# o-dichlorobenzene

| CAS number: | 95-50-1 |
| --- | --- |
| Synonyms: | 1,2-Dichlorobenzene, o-Dichlorobenzol, dowtherm E, ortho-dichlorobenzene |
| Chemical formula: | C6H4Cl2 |

Workplace exposure standard (retained)

| TWA: | **25 ppm (150 mg/m3)** |
| --- | --- |
| STEL: | **50 ppm (301 mg/m3)** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **200 ppm** |
| **Sampling and analysis**: The recommended value is quantifiable through available sampling and analysis techniques. | |

## Recommendation and basis for workplace exposure standard

A TWA of 25 ppm (150 mg/m3) is recommended to protect for irritant effects and possible liver damage in exposed workers.

A STEL of 50 ppm (301 mg/m3) is recommended to protect for irritant acute effects in exposed workers.

An evaluation of additional sources, in particular, studies relating to recommending a skin notation, are recommended at the next scheduled review.

## Discussion and conclusions

*o*-Dichlorobenzene (*o*DCB) is used as a solvent, insecticide, fumigant and as a chemical intermediate, particularly in production of dyes.

Evidence in humans indicate *o*DCB is irritating to the eyes and upper respiratory tract, with intermittent exposure to 100 ppm (602 mg/m3) causing these effects in workers. Liver damage is reported in rats acutely exposed at 50 ppm (301 mg/m3; ACGIH, 2018). A NOAEL of 20 mg/kg/day, based on liver and kidney effects is reported in rodents. This oral dose corresponds to an airborne concentration of approximately 23 ppm (140 mg/m3; DFG, 2003).

The current TWA and STEL are considered protective for exposed workers based on the LOAEL of 100 ppm for irritation in humans and 50 ppm (301 mg/m3) for liver damage in acutely exposed rats. This is supported by the calculated NOAEC of 23 ppm reported by DFG (2003).

## 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. However, further review is recommended as there is evidence of dermal absorption in humans and conflicting assessments between agencies.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 2005 TWA: 25 ppm (150 mg/m3); STEL: 50 ppm (301 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 25 ppm (150 mg/m3);  TLV-STEL: 50 ppm (301 mg/m3) |
| TLV-TWA and TLV-STEL recommended to minimise the potential for eye and upper respiratory tract irritation reported and possible liver damage.  Summary of data:  Human data:   * Irritating to the skin in 15–60 min (no further information) * Case report of dermatitis confirmed by skin patch test as sensitisation * Intermittent exposure at 100 ppm caused eye and upper respiratory irritation * Odour detected at ≈50 ppm; no eye or nasal irritation * Workers showed no chemically induced injury following exposure at 1–44 ppm (average 15 ppm) * 100 ppm induced sporadic irritation in respiratory tract and eyes; no other symptoms * Inconclusive evidence in the form of 4 case reports involving cancer and exposure to *o*DCB: peripheral leukoblastosis, chronic lymphoid leukaemia, myeloblastic leukaemias.   Animal data:   * Single report that rats do not tolerate *o*DCB dermally * Pain and slight conjunctival irritation in rabbits when applied to eyes; no residual injury after 5 d * Liver damage in rats acutely exposed at 50–800 ppm (no duration provided) * No histologic response in rats exposed at 322 ppm for 6 h/d for 10 d * No adverse effects in rats or guinea pigs exposed at 49 ppm 7 h/d for 6–7 mo * Increased incidence of tubular regeneration in the male mouse kidney in 2 yr feeding study; no evidence of carcinogenicity * Single IP injections of 50–800 mg/kg to male rats identified dose-related morphologic alterations in sperm consisting of misshapen head, acrosomal defects and tail abnormalities.   No evidence of mutagenicity.  Insufficient evidence to assign a skin or SEN notation.  Considers TLV-TWA and TLV-STEL protective considering 50 ppm is damaging to liver in rats and 100 ppm is irritative in humans. |
| DFG 2003 MAK: 10 ppm (61 mg/m3) |
| Summary of additional data:   * MAK established provisionally based on liver and kidney effects in rats * NOAEL of 20 mg/kg for liver and kidney weights in rodents; 13 wk oral study * Assuming 70 kg worker breathes 10 m3 per 8 hr shift this NOAEL ≡140 mg/m3 (23 ppm) * Another target organ is the haematopoietic system in the mouse and rat * Systemic and lethal effects observed without accompanying skin changes in animal experiments after dermal application. |
| SCOEL 1995 TWA: 20 ppm (122 mg/m3); STEL: 50 ppm (306 mg/m3) |
| Summary of additional data:   * NOAEL of 49 ppm (300 mg/m3); rats, mice or guinea pigs 7 h/d, 5 d/wk for 6 mo * LOAEL minimal systemic effects (decreased spleen weight) in guinea pigs at 93 ppm (569 mg/m3); 7 h/d, 5 d/wk for 6 mo. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN NA NA |
| No report. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| NICNAS |  | 2001 | * NOAEL for developmental effects in rabbits and rats 400 ppm * Occupational health risks may result from acute and/or chronic exposure to *o*DCB via inhalation and dermal exposure. |
| US EPA |  | 1989 | * NOAEL 85.7 mg/kg; 2 yr rat oral study. |

### 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 | Carcinogenicity – A4 |
| DFG | H (skin) |
| SCOEL | Skin |
| HCOTN | NA |
| IARC | Carcinogenicity – Group 3 |
| 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: | 147.01 |
| --- | --- |
| 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) (2003) 1,2-Dichlorobenzene – MAK value documentation.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (1995) Recommendation from the Scientific Committee on Occupational Exposure Limits for 1,2-Dichlorobenzene. SCOEL/SEG/SUM/66.

International Agency for Research on Cancer (IARC) (1999) Volume 73, Some chemicals that cause tumours of the kidney or urinary bladder in rodents and some other substances. IARC Monographs on the evaluation of the carcinogenic risk to humans.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2001) Benzene, 1,2-dichloro-: Priority Existing Chemical Assessment Report No. 14.

US Environmental Protection Authority (US EPA) (1989) Integrated Risk Information System (IRIS) Chemical Assessment Summary – 1,2-Dichlorobenzene.