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Rubber compounding ingredients — Carbon black — Determination of pellet size distribution

*Ingrédients de mélange du caoutchouc — Noir de carbone — Détermination de la distribution
granulométrique*

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8511 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*.

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Rubber compounding ingredients — Carbon black — Determination of pellet size distribution

0 Introduction

Carbon black for the rubber industry is generally pelletized to reduce dust and to improve handling and incorporation into polymers. Variations in pellet size distribution can affect dispersion in polymers, bulk handling, and conveying properties.

1 Scope and field of application

This International Standard specifies a method for the determination of pellet size distribution of carbon black.

2 References

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

ISO 1124, *Rubber compounding ingredients — Carbon black shipment sampling procedures.*¹⁾

3 Principle

Pelletized carbon black is passed through a succession of sieves with different sized apertures and the amount retained by each is determined.

4 Apparatus

4.1 Mechanical sieve shaker, which imparts a uniform rotary and tapping motion to a stack of nominally 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 into the centre of the top sieve cover (see 4.4) and extending 3 to 9 mm above it. Only cork shall be used, rubber being unsuitable.

NOTES

1 Details of a suitable machine are available from the ISO/TC 45 Secretariat, British Standards Institution, 3 York Street, Manchester, M2 2AT, United Kingdom.

2 Other types of machine that can be shown to give comparable results may be used.

4.2 Sieves, nominally 200 mm diameter, 25 mm high, of woven metal wire cloth, conforming to ISO 565, having apertures of 2,00; 1,00; 0,5; 0,25 and 0,125 mm.

NOTE — 0,71 mm aperture may be added if pellets produced by a dry process are tested.

4.3 Bottom receiver.

4.4 Top sieve cover.

4.5 Sample splitter, single stage, riffle type.

4.6 Balance, with at least 0,1 g sensitivity.

4.7 Container, suitable for use when weighing samples and sieved fractions.

5 Sampling

Samples shall be taken in accordance with ISO 1124.

6 Procedure

6.1 Stack the sieves (4.2) in the following order from bottom to top :

bottom receiver; 0,125 mm; 0,25 mm; 0,5 mm; 1,00 mm; 2,00 mm.

NOTE — The 0,71 mm or any sieve not specified above should be placed in the appropriate position in the stack.

6.2 Pass the sample through the sample splitter (4.5) and take two test portions, each of 100 ± 10 g.

6.3 Weigh each test portion to the nearest 0,1 g.

6.4 Transfer a test portion to the top sieve, install the sieve cover (4.4) and place the assembly in the mechanical shaker (4.1).

6.5 Allow the assembly to shake for 60 ± 10 s.

6.6 Remove the sieve assembly from the shaking device by transferring each fraction in turn to the container (4.7). Weigh the carbon black retained on each sieve and bottom receiver (4.3) individually to the nearest 0,1 g.

6.7 Repeat the operations in 6.4 to 6.6 for the second test portion.

1) At present at the stage of draft. (Revision of ISO 1124 : 1983.)

7 Expression of results

7.1 Calculate the pellet size distribution as a percentage of the test portion retained by each sieve using the formula

$$\frac{m_i}{m_0} \times 100$$

where

m_i is the mass, in grams, of carbon black on the i th test sieve or in the bottom receiver;

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

7.2 Add the masses of carbon black retained by all the sieves and in the bottom receiver. If the loss exceeds 2 %, the test results shall be regarded as invalid.

7.3 Calculate the mean pellet size distribution retained by each sieve from the two sets of results.

8 Test report

The test report shall include the following information :

- a) a reference to this International Standard;
- b) the proper identification of the sample;
- c) the mean values of the two test results, to the nearest whole number, as follows :
 - the percentage retained on the 2,00 mm sieve,
 - the percentage passing the 2,00 mm sieve but retained on the 1,00 mm sieve,
 - the percentage passing the 1,00 mm sieve but retained on the 0,5 mm sieve,
 - the percentage passing the 0,5 mm sieve but retained on the 0,25 mm sieve,
 - the percentage passing the 0,25 mm sieve but retained on the 0,125 mm sieve,
 - the percentage passing the 0,125 mm sieve.

NOTE — If a mesh size different from those specified in this International Standard is used, its result should be included in the appropriate position in the test report.

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