



**SLOVENSKI STANDARD**  
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**Geosintetika - Ugotavljanje debeline pri predpisanih tlakih - 1. del: Enojne plasti**  
**(ISO/DIS 9863-1:2014)**

Geosynthetics - Determination of thickness at specified pressures - Part 1: Single layers  
(ISO/DIS 9863-1:2014)

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Géosynthétiques - Détermination de l'épaisseur à des pressions spécifiées - Partie 1:  
Couches individuelles (ISO/DIS 9863-1:2014)

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# DRAFT INTERNATIONAL STANDARD

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## Geosynthetics — Determination of thickness at specified pressures —

### Part 1: Single layers

*Géosynthétiques — Détermination de l'épaisseur à des pressions spécifiées —  
Partie 1: Couches individuelles*

ICS: 59.080.70

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### ISO/CEN PARALLEL PROCESSING

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This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.



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## Foreword

This document (EN ISO 9863-1:2014) has been prepared by Technical Committee ISO/TC 221 "Geosynthetics", the secretariat of which is held by BSI, in collaboration with Technical Committee CEN/TC 189 "Geosynthetics".

This document supersedes EN ISO 9863-1:2005.

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**EN ISO 9863-1:2014 (E)****1 Scope**

This part of ISO 9863-1 specifies a method for the determination of the thickness of geosynthetics 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.

The method is applicable to all geosynthetics.

NOTE 1 Normally the thickness of geosynthetics is determined by measuring one layer of the product. When two or more layers are used on top of each other in a design, the test may be made in accordance with this standard with the agreed number of layers instead of one.

NOTE 2 When testing structured geosynthetics, care should be taken to ensure that the results are meaningful for the particular product.

**2 Normative references**

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 554 *Standard atmospheres for conditioning and/or testing — Specifications*

EN ISO 9862, *Geosynthetics — Sampling and preparation of test specimens.*

EN ISO 25619-1, *Geosynthetics – Determination of compressive behaviour – Part 1: Compressive creep properties*

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**3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

**3.1****thickness**

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**

for polymeric and bituminous geosynthetic barriers of uniform thickness, the thickness determined when a pressure of  $(20 \pm 0,2)$  kPa is applied to the specimen

for all other geosynthetics, the thickness determined when a pressure of  $(2 \pm 0,01)$  kPa or  $(20 \pm 0,1)$  kPa or  $(200 \pm 1)$  kPa is applied to the specimen

for textured polymeric and bituminous geosynthetic barriers, the thickness determined when a force of  $(0,6 \pm 0,1)$  N is applied to the specimen

**4 Principle**

**4.1** The thickness of a number of individual specimens of a geosynthetic 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 specified pressure on an area of defined size within a larger area of the specimen.

**4.2** At each specified pressure, the result of the test is given as the mean of the values obtained.

## 5 Apparatus

**5.1 Thickness tester**, incorporating the following elements:

**5.1.1 Removable presser-foot**, having a plane and smooth surface with an area as defined in Table 1 for testing materials of uniform thickness. For the determination of the overall thickness of materials of polymeric and bituminous geosynthetic barriers of non-uniform thickness, or the thickness of other parts of such materials, refer to annex A.

**Table 1: Pressure-foot sizes**

Type of geosynthetic under test	Presser-foot size
Polymeric and bituminous geosynthetic barrier	Circular, $(10 \pm 0,05)$ mm diameter
Geospacer and drainage geocomposites	square, minimum size of 100 mm x 100 mm size of the load plate and size of the test specimen shall satisfy the criteria in ISO 25619-1
Other geosynthetic products	Circular, $(25 \pm 0,2)$ cm <sup>2</sup> area

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

To ensure that the presser-foot surface and the reference plate are parallel when determining the overall thickness of geosynthetics of non-uniform thickness, except for polymeric and bituminous geosynthetic barriers, the presser-foot shall be supported at not less than three points evenly distributed over the presser-foot surface, which may require that a presser-foot with an area not less than 25 cm<sup>2</sup> 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 ensure 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 0,01 mm.

**5.2 Means of measuring time** with an accuracy of  $\pm 1$  s.

## 6 Specimens

**6.1** Cut out no less than 10 specimens of minimum dimensions greater than 1,75 times the diameter of the presser-foot.

If new specimens are used for testing at each pressure then not less than 30 specimens will be required.

**6.2** Select and cut out the specimens in accordance with EN 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 omitting this procedure.



**EN ISO 9863-1:2014 (E)****7 Procedure****7.1 General**

When determining the thickness of a material of non-uniform thickness, e.g. a geogrid (see clause 1, Notes 1 and 2), the part of the material to be tested shall be agreed between the interested parties. The part tested shall be identified in the test report.

The thickness is determined by using the procedure A or C as specified in either 7.2 or 7.4, applying pressures of 2 kPa, 20 kPa and 200 kPa to an accuracy as stated in clause 3.

If agreed between the interested parties procedure B, as specified in 7.3, may be used instead of procedure A in 7.2.

Other values of pressure 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 (New specimens for each pressure)**

**7.2.1** Place a specimen between the clean surfaces of the reference plate and the presser-foot specified in clause 5. Gently lower the presser-foot applying a pressure of  $(2 \pm 0,01)$  kPa to the specimen, and note the gauge reading after 30 s, unless a longer time is specified.

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 a corresponding number of new specimens and applying a pressure of  $(20 \pm 0,1)$  kPa.

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

**7.3 Procedure B (Incremental loading of individual specimens)**

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

**7.3.2** Increase the pressure to  $(20 \pm 0,1)$  kPa on the same specimen and note the gauge reading after 30 s, unless a longer time is specified, without removing the specimen.

**7.3.3** Repeat the procedure in 7.3.2 applying a pressure of  $(200 \pm 1)$  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.

**7.4 Procedure C (Polymeric and bituminous geosynthetic barriers of uniform thickness)**

Place a specimen between the clean surfaces of the reference plate and the presser-foot specified in clause 5. Gently lower the presser-foot applying a pressure of  $(20 \pm 0,2)$  kPa to the specimen, and note the gauge reading after 5 s.

Release the pressure and remove the specimen.

**7.5 Procedure D (Polymeric and bituminous geosynthetic barriers of non-uniform thickness)**

**7.5.1** Place a specimen between the clean presser points as specified in annex A. Both pressure points shall be the same shape and size. Gently lower the upper presser point applying a force of  $(0,6 \pm 0,1)$  N to the specimen

and note the gauge reading after 5 s, unless a longer time is specified. Release the force and remove the specimen.

**7.5.2** Repeat the procedure in 7.4.1 until at least 10 specimens have been tested.

**7.5.3** The purpose of the test is to ascertain the thickness of the barrier, and not of the texturing. The location of the presser points must be chosen to ensure that this is the case.

## 8 Expression of results

Determine the mean 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.

NOTE 1 Upon request, the result of each individual determination may be given.

NOTE 2 Upon request, a graphical plot of the mean value of the thickness against the applied pressure may 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) statement that the test was performed in accordance with this document;
- b) number of specimens tested at each pressure given in clause 7;
- c) conditioning atmosphere used (see 6.3) and the time for which the pressure was applied;
- d) presser-foot size;
- e) procedure used (A, B, C or D);
- f) results of the test (see clause 8: nominal thickness in mm and coefficient of variation); mean thickness at other pressures tested and coefficient of variation, if required;
- g) details of any deviation from the specified test procedure;
- h) date of the test.