

Sampling and testing carbon black for use in the rubber industry —

**Part 17: Method for determination of
dibutyl phthalate absorption number
using an absorptometer**

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Committees responsible for this British Standard

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British Rubber Manufacturers' Association

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National foreword

This Part of BS 5293 has been prepared under the direction of the Plastics and Rubber Standards Policy Committee and is identical with ISO 4656-1:1992 *Rubber compounding ingredients — Carbon black — Determination of dibutyl phthalate absorption number — Part 1: Method using absorptometer*, published by the International Organization for Standardization (ISO).

This Part of BS 5293 supersedes BS 5293-17:1988 which is withdrawn and of which it constitutes an editorial revision.

BS 5293-18:1992 specifies a method to determine dibutyl phthalate absorption number using a plastograph or plasticorder.

Annex A and Annex B form an integral part of this standard.

Cross-references

International Standard	Corresponding British Standard
ISO 1126:1992	BS 5293 <i>Sampling and testing carbon black for use in the rubber industry</i> Part 5:1992 <i>Method for determination of loss of mass on heating</i> (Identical)

The Technical Committee has reviewed the provisions of ISO 6809:1989, to which normative reference is made in the text, and has decided that they are acceptable for use in conjunction with this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Introduction

The degree of aggregation of carbon black particles affects the vulcanizate and other properties of rubber mixes in which the black is incorporated. The space between the agglomerates of carbon black is dependent on the degree of aggregation of the black particles. The volume of this space may be estimated from the volume of dibutyl phthalate absorbed by a given mass of carbon black. The dibutyl phthalate absorption is therefore an indication of the degree of aggregation of the carbon black.

WARNING — The use of this part of ISO 4656 may involve hazardous materials, operations and equipment. It does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this part of ISO 4656 to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

1 Scope

This part of ISO 4656 specifies a method using an absorptometer for the determination of the dibutyl phthalate absorption number of carbon black for use in the rubber industry.

NOTE 1 ISO 4656-2:1991, *Rubber compounding ingredients — Carbon black — Determination of dibutyl phthalate absorption number — Part 2: Method using plastograph or plasticorder*, specifies a method based on the use of a plastograph or plasticorder.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 4656. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 4656 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 1126:1992, *Rubber compounding ingredients — Carbon black — Determination of loss on heating*.

ISO 6809:1989, *Rubber compounding ingredients — Carbon black — Standard reference blacks*.

3 Principle

Dibutyl phthalate 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 a pre-set value, calibrated from a torque curve.

4 Reagent

4.1 *Dibutyl phthalate*, ρ_{25} 1,045 Mg/m³ to 1,050 Mg/m³.

5 Apparatus

5.1 *Absorptometer*¹⁾, type A or type B (see Annex A), consisting of the elements given in 5.1.1 to 5.1.4.

5.1.1 *Mixing chamber*

5.1.2 *Motor-driven rotors*, which fit into the mixing chamber (5.1.1) and rotate at a frequency of 2,08 Hz.

5.1.3 *Torque-sensing device*, consisting of a spring and a dashpot having a damper control valve operating a torque-limit switch which automatically stops the rotors (5.1.2) and the burette (5.1.4) when a pre-selected torque is reached. Instructions for checking and adjusting the settings are given in Annex A.

5.1.4 *Constant-rate burette*, pre-set to deliver dibutyl phthalate at a rate of 4,0 cm³/min $\pm$ 0,024 cm³/min. Instructions checking the burette are given in Annex B.

5.2 *Oven*, gravity convection type, capable of being maintained at 105 °C $\pm$ 2 °C or 125 °C $\pm$ 2 °C.

5.3 *Balance*, accurate to 0,01 g.

5.4 *Desiccator*

5.5 *Apparatus capable of pulverizing carbon black*²⁾, if pulverizing is found to be necessary (see 8.2, note 2).

5.6 *Spatula*

¹⁾ This apparatus is available commercially. Details may be obtained from the Secretariat of ISO/TC 45/SC 3.

²⁾ A coffee bean grinder is suitable.