

**SLOVENSKI STANDARD**  
**oSIST prEN 17187:2018**  
**01-januar-2018**

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**Ohranjanje kulturne dediščine - Značilnosti malt, ki se uporabljajo pri kulturni dediščini**

Conservation of cultural heritage - Characterization of mortars used in cultural heritage

Erhaltung des kulturellen Erbes - Charakterisierung von in kulturellem Erbe verwendeten Mörteln

Conservation du patrimoine culturel - Caractérisation des mortiers utilisés dans le patrimoine culturel

**Ta slovenski standard je istoveten z: prEN 17187**

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**ICS:**

91.100.10	Cement. Mavec. Apno. Malta	Cement. Gypsum. Lime. Mortar
97.195	Umetniški in obrtniški izdelki. Kulturne dobrine in kulturna dediščina	Items of art and handicrafts. Cultural property and heritage

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**en,fr,de**



EUROPEAN STANDARD  
NORME EUROPÉENNE  
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**DRAFT**  
**prEN 17187**

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English Version

**Conservation of cultural heritage - Characterization of  
mortars used in cultural heritage**

Erhaltung des kulturellen Erbes - Charakterisierung  
von Mörteln

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If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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## European foreword

This document (prEN 17187:2017) has been prepared by Technical Committee CEN/TC 346 “Conservation of Cultural Heritage”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

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## Introduction

The characterization of mortar is an essential step for a conservation plan, in order to decide on appropriate remedial interventions, to achieve better working practices, and technologies for conservation interventions including mortar replacements and stone repair. Cultural heritage structures and objects have used many types of mortars (for example hydraulic mortars, air mortars, pozzolanic, Roman cements) and, therefore, it is important that the typology of mortars is described and the characterization is achieved through a consistent and uniform methodology.

This document provides cultural heritage professionals with a guidance for a common methodology for the characterization of mortars used in cultural heritage. This information is used to define mineralogical, petrographic, physical, chemical and mechanical properties of these materials.

The characterization of mortar used in cultural heritage should be carried out and interpreted by professionals experienced in the field of materials science and/or conservation/restoration.

Where possible, existing standards are referred to and guidance provided where different specimens are required and additional methods used. The methods described are generally destructive, however, non-destructive (NDT) methods are always preferable to methods with a minimum of destruction and those are always preferable to destructive methods.

Methods used for mortar analysis can vary depending upon the objectives of the work. All investigation and analysis will be proportional to the significance of the building or artefact being investigated, its condition and the likely level of intervention.

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## 1 Scope

This European Standard specifies a methodology for the characterization of mortars by using the most appropriate analytical techniques on samples taken from cultural heritage structures and objects.

This standard contains guidelines for the selection of methods to determine mineralogical, textural, physical, chemical and mechanical properties of mortars used in cultural heritage structures and objects. This information is used to define mortar typology and to evaluate the mortar condition with respect to its conservation as well as for understanding of the ongoing deterioration processes.

## 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 1936, *Natural stone test methods - Determination of real density and apparent density, and of total and open porosity*

EN 1015-12, *Methods of test for mortar for masonry - Part 12: Determination of adhesive strength of hardened rendering and plastering mortars on substrates*

EN 13755, *Natural stone test methods - Determination of water absorption at atmospheric pressure*

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

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

EN 16455, *Conservation of cultural heritage - Extraction and determination of soluble salts in natural stone and related materials used in and from cultural heritage*

EN 16572, *Conservation of cultural heritage - Glossary of technical terms concerning mortars for masonry, renders and plasters used in cultural heritage*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15898, EN 16085 and EN 16572 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>

**prEN 17187:2017 (E)****4 Typology of mortars**

Based on the binder, aggregate and additives:

The principle binders are:

- a) clay;
- b) gypsum;
- c) air lime;
- d) hydraulic lime;
- e) Roman cement;
- f) Portland cement.

NOTE 1 Some mortars will be formed from a mixture of binders.

The principle aggregates are:

- g) natural sediments - sand, etc.;
- h) crushed rocks – calcitic, dolomitic, siliceous;
- i) other artificial materials.

The principle additives are:

- j) inorganic:

pozzalans – natural, crushed ceramics, etc.

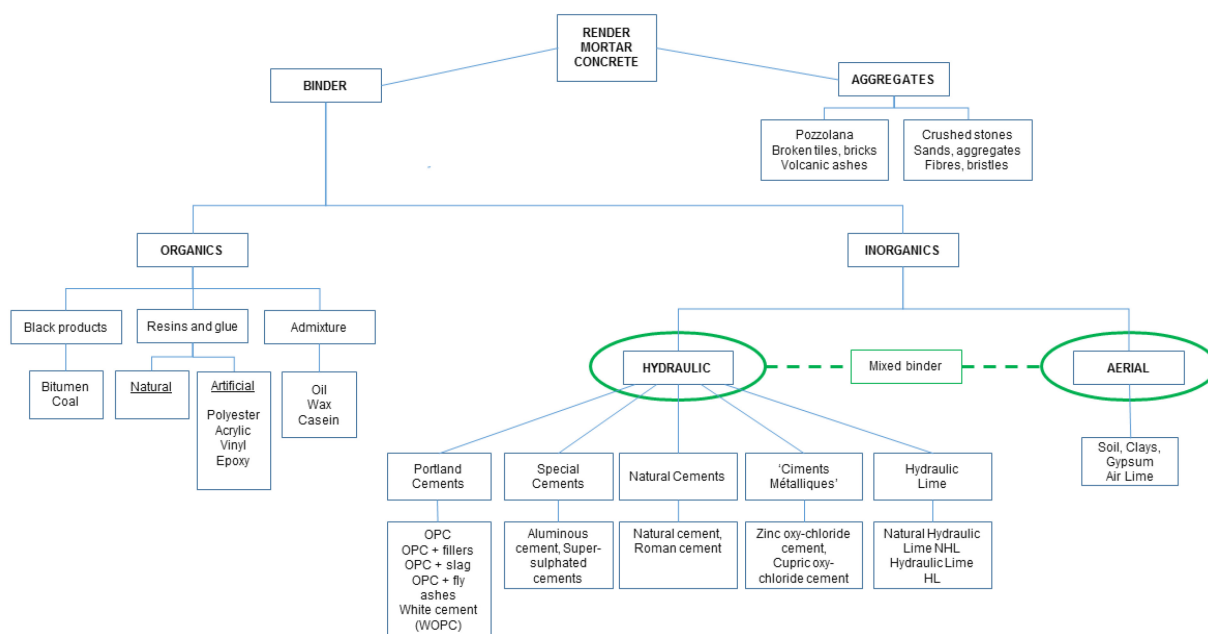
- k) organic:

black products – coal, etc.;

resins – oil, wax, etc.;

fibres – straw, bristles, hair, etc.

The relationship of these mortar components is shown in Figure 1.



**Figure 1 — Chemical, mineralogical and petrographic characterization of mortars: binder and aggregate(s)**  
**Typology of mortars – relationship of components**

NOTE 2 This flow chart can be used as the basis for the typology to describe mortars used in cultural heritage. It is intended to cover most commonly found mortars. It is not exhaustive but the techniques described in this standard can be applied to most mortars.

## 5 Preliminary operations

### 5.1 Initial survey

An initial survey of the object together with the objectives of the mortar characterization and the description of the context are essential for the selection of the analytical methodology that is to be followed. Where the object is part of the immovable heritage a condition survey should be undertaken in accordance with EN 16096 or if the object is part of the moveable heritage a condition report should be made in accordance with EN 16095.

The condition report or survey should be supplemented by sufficient information to allow a preliminary assessment of the existing mortars, their relative chronological position, and their condition. This preliminary assessment should include: function, general mortar types (pointing mortar, repointing mortar, repair mortar, render, plaster, moulded or cast features, etc.), the macroscopic characteristics, such as colour and texture, structural aspects and apparent condition.

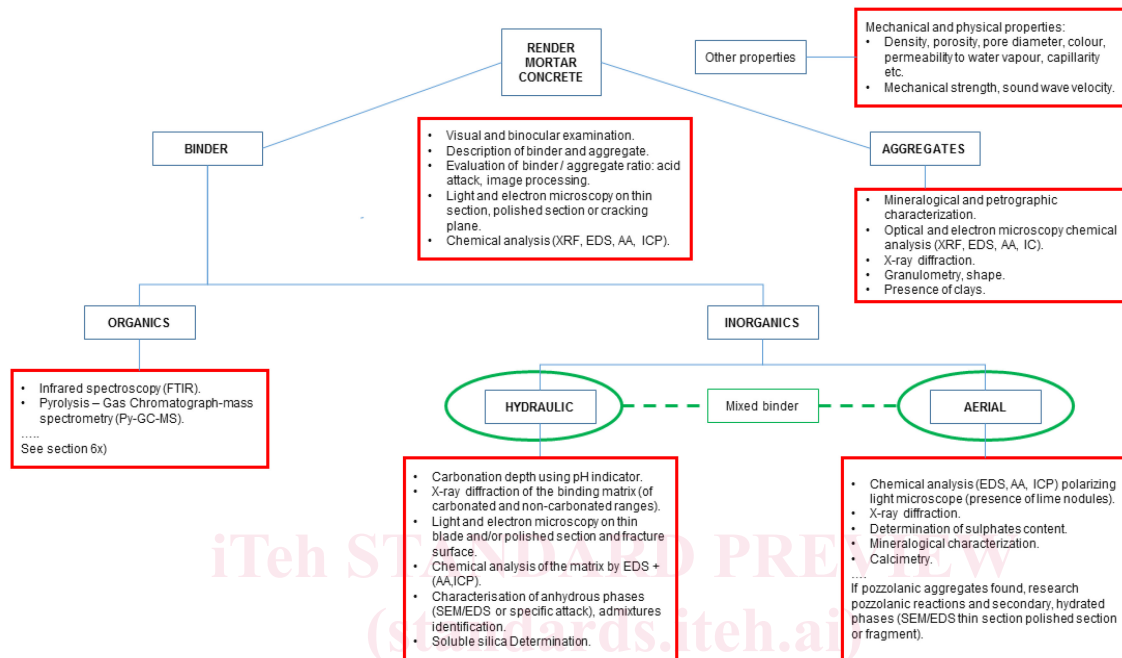
### 5.2 Sampling

Sampling has to be undertaken in accordance with EN 16085. In all cases, the location, the orientation, the number, the amount, the size and the shape of the specimens used should be documented in the test report (see Clause 7). In accordance with the initial survey, it should be stated whether the mortar specimen to be characterized is derived from sound or deteriorated part of the object.

## 6 Methodology

### 6.1 Selection of analytical methods

A flowchart to assist in the selection of analytical methods is given in Figure 2.



**Figure 2 — Chemical, mineralogical and petrographic characterization of mortars: binder and aggregate(s)**

### 6.2 Macroscopic observations

The preliminary information obtained during the in situ macroscopic observations shall be confirmed by a further examination of the specimens. When specimens are examined using a stereomicroscope this should be in accordance with EN 12407.

This examination enables an initial assessment of:

- the aggregate (colour, distribution, approximate size, etc.);
- the binder;
- texture of the mortar (including porosity, etc.);
- stratigraphy and chronology (if any);
- cohesion/ Adhesion within mortar (layers/joints);
- decay forms (if any);
- residues of protection and/or aesthetic treatments.