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**Continuous analyzers for
hydrocarbons in ambient air**

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Foreword

This translation has been made based on the original Japanese Industrial Standard 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 the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14. Consequently **JIS B 7956**:1995 is replaced with this Standard.

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Continuous analyzers for hydrocarbons in ambient air

1 Scope This Japanese Industrial Standard specifies the continuous analyzers used for measuring the concentration of hydrocarbons in ambient air continuously (hereafter referred to as “analyzer”) based upon the flame ionization detection method.

The measuring system of this Standard shall be the following types. The hydrocarbons in this Standard means the methane and the non-methane hydrocarbon as the factorial substances of photochemical oxidant formation.

- a) Non-methane hydrocarbons (direct method) measuring system
- b) Non-methane hydrocarbons (differential method) measuring system
- c) Total hydrocarbons measuring system

NOTE : Concerning the method of safety treatment of high-pressure gas shall comply with the High Pressure Gas Safety Law (7th June, 1951).

(See working guide for high-pressure gas control in continuous analysis of ambient air, Committee of Safety Countermeasures for Ambient Air Measurement, Environment Agency, October, 1973).

2 Normative references The following standards contain provisions which, 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 C 1302 *Insulation resistance testers*

JIS K 0006 *Reference material—Standard gas—Methane*

JIS K 0007 *Reference material—Standard gas—Propane*

JIS K 0055 *General rules for calibration method of gas analyzer*

JIS K 1107 *Nitrogen*

JIS Z 8103 *Glossary of terms used in measurement*

3 Terms and definitions For the purposes of this Standard, the definitions given in **JIS Z 8103** and the following definitions apply.

3.1 flame ionization detection method detection method for hydrocarbons by utilizing the ionization phenomenon in hydrogen flame

3.2 total hydrocarbons general term of hydrocarbons measured by flame ionization detection method

3.3 non-methane hydrocarbons total hydrocarbons except for methane

3.4 gas used for test general term of standard gas and the like used for calibration of analyzer and performance test

3.5 volppmC unit of the hydrocarbons concentration (volppm) expressed by making the number of carbon atoms the reference

Generally it is regarded that the response in proportion to the number of carbon atoms contained in hydrocarbons by the flame ionization detection method is indicated.

3.6 flame-extinction detector an apparatus to detect that the hydrogen flame of detector is extinguished

3.7 fuel gas shut-off device a valve or the like which shuts off the fuel gas line automatically by a signal of flame-extinction detector when the hydrogen flame of detector is extinguished

3.8 hydrogen generator an apparatus to be used as the fuel gas source in the case of hydrocarbons measurement in ambient air by the flame ionization detection method

3.9 air refiner an apparatus to be used for removing the hydrocarbons in air and obtaining zero gas and supporting gas

4 Type and measuring range of analyzer The types of analyzers shall be classified in accordance with the principle and the analyte and the measuring range (hereafter referred to as “range”) shall be in accordance with table 1.

The adequate range shall be selected from the ranges as shown in table 1.

Table 1 Type and range of analyzer

Type	Analyte	Range
Non-methane hydrocarbons (direct method) measuring system	Methane, non-methane hydrocarbons, total hydrocarbons	It shall be made to be able to set optionally within the range from (0 to 5) volppmC to (0 to 50) volppmC.
Non-methane hydrocarbons (differential method) measuring system	Methane, non-methane hydrocarbons, total hydrocarbons	It shall be made to be able to set optionally within the range from (0 to 5) volppmC to (0 to 50) volppmC.
Total hydrocarbons measuring system	Total hydrocarbons	It shall be made to be able to set optionally within the range from (0 to 5) volppmC to (0 to 50) volppmC.
NOTE 1 The measured value of total hydrocarbons by the non-methane hydrocarbons (direct method) measuring system shall be obtained as the sum of measured values of methane and non-methane hydrocarbons.		
NOTE 2 The measured value of non-methane hydrocarbons by the non-methane hydrocarbons (differential method) measuring system shall be obtained as the difference between the measured values of total hydrocarbons and methane.		

5 Performance of analyzer The analyzer, when tested in clause 7, shall satisfy the performance shown in table 2.

Table 2 Performance

Item	Performance		Test method
	Measuring range of non-methane hydrocarbons	Measuring range of methane	
Repeatability	Maximum scale value ± 2 %	Maximum scale value ± 1 %	7.4.1
Zero drift	Maximum scale value ± 2 %	Maximum scale value ± 1 %	7.4.2
Span drift	Maximum scale value ± 3 %	Maximum scale value ± 2 %	7.4.3
Measuring period is applied to the gas chromatograph system of non-methane hydrocarbons (direct method) measuring system and non-methane hydrocarbons (differential method) measuring system	At least four times per one hour		7.4.4
Response time is applied to the selective combustion system of non-methane hydrocarbons (differential method) measuring system and total hydrocarbons measuring system	At most two minutes		7.4.5
Indication error	Maximum scale value ± 4 %	Maximum scale value ± 2 %	7.4.6
Influence of interference component (moisture)	Maximum scale value ± 3 %	Maximum scale value ± 2 %	7.4.7
Test for sampling part	Maximum scale value ± 3 %	Maximum scale value ± 2 %	7.4.8
Stability against flow rate variation of sample ambient air	Maximum scale value ± 3 %	Maximum scale value ± 2 %	7.4.9
Stability against fluctuation of power source voltage	Maximum scale value ± 2 %	Maximum scale value ± 1 %	7.4.10
Dielectric withstand voltage	No abnormality shall appear.		7.4.11
Insulation resistance	At least 2 MΩ		7.4.12
For the total hydrocarbons measuring system, the performance specification for the measuring range of methane shall be applied.			

6 Structure

6.1 Structure in general The structure of the analyzer shall conform to the following items.

- The shape shall be correct, the assembly and the finish of each part shall be good and robust.
- It shall not have the potential danger under the normal operating condition and shall operate safely and smoothly.

- c) Each part shall not cause mechanical and electrical failure easily and shall be the structure not having the potential danger.
- d) It shall be the structure so that the operation of analyzer is not hindered by dew formation and the like.
- e) The contacting part to heating part such as detector, heater shall be the structure so as not to cause the deformation and change in function due to heat.
- f) It shall be the structure so as to be easy to work and have no danger in the case of maintenance and checking.

6.2 Analyzer The analyzer shall be composed of the sampling part, analytical meter, indicating recorder and the like as shown in figure 1.

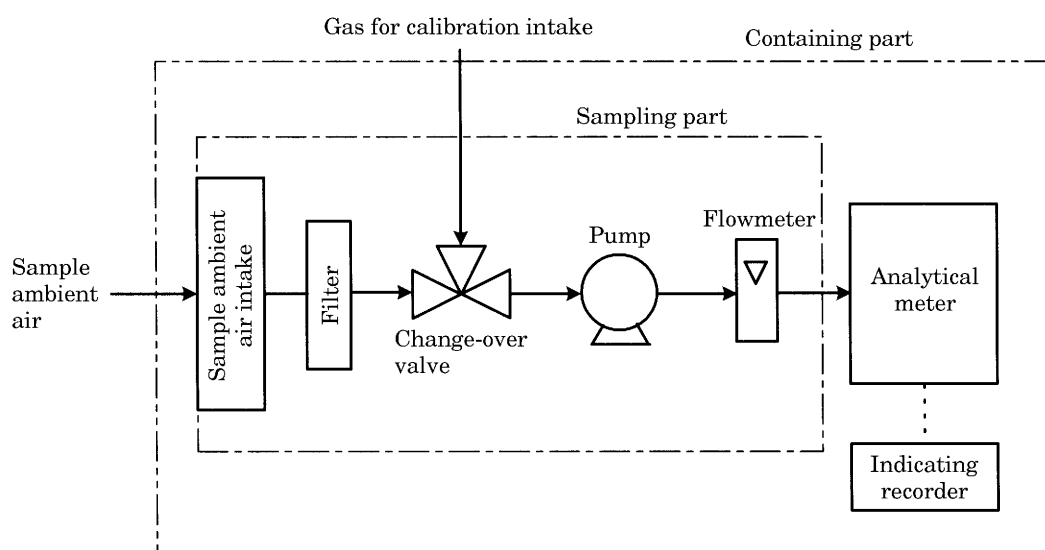


Figure 1 Example of configuration of analyzer

6.3 Sampling part It is the part in which the dust contained in sample ambient air is removed and a definite amount of sample gas is supplied to the analytical meter. The piping materials used for the gas contacting part of analyzer shall neither adsorb the hydrocarbons in sample ambient air nor release the substances from themselves which affect the measurement such as hydrocarbons.

- a) **Sample ambient air intake** It is the part to connect an introducing pipe of sample ambient air, and that which can connect the polytetrafluoroethylene resin pipe of 4 mm to 8 mm in inside diameter shall be used.
- b) **Filter** Polytetrafluoroethylene resin shall be used for the material. Depending on the use, cylindrical or disk filter of glass fibre or cellulose fibre, sintered filter of metal and the like be used.
- c) **Pump** The diaphragm pump or metallic bellows pump, which is able to supply the sample ambient air continuously at such flow rate and pressure as to be able to operate the analytical meter steadily, shall be used.