# Dibutyl phenyl phosphate

| CAS number: | 2528-36-1 |
| --- | --- |
| Synonyms: | DBPP, phosphoric acid, dibutyl phenyl ester |
| Chemical formula: | C14H23PO4 |

Workplace exposure standard (retained)

| TWA: | **TWA: 0.3 ppm (3.5 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Sk.** |
| 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 0.3 ppm (3.5 mg/m3) is recommended to protect for eye, respiratory tract and skin irritation as well as cholinergic effects in exposed workers.

## Discussion and conclusions

Dibutyl phenyl phosphate is used in the production of aviation hydraulic fluids.

In an acute animal exposure study conducted by a manufacturer involving dermal application a reduction of plasma cholinesterase (ChE) activity and reduction in brain and erythrocyte ChE activity was observed with a systemic NOEL of 10 mg/kg/day (ACGIH, 2018). In a sub chronic animal exposure study, a NOAEL of 5 mg/kg/day was observed, based on this the ACGIH (2018) calculated a human NOAEL of 35 mg/m3 assuming generic conversion factors.

The current TWA of 0.3 ppm (3.5 mg/m3) is recommended. Its derivation is based on the calculated NOAEL in humans and using an uncertainty factor of 10 for lack of human data. The TWA is considered sufficiently low to minimise the potential for eye, respiratory tract and skin irritation as well as cholinergic effects in exposed workers.

## 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 recommended based on evidence suggesting potential dermal absorption and adverse systemic effects in animals and effects on humans.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 0.3 ppm (3.5 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 0.3 ppm (3.5 mg/m3) |
| TLV-TWA recommended to minimise the risk of eye, respiratory tract and skin irritation and cholinergic effects in exposed workers.  A skin notation is warranted based on gross, repeated dermal contact resulting in effects in ChE activity.  Summary of data:  Data is based on unpublished findings by manufacturers  Human data:   * Contact with eyes produced pain with no damage * Repeated and prolonged dermal exposure produced drying and cracking of exposed skin * Aerosol and vapour exposure resulted in nasal and throat irritation leading to coughing and wheezing * Patch testing on 50 volunteers did not result in sensitisation or primary irritation * Based on the 90 d rat dietary study NOAEL of 5 mg/kg/d a human NOAEL of 35 mg/m3 was calculated assuming 70 kg, breathing 10 m3 during an 8 h day with 100% absorption.   Animal data   * LD50: 2,620 mg/kg (rats, oral) * LD50: 5,000 mg/kg (rabbits, dermal) * Exposure to 10, 100 and 1,000 mg/kg/d (rabbit, 6 h/d, 5 d/wk, 3 wk, dermal) produced dermal irritation at all concentrations and reduction of plasma cholinesterase activity observed in male rabbits following dermal application of 100 mg/kg/d * Dermal exposure of high-dose produced symptoms including reduction of plasma ChE activity and reduction in brain and erythrocyte ChE activity; * systemic NOEL: 10 mg/kg/d * Skin notation warranted as likely absorbed through skin with adverse systemic effects * Exposure to 50, 150, 500 mg/kg/d (rats, 90 d, oral) * 500 mg/kg/d: decreased bw gain, decreased food consumption, reduction of platelets and increase in biochemical parameters (albumin, protein and cholesterol) * 150, 500 mg/kg/d: increased liver weight, liver to bw ratios and decreased lung weights * 50, 150, 500 mg/kg/d: reduction of platelets * a subsequent 90 d study on rats reported a NOAEL of 5 mg/kg/d * Gavage of 3, 30 and 300 mg/kg/d on GD 6–15 did not result in any teratogenic or fetotoxic effects in offspring (rats) * No mutagenic activity was reported in microbial assays * No clastogenic effect on bone marrow cells were detected in *in vivo* cytogenic study. |
| DFG NA NA |
| No report. |
| SCOEL NA NA |
| No report. |
| 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 | Skin |
| HCIS | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | Skin |
| 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 |
| --- |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Conclusion:** | | | | | | | | |  |
| Adverse effects in human case study: | | | yes | 4.00 |  |  |  |  |  |
|  |  | Dermal LD50 ≤1000 mg/kg: |  |  |  |  |  |  |  |
|  |  | Dermal repeat-dose NOAEL ≤200 mg/kg: | yes | 3.00 |  |  |  |  |  |
|  |  | Dermal LD50/Inhalation LD50 <10: |  |  |  |  |  |  |  |
|  |  | *In vivo* dermal absorption rate >10%: |  |  |  |  |  |  |  |
|  |  | Estimated dermal exposure at WES >10%: |  |  |  |  |  |  |  |
|  |  |  |  | 3 | **a skin notation is warranted** | | |  |  |

### IDLH

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

## Additional information

| Molecular weight: | 286.3 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = 11.70 mg/m3; 1 mg/m3 = 0.086 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

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