# Methyl isoamyl ketone

| CAS number: | 110-12-3 |
| --- | --- |
| Synonyms: | 5-Methylhexane-2-one, 5-methyl-2-hexanone,  2-methyl-5-hexanone, MIAK, Isoamyl methyl ketone |
| Chemical formula: | C7H14O |
| Structural formula: | — |

Workplace exposure standard (amended)

| TWA: | **20 ppm (93 mg/m3)** |
| --- | --- |
| STEL: | **40 ppm (186 mg/m3)** |
| 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 (93 mg/m3) is recommended to protect for eye and nose irritation, lethargy and decreased response to noise in exposed workers.

A STEL of 40 ppm (186 mg/m3) is recommended to protect for acute eye and nose irritation, lethargy and decreased response to noise in exposed workers.

## Discussion and conclusions

Methyl isoamyl ketone (MIAK) is used as a solvent for cellulose esters, acrylics and vinyl copolymers.

The critical effects of exposure are eye and nose irritation, lethargy and decreased response to noise (ACGIH, 2018).

MIAK is structurally similar to methyl isobutyl ketone (MIBK) with comparable toxicities. MIAK is considered more irritating than MIBK. The recommended TLV‑TWA and TLV-STEL for MIBK are 20 ppm and 75 ppm, respectively (ACGIH, 2018).

No human data are available for MIAK. Short-term studies of MIBK exposure in humans report central nervous system (CNS) impairment following exposure at 49 ppm (200 mg/m3) for ninety minutes to two hours and irritation of mucous membrane is reported at 200 ppm. A NOAEC of 200 ppm for upper respiratory tract and eye irritation, lethargy, decreased response to noise is reported in a sub-chronic inhalation study in rats (ACGIH, 2018).

A TWA of 20 ppm (93 mg/m3) is recommended as derived by ACGIH (2018) and SCOEL (1991). A STEL of 40 ppm (186 mg/m3) is also recommended based on the reported CNS impairment and irritation in humans following short-term exposure to MIBK.

## 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.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 50 ppm (234 mg/m3) | |
|  |
| ACGIH 2013 TLV-TWA: 20 ppm (93 mg/m3); TLV-STEL: 50 ppm (233 mg/m3) |
| TLV-TWA recommended to protect for nasal and eye irritation, lethargy and decreased response to noise.  Summary of data:  Methyl isoamyl ketone (MIAK) structurally like methyl isobutyl ketone (MIBK), TLV–TWA 20 ppm, TLV-STEL 75 ppm; toxicities comparable.  Human data:   * No human data available * CNS impairment following exposure for 90–120 min at 49 ppm (200 mg/m3) MIBK * Irritation of the mucous membranes following short-term exposure at 200 ppm MIBK: * 100 ppm highest concentration tolerated for 8 h.   Animal data:   * LD50: 10 mL/kg (rabbit, dermal); marked erythema and necrosis of the skin, lung haemorrhage, pale or grey-coloured kidneys with surface markings and mottled livers, grey in colour * LOAEC: 270 ppm in mice; 4 h exposure; decrease in immobility time as an indicator of behavioural toxicity * NOAEC: 200 ppm in rats; 6 h/d, 5 d/wk, 96 d; upper respiratory and ocular irritation, lethargy, decreased response to noise * NOAEC: 500 ppm MIBK in rats; 3 generation study; F0 and F1 parental animals exhibited absent or diminished response to a novel sound stimulus.   TLV-TWA of 20 ppm based on NOAEC of 200 ppm in rats with an interspecies UF of 10 applied and supported by MIBK TLV-TWA.  TLV-STEL of 50 ppm based on MIBK TLV-STEL of 75 ppm; MIAK is considered more irritating.  Insufficient data to recommend a skin, sensitiser or carcinogenicity notation. |
| DFG NA NA |
| No report. |
| SCOEL 1991 TWA: 20 ppm (95 mg/m3) |
| The TWA is recommended based on irritation effects in animals.  Summary of additional data:   * LD50: 10 g/kg (rabbits, dermal) * Refers to Dutch Expert Committee risk assessment; recommended OEL of 12–120 ppm to protect for irritation; based on reported RD50 of 1,222 ppm * TLV derived from NOAEC of 200 ppm; same as ACGIH (2018). |
| 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 | 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: | 114.20 |
| --- | --- |
| 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.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2011) Recommendation from the Scientific Committee on Occupational Exposure Limits for 5-Methylhexan-2-one. SEG/SUM/10.