# Heptane (n-Heptane)

| CAS number: | 142-82-5 |
| --- | --- |
| Synonyms: | Dipropylmethane |
| Chemical formula: | C7H16 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **400 ppm (1,640 mg/m3)** |
| --- | --- |
| STEL: | **500 ppm (2,050 mg/m3)** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **750 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 400 ppm (1,640 mg/m3) is recommended to protect for narcosis and irritation of the respiratory tract in exposed workers.

The STEL of 500 ppm (2,050 mg/m3) is recommended to protect for acute narcosis and irritation of the respiratory tract in exposed workers.

## Discussion and conclusions

Heptane and isomers are used in organic synthesis and are ingredients of petrol and rubber solvent naphtha and other petroleum products that used as solvents and fuels.

Critical effects of exposure include narcosis and respiratory irritation. Limited data are available regarding its toxicology. In humans, exposure at 1,000 ppm for six minutes is associated with a slight dizziness and higher concentrations for shorter duration causes marked vertigo, incoordination and hysterics (ACGIH, 2018). A NOAEL of 3,000 ppm was identified for electrophysiological changes in a sixteen week study of rats (SCOEL, 1995). Based on this study, SCOEL (1995) assign a TWA of 500 ppm. Heptane’s irritation effects are considered greater than those of pentane or n-hexane and less than those of octane (ACGIH, 2018). Accordingly, ACGIH (2018) assign a TLV-TWA of 400 ppm and a TLV-STEL of 500 ppm based on narcotic and irritation effects.

The current TWA of 400 ppm and STEL of 500 ppm are recommended to be retained and are considered protective for adverse effects based on the available evidence.

## 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.

There are insufficient data to recommend a skin notation.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 400 ppm (1,640 mg/m3); STEL: 500 ppm (2,050 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 400 ppm (1640 mg/m3); TLV-STEL: 500 ppm (2,050 mg/m3) (All isomers) |
| TLV-TWA and TLV-STEL are recommended to minimise the potential for narcosis and respiratory irritation. TLV-TWA is based on narcotic and irritation effects; which are greater than those of pentane or *n*-hexane and less than those of octane (TLV-TWA 300 ppm).  Summary of data:  Human data:   * Limited data are available * 6 min at 1,000 ppm is associated with a slight dizziness; >1,000 ppm for shorter duration causes marked vertigo, incoordination and hilarity * Much more acutely toxic than *n*-hexane regarding narcosis and respiratory irritation; no reports of delayed neurotoxicity.   Animal data:   * 10,000–15,000 ppm produce narcosis in mice with 30–50 min * 3 min exposure at 48,000 ppm caused respiratory arrest in 3/4 head-exposed mice.   Insufficient data to recommend skin, sensitiser or carcinogenicity notations. |
| DFG 1958 MAK: 500 ppm (2,100 mg/m3) |
| No additional information. |
| SCOEL 1995 8-hour TWA: 500 ppm (2,085 mg/m3) |
| Summary of additional data:   * Narcotic in rats and mice >8,000 ppm * NOAEL of 3,000 ppm in rats; electrophysiological changes; 16 wk study * Uncertainty factor of 5 for lack of human data and of long term animal data applied to NOAEL to derive TWA * No STEL or "skin" notation considered necessary. |
| 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 | — |
| HCIS | — |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | — |
| ACGIH | — |
| DFG | — |
| SCOEL | — |
| 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 |
| --- |
| Insufficient data to assign a skin notation. |

### IDLH

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

## Additional information

| Molecular weight: | 100.21 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 4.09 mg/m3; 1 mg/m3 = 0.245 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) n-heptan – MAK value documentation.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (1995) Recommendation from the Scientific Committee on Occupational Exposure Limits for heptane. SCOEL/SUM/54.

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