# (2-Methoxymethylethoxy) propanol

| CAS number: | 34590-94-8 |
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| Synonyms: | Dipropylene glycol (mono) methyl ether, dipropylene glycol methyl ether, DPGME, 1-(2-methoxy-2-methoxy)-2-propanol, bis(2-methoxypropyl) ether |
| Chemical formula: | C7H16O3 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **50 ppm (308 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Sk.** |
| IDLH: | **600 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 50 ppm (308 mg/m3)is recommended to protect for eye, nose and throat irritation in exposed workers.

## Discussion and conclusions

(2-Methoxymethylethoxy) propanol is used as hydraulic fluid and as a high boiling solvent.

The critical effects of exposure are eye, nose and throat irritation.

In humans, exposure at 35 ppm causing slight nasal irritation was reported in one study; however, insufficient detail was provided (DFG, 2000). A NOAEC of 100 ppm for eye, nose and throat irritation was reported in a controlled human exposure experiments, with CNS impairment occurring at 1,000 ppm (ACGIH, 2018). No effect levels between 200 and 1,000 ppm for irritant effects reported in sub-chronic inhalation studies on animals (ACGIH, 2018 and DFG, 2000). In a six-month inhalation study on unspecified animals, minor systematic effects were reported starting at around 300 ppm, including narcosis and liver effects (ACGIH, 2018).

Derivation of the TWA is described by DFG (2000) and SCOEL (1993), both published the same TWA value of 50 ppm. ACGIH (2018) derived a TLV-TWA of 100 ppm based on the NOAEC of 100 ppm reported in human studies and added a STEL of 150 ppm. The NOAEC of 100 ppm derived from experiments in humans is supported by sub-chronic NOAEC in animals.

The current SWA TWA of 50 ppm (308 mg/m3), consistent with DFG (2000) and SCOEL (1993)is recommended to be retained. The recommended TWA is considered protective of the critical effects noted. The TWA is considered sufficiently protective of acute effects and as such a STEL 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.

A skin notation is recommended based on evidence suggesting potential dermal absorption and adverse systemic effects in animals including weight loss and narcosis.

# Appendix

### Primary sources with reports

| **Source Year set Standard** |
| --- |
| SWA 1991 TWA: 50 ppm (308 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 100 ppm (606 mg/m3); TLV-STEL: 150 ppm (909 mg/m3) |
| TLV-TWA recommended to minimise the risk of eye, nose and throat irritation in exposed workers and TLV-STEL against central nervous system (CNS) impairment at higher concentrations (no further information provided).  Summary of data:  Human data:   * No irritant or sensitisation effects reported after dermal exposure in 250 subjects (assumed to be acute, duration not noted) * Exposure at 300 and 400 ppm described as disagreeable; 100 ppm considered safe (assumed to be acute, duration not noted) * A NOAEL of 100 ppm for eye, nose and throat irritation and CNS impairment at 1,000 ppm (duration not noted) reported in controlled human exposure experiments at 50–2,000 ppm.   Animal data:   * LD50: 5,350 mg/kg (rats, oral) * LD50: 9,500 mg/kg (rabbits, dermal) * Dermal application to rabbits caused weight loss and narcosis at 10–20 mL/kg * Exposure at 300–400 ppm (animals, 7 h/d, 6 mo, inhalation) produced symptoms including narcosis, liver and lung changes (symptoms were reported as mild) * Exposure at 200 ppm (rabbits, rats, 13 wk) produced no adverse effects.   A skin notation is recommended due to weight loss and narcosis after dermal application in rabbits. |
| DFG 1986 MAK: 50 ppm (310 mg/m3) |
| The MAK value is established because of the slight irritation the substance causes and its unpleasant odour at higher concentrations.  MAK was determined based on slight nasal irritation effects that occurred in volunteers >35 ppm, as well as slight irritation effects on the eyes or on the respiratory tract >75 ppm.  Summary of additional data:   * Human exposure at 35 ppm caused slight nasal irritation and 75 ppm eye and airway irritation (assumed to be acute, duration not noted) * Exposure at 500 ppm (rats, 7 h, inhalation) caused a slight narcotic effect * Contradictory results exist on dermal toxicity in animals with LD50 reported as 13,000 g/kg and higher * Exposure at 1,000 mg/kg/d (rats, 35 d, oral) produced no adverse effects * NOAEL 3 mL/kg/d (rabbits, 5 d/wk,13 wk, dermal) * Exposure at 300 ppm (rats, rabbits, guinea pigs, monkeys, 7 h/d, 5 d/wk, 6–8 mo, inhalation) produced mild narcosis and slight liver damage * Exposure at 50, 140, 330 ppm (rats and mice, 6 h/d, 9 exposures, inhalation) produced liver effects in all group and thymus weight increases at the highest concentrations, the authors expressed doubts whether these changes were due to toxic effect * Exposure at 15, 50, 200 ppm (rats, rabbits, 6 h/d, 5 d/wk, 90 d, inhalation) produce no clinical or pathological changes * Negative results in mutagenicity assays.   Due to the minor effects caused by dermal absorption at high concentrations the designation "H" is not required. |
| SCOEL 1993 TWA: 50 ppm (308 mg/m3) |
| The NOAEL of 200 ppm (90-d study cited in DFG assessment) for systemic effects was considered the best available basis for proposing OEL. An uncertainty factor of 5 was applied to account for the absence of human data and rounded according to SCOEL methodology to obtain a TWA of 50 ppm.  Skin notation recommended as dermal absorption could contribute significantly to the total body burden. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN NA NA |
| No report. |

### Secondary source reports relied upon

| **Source** |  | **Year** | **Additional information** |
| --- | --- | --- | --- |
| ECHA |  | 2011 | * Exposure at 0, 300, 1,000 and 3,000 ppm (rats, 6 h/d, 5 d/wk, 2 yr, inhalation): * NOAEL: 300 ppm based on altered hepatocellular foci * no carcinogenic effect as evidenced by any increase in tumour incidence at any concentration. * Exposure at 0, 300, 1,000 and 3,000 ppm (rats, 6 h/d, 5 d/wk, 2 generations, inhalation): * NOAEL: 300 ppm for paternal toxicity * NOAEL: 1,000 ppm for offspring toxicity. |
| OECD |  | 2001 | * 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 | Skin |
| HCIS | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | Skin |
| DFG | — |
| SCOEL | Skin |
| 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: | no |  |  | | Dermal LD50 ≤1000 mg/kg: | no |  |  | | Dermal repeat-dose NOAEL ≤200 mg/kg: |  | -3.00 |  | | Dermal LD50/Inhalation LD50 <10: | yes |  |  | | *In vivo* dermal absorption rate >10%: |  |  |  | | Estimated dermal exposure at WES >10%: |  |  |  | |  |  | -3 | **a skin notation is not warranted** | |

### IDLH

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

## Additional information

| Molecular weight: | 148.2 |
| --- | --- |
| 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) (2000) Dipropylenglykolmonomethylether – MAK value documentation.

European Chemicals Agency Regulation (ECHA) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (1993) Recommendation from the Scientific Committee on Occupational Exposure Limits for Dipropyleneglycol monomethylether. SCOEL/SUM/45 final.

Organisation for Economic Cooperation and Development (OECD) (2001) SIDS initial assessment profile – Dipropylene Glycol Methyl Ether.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – Dipropylene glycol methyl ether.