# 1,1,2,2-Tetrabromoethane

| CAS number: | 79-27-6 |
| --- | --- |
| Synonyms: | Acetylene tetrabromide, muthmann’s liquid, tetrabromoethane, sym-tetrabromoethane, tetrabromoacetylene |
| Chemical formula: | C2H2Br4 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **1 ppm (14 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **8 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 1 ppm is recommended to protect for eye and upper respiratory tract irritation, pulmonary oedema and possible liver damage in exposed workers.

## Discussion and conclusions

1,1,2,2-tetrabromoethane (tetrabromoethane) is used as a solvent, gauge fluid, refractive index liquid in microscopy and in other industrial uses.

Critical effects of exposure are eye and upper respiratory tract irritation, pulmonary oedema and possible liver damage.

Limited data are available. Near fatal liver injury is reported in a chemist accidentally exposed over one day to an estimated 2 ppm. The initial symptoms were headache, anorexia, vomiting and stomach pains. Pulmonary oedema and slight fatty degeneration of the liver is reported in multiple test animals exposed at an average of 14 ppm for 100 to 106 days; with similar but slight effects at 4 ppm for 180 days. In this same study, no observed effects are identified at 1 ppm for 190 days. Exposure to saturated vapor for seven hours produced slight eye and respiratory tract irritation in rats (ACGIH, 2018).

Limited data are available; however, the evidence in animals suggests a NOAEC of 1 ppm. SWA and ACGIH are the only primary sources to recommend occupational exposure limits. DFG consider the data insufficient to drive a MAK. There are no other data available to suggest a change is required in current SWA TWA. A TWA of 1 ppm is recommended to be retained to protect exposed workers from irritation effects.

## 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 based on the available evidence.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 1 ppm (14 mg/m3) | |
| Adopted from ACGIH in 1991. |
| ACGIH 2006 TLV-TWA: 0.1 ppm (1.4 mg/m3) |
| TLV-TWA recommended to minimise the risk of eye and upper respiratory tract irritation, pulmonary oedema and liver damage in exposed workers.  Summary of data:   * Lowered from 1 ppm to 0.1 ppm in 2006.   Basis for TLV-TWA   * Based on data from inhalation study in various animals demonstrating no effects observed at 1 ppm exposures for 190 d.   Human data:   * Eye and skin irritant: * direct contact with skin causes blistering; no further information * A chemist exposed for 1 d to unknown concentration experienced near fatal liver injury; other chemicals (not disclosed) involved in the process led to exposure: * recreation of the process resulted in concentrations averaging 2 ppm * peak exposure for about 10 minutes at ~16 ppm * initial symptoms were headache, anorexia, vomiting and stomach pains * other workers in the area complained of slight irritation of eyes and nose, with headaches and lassitude.   Animal data:   * Eye and nasal irritation in rats reported following exposure to saturated vapour * Rabbits, guinea pigs, rats, mice and a monkey exposed by inhalation for 7 h/d, 5 d/wk for 100 to 106 d: * pulmonary oedema and slight fatty degeneration of liver of various test animals exposed at an average of 14 ppm for 100-106 d * similar but slight effects at 4 ppm for 180 d * NOEC identified at 1 ppm for 190 d (no further information on species and other doses) * study authors suggested to limit exposure to a TWA of 1 ppm (no further information) * LD50: 5,250 mg/kg (rats, dermal) * Application of 15 mg to the skin of mice produced a statistically significant increased incidence of forestomach papillomas: * biological significance is unclear.   Insufficient data to assign a skin, sensitiser or carcinogenicity notation or to recommend a STEL. |
| DFG 2001 Not assigned |
| No MAK assigned; consider the accidental exposure the chemist and the study in animals cited by ACGIH (2018) (1 ppm NOEC) insufficient to derive MAK. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN NA NA |
| No report. |

### 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 | — |
| HCIS | — |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | — |
| ACGIH | — |
| 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 |
| --- |
| |  |  |  |  | | --- | --- | --- | --- | | **Conclusion:** |  |  |  | | Adverse effects in human case study: |  |  |  | | 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? | Yes |
| --- | --- |

## Additional information

| Molecular weight: | 345.68 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 14 mg/m3; 1 mg/m3 = 0.071 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) (2001) 1,1,2,2-Tetrabromoethan – MAK value documentation.

European Chemicals Agency (ECHA) (2019) 1,1,2,2-Tetrabromoethane – REACH assessment.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – Acetylene tetrabromide.