



BSI Standards Publication

Rubber, raw styrene-butadiene, emulsion-polymerized — Determination of bound styrene content — Refractive index method

National foreword

This British Standard is the UK implementation of ISO 2453:2020. It supersedes BS 7164-12:1991, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/50, Raw materials (including latex) for use in the rubber industry.

A list of organizations represented on this committee can be obtained on request to its secretary.

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**Rubber, raw styrene-butadiene,
emulsion-polymerized —
Determination of bound styrene
content — Refractive index method**

*Caoutchouc butadiène-styrène brut polymérisé en émulsion —
Détermination de la teneur en styrène lié — Méthode par l'indice
de réfraction*



Reference number
ISO 2453:2020(E)



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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).

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For an explanation of 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 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 third edition cancels and replaces the second edition (ISO 2453:1991) which has been technically revised. It also incorporates the Technical Corrigendum ISO 2453:1991/Cor.1:2003.

The main changes compared to the previous edition are as follows:

- deletion of spiders and introduction of the extraction procedure of ISO 7781 into the preparation procedure ([7.1](#));
- addition of wide-mouthed conical flask ([6.1](#));
- correction of [Table 1](#);
- move of precision data to an informative [Annex A](#) with addition of precision data evaluated in 2019.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Rubber, raw styrene-butadiene, emulsion-polymerized — Determination of bound styrene content — Refractive index method

1 Scope

This document specifies a method for determining the bound styrene content of emulsion-polymerized styrene-butadiene rubbers (SBR) by correlation with the measured refractive index of an extracted sample according to a table of refractive indices versus percentage mass fractions styrene.

The method is also applicable to extracted oil-extended emulsion-polymerized SBR as long as it produces a film suitable for refractive index measurements. It is not applicable to solution-polymerized SBR.

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 1795, *Rubber, raw natural and raw synthetic — Sampling and further preparative procedures*

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:

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

4 Principle

The bound styrene test is a measure of the bound monomeric composition of the rubber. It is used to check the accuracy of monomer charging and also as a guide to the uniformity of the product, since the bound styrene content affects the physical properties.

The methods consist in the extraction of a test piece with ethanol-toluene azeotrope (ETA), followed by drying and pressing between sheets of aluminium foil to provide sheeted rubber having a thickness of not more than 0,50 mm.

The bound styrene content is calculated from the refractive index obtained at 25 °C on this thinly sheeted rubber.

5 Reagents

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