

1,1,1-Trichloroethane – Addendum for re-evaluation of the BAT value

Assessment Values in Biological Material – Translation of the German version from 2019

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Keywords

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Abstract

In 2018, the German Commission for the Investigation of Health Hazards of Chemical Compounds in the Work Area has re-evaluated the biological tolerance value (BAT value) for 1,1,1-trichloroethane (methyl chloroform) [71-55-6] after the MAK value for 1,1,1-trichloroethane has been lowered from 200 ml/m³ to 100 ml/m³. In consequence, the previous BAT value of 550 µg 1,1,1-trichloroethane/l blood was adjusted to 275 µg 1,1,1-trichloroethane/l blood. The sampling conditions (at the beginning of the next shift, after several shifts) remain unchanged.

Citation Note:

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BAT value (2018)	275 µg 1,1,1-trichloroethane/l blood Sampling time: at the beginning of the next shift, after several shifts
MAK value (2018)	100 ml/m³ ≙ 550 mg/m³
Absorption through the skin (2001)	H
Carcinogenicity (2017)	–
Prenatal toxicity (1986)	Pregnancy Risk Group C

Re-evaluation

The MAK value documentation for 1,1,1-trichloroethane specifies that at rest, an air concentration of 200 ml 1,1,1-trichloroethane/m³ is to be regarded as the NOAEC, based on the volunteer study by Mackay et al. (1987). Due to the increased respiratory volume under working conditions, the MAK value was lowered from 200 ml/m³ to 100 ml/m³ in 2018. This also requires the BAT value, which is linked to the MAK value, to be lowered accordingly.

Re-evaluation of the BAT value

As stated in the MAK value documentation for 1,1,1-trichloroethane, only about 10% of the inhaled substance is metabolised in the human body. An end product is trichloroacetic acid, which is excreted in urine. Approximately 90% of the absorbed dose of 1,1,1-trichloroethane, however, is excreted unchanged in exhaled air. As metabolism plays only a minor role in the toxicokinetics of 1,1,1-trichloroethane, blood levels of 1,1,1-trichloroethane are expected to be linearly correlated with the exposure level. This assumption is in line with experimental studies involving humans by Monster et al. (1979) (exposure to 70 and 145 ml/m³) and Laine et al. (1996) (exposure to 200 and 400 ml/m³).

In view of the MAK value having been lowered from 200 to 100 ml/m³, the **BAT value is consequently lowered** from 550 µg/l blood (translated in Bolt 1994)

to 275 µg 1,1,1-trichloroethane/l blood.

The sampling time (at the beginning of the next shift, after several shifts) remains unchanged.

If the BAT value of 275 µg 1,1,1-trichloroethane/l blood is observed, no prenatal toxic effects are to be expected (Pregnancy Risk Group C).

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