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Conservation of Cultural Heritage - Surface protection for porous inorganic materials - Laboratory test methods for the evaluation of the performance of water repellent products

Táto norma obsahuje anglickú verziu európskej normy.  
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 04/15

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Podľa zákona č. 264/1999 Z. z. v znení neskorších predpisov sa môžu slovenské technické normy rozmnožovať a rozširovať iba so súhlasom Úradu pre normalizáciu, metrológiu a skúšobníctvo SR.

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English Version

## Conservation of Cultural Heritage - Surface protection for porous inorganic materials - Laboratory test methods for the evaluation of the performance of water repellent products

Conservation du patrimoine culturel - Protection de surface des matériaux inorganiques poreux - Méthodes d'essai en laboratoire pour l'évaluation des performances des produits hydrofuges

Erhaltung des kulturellen Erbes - Oberflächenschutz für poröse anorganische Materialien - Laborprüfverfahren für die Ermittlung der Wirksamkeit von wasserabweisenden Produkten

This European Standard was approved by CEN on 18 October 2014.

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

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<b>Contents</b>		<b>Page</b>
Foreword.....		3
Introduction .....		4
1 Scope .....		5
2 Normative references .....		5
3 Terms and definitions .....		5
4 Symbols and abbreviations .....		6
5 Test methods for evaluation.....		7
6 Evaluation of long term performances .....		7
7 Test equipment for the treatment (apparatus and reagents) .....		7
8 Test procedure .....		8
8.1 Steps of evaluation of water repellent products .....		8
8.2 Specimen preparation and determination of dry mass .....		9
8.2.1 Number and dimensions of the test specimens.....		9
8.2.2 Surface preparation .....		11
8.2.3 Initial characterization before treatment .....		11
8.2.4 Measurement of dry mass after characterization tests and before the treatment ( $m_{0B}$ ) .....		11
8.3 Methodology of treatment application.....		11
8.3.1 General.....		11
8.3.2 Conditioning of the specimens .....		11
8.3.3 Duration of water repellent application .....		11
8.3.4 Water repellent application by capillarity and measurement of dry constant mass after treatment ( $m_{0A}$ ).....		11
9 Determination of the amount of water repellent applied .....		12
10 Measurements and methods for treatment evaluation .....		13
10.1 Determination of water absorption by capillarity .....		13
10.2 Protection Degree by capillarity $PD_C$ .....		13
10.3 Determination of water vapour permeability ( $\delta_p$ ) .....		14
10.4 Reduction of water vapour permeability ( $\delta_{p, red}$ ).....		14
10.5 Determination of static contact angle.....		14
10.6 Colour measurement of surfaces.....		15
10.7 Determination of water absorption by pipe method .....		15
10.8 Protection Degree of water absorption by pipe method $PD_{LP}$ .....		15
10.9 Determination of drying properties.....		16
11 Test report .....		17
11.1 General information.....		17
11.2 Determination of water absorption by capillarity .....		17
11.3 Determination of water vapour permeability .....		17
11.4 Colour measurement of surfaces.....		18
11.5 Measurement of water absorption by pipe method .....		18
11.6 Determination of drying properties.....		18
11.7 Determination of static contact angle.....		18
11.8 Gloss measurement .....		18
11.9 Long term performances after ageing tests .....		19
Bibliography .....		20

## **Foreword**

This document (EN 16581:2014) has been prepared by Technical Committee CEN/TC 346 "Conservation of Cultural Heritage", the secretariat of which is held by UNI.

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 June 2015, and conflicting national standards shall be withdrawn at the latest by June 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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## Introduction

As part of the conservation of built heritage, a variety of surface treatments can be carried out to delay the decay processes.

This document focuses on water repellent treatments of porous inorganic materials. The main goal of a water repellent is to reduce the penetration of liquid water and the substances dissolved in the water into porous material by changing its surface properties.

A water repellent product when applied to the surface of a material decreases its surface tension and prevents wetting of the surface. The water repellent treatment is applied to the surface and penetrates into the pores of the material, the depth of penetration being dependent on the capillary properties of the material, the properties of the hydrophobic, the type and duration of application as well as the moisture content of the substrate and the temperature.

Many deterioration mechanisms result from the presence of water and therefore the reduction of water absorption without significantly decreasing water vapour permeability may positively influence the preservation of porous inorganic materials.

Coatings including varnishes and paints are not considered within this European Standard.

A water repellent should fulfil the following requirements to:

- reduce the absorption of liquid water in the substrate,
- minimize change of water vapour permeability of the substrate,
- minimize change in colour and gloss of the substrate,
- produce no harmful by-products after the application,
- maintain its physical and chemical stability.

Water repellent products should be applied on the surface of heritage objects only after they have been tested on representative samples of porous inorganic materials in the laboratory. Field trials on small areas are strongly recommended prior to final application.

This European Standard for the evaluation of water repellent treatments is based on the measurement of appropriate parameters to assess the performance of the product using standardized test methods.

*In situ* application methods include brushing, spraying, immersion, capillary rise absorption and poultice. Due to the dimensions of samples and the requirements to perform reproducible treatment procedures for laboratory testing, the capillarity method is specified. Where a treatment cannot be applied according to the standard method (for example when an emulsion is used) the application method should be clearly described in the test report.

Technical and chemical data sheets of treatment under evaluation should be provided; the data sheets which detail at least the chemical formulas of the active substances and concentrations, the names and the ratio of solvents, if applicable.

In order to evaluate the durability and in service performance of a water repellent product applied on the substrate, ageing tests representing the environment in which the porous inorganic material is located can be carried out.

## 1 Scope

This European Standard specifies the methodology for laboratory evaluation of the performance of water repellent products on porous inorganic materials.

It is based on the measurement of several parameters which assess the performance of the product using standard test methods before and after ageing.

Acceptable performance within the laboratory does not constitute a blanket endorsement of application in every situation. The particular context of the heritage object, including such factors as material designation, condition, exposure, salt content and problems related to water ingress requires further investigation.

## 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 15801, *Conservation of cultural property - Test methods - Determination of water absorption by capillarity*

EN 15802, *Conservation of cultural property - Test methods - Determination of static contact angle*

EN 15803, *Conservation of cultural property - Test methods - Determination of water vapour permeability ( $\delta p$ )*

EN 15886, *Conservation of cultural property - Test methods - Colour measurement of surfaces*

EN 15898, *Conservation of cultural property - Main general terms and definitions*

EN 16085, *Conservation of Cultural property - Methodology for sampling from materials of cultural property - General rules*

EN 16302, *Conservation of cultural heritage - Test methods - Measurement of water absorption by pipe method*

EN 16322, *Conservation of Cultural Heritage - Test methods - Determination of drying properties*

EN ISO 2813, *Paints and varnishes - Determination of specular gloss of non-metallic paint films at 20°, 60° and 85° (ISO 2813)*

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