6. Filter Paper

Use filter papers conforming to the specifications given below. Unless otherwise specified, when the term" filter paper "is given alone, use filter papers for qualitative analysis. Filter papers must be stored by being protected from gases and other contaminants.

Filter Paper for Qualitative Analysis

Use filter papers conforming to the specifications for filter papers for qualitative analysis under the Japanese Industrial Standards (for chemical analysis).

Filter Paper for Quantitative Analysis

Use filter papers conforming to the specifications for filter papers for quantitative analysis under the Japanese Industrial Standards (for chemical analysis).

Filter Paper for Chromatography

Use filter papers conforming to the specifications for filter papers for the quantitative analysis and the specifications given in the table below.

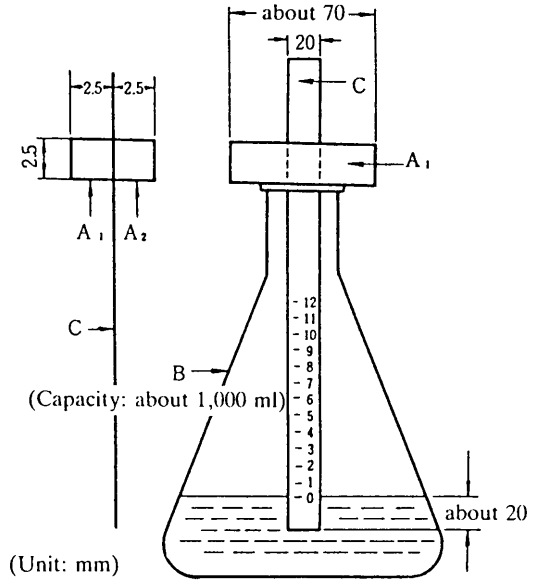
Class	No. 1	No. 2	No. 3	No. 4
α-Cellulose content (%)	not less than 90	not less than 95	not less than 95	not less than 95
Copper value (%)	not more than 1.6	not more than 1.4	not more than 1.4	not more than 1.4
pH	5—8	5—8	5—8	5—8
Ash content (%)	not more than 0.02	not more than 0.12	not more than 0.12	not more than 0.12
Filtration time (sec)	330 ± 132	240 ± 96	120 ± 48	100 ± 40
Wet burst strength (cm)	not less than 13	not less than 20	not less than 12	not less than 15
Water absorption (cm)	6 ± 1.2	5.5 ± 1.1	7 ± 1.4	7.5 ± 1.5

Tests for α-cellulose content, copper value, pH, ash content, filtration time, and wet burst strength are performed as directed under the Japanese Industrial Standards. Tests for water absorption are performed as directed below.

Test for Water Absorption

Apparatus

Use the apparatus illustrated in the following figure:



A_1 and A_2: Glass block to hold the filter paper

B: Erlenmeyer flask (Capacity: about 1,000 ml)

C: Sample filter paper

Procedure

Transfer about 300 ml of distilled water into Erlenmeyer flask B, and place 2 pieces of glass blocks (A_1 and A_2) in parallel to hold the filter paper at the mouth of the Erlenmeyer flask. Insert the sample filter paper, previously marked with 1-cm graduations using a pencil, between the two glass blocks. Gently slip down the filter paper in water until the lower edge of the filter paper reaches the surface of the water, quickly slip down until the zero mark is on the water-level, and fix the filter paper.

Measure the height of water absorbed by the filter paper in 10 minutes.

Membrane Filter

Use membrane filters conforming to the specifications given in the table.

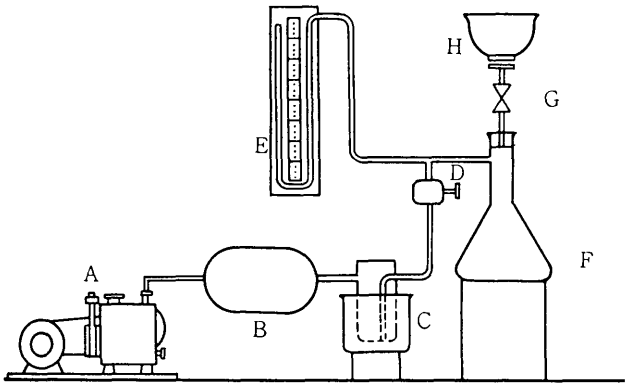
Pore diameter (μm)	Thickness (μm)	Water flow rate (ml/min/cm^2)	Bubble point (N/mm^2)
1.0 or 1.2	100—170	150—300	5.9×10^{-2} — 14.7×10^{-2}
0.45	130—170	20—60	16.7×10^{-2} — 34.3×10^{-2}
0.10	90—150	1.0—5.0	49.0×10^{-2} — 294.2×10^{-2}
0.05	70—150	0.1—2.0	98.1×10^{-2} — 490.3×10^{-2}

Tests for thickness are performed, according to the testing methods for paper thickness and paper density under the Japanese Industrial Standards. Tests for water flow rate and bubble point are performed as directed below:

Water Flow Rate Test

Apparatus

Use the apparatus illustrated in the following figure:



A: Vacuum pump

B: Reservoir (Capacity: not less than 10 liters)

C: Cold trap

D: Vacuum regulator

E: Manometer

F: Suction filter bottle (Capacity: 1－4 liters)

G: Valve

H: Filter device (1,000-ml container, equipped with a filter holder 47 mm in internal diameter, supported by a stainless steel screen)

Procedure

Close valve G, open fully vacuum regulator D, reduce the pressure in the system with vacuum pump A, and, using D, adjust the pressure in the system to 69 ± 0.7kPa.

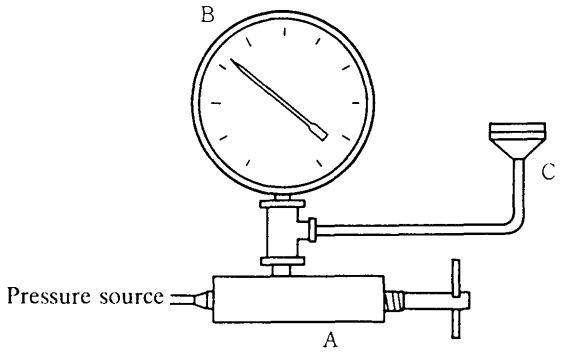
Moisten the sample membrane filter with water, place it into the filter holder, avoiding any air babbles under the filter, then assemble the filter device. Measure 500 ml of water, previously filtered twice through a membrane filter with a pore diameter the same as, or smaller than, that of the sample filter, and pour into the filter device. Open valve G, measure the time it takes to finish filtering, and calculate the water flow rate by the formula

$$\text{Water flow rate (ml/min/cm}^2\text{)} = \frac{500(\text{ml}) \times 60}{\text{Filtration time(sec)} \times \text{Effective filtration area(cm}^2\text{)}}$$

Bubble Point Test

Apparatus

Use the apparatus illustrated in Figures 1 and 2.

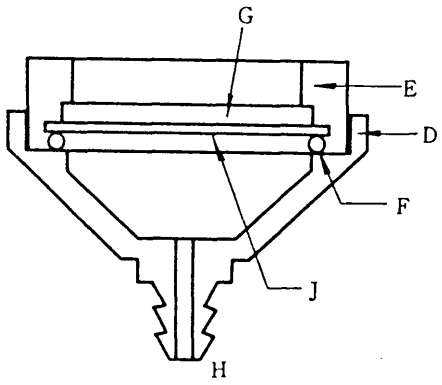


A: Regulator

B: Pressure gauge

C: Filter holder (9.5±0.5 cm² in effective filtration area, illustrated in Figure 2.)

Fig. 1



D: Base
E: Locking ring
F: Silicone O-ring
G: Supporting disk
H: Air inlet
J: Sample membrane filter

Fig. 2

Procedure

Moisten completely the sample membrane filter with water, set in the filter holder, and put water into it so that the water layer on supporting disk G is 2 to 3 mm deep. Adjust the pressure to a point not exceeding the expected bubble point, using regulator A, and increase the pressure at a rate of $0.14 \times 10^{-2} N/mm^2$ per second. Regard the pressure at which a stable effervescence occurs at the center of the sample membrane filter as the bubble point.