

INTERNATIONAL STANDARD

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Textile glass mats — Determination of mass per unit area

*Verre textile — Mats — Détermination de la masse surfacique ou
"grammage"*



Reference number
ISO 3374:1990(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 3374 was prepared by Technical Committee ISO/TC 61, *Plastics*.

This second edition cancels and replaces the first edition (ISO 3374:1980), of which it constitutes a technical revision.

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Textile glass mats — Determination of mass per unit area

1 Scope

This International Standard specifies a method for determining the mass per unit area of a glass mat (either chopped-strand mat or continuous-strand mat).

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 1886:1980, *Textile glass — Method of sampling applicable to batches*.

ISO 2602:1980, *Statistical interpretation of test results — Estimation of the mean — Confidence interval*.

ISO 3344:1977, *Textile glass products — Determination of moisture content*.

3 Definition

For the purposes of this International Standard, the following definition applies.

mass per unit area: The ratio of the mass of a piece of mat of specified dimensions to the area.

NOTE 1 This mass includes both the glass strands and the binder.

4 Principle

The mass of a test specimen of known surface area is determined, and the mass per unit area calculated. For products including more than 0,2 % moisture, this operation is preceded by a drying step in an oven.

5 Apparatus

5.1 Polished metal template, for preparing the test specimens. The preferred shape is a square with sides of 316 mm (i.e. 0,1 m²) with a tolerance of ± 1 mm.

Other shapes of test specimen may be used as long as their surface area is 0,1 m², for example test specimens measuring 400 mm $\times$ 250 mm.

5.2 Suitable trimming tool, for example knife, scissors or cutting disc.

5.3 Specimen container, which provides optimum air circulation around the specimen, made from a heat-resistant material and such that there is no loss of the test product. This may be a basket constructed from stainless steel wire mesh.

5.4 Ventilated drying oven, with an air change rate of 20 to 50 times per hour, capable of maintaining a temperature of 105 °C $\pm$ 2 °C.

5.5 Desiccator, containing a suitable drying agent (for example silica gel, calcium chloride, phosphorus pentoxide).

5.6 Balance, graduated to 0,1 g.

5.7 Stainless steel tongs, for handling the specimen and specimen container.

6 Sampling and test specimens

Sampling shall be carried out in accordance with ISO 1886.

As a rule, the number of specimens to be taken from each roll in the sample shall be five per metre of width for square (316 mm × 316 mm) specimens and seven per metre of width for rectangular (400 mm × 250 mm) specimens.

Specimens shall be taken adjacently over the mat width, distributing them in two or more rows, depending on mat width, in order to obtain the required number of specimens. For this operation, first cut, from across the whole width of each roll in the sample, a strip at least 650 mm wide for square (316 mm × 316 mm) specimens or 820 mm wide for rectangular (400 mm × 250 mm) specimens. Cut the test specimens from this strip, using the template (5.1) and the trimming tool (5.2).

Rectangular specimens shall be cut so that their long side is parallel to the mat length.

For untrimmed mats, take the first specimen at 100 mm from the untrimmed edge.

Figure 1 and figure 2 provide models for cutting out square (316 mm × 316 mm) specimens and rectangular (400 mm × 250 mm) specimens, respectively.

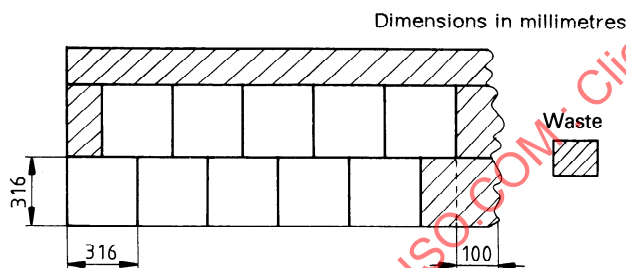


Figure 1 — Example of distribution of square (316 mm × 316 mm) specimens

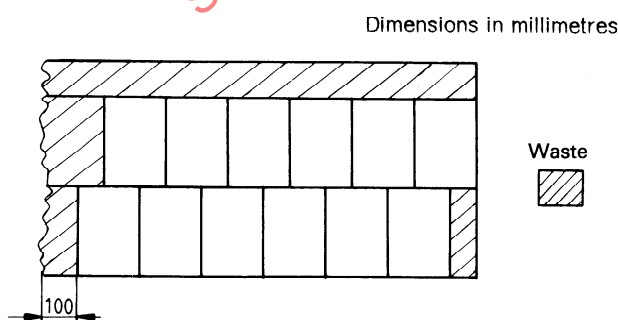


Figure 2 — Example of distribution of rectangular (400 mm × 250 mm) specimens

Another way of measuring the mean mass per unit area is by using a whole roll as the test specimen. In this method, the mass of the roll is divided by its total area. In view of the difficulty involved in measuring the length of a mat when it is wound in a roll, this method is generally used only when the mat is being produced. If, however, the variability of mass per unit area within the roll is to be evaluated, the normal method (using 0,1 m² specimens) will have to be used.

7 Procedure

Weigh each specimen to the nearest 0,1 g (m_s).

In case of doubt regarding the moisture content of the mat, first determine the moisture content in accordance with ISO 3344. If this moisture content exceeds 0,2 %, dry each specimen in a container (5.3) in a ventilated oven (5.4) for 1 h at 105 °C ± 2 °C. Remove the specimens from the container and allow them to cool in a desiccator (5.5) until ambient temperature is reached. Then weigh each dried specimen to the nearest 0,1 g.

8 Expression of results

8.1 Mass per unit area of the specimen

Calculate the mass per unit area ρ_A of each test specimen, expressed in grams per square metre, using the equation

$$\rho_A = \frac{m_s}{A}$$

where

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

A is the area, in square metres, of the specimen.

8.2 Mass per unit area of the roll

Express the mass per unit area of each roll as the arithmetic mean of the masses per unit area of the specimens taken from this roll.

When sampling a batch of textile glass mats, the roll represents the elementary unit and its mass per unit area is the value used in the statistical evaluation of the results (see ISO 2602).

NOTE 2 The mass per unit area obtained with 0,1 m² specimens is not comparable with the result obtained using a whole roll as the test specimen (see clause 6, last paragraph).

8.3 Mass per unit area of the batch

Express the mass per unit area of a batch as the arithmetic mean of the masses per unit area of the rolls taken from that batch.

9 Precision

The precision of this test method is not known because inter-laboratory data are not available. This method may not be suitable for use in specifications or in the event of disputed results as long as these data are not available.

10 Test report

The test report shall include the following particulars:

a) a reference to this International Standard;

- b) all details necessary for the complete identification of the mat tested;
- c) the dimensions of the test specimens;
- d) the number of test specimens tested;
- e) the mass per unit area of each roll and, if requested, the standard deviation for the specimens from each roll;
- f) the mean value of the mass per unit area and the standard deviation for all the specimens;
- g) any details of procedure not provided in this International Standard and any incidents liable to have influenced the results (indicate here if preliminary drying of the specimens was necessary and, if so, report the measured percentage moisture content).

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