

<b>79-2 (2004)</b>	<b>Arsenic and compounds, except arsine (as As)</b>
<b>CAS N°: 7440-38-2</b>	<b>EINECS N°: 231-148-6</b>
<b>EC-LV (8 h): - Lowest European LV (8 h): 0,01 mg/m<sup>3</sup> Highest European LV (8 h): 0,1 mg/m<sup>3</sup></b>	<b>EC-STLV: - Lowest European STLV: 0,02 mg/m<sup>3</sup> Highest European STLV: 0,4 mg/m<sup>3</sup></b>

### SUMMARY OF THE METHOD

<b>Language:</b> English, French	<b>Reference:</b> <b>Workplace air - Determination of metals and metalloids in airborne particulate matter by Inductively Coupled Plasma Atomic Emission Spectrometry:</b> ISO 15202-1:2000 (Sampling), ISO 15202-2:2001 (Sample preparation), and ISO 15202-3:2004 (Analysis), ISO (2000 – 2004).
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**Summary:** Air is drawn through a suitable filter mounted in a respirable or an inhalable sampler. The sample is then subjected to hotplate dissolution or microwave digestion with one of a number of different mixtures of inorganic acids and the sample solution is analysed by ICP-AES.

### SAMPLING

<b>Sampler type</b>	Sampler for the inhalable, respirable or both fractions of airborne particles, depending on the limit value, complying with the requirements of EN 13205
<b>Sampling substrate</b>	Suitable filter
<b>Recommended flow rate</b>	Flow rate according to manufacturer's specifications
<b>Recommended sampling time</b>	15 min – 8 h
<b>Recommended volume</b>	-

### TRANSPORT AND STORAGE

<b>Description/conditions of transport and storage incl. specific issues</b>	The sample filter is transferred to a filter transport cassette for transport to the laboratory, or it is transported in the sampler used for sampling or its internal filter cassette, after sealing with suitable plastic caps. There is a risk of sample loss from the filter if it is not handled carefully during transportation, especially for higher sample loadings, but once in the laboratory samples are stable indefinitely.
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### ANALYSIS

<b>Sample preparation</b>	Hotplate dissolution with HNO <sub>3</sub> and HCl; Hotplate dissolution with H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub> and HCl; Hotplate dissolution with HNO <sub>3</sub> , HClO <sub>4</sub> and HCl, and if silicates are present, HF; Ultrasonic dissolution with HF and HNO <sub>3</sub> ; or Microwave dissolution with HNO <sub>3</sub> and HF; or HNO <sub>3</sub> , HClO <sub>4</sub> and HF; or HNO <sub>3</sub> and HClO <sub>4</sub> .
<b>Analytical technique</b>	Analysis by ICP-AES.

### METHOD EVALUATION DATA

<b>Range studied</b>	Not applicable – see limit of quantification
<b>Sampling bias</b>	Overall uncertainty calculation: < 5 % (according to EN 13890) Expanded uncertainty calculation: included in sampling precision

<b>METHOD EVALUATION DATA (continued)</b>				
<b>Analytical bias</b>	< 10 %			
<b>Method bias</b>	-			
<b>Sampling precision</b>	Overall uncertainty calculation: < 5,3 % (according to EN 13890) Expanded uncertainty calculation: 9,0 % (incorporates bias uncertainty)			
<b>Analytical precision</b>	3,5 %			
<b>Method precision</b>	-			
<b>Limit of quantification</b>	1,6 µg per filter			
<b>Overall uncertainty (EN 482)</b>	0,1 LV >100 % 30 %	0,5 LV 37 % 27 %	2 LV 28 % 27 %	LLV HLV
<b>Expanded uncertainty (prEN 482)</b>	0,1 LV 95 % 25 %	0,5 LV 30 % 24 %	2 LV 24 % 24 %	LLV HLV
<b>INFORMATION IN RELATION TO THE VALIDATION</b>				
<b>Is the sample dissolution procedure described widely applicable?</b>	yes			
<b>Does the sample dissolution method include wall deposits, where applicable?</b>	yes			
<b>Was a test gas atmosphere used, where applicable?</b>	not applicable			
<b>How was the recovery determined?</b>	The analytical recovery is user determined and required to be > 90 %.			
<b>Was the sampler capacity or breakthrough volume determined?</b>	not applicable			
<b>Was temperature and RH considered, where appropriate?</b>	not applicable			
<b>EVALUATION</b>				
<b>Rating category</b>	A 2			
<b>Rationale for rating</b>	<p>Up to date methodology, detailed method description, range studied does not cover 0,1×LLV, the expanded uncertainty requirements not met for concentrations less than 50 % of the LLV.</p> <p>The overall uncertainty data above have been determined from the analytical bias and precision data given in HSL back-up data report IEAS/02/03 using the calculation method and sampling bias and precision estimates given in EN 13890. The expanded uncertainty data have been calculated using the method described in the EU mandated report Analytical methods for chemical agents. The data are for samples with an air volume of 480 l prepared by microwave dissolution using HNO<sub>3</sub> and HF. Overall uncertainty calculations assume the maximum permitted analytical bias of 10 %.</p>			

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<b>EVALUATION (continued)</b>	
<b>Observations</b>	There are no significant interferences in ICP-AES analysis.
<b>Similar methods</b>	Métropol Fiche 003, NIOSH 7300, NIOSH 7301, NIOSH 7303, OSHA ID-125G, OSHA ID-206