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**Rubber compounding ingredients —  
Carbon black — Determination of  
oil absorption number (OAN) and oil  
absorption number of compressed  
sample (COAN)**

*Ingrédients de mélange du caoutchouc — Noir de carbone —  
Détermination de l'indice d'absorption d'huile (OAN) et de l'indice  
d'absorption d'huile d'échantillons comprimés (COAN)*



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Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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.

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 4656 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 second edition cancels and replaces the first edition (ISO 4656:2007), which has been technically revised. In addition to a number of minor editorial changes, the following changes have been made:

- a warning concerning the dangers of dibutyl phthalate has been added at the beginning of Clause 4;
- the current standard reference black, SBR D8, has been added to Table 1;
- in A.3.7, “mesh” has been replaced by “nominal size of openings”;
- in Annex A concerning the preparation of compressed test portions, A.5.1.2, A.5.1.11, A.5.2.1 and A.5.2.14 have been rewritten to specify, for each type of carbon black, the mass of carbon black to be taken for the compression procedure and the mass to be subsequently taken as the test portion for determination of the absorption number of the compressed sample;
- the precision data (previously in Clause 10) have been moved to an informative annex (Annex D);

ISO/TR 9272:2005 has been moved from the normative references clause to a bibliography.

# Rubber compounding ingredients — Carbon black — Determination of oil absorption number (OAN) and oil absorption number of compressed sample (COAN)

**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

Oil absorption number (OAN) is a measure of the ability of a carbon black to absorb liquids. This property is a function of the structure of the carbon black. Either dibutyl phthalate (DBP) or paraffin oil is acceptable for use with standard pelleted grades, including N-series carbon blacks found in ASTM D1765, although OAN testing using paraffin oil on some speciality blacks and powder blacks might result in unacceptable differences as compared to OAN testing using DBP oil. While studies have shown the two oils to give comparable precision, paraffin oil offers the advantage of being non-hazardous.

This International Standard specifies a method using an absorptometer for the determination of the oil absorption number of carbon black for use in the rubber industry.

The same method is used for the determination of the oil absorption number of compressed samples of carbon black. The procedure for the preparation of the compressed samples is described in Annex A.

## 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 1126, *Rubber compounding ingredients — Carbon black — Determination of loss on heating*

ASTM D1765, *Standard Classification System for Carbon Blacks Used in Rubber Products*

ASTM D4821, *Standard Guide for Carbon Black — Validation of Test Method Precision and Bias*

## 3 Principle

Oil is added to a test portion of the carbon black which is kept in motion by means of rotating blades. As the liquid is added, the mixture changes from a free-flowing powder to a semi-plastic mass. The end-point for the determination is reached when the torque resulting from this change in viscous properties attains either a preset value or a defined percentage of the maximum torque, calculated from the recorded torque curve.