# Diisobutyl ketone

| CAS number: | 108-83-8 |
| --- | --- |
| Synonyms: | 2,6-Dimethyl-4-heptanone |
| Chemical formula: | C9H18O |

 Workplace exposure standard (retained)

| TWA: | **25 ppm (145 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
|  Notations: | **—** |
| IDLH: | **500 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 (145 mg/m3) is recommended to protect for eye, nose and throat irritation in exposed workers.

## Discussion and conclusions

Diisobutyl ketone is used as a diluent for epoxy resins, as a textile-treating agent and as a chlorinated organic compound stabiliser.

The critical effects of exposure include eye, nose and throat irritation. In a human acute exposure study, slight eye, nose and throat irritation was observed in subjects exposed at 50 ppm (ACGIH, 2018). Sub-chronic animal inhalation exposure at 250 ppm was marginally toxic as evidenced by increased liver and kidney weight with a NOAEC of 125 ppm reported (ACGIH, 2018). Some reproductive effects are reported in animals studies with NOAELs starting at 300 mg/kg/day (ECHA, 2011; OECD, 1998).

The current TWA of 25 ppm (145 mg/m3) adopted from ACGIH (2018) is recommended and considered sufficiently low to minimise the potential for eye, skin and respiratory tract irritation in acute exposures and sub-chronic effects including those reported in reproductive organs.

## 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 warranted based on the available evidence.

# Appendix

### Primary sources with reports

| Source Year set Standard  |
| --- |
| SWA 1991 TWA: 25 ppm (145 mg/m3) |
|  |
| ACGIH 2001 TLV-TWA: 25 ppm (145 mg/m3) |
| TLV-TWA recommended to minimise the risk of eye, noise, and throat irritation in exposed workers.Summary of data:Human data:* LOAEC: 50 ppm (1 x 3 h, inhalation); slight irritation to the eyes, nose and throat of 3 volunteers
* 12 subjects exposed >25 ppm had some eye irritation and complained of unpleasant odour.

Animal data:* Exposure at ≈3,200 ppm (rats and guinea pigs, 7–16 h, inhalation) reported no fatalities
* Exposure at 2,000 ppm (rats, 8 h, inhalation) killed 5/6 subjects, narcosis reported
* LD50: >20 mL/kg (rabbits, dermal)
* LD50: 5,800 mg/kg (rat, oral)
* NOAEL: 125 ppm (rats and guinea pigs, 7 h, 30 exposures), 250–1,650 ppm produced increased kidney and liver weights.

Insufficient data to recommend a skin, sensitiser or carcinogenicity notation. |
| DFG 2002 Not assigned |
| Due to limited human studies and insufficient information available for the effects of long-term exposure the previous MAK withdrawn.Summary of additional data:* Previous MAK of 0.1 ppm established in 1958 in analogy to the TLV value at the time
* LD50: 16,000 mg/kg (rabbits, dermal), no evidence of systematic toxicity
* Negative results in mutagenicity assays.
 |
| 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 |
| --- | --- | --- | --- |
| ECHA |  | 2011 | * LC50: 14,500 ppm (rats, 4 h)
* No skin sensitisation reported in guinea pigs
* NOAEC: 1,000 ppm (rats, 2-gen, inhalation) for parental systemic toxicity and neonatal toxicity.
 |
| OECD |  | 1998 | * NOAEC: 534 ppm (rats, 7 h/d, 5 d/wk, 6 wk, inhalation)
* NOAEL: 300 and 1000 mg/kg/d (rats, oral) for parental and reproductive effects.
 |

### 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 | — |
| 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  |
| --- |
|

|  |  |  |  |
| --- | --- | --- | --- |
| Adverse effects in human case study: | no |   |   |
| Dermal LD50 ≤1000 mg/kg: | no |   |   |
| Dermal repeat-dose NOAEL ≤200 mg/kg: | no | -3.00 |   |
| Dermal LD50/Inhalation LD50 <10: |   |   |   |
| *In vivo* dermal absorption rate >10%: |   |   |   |
| Estimated dermal exposure at WES >10%: |   |   |   |
|   |   | -3 | **a skin notation is not warranted** |

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### IDLH

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

## Additional information

| Molecular weight: | 142.24 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa:  | 1 ppm = 5.81 mg/m3; 1 mg/m3 = 0.172 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) (2002) Diisobutyl ketone – MAK value documentation.

European Chemicals Agency (ECHA) (2011) 2,6-dimethylheptan-4-one – REACH assessment.

Organisation for Economic Cooperation and Development (OECD) (1998) SIDS initial assessment profile – DI-ISO-BUTYLKETONE.

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