INTERNATIONAL STANDARD

ISO 5794-1

Fifth edition
2022-06

Rubber compounding ingredients — Silica, precipitated, hydrated —

Part 1: Non-rubber tests

Ingrédients de mélange du caoutchouc — Silices hydratées précipitées —

Partie 1: Essais sur le produit brut

Reference number
ISO 5794-1:2022(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

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 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 fifth edition cancels and replaces the fourth edition (ISO 5794-1:2010), which has been technically revised.

The main changes are as follows:

— update of the normative references;

— addition of CAS Registry Numbers®[1)] for reagents and chemicals;

— addition of information on the manufacturer of instruments in Annex D, footnotes 1 and 2;

— withdrawal of D.6.2 on the use of a nomogram for the calculation of the specific surface area.

A list of all parts in the ISO 5794 series can be found on the ISO website.

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.

1) CAS Registry Number® is a trademark of CAS corporation. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product named.

Rubber compounding ingredients — Silica, precipitated, hydrated —

Part 1: Non-rubber tests

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 methods of test for characterizing precipitated hydrated silica for use as a rubber compounding ingredient.

This document specifies the test formulation, mixing equipment, mixing procedure and methods of test for use in determining the physical properties of styrene-butadiene rubber compounded with precipitated hydrated silica.

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 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 787-2, *General methods of test for pigments and extenders — Part 2: Determination of matter volatile at 105 °C*

ISO 787-8, *General methods of test for pigments and extenders — Part 8: Determination of matter soluble in water — Cold extraction method*

ISO 787-9, *General methods of test for pigments and extenders — Part 9: Determination of pH value of an aqueous suspension*

ISO 787-10, *General methods of test for pigments and extenders — Part 10: Determination of density — Pyknometer method*

ISO 787-18, *General methods of test for pigments and extenders — Part 18: Determination of residue on sieve — Mechanical flushing procedure*

ISO 1124, *Rubber compounding ingredients — Carbon black shipment sampling procedures*

ISO 3262-1:2020, *Extenders — Specifications and methods of test — Part 1: Introduction and general test methods*

ISO 3262-19:2021, *Extenders — Specifications and methods of test — Part 19: Precipitated silica*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

ISO 18852, *Rubber compounding ingredients — Determination of multipoint nitrogen surface area (NSA) and statistical thickness surface area (STSA)*

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
precipitated hydrated silica
material composed of amorphous particles obtained from soluble silicates by precipitation from aqueous solution

Note 1 to entry: A classification of silicas and typical physical and chemical properties can be found in Annex H.

4 Sampling

Sampling shall be carried out in accordance with ISO 15528.

5 Methods of test

The properties of precipitated hydrated silica shall be determined by the methods of test referred to in Table 1.

Table 1 — Methods of test

Property	Method of test
Silica content of ignited sample, % (mass fraction)	ISO 3262-19:2021, Clause 6
Colour	ISO 3262-1:2020, 5.1
Residue on sieve (nominal aperture size 45 µm)	
for silica in powder form	ISO 3262-19:2021, Clause 8
for silica in other forms	ISO 787-18
Volatile matter at 105 °C (loss on heating)	ISO 787-2 (Use a test portion of 2 g weighed to the nearest 0,1 mg.)
Density, Mg/m^3	ISO 787-10
Loss on ignition at 1 000 °C of dried sample	ISO 3262-1:2020, 5.2
pH of slurry	ISO 787-9
Water-soluble matter	ISO 787-8
Total copper content, mg/kg	Annex A
Total manganese content, mg/kg	Annex B
Total iron content, mg/kg	Annex C
Specific surface area, m^2/g	Annexes D and E
Granule size distribution, %	Annex F
CTAB surface area, m^2/g	Annex G