INTERNATIONAL STANDARD

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Reinforcement materials — Tubular braided sleeves — Basis for a specification

Produits de renfort — Gaines tressées — Base de spécification

Reference number
ISO 10122:1995(E)

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.

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.

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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. Its deals with tubular sleeves braided from all types of yarn or roving.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 139:1973, *Textiles — Standard atmospheres for conditioning and testing.*

ISO 291:1977, *Plastics — Standard atmospheres for conditioning and testing.*

ISO 1886:1990, *Reinforcement fibres — Sampling plans applicable to received batches.*

ISO 1887:1995, *Textile glass — Determination of combustible-matter content.*

ISO 1889:—[1], *Reinforcement yarns — Determination of linear density.*

ISO 2797:1986, *Textile glass — Rovings — Basis for a specification.*

ISO 3598:1986, *Textile glass — Yarns — Basis for a specification.*

ISO 4603:1993, *Textile glass — Woven fabrics — Determination of thickness.*

ISO 8516:1987, *Textile glass — Textured yarns — Basis for a specification.*

ISO 10120:1991, *Carbon fibre — Determination of linear density.*

ISO 10548:1994, *Carbon fibre — Determination of size content.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 tubular braided sleeve: A 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: A method of interlacing yarns or rovings.

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

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

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

1) To be published. (Revision of ISO 1889:1987)

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) the designation of the braid yarn(s);

b) the construction of the sleeve;

c) the braid angle at a specific diameter;

d) the type of treatment;

e) the mass per metre length of the sleeve.

As the full description is unwiedly, 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 technical description 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

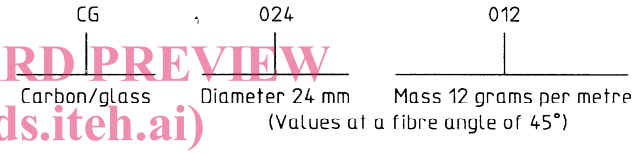
CGEA = Carbon/glass/ceramic/aramid

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 and/or ISO 3598.

5.2.1.2 The construction of the sleeve shall be specified by:

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

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

c) the number of carriers;

d) the 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) the braid angle at a specific diameter;

f) the 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.

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 Slack 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 selection of test specimens

6.1 Sampling

Each delivery of a given type of tubular braided sleeve shall be sampled in accordance with ISO 1886. The whole length of each roll selected shall be examined for defects, and all other tests shall carried out on sections taken from the length of the sleeve.

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

6.2 Conditioning of specimens

Specimens shall be kept for at least 6 h in one of the atmospheres specified in ISO 291 or ISO 139 [generally 23 °C ± 2 °C, (50 ± 5) % relative humidity], unless a different conditioning atmosphere is specified.

7 Test methods

7.1 Thickness

The method specified in ISO 4603 may 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 the equation

$$\cos \Phi_t = \frac{L_t}{L_y}$$

where

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

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

7.2.5.2 Diameter at a braid angle of 45°

The diameter D_{45}, in millimetres, of the sleeve at a braid angle of 45° is calculated using the equation

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

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 the equation

$$W_{45} = \frac{1\,000 \times m_b \times 2^{0,5}}{L_y} \times \cos \Phi_t$$

where

m_b is the mass, in grams, of the specimen;

L_y 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 the equation

$$W = \frac{N \times \Sigma n_i \cdot W_i}{\cos \Phi_t}$$

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 the ensure that none of the properties of the product deteriorate during storage.

ICS 59.100

Descriptors: plastics, reinforcing materials, textile products, braided sleeves, specifications, general conditions.

Price based on 5 pages