BP 156-01

ELASTOMER PHYSICAL PROPERTIES RESISTANCE TO FLUIDS

Application

To measure the change in hardness, tensile strength, elongation at break and volume, of elastomers, vulcanized or thermoplastic, before and after ageing at high temperature in a standard oil or a CVJ grease. This method is based on ISO 1817and adopted by Ford in Brazil.

Apparatus Required

The test is conducted in an oven capable of maintaining the test temperature within +/- 1°C.

Test Pieces

All test pieces shall be cut from the same batch of material, no two test pieces shall be cut from the same boot or sheet. Volume, hardness and tensile properties are described in ASTM D 471, ASTM D 2240 and ASTM D 412 respectively.

Method

Hardness and tensile properties shall be measured according to ASTM D 2240 and ASTM D 412 respectively. The dimensions of the tensile test pieces shall be measured before ageing.

The method described in ASTM D 471 shall be used to determine the volume of the test pieces. Weight the volume test pieces in air to the nearest milligram. Then reweigh each test piece suspended in water.

Place the test pieces, suitably separated, in a glass or aluminium container with a volume of the test fluid at least 15 times the combined volume of the test pieces and sufficient to keep them totally immersed. Close the container.

The container and test pieces for ageing shall then be placed in the oven and conditioned at the temperature and immersion period stated in the Material Specification. The test pieces shall be shielded from light during conditioning.

At the end of the conditioning period, remove the container with the test pieces from the oven and condition to the standard laboratory temperature. Testing shall be carried out as soon as possible within the working day.

Surplus test fluid should be wiped from the surfaces of each test piece without the use of solvents or detergents.

Determine the mass of the volume test pieces in air and then reweigh them in water at the standard laboratory temperature.

Date	Action	Revisions
2007 06 07	Activated	L. Rodrigues

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Number of Tests

Three test pieces shall be used to determine the change in hardness and volume.

Five test pieces shall be used to determine tensile properties before and after heat ageing.

Analysis and Statistics

Report the change in hardness as the difference between the value obtained after immersion and the value obtained before immersion.

Calculate the tensile strength per unit area of the original cross-section of the test piece before immersion and report the result as the change expressed as a percentage of the value for un-immersed material.

Calculate the elongation at break as a percentage of the gauge length after immersion and report the result as the change expressed as a percentage of the value for un-immersed material.

The percentage change in volume, V, is calculated using the formula:

$$V = \frac{(m_3 - m_4) - (m_1 - m_2)}{(m_1 - m_2)} x100$$

where

m_1 is the initial mass of the test piece in air;

m_2 is the initial apparent mass of the test piece in water;

m_3 is the mass of the test piece in air after immersion;

m_4 is the apparent mass of the test piece in water after immersion.

Take the result as the average of the values obtained for the test pieces. No censoring of data is permitted.

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