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Geotextiles — Determination of thickness at specified pressures

Géotextiles — Détermination de l'épaisseur à des pressions prescrites

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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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Geotextiles — Determination of thickness at specified pressures

1 Scope

1.1 This International Standard specifies a method for the determination of the thickness of geotextiles at specified pressures and defines the pressure at which the nominal thickness is determined.

The test results are intended for identification purposes and for use in technical data sheets and/or as part of other test methods, e.g. tests of hydraulic properties.

1.2 The method is applicable to all geotextiles but not necessarily to all geotextile-related products such as geogrids.

NOTE 1 Normally the thickness of a geotextile is determined by measuring one layer of the geotextile. In cases when two or more layers are used on top of each other in a design, the test may be made in accordance with this International Standard with the agreed number of layers instead of one. In such cases when testing structured geotextiles, consideration should be given to the relevance of such findings.

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 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications.*

ISO 9862:1990, *Geotextiles — Sampling and preparation of test specimens.*

3 Definitions

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

3.1 thickness (of geotextiles): The distance between a reference plate on which the specimen rests and the contacting face of a parallel presser-foot applying a given pressure to the specimen.

3.2 nominal thickness (of geotextiles): The thickness determined when a pressure of 2 kPa $\pm$ 0,01 kPa is applied to the specimen.

4 Principle

4.1 The thickness of a number of specimens of geotextiles is measured as the distance between the reference plate on which the specimen rests and the contacting face of a parallel, circular presser-foot exerting a given pressure on an area of defined size within a larger area of geotextile.

4.2 The result of the test is given as the average of the results obtained at each specified pressure.

5 Apparatus

5.1 Thickness tester, incorporating the following elements:

5.1.1 Removeable presser-foot, having a plane circular surface of area 25 cm^2 for testing materials of uniform thickness. For the determination of the overall thickness of materials of non-uniform thickness or the thickness of parts of such materials, the size of the presser-foot shall be agreed between the interested parties and the size shall be given in the test report.

The presser-foot shall be capable of exerting pressures of 2 kPa, 20 kPa and 200 kPa, within a tolerance of 0,5 %, normal to the plane of the specimen.

To assure that the presser-foot surface and the reference plate are parallel when determining the overall thickness of geotextiles of non-uniform thickness, the presser-foot shall be supported at at least three points evenly distributed over the presser-foot surface, which normally will require that a presser-foot with an area of more than 25 cm^2 be used.

5.1.2 Reference plate, with a plane surface of minimum dimensions greater than 1,75 times the diameter of the presser-foot surface for testing material of uniform thickness. When testing thinner areas in materials of non-uniform thickness, the reference plate can be as small as the area of the presser-foot, or an alternative supporting device of these dimensions can be used, to assure full contact with the lower surface of the specimen.

5.1.3 Gauge, for indicating the distance between the reference plate and the presser-foot to an accuracy of 1 % for geotextiles over 0,5 mm in thickness and to 0,001 mm for geotextiles not exceeding 0,5 mm in thickness.

5.2 Means of measuring time, having an accuracy of $\pm$ 0,1 s.

6 Specimens

6.1 Cut a number of specimens of minimum dimensions greater than 1,75 times the diameter of the presser-foot surface.

The number of specimens shall be not less than 10. If new specimens are used for testing at each pressure, then not less than 30 specimens will be required.

6.2 Select and cut the specimens in accordance with ISO 9862.

6.3 Condition the specimens in accordance with ISO 554 for a period of 24 h unless it can be shown that the results are not affected by ommitting this procedure.

7 Procedure

7.1 General

When determining the thickness of material of non-uniform thickness, e.g. geogrids (see note to 1.2), the part of the material to be tested shall be agreed between the interested parties. The part tested shall be specified in the test report.

The thickness is determined by using the procedure specified in 7.2 or that specified in 7.3, applying pressures of 2 kPa, 20 kPa and 200 kPa to an accuracy of 0,5 %.

NOTE 2 Other pressures may be used if agreed between the interested parties. If a pressure of more than 200 kPa is applied, a new, conditioned specimen shall be used for each test.

7.2 Procedure A (Loading each set of specimens)

NOTE 3 This procedure may be chosen when using an apparatus the construction of which requires much time and/or labour when changing the pressure.

7.2.1 Place a specimen between the clean surfaces of the reference plate (5.1.2) and presser-foot (5.1.1). Gently lower the presser-foot, applying a pressure of 2 kPa $\pm$ 0,01 kPa to the specimen, and note the gauge reading after 30 s, unless some other time is specified.

NOTE 4 Such other time shall be selected so that no appreciable change in fabric thickness is indicated by the instrument during a further 20 % of that time.

Release the pressure and remove the specimen.

7.2.2 Repeat the procedure in 7.2.1 until at least 10 specimens have been tested.

7.2.3 Repeat the procedure in 7.2.1 and 7.2.2 using the same specimens or a corresponding number of new specimens, and applying a pressure of 20 kPa $\pm$ 0,1 kPa.

7.2.4 Repeat the procedure in 7.2.1 and 7.2.2 using the same specimens or a corresponding number of new specimens, and applying a pressure of 200 kPa $\pm$ 1 kPa.

7.3 Procedure B (Incremental loading of individual specimens)

NOTE 5 This procedure may be used if agreed on between the interested parties.

7.3.1 Carry out the procedure in 7.2.1 but without removing the specimen.

7.3.2 Gently lower the presser-foot, applying a pressure of 20 kPa $\pm$ 0,1 kPa to the same specimen, and note the gauge reading after 30 s or as specified alternatively in 7.2.1, without removing the specimen.

7.3.3 Repeat the procedure in 7.3.2, applying a pressure of 200 kPa $\pm$ 1 kPa. Remove the specimen.

7.3.4 Repeat the procedures in 7.3.1 to 7.3.3 until at least 10 specimens have been tested.

8 Expression of results

Determine the average thickness of the specimens, and the coefficient of variation, for each pressure given in clause 7 and to the accuracy given in 5.1.3.

NOTES

6 Upon request, the result of each individual determination can be given.

7 Upon request, a graphical plot of the mean value of the thickness against the applied pressure can be given. The x-axis (applied pressure) should be logarithmic. The y-axis (thickness) should be linear.

9 Test report

The test report shall include the following particulars:

a) a statement that the test was performed in accordance with this International Standard;

b) the number of specimens tested at each pressure given in clause 7;

c) the conditioning atmosphere used (see 6.3) and the time for which the pressure was applied (see 7.2.1);

d) the presser-foot size and, if the 25 cm^2 presser-foot was not used, the reason for this;

e) the procedure used (A or B);

f) the results of the test (see clause 8);

g) details of any deviation from the specified test procedure;

h) the date of the test.

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