∙h   + NOAEC: 1 ppm (4 h)   + pulmonary injury (not specified) reported at 1 and 5 ppm (1 h/d, 5 d)   + acute toxicity~ half that of ozone (C∙t= 25 ppm∙h of ozone) * No mutagenicity or ADME data presented.   Insufficient data to recommend a TLV-STEL or notations for carcinogenicity, skin absorption or sensitisation. |
| DFG NA NA |
| No report. |
| 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 |
| --- | --- | --- | --- |
| US NIOSH |  | 1994 | * IDLH based on acute inhalation toxicity data in animals. |

### 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 | — |
| HCIS | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | — |
| 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 assign a skin notation. |

### IDLH

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

## Additional information

|  |  |
| --- | --- |
| Molecular weight: | 192.95 |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 7.89 mg/m3; 1 mg/m3 = 0.124 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.

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