

Conservation of Cultural Heritage - Guidelines to
characterize natural stone used in cultural heritage

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Conservation of Cultural Heritage - Guidelines to characterize natural stone used in cultural heritage

Conservation du patrimoine culturel - Lignes directrices
pour la caractérisation de la pierre naturelle utilisée dans le
patrimoine culturel

Erhaltung des kulturellen Erbes - Leitfaden zur
Charakterisierung von Naturstein in der Denkmalpflege

This European Standard was approved by CEN on 7 February 2015.

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Foreword

This document (EN 16515:2015) 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of an identical text or by endorsement, at the latest by October 2015 and conflicting national standards shall be withdrawn at the latest by October 2015.

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Introduction

The characterization of a stone 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 stone replacements. Therefore, it is important that it 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 stones used in cultural heritage. This information is used to define nature (petrography or mineralogy and texture) and properties (chemical, physical and mechanical) of stone.

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

1 Scope

This European Standard specifies a methodology for the characterization of sound or deteriorated stones by using the most appropriate analytical techniques on samples taken from the object.

This European Standard contains guidelines for the selection of methods to determine mineralogical, textural, physical, chemical and mechanical properties of natural stone used in cultural heritage monuments and objects. This information is used to define rock typology and to evaluate the stone's condition with respect to its conservation as well as for understanding of deterioration processes of natural stone. 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 stone analysis can vary depending upon the objectives of the work. All investigation and analysis need be proportional to the significance of the building or artefact being investigated, its condition and the likely level of intervention. This European Standard will be used to determine the kind, extent, and objectives of the examination to be made.

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 1926, *Natural stone test methods — Determination of uniaxial compressive strength*

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

EN 12372, *Natural stone test methods — Determination of flexural strength under concentrated load*

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

EN 14146, *Natural stone test methods — Determination of the dynamic modulus of elasticity (by measuring the fundamental resonance frequency)*

EN 14579, *Natural stone test methods — Determination of sound speed propagation*

EN 14580, *Natural stone test methods — Determination of static elastic modulus*

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

EN 16455, *Conservation of cultural heritage — Dissolution and determination of soluble salts in natural stone and related materials used in cultural heritage*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15898 and EN 16085 and the following apply.

- 3.1 investigation**
gathering of information necessary for a conservation decision making process
- 3.2 sample**
number of specimens of material, ideally representative, removed from the cultural property for scientific investigation
- [SOURCE: EN 16085, modified]
- 3.3 sampling**
process of removing a sample
- 3.4 specimen**
single individual piece of stone forming one portion of a sample
- 3.5 sound material**
stone showing an un-altered state under visual observation with the naked eye
- 3.6 deteriorated material**
stone showing evidence of alteration under visual observation with the naked eye
- 3.7 analysis**
investigation of natural stone which supplies important information to establish its nature and properties
- 3.8 petrography**
description of the mineral content and the textural relationships of rock, based on observation of hand specimen and thin microscopic section

4 Preliminary operations

4.1 Initial survey

An initial survey of the object together with the objectives of the stone 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 stone and its condition. This preliminary assessment should include general stone type, the macroscopic characteristics, such as colour and texture, structural aspects and apparent condition.