
**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



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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 5794-1 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 fourth edition cancels and replaces the third edition (ISO 5794-1:2005), of which it constitutes a minor revision comprising the following changes:

- the distilled or deionized water used for the tests has been replaced throughout the document by grade 3 water as defined in ISO 3696;
- the way in which the silica content is calculated (see Table 1) has been simplified;
- for the sieve specified in F.3.2, an alternative sieve height (45 mm) has been included in addition to the sieve height of 25 mm originally specified.

This fourth edition also incorporates the Technical Corrigenda ISO 5794-1:2005/Cor.1:2006 and ISO 5794-1:2005/Cor.2:2007.

ISO 5794 consists of the following parts, under the general title *Rubber compounding ingredients — Silica, precipitated, hydrated*:

- *Part 1: Non-rubber tests*
- *Part 2: Evaluation procedures in styrene-butadiene rubber*

Rubber compounding ingredients — Silica, precipitated, hydrated —

Part 1: Non-rubber tests

WARNING — Persons using this part of ISO 5794 should be familiar with normal laboratory practice. This part of ISO 5794 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 ensure compliance with any national regulatory conditions.

1 Scope

This part of ISO 5794 specifies methods of test for characterizing precipitated hydrated silica for use as a rubber compounding ingredient. A definition of precipitated hydrated silica is given.

ISO 5794-2 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 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 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 — Pycnometer 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 3262-1:1997, *Extenders for paints — Specifications and methods of test — Part 1: Introduction and general test methods*

ISO 3262-19:2000, *Extenders for paints — 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.

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

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, % (by mass)	ISO 3262-19:2000, Clause 6
Colour	ISO 3262-1:1997, 5.1
Residue on sieve (nominal aperture size 45 µm) for silica in powder form for silica in other forms	ISO 3262-19:2000, Clause 8 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 3262-1:1997, 5.2
pH of slurry	ISO 787-9
Water-soluble matter	ISO 787-8
Total copper content, mg/kg	See Annex A
Total manganese content, mg/kg	See Annex B
Total iron content, mg/kg	See Annex C
Specific surface area, m ² /g	See Annexes D, E
Granule size distribution, %	See Annex F
CTAB surface area, m ² /g	See Annex G