

CALCIUM OXIDE

CAS number: 1305-78-8

Synonyms: Lime, quicklime, calcium monoxide, lime, burnt lime, calx

Chemical formula: CaO

Structural formula:

Workplace exposure standard (amended)

TWA: 1 mg/m³

STEL: —

Peak limitation: —

Notations: —

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 1 mg/m³ is recommended to protect for local irritation effects in the eyes and respiratory tract in exposed workers.

Discussion and conclusions

The major use of calcium oxide is in mortar, plaster, cement and other building and paving materials.

It is a known irritant to exposed body surfaces including the eyes and respiratory tract (ACGIH, 2018; DFG, 2017; SCOEL, 2008). Irritation effects impact mucous membranes and moist surfaces and appear to reach a plateau after 30 minutes. A NOAEC of 2 mg/m³ is reported in humans for irritation of the eyes, nose and throat in humans following 20 minutes of exposure. In a workplace study, no relevant respiratory symptoms were identified after exposure to 0.4 to 5.8 mg/m³ (ACGIH, 2018; DFG, 2017).

Therefore, a TWA of 1 mg/m³ is considered low enough to reduce the irritation potential 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
SWA	1991	TWA: 2 mg/m³
ACGIH	2001	TWA: 2 mg/m³
TLV-TWA recommended to reduce the potential for irritation of the eye, mucous membrane, nasal and moist skin in exposed workers. Summary of data: Human data: • Very irritating to mucous membranes and moist skin in industrial settings • Effects also include inflammation of the respiratory passages and ulceration and perforation of the nasal septum • Reports of strong nasal irritation following exposure to a mixture of dust containing calcium oxide at ≈25 mg/m³ ◦ no irritation reported at 9–10 mg/m³ • TLV-TWA established based on evidence presented for calcium hydroxide • Insufficient data to recommend skin, sensitiser or carcinogen notations.		
DFG	2013	MAK: 1 mg/m³ (inhalable fraction)
MAK recommended to protect for local irritation effects. Summary of additional data: • Slight nasal irritation was observed following exposure of volunteers to concentrations of 2.5 mg/m³ for 30 min • No irritation in eye, nose or throat following exposure of volunteers to 1 or 2 mg/m³ for 20 min • Irritation effects reach a plateau after 30 min • No relevant respiratory symptoms after exposure to 1.2 mg/m³ (0.4–5.8 mg/m³) • No developmental or maternal effects at doses of 680 mg/kg/d in rats and 440 mg/kg/d in mice.		
SCOEL	2008	TWA: 1 mg/m³ (respirable dust)
TWA recommended to prevent sensory irritation. No additional data.		
OARS/AIHA	NA	NA
No report		

Source	Year set	Standard
HCOTN	2006	TWA: 2 mg/m ³
TWA considered an administrative OEL and the HCOTN considers the toxicological data insufficient to justify recommendation of a health based OEL.		

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	—
DFG	—
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

Insufficient data to assign a skin notation

IDLH

Is there a suitable IDLH value available?

No

Additional information

Molecular weight:	56.08
Conversion factors at 25°C and 101.3 kPa:	1 ppm = Number mg/m ³ ; 1 mg/m ³ = 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](#) on the ACGIH website.

Deutsche Forschungsgemeinschaft (DFG) (2017) Calcium oxide/oxocalcium – MAK value documentation.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2008) Recommendation from the Scientific Committee on Occupational Exposure Limits for Calcium oxide (CaO) and calcium hydroxide (Ca(OH)₂). SCOEL/SUM/137.

Health Council of the Netherlands (HCOTN) (2006) Calcium oxide. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2006/08OSH.