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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.

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 2000 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 sixth edition cancels and replaces the fifth edition (ISO 2000:1989), which has been technically revised (for details, see the Introduction).

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## 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 — it was felt that a more open approach was 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 guide 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.

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# 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 will need to be the subject of appropriate agreement between the interested parties.

## 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 247:1990, *Rubber — Determination of ash* ISO 2000:2003  
<https://standards.iteh.ai/catalog/standards/sist/6f22567e-ec15-4ce4-a7ab-210579d376a9/iso-2000-2003>

ISO 248:1991, *Rubbers, raw — Determination of volatile-matter content*

ISO 249:1995, *Rubber, raw natural — Determination of dirt content*

ISO 289-1:1994, *Rubber, unvulcanized — Determinations using a shearing-disc viscometer — Part 1: Determination of Mooney viscosity*

ISO 1656:1996, *Rubber, raw natural, and rubber latex, natural — Determination of nitrogen content*

ISO 1795:2000, *Rubber, raw natural and raw synthetic — Sampling and further preparative procedures*

ISO 2007:1991, *Rubber, unvulcanized — Determination of plasticity — Rapid-plastimeter method*

ISO 2930:1995, *Rubber, raw natural — Determination of plasticity retention index (PRI)*

ISO 4660:1999, *Rubber, raw natural — Colour index test*

## 3 Terms and definitions

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

### 3.1

#### technically specified rubber

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 a 45 µm sieve

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 It may be dried, partially dried or undried.

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3.6

**whole field latex**

latex material derived from *Hevea Brasiliensis* which may be diluted but is not fractionated

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**4 Material composition**

TSR shall be divided into three principal groups based on the raw materials used, as follows:

- 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 — Grades of TSR**

Raw material	Characteristics	Grade
Whole field latex	With controlled viscosity	CV
	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	10V or 20CV



## 6 Specification of requirements

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 (see Note 1)								Test method
	CV	L	WF	5	10	20	10CV	20CV	
Colour coding, marker	Green	Green	Green	Green	Brown	Red	Brown	Red	
Dirt retained on 45 µm sieve, % (by mass), max.	0,05	0,05	0,05	0,05	0,10	0,20	0,10	0,20	ISO 249
Ash, % (by mass), max.	0,5	0,5	0,5	0,6	0,75	1,0	0,75	1,0	ISO 247
Nitrogen content, % (by mass), max.	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6	ISO 1656
Volatile-matter content, % (by mass), max.	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	ISO 248:1991 (oven method at 100 °C ± 5 °C)
Initial plasticity ( $P_0$ ), min.	N/A	30	30	30	30	30	N/A	N/A	ISO 2007
Plasticity retention index (PRI), min.	60	60	60	60	50	40	50	40	ISO 2930
Lovibond colour index, max.	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	60 ± 5 (see Note 2)	N/A	N/A	N/A	N/A	N/A	(see Note 3)	(see Note 3)	ISO 289-1
NOTE 1 The raw material is given in Table 1.									
NOTE 2 Other viscosity levels may be agreed between the interested parties.									
NOTE 3 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 ± 5. Other viscosity levels may be agreed between the interested parties.									

## 7 Sampling and evaluation

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

Each bale shall be identified and 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. (On agreement between the interested parties, a maximum thickness of 65 µm may be used especially if removal of the packaging film is desired.)