

KES

Physical Testing Methods for Unvulcanized Rubber

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1. Scope of application

This standard shall be applied to physical testing method for the unvulcanized rubber.

2. Test items

The test item this standard shall regulate is as follows.

- (1) Pattern viscosity test
- (2) Pattern, scothy test
- (3) Williams plasticity test

3. General test condition

3.1 Standard condition of test room

The temperature of test room should be basically 20±10°C and test temperature does not require to be recorded on test results. And relative humidity of test room should be basically 50±20%.

3.2 Standard condition of the sample

The sample should be basically the one that has elapsed for more than 1 hour and less than 72 hours after mixing and should remain on the standard condition 30 minutes prior to test during the period.

3.3 Conversion method of test results

Test results from respective tests should be conversed according to JIS Z 8401 (Conversion method of value) and recorded as the place number shown on table 1.

Test items		Measured value	Conversion value
Pattern viscosity(M)		Above a positive number	Above a positive number
Pattern, scothy	Time (minute)	Above a positive number	Above a positive number
	Lowest viscosity(M)	Above a positive number	Above a positive number
Williams plasticity	Plasticity	Above a positive number	Above a positive number
	Restoration value	Above a positive number	Above a positive number

4. Method to make the sample

4.1 Mixing

The following clauses should be basically observed although mixing is conducted by respective test items according to the method regulated by the Kia standard or the method by the agreement between parties.

Use as materials the mixing ingredients appropriate to the Kia standard or kwon as bearing the property equivalent to it.

But mixing can be selected between parties.

- (1) Carefully treat the mixing ingredients not to get the extraneous materials to be soaked into or not to be made into a lump.

Especially, those with absorptive property should be used as dry.

- (2) Leave alone the carbon black in the place with the temperature of about 25°C and relative humidity of 35% for more than 20 hours but heat and dry it in a heater of $105 \pm 5^\circ\text{C}$ before mixing. In this case, the container used for drying should be moderately large of the extent to which the thickness of carbon black layer can become less than 10mm in the middle of drying. It is required for the dried carbon black to be used immediately or preserved in a sealed container until it is mixed.

The carbon black dried through above two methods must be treated in the same way because it has the different specificity respectively.

- (3) Accurately measure the mixing ingredients to 1% of regulated mixing weight.

4.2 Mixing method

4.2.1 Test roll

Use the test roll basically composed of a steel material with outside diameter of 150mm or 200mm, which does not get worn and corroded easily and also whose surface does not get damaged by a knife.

The gap between guides of test roll (Called below as roll gap), revolving speed and revolving ratio between front and rear roll should be accorded with the agreement between parties.

Test roll should be equipped with the apparatus that can maintain the regulated temperature within the regulated range of temperature.

The gap of test roll should be measured as follows.

- (1) Use two pieces of paper-type stereotype fuses, which has at least the width of about 10mm and the length of 50mm, slightly thicker than the measuring roll gap.

- (2) Use a mixing rubber oil whose pattern viscosity is above 50ML₁₊₄ (100°C) and whose size is 80mm x 80mm x 70mm.
 - (3) Put a rubber roll in the center of the roll and directly place two plate fuses respectively within 25mm from the roll gap.
 - (4) Conducting like above, measure the thickness of stereotype fuse accurately with a gauge and regard it as the roll gap.
- The allowable error range for roll gap should be $\pm 0.13\text{mm}$ on the gap more than 0.7mm and $\pm 0.05\text{mm}$ on the gap below 0.7mm.

4.2.2 Manipulation

The manipulation should basically follow the following clauses although it can be conducted by respective test items according to the method regulated by the Kia standard or the method by the agreement between parties.

- (1) Wind and stick the rubber to the roll being in a slow revolving direction.
- (2) Measure the temperature on the center of roll surface.
- (3) In case that the back cutting of 3/4 is regulated, cut only 3/4 of roll gap until the ball of cut surface can not be seen.
- (4) After the weight loss of upper mixing mixture rubber oil should be compared with the total weight of mixing ingredients before mixing, it must not be exceeding 0.3% as compared to the mixed rubber without fillers being put in and 0.6% as compared to the mixed rubber with fillers put in.

5. Pattern viscosity test

5.1 Purpose

This test shall be conducted to measure the pattern viscosity of unvulcanized rubber.

5.2 Specimen

The specimen circular test material of rubber with enough thickness to fill the hollow of about diameter 45mm in a dice. It includes one with a hole of about 10mm hole and composed of a pair.

Manufacture a specimen not to have air in it possibly and removes depressed part to produce air on the surface of a dice and a rotor.