

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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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

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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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of an identical text or by endorsement, at the latest by June 2015, and conflicting national standards shall be withdrawn at the latest by June 2015.

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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 (δp)*

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)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15898 and the following apply.

3.1

water-repellency

ability of the substrate to resist the ingress of liquid water

3.2

water repellent product

product increasing the water-repellency of the treated surface of porous inorganic materials

3.3

water repellent treatment

application of a water repellent product to the surface of a material by a specified methodology