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## General purpose rubber thread — Specification

*Fils de caoutchouc pour usages généraux — Spécification*

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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](http://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](http://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 on 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 the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 4, *Products (other than hoses)*.

# General purpose rubber thread — Specification

## 1 Scope

This document specifies physical and mechanical requirements for rubber threads. It does not apply to rubber threads for food contact, furniture, high heat resistance and high ozone resistance applications.

## 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 2321:2017, *Rubber threads — Methods of test*

## 3 Terms and definitions

For the purpose of this document, the terms and definitions given in ISO 2321 and the following apply.

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

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1

#### **tension set**

elongation remaining in a test piece in the relaxed condition after it has been subjected to a constant elongation at a specified time, expressed as a percentage of the elongation

## 4 Rubber thread classification

Rubber threads are classified according to cross-sectional shape into three types:

- Type 1: a round thread;
- Type 2: a square thread;
- Type 3: a rectangular thread.

The types of rubber threads as mentioned above are further sub-divided into three classes depending on the properties:

- Class 1;
- Class 2;
- Class 3.

## 5 Requirements

### 5.1 General

The rubber threads shall be uniform in dimension, free from any visual substances and free from other defects that may cause deleterious effects on performance.

### 5.2 Conventional count

Conventional count (size number) should be agreed between the purchaser and the manufacturer.

When tested in accordance with ISO 2321:2017, Clause 5, the tolerance of thread diameter (round thread) or cross-sectional length (square or rectangular thread) shall be less than  $\pm 3\%$ , unless otherwise specified.

### 5.3 Metric yield or density

Metric yield when tested according to ISO 2321:2017, Clause 6, shall be within  $\pm 6\%$  of the declared value. The specified value for metric yield is dependent on count and density.

If density is required by agreement between the purchaser and the manufacturer, it can be tested according to ISO 2321:2017, Clause 8. It shall be as follows:

Density  $< 1,10 \text{ g/cm}^3$  marked as low density;

Density  $= 1,10 \text{ g/cm}^3$  to  $1,20 \text{ g/cm}^3$  marked as medium density;

Density  $> 1,20 \text{ g/cm}^3$  marked as high density.

### 5.4 Physical and mechanical properties

Physical and mechanical properties of rubber threads shall comply with the requirements given in [Table 1](#).

The age of test pieces shall not exceed 6 months from the date of manufacture.

**Table 1 — Required physical and mechanical properties**

| Physical and mechanical properties         | Requirements |            |            | Test method              |
|--------------------------------------------|--------------|------------|------------|--------------------------|
|                                            | Class 1      | Class 2    | Class 3    |                          |
| Modulus at 300 %, N/mm <sup>2</sup>        | 2,0 to 4,0   | 3,0 to 4,5 | 4,0 to 5,5 | ISO 2321:2017, Clause 9  |
| Tensile strength, N/mm <sup>2</sup> , min. | 25           | 20         | 15         | ISO 2321:2017, Clause 9  |
| Elongation at break, %, min.               | 700          | 600        | 500        | ISO 2321:2017, Clause 9  |
| Tension set, %, max.                       | 8            | 10         | 12         | ISO 2321:2017, Clause 13 |
| After accelerated-ageing test              |              |            |            |                          |
| Tensile strength, N/mm <sup>2</sup> , min. | 20           | 16         | 12         | ISO 2321:2017, Clause 14 |
| Elongation at break, %, min.               | 560          | 480        | 400        | ISO 2321:2017, Clause 14 |

### 5.5 Schwartz value

If the Schwartz value is required, the value given in [Annex A](#) should be used.

## 6 Packaging

### 6.1 Packing

The material shall be packed to facilitate safe transport and storage.

### 6.2 Marking

The packages shall be clearly marked with at least by the following items:

- a) material used;
- b) conventional count (size number), colour, and the number of threads in ribbon;
- c) class;
- d) weight, in kilograms;
- e) date of manufacture and/or manufacturer's identifying lot number.

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## **Annex A** **(informative)**

### **Schwartz value**

#### **A.1 General**

Schwartz value is the average of the stresses, in megapascals, calculated with respect to the original cross-sectional area at a specified elongation measured on extension and retraction of a previously massaged (mechanically conditioned) thread.

The preferred values of the elongation at which the readings are 300 % and 500 %, depending on the type of thread under test. However, the recommended reading of Schwartz value is at 300 % elongation.

#### **A.2 Recommended Schwartz value**

When tested in accordance with ISO 2321:2017, Clause 10, using Schwartz value at 300 % elongation, the Schwartz value shall be  $1,3 \text{ MPa} \pm 25 \%$ .

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