

# POTASSIUM HYDROXIDE

**CAS number:** 1310-58-3

**Synonyms:** Caustic potash

**Chemical formula:** KOH

**Structural formula:** —

## Workplace exposure standard (retained)

**TWA:** —

**STEL:** —

**Peak limitation:** 2 mg/m<sup>3</sup>

**Notations:** —

**IDLH:** —

**Sampling and analysis:** The recommended value is quantifiable through available sampling and analysis techniques.

## Recommendation and basis for workplace exposure standard

A peak limitation of 2 mg/m<sup>3</sup> is recommended to protect for dermal, ocular and respiratory tract irritation and corrosive effects in exposed workers.

## Discussion and conclusions

Potassium hydroxide (KOH) has a variety of uses including in paint and varnish removers, electroplating, photoengraving, drain cleaners, liquid soap manufacture and as a mordant for wood.

The critical effects of exposure are identified as irritation of the skin, eyes and respiratory tract (ACGIH, 2018).

Very limited data exists in humans and animals. Data in humans generally relates to accidental or deliberate high-level ingestion with skin and mucous membrane corrosion and necrosis reported in humans and animals. No inhalational data are available and repeat dose data is limited to a dermal study (ACGIH, 2018; HCOTN, 2004). Based on similar properties and effects to sodium hydroxide (NaOH), ACGIH recommended a TLV-Ceiling of 2 mg/m<sup>3</sup> (as per that assigned to NaOH).

Noting the limited data available, the peak limitation of 2 mg/m<sup>3</sup> is recommended to be retained and is considered protective of irritation to skin, eyes and respiratory tract and corrosive 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.

There are insufficient data to recommend a skin notation.

## APPENDIX

### Primary sources with reports

Source	Year set	Standard
<b>SWA</b>	<b>1991</b>	<b>Peak limitation: 2 mg/m<sup>3</sup></b>
<b>ACGIH</b>	<b>2001</b>	<b>TLV-Ceiling: 2 mg/m<sup>3</sup></b>
<p>TLV-Ceiling recommended to minimise irritation to respiratory tract, eyes and skin.</p> <p>TLV based on analogy to NaOH.</p> <p>Summary of data:</p> <p>Human data:</p> <ul style="list-style-type: none"> <li>Numerous accounts of accidental and suicidal ingestion with death resulting from shock, perforation of the oesophagus, aspiration from the oesophagus into the trachea, pneumonitis, chest cavity inflammation or inanition and infection</li> <li>Similar effects to NaOH</li> <li>Eye and respiratory tract irritation and lesions of the nasal septum can occur following exposure to dust or mist</li> <li>Rapid tissue destruction occurs following skin contact</li> <li>One case of oesophageal carcinoma reported.</li> </ul> <p>Animal data:</p> <ul style="list-style-type: none"> <li>Identical pH to NaOH (based on equimolar concentrations): <ul style="list-style-type: none"> <li>some evidence that KOH poses greater hazard</li> </ul> </li> <li>Oral doses administered to dogs (concentrations not provided) caused haemorrhagic gastritis</li> <li>1 mL (25–36% aqueous hydroxide solution) administered to cats caused oesophageal necrosis.</li> </ul> <p>Insufficient data to recommend skin, SEN or carcinogenicity notations.</p>		
<b>DFG</b>	<b>NA</b>	<b>NA</b>
No report.		
<b>SCOEL</b>	<b>NA</b>	<b>NA</b>
No report.		
<b>OARS/AIHA</b>	<b>NA</b>	<b>NA</b>
No report.		
<b>HCOTN</b>	<b>2004</b>	<b>Ceiling limit: 2 mg/m<sup>3</sup></b>
<p>Summary of additional data:</p> <ul style="list-style-type: none"> <li>10% of workers developed allergic dermatitis when exposed during ascorbic acid production</li> <li>Dermal application of 1–10% aqueous solutions corrosive and/or severely irritating to rabbits (after 4 h and 24 h)</li> <li>0.5–5% solutions irritating to corrosive in rabbit eye</li> </ul>		



Source	Year set	Standard
		<ul style="list-style-type: none"> <li>Not sensitising to guinea pigs following repeated intracutaneous injections</li> <li>LD<sub>50</sub>: 214–1,890 mg/kg (rat, oral)</li> <li>Negative in <i>in vitro</i> test for genotoxicity with <i>E. coli</i>; positive result with Chinese hamster ovary K1 cells (with metabolic activation) and interfered with G- and C- banding patterns of human chromosomes: <ul style="list-style-type: none"> <li>positive responses considered likely due to high pH in the culture medium</li> </ul> </li> <li>Following repeated applications (3–6% aqueous solutions) to mouse skin (46 wk), increased incidence of skin tumours, associated with severe skin damage causing epidermal hyperplasia: <ul style="list-style-type: none"> <li>non-genotoxic mechanism assumed</li> </ul> </li> <li>Committee concluded that insufficient information to comment on administrative value or recommend health-based OEL.</li> </ul>

## Secondary source reports relied upon

Source	Year	Additional information
NICNAS	✓ 2015	<ul style="list-style-type: none"> <li>No additional information.</li> </ul>
ECHA	✓ 2019	<ul style="list-style-type: none"> <li>Not expected to be systemically available during normal handling and use <ul style="list-style-type: none"> <li>systemic effects after repeated exposure not expected</li> </ul> </li> <li>By analogy to NOEL of 1 mg/m<sup>3</sup> for NaOH mist (based on respiratory irritation), DNEL is 1 mg/m<sup>3</sup>.</li> </ul>
US NIOSH	✓ 2007	<ul style="list-style-type: none"> <li>REL =2 mg/m<sup>3</sup> ceiling.</li> </ul>

## 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	—
HCIS	—
NICNAS	—
EU Annex	NA
ECHA	—
ACGIH	—
DFG	NA
SCOEL	NA



Source	Notations
HCOTN	—
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

Insufficient data to assign skin notation.

### IDLH

Is there a suitable IDLH value available? No

### Additional information

Molecular weight:	56.10
Conversion factors at 25°C and 101.3 kPa:	1 ppm = Number mg/m <sup>3</sup> ; 1 mg/m <sup>3</sup> = Number ppm
This chemical is used as a pesticide:	<input type="checkbox"/>
This chemical is a biological product:	<input type="checkbox"/>
This chemical is a by-product of a process:	<input type="checkbox"/>
A biological exposure index has been recommended by these agencies:	<input type="checkbox"/> ACGIH <input type="checkbox"/> DFG <input type="checkbox"/> SCOEL

### Workplace exposure standard history

Year	Standard
<a href="#">Click here to enter year</a>	



## References

American Conference of Industrial Hygienists (ACGIH®) (2018) TLVs® and BEIs® with 7<sup>th</sup> Edition Documentation, CD-ROM, Single User Version. Copyright 2018. Reprinted with permission. See the [TLVs® and BEIs® Guidelines section](#) on the ACGIH website.

European Chemicals Agency (ECHA) (2019) Potassium hydroxide – REACH assessment.

Health Council of the Netherlands (HCOTN) (2004) Potassium hydroxide. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/110.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2015) Potassium hydroxide: Human health tier II assessment – IMAP report.

US National Institute for Occupational Safety and Health (NIOSH) (2007) NIOSH Pocket Guide To Chemical Hazards – Potassium hydroxide.

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