

# SVENSK STANDARD

## SS-EN 16515:2015

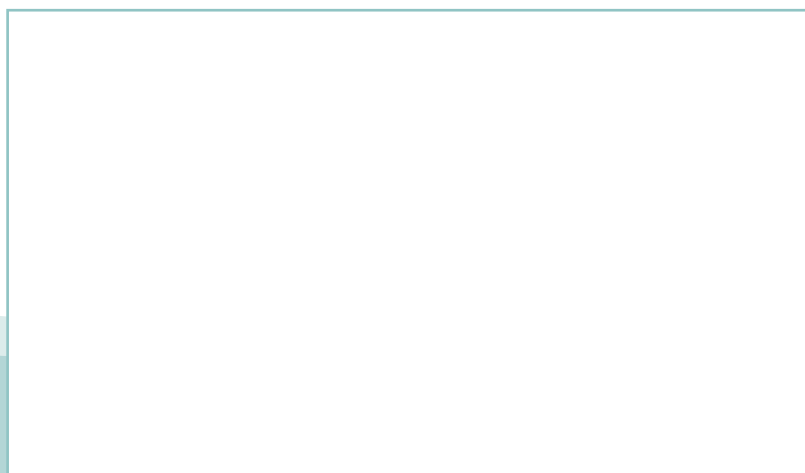


Fastställt/Approved: 2015-04-05  
Publicerad/Published: 2015-04-08  
Utgåva/Edition: 1  
Språk/Language: engelska/English  
ICS: 97.195

---

### **Bevarande av kulturarv – Riktlinjer för karaktärisering av natursten**

### **Conservation of Cultural Heritage – Guidelines to characterize natural stone used in cultural heritage**



# Standarder får världen att fungera

*SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.*

## Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

## Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

## Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

**Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på [www.sis.se](http://www.sis.se) eller ta kontakt med oss på tel 08-555 523 00.**



# Standards make the world go round

*SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.*

## Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

## Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

## Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

**If you want to know more about SIS, or how standards can streamline your organisation, please visit [www.sis.se](http://www.sis.se) or contact us on phone +46 (0)8-555 523 00**



Europastandarden EN 16515:2015 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 16515:2015.

The European Standard EN 16515:2015 has the status of a Swedish Standard. This document contains the official English version of EN 16515:2015.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

*Uppllysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS Förlag AB som även lämnar allmänna upplysningar om svensk och utländsk standard.*

*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 Förlag AB, who can also provide general information about Swedish and foreign standards.*

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

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på [www.sis.se](http://www.sis.se) - där hittar du mer information.



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**

| <b>Contents</b>  | <b>Page</b> |
|--|-------------|
| 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.

## 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.