

# DIMETHYL ETHER

**CAS number:** 115-10-6

**Synonyms:** DME, methyl ether, oxybismethane, wood ether

**Chemical formula:** C<sub>2</sub>H<sub>6</sub>O

## Workplace exposure standard (retained)

**TWA:** 400 ppm (760 mg/m<sup>3</sup>)

**STEL:** 500 ppm (950 mg/m<sup>3</sup>)

**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 400 ppm (760 mg/m<sup>3</sup>) and STEL of 500 ppm (950 mg/m<sup>3</sup>) are recommended to protect for mild central nervous system (CNS) effects and the potential for chronic systemic toxicity in exposed workers.

## Discussion and conclusions

Dimethyl ether is a gas under standard conditions and is used as a propellant for aerosols.

Available data suggest very low relative toxicity as indicated by acute and chronic animal inhalation studies (DFG, 1990). Critical effects include CNS depression at acute exposures above 50,000 ppm in humans. Body weight gain and reduced life expectancy are reported in chronic exposure studies above 2,000 ppm in rats (DFG, 1990).

The current TWA is recommended to be retained as it is considered to protect for the critical end points reported at high concentrations. As potential adverse effects are expected within an order of magnitude of the TWA concentration, a STEL of 500 ppm is recommended to protect for systemic effects observed in rats, which is supported by the recommendation by HSE (2002).

## 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 sensitizer or respiratory sensitizer 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>2002</b>	<b>TWA: 400 ppm (760 mg/m<sup>3</sup>); STEL: 500 ppm (950 mg/m<sup>3</sup>)</b>
Assigned from HSE in 2002.		
<ul style="list-style-type: none"> <li>• Considered of very low toxicity</li> <li>• NOAEC at least 2000 ppm in rats</li> <li>• TWA assigned to take account of concerns over potential CNS effects</li> <li>• STEL assigned for both diethyl ether and dimethyl ether to protect for irritation.</li> </ul>		
<b>ACGIH</b>	<b>NA</b>	<b>NA</b>
No report.		
<b>DFG</b>	<b>1988</b>	<b>MAK: 1,000 ppm (1,910 mg/m<sup>3</sup>)</b>
Summary of data:		
MAK set at 1,000 ppm and expected to protect for narcotic effects. based on a LOAEL of 10,000 ppm for bw loss and survival with a corresponding NOAEL of 2,000 ppm.		
Human data:		
<ul style="list-style-type: none"> <li>• Slight reduction in ability to concentrate at 50,000–75,000 ppm (duration not specified); <ul style="list-style-type: none"> <li>○ 82,000 ppm resulted in incoordination and visual defects (21 min) and facial analgesia (30 min)</li> <li>○ 200,000 ppm caused unconsciousness (17 min)</li> </ul> </li> <li>• Blood concentrations increased to 20–50 ppb when exposed to hair-spray propellant (7 sec, concentration not specified) <ul style="list-style-type: none"> <li>○ blood levels increased to 0.5 ppm at 300 ppm (15 min)</li> </ul> </li> <li>• No toxic effects after IV injection of 0.2–0.3 mL doses</li> <li>• No evidence for tissue accumulation after 2 inhalational doses of 27 mg separated by 1 h <ul style="list-style-type: none"> <li>○ blood concentrations increased to 179–2,842 ppb after each dose.</li> </ul> </li> </ul>		
Animal data:		
<ul style="list-style-type: none"> <li>• LC<sub>50</sub>: 16.4% v/v (rats, 4 h)</li> <li>• Subchronic repeat inhalation study with exposure groups 100, 1,000, and 10,000 ppm (rats, 6 h/d, 5 d/wk, 4 wk); <ul style="list-style-type: none"> <li>○ NOAEC: 1,000 ppm</li> <li>○ LOAEC: 10,000 ppm for slight bw loss in last wk</li> <li>○ similar hamster study reported reduced WBC counts at 10,000 ppm</li> </ul> </li> <li>• Chronic inhalation study with exposure groups 2,000, 10,000, and 25,000 ppm (rats, 6 h/d, 5 d/wk, 2 yr); <ul style="list-style-type: none"> <li>○ NOAEC: 2,000 ppm</li> <li>○ LOAEC: 10,000 ppm for bw increase and reduced life times, no substance-related changes to liver weight and serum parameters</li> <li>○ transient haemolytic effects at 25,000 ppm</li> <li>○ no significant increase in tumour incidence in any exposure group</li> </ul> </li> </ul>		



Source	Year set	Standard
<ul style="list-style-type: none"> <li>No effect on mating behaviour or on number of pregnancies at 20,000–28,000 ppm (rats, 6 h/d, 13 d before mating) <ul style="list-style-type: none"> <li>no maternal or foetal toxicity at these concentrations when dams exposed during GD 6–16</li> </ul> </li> <li>Non-mutagenic <i>in vivo</i> and <i>in vitro</i>.</li> </ul>		
<b>SCOEL</b>	<b>1991</b>	<b>8-hour TWA: 1,000 ppm (1,920 mg/m<sup>3</sup>)</b>
<p>Summary of additional data:</p> <p>Available data indicate low toxicity of the substance and critical target organ is the CNS at high concentrations. TWA derived from a NOAEL of 2,000 ppm for bw gain and survival from a 2 yr inhalational study with rats; a factor of 2 is applied to account for limited human exposure data. A 15 min STEL is not considered necessary.</p> <p>Animal data:</p> <ul style="list-style-type: none"> <li>No adverse CNS effects reported for chronic inhalation study (rats, 6 h/d, 5 d/wk, 2 yr, also presented in DFG, 1990)</li> <li>No evidence for genotoxic or carcinogenic activity.</li> </ul>		
<b>OARS/AIHA</b>	<b>NA</b>	<b>NA</b>
No report.		
<b>HCOTN</b>	<b>NA</b>	<b>NA</b>
No report.		

## Secondary source reports relied upon

Source	Year	Additional information
HSE	✓ 2002	<ul style="list-style-type: none"> <li>TWA: 400 ppm (760 mg/m<sup>3</sup>); STEL: 500 ppm (950 mg/m<sup>3</sup>).</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	NA
EU Annex	—
ECHA	—
ACGIH	NA



Source	Notations
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:	46.07
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
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[Click here to enter year](#)

## References

Deutsche Forschungsgemeinschaft (DFG) (1990) Dimethyl ether – MAK value documentation.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (1991) Recommendation from the Scientific Committee on Occupational Exposure Limits for Dimethyl ether. SCOEL/SUM/2.

UK Health and Safety Executive (HSE) (2002) EH40/2005 Workplace exposure limits.