

ISO 30011:2025-08 (E)

Workplace air - Determination of metals and metalloids in airborne particulate matter by inductively coupled plasma mass spectrometry

Contents		Page
Foreword		v
Introduction		vi
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
3.1	Terms related to analysis	2
3.2	Terms related to inductively coupled plasma mass spectrometry (ICP-MS)	3
4	Principle	6
5	Requirements	6
6	Reagents	6
7	Laboratory apparatus	9
8	Procedure	10
8.1	Preparation of sample solutions	10
8.2	Method development	10
8.2.1	General	10
8.2.2	Interferences	10
8.2.3	Sample introduction system	10
8.2.4	Analytical mass	10
8.2.5	Plasma conditions	12
8.2.6	Instrument operating parameters	13
8.2.7	Sample introduction rate	13
8.2.8	Sample wash-out parameters	13
8.2.9	Minimization of wall losses and contamination	13
8.2.10	Calibration solutions	14
8.2.11	Selection of internal standards	14
8.3	Instrument performance checks	15
8.3.1	Visual inspection	15
8.3.2	Performance checks and fault diagnostics	15
8.4	Routine analysis	15
8.4.1	Dilution of sample solutions	15
8.4.2	Addition of internal standards	15
8.4.3	Determination of mercury	15
8.4.4	Setting up the instrument	16
8.4.5	Analysis	16
8.5	Estimation of detection and quantification limits	17
8.5.1	Estimation of the instrumental detection limit	17
8.5.2	Estimation of the limit of detection and the limit of quantification	17
8.6	Quality control	17
8.6.1	Blank solutions	17
8.6.2	Quality control solutions	17
8.6.3	Internal standards	18
8.6.4	External quality assessment	18

8.7	Estimation of measurement uncertainty	18
9	Expression of results	18
10	Method performance	19
10.1	Limits of detection and limits of quantification	19
10.2	Upper limits of the analytical range	19
10.3	Bias and precision	19
10.3.1	Analytical bias	19
10.3.2	Analytical precision	20
10.4	Evaluation of measurement uncertainty for this method	20
11	Test report	20
11.1	Test records	20
11.2	Laboratory report	21
	Annex A (informative) ICP-MS principles and interferences	22
	Annex B (informative) Examples of instrument operating parameters	25
	Annex C (informative) Guidance on maintenance of ICP-MS instrumentation	27
	Annex D (informative) Recalculation of metal and metalloid in air concentrations to reference conditions	29
	Annex E (informative) Method validation data (LOD, LOQ) for ICP-MS using various substrates	30
	Bibliography	33