
International Standard



2559

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Textile glass — Mats (made from chopped or continuous strands) — Basis for a specification

Verre textile — Mats (constitués de fils de base, coupés ou non) — Base de spécification

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2559 was developed by Technical Committee ISO/TC 61, *Plastics*, and this second edition was circulated to the member bodies in November 1976.

It has been approved by the member bodies of the following countries :

Australia	India	Poland
Austria	Iran	Portugal
Belgium	Israel	Romania
Brazil	Italy	Sweden
Bulgaria	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Finland	Mexico	United Kingdom
France	Netherlands	USA
Germany, F.R.	Philippines	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Canada
Ireland

This second edition cancels and replaces the first edition (i.e. ISO 2559-1974).

Textile glass — Mats (made from chopped or continuous strands) — Basis for a specification

1 SCOPE AND FIELD OF APPLICATION

This International Standard gives a basis for a specification applicable only to textile glass mats which are made from chopped or continuous strands and used for the reinforcement of plastics.

It is not applicable to surfacing mats, staple fibre mats or glass mats (or bats) of the type used for thermal and acoustic insulation.

2 REFERENCES

ISO 137, *Wool — Determination of fibre diameter — Projection microscope method.*

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

ISO 472, *Plastics — Vocabulary.*

ISO 1144, *Textiles — Universal system for designating linear density (Tex system).*

ISO 1886, *Textile glass — Method of sampling applicable to batches.*¹⁾

ISO 1887, *Textile glass — Determination of combustible matter content.*²⁾

ISO/R 1888, *Textile glass — Determination of the average diameter of staple fibres or continuous filaments constituting a textile glass yarn — Cross-section method.*

ISO 2078, *Textile glass yarns — Designation.*

ISO 2558, *Textile glass chopped-strand mats — Determination of time of dissolution of the binder in styrene.*

ISO 3342, *Textile glass — Determination of breaking force of mats.*

ISO 3374, *Textile glass mats — Determination of mass per unit area or "substance".*³⁾

ISO 3598, *Textile glass yarns — Basis for a specification.*

ISO 3616, *Textile glass — Mats — Determination of average thickness, thickness under load and recovery after compression.*

ISO/TR 3717, *Textile glass — Mats and woven fabrics — Determination of wet-out time by resin.*

ISO/TR 3718, *Textile glass — Mats — Determination of wet-through time by resin.*

3 TECHNOLOGICAL DESCRIPTION

A complete and accurate technological description of a textile glass mat shall be given in the manufacturer's catalogue. It shall include those properties which are mandatory (a), and may include some or all of the optional properties (b) as indicated in each of the subsequent paragraphs.

3.1 Type of mat

The type of mat shall be described by means of the following information :

3.1.1 Whether strands are chopped or not. (a)

3.1.2 In the case of chopped strands, whether the mat consists of strands of similar or dissimilar nominal lengths. (a)

3.1.3 The code number of the plastic (or coupling) size deposited on the strand. (b)

3.1.4 Whether the bond holding the strands together in the mat is mechanical or chemical.

3.1.4.1 If the bond is chemical, the following particulars shall be given :

- the type of binder ("liquid", "solid" or "liquid plus solid"); (a)
- the degree of solubility of the mat binder in styrene or other monomers (high, medium or low); (a)
- the percentage of combustible matter; (a)
- the code number of the binder(s). (b)

1) At present at the stage of draft. (Revision of ISO 1886.)

2) At present at the stage of draft. (Revision of ISO 1887.)

3) At present at the stage of draft.

3.1.4.2 In the case of a needled mat, whether or not it has a carrier. If it has, the nature of the carrier (a).

3.2 Simplified designation of strands

The simplified designation comprises in the following order :

- 1) a first capital letter, standing for the type of glass used by the producer (see the note); (a)
- 2) a second capital letter, indicating the type of fibre used : C (continuous) for continuous filament; (b)
- 3) a number equal to the nominal diameter of the filament, expressed in micrometres; (b)
- 4) linear density (Tex System) of the strands as they appear in the mat; (a)

NOTE — The following types of glass are in general use : (see ISO 2078).

Type	General description
E	For general purposes; good electrical properties
A	High alkali content
C	Chemical resistance
S, R	High mechanical strength

3.3 Mass of mat per unit area, in grams per square metre (a)

3.4 Width of mat, in centimetres (a)

3.5 Compatibility with resins (a)

Indicate the resins with which the mat is compatible (polyester, epoxy, etc.).

3.6 Technical process for which the product is suited (a)

(For example : hand lay up, hot press moulding.)

3.7 Recommended field of application (b)

(For example : manufacture of boats, corrugated sheet.)

4 LABELLING CODE

The labelling code includes necessarily :

- 1) a code identification specific to the manufacturer and the type of mat. With this information, the user can find in the manufacturer's catalogue the technical description of the type of mat as indicated in clause 3;
- 2) a dash;

- 3) the simplified designation of the strands (see 3.2);
- 4) a double space;
- 5) the mass per unit area of mat, in grams per square metre;
- 6) a dash;
- 7) the width of the mat, in centimetres.

For example :

M.XY9 — E 40 450 — 125

in which

- M.XY9 is the code name of the type of mat, chosen by the manufacturer;
- E 40 is the simplified designation of the strands;
- 450 is the mass per unit area, in grams per square metre;
- 125 is the width in centimetres.

5 TECHNICAL REQUIREMENTS

5.1 General

Depending on their type, or the end use to which they are to be put, the textile glass mats shall satisfy some or all of the following technical requirements.

5.2 Strands used for the manufacture of mat

5.2.1 Type of glass

At the purchaser's request, the textile glass producer shall state the mean content of the essential chemical elements of the glass type supplied.

5.2.2 Average diameter of the filaments constituting the strands

The average diameter of the filaments constituting the strands shall be determined according to ISO/R 1888 or by a longitudinal method.¹⁾

5.2.3 Plastic size (or coupling size)

For the manufacture of textile glass mats used in the reinforcement of plastics, only those strands shall be used that have a plastic size compatible with the resins.

For each plastic size, the manufacturer shall indicate in his catalogue all the types of resin with which the size is compatible.

1) In this case, ISO 137 can be used.

5.3 Degree of solubility of a chopped-strand mat binder in styrene

The degree of solubility of the mat binder in styrene shall be determined according to ISO 2558.

The degree of solubility is represented by the time, expressed in seconds, taken by a mat specimen to break when immersed in styrene and under a predetermined tension.

It is usual to classify mats in three categories, according to the degree of solubility of the binder in pure styrene :

- 1) between 0 and 40 s : mats with high solubility;
- 2) between 40 and 200 s : mats with medium solubility;
- 3) greater than 200 s : mats with low solubility.

5.4 Wettability of a mat

See ISO/TR 3717 and ISO/TR 3718.

5.5 Tensile strength of a mat (for chopped strand mat)

This property shall be determined according to ISO 3342.

5.6 Percentage of combustible matter

The manufacturer shall indicate the percentage by mass of combustible matter included in the glass mat, i.e. a percentage corresponding to the sum of

- the plastic size applied to the strands;
- the binder(s) used to bond the strands.

The percentage of combustible matter is determined by subjecting the sample to heat as specified in ISO 1887.

For each type of mat, the manufacturer shall give the nominal value of the percentage of combustible matter in the mat. The difference between each individual value and the nominal value shall not be more than 50 % of the nominal value.

5.7 Mass per unit area

The mass per unit area of textile glass mat includes textile glass strands, plastic size and binder(s). It is expressed in grams per square metre.

The most usual nominal values are :

300, 400, 450 and 600 g/m²

This property shall be determined according to ISO 3374.

For each type of mat, the manufacturer shall give the nominal value of the mass per unit area.

Individual measurements of the mass per unit area shall not differ by more than 35 % from the nominal value.

The average of all determinations of the mass per unit area on one mat shall not differ by more than 25 % from the nominal value.

5.8 Width

The width of the mat is the width of a mat trimmed on both edges. It is expressed in centimetres.

The difference between any individual width measurement and the nominal width shall not be greater than 0,5 cm.

In the case of a mat untrimmed on one or both edges, the minimum value of width of the corresponding trimmed mat shall be given. This width shall be measured between two points where the thickness of the mat does not visibly vary. In the case of dispute between the interested parties, the conventional method described in the annex shall be used. The tolerance on the width of an untrimmed mat shall be agreed between the supplier and the purchaser.

5.9 Length

The nominal roll length of the mat shall be fixed by prior agreement between the supplier and the purchaser. 65 % by mass of the rolls of every delivery shall have the nominal length indicated. The remaining 35 % shall not have pieces shorter than 10 m and shall not contain more than three pieces per roll.

5.10 Mean thickness; recovery after compression

The mean thickness and the recovery after compression shall be determined according to ISO 3616.

6 DEFECTS

The mat shall be uniform in appearance.

Listed below are a number of recognized visible faults, produced during manufacture or during subsequent handling, which may exist in the mats :

- tears;
- holes;
- dirty marks;
- grease spots;
- foreign matter;
- clumps of strands.

The permissible number and severity of these defects shall be agreed between the supplier and the purchaser.

7 SAMPLING AND CONDITIONING

7.1 Sampling

Sampling shall be carried out as specified in ISO 1886.

Unroll the five outer layers of all the rolls selected and then take, over the whole width, specimens appropriate to the tests to be performed.

Specimens shall not be folded.

7.2 Conditioning

7.2.1 Pre-conditioning of test specimens

If no specific conditioning is required, leave specimens for at least 6 h in one of the standard atmospheres specified in ISO 291.

7.2.2 Test atmosphere

Use the standard atmosphere chosen in 7.2.1.

8 PRESENTATION, PACKAGING, STORAGE CONDITIONS

Requirements concerning presentation, packaging, and storage conditions shall be given.

ANNEX

CONVENTIONAL METHOD FOR DETERMINATION OF WIDTH OF AN UNTRIMMED MAT

(This conventional method shall be used in the case of dispute between parties.)

A.1 MATS UNTRIMMED ON ONE EDGE

Cut from across the whole width of the mat a 30 cm strip.

From this strip, cut a rectangular test piece of 50 ± 5 cm, containing the untrimmed edge (see figure 1).

Place the piece between two vertical guides, separated by approximately 10 mm, with the untrimmed edge lowermost. Measure the vertical height, a , of the piece, which corresponds to width (see figure 2).

Measure directly (as in the case of a mat trimmed on two edges) the width l of the remaining portion of the strip.

The conventional width of the sample of mat is

$$l + a$$

A.2 MATS UNTRIMMED ON TWO EDGES

Proceed as in clause A.1, but cut from each edge of the strip of mat a test piece of 50 ± 5 cm having an untrimmed edge.

Measure the vertical height a and b of each of these samples.

The conventional width of the sample of mat is

$$l + a + b$$