# But-2-yne-1,4-diol

| CAS number: | 110-65-6 |
| --- | --- |
| Synonyms: | 2-butyne-1,4-diol, 1,4-butynediol, 2-butynediol,  1,4-dihydroxy-2-butyne, bis(hydroxymethyl) acetylene |
| Chemical formula: | C4H6O2 |

Workplace exposure standard (new)

| TWA: | **0.5 mg/m3** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Sk., DSEN** |
| IDLH: | **—** |
| Sampling and analysis: | There is uncertainty regarding quantification of the recommended value with available sampling and/or analysis techniques. |

## Recommendation and basis for workplace exposure standard

A TWA of 0.5 mg/m3 is recommended to protect for irritation effects in exposed workers.

## Discussion and conclusions

But-2-yne-1,4-Diol is predominantly used as an intermediate in the synthesis of butanediol and butenediol.

No adequate human inhalational exposure data are available. At concentrations above 1 mg/m3,but-2-yne-1,4-diol is an aerosol and is considered to be more irritating than the vapour form. A 30 day inhalation study in rats reported a NOAEC of 0.5 mg/m3 for local effects in the upper respiratory tract. A NOAEC of 25 mg/m3 is reportedfor systemic toxicity (liver damage) in rats (DFG, 2006; SCOEL, 2011).

The recommended TWA is based on the reported NOAEC and no uncertainty factor was applied (aligning with the approach by SCOEL, 2011) as other effects are only reported at significantly higher concentrations.

## Recommendation for notations

Not classified as a carcinogen according to the Globally Harmonized System of Classification and Labelling on Chemicals (GHS).

Classified as a skin sensitiser and not a respiratory sensitiser according to the GHS.

A skin notation is recommended based on reports of dermatitis in humans and evidence of systemic effects in acute toxicity studies in animals.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA NA NA | |
|  |
| ACGIH NA NA |
| No report. |
| DFG 2006/2012 MAK: 0.36 mg/m3 |
| MAK recommended to protect for local irritation in the upper respiratory tract in workers.  Summary of data:  Human data:   * 9 confirmed cases of contact dermatitis in humans * No inhalation exposure response relationship data presented.   Animals data:   * Considers effects in trachea and larynx to be greater in aerosol than vapour form * >1 mg/m3 but-2-yne-1,4-diol is present as an aerosol * NOAEC of 1 mg/m3 for inflammation of larynx; 0.5 mg/m3 for local effects in URT (30 d inhalation study in rats) * NOAEC of 25 mg/m3 for systemic toxicity (liver damage) in rats * LD50:659 mg/kg (rats, dermal aq solution) * LC50:690 mg/m3 (rats, 4 h) * No skin sensitising effect in two valid guinea pigs studies * No indication of a genotoxic potential. |
| SCOEL 2011 TWA: 0.5 mg/m3 |
| TWA recommended to prevent for irritation based on data from animals.  Summary of additional data:   * No adequate human data available * No systemic effects are expected at non-irritating concentrations * TWA based on NOAEC of 0.5 mg/m3 * no UF due to irritation effect and other effects only being seen at much higher concentrations. |
| 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 | Skin sensitisation – category 1 |
| NICNAS | NA |
| EU Annex | Skin sensitisation – category 1 |
| ECHA | NA |
| ACGIH | NA |
| DFG | H (skin), Sh (dermal sensitiser) |
| 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 |
| --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | Adverse effects in human case study: | yes |  |  |  | | Dermal LD50 ≤1000 mg/kg: | yes | 3.00 |  |  | | Dermal repeat-dose NOAEL ≤200 mg/kg: |  |  |  |  | | Dermal LD50/Inhalation LD50 <10: |  |  |  |  | | *In vivo* dermal absorption rate >10%: |  |  |  |  | | Estimated dermal exposure at WES >10%: |  |  |  |  | |  |  | 3 | **consider assigning a skin notation** | | |

### IDLH

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

## Additional information

| Molecular weight: | 86.09 |
| --- | --- |
| 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

Deutsche Forschungsgemeinschaft (DFG) (2006) 2-butin-1,4-diol (butindiol) – MAK value documentation German language.

Deutsche Forschungsgemeinschaft (DFG) (2012) 2-butin-1,4-diol (butindiol) – MAK value documentation German language.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2011) Recommendation from the Scientific Committee on Occupational Exposure Limits for but-2-yne-1,4-diol. SCOEL/SUM/159.

National Toxicology Program (NTP) (1997) Toxicology of 2-Butyne-1,4-diol [110-65-6] Review of Literature ILS Project No. L082.

Commission Regulation (EU) No 2017/776 (2017) Tenth Adaptation to Technical Progress amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures.