

ICS 59.080.70

English Version

**Geosynthetic barriers - Test method for the determination of the
influence of freezing-thawing cycles on the permeability of clay
geosynthetic barriers**

Barrières géosynthétiques - Méthode d'essai pour la
détermination de l'influence de cycles de gelée-dégel sur la
perméabilité à l'eau des barrières géosynthétiques
bentonitiques

Geosynthetische Dichtungsbahnen - Prüfverfahren zur
Bestimmung des Einflusses von Frost-Tau-
Wechselbeanspruchungen auf die Durchlässigkeit von
geosynthetischen Tondichtungsbahnen

This Technical Specification (CEN/TS) was approved by CEN on 3 April 2005 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents		Page
Foreword		3
Introduction		4
1 Scope		5
2 Normative references		5
3 Terms and definitions		5
4 Principle		5
5 Reagent		5
6 Apparatus		6
7 Procedure		8
8 Calculation and expression of results		10
9 Test report		11
Bibliography		12

Foreword

This Technical Specification (CEN/TS 14418:2005) has been prepared by Technical Committee CEN/TC 189 “Geosynthetics”, the secretariat of which is held by IBN/BIN.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this CEN Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

This document is a preview generated by EVS

Introduction

This Technical Specification defines a method for testing the influence of freezing-thawing cycles on the permeability of 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 freezing and thawing cycles in earth constructions. The permeability of saturated clay geosynthetic barriers may increase in consequence of repeated freezing-thawing cycles.

This 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 document to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

The current Technical Specification has not yet been widely validated. The organisation of interlaboratory-tests to acquire more experience is recommended.

1 Scope

This Technical Specification specifies an index test to determine the influence ratio of freezing-thawing cycles on the flux through saturated clay geosynthetic barriers.

This test is applicable to clay geosynthetic barrier products with a geotextile backing. It is not necessarily applicable to clay geosynthetic barrier products with a geomembrane backing.

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.

EN ISO 10320, *Geotextiles and geotextile-related products – Identification on site (ISO 10320:1999)*

EN ISO 3696, *Water for analytical laboratory use – Specification and test methods (ISO 3696:1987)*

3 Terms and definitions

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

3.1

influence ratio

ratio of the flux value of a specimen exposed to wetting-drying cycles and divided by the flux through an unexposed reference specimen, expressed in percent

4 Principle

The flux through 100 mm diameter clay geosynthetic barrier specimens is determined with a flexible wall permeameter both on specimens exposed to freezing-thawing cycles and on unexposed reference specimens.

Geosynthetic clay barrier samples of 300 mm x 300 mm are saturated under a pressure of $(4 \pm 0,2)$ kPa for 48 h at constant room temperature. After saturation, one sample is stored in the freezer at -5 °C for 24 h, while the reference sample remains at normal room temperature. After the freezing period the first sample is allowed to thaw at room temperature for 24 h. Then the samples are submerged again for 24 h at room temperature. This freezing-thawing cycle is performed four times before cutting the test specimens.

The specimen is mounted in a flexible-wall permeameter, subjected to a cell pressure of 550 kPa and a back pressure of 515 kPa for a period of 48 h. Flow is initiated using deionized water by raising the pressure on the inlet side of the test specimen to 530 kPa. The flux is determined when inflow and outflow are approximately equal (within ± 25 %).

NOTE This test does not provide a hydraulic conductivity value. Hydraulic conductivity can be determined in a similar way, but requires knowledge of the thickness of the specimen. This test does not include procedures for thickness measurement of the clay geosynthetic barrier or of its clay component.

5 Reagent

De-aired, de-ionized water shall be in accordance with EN ISO 3696 grade 3.