

## INTERPRETATION

**Health Guidance Values (HGVs)** are set at a level at which there is no indication from the scientific evidence available that the substance being monitored is likely to be injurious to health. Values not greatly in excess of a HGV are unlikely to produce serious short or long term effects on health. However, regularly exceeding the HGV does indicate that exposure is not being adequately controlled. Under these circumstances employers will need to look at current work practices to see how they can be improved to reduce exposure.

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# BIOLOGICAL MONITORING METHODS

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## Method for Butan-2-one in Urine

### Hazardous Substance:

Butan-2-one

Alternative name: Methyl ethyl ketone (MEK)

Occupational Exposure Standard = 200 ppm  
(skin notation)  
CAS No. 78-93-3

### Biological Monitoring Guidance Value:

Health Guidance Value - 70  $\mu\text{mol}$  butan-2-one/l  
Conversion: 1  $\mu\text{mol/l}$  = 72.1  $\mu\text{g/l}$

## ❑ Sample Collection

Time: Urine samples collected at the end of the shift

Equipment: Polystyrene universal container (30ml)

## ❑ Description of Suggested Method

Urine samples (0.25 - 1ml) are diluted with K<sub>2</sub>HPO<sub>4</sub> buffer (0.75 - 1ml of 2g/ml) in glass headspace vials, capped with PTFE faced butyl rubber septa and incubated at 65°C for 10 minutes before injection into a gas chromatography column. The oven temperature is held at 60°C for 1 min then increased at 8°C/min to 80°C then 25°C/min to 200°C where it is held for 1 minute before cooling to reset. Detection is by flame ionisation or mass spectrometry in electron impact mode (using ions m/z 43 and 72)

## ❑ Reference

Brooke et al (1998). *Ann Occup. Hyg.* 42 (8) 331-40

## ❑ Alternative Method

HPLC - Gori et al. (1995) *Chromatographia*, **40**, 336-340.

GC - Yoshikawa et al. (1995) . *Arch Environ Contam Toxicol*, **29** (1), 135-139.

## ❑ Sample Transport to Laboratory

At ambient temperature, samples should arrive within 48h of collection. If delay anticipated, store at -20°C. Samples sent through postal system must comply with Post Office regulations.

## ❑ Analytical Evaluation

Precision

- within day <2% RSD at 27 µmol/l

- day to day <10% RSD at 27 µmol/l

Detection Limit

- 3x background - 1 µmol/l

Calibration Range

- typically 0-140 µmol/l

Sample Stability

- 4 days at ambient, >2 months at -20°C

Analytical Interferences

- None known

## ❑ Other Information

*Elimination half-time*

For butan-2-one in blood approximately 0.5 and 1.4 hours

*Confounding Factors*

None known

*Unexposed Levels*

<2 µmol/l

*Creatinine Correction*

Not Advised

## ❑ Quality Assurance

Internal QC - must be established

External QA - G-EQUAS ([www.g-equas.de](http://www.g-equas.de))