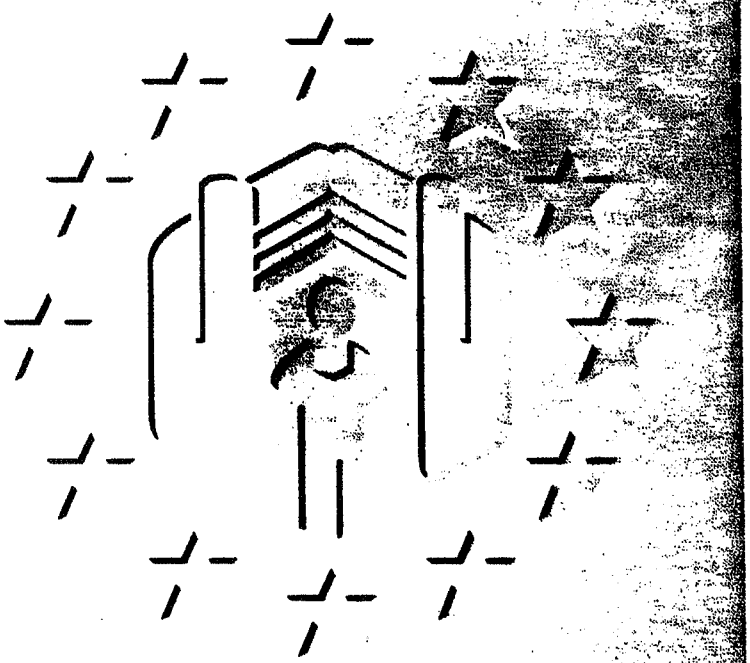
EUROPEAN COMMISSION

Occupational exposure limits

Recommendations of the Scientific Expert Group 1991-92



Health and safety

Report
EUR 15091 EN

Dimethyl ether

8-hour TWA:	1 000 ppm (1 920 mg/m^3)
STEL:	—
Additional classification:	—

Substance

Dimethyl ether	CH_3OCH_3
Synonyms:	DME, methyl ether, oxybismethane
Einecs No:	204-065-8
EEC No:	603-019-00-8; Classification: F+; R12
CAS No:	115-10-6
MWt:	46.07
Conversion factor (20°C, 101 kPa):	1.92 mg/m^3 = 1 ppm

Occurrence/use

Dimethyl ether (DME) is a colourless, highly flammable gas with a slight sweetish odour similar to that of diethyl ether. It has a melting-point of −138.5°C, a boiling-point of −23.7°C and a vapour pressure of 520 kPa at 20°C.

It has a production rate in the European Community greater than 1 000 tonnes per annum. One of the main uses of DME is as a propellant in aerosol sprays as a substitute for fully halogenated chlorofluorohydrocarbons.

Health significance

The SEG discussed the MAK document, which showed a lack of availability of contemporary human data, in particular in relation to central nervous system (CNS) changes such as neurobehavioural disturbances.

The SEG considered that the experimental evidence available for evaluation had not demonstrated that DME was a genotoxic, carcinogenic, or a reproductive toxicant.

Studies in human subjects, dating from the 1920s, demonstrated acute CNS effects from short-term exposures to extremely high levels of DME, in the range of 5 to 20% (96 to 384 g/m^3). Animal studies have confirmed the low toxicity. A well-conducted chronic inhalation study in rats demonstrated no observable adverse effect, including to the CNS, at a level of 2 000 ppm (3 840 mg/m^3), although 10 000 ppm (19 200 mg/m^3) produced an adverse effect on weight increase and lifespan.

The available data thus indicate that DME is of generally low toxicity and at high concentrations the critical target organ is the CNS.

Recommendation

The Du Pont (Du Pont de Nemours & Co., 1986) study, establishing a NOAEL of 2 000 ppm (3 840 mg/m^3), was considered to be an adequate basis for setting the exposure limit, allowing a safety factor of 2 to compensate for the lack of adequate human data. The recommended 8-hour TWA is 1 000 ppm (1 920 mg/m^3). No STEL was considered necessary.

At the level recommended no measurement difficulties are foreseen.

Key bibliography

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