KES

Testing Method for Aromatic Hydro Carbons of Petroleum Products (Silica Gel Adsorption Method)

KES T – M177

(EST.) 1989 – 07 – 04

Contents

1. Scope of Application

2. Summary of Test Method

3. Apparatus

4. Reagent

5. Preparation of Apparatus

6. Operation

7. Calculation of Report

8. Accuracy

Additional Rule

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1. Scope of Application

This standard shall specify the method to measure the amount of aromatic hydrocarbon among oil content of de-butylized petroleum, which is flowed out with less than 1% of hydrocarbon and below 204 °C by KS M 2031 (Test method to distill petroleum products).

Remark Paraffin and naphthalene hydrogen are not interrupted by their concentration. The compound of sulfur and nitrogen are interrupted when they coexist with aromatic hydrocarbon.

2. Summary of Test Method

The specimen is flowed to the absorbing pipe, which charged active silica gel, and the whole specimen is absorbed by gel. Then, alcohol is added as an effluent.

The hydrocarbon is dissolved and separated by this alcohol and the absorbing pipe is remained. The hydrocarbon from the bottom region of absorbing pipe by absorption and removal is classified as following sequence by its absorbing attraction.

The sequence is saturated hydrocarbon, saturated hydrocarbon & aromatic hydrocarbon, aromatic hydrocarbon, aromatic hydrocarbon & alcohol, alcohol. Capacity and refracting rate for each solution (Hereinafter referred to as separating solution), which is separated from the eluting solution, are measured. The amount of aromatic hydrocarbon among specimen is obtained by a calculation.

At this moment, the specimen with more than 4 V/V% of aromatic hydrocarbon is diluted by saturated hydrocarbon or saturated hydrocarbon mixture, which has boiling point range of gasoline. Then, the added toluene or diluted material on calculation is compensated.

3. Apparatus

3.1 Absorbing pipe: As the shape and measurements are shown on figure 1, the absorbing pipe is composed of wide region and narrow region, which has solute gathering region,

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specimen gathering region and external pipe. When it is operated with pressure of more than 0.7 ㎏ / ㎠, a clear protection cap should be attached around the absorbing pipe.

3.2 Receiving vessel

As the shape and measurements are shown on figure 2, compensated one with 11 ㎖ of notch mark is employed.

Remark 1. It is not always necessary. However, for the purpose of accurate and clear measurement, it is favorable to use cassette meter, which can measure the position of solution surface as accurate as ± 0.1 ㎜.

2. Compensating method of receiving vessel: The receiving vessel is washed by chromic acid mixed solution, water and acetone. Then, it is dried by suction.

Lubricants are applied on the stop cock and the weight of receiving vessel is measured as accurate as ± 0.1 ㎎ by a scale, which is located at a place with no ventilation.

The receiving vessel is untouched during compensation with stop cock closed. The mercury is filled up to notch of 0.2 ~ 0.3 and the glass pipe is softly tapped to drop the air & mercury on the pipe wall.

The amount of mercury is measured up to ± 1 ㎎. The receiving vessel is vertically fixed and indirect light is adjusted for meniscus to be appeared clearly. Then, top region of meniscus is measured and recorded as vobs.

The actual temperature is recorded up to ± 5° C and the amount (V_m) of mercury is calculated as followings.

Narrow region of receiving vessel

$$V_m = vW + 0.006$$

Wide region of receiving vessel

$$V_m = vW + 0.023$$

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Where, W : Weight of mercury (g)

v : Amount of mercury 1g at t °C (㎖)

(See table 1)

0.006 and 0.023 : Compensating value of each mercury meniscus corresponding to the diameter of receiving vessel

Where, Vobs : Capacity of measurement

V_m : Capacity of mercury

The mercury is continuously inserted like this. 4 points with some intervals are compensated for the narrow region of receiving vessel and 5 points for the wide region of receiving vessel. As a result of analysis, the difference of maximum and minimum should be less than 0.005 ㎖ at the narrow region and 0.02 ㎖ at the wide region.

When the amount compensation is performed, it is allowable to use the ones, which stay out of the range of these compensating error.

Table 1. Amount of Mercury 1g at Each Temperature

Temperature (t℃)	Capacity (㎖)	Temperature (t℃)	Capacity (㎖)
18	0.07379	24	0.07387
19	0.07380	25	0.07388
20	0.07382	26	0.07390
21	0.07383	27	0.07391
22	0.07385	28	0.07393
23	0.07386	29	0.07394

When it is compensated by the cassette meter, h_1 (Position of bottom initial notch line on meniscus), h / m (Position of cutting line on meniscus) and h_2 (Position of initial

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Unit: ㎜

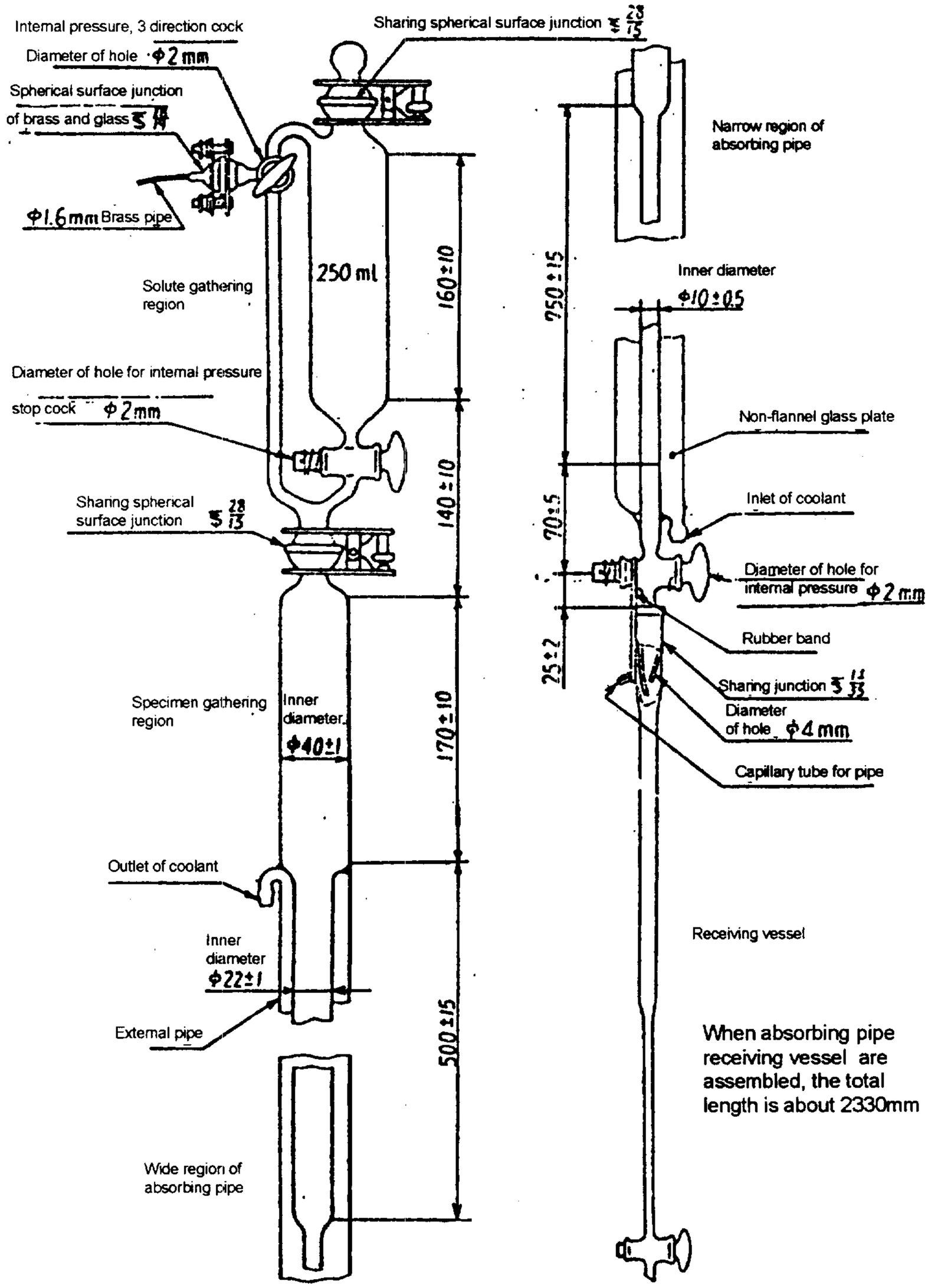

Figure 1. Absorbing Pipe

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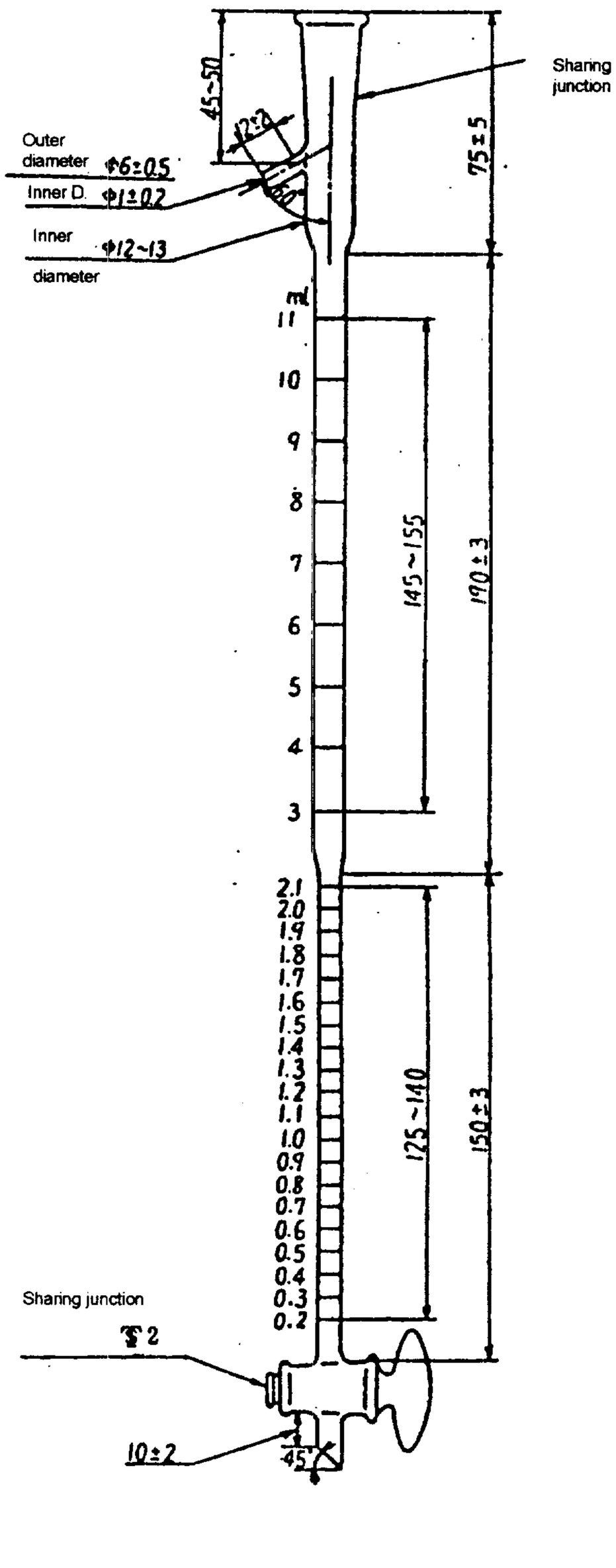

Measurement and accuracy of notch mark

Length of notch line

Wide region of receiving vessel

Indication line every 1 ㎖

¾ of indication line every 0.5 ㎖

½ of indication line every 0.1 ㎖

Narrow region of receiving vessel

Indication line every 0.1 ㎖

½ of indication line every 0.02 ㎖

Thickness of notch line is 0.12 ~ 0.15 ㎜

Accuracy of notch

Wide region of receiving vessel

less than 0.02 ㎖

Narrow region of receiving vessel

less than 0.005 ㎖

Figure 2. Receiving Vessel

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