

METHYL BROMIDE

CAS number: 74-83-9

Synonyms: Bromomethane, monobromomethane, MeBr

Chemical formula: CH₃Br

Workplace exposure standard (amended)

TWA: 1 ppm (3.89 mg/m³)

STEL: —

Peak limitation: —

Notations: Sk.

IDLH: 250 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 1 ppm (3.89 mg/m³) is recommended to protect for irritation of the skin and respiratory tract in exposed workers.

Discussion and conclusions

Methyl bromide is used as a fumigant, and historically as a refrigerant and fire extinguisher; however, this use is discontinued.

Critical effects of exposure include pulmonary oedema, muscle weakness, pain, loss of coordination and gait, convulsions, hyperthermia and coma. It can be absorbed through clothing and cause burns when in liquid form. Results from both *in vivo* and *in vitro* tests, show it is clearly genotoxic (ACGIH, 2001). No NOAEC are available from human studies. However, evidence from animal inhalation studies report a NOAEC of 3 ppm, based on irritation as the most sensitive endpoint (DFG, 2010).

DFG (2010) derived a TWA of 1 ppm (3.89 mg/m³) which is consistent with the TLV-TWA derived by ACGIH (2001) and is recommended to be adopted. This TWA is considered sufficiently low enough to account for all irritation effects.

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 as evidence indicates absorption through the skin and reports of poisonings in the workplace.

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 5 ppm (19 mg/m³)
ACGIH	2001	TLV-TWA: 1 ppm (3.89 mg/m³)
<p>TLV-TWA recommended to minimise irritant effects associated with skin and respiratory tract in exposed workers.</p> <p>Summary of data:</p> <p>Human studies:</p> <ul style="list-style-type: none"> Pulmonary oedema is primary issue with acute poisoning <ul style="list-style-type: none"> other symptoms include muscle weakness, pain, loss of coordination and gait, convulsions, hyperthermia and coma Reports that symptoms of acute poisoning persistent for several months before recovery occurred, whilst other cases were irreversible Case of mild systemic poisoning in 90 workers exposed for 2 wk at concentrations generally <35 ppm Liquid form caused superficial burns, penetrating through clothing Occupational exposure in 6 people to ~35 g/m³ (9,000 ppm) during 40 min fumigation caused skin lesions and a strong indicator of dermal absorption. <p>Animal studies:</p> <ul style="list-style-type: none"> Prolonged single exposure at >260–500 ppm fatal in rats, rabbits and guinea pigs LC₅₀: 1,200 ppm (mice, 1 h); NOEL = 444 ppm Rats and guinea pigs showed no toxic effects at 64 ppm, 7–8 h/d for 6 mo <ul style="list-style-type: none"> monkeys not affected at 33 ppm; rabbits not affected at 16 ppm Inhalation study over 2 yr in mice (6 h/d, 5 d/wk) indicated no adverse effects at 33 ppm Clearly genotoxic in both <i>in vivo</i> and <i>in vitro</i> tests; positive results in <i>Salmonella</i> and <i>Drosophila</i> gene mutation assays and SCE. <p>Derivation TLV-TWA was not reported by ACGIH, although consistent with MAK by DFG.</p> <p>Skin notation warranted based on toxic quantities absorbed in workers wearing respirators. Insufficient data to recommend a SEN notation or TLV-STEL.</p>		
DFG	2010	MAK: 1 ppm (3.9 mg/m³)
<p>Summary of additional data:</p> <ul style="list-style-type: none"> NOAEC: 3 ppm from 29 mo inhalation study in rats with irritant effect on olfactory epithelium as most sensitive endpoint No increased tumour incidence in inhalation studies of rats and mice No NOAEC available from human data for irritation or neurotoxic effects. 		



Source	Year set	Standard
SCOEL	2004	Not assigned
Summary of additional data:		
<ul style="list-style-type: none"> Inhalation uptake in animals appears saturable Latency period of 2–48 hr reported before poisoning symptoms apparent Health-based OEL cannot be derived due to clear systemic mutagenic effects <ul style="list-style-type: none"> based on LOAEL for inflammation in upper airways, should be kept <1 ppm. 		
OARS/AIHA	NA	NA
No report.		
HCOTN	NA	NA
No report.		

Secondary source reports relied upon

Source	Year	Additional information
NICNAS	✓ 2016	• No additional data
US EPA	✓ 1992	• No additional data

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	Skin
HCIS	—
NICNAS	—
EU Annex	NA
ECHA	—
ACGIH	Carcinogenicity – A4, Skin
DFG	Carcinogenicity – 3B
SCOEL	Skin
HCOTN	NA
IARC	Carcinogenicity – Group 3



Source	Notations
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 LD ₅₀ ≤ 1000 mg/kg:
Dermal repeat-dose NOAEL ≤ 200 mg/kg:
Dermal LD ₅₀ /Inhalation LD ₅₀ < 10:
<i>In vivo</i> 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:	94.94
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 3.89 mg/m ³ ; 1 mg/m ³ = 0.26 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
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) (2016) Methyl bromide – MAK value documentation.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2004) Recommendation from the Scientific Committee on Occupational Exposure Limits for methyl bromide. SCOEL/SUM/114.

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

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