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Continuous analyzer for mercury
in flue gas

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by Japan Electric Measuring Instruments Manufacturers' Association (JEMIMA)/Japanese Standards Association (JSA) with a draft being attached, based on the provision of Article 12, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act. This edition replaces the previous edition (**JIS B 7994 : 2016**), which has been technically revised.

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Continuous analyzer for mercury in flue gas

1 Scope

This Japanese Industrial Standard specifies requirements for analyzers for performing continuous measurement of flue gas emitted from a fixed source for the purpose of monitoring its gaseous mercury concentration (hereafter referred to as analyzers). The principle of the measurement specified in this Standard is based on the reduction of metallic mercury or mercury compounds in the flue gas using a reducing agent and the atomic absorption spectrometry.

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS B 7551 *Variable area flowmeters*

JIS C 1302 *Insulation resistance testers*

JIS K 0095 *Methods for sampling of flue gas*

JIS K 0212 *Technical terms for analytical chemistry (optical part)*

JIS K 0215 *Technical terms for analytical chemistry (Analytical instrument part)*

JIS K 0222 *Methods for determination of mercury in stack gas*

JIS K 8136 *Tin(II) chloride dihydrate (Reagent)*

JIS K 8139 *Mercury (II) chloride (Reagent)*

JIS K 8541 *Nitric acid (Reagent)*

JIS K 8780 *Pyrogallol (Reagent)*

JIS K 9502 *L(+)-Ascorbic acid (Reagent)*

JIS Z 8103 *Glossary of terms used in measurement*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions, and those given in JIS K 0212, JIS K 0215, JIS K 0222 and JIS Z 8103 apply.

3.1

sample gas

flue gas which is introduced into the spectrometer after being pretreated through a filter or the like

3.2

fixed source flue gas

gas which is produced by burning fuels or other materials in a factory or business facility, or generated in various manufacturing processes, and which is discharged into ducts or chimneys for diffusion in the atmosphere

3.3**gaseous mercury**

metallic mercury and divalent mercury in a gaseous state

3.4**concentration**

mass of a target substance contained per unit volume of a gaseous substance under the condition of pressure of 101.32 kPa, temperature of 273.15 K and dry gas

3.5**zero drift**

variation of the analyzer indication over a certain period of time corresponding to the minimum scale of the analyzer

3.6**span drift**

variation of the analyzer indication over a certain period of time corresponding to the maximum scale of the analyzer

3.7**predetermined flow rate**

flow rate of a sample gas, calibration gas or the like specified for an analyzer

3.8**indication error**

percentage of the difference between the nominal value and the analyzer indication of the concentration of the midway point calibration gas introduced into an analyzer to the maximum scale of the analyzer

3.9**response time**

sum of the lag time and rise time required for an analyzer indication to reach a value corresponding to 90 % of the final indication after introduction of a test gas

3.10**dry reduction type**

analyzer type that reduces a mercury compound to metallic mercury through the use of a solid reducing agent

3.11

wet reduction type

analyzer type that reduces a mercury compound to metallic mercury through the use of a solution-type reducing agent

4 Types and measuring ranges of analyzers

The gas analyzers are either of dry reduction type or wet reduction type.

The measuring range (hereafter referred to as the range) of each analyzer type shall be in accordance with Table 1.

Table 1 Types and ranges of analyzers

Type	Example of range ^{a)}
Dry reduction type	Minimum scale value 0, maximum scale value 50 µg/m ³ to 5 µg/m ³
Wet reduction type	Minimum scale value 0, maximum scale value 50 µg/m ³ to 5 µg/m ³
Note ^{a)} The maximum scale value of each type shall be selected so that the range is suitable for the specific purpose of use.	

5 Performance of analyzer

The analyzer shall satisfy the requirements given in Table 2 with respect to the maximum scale value of each range when tested by the methods specified in Clause 7.

Table 2 Performance of analyzer

Item	Required performance		Test method
	Dry reduction type	Wet reduction type	
Repeatability	±2 % of the maximum scale value	±3 % of the maximum scale value	7.4 a)
Zero drift	±2 % of the maximum scale value	±3 % of the maximum scale value	7.4 b)
Span drift	±2 % of the maximum scale value	±3 % of the maximum scale value	7.4 c)
Indication error	±3 % of the maximum scale value		7.4 d)
Response time	5 minutes max.		7.4 e)
Stability of indication against flow rate fluctuation of sample gas	±2 % of the maximum scale value		7.4 f)
Stability against voltage fluctuation	±2 % of the maximum scale value		7.4 g)
Withstand voltage	No abnormalities		7.4 h)
Insulation resistance	5 MΩ min.		7.4 i)