# Isopropyl glycidyl ether (IGE)

| CAS number: | 4016-14-2 |
| --- | --- |
| Synonyms: | 1,2-epoxy-3-isopropoxypropane, glycidyl isopropyl ether, IGE, (isopropoxymethyl)oxirane, 3-isopropyloxypropylene oxide, 2,3-Epoxypropyl isopropyl ether |
| Chemical formula: | C6H12O2 |
| Structural formula: | — |

Workplace exposure standard (interim)

| TWA: | 50 ppm (238 mg/m3) |
| --- | --- |
| STEL: | 75 ppm (356 mg/m3) |
| Peak limitation: | — |
| Notations: | Sk. |
| IDLH: | 400 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 50 ppm (238 mg/m3) is recommended to protect for eye, skin, nose and respiratory tract irritation, dermatitis and systemic effects. A STEL of 75 ppm is also retained in the interim to protect workers from irritation caused by acute exposures.

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

## Discussion and conclusions

Isopropyl glycidyl ether is used as an organic compound stabiliser, reactive diluent and chemical intermediate.

The critical effects are eye, skin, nose and respiratory tract irritation, dermatitis, systemic effects and reproductive toxicity.

Limited toxicological data are available in humans and animals. Acute human exposure is reported to cause mental confusion and moderate irritation of the eyes and skin with irritation of the respiratory tract occurring at high concentrations. Chronic exposure is associated with dermatitis and skin sensitisation. Rats exposed at 400 ppm for seven hours a day experienced irritation of the eyes and respiratory passages and other systemic effects. Handlers suffered irritation of the eyes, nose, and respiratory tract during this experiment (ACGIH, 2018). A NOAEL of 100 mg/kg/day for systemic toxicity was reported in female rats in a reproductive study by gavage; however, a NOAEL for reproductive toxicity was not established in this study because a LOAEC of 100 mg/kg/day was reported for reduced fertility (ECHA, 2018).

Given the limited available data, the current TWA of 50 ppm and STEL of 75 ppm initially sourced from ACGIH are recommended to be retained in the interim to limit irritant effects in eye, skin, nose and respiratory tract, as well as dermatitis and systemic effects.

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

## 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 adverse systemic effects in humans, including dermatitis.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 50 ppm (238 mg/m3); STEL: 75 ppm (356 mg/m3) | |
|  |
| ACGIH 2001 TLV-TWA: 50 ppm (238 mg/m3); TLV-STEL: 75 ppm (356 mg/m3) |
| TLV-TWA recommended to minimise the risk of eye, skin, nose and respiratory tract irritation, dermatitis and systemic effects in exposed workers (derivation of TLV-TWA not reported).  TLV-STEL is warranted as being precautionary given the absence of dose-response data.  Summary of data:  Human data:   * Eye, skin, nose and respiratory tract irritation and dermatitis associated with exposure to various glycidyl ethers * Chronic exposure associated with dermatitis and skin sensitisation * Workers in glycidyl ether plants frequently reported dermatitis, including one involving IGE * Acute exposure reported to cause mental confusion.   Animal data:   * CNS depression after acute exposure (rats, rabbits, oral) * LC50: 1,500 ppm (mice, 4 h) * LC50: 1,100 ppm (rats, 8 h) * Pulmonary inflammation, pneumonia and respiratory distress associated with repeated inhalation * Rats exposure *via* inhalation at 400 ppm (7 h/d, 50 exposures,) showed reduced weight gain, increased haemoglobin, decrease in peritoneal fat, emphysematous, liver effects, pneumonia and slight ocular irritation and respiratory distress * handlers experienced irritation of the eyes, nose, and respiratory tract during this experiment.   Insufficient data to recommend a skin, sensitiser or carcinogen notation. |
| DFG 1996 Not assigned |
| The available data precludes the establishment of a MAK.  Summary of additional data:   * LD50: 1,300 mg/kg (mice, oral) * LD50: 4,200 mg/kg (rats, oral) * LD50: 9,650 mg/kg (rabbits, dermal) * Positive results for metabolic activation in the *Salmonella typhimurium* strains TA100 and TA1535 * Induced mutation in *E.coli* WP2uvrA * Positive results in SOS chromotest in *E.coli PQ37* * Induced sister chromatid exchange in V79 Chinese hamster cells * Mutagenic in tests for sex-linked recessive lethal mutations and reciprocal translocations in *Drosophila melanogaster* (NTP 1986). |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN NA NA |
| No report. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| ECHA |  | 2018 | * 12 male and female rats exposed to 100, 300 and 600 mg/kg/d by gavage. Male rats for 43–44 d, female rats were exposed 14 d prior to pairing, during pairing and pregnancy and 4 days afterwards * male NOAEL: 300 mg/kg, female NOAEL: 100 mg/kg systemic toxicity * NOEL could not be established for reproductive toxicity due to reduced fertility at 100 mg/kg. |

### Carcinogenicity — non-threshold based genotoxic carcinogens

| Is the chemical mutagenic? | Yes |
| --- | --- |
| Is the chemical carcinogenic with a mutagenic mechanism of action? | Insufficient data |
| **Insufficient data are available to determine if the chemical is a non-threshold based genotoxic carcinogen.** |  |

## Notations

| Source | Notations |
| --- | --- |
| SWA | NA |
| HCIS | — |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | NA |
| DFG | — |
| 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 |
| --- |
| |  |  |  |  | | --- | --- | --- | --- | | Adverse effects in human case study: | yes | 4.00 |  | | Dermal LD50 ≤1000 mg/kg: |  |  |  | | Dermal repeat-dose NOAEL ≤200 mg/kg: |  |  |  | | Dermal LD50/Inhalation LD50 <10: |  |  |  | | *In vivo* dermal absorption rate >10%: |  |  |  | | Estimated dermal exposure at WES >10%: |  |  |  | |  |  |  | **a skin notation is warranted** | |

### IDLH

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

## Additional information

| Molecular weight: | 116.18 |
| --- | --- |
| 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.

Deutsche Forschungsgemeinschaft (DFG) (1996) Isopropyl glycidyl ether – MAK value documentation.

European Chemicals Agency (ECHA) (2018) 2,3-epoxypropyl isopropyl ether – REACH assessment.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – isopropyl glycidyl ether.