BS ISO 10122:2014

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Reinforcement materials — Tubular braided sleeves — Basis for a specification

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National foreword

This British Standard is the UK implementation of ISO 10122:2014.

The UK participation in its preparation was entrusted to Technical Committee PRI/42, Fibre reinforced thermosetting plastics and prepregs.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Produits de renfort — Gaines tressées — Base de spécification

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Foreword

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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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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 61, *Plastics*, Subcommittee SC 13, *Composites and reinforcement fibres*.

This second edition cancels and replaces the first edition (ISO 10122:1995), which has been technically revised.

INTERNATIONAL STANDARD ISO 10122:2014(E)

Reinforcement materials — Tubular braided sleeves — Basis for a specification

1 Scope

This International Standard provides a basis for specifications applicable to tubular braided sleeves used as reinforcements in plastics. It deals with tubular sleeves braided from all types of yarn or roving.

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 291, *Plastics — Standard atmospheres for conditioning and testing*

ISO 1887, *Textile glass — Determination of combustible-matter content*

ISO 1889, *Reinforcement yarns — Determination of linear density*

ISO 2797, *Textile glass — Rovings — Basis for a specification*

ISO 3598, *Textile glass — Yarns — Basis for a specification*

ISO 4603, *Textile glass — Woven fabrics — Determination of thickness*

ISO 8516, *Textile glass — Textured yarns — Basis for a specification*

ISO 10548, *Carbon fibre — Determination of size content*

3 Terms and definitions

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

3.1
tubular braided sleeve
sleeve made by interlacing (braiding or plaiting) four or more yarns or rovings in such a way that they cross one another and are laid together in a helical formation

3.2
braiding
method of interlacing yarns or rovings

3.3
construction
structure of a sleeve, depending closely upon the type of machine used and the number of yarns or rovings per carrier

3.4
carrier
braiding-machine part on which the yarns or rovings are wound

3.5
braid angle
angle between the longitudinal axis of a braid and the direction of the yarns or rovings

4 Description and designation

4.1 Technical description of tubular braided sleeves

The complete description of a tubular braided sleeve requires definition of the following points:

a) designation of the braid yarn(s);

b) construction of the sleeve;

c) braid angle at a specific diameter;

d) type of treatment;

e) mass per metre length of the sleeve.

As the full description is unwieldy, the manufacturers of tubular braided sleeves normally give a code number to their products to simplify ordering and stocking. The full description of the braided sleeve shall, however, be given in the manufacturer's catalogue against its code number.

Thus, this International Standard is not meant for use in the designation of tubular braided sleeves, but is intended to be used as an aid in the preparation of standardized descriptions in the braided-sleeve catalogues and to ensure the consistency of braided sleeve identification.

4.2 Designation

The designation shall be made up of the following three groups of code-letters/numbers:

a) the first group (maximum of four characters) indicates the type or types of material used in the braiding;

   The following code letters shall be used to designate different types of material:

   — G = Glass

   — C = Carbon

   — A = Aramid

   — E = Ceramic

   — P = Polyethylene

   If two or more types of material are combined in a hybrid braiding, two or more code letters shall be used.

   EXAMPLES

   — CG = Carbon/glass

   — CAE = Carbon/aramid/ceramic

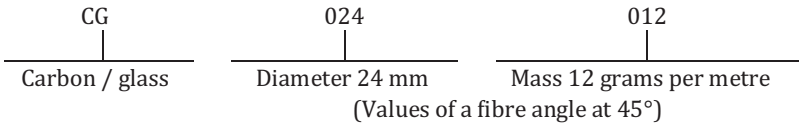
   — CGEA = Carbon/glass/ceramic/aramid

   If several fibre types are used, they shall be given in order of the cross-sectional area (i.e. the mass per unit length divided by the density) of the fibre concerned, starting with the fibre having the greatest cross-sectional area.

b) the second group (three digits) indicates the sleeve diameter, in millimetres, at a fibre angle of 45°;

c) the third group (three digits) indicates the mass, in grams per metre of sleeve, at a diameter which corresponds to a fibre angle of 45°.

EXAMPLE



5 Characteristics

5.1 General

The sleeve shall be of uniform structure.

5.2 Characteristics to be specified

For relevant methods of measurement, see Clause 7.

5.2.1 Construction characteristics

5.2.1.1 The type of braiding yarn or roving shall be in accordance with ISO 2797, ISO 3598, and/or ISO 8516.

5.2.1.2 The construction of the sleeve shall be specified by the following:

a) type(s) of yarn used on each carrier;

b) linear density, in tex or decitex of the braid yarns in accordance with ISO 1889;

c) number of carriers;

d) type of braid;

   1) standard or regular braid (each carrier passes alternately under and over, or inside and outside two other carriers);

   2) two-by-two or paired braid (the carriers run in pairs, each pair passing alternately under and over every other pair revolving in the opposite direction);

e) braid angle at a specific diameter;

f) mass per metre length of the sleeve at that diameter.

5.2.1.3 A roll or spool of sleeve shall be assumed to be in one piece, unless otherwise stated.

5.2.1.4 The nominal thickness shall be subject to agreement between supplier and buyer. It shall be given in millimetres.

5.2.2 Treatment

Specify the treatment from the following:

5.2.2.1 Type of treatment

a) textile size;

b) plastic size;

c) desized;

d) coupling finish;

e) any other treatment.

5.2.2.2 Amount of size and finish

The amount of size and finish shall be expressed as a nominal percentage by mass in accordance with ISO 1887 or ISO 10548.

5.3 Defects

For the defects listed below, the specification shall define the level of defects which can be considered acceptable and, when applicable, the method of visual examination to be used.

5.3.1 Braiding defects

5.3.1.1 Ends out: a gap caused by a missing braiding yarn.

5.3.1.2 Tight end: a braiding yarn braided under excessive tension.

5.3.1.3 Stack end: a braiding yarn braided under insufficient tension.

5.3.1.4 Angle deviation at a specified diameter.

5.3.2 Other defects

5.3.2.1 Dirt: self-descriptive.

5.3.2.2 Folds: self-descriptive.

5.3.2.3 Grease: self-descriptive.

5.3.2.4 Faulty splices: self-descriptive.

6 Sampling and conditioning of specimens

6.1 Sampling

Samples shall be taken from the elementary unit for each delivery of a given type of tubular braided sleeve (roll or spool). The whole length of each roll selected shall be examined for defects.

The number of test specimens taken from each sample shall be as specified for each test method.

NOTE The elementary unit is the smallest normally commercially available entity of a given product as the following:

— package (single yarn, folded or cabled yarn, roving, etc.);

— roll (mat, woven fabric, veil, etc.);

— smallest physical entity in a bulk product (e.g. chopped fibres, milled fibres).

6.2 Conditioning of specimens

Specimens shall be kept for at least 6 h in one of the atmospheres specified in ISO 291 [generally 23 °C ± 2 °C (50 ± 10) % relative humidity] unless a different conditioning atmosphere is specified.

7 Test methods

7.1 Thickness

The method specified in ISO 4603 can be used to measure the thickness of the flattened tubular braid.

7.2 Diameter, braid angle, and mass per metre length

The procedure described enables a tubular braided sleeve to be characterized in terms of its diameter, braid angle, and mass per metre length, the values obtained being used to generate a designation code.

7.2.1 Apparatus

7.2.1.1 Circular tube or shaft with a diameter which gives a fibre angle between 20° and 70° relative to the axis of the tube.

It is advisable to use a tube or shaft with a length between 500 mm and 1 000 mm. The walls of the tube shall not deviate from parallel by more than 5 %.

7.2.1.2 Vernier callipers reading to 0,1 mm and accurate to 0,5 mm, for measuring the diameter of the tube.

7.2.1.3 Rule reading to 0,5 mm, to measure the length of the tube and the length of a yarn or roving taken from the specimen.

7.2.1.4 Balance reading to 0,01 g and accurate to 0,05 g, to determine the mass of the specimen.

7.2.1.5 Pair of scissors or knife, suitable for cutting the specimen.

7.2.2 Conditioning

See 6.2.

7.2.3 Procedure

Measure the diameter and length in millimetres of the tube or shaft.

Pull the sleeve over the tube or shaft without leaving any slack and cut off a specimen with the same length as the tube.

Determine the mass in grams of the specimen.

Take a yarn or roving from the specimen and measure its length, in millimetres.

Calculate the braid angle (see 7.2.5.1).

Calculate the diameter at a braid angle of 45° (see 7.2.5.2).

Calculate the mass per metre length at a braid angle of 45° (see 7.2.5.3).

7.2.4 Designation code

Generate the designation code as specified in 4.2.

7.2.5 Calculations

7.2.5.1 Braid angle

The braid angle Φ_t, in degrees of the sleeve as it sits on the tube or shaft is calculated using Formula (1):

$$\cos\Phi_t = \frac{L_t}{L_v} \tag{1}$$

where

L_t is the length, in millimetres of the tube or shaft;

L_v is the length, in millimetres of the yarn or roving taken from the specimen.

7.2.5.2 Diameter at braid angle of 45°

The diameter D_{45}, in millimetres of the sleeve at a braid angle of 45° is calculated using Formula (2):

$$D_{45} = 2^{-0,5} \times \frac{D_t}{\sin\Phi_t} \tag{2}$$

where

D_t is the diameter, in millimetres of the tube;

Φ_t is the braid angle, in degrees.

7.2.5.3 Mass per metre length

a) The mass per metre length W_{45}, in grams per metre, at a braid angle of 45° is calculated (when 0° rovings are not used) using Formula (3):

$$W_{45} = \frac{1\,000 \times m_0 \times 2^{0,5}}{L_v} \times \cos\Phi_t \tag{3}$$

where

m_0 is the mass, in grams, of the specimen,

L_v is the length, in millimetres, of the yarn or roving taken from the specimen;

Φ_t is the braid angle, in degrees.

b) The mass per metre length W, in grams per metre, calculated from the number of carriers at a braid angle of Φ_t, is given by Formula (4):

$$W = \frac{N \times \sum n_i \,.\, W_i}{\cos \Phi_t} \tag{4}$$

where

N is the number of carriers;

n_i is the number of yarns per carrier;

W_i is the linear density, in grams per metre, of the individual yarns;

Φ_t is the braid angle, in degrees.

8 Packaging and ordering

8.1 Packaging

The packaging required to ensure that the quality of the tubular braided sleeve does not deteriorate during transportation and storage shall be precisely described in the specification.

8.2 Ordering data

8.2.1 Title, number, and date of the specification written on the basis of this International Standard.

8.2.2 Quality desired.

8.2.3 Type of braid required.

8.2.4 Required braid angle at a specified diameter.

8.2.5 Type of yarn or roving and number of carriers required.

8.2.6 Roll or spool mass, in kilograms.

8.2.7 Designation code (see 4.2).

9 Storage

The specification shall give complete details (temperature, relative humidity, time) on the storage conditions necessary to ensure that none of the properties of the product deteriorate during storage.

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Price based on 7 pages

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