# Methyl isobutyl carbinol

| CAS number: | 108-11-2 |
| --- | --- |
| Synonyms: | Methyl amyl alcohol, 4-methyl-2-pentanol, MIBC |
| Chemical formula: | C6H14O |

Workplace exposure standard (retained)

| TWA: | **25 ppm (104 mg/m3)** |
| --- | --- |
| STEL: | **40 ppm (167 mg/m3)** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **400 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 (104 mg/m3) is recommended to protect for irritation of the eyes and respiratory tract in exposed workers.

A STEL of 40 ppm (167 mg/m3) is recommended to protect for acute irritant effects and anaesthesia in exposed workers.

## Discussion and conclusions

Methyl isobutyl carbinol is used as a solvent for gums, resins, dyestuffs. and oils. It also is used in flotation processes and brake fluids.

Critical effects of exposure are irritation of eyes and upper respiratory tract and anaesthesia from elevated short-term peaks. Exposure of volunteers at 50 ppm for fifteen minutes resulted in eye irritation; with nasal and throat irritation at higher concentrations. A concentration of 25 ppm is estimated as the highest concentration acceptable for an eight hour exposure by ACGIH (2018). A NAOEC of 200 ppm for systemic effects is reported in a six week inhalation study in rats (DFG, 2012). Exposure of mice at 4,600 ppm for one hour resulted in strong drowsiness (ACGIH, 2018).

The TWA of 25 ppm is recommended be retained as it is based on the evidence presented and is considered protective for irritation effects reported in humans. The STEL of 40 ppm is also recommended be retained and is protective of anaesthesia resulting from elevated, short-term peaks.

## 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 data in animals.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 25 ppm (104 mg/m3); STEL: 40 ppm (167 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 25 ppm (104 mg/m3); TLV-STEL: 40 ppm (167 mg/m3) |
| TLV-TWA recommended to minimise the potential for irritation eyes and upper respiratory tract in exposed workers.  TLV–STEL is recommended for risk against anaesthesia observed in animal studies.  Summary of data:  Human data:   * 50 ppm for 15 min resulted in eye irritation * nasal and throat irritation was reported at higher concentrations * 25 ppm estimated as the highest acceptable 8 h concentration.   Animal data:   * 4,600 ppm (rats, 2 h, inhalation) resulted in no deaths * 5/6 rats died after 8 h at 2,000 ppm * 4,600 ppm (mice, inhalation) for up to 15 h: * 1 min resulted in irritation * 1 h, somnolence * 4–8 h anaesthesia * 15 h death * LD50: 3.56 ml/kg (rabbits, dermal); systemic toxicity observed * LD50: 2,600 mg/kg (rats, oral).   No derivation or explanation of TLV-TWA or TLV-STEL provided.  Insufficient data to recommend a sensitiser or carcinogen notation. |
| DFG 2012 MAK: 20 ppm (85 mg/m3) |
| MAK recommended to protect for irritation of the mucous membranes and systemic effects in workers.  Summary of additional data:   * Previous MAK of 25 ppm based on human irritation at 50 ppm for 15 min and a tolerable 25 ppm (cited by ACGIH, 2018) * RD50: 420 ppm (mice, inhalation) * LD50: 2,870 (rabbits, dermal) * NOEC of 200 ppm for systemic effects in rats; 6 h/d, 5 d/wk, 6 wk; basis of MAK; derivation not explained * Based on model calculations, absorption by skin not considered to significantly contribute to body burden to promote toxicity. |
| 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 |
| --- | --- | --- | --- |
| NICNAS |  | 2013 | * Severe irritation following instillation of the undiluted chemical in eyes of rabbits * NOAEC: 886 ppm (highest dose tested) in Wistar rats (6 h/d, 5 d/wk for 6 wk). |

### 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 | 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 |
| --- |
| |  |  |  |  | | --- | --- | --- | --- | | 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? | Yes |
| --- | --- |

## Additional information

| Molecular weight: | 102.18 |
| --- | --- |
| 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) (2018) 4-methyl pentane-2-ol – MAK value documentation.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2013) 2-Pentanol, 4-methyl-: Human health tier II assessment – IMAP report.

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