

The MAK Collection for Occupational Health and Safety

N,N-Dimethylethylamine

MAK Value Documentation, addendum – Translation of the German version from 2018

A. Hartwig^{1,*}, MAK Commission^{2,*}

¹ Chair of the Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area, Deutsche Forschungsgemeinschaft, Institute of Applied Biosciences, Department of Food Chemistry and Toxicology, Karlsruhe Institute of Technology (KIT), Adenauerring 20a, Building 50.41, 76131 Karlsruhe, Germany

² Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area, Deutsche Forschungsgemeinschaft, Kennedyallee 40, 53175 Bonn, Germany

* email: A. Hartwig (andrea.hartwig@kit.edu), MAK Commission (arbeitsstoffkommission@dfg.de)

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N,N-Dimethylethylamine / N,N-Dimethylethanamine

MAK Value Documentation

A. Hartwig^{1,*}, MAK Commission^{2,*}

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Abstract

The German Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area has evaluated a momentary value of N,N-dimethylethylamine [598-56-1].

Critical effects are vision disturbances and irritation of the eyes and the respiratory tract in exposed workers and volunteers. In a study in a foundry, these effects were caused by peak exposures of about 10 ml/m³. By analogy with cyclohexylamine, a momentary value of 5 ml/m³ which must not be exceeded at any time is also established for N,N-dimethylethylamine.

Keywords

N,N-dimethylethylamine; N,N-dimethylethanamine; vision disturbance; glaucopsia; peak limitation; occupational exposure; maximum workplace concentration; MAK value; toxicity; hazardous substance

Author Information

¹ Chair of the Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area, Deutsche Forschungsgemeinschaft, Department of Food Chemistry and Toxicology, Institute of Applied Biosciences, Karlsruhe Institute of Technology (KIT), Adenauerring 20a, Building 50.41, 76131 Karlsruhe, Germany

² Permanent Senate Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area, Deutsche Forschungsgemeinschaft, Kennedyallee 40, 53175 Bonn, Germany

* Email: A. Hartwig (andrea.hartwig@kit.edu), MAK Commission (arbeitsstoffkommission@dfg.de)

N,N-Dimethylethylamine

[598-56-1]

Supplement 2018

MAK value (2000)	2 ml/m³ (ppm) \triangleq 6.1 mg/m³
Peak limitation (2002)	Category I, excursion factor 2
Momentary value (2017)	5 ml/m³ (ppm) \triangleq 15 mg/m³

Absorption through the skin –

Sensitization –

Carcinogenicity –

Prenatal toxicity (2006) **Pregnancy Risk Group D**

Germ cell mutagenicity –

1 ml/m³ (ppm) \triangleq 3.035 mg/m³ **1 ml/m³ (ppm) \triangleq 0.330 mg/m³**

This supplement to the documentation published in 2000 (documentation “*N,N*-Dimethylethylamine” 2000) was drawn up to evaluate the necessity of a momentary value.

Effects in Humans

The critical effects are visual disturbances (blurred vision or streaks of colour resulting from corneal oedema); these concentration-dependent effects developed at the workplace at concentrations of 3.3 to 4.4 ml/m³ (8-hour average value). Irritation of the eyes, nose and throat was reported at 8 ml/m³ and above (Warren and Selchan 1988). This study concurrently investigated visual disturbances and irritation caused by triethylamine, which was found to have about the same potency as *N,N*-dimethylethylamine. Based on the workplace study of Åkesson et al. (1986), which reported a NOAEC (no observed adverse effect concentration) of 1.44 ml/m³ and a LOAEC (lowest observed adverse effect concentration) of 3.12 ml/m³, a MAK value of 1 ml/m³ was derived for triethylamine.

In two controlled studies in volunteers with 8-hour exposure, the research group of Åkesson carried out a comparative investigation of *N,N*-dimethylethylamine (Ståhlbom et al. 1991) and triethylamine (Åkesson et al. 1985). The findings on irritation and visual disturbances led the authors to conclude that, with a NOAEC of 10 mg/m³ (2.3 ml/m³) and a LOAEC of 18 mg/m³ (4.3 ml/m³), triethylamine was twice as potent as *N,N*-dimethylethylamine, for which a NOAEC of 20 mg/m³ (6.7 ml/m³) and a LOAEC of 40 mg/m³ (13.4 ml/m³) were found. This was explained by the higher solubility of triethylamine in fat (Ståhlbom et al. 1991), which makes it easier for the substance to penetrate the layers of the cornea. This finding supports the establishment of different MAK values for the two substances.

A review of visual disturbances caused by amines cited investigations carried out by NIOSH, which found that these effects were observed at the workplace at mean exposure levels of 2 ml/m³ (Jang 2016). This study, which was carried out in a foundry, recorded personal average shift values of 2 ml/m³ (n = 56, range 0.5 to 8 ml/m³) with 15-minute peak values of a maximum 9.7 ml/m³ (n = 31, range: detection limit (no other details) up to 9.7 ml/m³). Visual disturbances (halos) were reported by 3 of 56 workers. These workers were exposed to average shift values of 1.8 ml/m³ (15-minute value of 8 ml/m³), 2 ml/m³ (15-minute value not specified) and 3 ml/m³ (15-minute value of 9.7 ml/m³). The investigator attributed the visual disturbances to exposure to peak concentrations during the production of foundry cores caused by leaking coreboxes (NIOSH 1988). It is conspicuous that the investigators described a concentration of 9.7 ml/m³ as “intolerable”, while volunteers tolerated 15-minute peak concentrations of up to 50 ml/m³ in the controlled study of Ståhlbom et al. (1991). It is likely that the 15-minute average values at the workplace included much higher concentrations over short periods.

Manifesto

Peak limitation. Taking into consideration that very short exposures caused irritation to the eyes and visual disturbances, short-term exposures have been limited by a momentary value of 5 ml/m³, as is the case for cyclohexylamine, for which a momentary value of 5 ml/m³ was derived from a study in volunteers to prevent irritation (supplement “Cyclohexylamin” 2017, available in German only).

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