The MAK Collection for Occupational Health and Safety

trans-1,3,3,3-Tetrafluoropropene

MAK Value Documentation, addendum – Translation of the German version from 2019

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Keywords: trans-1,3,3,3-tetrafluoropropene; MAK value; maximum workplace concentration; blood:air distribution coefficient

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The commission established rules and measures to avoid conflicts of interest.

trans-1,3,3,3-Tetrafluoropropene / (E)-1,3,3,3-Tetrafluoroprop-1-ene

MAK Value Documentation

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Abstract

The German Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area has re-evaluated the maximum concentration at the workplace (MAK value) of trans-1,3,3,3-tetrafluoropropene [29118-24-9]. As the blood:air partition coefficient of trans-1,3,3,3-tetrafluoropropene is < 5, the increased respiratory volume at the workplace (see List of MAK and BAT Values, Sections I b and I c) does not have to be taken into account for the derivation of the MAK value. Even after extrapolation of 6-hour exposure in the animal experiment to 8-hour exposure at the workplace, the MAK value for trans-1,3,3,3-tetrafluoropropene of 1000 ml/m^3 can be retained.

Keywords

trans-1,3,3,3-tetrafluoropropene; blood:air distribution coefficient; occupational exposure; maximum workplace concentration; MAK value; toxicity; hazardous substance

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trans-1,3,3,3-Tetrafluoropropene

[29118-24-9]

Supplement 2019

MAK value (2014)	**1000 ml/m³ (ppm) ≙ 4700 mg/m³**
Peak limitation (2014)	**Category II, excursion factor 2**
Absorption through the skin	**–**
Sensitization	**–**
Carcinogenicity	**–**
Prenatal toxicity (2014)	**Pregnancy Risk Group C**
Germ cell mutagenicity	**–**
BAT values	**–**

1 ml/m³ (ppm) ≙ 4.73 mg/m³ **1 mg/m³ ≙ 0.21 ml/m³ (ppm)**

In 2016, the Commission began using a revised approach for assessing substances with a MAK value based on systemic effects and derived from inhalation studies in animals or studies with volunteers at rest; this new approach takes into account that the respiratory volume at the workplace is higher than under experimental conditions. This does not, however, apply to gases or vapours with a blood:air partition coefficient < 5 (see List of MAK and BAT Values, Sections I b and I c). The blood:air partition coefficient of trans-1,3,3,3-tetrafluoropropene calculated using the formula of Buist et al. (2012) is 0.49. The increased respiratory volume therefore does not need to be taken into account for the derivation of the MAK value for trans-1,3,3,3-tetrafluoropropene. In addition, extrapolation of the usual 6-hour exposure in the animal experiment to 8-hour exposure at the workplace must be considered. Based on the NOAEC (no observed adverse effect concentration) of 5000 ml/m³ for rats in the 13-week study, however, the MAK value of 1000 ml/m³ for trans-1,3,3,3-tetrafluoropropene, even taking into consideration the shorter exposure duration of the animals in this study, can be retained.

References

Buist HE, de Wit-Bos L, Bouwman T, Vaes WHJ (2012) Predicting blood:air partition coefficients using basic physicochemical properties. Regul Toxicol Pharmacol 62: 23–28

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