



**NSAI**  
Standards

Irish Standard  
I.S. EN 196-1:2016

# Methods of testing cement - Part 1: Determination of strength

## I.S. EN 196-1:2016

*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 196-1:2016

*Published:*

2016-04-27

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

2016-05-15

ICS number:

91.100.10

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

## National Foreword

I.S. EN 196-1:2016 is the adopted Irish version of the European Document EN 196-1:2016, Methods of testing cement - Part 1: Determination of strength

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

EUROPEAN STANDARD

EN 196-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2016

ICS 91.100.10

Supersedes EN 196-1:2005

English Version

## Methods of testing cement - Part 1: Determination of strength

Méthodes d'essais des ciments - Partie 1:  
Détermination des résistances

Prüfverfahren für Zement - Teil 1: Bestimmung der  
Festigkeit

This European Standard was approved by CEN on 20 December 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>
European foreword.....	4
<b>1 Scope .....</b>	<b>5</b>
<b>2 Normative references .....</b>	<b>5</b>
<b>3 Principle .....</b>	<b>5</b>
<b>4 Laboratory and equipment.....</b>	<b>6</b>
4.1 Laboratory .....	6
4.2 General requirements for the equipment.....	6
4.3 Test sieves.....	7
4.4 Mixer .....	7
4.5 Moulds.....	8
4.6 Jolting apparatus.....	11
4.7 Flexural strength testing apparatus.....	13
4.8 Compressive strength testing machine.....	14
4.9 Jig for compressive strength testing machine .....	15
4.10 Balance.....	15
4.11 Timer .....	15
<b>5 Mortar constituents.....</b>	<b>16</b>
5.1 Sand.....	16
5.2 Cement .....	17
5.3 Water .....	17
<b>6 Preparation of mortar .....</b>	<b>18</b>
6.1 Composition of mortar .....	18
6.2 Mixing of mortar .....	18
<b>7 Preparation of test specimens.....</b>	<b>18</b>
7.1 Size of specimens.....	18
7.2 Moulding of test specimens .....	18
<b>8 Conditioning of test specimens .....</b>	<b>19</b>
8.1 Handling and storage before demoulding.....	19
8.2 Demoulding of specimens .....	19
8.3 Curing of specimens in water.....	19
8.4 Age of specimens for strength tests.....	20
<b>9 Testing procedures.....</b>	<b>20</b>
9.1 Flexural strength.....	20
9.2 Compressive strength.....	20
<b>10 Results.....</b>	<b>21</b>
10.1 Flexural strength.....	21
10.2 Compressive strength.....	21
<b>11 Validation testing of CEN Standard sand and of alternative compaction equipment .....</b>	<b>23</b>
11.1 General.....	23
11.2 Validation testing of CEN Standard sand .....	23
11.3 Validation testing of alternative compaction equipment.....	26

<b>Annex A (normative) Alternative vibration compaction equipment and procedures validated as equivalent to the reference jolting compaction equipment and procedure .....</b>	<b>29</b>
<b>A.1 General .....</b>	<b>29</b>
<b>A.2 Vibrating table, A .....</b>	<b>29</b>
<b>A.3 Vibrating table, B .....</b>	<b>32</b>

**EN 196-1:2016 (E)****European foreword**

This document (EN 196-1:2016) has been prepared by Technical Committee CEN/TC 51 "Cement and building limes", the secretariat of which is held by NBN.

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 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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 supersedes EN 196-1:2005.

In comparison to EN 196-1:2005, the following changes have been made:

- In Clause 2, the normative references have been updated.
- In 10.2.3 estimates of the precisions for compressive strength testing have been revised with an indication of repeatability and reproducibility at 2 d and 7 d.
- In 6.2 the mixing procedure has been revised with an indication of a maximum timing for the addition in the bowl.
- The standard has been editorially revised.

EN 196 consists of the following parts, under the general title *Methods of testing cement*:

- *Part 1: Determination of strength;*
- *Part 2: Chemical analysis of cement;*
- *Part 3: Determination of setting times and soundness;*
- *Part 4: Quantitative determination of constituents (CEN/TR 196-4);*
- *Part 5: Pozzolanicity test for pozzolanic cement;*
- *Part 6: Determination of fineness;*
- *Part 7: Methods of taking and preparing samples of cement;*
- *Part 8: Heat of hydration - Solution method;*
- *Part 9: Heat of hydration - Semi-adiabatic method;*
- *Part 10: Determination of the water-soluble chromium (VI) content of cement.*

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.



## 1 Scope

This part of EN 196 describes the method for the determination of the compressive and, optionally, the flexural strength of cement mortar. The method applies to common cements and to other cements and materials, the standards for which call up this method. It may not apply to other cement types that have, for example, a very short initial setting time.

The method is used for assessing whether the compressive strength of cement is in conformity with its specification and for validation testing of a CEN Standard sand, EN 196-1, or alternative compaction equipment.

This part of EN 196 describes the reference equipment and procedure and allows alternative compaction equipment and procedures to be used provided that they have been validated in accordance with the appropriate provisions in this document. In the event of a dispute, only the reference equipment and procedure are used.

## 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 196-7, *Methods of testing cement - Part 7: Methods of taking and preparing samples of cement*

EN 197-1, *Cement - Part 1: Composition, specifications and conformity criteria for common cements*

EN ISO 1101, *Geometrical product specifications (GPS) - Geometrical tolerancing - Tolerances of form, orientation, location and run-out (ISO 1101)*

EN ISO 1302, *Geometrical Product Specifications (GPS) - Indication of surface texture in technical product documentation (ISO 1302)*

EN ISO 7500-1, *Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Verification and calibration of the force-measuring system (ISO 7500-1)*

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 3310-1, *Test sieves - Technical requirements and testing - Part 1: Test sieves of metal wire cloth*

ISO 4200, *Plain end steel tubes, welded and seamless — General tables of dimensions and masses per unit length*

## 3 Principle

The method comprises the determination of the compressive, and optionally the flexural, strength of prismatic test specimens 40 mm × 40 mm × 160 mm in size.

These specimens are cast from a batch of plastic mortar containing one part by mass of cement, three parts by mass of CEN Standard sand and one half part of water (water/cement ratio 0,50). CEN Standard sands from various sources and countries may be used provided that they have been shown to give cement strength results which do not differ significantly from those obtained using the CEN Reference sand (see Clause 11).

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](#)
-