

80-1-(2004)	Beryllium and beryllium compounds (as Be)
CAS N°: 7440-41-7	EINECS N°: 231-150-7
EC-LV (8 h): - Lowest European LV (8h): 0,001 mg/m ³ Highest European LV (8h): 0,002 mg/m ³	EC-STLV: - Lowest European STLV: 0,002 mg/m ³ Highest European STLV: 0,008 mg/m ³

SUMMARY OF THE METHOD

Language: English, French	Reference: Workplace air - Determination of metals and metalloids in airborne particulate matter by Inductively Coupled Plasma Atomic Emission Spectrometry: 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

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

TRANSPORT AND STORAGE

Description/conditions of transport and storage incl. specific issues	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

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

METHOD EVALUATION DATA

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

METHOD EVALUATION DATA (continued)				
Analytical bias	< 10 %			
Method bias	-			
Sampling precision	Overall uncertainty calculation: < 5,3 % (according to EN 13890) Expanded uncertainty calculation: 9,0 % (incorporates bias uncertainty)			
Analytical precision	5,4 %			
Method precision	-			
Limit of quantification	0,02 µg per filter			
Overall uncertainty (EN 482)	0,1 LV 35 % 31 %	0,5 LV 30 % 30 %	2 LV 30 % 30 %	LLV HLV
Expanded uncertainty (prEN 482)	0,1 LV 28 % 26 %	0,5 LV 25 % 25 %	2 LV 25 % 25 %	LLV HLV
INFORMATION IN RELATION TO THE VALIDATION				
Is the sample dissolution procedure described widely applicable?	yes			
Does the sample dissolution method include wall deposits, where applicable?	yes			
Was a test gas atmosphere used, where applicable?	not applicable			
How was the recovery determined?	The analytical recovery is user determined and required to be > 90 %.			
Was the sampler capacity or breakthrough volume determined?	not applicable			
Was temperature and RH considered, where appropriate?	not applicable			

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EVALUATION	
Rating category	A 1
Rationale for rating	<p>Up to date methodology, detailed method description, overall uncertainty and expanded uncertainty requirements met.</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 <i>Analytical methods for chemical agents</i>. The data are for samples with an air volume of 480 l prepared by microwave dissolution using HNO₃ and HF. Overall uncertainty calculations assume the maximum permitted analytical bias of 10 %.</p>
Observations	There are no significant interferences in ICP-AES analysis.
Similar methods	Métropol 003, NIOSH 7300, NIOSH 7301, NIOSH 7303, OSHA ID-125G, OSHA ID-206