# o-chlorostyrene

| CAS number: | 2039-87-4 |
| --- | --- |
| Synonyms: | 2-Chlorostyrene, 1-chloro-2-ethenylbenzene |
| Chemical formula: | C8H7Cl |
| Structural formula: |  |

Workplace exposure standard (retained)

| TWA: | **50 ppm (283 mg/m3)** |
| --- | --- |
| STEL: | **75 ppm (425 mg/m3)** |
| 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 50 ppm (283 mg/m3) is recommended to protect for liver and kidney effects in exposed workers.

Supplementing the available data with a structurally similar chemical, a STEL of 75 ppm (425 mg/m3) is recommended to protect for possible neuropathy and narcosis in exposed workers.

## Discussion and conclusions

o-Chlorostyrene is used in organic synthesis and in the preparation of speciality polymers.

No human exposure data are available. A six-month inhalation study in rats, rabbits, guinea pigs and dogs, exposed to an average of 101 ppm reported slightly higher incidences of kidney and liver changes in exposed animals when compared to controls.

The recommended TWA is based on the animal inhalation study, with an assumed uncertainty factor of two applied.

Exposure to the structurally analogous styrene monomer results in neuropathic and narcotic effects in humans following short-term exposure at 100 ppm. As these effects occur rapidly at this concentration and a STEL is considered an appropriate measure to protect exposed workers. While these effects were not reported in the six-month inhalational study that is the basis of the TWA, they were also not specifically examined. Therefore, a STEL of 75 ppm is considered appropriate to protect for the possibility of these effects in 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.

A skin notation is not recommended as toxicity is very low in animals exposed *via* the dermal route.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 50 ppm (283 mg/m3); STEL: 75 ppm (425 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 50 ppm (283 mg/m3);  TLV-STEL: 75 ppm (425 mg/m3) |
| TLV-TWA and TLV-STEL recommended to minimise the potential for narcosis, neuropathy and adverse liver and kidney effects.  Summary of data:   * Used in organic synthesis and preparation of polymers * No human data presented * Odour warnings are not recognised in unacclimated workers until 400-600 ppm * Unpublished study in rats, rabbits, guinea pigs and dogs exposed 7 h/d, 5 d/wk for 130 exposures over 180 d to an average of 101 ppm: * no adverse effects on gross pathological and biochemical examinations * slightly higher incidents of pathological changes in the liver and kidneys upon microscopic examination * TLV-STEL based on the structural analogy to styrene monomer (TLV-TWA 20 ppm, TLV-STEL 40 ppm) for which short-term exposure of humans at 100 ppm results in neuropathic and narcotic effects * Insufficient evidence to recommend skin, sensitiser or carcinogen notations. |
| DFG NA NA |
| No report. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2001 TWA: 50 ppm (283 mg/m3) |
| Administrative limit not health-based.   * LD50: 20,000 mg/kg (rabbits, dermal) * Moderately irritating to the skin and eyes of rabbits; induced hyperaemia, oedema and necrosis in rabbit skin * Not mutagenic when tested in *S. typhimurium* strains with and without rat or hamster liver metabolic activation. |

### 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 | 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 |
| --- |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Conclusion:** |  |  |  |  |  |  |  |
| Adverse effects in human case study: | | | no |  |  |  |  |
| Dermal LD50 ≤1000 mg/kg: | | | no |  |  |  |  |
| Dermal repeat-dose NOAEL ≤200 mg/kg: | | |  |  |  |  |  |
| Dermal LD50/Inhalation LD50 <10: | | |  |  |  |  |  |
| *In vivo* dermal absorption rate >10%: | | |  |  |  |  |  |
| Estimated dermal exposure at WES >10%: | | |  |  |  |  |  |
|  |  |  |  | **a skin notation is not warranted** | | | |

### IDLH

| Is there a suitable IDLH value available? | No |
| --- | --- |

## Additional information

| Molecular weight: | 138.6 |
| --- | --- |
| 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.

Health Council of the Netherlands (HCOTN) (2001) o-Chlorostyrene. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/020.