
**Rubber compounding ingredients —
Carbon black — Determination of the
aggregate-size distribution at ultimate
dispersion**

*Ingrédients de mélange du caoutchouc — Noir de carbone —
Détermination de la distribution de la taille des agrégats à la dispersion
ultime*



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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The main task of technical committees is to prepare International Standards. 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.

In other circumstances, particularly when there is an urgent market requirement for such documents, a technical committee may decide to publish other types of document:

- an ISO Publicly Available Specification (ISO/PAS) represents an agreement between technical experts in an ISO working group and is accepted for publication if it is approved by more than 50 % of the members of the parent committee casting a vote;
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An ISO/PAS or ISO/TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/PAS or ISO/TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 16176 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 Technical Specification specifies a new test method to determine the aggregate-size distribution at ultimate dispersion. An interlaboratory test programme (ITP) was carried out but, because not enough of the laboratories had the necessary equipment, the results could not be used to validate the method. It is for this reason that ISO/TC 45/SC 3 decided to publish the document as a Technical Specification. When enough laboratories have the equipment, an ITP will be organized and, assuming the result is satisfactory, the Technical Specification will be converted into an International Standard.

Rubber compounding ingredients — Carbon black — Determination of the aggregate-size distribution at ultimate dispersion

1 Scope

This Technical Specification specifies a method for determining the size distribution of carbon black aggregates dispersed in a liquid by means of a high-power ultrasonic device. The measurement is done with a disc centrifuge photosedimentometer. This technique is based on the hydrodynamic behaviour of carbon black in a centrifugal field. The determination of the aggregate-size distribution is important in the evaluation of carbon black used in the rubber industry.

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.

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

ISO 3696, *Water for analytical laboratory use — Specification and test methods*

3 Significance and use

Disc centrifuge photosedimentometry produces a rapid mass-differential aggregate-size distribution by continuously measuring the solution turbidity as a function of centrifugation time. In order to obtain a true mass distribution, a light-scattering correction has to be applied.

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1

carbon black aggregate

discrete, rigid colloidal entity that is the smallest dispersible unit in a suspension

NOTE It is composed of extensively coalesced particles.

4.2

spin fluid

inert liquid injected into the disc of a disc centrifuge photosedimentometer prior to the sample and through which aggregates sediment

NOTE Alkaline conditions minimize agglomeration of dispersed aggregates in most cases.