INTERNATIONAL STANDARD

ISO 1435

Fourth edition
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Rubber compounding ingredients — Carbon black (pelletized) — Determination of fines content

Ingrédients de mélange du caoutchouc — Noir de carbone (en granules) — Détermination de la teneur en matières fines

Reference number
ISO 1435:1996(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 1435 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry.*

This fourth edition cancels and replaces the third edition (ISO 1435:1988), which has been technically revised.

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Rubber compounding ingredients — Carbon black (pelletized) — Determination of fines content

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies a method for the determination of the fraction of a test portion of pelletized carbon black that will pass through a sieve with 125 µm nominal aperture size under specified conditions (i.e. the fines content). It is applicable to all types of pelletized carbon black for use in the rubber industry.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings.*

ISO 1124:1988, *Rubber compounding ingredients — Carbon black shipment sampling procedures.*

3 Principle

A test portion of pelletized carbon black is weighed accurately and sieved through a 125 µm aperture sieve with shaking and tapping. The amount of material passing through the sieve is measured as the fines.

4 Apparatus

4.1 Mechanical sieve shaker[1], which imparts a uniform rotary and tapping motion to a stack of 200-mm-diameter sieves. The mechanism shall produce 280 to 320 rotary motions per minute (4,6 to 5,3 per second) and 140 to 160 taps per minute (2,3 to 2,7 per second) to a cork fitted in the centre of the sieve cover (4.4) and extending 3 mm to 9 mm above it. Only cork shall be used, rubber being unsuitable.

4.2 Sieve, approximately 200 mm in diameter and 25 mm in height, to fit the mechanical sieve shaker (4.1). The sieve shall be of nominal aperture size

1) A Ro-Tap sieve shaker is satisfactory for this purpose, available from
Tyler Power Systems,
8648 Tyler Boulevard, Mentor, OH - 44060, USA
or
Stein Industrie,
19, avenue Morane, Saulnier, F-78140 Vélizy-Villacoublay, France

This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of the equipment named. Other equipment may be used if it can be shown to lead to the same results.

125 µm and shall comply with the requirements of ISO 565. Only corrosion-resistant woven metal-wire cloth shall be used.

4.3 Bottom receiver pan.

4.4 Sieve cover.

4.5 Riffle-type sample splitter, with six or more parallel troughs on each side, designed to divide a sample of carbon black into two equal parts.

4.6 Balance, accurate to 1 mg.

5 Procedure

5.1 Obtain the test portion of carbon black as follows:

5.1.1 Pass a representative sample, taken in accordance with ISO 1124, through the sample splitter (4.5) to obtain a test portion of 22 g to 28 g or, for carbon blacks such as thermal blacks, which have a bulk density roughly twice that of most carbon blacks (600 kg/m³ to 650 kg/m³), a test portion of 47 g to 53 g.

5.1.2 Weigh the test portion to the nearest 0,1 g.

5.2 Transfer the weighed test portion to the sieve (4.2). Using other sieves as spacers if necessary, cover the top and place the receiver pan (4.3) underneath. If spacers are used, the sieve containing the test material shall be placed at the bottom of the stack.

NOTE 1 The position in the stack of the sieve containing the test material affects the test result: the higher the sieve in the stack, the higher the result.

5.3 Allow the sieve assembly to shake, with the hammer operating, for 5 min, or for a different period if agreed between the purchaser and the supplier.

5.4 Remove the sieve and receiver pan from the shaking device, and weigh the carbon black in the receiver pan to the nearest 1 mg.

6 Expression of results

The fines content C_F, expressed as a percentage by mass, is given by the formula

$$C_F = \frac{m_1}{m_0} \times 100$$

where

m_0 is the mass, in grams, of the test portion;

m_1 is the mass, in grams, of carbon black in the receiver pan.

Express the result to the nearest 0,1 % (*m/m*).

7 Precision and bias

7.1 The precision data given below only give an estimate of the precision of this method. The precision parameters shall not be used for acceptance/rejection testing of any group of materials without documentation that they are applicable to those particular materials and the specific testing protocols that include this test method.

7.2 These precision data are based on a single determination carried out on four samples by six laboratories on two days. The samples studied ranged from about 2 % (*m/m*) to about 11 % (*m/m*). Both repeatability and reproducibility represent short-term testing. Precision is expressed in relative terms.

In the absence of the necessary detailed results, the precision data relevant to this International Standard cannot be presented in the format recommended by ISO/TR 9272:1986, *Rubber and rubber products — Determination of precision for test method standards.*

7.3 Repeatability (single operator):

The repeatability r has been estimated to be 50 % of a test result. Two single test results that differ by more than 50 % of their average value shall be considered suspect and dictate that some appropriate investigative action be taken.

7.4 Reproducibility (interlaboratory):

The reproducibility R has been estimated to be 97 % of a test result. Two single test results that differ by more than 97 % of their average value shall be considered suspect and dictate that some appropriate investigative action be taken.

7.5 Bias:

In test method terminology, bias is the difference between an average test value and the reference or true

value of a property. Reference values do not exist for this test method since the value of the test property is exclusively defined by the test method. Bias, therefore, cannot be determined.

7.6 The above precision data may appear quite poor. It must be borne in mind, however, that they are expressed in percent relative, making the difference between two test results very high when the actual fines content is low. Results shall therefore be interpreted with care.

8 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) all details necessary for identification of the sample;

c) the duration of shaking of the sieve assembly;

d) the result obtained.

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