



SLOVENSKI STANDARD

SIST EN 14196:2004

01-februar-2004

Geosintetika - Preskusne metode za merjenje mase glinenih geosintetičnih zapor

Geosynthetics - Test methods for measuring mass per unit area of clay geosynthetic barriers

Geokunststoffe - Prüfverfahren zur Bestimmung der flächenbezogenen Masse von geosynthetischen Tondichtungsbahnen

Géosynthétiques - Méthodes d'essai pour la détermination de la masse surfacique des barrières géosynthétiques argileuses

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ICS:

59.080.70 Geotekstilije Geotextiles

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EUROPEAN STANDARD

EN 14196

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2003

ICS 59.080.70; 91.100.50

English version

Geosynthetics - Test methods for measuring mass per unit area of clay geosynthetic barriers

Géosynthétiques - Méthodes d'essai pour la détermination de la masse surfacique des barrières géosynthétiques argileuses

Geokunststoffe - Prüfverfahren zur Bestimmung der flächenbezogenen Masse von geosynthetischen Tondichtungsbahnen

This European Standard was approved by CEN on 1 September 2003.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This document (EN 14196:2003) has been prepared by Technical Committee CEN/TC 189 "Geosynthetics", the secretariat of which is held by IBN.

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 May 2004, and conflicting national standards shall be withdrawn at the latest by May 2004.

Annex A is normative.

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

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EN 14196:2003 (E)**1 Scope**

This European Standard describes a test method for the laboratory determination of the mass per unit area of a sample of clay geosynthetic barrier (GBR-C) in the condition as received.

Since manufacturers quote mass per unit area at a given moisture content, it is necessary to measure the moisture content.

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 (including amendments).

prEN ISO 9862, *Geosynthetics — Sampling and preparation of test specimens (ISO/DIS 9862:2002)*.

prEN ISO 10318:2000, *Geosynthetics — Geotextiles, geotextile-related products, geomembranes and geosynthetic clay liners - Terms and their definitions (ISO/DIS 10318:2000)*.

ISO 11465, *Soil quality — Determination of dry matter and water content on a mass basis — Gravimetric method*.

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3 Terms and definitions (standards.iteh.ai)

For the purposes of this European Standard, the terms and definitions given in prEN ISO 10318:2000 and the following apply.

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3.1 moisture content

part of the mass of a clay geosynthetic barrier that is absorbed water, expressed as a percentage of the mass of dry clay

4 Principle

The mass per unit area is determined by weighing specimens of known dimensions cut from positions distributed over the full width of the sample.

The moisture content of the clay component of the GBR-C is measured in accordance with ISO 11465.

5 Apparatus

5.1 Balances

Balance of 0,01 g readability for samples having a mass of up to 200 g.

Balance of 0,1 g readability for samples having a mass of 200 g or more.

5.2 Die or template

Of known dimensions to a tolerance of $\pm 0,5\%$ either square with an edge length not less than 200 mm or circular with a diameter not less than 200 mm.

5.3 Miscellaneous

Knives, spatulas, scoops, quartering cloth, sample splitters etc., as required.

6 Procedure

6.1 Cut a minimum of five specimens in accordance with prEN ISO 9862 and either a) or b) as follows:

- a) If a die is used to cut the specimen: reduce the loss of clay by leaving the die in place and removing all the remaining sample outside the edge of the die. This includes brushing the cutting board clean. Weigh all material found within the edge of the die along with the specimen.
- b) If a template is used to cut the specimen: collect all clay lost from the edges and weigh 50% of this with the specimen.

NOTE The loss of clay during the specimen cutting process can have a significant impact on the accuracy of this test method.

6.2 Weigh the specimens.

NOTE The mass per unit area of the clay component of the GBR-C is estimated by subtracting the manufacturer's reported nominal mass per unit area of the synthetic component(s) from the total GBR-C mass per unit area. The supplier of the clay geosynthetic barrier should be able to verify that the actual mass per unit area of the synthetic component(s) is within + 10% of the reported nominal value. A more accurate estimation of the actual dry clay mass per unit area can be obtained by using the actual average value for the synthetic component(s) (as obtained from the manufacturer for the actual lots used to make the GBR-C) rather than the nominal value.

6.3 If the mass per unit area of the geosynthetic component is not known, refer to annex A.

6.4 Determine the moisture content of the clay component w_{clay} in accordance with ISO 11465.

7 Calculation

7.1 Calculate the mass per unit area of each of the specimens using the following formula:

$$\rho_{\text{GBR-C}} = \frac{m_{\text{GBR-C}}}{A} \quad (1)$$

where:

$\rho_{\text{GBR-C}}$ = mass per unit area of the GBR-C specimen rounded to the nearest 1 g/m²;

$m_{\text{GBR-C}}$ = mass of GBR-C specimen measured to the nearest 0,01 g;

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A = area of specimen, in m^2

7.2 The mass per unit area of the clay component of the GBR-C is determined using the following formula:

$$\rho_{\text{CLAY}} = \rho_{\text{GBR-C}} - \rho_{\text{SYN}} \quad (2)$$

where:

ρ_{CLAY} = mass per unit area of clay component rounded to the nearest 1 g/m^2 ;

ρ_{SYN} = nominal mass per unit area of GBR-C synthetic component(s), in g/m^2 , as provided by the manufacturer or as determined in accordance with annex A.

NOTE The synthetic component(s) may consist of woven or non-woven structures, of threads, of foils or other materials attached, e.g. bituminous coatings.

7.3 The mass per unit area of the clay component normalized to a moisture content of 0% of the GBR-C is determined using the following formula:

$$\rho_{\text{CLAY}0\%} = \frac{\rho_{\text{CLAY}}}{(w_{\text{CLAY}} + 100)/100} \quad (3)$$

where:

w_{CLAY} = percent moisture content of the clay component determined in accordance with ISO 11465 rounded to the nearest 0,1%.

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8 Test Report

Report the following information on mass per unit area of GBR-Cs:

- a) reference to EN 14196;
- b) sample identification (for example sample number, roll number or other traceable identifier);
- c) method used for cutting specimens, sample size, specimen size and shape, number of test specimens used;
- d) full description of the GBR-C tested and a description of the individual components (e.g. bonding method / clay / geosynthetic / coating);
- e) mass per unit area of the synthetic component(s) (ρ_{SYN}).
The source of the information (e.g. the manufacturers data sheet in which case a copy shall be supplied, which must clearly show the range of tolerance) relating to the synthetic component with the test method used together with the stated accuracy of the value or the average mass per unit area of the synthetic component(s) (ρ_{SYN}) to the nearest 1 g/m^2 , if measured according to annex A;
- f) average mass per unit area of the GBR-C ($\rho_{\text{GBR-C}}$) to the nearest 1 g/m^2 ;
- g) average mass per unit area of the clay component of the GBR-C (ρ_{CLAY}) to the nearest 1 g/m^2 ;
- h) mass per unit area of the clay component of the GBR-C ($\rho_{\text{CLAY}0\%}$) to the nearest 1 g/m^2 normalized to a moisture content of 0%;
- i) average moisture content of the clay component of the GBR-C (w_{CLAY}) to the nearest 0,1%;
- j) statement of any deviation from the testing procedures.

Annex A (normative)

Test method for the determination of the mass per unit area of the synthetic component

A.1 Apparatus

A.1.1 Oven

Drying oven in which the temperature is set to (105 ± 5) °C.

A.1.2 Blowing or suction apparatus

Apparatus for removing as much of the clay component as possible.

A.1.3 Balances

As in 5.1.

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A.2 Procedure

Where the mass per unit area of the synthetic component(s) is not known, determine this mass by dissection of the specimens.

Having determined the mass per unit area of each specimen in accordance with this standard, separate the components by peeling. Brush each component, taking care not to lose any threads from any woven structure, or loose fibres from non-woven structures, and then either by blowing or using suction remove as much of the clay component as possible.

If the GBR-C is wet or moist immerse each specimen in tap water until the clay can be easily be removed from the fibres. Remove the bulk of clay from the synthetic components either by scraping the substrate and/or by cutting the seams or link bridges (stitch-bonded GBR-Cs). For needle punched GBR-Cs, remove the bulk of clay from the synthetic components by making the clay move towards the edges of the specimen by applying pressure from centre outwards. Thoroughly wash the remaining clay from the synthetic components until they seem clay free and the rinsing water is clear of clay.

Dry the synthetic component(s) specimens in an oven in which the temperature is set to (105 ± 5) °C until a constant mass is reached. Weigh the synthetic component(s) separately.

A.3 Calculation

Calculate the mass per unit area of each of the specimens using the following equation:

$$\rho_{\text{SYN}} = \frac{m_{\text{SYN}}}{A} \quad (\text{A.1})$$