# 2,2-Dichloropropionic acid

| CAS number: | 75-99-0 |
| --- | --- |
| Synonyms: | Dalapon, dalzpon, α,α-dichloropropionic acid, radapon |
| Chemical formula: | C3H4Cl2O2 |

Workplace exposure standard (retained)

| TWA: | **1 ppm (5.8 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Sk.** |
| 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 1 ppm (5.8 mg/m3) is retained to protect for irritation of the skin and eyes 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

2,2-Dichloropropionic acid is used commercially as an herbicide called Dalapon which is 2,2‑Dichloropropionic acid with either sodium or magnesium salts attached.

Limited information in humans and animals is available. Contact dermatitis is reported in a worker exposed to a sodium 2, 2-dichloropropionate containing herbicide (Dalapon) after four days of initial application (DFG, 2004). In animals, kidney and liver effects are reported only at high concentrations in feeding studies (ACGIH, 2018). A NOEL of 15 mg/kg/day is reported in a two year feeding study in rats. With application of an uncertainty factor of ten and assuming generic exposure factors, this dose corresponds to an inhalation concentration in humans of 10 mg/m3 (ACGIH, 2018) and is considered protective for irritation of the skin and eyes in exposed workers.

Given the limited toxicological data, the current TWA of 1 ppm is retained and is considered to protect exposed workers for the listed adverse effects. However, a review of additional data sources is recommended at the next scheduled review.

## 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 recommended based on case studies of dermal absorption and systemic effects in humans.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 1 ppm (5.8 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 5 mg/m3 |
| TLV-TWA recommended is sufficient to protect for eye and respiratory irritation.  Summary of Data:  Human data:   * Half-life: 1.5–3.0 days * An unpublished study noted that Dalapon was rapidly absorbed into human blood with a maximum concentration occurring with 3–9 h of administration (no information provided about administration).   Animal data:   * LD50: 2.3–10.3 g/kg (oral; rats, mice, guinea pigs, rabbits and chickens) * LD50: >5 g/kg (dermal, rats) * NOEL of 15 mg/kg/d in rats; 2-yr feeding study; increased kidney weights * Dermal necrosis and conjunctivitis reported in dermal and eye instillation studies in rabbits; no permanent damage * Dogs given 100 mg/kg/d of Dalapon sodium in food for 1 yr or rats given 50 mg/kg/d in food for 2 yr had a slight increase in kidney weight.   Not genotoxic or carcinogenic.  TWA used NOEL of 15 mg/kg/d in rats; applying UF of 10, assuming 100% a 70 kg worker inhaling 10m3 per 8 h shift could be exposed to 10 mg/m3 without effects.  Consistent with the 1978 TLV-TWA of 1 ppm (5.8 mg/m3) recommended to minimise irritation of the eyes and respiratory tract. |
| DFG 2004 MAK: 1 ppm (5.93 mg/m3) |
| The current MAK recommended to protect for irritant effects on the respiratory system.  Summary of additional data:  Human Data:   * Contact dermatitis was observed in a worker 4 d after the start of the application of a sodium 2, 2-dichloropropionate containing herbicide * A patch test conducted on 76 male workers showed no evidence of allergic response to sodium 2, 2-dichloropropionate.   Animal Data:   * LD50: 7 g/kg (oral, rats). |
| 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 EPA |  |  | * No additional 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 | — |
| NICNAS | — |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | Carcinogenicity – A4 |
| DFG | — |
| 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 |
| --- |
| |  |  |  |  | | --- | --- | --- | --- | | Adverse effects in human case study: | yes | 4.00 |  | | Dermal LD50 ≤1000 mg/kg: |  |  |  | | 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 warranted** | |

### IDLH

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

## Additional information

| Molecular weight: | 142.97 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 5.93 mg/m3; 1 mg/m3 = 0.17 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) (2004) 2,2-Dichloropropionic acid – MAK value documentation.

US Environmental Protection Authority (US EPA) (1988) Integrated Risk Information System (IRIS) Chemical Assessment Summary – Dalapon, sodium salt.