

KES

Test Standard for Distillation of Petroleum Products

KES T – L227

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Additional Rule

Attached document

1. Scope of application

This standard shall regulate testing method for distillation of gasoline, jet fuel, lamp oil, diesel oil and similar petroleum products.

Remark 1. When distillation is carried out with automatic distillation tester, follow the attached document.

2. Number or unit that are written in the { } are based on the international unit system (SI) and are written for reference.

2. Terminology

(1) Initial drop point

This is a temperature when the first drop of fluid flows out from the end of condenser.

(2) End point

This is the highest temperature during distillation, and this temperature is generally reached after the samples in the bottom of flask evaporate.

(3) Dry point

This is a temperature when the bottom part in the flask is dry. At this point, inner wall of flask and surface of thermometer may be wet.

Remark : Generally, end point is used more widely than dry point. However the dry point may be reported in the KS M 2611 (Industrial gasoline). If the end point of a sample is not obtained with the regulated accuracy in 9, replace end point with dry point.

(4) Decomposition point

This is the temperature when a sample starts heat-decomposition.

Remark : Heat-decomposition can be detected with a generation of white smoke or irregular drop of temperature.

 (5) Efflux

This is amount of efflux (v / v %) corresponding to scale of thermometer.

(6) Pre-efflux

This is the maximum efflux (v / v %) measured according to 7.(7).

(7) Residual flux

This is residual fluid in the flask (v / v %) measured according to remark in 7.(8).

(8) Recovery

This is the sum of pre-efflux and residual flux (v / v %).

(9) Loss

This is 100 minus recovery (v / v %).

(10) Loss added by recovery

This is sum of efflux and loss (v / v %).

 (11) Efflux temperature

This is scale of thermometer corresponding to efflux.

3. Abstract of testing method

Distillate 100 ml of sample according to its properties and test condition regulated in Table 1, and measure initial drop point, efflux, efflux temperature, and end point (Or dry point).

Table 1 Types of sample and test condition

	1 st type	2 nd type	3 rd type	4 th type
Property of sample	More than 0.65	Less than 0.65	Less than 0.65	Less than 0.65
Lead vapor pressure ⁽¹⁾ (kg f / cm ²) {kPa}	{More than 63.7}	{Less than 63.7}	{Less than 63.7}	{Less than 63.7}
Vapor properties				
Initial drop point	—	—	Less than 100	More than 100
End point	Less than 250	Less than 250	More than 250	More than 250
Preparation of device	7 C for low temp.	7 C for low temp.	7 C for low temp.	8 C for high temp.
Number of ASTM-E- 133 thermometer				
Hole diameter of flask saucer	37.5	37.5	50	50
Temperature of thermometer and flask when the test starts	13 ~ 18	13 ~ 18	13 ~ 18	Less than normal temp.
Temperature of flask saucer and windbreak when the test starts	Normal temperature	Normal temperature	Normal temperature	—
Temperature of disk and sample when the test starts	13 ~ 18	13 ~ 18	13 ~ 18	13 ~ Normal temp.
Flask regulated in 4.1	I type (100 mℓ)	I type (100 mℓ)	II type (125 mℓ)	II type (125 mℓ)

Table 1 (Continued)

	1 st type	2 nd type	3 rd type	4 th type
Test condition				
Temperature in a cooling bath(°C)	0 ~ 1	0 ~ 4	0 ~ 4	0 ~ 60
Temperature of water bath that contain saucer	13 ~ 18	13 ~ 18	13 ~ 18	Within $\pm 3^\circ$ of sample temperature
Elapsed time from start of heating to initial drop point (min)	5 ~ 10	5 ~ 10	5 ~ 10	5 ~ 15
Elapsed time from initial drop point to 5 v / v % efflux (sec)	60 ~ 75	60 ~ 75	—	—
Mean efflux (mℓ / min) from the temperature of 5 v / v % to residual flux of about 5 mℓ	4 ~ 5	4 ~ 5	4 ~ 5	4 ~ 5
Elapsed time (min) from residual flux of 5 mℓ to end point	3 ~ 5	3 ~ 5	Less than 5 min.	Less than 5 min.

Note ⁽¹⁾ : This is based on the KS M 2030 (Test method of vapor pressure in petroleum products (Lead method)).

⁽²⁾ : The temperature of cold water bath should be adjusted to be 0 ~ 60 °C for wax in the condenser not to condense according to wax content in sample and efflux.

Remark : When carrying out distillation of jet fuel corresponding to 3 in table 1 or similar petroleum products, if thermometer for low temperature distillation is

inappropriate, thermometer for high temperature distillation may be used.

And refer to 8.(3).

4. Device

This is the same type as example shown in Fig.1 ~ Fig.3 and composed of major part regulated in 4.1 ~ 4.7.

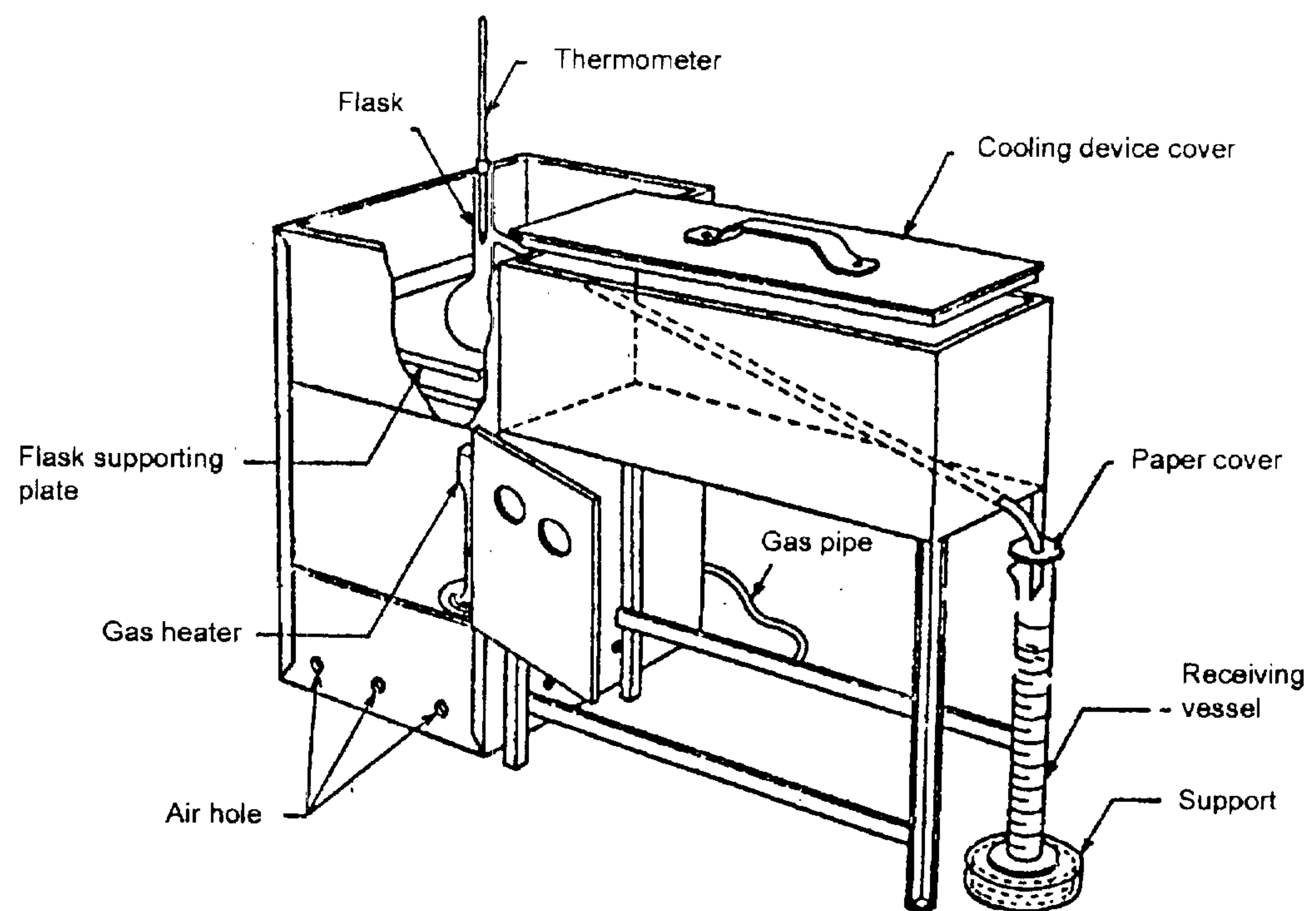


Fig. 1 Example of test device for distillation

(Gas heating type)

A : Saucer

C : Flask

E : Cold water bath

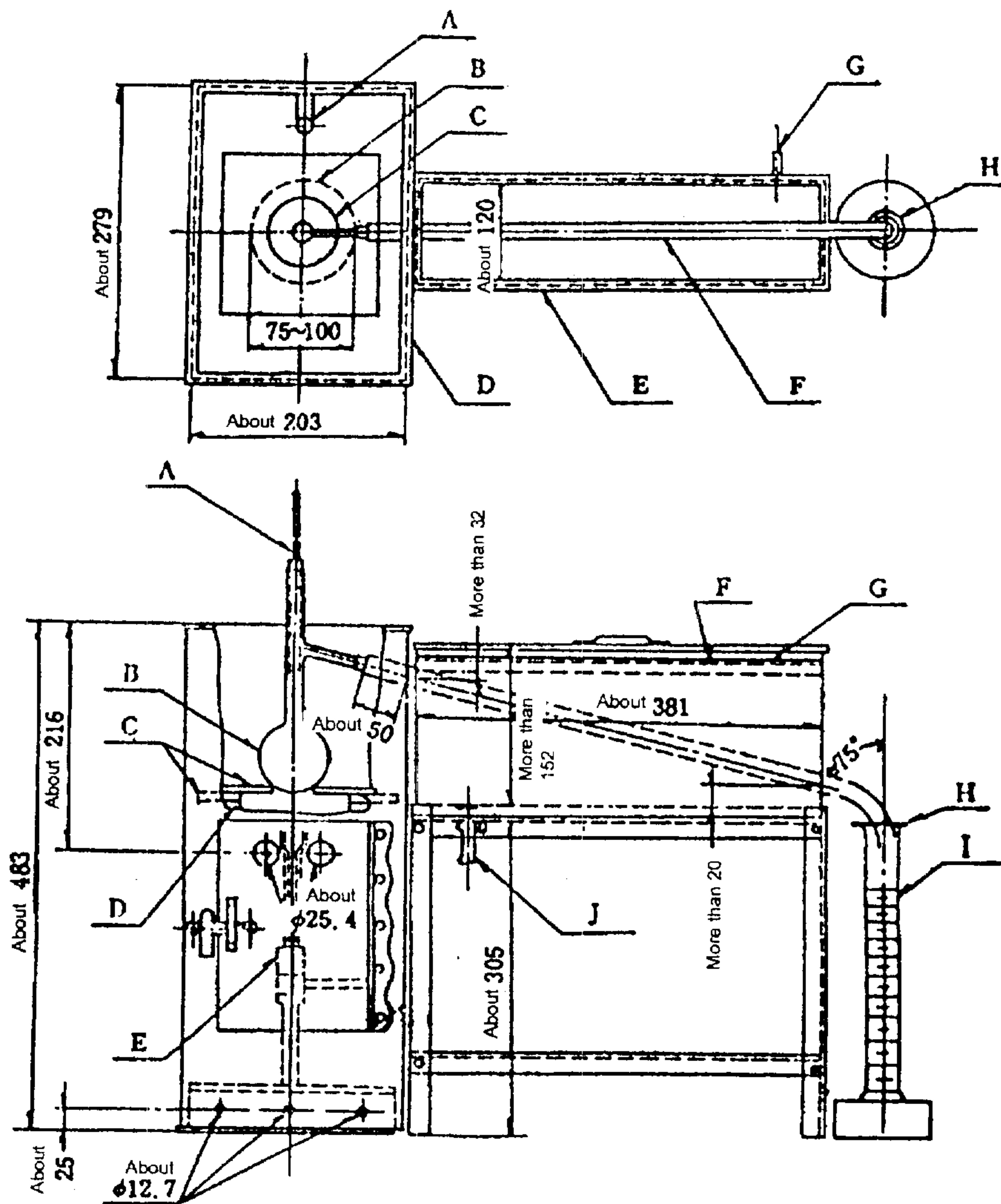
G : Overflow

B : Flask saucer

D : Windbreak

F : Cooling tube

H : Reservoir dish



A : Thermometer

C : Flask supporting plate

E : Gas burner

G : Over flow

I : Bowl

B : Flask

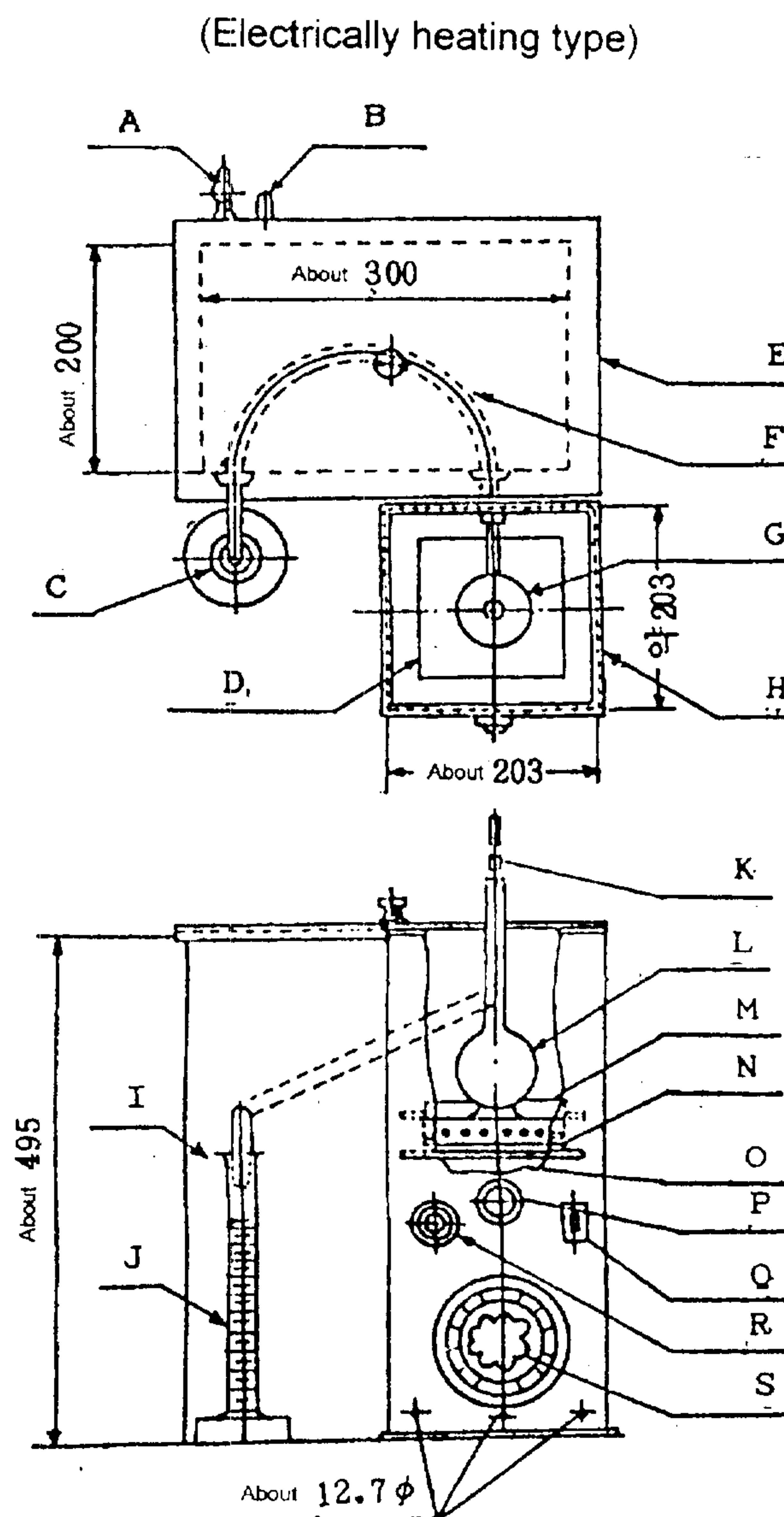
D : Flask prop

F : Liquid surface

H : Paper stopper

J : Drain hole

Fig.2 Example of test device for distillation



- | | |
|--------------------------------|---|
| A : Drain hole | B : Overflow |
| C : Bowl | D : Flask supporting plate |
| E : Condensing bath | F : Cooling tube (Outer diameter 14.3 ± 0.5 , thickness 0.8, 0.9) |
| G : Flask | H : Windbreak |
| I : Paper stopper | J : Bowl |
| K : Thermometer | L : Flask |
| M : Flask supporting plate | N : Electrical heater |
| O : Flask prop | P : Pincers for flask prop |
| Q : Switch | R : Indicating lamp |
| S : Dial for adjusting heating | |

Fig.3 Example of test device for distillation

4.1 Flask

Use a light glass flask of the type I (100 mL) or II (125 mL) for distillation with the dimension and shape shown in the Fig.4. The quality should be light 1st class in KS L 2303 (Chemical glass instrument).

Unit : mm

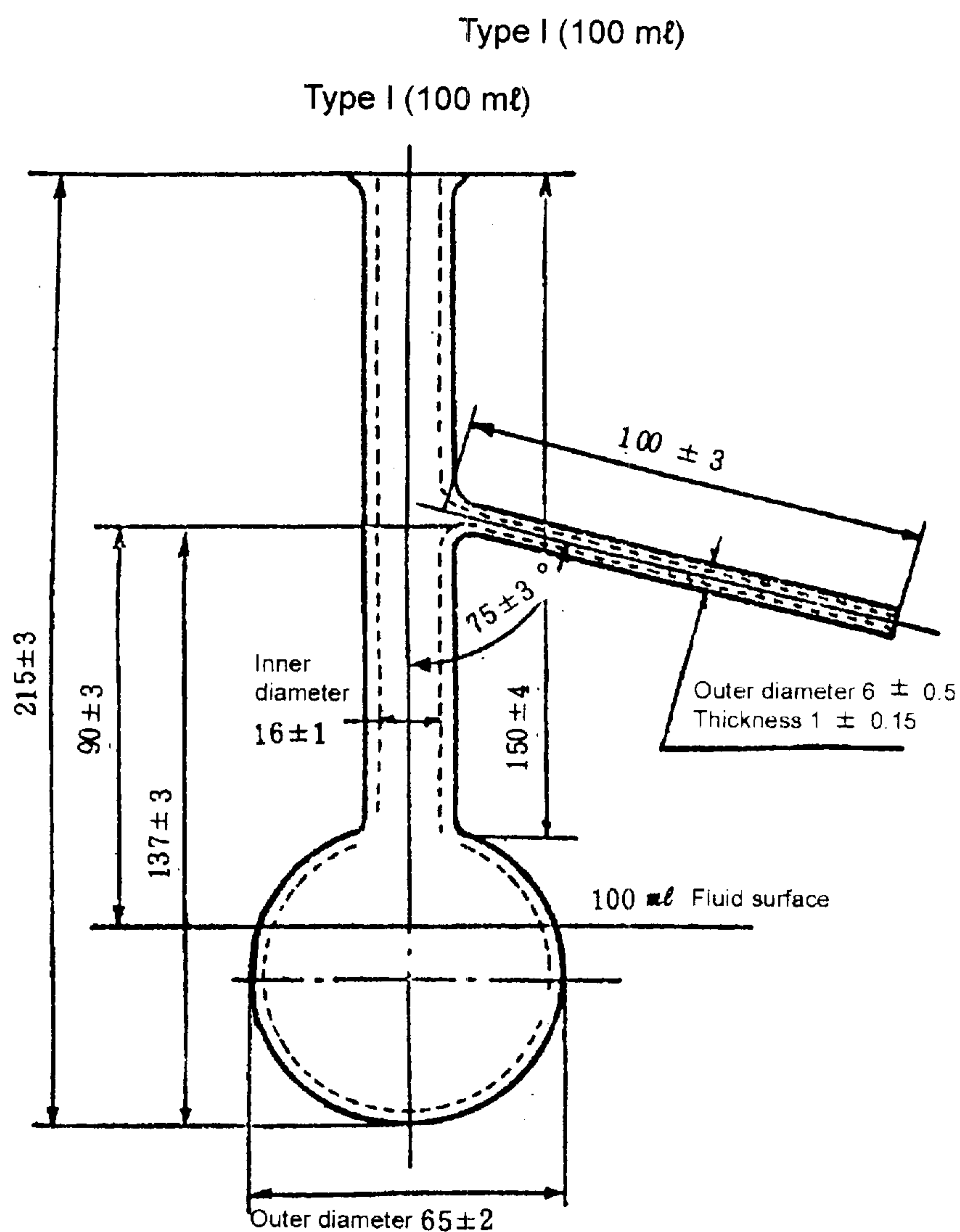


Fig.4 Flask

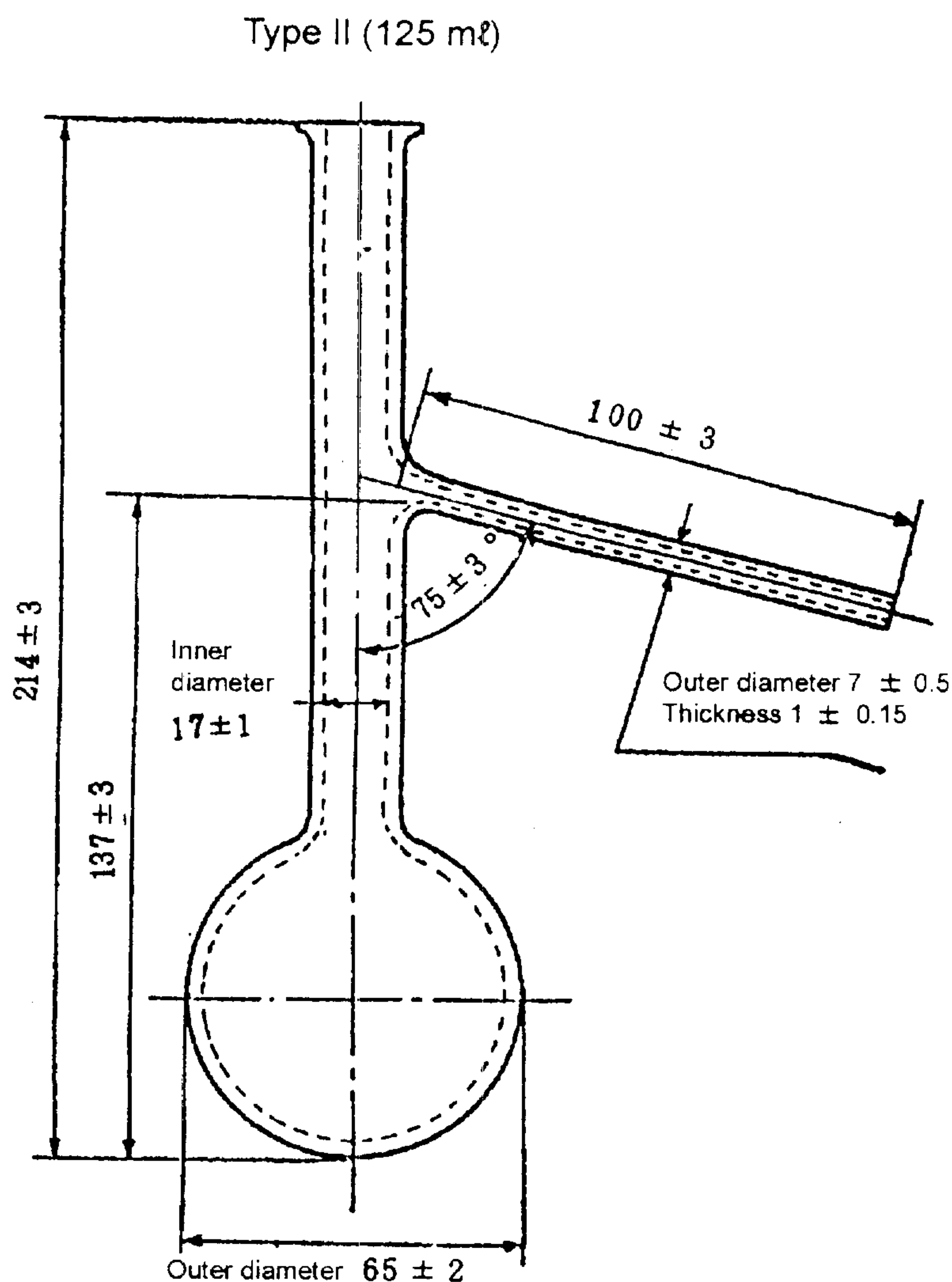


Fig.5 Flask

4.2 Condenser

This is composed of cooling bath and condensing tube and have shape and dimension as shown in Fig.1 ~ Fig.3.

- (1) Condenser is 560 ± 2 mm of length, 14.3 ± 0.5 mm of outer diameter and 0.8 ~ 0.9 mm of thickness. And it is made of unlinked brass tube. Soak about 395 mm of tube length in the cooling fluid in cooling bath. And let about 50 mm of upper end and about 115 mm of bottom end emerge on the water bath.