

KES

Test Method of Pore Size for Filter Paper

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1. Scope of Application

This standard shall be applied to measurement of Pore Size for Filter Paper used for a vehicle (Air, Oil, Fuel Element).

2. Measuring Equipment

Equipment is bubble test using pressure difference on manometer at the time that bubble is generated or the time to reach to specific pressure by adding air pressure to sample deposited in solvent and main partial equipment is same to followings.

- (1) Manometer : It is meter of which range is maximum 20 kg/cm² and real using pressure is approximate 0.5 kg/cm².
- (2) Flow rate meter : It is meter of which range is maximum 20~140 mL/min and average pore size is used at min 5mL.
- (3) Air filter : Use thing to endure pressure of maximum 9.9 kg/cm³, temperature of 60°C.
- (4) Solvent : Use reagent 1st class Iso Propyl Alcohol

3. Introduction of Measuring Method

Fill solvent of 1st iso propyl alcohol with filter paper inserted to clamp of ring shape (Diameter 20mm) and if increase pressure by supplying air at lower part, the first bubble is generated at the part that hole is largest. At this moment, calculate maximum pore size by following conversion equation with water pillar difference on manometer. Also, if increase air pressure continuously, many bubbles are generated and if apply pressure difference at the moment to reach specific pressure (Flow rate, 95mL/min) to method same to above, can calculate average pore size.

Pore size calculating equation

$$M = \frac{348}{\frac{x}{25.4} - 0.6} = \frac{8839.2}{x - 15.24}$$

Where, M : Pore size (μm)

348 : Surface tension of iso propyl alcohol

0.6 : Value considering measuring error

4. Measuring Point of Pore Size

- (1) Manufacture the sample circular shape of diameter, 28mm, and mount it to a sample holder (Illustrating drawing 1).
- (2) Supply air slowly through inlet of air filter (Illustrating drawing 2) and fix by rotating air adjusting valve (Illustrating drawing 4) in clockwise so that pressure of gauge (Illustrating drawing 3) becomes 0.4kg/cm^2 .
- (3) At this state, make needle valve (Illustrating drawing 5) open with counter clock wise in specific amount and supply some air to sample by rotating flow meter valve (Illustrating drawing 6) in counter clock wise again and thereafter inject 1st class iso propyl alcohol into sample holder until overflow.
- (4) If increase supply of air slowly by using flow meter valve, the first bubble is generated in liquid of iso propyl alcohol injected into sample holder.
- (5) At this moment, cut supply of air and read water pillar difference of U shaped manometer (Illustrating drawing 7).

Remark In case that not one bubble but several bubbles are generated, measure again by preparing new sample.

- (6) Calculate pore size by applying the water pillar difference to converting equation and converting table and numerical feature at the moment is maximum pore size.
- (7) If measurement of maximum pore size is completed, increase airflow rate by rotating flow meter valve in counter clock wise with point of order (4) again and if flow rate becomes 5mL/min , cut supply of air and read the water pillar difference of manometer. At the moment, calculated measuring value is average pore size.

- (8) If measurement is completed, collect solvent in sample holder into vessel by opening drain valve (Illustrating drawing 8).