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Rubber, raw natural — Guidelines for the specification of technically specified rubber (TSR)

Caoutchouc naturel brut — Lignes directrices pour la spécification de caoutchoucs spécifiés techniquement (TSR)

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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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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 3, *Raw materials (including latex) for use in the rubber industry*.

This seventh edition cancels and replaces the sixth edition (ISO 2000:2003), which has been technically revised with the following changes:

— the normative references were updated in Clause 2 and in Table 2;

— a grade of low viscosity in TSR (LoV) was added in Table 1;

— the gel content property was added in Table 2, with reference to the new test method described in ISO 17278.

Introduction

Since the initial development of ISO 2000, when requirements for raw natural rubber were first specified, a number of different grades have become available, and significant developments have taken place in the supply of raw natural rubber, especially in relation to constant-viscosity (CV) grades. Rather than continuing to closely specify a limited number grades, possibly restricting future developments, a more open approach is appropriate, providing guidance and assistance to those parties (such as producers, suppliers, and purchasers) involved in the specification of requirements for technically specified rubber rather than imposing potentially inappropriate limits on the TSR available.

This International Standard encompasses rubbers that are typically more closely defined elsewhere. In more precise specifications, reference may need to be made to such specifications in particular cases.

Rubber, raw natural — Guidelines for the specification of technically specified rubber (TSR)

1 Scope

This International Standard provides guidance on the specification of technically specified rubber (TSR). A grading system is proposed, based on the origin of the natural rubber content and on properties exhibited by the rubber.

This International Standard is intended for use by parties involved in the procurement of TSR, and is intended to form a basis from which requirements for a particular case may be more closely specified. As such, it describes a number of criteria that need to be the subject of appropriate agreement between the interested parties.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 247, *Rubber — Determination of ash*

ISO 248-1, *Rubber, raw — Determination of volatile-matter content — Part 1: Hot-mill method and oven method*

ISO 249, *Rubber, raw natural — Determination of dirt content*

ISO 289-1, *Rubber, unvulcanized — Determinations using a shearing-disc viscometer — Part 1: Determination of Mooney viscosity*

ISO 1656, *Rubber, raw natural, and rubber latex, natural — Determination of nitrogen content*

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

ISO 2007, *Rubber, unvulcanized — Determination of plasticity — Rapid-plastimeter method*

ISO 2930, *Rubber, raw natural — Determination of plasticity retention index (PRI)*

ISO 4660, *Rubber, raw natural — Colour index test*

ISO 17278, *Rubber, raw natural — Determination of the gel content of technically specified rubber (TSR)*

3 Terms and definitions

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

3.1
technically specified rubber
TSR
natural rubber obtained from the latex of *Hevea brasiliensis* (typically processed into block rubber), and having properties complying with the criteria for the grade concerned

3.2
constant viscosity (CV) rubber
natural rubber whose viscosity is controlled, typically by treating it with viscosity-stabilizing agents, prior to or after the drying process

3.3
dirt
foreign matter retained on the sieve as described in ISO 249

3.4
field-grade coagulum
natural rubber obtained from acid-coagulated latex or from latex naturally coagulated (i.e. by autocoagulation) in tapping cups or other suitable vessels

3.5
sheet rubber
typically, rubber which has been deliberately coagulated and sheeted

Note 1 to entry: It may be dried, partially dried, or undried.

3.6
whole field latex
latex material derived from *Hevea brasiliensis* which may be diluted but is not fractionated

4 Material composition

TSR shall be divided into the following three principal groups based on the raw materials used:

— bulked field latex coagulated with a coagulant, such as formic acid or acetic acid under controlled conditions;

— field-grade coagulum;

— sheet rubber.

5 Grade structure

The grade of the TSR shall be based on the properties of the TSR and the type of material used in its production (see Table 1).

Table 1 — Grade of TSR

Raw material	Characteristics	Grades
Whole field latex	With controlled viscosity	CV or LoV
	Light-coloured rubber, with a specified colour index	L
	With no specified viscosity or colour	WF
Sheet rubber or coagulated bulked field latex	With no specified viscosity or colour	5 or 5S
Field-grade coagulum and/or sheet rubber	With no specified viscosity	10 or 20
	With controlled viscosity	10 CV or 20 CV

6 Specification of requirement

Any specific values for physical and chemical properties shall be based upon the grade (see Table 2).

Table 2 — Typical properties of TSR

Properties	Grade[a]									Test method
	LoV	CV	L	WF	5	10	20	10 CV	20 CV	
Colour coding, marker	Green	Green	Green	Green	Green	Brown	Red	Brown	Red	
Dirt retained on the sieve maximum % (mass fraction)	0,05	0,05	0,05	0,05	0,05	0,10	0,20	0,10	0,20	ISO 249
Ash maximum % (mass fraction)	0,5	0,5	0,5	0,5	0,6	0,75	1,0	0,75	1,0	ISO 247
Nitrogen content maximum % (mass fraction)	0,3	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	ISO 1656
Volatile-matter content maximum % (mass fraction)	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	ISO 248-1
Initial plasticity (P_o) minimum	N/A	N/A	30	30	30	30	30	N/A	N/A	ISO 2007
Plasticity retention index (PRI) minimum	N/A	60	60	60	60	50	40	50	40	ISO 2930
Lovibond colour index maximum	N/A	N/A	6	N/A	N/A	N/A	N/A	N/A	N/A	ISO 4660
Mooney viscosity, ML(1 + 4) at 100 °C	55 ± 10[b]	60 ± 5[b]	N/A	N/A	N/A	N/A	N/A	65^{+7}_{-5} [c]	65^{+7}_{-5} [c]	ISO 289-1
Gel content maximum % (mass fraction)	4,0 [d]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ISO 17278

[a] The raw material is given in Table 1.

[b] Other viscosity levels might be agreed between the interested parties.

[c] The viscosity of these grades is not specified as it can change with, for example, age and handling. However, the viscosity will typically be controlled at the producer's end to a value of 65^{+7}_{-5}. Other viscosity levels might be agreed between the interested parties.

[d] Other gel content levels might be agreed between the interested parties.

7 Sampling

TSR shall be sampled in accordance with ISO 1795, unless otherwise agreed between the interested parties.

Each sample derived from the lot shall comply with the requirements agreed for that grade of TSR.

8 Packaging

TSR should normally be packaged in bales of nominal mass 33,3 kg or 35 kg (tolerance ±0,5 %).

NOTE 1 Since 30 bales of 33,3 kg make up a tonne, it can be the preferred size.

Each bale shall be

— identified,

— marked, and

— wrapped either in polyethylene film having a preferred thickness of 30 µm to 50 µm and a Vicat softening point lower than 95 °C or in some other form of packaging as agreed between the interested parties.

NOTE 2 On agreement between the interested parties, a maximum thickness of 65 µm can be used especially if the removal of the packaging film is desired.

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