
**Geotextiles and geotextile-related
products — Determination of thickness at
specified pressures —**

Part 2:

Procedure for determination of thickness of
single layers of multilayer products

*Géotextiles et produits apparentés — Détermination de l'épaisseur à des
pressions prescrites —*

*Partie 2: Méthode de détermination de l'épaisseur des couches individuelles
de produits multi-couches*



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 9863-2 was prepared by the European Committee for Standardization (CEN) in collaboration with ISO Technical Committee TC 38, *Textiles*, Subcommittee SC 21, *Geotextiles*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Together with the other parts of ISO 9863, ISO 9863-2 cancels and replaces ISO 9863:1990, which has been technically revised.

ISO 9863 consists of the following parts, under the general title *Geotextiles and geotextile-related products — Determination of thickness at specified pressures*:

- *Part 2: Procedure for determination of thickness of single layers of multilayer products*

Annexes A and ZZ of this part of ISO 9863 are for information only.

Annex ZZ provides a list of corresponding International and European Standards for which equivalents are not given in the text.

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@isocs.iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

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Foreword

The text of EN ISO 9863-2:1996 has been prepared by Technical Committee CEN/TC 189 "Geotextiles and geotextile-related products", the secretariat of which is held by IBN, in collaboration with Technical Committee ISO/TC 38 "Textiles".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 1997, and conflicting standards shall be withdrawn at the latest by February 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This part of EN ISO 9863 specifies a method for determination of the thickness of single layers of multilayer products at specified pressures.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

| | |
|----------|---|
| EN 963 | Geotextiles and geotextile-related products - Sampling and preparation of test specimens |
| EN 964-1 | Geotextiles and geotextile-related products - Determination of thickness at specified pressures - Part 1: Single layers |
| EN 30320 | Geotextiles - Identification on site (ISO 10320:1991) |
| ISO 554 | Standard atmospheres for conditioning and/or testing - Specifications |

3 Principle

The thickness of the individual layers of a specimen is measured under a specified pressure without the layers being mechanically separated. This requires prior determination of the mean value of the total thickness of the multilayer product at the desired pressure in accordance with EN 964-1.

4 Apparatus

4.1 The apparatus (see figure 1) shall satisfy the following conditions:

- The apparatus shall consist of a frame with a fixed, flat lower plate and a movable flat upper plate of the same size.
- The lower and upper plates shall be rectangular.
- The upper plate shall be capable of being fixed at any position of its travel.
- Lower and upper plates shall be so rigid that they do not deflect by more than 0,1 mm, measured over an area equivalent to that of the specimen, under the desired pressure.
- Four smooth intermediate identical plates are required of minimum 1,0 mm thickness. They shall be sufficiently rigid not to deflect during the tests and their area and shape shall be the same as those of the specimens.

- The frame shall be sufficiently high to accommodate a pile of five multilayer specimens and four intermediate plates between the lower and upper plates.

4.2 A device for measuring distance, accurate to 0,1 mm.

5 Test specimens

5.1 Sampling

Take samples in accordance with EN 963.

5.2 Number and dimensions

Cut five rectangular specimens (200 mm x 300 mm) from the sample. If this size is not representative of the product other more representative dimensions may be chosen.

NOTE: It is suggested that test specimens identical to those prepared for the tensile test in accordance with EN ISO 10319 be used.

5.3 Specimen conditions

The specimens shall be clean, and conditioned in accordance with ISO 554.

6 Procedure

6.1 Lay five conditioned specimens on top of one another, with one side exactly aligned retaining the sequence of the layers to form a pile. Place one separator plate between each specimen with one side exactly aligned with the specimen faces. Place the upper plate in position, again with one side exactly aligned.

6.2 Fix the upper plate at each corner. The distance from the lower plate is equal to five times the mean value of thickness of the multilayer product previously measured at the specified pressure with an accuracy of 0,1 mm in accordance with EN 964-1. Make allowance for the separator plates by adding their thickness to the value calculated.

6.3 Draw or otherwise apply at least three gauge lines on the aligned specimen face of the pile, perpendicular to both the lower and upper plates and evenly distributed over the face, the lines being at least 30 mm from one another.

6.4 Represent the boundaries between the individual layers of each specimen by median lines perpendicular to the gauge lines and which extend at least 10 mm on both sides of the gauge lines (see figure 2).

NOTE: This procedure can be simplified by photocopying the aligned face of the sample pile using a magnifying copier, or by optical measurement of the layer boundaries using cross hairs. The magnification accuracy should previously be checked, e.g. by copying a sheet of graph paper, calibrated in mm. For individual layer thickness of ≤ 1 mm optical measurement should be used.

At pressures ≤ 20 kPa the apparatus is rotated by 90° after stacking of the samples (specimens vertical) to avoid a deformation of the lower layers by the weight of the upper layers and separator plates.

6.5 The intersection of the median line and the gauge line defines the individual layer boundary.

7 Calculation and expression of results

The individual layer thickness is the difference between two measuring points on a gauge line. Using the layer thicknesses thus determined for the five specimens, calculate the mean and standard deviation for each individual layer.

NOTE: The sum of the mean values of the individual layers is equal to the mean total thickness.

8 Test report

The test report shall include the following information:

- a) the number and date of this European Standard;
- b) the standard atmosphere used;
- c) a description of the geotextile tested in accordance with the standard of identification (see EN 30320);
- d) thickness of the specimens and their individual layers;
- e) details of apparatus used including specimen dimensions;
- f) the pressure used;
- g) any deviation from the standard.

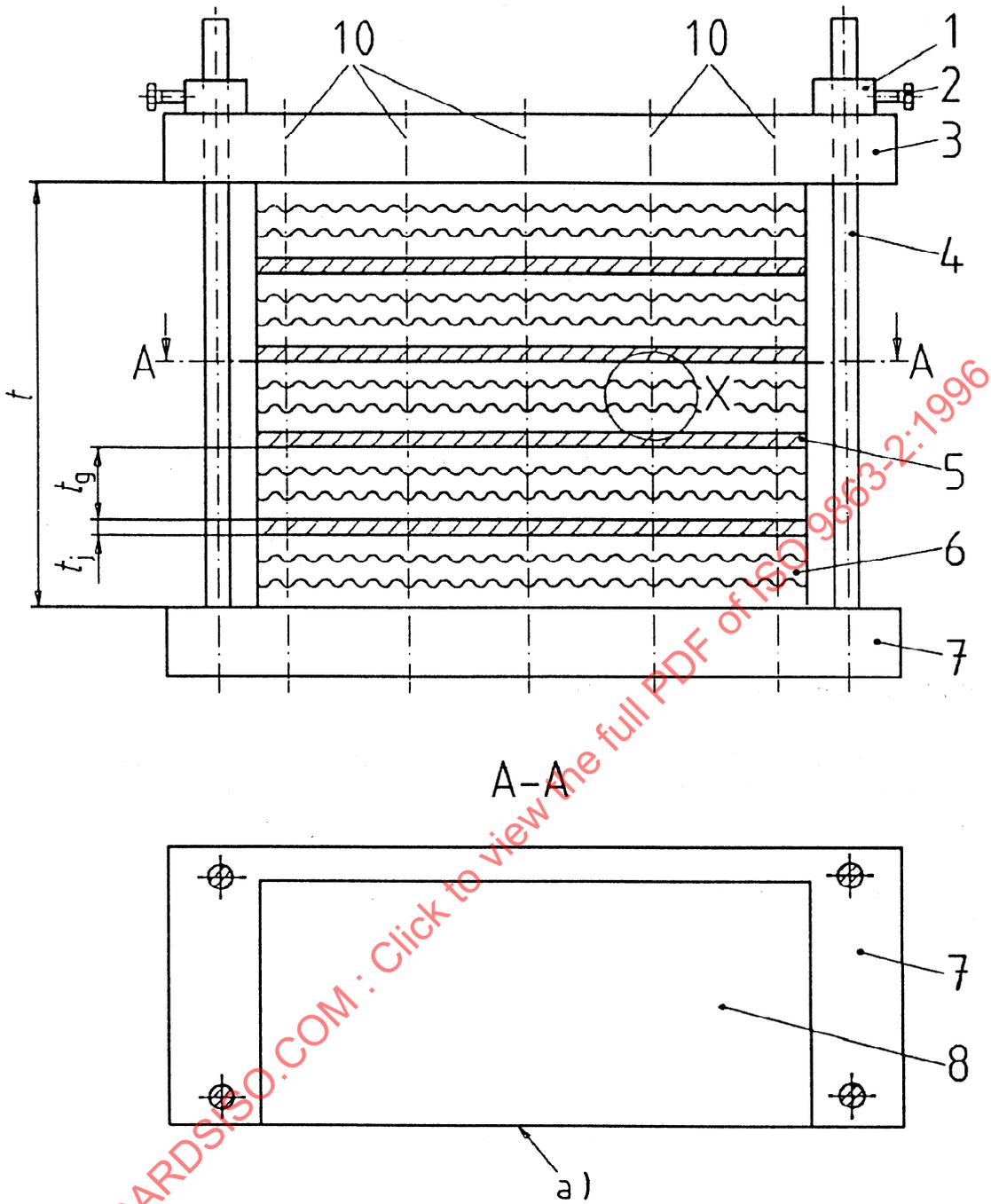
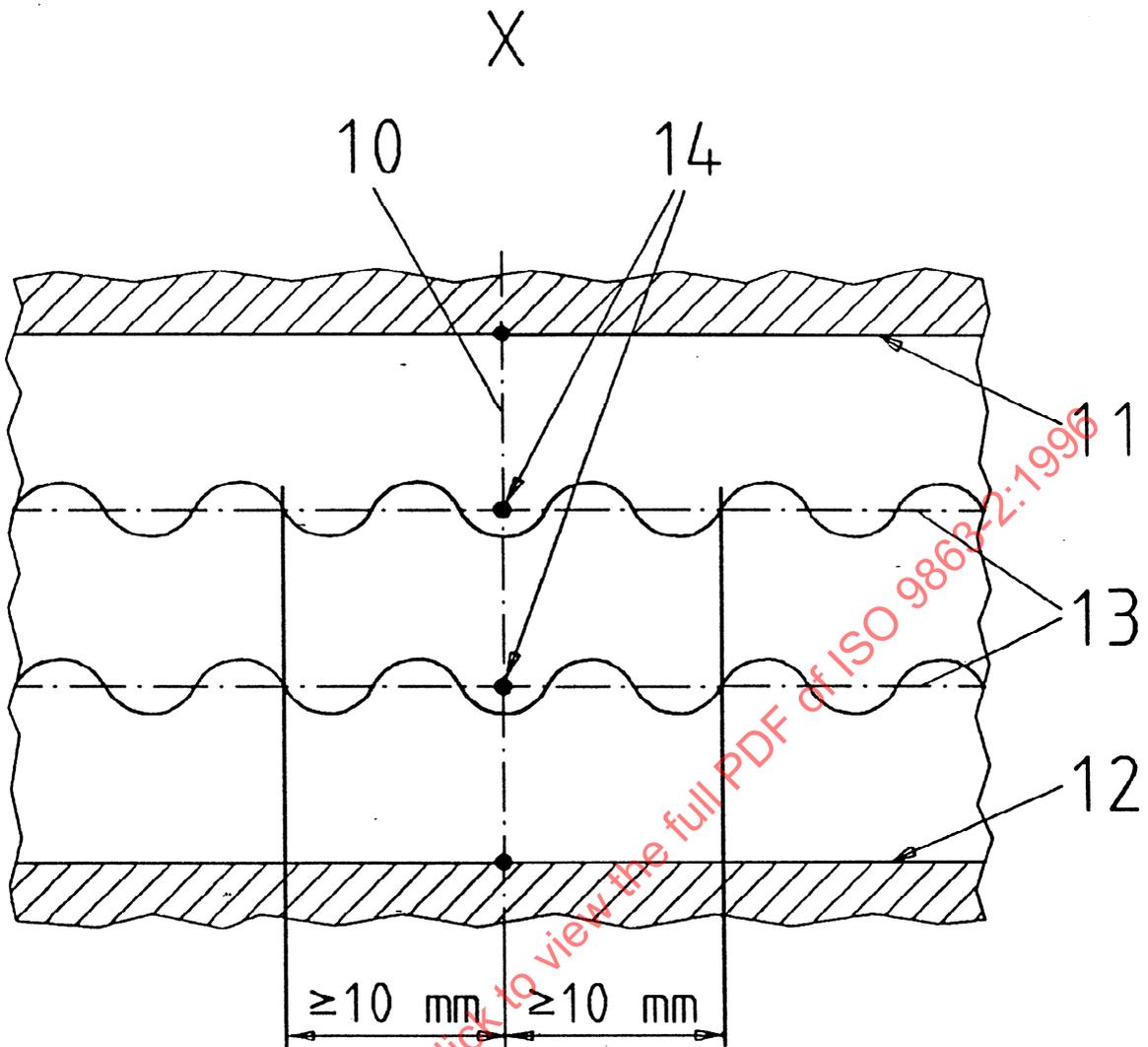


Figure 1. Example of apparatus for determination of thickness of single layers of multilayer products

- 1 locking nuts
- 2 fixing screw
- 3 upper plate
- 4 guide rod
- 5 separation plate
- 6 specimen 1
- 7 lower plate
- 8 plan area of specimens
- a) aligned edges of specimens and plates



**Figure 2: Example showing a gauge line, median lines, and measuring points
(detail X from figure 1)**

- 10 gauge line
- 11 lower face of separator plate
- 12 upper face of separator plate
- 13 median lines
- 14 measuring points