

KES

Methods for Determination of Pyridine in Exhaust Gas

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1. Scope of Application

This standard shall specify the analysis method for pyridine in exhaust gas.

2. General Provision

Common items in chemical analysis are specified in KS M 0001 (General Provision for Chemical Analysis and Test Method). Extinction photometric method is specified by KS M 0012 (Extinction Brightness Measurement Method). Gas chromatography method is specified by KS M 0018 (General Provision for gas chromatography analysis Method). Exhaust gas collection method is specified by KS M 0021 (Exhaust Gas Collection Method).

3. Analysis Method

3.1 Extinction Photometric Method

3.1.1 Summary

Absorb exhaust gas in sulfuric acid (0.02 N). Then add 4.4 – di aminosphyllbene – 2.2 – di sulfonic acid solution and chromium cyanide solution. Then extinction rate is measured to quantify pyridine. This method is suitable for analysis of pyridine with concentration about 0.1~1.0 V/V RPM or more about 20 l of exhaust gas collected (1).

Note (1) This method is suitable about concentration of pyridine, α - pygorine should have concentration equal or less to pyridine, β - pygorine at 1/10 of concentration of pyridine or less.

3.1.2 Apparatus

(1) Exhaust Sample Collection Device

Standard KS M 0021 is followed. Absorbent bottle suitable is shown in Figure (d) or (e).

(2) Extinction Photometer

Diffuse Photometer and its use, and general items are listed in KS M 0012.

3.1.3 Reagent

(1) Absorbent

0.02 N Sulfuric Acid

(2) 4.4 – di aminosphylbene – 2.2 – di sulfonic acid solution

Emulsify 1.0 g of 4.4 – di aminosphylbene – 2.2 – di sulfonic acid solution. Gradually add the solution to 30 ml of Acetic Acid sodium solution. Then add ethanol (99.5%) so the volume becomes 100 ml ⁽²⁾.

(3) Cyanide Bromide Solution ⁽³⁾

Solution is prepared by dissolving 1.5 g of Cyanide Bromide in water to make 100 ml.

(4) Buffer Solution

Dissolve 38 g of boric acid (10 hydrogen nitrate) in 950 ml of water. Dilute 1.80 ml of this solution to 1000 ml of 0.02 N sulfuric acid to make standard solution. 1 ml of standard solution is equivalent to 0.0005 ml of C₅H₅N (0 °C, 760 mmHg 101.32 kpa).

Note ⁽²⁾ 4.4 – di aminosphylbene – 2.2 – di sulfonic acid solution can not be used after one month.

Note ⁽³⁾ Cyanide bromide solution of 1 month old can not be used.

3.1.4 Collection of Test Gas

(1) Place 20 ml and 10 ml of 0.02N sulfuric acid in two separate test gas collection bottle.

(2) Intake rate of test gas should be 0.5~1 l/min, Collection amount should be 10~20 l.

(3) Place the whole amount of gas collected in mess flask. Fill the flask with water to the mark to make test sample solution for analysis.