

# ISO 30011:2025-08 (E)

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

---

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

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