International Standard 1887

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Textile glass — Determination of combustible matter content

Verre textile — Détermination de la teneur en matières combustibles

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Foreword

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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 1887 was developed by Technical Committee ISO/TC 61, *Plastics*, and was circulated to the member bodies in March 1978.

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

Australia	Iran	Romania
Austria	Israel	South Africa, Rep. of
Brazil	Italy	Sweden
Czechoslovakia	Japan	Switzerland
Egypt, Arab Rep. of	Korea, Rep. of	Turkey
Finland	Mexico	United Kingdom
France	Netherlands	USA
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Hungary	Poland	
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The member bodies of the following countries expressed disapproval of the document on technical grounds :

Belgium
Canada

This second edition cancels and replaces the first edition (i.e. ISO 1887-1975).

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Textile glass — Determination of combustible matter content

1 Scope and field of application

This International Standard specifies a method for the determination of the combustible matter content of products made from textile glass, such as continuous filament yarns, staple fibre glass yarns, rovings, chopped strands, milled fibres, glass fabrics, glass mats, and other glass reinforcements.

2 References

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

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

3 Definition

combustible matter content : The ratio of the mass of material removed from the dried textile glass product under the conditions prescribed, to the mass of the dried product.

NOTE — This ratio is expressed as a percentage in this International Standard. It is equal to the content of size or finish on the textile glass product when the size or finish is completely combustible without significant residue (i.e. primarily organic products).

4 Principle

Weighing of test specimens, dried under prescribed conditions, before and after calcination at a standard temperature of 625 ± 20 °C.

NOTE — For glasses which are unstable at this temperature a temperature between 500 and 600 °C may be chosen according to the glass specification or upon agreement. The chosen temperature should be kept constant to within 20 °C.

5 Apparatus

5.1 Air-ventilated oven, for drying specimens, capable of being controlled at 105 ± 2 °C or 80 ± 2 °C or the chosen temperature ± 2 °C (see note to 7.2).

5.2 Muffle furnace, capable of being maintained with a tolerance of ± 20 °C at any desired temperature up to 650 °C, the temperature being measured at the centre of the muffle furnace with the door closed.

5.3 Desiccator, containing a suitable desiccant (for example, silica gel, calcium chloride, phosphorous(V) oxide).

5.4 Specimen holder, made from a material stable at the test temperature, allowing the best possible air circulation around the test specimen and such as to prevent loss of material. The holder may be a porcelain crucible, a basket made from stainless steel gauze, etc.

5.5 Stainless steel tongs, for handling test specimens and holders.

5.6 Balance, accurate to 0,1 mg.

5.7 Polished metal templates, for preparing the specimens.

5.7.1 For glass mats, the recommended shape is a square of side approximately 316 mm. Other shapes may be used (see note to 6.4.1).

5.7.2 For glass fabrics, the shape is a rectangle 150 mm × 80 mm (see 6.3).

5.8 Suitable tool, for cutting glass mat or glass fabric : for example, knife, scissors or disc.

5.9 Suitable wrap-reel, for taking yarn and roving test specimens.

6 Sampling and test specimens

6.1 Glass textile continuous filament yarns, staple fibre yarns and rovings

6.1.1 Test specimens[1]

The following table gives the quantity of yarn to take (in general, the length in metres) as a function of the linear density

1) If the linear density of the yarn is also to be determined, the specimens for that test can be used.

Tt of the yarn. The test specimen shall not be unduly compressed in order to allow as much free air circulation as possible and therefore ensure its complete drying and calcination.

Linear density, Tt	Length of yarn to take
tex	m
Tt < 5	2 000
5 ≤ Tt < 10	1 000
10 ≤ Tt < 50	500
50 ≤ Tt < 200	100
200 ≤ Tt < 500	50
500 ≤ Tt < 1 000	20
1 000 ≤ Tt < 2 500	10
2 500 ≤ Tt < 5 000	5
Tt ≥ 5 000	Length such that the mass lies between 5 and 25 g

6.1.2 Number of test specimens

At least two test specimens shall be taken from each package.

6.2 Chopped strands and milled fibres

6.2.1 Test specimens

Each test specimen shall have a mass of not less than 5 g.

6.2.2 Number of test specimens

At least five test specimens per sample shall be taken.

6.3 Textile glass fabrics

6.3.1 Test specimens

The specimens shall be rectangles 150 mm × 80 mm, the edges being frayed out for about 5 mm to prevent any subsequent loss of yarns. Larger rectangles shall be taken in the case of light-weight fabrics to obtain test specimens of mass at least 5 g.

The test specimen dimensions shall be compatible with the apparatus (muffle furnace, balance). If for this reason it has not been possible to comply with the specified dimensions or the 5 g minimum mass, this shall be mentioned in the test report (see note to 6.4.2).

6.3.2 Number of test specimens

At least five test specimens per sample shall be taken.

6.4 Textile glass mat

6.4.1 Test specimens

The recommended shape of each test specimen is a 316 mm square of mass at least 5 g. If the mass of one 316 mm square is less than 5 g, take as many 316 mm square specimens as are necessary to achieve this minimum mass.

NOTE — Other shapes may be used, provided that their surface area is 0,1 m^2, for example, test specimens of 400 mm × 250 mm. In this case, it is necessary to modify slightly the preparation described below.

Cut a strip of width at least 316 mm from across the whole width of the mat. By means of the template (5.7.1) and the cutting device (5.8), cut

— at each end (in the case of mats with trimmed edges at least 10 mm inside the edges), a test specimen 316 mm × 316 mm;

— between these end specimens, as many test specimens 316 mm × 316 mm as the remaining width allows. These test specimens shall be evenly distributed.

6.4.2 Number of test specimens

The minimum number of test specimens shall be agreed between the interested parties.

NOTE — For fabrics and mats, the specimens may be cut and stacked rather than folded, in order to put them on a holder compatible with the apparatus (muffle furnace, balance).

7 Procedure

7.1 Weighing of holder

Stabilize the mass of the holder (5.4) by placing it in the muffle furnace (5.2), controlled at 625 ± 20 °C or at the chosen temperature between 500 and 600 °C (see clause 4).

Allow the holder to cool in the desiccator (5.3) to standard room temperature (see ISO 291 or ISO 139).

Weigh the holder and note the reading to the nearest 0,000 1 g.

7.2 Weighing of dried test specimen plus holder

Place the test specimen on the holder.

Place the holder with the specimen in the oven (5.1), controlled at 105 ± 2 °C. In the case of products having a textile size, the standard temperature shall be 80 ± 2 °C.

NOTE — In the case of textile glass products containing components which are volatile or susceptible to change at these standard temperatures, a lower temperature may be chosen by agreement between the interested parties; it shall be maintained constant to within 2 °C.

Heat the specimen for at least 1 h.

Remove the specimen with its holder from the drying oven and allow to cool to standard room temperature (see ISO 291 or ISO 139) in the desiccator (5.3) for 30 min. Weigh the whole (specimen plus holder) and note the reading to the nearest 0,000 1 g.

Repeat this procedure, heating the specimen plus holder for a further 10 min, in the oven, until the results of two successive weighings differ by less than 0,001 g.

7.3 Weighing of calcined test specimen plus holder

Place the test specimen with its holder in the muffle furnace (5.2), controlled at 625 ± 20 °C or the chosen temperature between 500 and 600 °C (see clause 4).

Allow the specimen to burn for 5 min with the door of the furnace open[1]. Then close the door of the furnace and heat for a further 30 min. If a temperature lower than 625 °C is chosen, the latter heating period shall be increased to at least 1 h.

Remove the test specimen and holder from the furnace and transfer to the desiccator (5.3). Allow to cool to standard room temperature (see ISO 291 or ISO 139).

Weigh the calcined test specimen plus holder, and note the reading to the nearest 0,000 1 g.

7.4 Precautions to be taken during test

7.4.1 Ensure that the test specimen does not come into contact with the furnace during the heating stage.

7.4.2 Transport the test specimen plus holder with great care to prevent loss of material.

7.4.3 Never touch the test specimen with the fingers, but use the tongs (5.5).

8 Expression of results

The combustible matter content of a test specimen, expressed as a percentage by mass of the dried product, is given by the formula

$$\frac{m_1 - m_2}{m_1 - m_0} \times 100$$

where

m_0 is the mass, in grams, of the holder;

m_1 is the mass, in grams, of the holder plus the dried specimen;

m_2 is the mass, in grams, of the holder plus the dried and calcined specimen.

Express the results as the arithmetic mean of the combustible matter contents of the individual test specimens.

9 Test report

The test report shall include the following particulars :

a) reference to this International Standard;

b) complete identification of the textile glass product which has been tested;

c) type of specimen holder used;

d) temperature of muffle furnace, if different from the standard temperature (625 °C);

e) type of oven used;

f) temperature of drying, if different from 105 °C;

g) sampling procedure;

h) dimensions, mass and number of test specimens used;

j) the standard room temperature;

k) result obtained for each test specimen and the mean value for the sample;

m) any operational details not specified in this International Standard and any circumstances liable to have had an influence upon the results.

1) The door is left open to allow volatile products to escape from the furnace, thus preventing condensable materials which they may contain being redeposited on the specimen or on the holder.