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NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

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GB/T 16586-2014

Replacing GB/T 16586-1996

Rubber, vulcanized – Determination of adhesion to wire cord

硫化橡胶 与钢丝帘线粘合强度的测定

(ISO 5603:2011, MOD)

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Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This Standard replaces GB/T 16586-1996, *Rubber, vulcanized - Determination of adhesion to wire cord*; compared with GB/T 16586-1996, the major technical changes of this Standard are as follows:

- In 7.3.4, CHANGE “Warm up the mould so that the rubber temperature is about 100 °C and the rubber is ready to flow. Apply a force of at least 100 kN and maintain for the duration of the vulcanization” TO “During the entire vulcanization process, the pressure applied by the flat vulcanizer on the mold cavity area shall not be less than 3.5 MPa.” (6.3.4 of the 1996 edition; 7.3.4 of this edition)
- Add the normative appendix A “Calibration schedule”.

This Standard uses the redrafting method to modify and adopt ISO 5603:2011, *Rubber, vulcanized - Determination of adhesion to wire cord*.

The technical differences between this Standard and ISO 5603:2011 and the reasons are as follows:

- In 5.2, to be consistent with the provisions in GB/T 6038, CHANGE “Vulcanizing press, large enough to take the mould. It shall conform to the requirements of GB/T 6038 and shall be capable of applying a force of at least 100 kN.” TO “Vulcanizing press shall conform to the requirements of GB/T 6038.”
- In 7.3.2.2, according to the actual test procedure, CHANGE “If required, preheat the mould, including all component parts, to about 100 °C.” TO “The mold must be preheated at the test temperature for at least 20 minutes.”
- In 7.3.4, to be consistent with the provisions in GB/T 6038, DELETE “Allow the mould to warm up so that the rubber temperature is about 100 °C and the rubber is ready to flow.” and CHANGE “Apply a force of at least 100 kN and maintain for the duration of the vulcanization.” TO “During the entire vulcanization process, the pressure applied by the flat vulcanizer on the mold cavity area shall not be less than 3.5 MPa.”
- In 7.3.4, DELETE “Note: In order to set the conditions to achieve a rubber temperature of 100 °C, it might be necessary to carry out a preliminary calibration using a thermocouple inserted into the rubber.”

This Standard was proposed by China Petroleum and Chemical Industry Federation.

This Standard shall be under the jurisdiction of Sub-committee of General Test Method, Committee of National Standardization for Rubber and Rubber Products (SAC/TC 35/SC 2).

Rubber, vulcanized – Determination of adhesion to wire cord

1 Scope

This Standard specifies two methods for determining the adhesion strength of vulcanized rubber to wire cord which is embedded in the rubber: method 1 and method 2.

The two methods do not necessarily give the same results.

They are applicable primarily to test pieces prepared in the laboratory under standard conditions and used for the development and control of materials and processes utilized in the manufacture of products reinforced with wire cord.

Note: This Standard can also be used for single wire, for example bead wire. Method 1 reduces the dependence of the measured adhesion on the modulus and strength properties of the rubber.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 2941, Rubber - General procedures for preparing and conditioning test pieces for physical test methods (GB/T 2941-2006, ISO 23529:2004, IDT)

GB/T 6038, Rubber test mixes - Preparation, mixing and vulcanization - Equipment and procedures (GB/T 6038-2006, ISO 2393:1994, MOD)

GB/T 17200-2008, Technical specification for tensile compression and flexural testing machines for rubber and plastics (constant rate of traverse) (ISO 5893:2002, IDT)

GB/T 25269-2010, Rubber - Guide to the calibration of test equipment (ISO 18899:2004, IDT)

3 Principle

The adhesion strength is determined by measuring the force required to pull out a single cord from the surrounding rubber of a prepared test piece. The force is directed along the axis of the cord, using a test jig containing a suitably chosen circular- or square-shaped hole to ensure uniformity of stress.

The test piece preparation procedure follows that of method 1, except that the mould spacers and the reinforcement strips are omitted, and that test piece construction prior to vulcanization is carried out on a special building rack similar to the mould (see Figure 4).

The unvulcanized formed test pieces shall be carefully removed from the building rack by pressing uniformly from the rear, placed in a desiccated container and stored at standard laboratory temperature (see GB/T 2941) until vulcanization. Test pieces shall be vulcanized within a maximum of 12 h.

7.3.4 Vulcanization of test piece

Place the made-up mould in the press already set at the vulcanization temperature. During the entire vulcanization process, the pressure applied by the flat vulcanizer on the mold cavity area shall not be less than 3.5 MPa.

Either pass cooling water through the platens of the press for a suitable time, release the moulding force and remove the mould from the press, or allow the mould to cool after its removal from the press. Extract the test piece, using the relevant extraction tools, if appropriate, and avoiding any deformation of the test piece.

Examine the test piece to ensure that rubber has flowed completely along each cord-hole in the pairs of steel spacers for the method 1 test pieces.

Separate the blocks if appropriate. Trim off the shorter lengths of wire cord close to the surface of the rubber block and any spew or flash on the outer edges of the block. With test pieces for method 1, the flash near the cords need not be trimmed as it does not affect the test procedure or result; for method 2 test pieces, trim any flash with a razor blade or suitable clippers, taking care not to damage the cord or the body of the test piece.

The test piece shall be rested at standard laboratory temperature (see GB/T 2941) for a minimum of 16 h before testing if no time is specified.

8 Procedure

Tests shall be performed at standard laboratory temperature (see GB/T 2941) unless otherwise specified.

Mount the test piece in the tensile-testing machine using the relevant fixture shown in Figure 6. Carefully adjust the test piece so that the first wire cord is central in the hole, thus ensuring that the test tension will be uniformly distributed round the circumference of the cord (see Figures 6 and 8). This centring is facilitated by the use of the aligning features already mentioned in 5.1.1 and 5.4. Clamp the cord to be tested in the extraction jaws.

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