
**Rubber compounding ingredients —
Carbon black — Determination of light
transmittance of toluene extract**

*Ingrédients de mélange du caoutchouc — Noir de carbone —
Détermination de la transmittance spectrale de l'extrait toluénique*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document 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 3858:2008), which has been technically revised. The main changes compared to the previous edition are as follows:

- update of the normative references in [Clause 2](#);
- addition of a clause for terms and definitions ([Clause 3](#));
- changes in the Notes in [Clause 6](#);
- modification of the conditions of test ([Clause 8](#)).

Rubber compounding ingredients — Carbon black — Determination of light transmittance of toluene extract

WARNING — Persons using this document should be familiar with normal laboratory practice. This document 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.

1 Scope

This document specifies a method for the determination of the light transmittance of the toluene extract from carbon black for use in the rubber industry, as a means of measuring the discolouration caused by the extractable matter.

The light transmittance value provides an estimate of the degree of discolouration caused by the toluene-extractable matter present on the surface of the carbon black.

This method might not be applicable to carbon blacks with a high extractable-matter content.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1126:2015, *Rubber compounding ingredients — Carbon black — Determination of loss on heating*

[ISO 3858:2018](https://www.iso.org/standards/iso/e7666b28d-2316-4bde-8244-d5ef5fca9528/iso-3858-2018)

<https://www.iso.org/standards/iso/e7666b28d-2316-4bde-8244-d5ef5fca9528/iso-3858-2018>

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 Principle

A sample of the carbon black is dried and a test portion weighed out and mixed with a measured volume of toluene at room temperature. The mixture is filtered and a portion of the filtrate transferred to an absorption cell. The light transmittance of the filtrate is measured against pure toluene at a set wavelength using a spectrophotometer.

5 Reagents

Use only reagents of recognized analytical grade and only distilled water or water of equivalent purity.

5.1 Toluene, analytical reagent grade, CAS No. 108-88-3.

6 Apparatus

Standard laboratory equipment together with the following.

6.1 Analytical balance, accurate to 0,1 mg.

6.2 Oven, preferably of the gravity-convection type, capable of temperature regulation within ± 1 °C at 125 °C and temperature uniformity within ± 5 °C.

6.3 Spectrophotometer, with a tungsten filament lamp, 20 nm maximum spectral passband width, capable of measuring percent transmittance at a wavelength of 425 nm. The instrument shall be of the high-resolution prism or grating type, eliminating the use of an optical filter. The instrument shall be operated in accordance with the manufacturer's operating manual for optimum performance. Some instruments might require the use of a constant-voltage transformer in the electricity circuit in order to compensate for voltage variations of more than 4 V.

NOTE Current types of photometer could be used. However, they might differ in passband width from the specified one, and they might give different transmittance results. Proper calibration of such instruments over the whole transmittance range against a high-resolution spectrophotometer (of a passband width of 2 nm at 425 nm, for example) might be performed for possible corrections of the readings.

6.4 Absorption cells, with parallel sides polished flat to within 10 nm.

The internal distance between the parallel faces shall be 10 mm \pm 0,05 mm.

NOTE If the cell used does not have an optical path length of 10 mm, the transmittance which would be obtained with a 10 mm cell is given by [Formula \(1\)](#).

$$\log_{10} \tau_0 = \frac{10}{L} \times \log_{10} \tau - \frac{20}{L} + 2 \quad (1)$$

where

τ_0 is the percentage transmittance through a 10 mm cell;

τ is the percentage transmittance observed through the cell used;

L is the optical path length, in millimetres, of the cell used.

6.5 Conical flasks, capacity 100 cm³ or 125 cm³, with ground-glass stoppers.

6.6 Graduated cylinder, capacity 50 cm³, graduated in divisions of 1 cm³, or **automatic dispenser**, bottle type.

6.7 Filter funnel, 75 mm inside diameter at top, made of chemically resistant glass.

6.8 Filter paper, 150 mm diameter, free from matter extractable by toluene and capable of retaining all the carbon black.

6.9 Beakers, capacity 50 cm³ or 100 cm³, with pouring lip.

6.10 Wiping paper, lint free, or **optical lens tissue**.

6.11 Cotton swabs.