



**NSAI**  
Standards

Irish Standard  
I.S. EN 12390-5:2019

# Testing hardened concrete - Part 5: Flexural strength of test specimens

**I.S. EN 12390-5:2019**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN 12390-5:2019 is the adopted Irish version of the European Document EN 12390-5:2019, Testing hardened concrete - Part 5: Flexural strength of test specimens

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

EN 12390-5

June 2019

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Supersedes EN 12390-5:2009

English Version

Testing hardened concrete - Part 5: Flexural strength of  
test specimens

Essai pour béton durci - Partie 5 : Résistance à la  
flexion sur éprouvettes

Prüfung von Festbeton - Teil 5: Biegezugfestigkeit von  
Probekörpern

This European Standard was approved by CEN on 29 April 2019.

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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.

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## European foreword

This document (EN 12390-5:2019) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by SN.

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of an identical text or by endorsement, at the latest by December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.

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 12390-5:2009.

It is recognized as good practice to include measurement of density prior to the determination of flexural strength, as a check on compaction of the concrete.

The two-point method of loading has been taken as the reference method, but the use of centre-point loading has been included as a normative annex. An inter-comparison of the two-point and the centre-point methods has been made as part of a test programme, part-funded by the EC under the Measurement and Testing Programme, contract MAT I-CT-94-C043. The centre-point method gave results which were consistently 13 % higher than those from the two-point method.

This standard is one of a series on testing concrete.

EN 12390, *Testing hardened concrete*, consists of the following parts:

- *Part 1: Shape, dimensions and other requirements of specimens and moulds;*
- *Part 2: Making and curing specimens for strength tests;*
- *Part 3: Compressive strength of test specimens;*
- *Part 4: Compressive strength – Specification for testing machines;*
- *Part 5: Flexural strength of test specimens;*
- *Part 6: Tensile splitting strength of test specimens;*
- *Part 7: Density of hardened concrete;*
- *Part 8: Depth of penetration of water under pressure;*
- *Part 11: Determination of the chloride resistance of concrete, unidirectional diffusion;*
- *Part 12: Determination of the potential carbonation resistance of concrete: Accelerated carbonation method (in preparation);*
- *Part 13: Determination of secant modulus of elasticity in compression;*
- *Part 14: Semi-adiabatic method for the determination of heat released by concrete during its hardening process;*
- *Part 15: Adiabatic method for the determination of heat released by concrete during its hardening process;*
- *Part 16: Determination of the shrinkage of concrete (in preparation);*
- *Part 17: Determination of creep of concrete in compression (in preparation);*

## **EN 12390-5:2019 (E)**

— *Part 18: Determination of the chloride migration coefficient (in preparation).*

This edition includes the following significant technical changes with respect to EN 12390 5:2009:

- editorial revision;
- technical corrections;
- curing procedure aligned with EN 12390-3.

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



## 1 Scope

This document specifies a method for the determination of the flexural strength of specimens of hardened concrete.

## 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 12350-1, *Testing fresh concrete — Part 1: Sampling*

EN 12390-1, *Testing hardened concrete — Part 1: Shape, dimensions and other requirements for specimens and moulds*

EN 12390-2, *Testing hardened concrete — Part 2: Making and curing specimens for strength tests*

EN 12390-4, *Testing hardened concrete — Part 4: Compressive strength — Specification for testing machines*

EN 12390-7, *Testing hardened concrete — Part 7: Density of hardened concrete*

## 3 Terms and definitions

No terms and definitions are listed in this document.

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>

## 4 Principle

Prismatic specimens are subject to a bending moment by the application of load through upper and lower rollers. The maximum load sustained is recorded and the flexural strength is calculated.

## 5 Apparatus

### 5.1 Testing machine

The test shall be carried out using a testing machine conforming to EN 12390-4.

### 5.2 Force application

The device for applying loads (see Figure 1) shall consist of:

- 1) two supporting rollers;
- 2) two upper rollers carried by an articulated cross member, which divides the load applied by the machine equally between the two rollers.

All rollers shall be manufactured from steel and shall have a circular cross-section with a diameter of 20 mm to 40 mm. They shall be at least 10 mm longer than the width of the test specimen.

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