

SVENSK STANDARD

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Bevarande av kulturarv – Artificiellt åldrande genom simulerad solstrålning av ytan av obehandlade eller behandlade porösa oorganiska material

Conservation of Cultural Heritage – Artificial ageing by simulated solar radiation of the surface of untreated or treated porous inorganic materials

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Denna standard är framtagen av kommittén för Bevarande av kulturarv, SIS/TK 479.

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EUROPEAN STANDARD

EN 17036

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2018

ICS 97.195

English Version

Conservation of Cultural Heritage - Artificial ageing by simulated solar radiation of the surface of untreated or treated porous inorganic materials

Conservation du patrimoine culturel - Vieillessement artificiel par rayonnement solaire simulé de la surface de matériaux inorganiques poreux traités ou non traités

Erhaltung des kulturellen Erbes - Künstliche Alterung von unbehandelten oder behandelten porösen anorganischen Materialoberflächen mit simulierter Sonnenstrahlung

This European Standard was approved by CEN on 15 February 2018.

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

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European foreword

This document (EN 17036:2018) 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of an identical text or by endorsement, at the latest by December 2018, and conflicting national standards shall be withdrawn at the latest by December 2018.

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SS-EN 17036:2018 (E)

Introduction

In contrast to natural weathering, artificial ageing using simulated solar radiation involves a limited number of variables which can be controlled more readily and which are intensified to evaluate in a short way the stability of porous inorganic materials and the durability of conservation treatments.

The ageing processes which occur during artificial and natural weathering cannot be expected to correlate exactly with each other because of the large number of factors influencing these processes. Definite relationships can only be expected if the important parameters (distribution of the irradiance over the photochemical relevant part of the spectrum, temperature of the specimen, type of wetting and wetting cycle, and relative humidity) are the same in each case or if their effect on the coatings is known.

No direct correlation can be made between artificial ageing duration and actual exposure duration. However, performance comparisons under the controlled conditions of artificial weathering can be compared to documented performance of materials and coatings that have experienced extended periods of end use exposure.

This methodology is intended to be used on new materials. In all cases, the risk of potential damage to irreplaceable objects during irradiation should be considered.

1 Scope

This document assesses the long-term susceptibility to light of materials and treatments used in conservation of porous inorganic materials. Examples may include materials which have been treated in the course of conservation (e.g. cleaning, consolidation, water repellents, coatings or biocides) or materials which may exhibit colour changes following exposure (e.g. mortars and small number of stones). The procedure can be used to evaluate the impact and longevity/durability of treatments against untreated materials or unexposed materials.

NOTE 1 Porous inorganic materials are both natural stones (rocks) and artificial stone materials (mortars, stuccoes, bricks, ceramic materials, etc.).

NOTE 2 Treated materials are those on which one of the following treatments has been applied: cleaning, application of water repellent, consolidating materials, coatings or biocides and artificial ageing.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 13373, *Natural stone test methods — Determination of geometric characteristics on units*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

black standard thermometer

temperature measuring device consisting of a stainless-steel plate, having a black coating which absorbs at least 90 % of the incident radiation flux below $\lambda = 2\,500$ nm

3.2

daylight

visible part of global solar radiation

Note 1 to entry: When dealing with actinic effects of optical radiation, this term is commonly used for radiations extending beyond the visible region of the spectrum.

[SOURCE: CEN/TS 16163:2014, 3.9]

3.3

exposure

in weathering the act of subjecting the specimen to the action of artificial conditions

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3.4

exposure time

time of exposure (partial or total) to weathering

3.5

filter

any device that modifies or reduces a portion of the electromagnetic spectrum

[SOURCE: CEN/TS 16163:2014, 3.16 modified – Note 1 has been omitted]

3.6

filter, long-pass

filter that transmits wavelengths longer than the cut-on wavelength, while rejecting shorter wavelengths, and characterized by a sharp transition from minimum to maximum transmittance

3.7

filter, short-pass

filter that transmits wavelengths shorter than the cut-off wavelength, while rejecting longer wavelengths, and characterized by a sharp transition from maximum to minimum transmittance

3.8

infrared radiation

IR

part of the electromagnetic spectrum with wavelength longer than those of the visible radiation, from about 780 nm to tens of micrometres

[SOURCE: CEN/TS 16163:2014, 3.18]

3.9

irradiance

E_e

radiometric quantity, the radiant flux per unit area at a point of a surface (unit: watt per square metre, W/m^2)

[SOURCE: CEN/TS 16163:2014, 3.19]

3.10

light

radiation that is considered from the point of view of its ability to excite the visual system

Note 1 to entry: It corresponds to the so-called visible radiation in the range between 400 nm and 780 nm.

3.11

radiant flux

Φ_e

radiometric quantity representing the radiant energy transported per unit time into a region of space by electromagnetic waves (unit: watt, W)

[SOURCE: CEN/TS 16163:2014, 3.28]

3.12
radiant exposure
 H_e

time integral of irradiance (unit: joule per square metre, J/m²)

3.13
radiometer

instrument for measuring the irradiance in the wavelength interval chosen consisting of a detector and a signal-processing system

3.14
source

object that produces light or other radiant flux

[SOURCE: CEN/TS 16163:2014, 3.33]

3.15
ultraviolet radiation UV

part of the electromagnetic spectrum with wavelengths from 100 nm to 400 nm

Note 1 to entry:

UV-A: Wavelength: 315 nm to 400 nm. Not absorbed by the ozone layer.

UV-B: Wavelength: 280 nm to 315 nm. Mostly absorbed by the ozone layer, but some does reach the Earth's surface.

UV-C: Wavelength: 100 nm to 280 nm. Completely absorbed by the ozone layer and atmosphere.

[SOURCE: ISO 21348:2007, 6.5]

4 Symbols and abbreviations

For the purposes of this document, the following symbols and abbreviations apply.

Φ_e radiant flux, in W

E_e irradiance, in W/m²

H_e radiant exposure, in J/m²

t_e exposure time, in s

5 Principle

Specimens to be tested are exposed to artificial source(s) characterized by spectral power distribution simulating daylight.