# Methyl isopropyl ketone

| CAS number: | 563-80-4 |
| --- | --- |
| Synonyms: | 3-Methyl-2-butanone, MIPK |
| Chemical formula: | C5H10O |

Workplace exposure standard (amended)

| TWA: | **20 ppm (70 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| 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 20 ppm (70 mg/m3) is recommended to protect for the risk of developmental toxicity in exposed workers.

## Discussion and conclusions

Methyl isopropyl ketone (MIPK) is a by-product of hot gas welding on PVC.

The critical effect of exposure is developmental toxicity (ACGIH 2018). The available toxicological dataset is limited to acute and sub-chronic animal exposure studies. A NOAEC of 284 ppm is reported for developmental toxicity in a sub-chronic inhalation study in rats (ACGIH 2018).

The TLV-TWA of 20 ppm (70 mg/m3) derived by ACGIH (2011) is recommended to be adopted. The method by which this TWA was derived was not reported. Seemingly, an uncertainty factor was applied to the NOAEC to account for the short duration of the study and interspecies variation. This TWA is considered sufficiently low to protect for the identified critical 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: 200 ppm (705 mg/m3) | |
|  |
| ACGIH 2011 TLV-TWA: 20 ppm (70 mg/m3) |
| TLV-TWA recommended to minimise the risk of developmental toxicity in exposed workers.  Summary of data:  Human data:   * Atopic and non-atopic subjects experienced bronchoconstriction at >200 ppm and >400 ppm respectively of methyl n-propyl ketone (an isomer of MIPK) * an estimated 25–30% of the general population is atopic.   Animal data:   * Exposure at 5,700 ppm (rats, 4 h, inhalation) was fatal * based on this LC50 was estimated between 4,000 and 8,000 ppm * LD50: 3,200 mg/kg (rats, mice, oral) symptoms included weakness, prostration and ataxia * LD50: >5,000 mg/kg (rabbits, dermal) * Evidence of point mutation or mitotic recombination observed in assay with diploid yeast strain D61 * Rats exposed at 0, 284, 710 and 1,420 ppm (0, 1,000, 2,500, and 5,000 mg/m3) (6 h/d, 7 d/wk); females exposed GD 0–19, males 51 d; * NOAEL: 284 ppm for developmental toxicity * >710 ppm: reduced body weight, food consumption, activity, porphyrin discharge, reduced number of pups per litter * 1,420 ppm: increase fatalities per litter.   Derivation of TLV-TWA not reported. |
| DFG NA NA |
| No report. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2000 TWA: 200 ppm (705 mg/m3) |
| The toxicological database too poor to justify recommendation of a health-based OEL. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| ECHA |  | 2011 | * LC50: 6,377 ppm * Negative results in skin sensitisation study * Exposure at 0, 300, 750, 1,500 ppm (rats, 6 h/d, 5 d/wk, inhalation) for 6–12 wk. * no test substance-related clinical observations, macroscopic findings or effects on food consumption, functional observational battery assessments, motor activity, clinical pathology or ophthalmic examinations * Negative result in mutagenicity assays. |

### Carcinogenicity — non-threshold based genotoxic carcinogens

| Is the chemical mutagenic? | Insufficient data |
| --- | --- |
| Is the chemical carcinogenic with a mutagenic mechanism of action? | Insufficient data |
| **Insufficient data are available to determine if the chemical is a non-threshold based genotoxic carcinogen.** | |

## Notations

| Source | Notations |
| --- | --- |
| SWA | NA |
| 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? | No |
| --- | --- |

## Additional information

| Molecular weight: | 86.14 |
| --- | --- |
| 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.

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).

Health Council of the Netherlands (HCOTN) (2000) Methyl isopropyl ketone. Health-based reassessment of administrative occupational exposure limits. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/009.