SLOVENSKI STANDARD
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SIST-TS CEN/TS 14417:2006

Geosintetične ovire - Preskusna metoda za ugotavljanje vpliva ciklusov močenja-sušenja na prepustnost geosintetičnih bentonitnih ovir

Geosynthetic barriers - Test method for the determination of the influence of wetting-drying cycles on the permeability of clay geosynthetic barriers

Geosynthetische Dichtungsbahnen - Prüfverfahren zur Bestimmung des Einflusses von Nass-Trocken-Zyklen auf die Wasserdurchlässigkeit von geosynthetischen Tondichtungsbahnen

Géosynthétiques bentonitiques - Méthode d'essai pour la détermination de l'influence de cycles humidification/dessiccation sur la perméabilité des géosynthétiques bentonitiques

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59.080.70	Geotekstilije	Geotextiles

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English Version

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

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Contents

Page

Foreword

This document (CEN/TS 14417:2014) has been prepared by Technical Committee CEN/TC 189 “Geosynthetics”, the secretariat of which is held by NBN.

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Introduction

This Technical Specification defines a method for testing the influence ratio of wetting-drying cycles on the flux through clay geosynthetic barriers. Such resistance is a requirement for many uses of these products.

The influence ratio is an indication of the behaviour of the product when exposed to repeated wetting and drying cycles in earth constructions. The flux of saturated clay geosynthetic barriers may increase after exposure to repeated wetting-drying cycles.

The Technical Specification does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to comply with any regulations or legislation regardless of the wording in the technical specification.

The flux determined using this test method is not considered to be representative of the in-service flux of clay geosynthetic barriers. This test determines the influence of wetting-drying cycles in the absence of any other phenomenon, for example cation exchange.

1 Scope

This Technical Specification describes an index test to determine the influence ratio of wetting-drying cycles on the flux through saturated clay geosynthetic barrier specimens.

This test method is applicable to GBR-C products with no additional sealing layers attached.

2 Normative references

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

EN 16416, *Geosynthetic clay barriers — Determination of water flux index — Flexible wall permeameter method at constant head*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

EN ISO 10320, *Geotextiles and geotextile-related products — Identification on site (ISO 10320)*

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

3 Terms and definitions

For the purposes of this document, the following term and definition applies.

3.1
influence ratio
ratio of the flux of a specimen exposed to wetting-drying cycles to that of the flux through an unexposed reference specimen, expressed in percent

4 Principle

The flux through 100 mm diameter clay geosynthetic barrier (GBR-C) specimens is determined with a flexible wall permeameter both on a specimen exposed to wetting-drying cycles and on an unexposed reference specimen.

A specimen either square with an edge length not less than 200 mm or circular with a diameter not less than 200 mm to a tolerance of ± 0,5 % is saturated under a pressure of (4 ± 0,2) kPa for 48 h at constant room temperature. After saturation, the sample is dried under a pressure of (4 ± 0,2) kPa in an oven at 110 °C for 24 h. After the drying period the sample is allowed to cool to room temperature under a pressure of (4 ± 0,2) kPa for a minimum of 24 h. This wetting-drying cycle is performed four times before cutting the test specimen.

Test this specimen and the unexposed reference specimen in accordance with EN 16416.

5 Apparatus

The apparatus shall consist of the following:

— a template of known dimensions to a tolerance of ± 0,5 % either square with an edge length not less than 200 mm or circular with a diameter not less than 200 mm,

— a waterproof box large enough to accommodate the specimen,

— a rigid chemically inert pressure plate of the same dimensions as the specimen, and not less than 10 mm thick,

— sufficient weights to exert a pressure of (4 ± 0,2) kPa on the specimen (allowing for the weight of the pressure plate),

— a mechanically bonded nonwoven geotextile with a mass per unit area of (250 ± 50) g/m^2.

6 Reagent

De-ionized water in accordance with EN ISO 3696, grade 3.

7 Procedure

7.1 Specimen preparation

Inspect the bulk clay geosynthetic barrier specimen to be tested and record any disturbance, irregularity or damage. Choose two representative sections of the specimen for testing, one for the reference specimen and one for the test specimen to be submitted to the wetting-drying cycles.

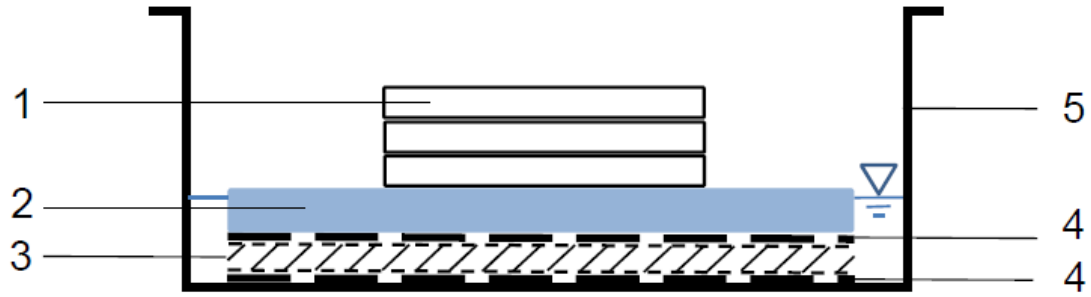
Place the template on the selected section. Cut the specimens to the exact size of the template with a sharp knife or any other suitable instrument. Remove the specimens carefully to avoid loss of bentonite.

The specimen size may be limited by safety restrictions on the total mass of the weights where these are to be transported manually.

Seal the edges of the clay geosynthetic barrier specimens with waterproof tape or self-adhesive aluminium foil to prevent bentonite loss during further handling.

7.2 Specimen hydration

Fill a waterproof box with de-ionized water. Place a piece of mechanically bonded nonwoven geotextile with a mass per unit area of (250 ± 50) g/m^2 on the bottom of the box and manually remove any air bubbles. Place the GBR-C sample on the nonwoven and then put a further piece of similar nonwoven geotextile on top of the GBR-C and manually remove any air bubbles. Place a pressure plate on the “sandwich” of specimens. Place weights on the pressure plate to obtain a required pressure of (4 ± 0,2) kPa.



Key

1 dead load

2 pressure plate

3 GBR-C sample

4 mechanically bonded nonwoven geotextile

5 waterproof box

Figure 1 — GBR-C hydration setup

NOTE The use of drainage mats instead of nonwoven geotextile results in unevenness in the surface of GBR-Cs. This could lead to incorrect measurements.

Add de-ionized water to the box so that the water level is not above the top of the pressure plate. In order to maintain the GBR-C specimen submerged, add de-ionized water at the rate at which it is absorbed by the GBR-C specimen. Keep the specimen submerged at room temperature and at a pressure of (4 ± 0,2) kPa.

7.3 Specimen drying

After 48 h, remove the excess water from the box.

Preheat the oven to (110 ± 5) °C.

Move the box containing the test specimen with the weights and the top plate to the drying oven. Allow the specimen to dry for 24 h.

7.4 Specimen cooling

After the drying period allow the exposed specimen to cool for a minimum of 24 h at room temperature selected according to ISO 554 without adding any water unless it can be shown that omitting this point has no influence on the test result.

7.5 Repetition

Repeat steps from 7.2 to 7.4 a further three times.

7.6 Preparation of specimen for flux testing

Remove the weights and the nonwoven geotextile pieces and the clay geosynthetic barrier specimen from the box and carefully place the specimen on a flat smooth surface.

Take a (100 ± 2) mm diameter specimen and perform the test in accordance with EN 16416.

Perform the test in accordance with EN 16416 on an unexposed reference specimen.