80-2 (2004)	Beryllium and beryllium compounds (as Be)
CAS Nº: 7440-41-7	EINECS Nº: 231-150-7
EC-LV (8 h): - Lowest European LV (8h): 0,001 mg/m³ Highest European LV (8h): 0,002 mg/m³	EC-STLV: - Lowest European STLV: 0,002 mg/m³ Highest European STLV: 0,008 mg/m³

SUMMARY OF THE METHOD	
Language: English	**Reference:** **Beryllium and beryllium compounds in air:** MDHS 29/2, Methods for the Determination of Hazardous Substances, HSL (1996).
Summary: Air is drawn through an MCE or other suitable filter mounted in an inhalable sampler. The sample is then subjected to hotplate dissolution with HNO_3, or with HNO_3 and H_2SO_4 if calcined BeO is present, and the sample solution is analysed by FAAS. If the beryllium concentration of the sample solution is < 0.01 µg/ml it is reanalysed by ETAAS.	
SAMPLING	
Sampler type	Multi-orifice sampler, IOM sampler or CIS, as described in MDHS 14/2 (now MDHS 14/3)
Sampling substrate	MCE filter or other suitable filter
Recommended flow rate	2 l/min (multi-orifice sampler and IOM sampler) 3,5 l/min (CIS)
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.
ANALYSIS	
Sample preparation	The sample is dissolved on a hotplate in 1+1 HNO_3 (5 ml) and reduced to 1 ml. If calcined beryllia is present, H_2SO_4 (1 ml) is added and the solution is again reduced to 1 ml. The sample solution is then made to 10 ml with H_2O. The sample solution matrix is 10 % HNO_3 or 10 % H_2SO_4.
Analytical technique	Analysis by FAAS or ETAAS.
METHOD EVALUATION DATA	
Range studied	Not applicable – see limit of quantification.
Sampling bias	0 % (assumed)
Analytical bias	FAAS: - 6,5 % to + 6,8 % ETAAS: - 2,9 % to + 4,8 %
Method bias	-
Sampling precision	< 5 % (assumed)

METHOD EVALUATION DATA (continued)	
Analytical precision	FAAS: 2,1 – 10,4 % ETAAS: 1,7 – 8,9 %
Method precision	-
Limit of quantification	FAAS: 0,10 µg per filter (HNO_3) 0,12 µg per filter (HNO_3+ H_2SO_4) ETAAS: 0,9 ng per filter (HNO_3) 3,3 ng per filter (HNO_3+ H_2SO_4)
Overall uncertainty (EN 482)	30 l air volume (recommended minimum): 0,1×LV 0,5×LV 2×LV 17 % ** 14 % ** 20 % * UK LV (0,002 mg/m³) 240 l air volume: 0,1×LV 0,5×LV 2×LV 18 % ** 20 % * 14 % * UK LV (0,002 mg/m³) * FAAS analysis, ** ETAAS analysis
Expanded uncertainty (prEN 482)	30 l air volume (recommended minimum): 0,1×LV 0,5×LV 2×LV 24 % ** 22 % ** 22 % ** LLV 23 % ** 22 % ** 27 % * HLV 240 l air volume: 0,1×LV 0,5×LV 2×LV 22 % ** 22 % ** 22 % ** LLV 22 % ** 27 % * 24 % * HLV * FAAS analysis, ** ETAAS analysis

INFORMATION IN RELATION TO THE VALIDATION	
Is the sample dissolution procedure described widely applicable?	yes
Does the analysis include wall deposits, where applicable?	yes
Was a test gas atmosphere used, where applicable?	not applicable
How was the recovery determined?	The sample dissolution method was tested by analysis of a range of well-characterised materials and it was found to be fully effective. Recovery was determined from the analysis of spiked filters.
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	Up to date methodology, detailed method description, overall uncertainty and expanded uncertainty requirements met. The analytical bias, analytical precision and overall uncertainty data above are taken from HSL back-up data report IR/L/IS/95/10. The expanded uncertainty data have been calculated from the performance data contained in the report using the method described in the EU mandated report *Analytical methods for chemical agents*. The overall uncertainty data and expanded uncertainty data for the two sample dissolution methods have been averaged for each analytical technique.
Observations	It is stated that the FAAS method can be used for sampling times in the range 2 – 8 h, but in fact the overall uncertainty and expanded uncertainty requirements are only met in the range 4 – 8 h.
Similar methods	BIA 6300, NIOSH 7102