

# 2-Propanol (isopropyl alcohol) – Addendum for re-evaluation of the BAT value

## Assessment Values in Biological Material – Translation of the German version from 2010

K. H. Schaller<sup>1</sup>

<sup>1</sup> Institute and Outpatient Clinic of Occupational, Social and Environmental Medicine, Friedrich-Alexander University (FAU) Erlangen-Nürnberg, Henkestraße 9–11, 91054 Erlangen, Germany

email: MAK Commission ([arbeitsstoffkommission@dfg.de](mailto:arbeitsstoffkommission@dfg.de))

### Keywords:

2-propanol, isopropyl alcohol,  
BAT value, biological tolerance  
value, biomonitoring, acetone

<b>BAT value (2009)</b>	<b>25 mg acetone/l blood</b> <b>25 mg acetone/l urine</b> Sampling time: end of exposure or end of shift
<b>MAK value (1996)</b>	<b>200 ml/m<sup>3</sup> ≙ 500 mg/m<sup>3</sup></b>
Absorption through the skin	–
Carcinogenicity	–

## Re-evaluation

The BAT values (biological tolerance values) for 2-propanol [67-63-0] for the concentration of the parameter acetone in blood or urine evaluated in 1990 (translated in Schaller and Triebig 1994) were derived on the basis of the relationship between external and internal exposure from field studies (Brugnone et al. 1983; Triebig et al. 1989). As reference value, the MAK value (maximum workplace concentration) of 400 ml 2-propanol/m<sup>3</sup> valid at that time was used for the evaluation.

## Re-evaluation of the BAT value

When deriving a BAT value via correlation to external exposure, according to the new definition of the BAT value, the average value, i.e. the pair of values corresponding at the regression line, is to be used. The same procedure had already been used with the BAT values derived in 1990. Therefore, no re-evaluation is necessary on account of the redefinition of the BAT value.

The lowering of the MAK value to 200 ml 2-propanol/m<sup>3</sup> (formerly 400 ml/m<sup>3</sup>) carried out in 1996 (translated in Hartwig 2013) makes a re-evaluation of the BAT values necessary. For this, the correlation given for the evaluation of the previous BAT values is used (Schaller and Triebig 1994).

Based on this correlation, the following **BAT values** are established:

**25 mg acetone/l blood**  
**25 mg acetone/l urine**

Sampling should take place at the end of exposure or end of shift.

### Citation Note:

Schaller KH. 2-Propanol (isopropyl alcohol) – Addendum for re-evaluation of the BAT value. Assessment Values in Biological Material – Translation of the German version from 2010. MAK Collect Occup Health Saf. 2021 Dec:Doc916. DOI: [https://doi.org/10.34865/bb6763eoj21\\_1ad](https://doi.org/10.34865/bb6763eoj21_1ad)

Manuscript completed:  
01 Oct 2008

Publication date:  
14 Dec 2021

License: This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).



## Interpretation

As a result of the redefinition of the BAT value as average value from several biomonitoring examinations in a single person, individual values above the BAT value are accepted as not exceeding the threshold value. However, care must be taken that such sporadic excursions do not attain values from which acute toxic effects can be expected. Following acute exposure to 2-propanol, irritation is the most sensitive effect. After 5-minute exposure of volunteers to 400 ml 2-propanol/m<sup>3</sup> they reported slight or, at 800 ml 2-propanol/m<sup>3</sup>, a stronger, but not yet intense irritation (Hartwig 2013). As a result of these local effects at levels close to the MAK value, an excursion factor of 2 was established.

The BAT value relates to normally concentrated urine, in which the creatinine concentration should be in the range of 0.3–3.0 g/l. In addition to this, the Commission considers it useful, for further improving the validity of the analyses, to select a narrower target range of 0.5–2.5 g/l for urine samples. As a rule, where urine samples are outside the above limits, a repetition of the measurement in normally hydrated persons is recommended (Bader et al. 2016).

## Notes

### Competing interests

The established rules and measures of the Commission to avoid conflicts of interest ([https://www.dfg.de/en/dfg\\_profile/statutory\\_bodies/senate/health\\_hazards/conflicts\\_interest/index.html](https://www.dfg.de/en/dfg_profile/statutory_bodies/senate/health_hazards/conflicts_interest/index.html)) ensure that the content and conclusions of the publication are strictly science-based.

## References

- Bader M, Ochsmann E, Drexler H, Hartwig A, MAK Commission (2016) Addendum to creatinine as reference parameter for the concentration of substances in urine. BAT Value Documentation, 2010. MAK Collect Occup Health Saf 1(1): 266–268. DOI: [10.1002/3527600418.bbgeneral05e1715](https://doi.org/10.1002/3527600418.bbgeneral05e1715)
- Brugnone F, Perbellini L, Apostoli P, Bellomi M, Caretta D (1983) Isopropanol exposure: environmental and biological monitoring in a printing works. Br J Ind Med 40(2): 160–168. DOI: [10.1136/oem.40.2.160](https://doi.org/10.1136/oem.40.2.160)
- Hartwig A (ed) (2013) Isopropyl alcohol. MAK Value Documentation, 1996. In: The MAK-Collection for Occupational Health and Safety. Part I: MAK Value Documentations, vol 27. Wiley-VCH, Weinheim, 2–16. Also available from DOI: [10.1002/3527600418.mb6763e2313](https://doi.org/10.1002/3527600418.mb6763e2313)
- Schaller KH, Triebig G (1994) 2-Propanol. BAT Value Documentation, 1990. In: Lehnert G, Henschler D (eds) Biological Exposure Values for Occupational Toxicants and Carcinogens, vol 1. VCH, Weinheim, 129–138. Also available from DOI: [10.1002/3527600418.bb6763e0001](https://doi.org/10.1002/3527600418.bb6763e0001)
- Triebig G, Fritz M, Schaller KH, Helbing F, Bunte EM, Kufner G, Weltle D (1989) Arbeitsmedizinische Untersuchungen bei beruflich Iso-Propanol-exponierten Frauen. Arbeitsmed Sozialmed Präventivmed 24: 27–31