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Flexible sheets for waterproofing - Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles - Compatibility by heat conditioning

Feuilles souples d'étanchéité - Etanchéité de ponts et autres surfaces en béton circulables par les véhicules - Détermination de la compatibilité au conditionnement thermique

Abdichtungsbahnen - Abdichtungen für Betonbrücken und andere Verkehrsflächen auf Beton - Bestimmung der Verträglichkeit nach Wärmelagerung

This European Standard was approved by CEN on 17 April 2005.

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Foreword

This document (EN 14691:2005) has been prepared by Technical Committee CEN/TC 254 “Flexible sheets for waterproofing”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by November 2005, and conflicting national standards shall be withdrawn at the latest by November 2005.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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.

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Introduction

The purpose of the test is to determine the compatibility of the waterproofing system in the installed condition by determination of the shear strength properties before and after accelerated heat conditioning.

Waterproofing systems are required to maintain performance over extended periods of time once installed on a concrete structure. Many flexible sheets used in the waterproofing of concrete bridge decks are based on materials that are subject to oxidation, migration, diffusion, and absorption of components within the system itself and/or those to which the system is adhered. These physico-chemical effects occur over time, however increased temperature will accelerate these effects. The use of an accelerated heat-conditioning test will allow the evaluation of the change in a specific mechanical property, shear strength, over a significantly shorter time period than allowing the waterproofing system to age under normal ambient conditions. The use of the shear resistance test will allow the determination of any change in properties together with an indication of any migrational or interfacial long term incompatibility between the adherents.

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1 Scope

This European Standard specifies a test method for the evaluation of the compatibility of the waterproofing system applied to a concrete surface and covered with an asphalt layer. The complete system is exposed to an accelerated heat conditioning followed by a determination of the shear strength properties before and after heat conditioning.

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 13375:2004, *Flexible sheets for waterproofing - Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles - Specimen preparation*

EN 13416:2001, *Flexible sheets for waterproofing — Bitumen, plastic and rubber sheets for roof waterproofing — Rules for sampling*

EN 13653, *Flexible sheets for waterproofing - Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles - Determination of shear strength*

prEN 14695:2003, *Flexible sheets for waterproofing — Reinforced bitumen sheets for waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Definitions and characteristics*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 13416:2001, EN 13375:2004, prEN 14695:2003, and the following apply.

heat conditioning
process whereby the test specimen is held at an elevated temperature for a specified period of time

4 Test methods

4.1 Principle

To detect by a change of the shear resistance if any changes occur in properties of test specimens when they are subjected to accelerated heat conditioning. This is achieved by testing a set of test specimens that have been heat conditioned and comparing the results with a reference set of test specimens that have not been heat conditioned.

4.2 Apparatus

a) *Oven,* with circulating air (without fresh supply), capable of maintaining (50 ± 2) °C.

b) *Loading and support device*, capable of meeting the requirements set out in EN 13653.

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4.3 Preparation of the test specimen

Prepare the test specimens (Type 3) in accordance with EN 13375 for the test method according to EN 13653, and cool to room temperature. Four test specimens are used for the heat conditioning, and four reference test specimens are used for comparison.

4.4 Procedure

4.4.1 Condition the four reference test specimens at (23 ± 2) °C for at least 24 h prior to them being tested in accordance with EN 13653.

4.4.2 Place the remaining four test specimens horizontally in an air-circulating oven in such a way as to allow free movement of air over and around the test specimen. Maintain the temperature in the oven at (50 ± 2) °C. Ensure that the test specimens are not stacked on top of each other.

4.4.3 Remove the test specimens from the oven after a period of 91 days, and allow to condition at (23 ± 2) °C for 24 h prior to being tested for shear strength in accordance with EN 13653.

4.4.4 Before and after the test for shear strength, visually inspect the test specimens for evidence of migration and separation of component layers.

NOTE Migration and separation can take the form of a build up of a semi liquid layer at the interfaces of the waterproofing systems.

4.5 Expression of results

The results shall be expressed in accordance with EN 13653.

Compatibility C (%) is expressed by:

$$C = \left(1 - \frac{\tau_{\max 0} - \tau_{\max C}}{\tau_{\max 0}}\right) \times 100$$

where $\tau_{\max o}$ = mean value of shear strength of reference test specimens

$\tau_{\max C}$ =mean value of shear strength of conditioned specimens

NOTE There is no precision data currently available for this test method.

4.6 Test report

The test report shall include at least the following information:

a) all details necessary to identify the product tested;

b) reference to this European Standard and any deviation from it;

c) information about preparation of test specimens in accordance with 4.3;

d) information about the procedure in accordance with 4.4;

e) test result with the force displacement plot and failure mode for each individual shear test according to 4.4 and compatibility in accordance with 4.5;

f) visual inspection of the condition of the conditioned test specimen as compared with the control;

g) dates of delivery and preparation of specimens;

h) date of tests.