**BIOLOGICAL MONITORING METHODS**
October 2005

**Method for Mercury in Urine**

**Hazardous Substance:**
Mercury & inorganic compounds

**Occupational Exposure Standard**
0.025 mg m\(^{-3}\)

**CAS No.** 7439-97-6

**Biological Monitoring Guidance value:**
HGV = 20 μmol Hg/mol creatinine
Conversion: 1 μmol/mol = 1.77 μg

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**INTERPRETATION**

**Health Guidance Values (BGVs)** 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 injuries 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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**For further advice contact:**
Group Support Unit, Room L.2.51
Health and Safety Laboratory,
Harpur Hill, Buxton, SK17 9JN
Tel: 01298 218099
Fax: 01298 218172

Website: www.hsl.gov.uk

The Health and Safety Laboratory is an Agency of the Health and Safety Executive
Sample Collection
Time: Random, untimed urine
Equipment: Polystyrene universal container (30ml)

Description of Suggested Method
Analysis of urine using direct nebulisation Inductively Coupled Plasma Mass Spectrometry (ICP-MS). Samples should be diluted in nitric acid, and it is advisable to add gold to the samples and standards to stabilise the analytical performance. An internal standard must be added to the samples to compensate for matrix effects.

References

Alternative Method
Mercury in urine may also be determined using a cold vapour mercury detector or by cold vapour atomic absorption spectrometry. The method consists of firstly digesting the urine sample by reduction of Hg\(^{2+}\) to Hg\(^0\) using stannous chloride and subsequent measurement of elemental mercury with the detector of choice.

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 <4% RSD at 180 nmol/l
- day to day <6% RSD at 180 nmol/l
- recommended precision <7.3% RSD
Detection limit
- 5 nmol/l creatinine
Calibration range
- typically 0 - 500 nmol/l
Sample Stability
- 2 days at RT, > 6 months at -20°C
Analytical interferences
- None known

Other Information
At moderate exposures result reflect cumulative exposure over recent weeks/months
Half life-time
- 40-60 days

Confounding Factors
None known
Unexposed Levels
< 2 μmol/mol creatinine
Creatinine Correction
Advised, specific gravity correction less suitable

Quality Assurance
Internal QC - must be established
External QA - TEQAS, University of Surrey (Tel: 01483 509217)