INTERNATIONAL STANDARD

ISO 10371

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Reinforcement materials — Braided tapes — Basis for a specification

Produits de renfort — Rubans tressés — Base de spécification

Reference number
ISO 10371:1993(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.

International Standard ISO 10371 was prepared by Technical Committee ISO/TC 61, *Plastics*, Sub-Committee SC 13, *Composites and reinforcement fibres*.

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Reinforcement materials — Braided tapes — Basis for a specification

1 Scope

This International Standard provides a basis for specifications applicable to braided tapes used as reinforcements in plastics. It deals with tapes 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 1887:1980, *Textile glass — Determination of combustible matter content.*

ISO 1889:1987, *Textile glass — Continuous filament yarns, staple fibre yarns, textured yarns and rovings (packages) — 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 10120:1991, *Carbon fibre — Determination of linear density.*

3 Definitions

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

3.1 braided tape: A tape made by interlacing (braiding or plaiting) three or more yarns or rovings in such a way that they cross one another and are laid together in diagonal formation.

3.2 braiding: A method of interlacing yarns or rovings.

3.3 construction: The type, machine-setting and 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 yarn or roving.

4 Description and designation

4.1 Technical description of braided tapes

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

a) the designation of the braid yarn(s);

b) the construction of the braided tape;

c) the braid angle at a specific length;

d) the type of treatment;

e) the mass per unit length of the tape.

As the full description is unwieldy, the manufacturers of tapes normally give a code-number to their products to simplify ordering and stocking. The full description of the tape 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 tapes, but is intended to be used as an aid in the preparation of standardized descriptions in the tape catalogues and to ensure consistency of tape identification.

4.2 Designation

The designation shall be made up of the following four groups of code-letters/numbers.

a) The first group (maximum of four characters) indicates the fibre type or types used in the braiding.

The following code-letters shall be used to designate different fibre types:

G = Glass fibre

C = Carbon fibre

A = Aramid fibre

E = Ceramic fibre

V = Any other fibre

If two or more fibre types 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

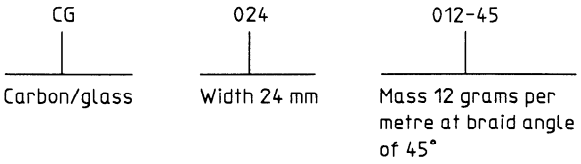
NOTE 1 If several fibre types are used, they shall be given in order of the cross-sectional area (i.e. the mass per unit length divided by the density) of the fibre concerned, starting with the fibre having the greatest cross-sectional area.

b) The second group (three digits) indicates the width, in millimetres, of the braided tape.

c) The third group (three digits) indicates the mass, in grams, per metre length of tape.

d) The fourth group (two digits) indicates the braid angle, in degrees, at the width defined in the second group.

EXAMPLE



Tape width, mass per metre length and braid angle may be determined by the method specified in 7.2.

5 Characteristics

5.1 General

The braided tape shall be of uniform structure.

5.2 Characteristics to be specified

5.2.1 Type and construction

5.2.1.1 The type of braiding yarn or roving shall be in accordance with ISO 2797 and/or ISO 3598 (for glass fibres only).

5.2.1.2 The construction of the braided tape 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 or ISO 10120;

c) the number of carriers;

d) the type of braid:

1) standard or regular braid: one 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 width;

f) the mass per metre length of the tape at that width.

5.2.1.3 A roll or spool of tape shall be assumed to be one length, 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

5.2.2.1 Type of treatment

Specify the treatment from the following:

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

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 over a specified length.

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 Holes: self-descriptive.

5.3.2.5 Faulty splices: self-descriptive.

6 Sampling and selection of test pieces

6.1 Sampling of a batch

Follow the specifications given in ISO 1886.

6.2 Selection of test pieces

Each test method specifies the number of test pieces (one or more) to be tested from each elementary unit (or from the laboratory sample taken from each elementary unit) in order to obtain a test result for the method concerned.

The product specification may state that the test shall be carried out on samples taken from different locations in the elementary unit. In this case, instructions concerning the selection of sampling locations within the elementary units shall be given in the specification.

When checking for visual defects, the whole length of each roll selected shall be checked.

6.3 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 flat braid.

7.2 Width, braid angle and mass per metre length

The procedure described enables a braided tape to be characterized in terms of its width, 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 Rule, to measure in millimetres, to the nearest 0,5 mm, the length and width of the specimen and the length of a yarn or roving taken from the specimen.

7.2.1.2 Balance, with an accuracy of 0,01 g, to determine the mass of the specimen.

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

7.2.2 Conditioning

See 6.3.

7.2.3 Procedure

Lay a length of braided tape on a table in such a way that its width is the same from one end to the other. The length of the specimen shall be between 500 mm and 1 000 mm.

Measure the length, in millimetres, of the specimen. Measure the width, in millimetres, of the specimen. 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 ϕ_t, expressed in degrees, at the point at which the width was measured, using the equation

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

where

L_t is the length, in millimetres, of the specimen;

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

Either

calculate the mass per metre length W_{45}, expressed in grams per metre, at a braid angle of 45° (when 0° rovings are not used), using the equation

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

where

W_t 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, at the point at which the specimen width was measured.

or

calculate the mass per metre length W, expressed in grams per metre, from the number of carriers, using the equation

$$W = \frac{N \cdot \rho_l}{\cos \phi_t}$$

where

N is the number of carriers;

ρ_l is the linear density of the yarn or roving;

ϕ_t is the braid angle, in degrees, at the point at which the specimen width was measured.

From the values obtained for the tape width, braid angle and mass per metre length, generate the tape designation code as specified in 4.2.

8 Packaging and ordering

8.1 Packaging

Recommendations regarding packaging shall be given in the specification.

8.2 Ordering data

8.2.1 Reference number and title of this International Standard

8.2.2 Quality desired

8.2.3 Type of braid required

8.2.4 Required braid angle at the width specified

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 (see 4.2)

9 Storage

The packaging required to ensure that the quality of the braiding does not deteriorate during storage shall be precisely described in the specification.