# p-tert-butyltoluene

| CAS number: | 98-51-1 |
| --- | --- |
| Synonyms: | 4-t-butyltoluene, 1-methyl-4-tret-butylbenzene,  p-methyl-tert-butylbenzene, p-TBT, TBT |
| Chemical formula: | C11H16 |
| Structural formula: |  |

Workplace exposure standard (interim)

| TWA: | **1 ppm (6.1 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **—** |
| Sampling and analysis: | The recommended value is readily quantifiable through currently available sampling and analysis techniques. |

## Recommendation and basis for workplace exposure standard

An interim TWA of 1 ppm (6.1 mg/m3) is recommended to protect for eye and respiratory tract irritation and cardiovascular and haematologic disturbances in exposed workers. The TWA is considered sufficiently protective of acute exposures and it is recommended that the current STEL be withdrawn.

Given the limited data available from the primary sources, it is recommended that a review of additional sources be conducted at the next scheduled review.

## Discussion and conclusions

p-tert-Butyltoluene is used as an intermediate in the production of tert-butyl benzoic acid which is ultimately used in the manufacturing of unsaturated polyesters and other products.

Based on the available data, the critical effects of acute exposure are depression of the central nervous system, nausea, headache and weakness, with critical effects of chronic exposure reported to be cardiovascular and haematologic disturbances. Data from acute human and animal studies indicate that p-tert-butyltoluene is an ocular and respiratory tract irritant (ACGIH, 2018).

Controlled inhalation studies in humans reported a LOAEL of 10 ppm for eye and respiratory tract irritation following a three-minute exposure (ACGIH, 2018). A TWA of 1 ppm is considered protective of irritant effects and cardiovascular and hematologic disturbances. The TWA is considered sufficiently low to protect for acute effects and a STEL is not recommended.

## 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: 10 ppm (61 mg/m3), STEL: 20 ppm (121 mg/m3) | |
|  | |
| ACGIH 2001 TLV-TWA: 1 ppm (6.1 mg/m3) |
| TLV-TWA recommended to minimise olfactory irritation, agnosia, eye and nasal mucosal irritation effects observed in humans at 10 ppm. The TLV-TWA also reduces chance of depression of the central nervous symptoms, nausea, headache and weakness.  Summary of data:  Human data:   * Effects of acute toxicity reported as olfactory irritation, agnosia, eye irritation, nasal mucosal irritation, depression of the CNS, nausea, headache and weakness * Lowest acute adverse reactions (ocular and respiratory tract irritation) at 10 ppm for 3 min in healthy adults * Exposure >20 ppm resulted in nausea and adverse taste * Eye irritation reported by 1/9 volunteers following inhalation of 5 ppm for 2 min * Myelotoxicity and abnormal cardiovascular syndrome reported in exposed workers (no further information). * A study of workers (n=33) exposed over 3 yr concluded that exposure at low concentrations resulted in low grade intoxication and affected the cardiovascular, haemopoietic and central nervous systems.   Animal data:   * LC50: 934 ppm (1 h), 734 ppm (1 h), 248 ppm (4 h), 165 ppm (8 h) (female rats) * LD50:19.6 mL/kg (rabbits, dermal) * LD50: 500 mg/24 h (rabbits, dermal) * LD50: 900 mg/kg (male mice, oral) * Symptoms of short-term inhalation exposure in rats included fatty liver degeneration and signification reduction of leukocyte counts with prolonged exposure. * Significant reduction in leukocyte cells reported after 2, 4 and 7 h inhalational exposures to 50 ppm (rats) * The primary target of the intoxication following oral exposure in rats reported to be the white matter * Clonic convulsions and tremors in 30% of adult rats following inhalation of 850 ppm for 1 h * 10 repeated exposures at 850 ppm resulted in 80% mortality. |
| DFG NA NA |
| No report. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2002 TWA: 1ppm |
| Additional summary of data:  Human data:   * Moderate eye irritant at 80 ppm * Nasal irritant at 10 ppm * Throat irritant >60 ppm * Giddiness and increased breathing 160 ppm.   Animal data:   * Exposure of 60 ppm for 8 h reported to cause eye and respiratory tract irritation (rats) * Exposure of 200 ppm in mice resulted in brain lesions characterised by oedema of meninges and white matter (no further information) * No chromosomal damage detected in mammalian cell systems * Negative for testing of mutagenicity and genotoxicity.   Concludes that the limited information suggests present OEL may be too high. |

### Secondary source reports relied upon

NIL.

### Carcinogenicity — non-threshold based genotoxic carcinogens

| Is the chemical mutagenic? | Insufficient data |
| --- | --- |
| Is the chemical carcinogenic with a mutagenic mechanism of action? | 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 |
| --- |
| Insufficient data to assign a skin notation. |

### IDLH

| Is there a suitable IDLH value available? | No |
| --- | --- |

## Additional information

| Molecular weight: | 148.18 |
| --- | --- |
| 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.

Health Council of the Netherlands (HCOTN) (2002) p-tert-Butyltoluene. Health-based reassessment of administrative occupational exposure limits. The Hague: Health Council of the Netherlands; publication no. 2000.