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Bevarande av kulturarv – Metoder och material för rengöring av porösa oorganiska material

Conservation of Cultural Heritage – Methods and materials for cleaning porous inorganic materials



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Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

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

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EUROPEAN STANDARD

EN 17138

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2018

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English Version

Conservation of Cultural Heritage - Methods and materials for cleaning porous inorganic materials

Conservation du patrimoine culturel - Méthodes et
produits de nettoyage des matériaux inorganiques
poreux

Erhaltung des kulturellen Erbes - Verfahren und
Materialien für die Reinigung von porösen
anorganischen Materialien

This European Standard was approved by CEN on 29 July 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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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 17138:2018) 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of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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

This document calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It is recommended to read the relevant safety data sheets on the occupational and health hazards of the main chemical constituents of the products before using them. It refers only to technical suitability and this not absolves the user from legal obligations relating to health and safety at any stage. The manufacturer should also provide safety data sheets.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

SS-EN 17138:2019 (E)**Introduction**

Cleaning is the removal of unwanted material from an object surface or near-surface.

The surface of an object is cleaned either for conservation and/or maintenance or to improve legibility.

A cultural heritage object is irreplaceable and while cleaning is undertaken for object conservation; its effects are irreversible. Failure to consider and address the technical problems which can arise during cleaning may cause irrevocable damage to an object. Cultural Heritage should be cleaned using the least disruptive/invasive procedure possible in order to best preserve it.

Furthermore, an inadequate or inappropriate intervention may cause, or increase, future deterioration processes or eliminate materials which are undocumented or which would allow a greater understanding of the history of the object.

Materials to be removed may include alteration products of the constituent materials, air particulate pollutants, dust, salt efflorescence; partially or totally soluble encrustations; layers of intentionally applied materials that are either inappropriate or no longer functional; biofilms; lichens; mosses.

Cleaning, as a part of the conservation plan, is based on the definition of which materials are to be removed and which materials to be preserved. In order to fulfil this task, the appropriate balance should be found among the following requirements: selectivity, effectiveness and controllability.

Before cleaning is carried out, it should be evaluated in terms of effectiveness and potential damage (harmfulness) by the use of trial areas. Evaluation should be continued during the cleaning operations and over the longer terms to monitor the effects of cleaning.

This framework document describes the cleaning systems providing a list of technical specifications useful for their selection, evaluation and optimization to allow proper and systematic evaluation.

Cleaning methods will be described according to a common structure:

- a) description;
- b) technical specifications (factors that define the system to be used);
- c) variables (factors that end users can adjust, control or change to optimize the process according to surface condition, the type and thickness of material to be removed, etc.);
- d) advantages;
- e) disadvantages;
- f) examples of applications (indicative situations in which the cleaning methods have been found to be effective).

This standard presents the methodology and requirements for cleaning particularly applicable to natural stone, ceramics, plaster, mortars and concrete. The presence of sensitive components, which may include certain stone lithologies or paint or other decorations on porous inorganic surfaces, for example, will preclude the use of some of the methods outlined in this document. The example applications given in the standard are indicative of practice and are not exhaustive.

The standard is intended to serve as guidance for all conservation professionals (architects, surveyors, conservators/restorers, conservation scientists, curators, etc.) involved in the conservation of objects. The standard is intended as a reference for organizations including government bodies and cultural heritage agencies, with a duty to preserve items of cultural heritage.

1 Scope

This document provides the guidelines for the choice of the operational cleaning technical specifications in order to optimize the cleaning operation. The fundamental requirements for each specific cleaning method are given as to adapt cleaning works for single specific cases.

The objective of cleaning may consist of removal of any combination of unwanted materials, such as: degraded protective coatings, surface or near-surface materials, which constitute a present or future threat to conservation, materials which prevent legibility of the object or are disfiguring by nature, deposits which are judged to be incompatible to the historical nature of the object.

2 Normative references

There are no normative references in this document.

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

porous inorganic material

material including natural stones, e.g. sandstone, limestone, marble, granite, gneiss, gypsum as well as artificial materials, such as mortar, plaster, brick, ceramics, concrete and others

[SOURCE: EN 15801:2009, 3.1, modified]

3.2

object

single manifestation of tangible cultural heritage

Note 1 to entry: The term object is used in this standard for cultural heritage, both immovable and movable. In specific professional contexts, other terms are used: e.g. artefact, cultural property, item, ensemble, site, building fabric.

[SOURCE: EN 15898:2011, 3.1.3]

3.3

specimen

part considered representative of the material constituting an object

Note 1 to entry: The specimen can have different origins and can be taken from:

- materials similar to those constituting the object under study (e.g. stone quarries);
- specifically prepared comparative materials e.g. reference materials;
- available materials from the object.

Note 2 to entry: The number and dimension of the specimens can be different depending on constraints encountered in sampling the required amount of material.

[SOURCE: EN 16302:2013, 3.3]

SS-EN 17138:2019 (E)

3.4

cleaning

removal of unwanted material from an object

Note 1 to entry: The criteria for something being “unwanted” can be stated, e.g. potentially damaging, obscuring detail, diminishes aesthetic value, etc.

[SOURCE: EN 15898:2011, 3.5.3]

3.5

water cleaning

cleaning including a series of different systems using water in liquid or vapour phase

3.6

nebulous spray

intermittent mist spray

development of low-pressure water washing, characterised by a mist spray entering in contact with the object surface

3.7

water spray at low pressure

spray based on the use of water at low pressure

3.8

abrasive cleaning

cleaning including all techniques that physically abrade the object surface to remove unwanted materials

3.9

dry grit blasting

sandblasting

dry blasting process delivering a stream of abrasive particles, under pressure, toward the object surface

3.10

microblasting

microsandblasting

dry blasting process delivering a thin stream of fine abrasive particles, under pressure, toward the object surface

3.11

wet grit blasting

hydro sandblasting

blowing of a mixture of water and grit toward the object surface

3.12

peeling system

cleaning method consisting of the application of a film forming product which can be peeled off to remove adhered particulate materials

3.13

steam cleaning

cleaning method where water vapour is used

3.14**aqueous poultices packs**

absorbent materials (non-reactive packs) mixed with water to form a paste which is applied to the object surface

3.15**biocide**

substance able to kill micro-organisms, animals or plants colonizing porous substrates

3.16**biocleaning**

cleaning using non-pathogenic micro-organisms to remove undesired substances (sulfates, nitrates, organic matter, etc.) from a surface

3.17**chelating agents**

organic substances forming coordinate bonds with metal ions and producing a stable structure

3.18**cryogenic cleaning****dry ice-blasting**

abrasive cleaning in which dry ice, the solid form of carbon dioxide (stable below $-78\text{ }^{\circ}\text{C}$), is accelerated in a pressurized air stream and directed onto the object surface

3.19**ion exchange resins**

polymers (essentially) which contain ionic groups linked to their macromolecules by a weak bond and consequently have the ability to inter-exchange these groups with the ions present in the surrounding medium

3.20**laser cleaning**

cleaning consisting in the removal of the unwanted surface materials from a substrate by using laser irradiation

3.21**surfactant**

substance which lowers the surface tension of the medium in which it is dissolved, and/or the interfacial tension with other phases, and, accordingly, is positively adsorbed at the liquid/vapour and/or at other interfaces

3.22**toxic**

substances and preparations which, if they are inhaled or taken internally or if they penetrate the skin, may involve serious, acute or chronic health risks and even death

Note 1 to entry: See Directive 67/548/EEC.

3.23**toxicity**

degree to which a substance is toxic