



NSAI
Standards

Irish Standard
I.S. EN 16515:2015

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

I.S. EN 16515:2015

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:

EN 16515:2015

Published:

2015-04-01

This document was published under the authority of the NSAI and comes into effect on:

2015-04-18

ICS number:

97.195

NOTE: If blank see CEN/CENELEC cover page

NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie
W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

EN 16515

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2015

ICS 97.195

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.

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.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

| Contents | Page |
|------------------------------------------------------------------------|-------------|
| Foreword..... | 3 |
| Introduction | 4 |
| 1 Scope | 5 |
| 2 Normative references | 5 |
| 3 Terms and definitions | 6 |
| 4 Preliminary operations..... | 6 |
| 4.1 Initial survey..... | 6 |
| 4.2 Sampling..... | 7 |
| 5 Methodology to characterize sound and deteriorated material..... | 7 |
| 5.1 Visual examination of specimens | 7 |
| 5.2 Examination under petrographic microscope..... | 7 |
| 5.3 Mineralogical analysis by X-ray diffraction (XRD)..... | 8 |
| 5.4 Micro-structural examination by Scanning Electron Microscopy | 8 |
| 5.5 Chemical analysis..... | 8 |
| 5.6 Physical properties..... | 8 |
| 5.6.1 General..... | 8 |
| 5.6.2 Density, porosity and pore size distribution..... | 8 |
| 5.6.3 Hydric behaviour..... | 9 |
| 5.6.4 Colour | 9 |
| 5.7 Mechanical properties..... | 9 |
| 5.7.1 General..... | 9 |
| 5.7.2 Compressive Strength | 9 |
| 5.7.3 Flexural strength..... | 9 |
| 5.7.4 Static modulus of elasticity | 9 |
| 5.7.5 Dynamic modulus of elasticity..... | 9 |
| 5.7.6 Sound speed propagation | 10 |
| 6 Characterization report | 10 |
| Bibliography..... | 11 |

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.

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

EN 16515:2015 (E)

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*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
 - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-