# 2-Butoxyethyl acetate

| CAS number: | 112-07-2 |
| --- | --- |
| Synonyms: | Acetic acid, 2-butoxyethyl ester,  2-Butoxyethanol acetate, butyl cellosolve acetate |
| Chemical formula: | C8H16O3 |
| Structural formula: |  |

Workplace exposure standard (retained)

| TWA: | **20 ppm (133 mg/m3)** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **—** |
| Sampling and analysis: |  |

## Recommendation and basis for workplace exposure standard

A TWA of 20 ppm (133 mg/m3) is recommended to protect for adverse effects on erythrocytes in exposed workers.

There are no acute effects reported within ten times of the TWA and the TWA is considered protective for any short-term effects. Therefore, a STEL is not recommended.

## Discussion and conclusions

2-Butoxyethyl acetate is primarily used as a solvent for nitrocellulose lacquers, epoxy resins and multicolour lacquers.

There is limited human information regarding health effects and exposure to 2‑butoxyethyl acetate. A chronic inhalation study in rats and rabbits identified no evidence of pulmonary toxicity or irritation in all animals; haemolytic effects (primarily on red blood cells) were reported in animals exposed to 400 ppm for one month. In the same study, no adverse effects were identified in animals exposed to 100 ppm for 10 months (ACGIH, 2018).

2-Butoxyethyl acetate is rapidly metabolised to 2-butoxyethanol which demonstrates adverse effects on erythrocytes in animals. Humans are considered less susceptible to these effects. The ACGIH TLV-TWA for 2-butoxyehtanol (20 ppm) is based on reported eye and nose irritation in naïve volunteers. The toxicological profile of action corresponds to that of 2-butoxyethanol although the irritant effect on skin and eye is considered weaker. Based on animal inhalation studies, 2‑butoxyethyl acetate is not expected to be a potent respiratory irritant. A NOAEL of 25 ppm is reported for 2‑butoxyethanol for erythrocyte effects in rats (ACGIH, 2018; DFG, 2008). Accordingly, ACGIH recommended a TWA of 20 ppm based on the comparison to 2-butoxyethanol to protect for adverse effects (ACGIH, 2018).

Based on the identified NOAEL in rats and the fact that humans are less sensitive, the recommended TWA of 20 ppm (133 mg/m3) is considered suitable to protect for effects on erythrocytes in exposed workers. As there is lack of evidence to suggest an immediately acute effect at concentrations within ten times the recommended TWA, the previous STEL of 50 ppm is recommended to be withdrawn.

## 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 evidence.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 20 ppm (133 mg/m3); STEL: 50 ppm (333 mg/m3) | |
|  |
| ACGIH 2003 TLV-TWA: 20 ppm (131 mg/m3) |
| TWA recommended to minimise the potential for haemolytic effects.  Summary of data:  Rapidly metabolised to 2-butoxyethanol; demonstrates RBC effects in rodents; *in vivo* and *in vitro* clearly demonstrate that human RBC were less susceptible than rodents.  Based on animal inhalation studies, 2-butoxyethyl acetate not expected to be a potent respiratory irritant.  Human data:   * No health effect information in humans available * TWA exposures across various silk screening and printing operations ranged from  0.8–4.05 ppm.   Animal data:   * LD50: ≈1,500 mg/kg (rabbits, dermal); death in 24–48 h with haemoglobinuria, haematuria and decrease in RBC * Non-irritating to the skin and eye in rabbits * 4 h exposure of rabbits to ≈400 ppm showed slight and transient haemoglobinuria and/or haematuria; no gross pathological lesions * Inhalation exposure study in rats and rabbits; 4 h/d, 5 d/wk at 400 ppm for 1 mo or ≈100 ppm for 10 mo: * at 400 ppm, signs of haemoglobinuria and haematuria in animals from 2 wk with effects more prominent in rabbits * necroscopy of 2 rabbits that died after 4 wk revealed hypertrophic, blood engorged kidneys and the bladders swollen with blood; no gross pathological lesions in other animals * no adverse effects in animals exposed to 100 ppm for 10 mo * no evidence of pulmonary toxicity or irritation in all animals * No reported chronic studies * 2-butoxyethyl acetate rapidly metabolises to 2-butoxyethanol; NOAEL (2-butoxyethanol) of 25 ppm in rats; 13 wk inhalation study; RBC effects (no further information) * In a 105 wk inhalation study in rats and mice: * no evidence of carcinogenicity in male rats * tumorigenicity was judged as equivocal in female rats * macrocytic, normochromic regenerative anaemia in male and female rats * reported evidence of carcinogenicity at highest doses in both male (increased incidence of haemangiosarcoma of the liver) and female mice (combined incidence of forestomach squamous cell papilloma and carcinoma).   Recommended TLV-TWA (20 ppm) is based on comparison to 2-butoxyethanol. TLV-TWA (20 ppm) for 2-butoxyethanol is based on reported eye and nose irritation in naïve volunteers exposed at 100 or 200 ppm for 8 h; 2-butoxyethyl acetate is not anticipated to be a potent respiratory irritant, based on findings from inhalation animal studies.  No mutagenicity data.  Insufficient data to recommend skin or sensitiser notations. |
| DFG 2008 MAK: 10 ppm (66 mg/m3) |
| Summary of additional data:   * Classified as carcinogenicity category 4 * liver cell carcinomas and haemangiosarcomas in the liver of male mice * likely non-genotoxic mechanisms of action in carcinogenesis * The toxicological profile of action corresponds to that of 2-butoxyethanol although the irritant effect on skin and eye is considered weaker * MAK estimated based on histologically demonstrated nose irritation in a 2 yr 2‑butoxyethanol inhalation study (rats). |
| SCOEL 1996 TWA: 20 ppm (133 mg/m3); STEL: 50 ppm (333 mg/m3) |
| Summary of additional information:   * TWA and STEL based on the assumption of similar toxic effects of the metabolite 2‑butoxyethanol. |
| 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 | Carcinogenicity – A3 |
| DFG | Carcinogenicity – 4, H (skin) |
| SCOEL | Skin |
| 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: | 160.2 |
| --- | --- |
| 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.

Deutsche Forschungsgemeinschaft (DFG) (2008) 2-Butoxyethylacetat – MAK value documentation in German language.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (1996) Recommendation from the Scientific Expert Group on Occupational Exposure Limits for 2-butoxyethyl acetate. SEG/SUM/71.