

Dimethylamine
C₂H₇N
[CAS No. 124-40-3]
OEL-M: 2 ppm (3.7 mg/m³)
Occupational sensitizer: Skin Group 3

Summary of OEL-M documentation

Dimethylamine is a colorless gas with an ammonia-like irritating odor at room temperature that forms toxic fumes, such as nitrogen oxides, when burning and is corrosive at acidic pH. It is mainly used as a precursor for N,N-dimethylformamide, as well as a raw material in the manufacture of rubber accelerators, insecticides, microbicides, antihistamines, surfactants, and solvents. In 1979, 10 ppm (18 mg/m³) was designated as occupational exposure limit-mean (OEL-M). The Japan Society for Occupational Health proposes 2 ppm (3.7 mg/m³) as the revised OEL-M, according to the dose-dependent pathological changes in respiratory and olfactory epithelia in the nasal cavity at concentrations of ≥10 ppm. These numbers were given based on the results of 2-year inhalation studies of rats and mice (10–175 ppm)^{1,2)}. An uncertainty factor of 5 was applied to account for both uncertainty involved in extrapolating from the lowest-observed adverse effect level (LOAEL) to no-observed adverse effect level (NOAEL) and interspecies difference in toxicodynamics.

There is no epidemiological evidence of sensitizing potential in humans. Dimethylamine is proposed to belong to group 3 (possible sensitizer in humans) of the skin occupational sensitizer classification based on a case series in patients with allergic contact dermatitis due to rubber gloves³⁾ and the guinea pig skin sensitization test⁴⁾.

Year of Proposal (revision): 2016

Year of Proposal: 1979 (OEL-M 10 ppm, 18 mg/m³)

References

- 1) Buckley LA, Morgan KT, Swenberg JA, et al. The toxicity of dimethylamine in F-344 rats and B6C3F1 mice following a 1-year inhalation exposure. *Fundamental and Applied Toxicology* 1985; 5 (2): 341–352.
- 2) Swenberg JA. Twenty four month final report. Inhalation toxicity of dimethylamine in F-344 rats and B6C3F1 mice and third party audit report summary. Docket #11957. NTIS/OTS0530078. Research Triangle Park, NC: Chemical Industry Institute of Toxicology; 1990.
- 3) Kaniwa M, Isama K, Nakamura A, et al. Identification of causative chemicals of allergic contact dermatitis using a combination of patch testing in patients and chemical analysis. Application to cases from rubber gloves. *Contact Dermatitis* 1994; 30 (1): 65–71.
- 4) Kantoh H, Ishihara M, Itoh M, et al. Allergens in rubber products. *HIFU* 1985; 27 (3): 501–509. (in Japanese with English abstract)