BS ISO 2782-1:2022

BSI Standards Publication

Rubber, vulcanized or thermoplastic — Determination of permeability to gases

Part 1: Differential-pressure methods

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National foreword

This British Standard is the UK implementation of ISO 2782-1:2022. It supersedes BS ISO 2782-1:2016, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/22, Testing and analysis of rubber.

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

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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).

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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 2, *Testing and analysis*.

This third edition cancels and replaces the second edition (ISO 2782-1:2016), of which it constitutes a minor revision.

The main changes are as follows:

— editorially revised to update references.

— editorially revised to take into account the updated ISO/IEC Directives, Part 2.

A list of all parts in the ISO 2782 series can be found on the ISO website.

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Introduction

The measurement of the permeability of rubber to gases is important in the evaluation of compounds for products such as inner tubes, tubeless-tyre liners, hoses, balloons and other gas-containing products, as well as seals and diaphragms. The measurement is also of theoretical importance in the study of the characteristics of gas diffusion and gas solubility in relation to polymer structure.

This document proposes three different methods. The first one is the pressure sensor method which allows a complete characterization of a material. The second one is a simplified pressure sensor method which is appropriate when only the gas permeability coefficient is needed (e.g. routine control, specification verification, design). The third one is the gas-chromatographic method.

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Part 1: Differential-pressure methods

WARNING 1 — 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 and to take legal compliance into consideration.

WARNING 2 — Certain procedures specified in this document can involve the use or generation of substances, or the generation of waste, that can constitute a local environmental hazard. Reference should be made to appropriate documentation on safe handling and disposal after use.

1 Scope

This document specifies three methods for the determination of the permeability to gases of vulcanized or thermoplastic rubber under a differential partial pressure.

The three methods specified are as follows:

— a pressure sensor method (using vacuum): for determining the gas transmission rate, gas permeability coefficient, gas diffusion coefficient and gas solubility coefficient;

— a simplified sensor method (using applied pressure): for determining the gas permeability coefficient only;

— a gas-chromatographic method: for determining the gas transmission rate and gas permeability coefficient.

These methods apply to vulcanized and thermoplastic rubbers of hardness not less than 35 IRHD (international rubber hardness degrees) and to both single gases and mixtures of gases.

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 18899:2013, *Rubber — Guide to the calibration of test equipment*

ISO 23529:2016, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at https://www.iso.org/obp

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