



SLOVENSKI STANDARD SIST EN 12504-1:2009

01-julij-2009

BUXca Yý U
SIST EN 12504-1:2001

DfYg_i ýUb^Y^VYrcbUj`_cbgfi _Vj^U`!%r^XY`-nj fHUb]dfYg_i ýUbVj!>Ya Ub^Yž
dfY[`YX`]b`hU b]dfYg_i g

Testing concrete in structures - Part 1: Cored specimens - Taking, examining and testing in compression

Prüfung von Beton in Bauwerken - Teil 1: Bohrkernproben - Herstellung, Untersuchung und Prüfung der Druckfestigkeit
(standards.iteh.ai)

Essais pour béton dans les structures - Partie 1 - Carottes - Prélèvement, examen et essais en compression
<http://standards.iteh.ai/catalog/standards/sist/f1244970-b596-41da-95d8-2feb27cca81/sist-en-12504-1-2009>

Ta slovenski standard je istoveten z: EN 12504-1:2009

ICS:

91.100.30 Beton in betonski izdelki Concrete and concrete products

SIST EN 12504-1:2009 en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12504-1:2009

<https://standards.iteh.ai/catalog/standards/sist/f1244970-b596-41da-95d8-2feb27cca81/sist-en-12504-1-2009>

EUROPEAN STANDARD

EN 12504-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2009

ICS 91.100.30

Supersedes EN 12504-1:2000

English Version

Testing concrete in structures - Part 1: Cored specimens - Taking, examining and testing in compression

Essais pour béton dans les structures - Partie 1: Carottes -
Prélèvement, examen et essais en compression

Prüfung von Beton in Bauwerken - Teil 1: Bohrkernproben -
Herstellung, Untersuchung und Prüfung der Druckfestigkeit

This European Standard was approved by CEN on 27 December 2008.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 12504-1:2009](https://standards.iteh.ai/catalog/standards/sist/fl244970-b596-41da-95d8-2feb27cca81/sist-en-12504-1-2009)

<https://standards.iteh.ai/catalog/standards/sist/fl244970-b596-41da-95d8-2feb27cca81/sist-en-12504-1-2009>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Principle	4
4 Apparatus	4
5 Taking cores.....	5
6 Examination.....	6
7 Preparation of cores	6
8 Compression test.....	7
9 Expression of results	7
10 Test report	7
11 Precision.....	8
Annex A (informative) The effect of aggregate size and core diameter on core specimen strength	9
Bibliography	10

[SIST EN 12504-1:2009](https://standards.itech.ai/catalog/standards/sist/fl244970-b596-41da-95d8-2feb27cca81/sist-en-12504-1-2009)
<https://standards.itech.ai/catalog/standards/sist/fl244970-b596-41da-95d8-2feb27cca81/sist-en-12504-1-2009>

Foreword

This document (EN 12504-1:2009) has been prepared by Technical Committee CEN/TC 104 "Concrete and related products", the secretariat of which is held by DIN.

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 August 2009, and conflicting national standards shall be withdrawn at the latest by August 2009.

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.

This document supersedes EN 12504-1:2000.

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

In drafting the standard consideration has been given to the results of the research programme, part funded by the EC under the Measurement and Testing Programme, contract MAT1-CT94-0043.

The standard includes simple guidance on the process of taking cores, but does not consider a sampling plan. It also provides procedures for visual examination and compressive strength testing, but not the interpretation of the results.

This standard is one of a series concerned with testing concrete.

This series EN 12504 includes the following parts:

EN 12504 Testing concrete in structures

Part 1: Cored specimens - Taking, examining and testing in compression;

Part 2: Non-destructive testing - Determination of rebound number;

Part 3: Determination of pull-out force;

Part 4: Determination of ultrasonic pulse velocity.

The following amendments have been made to the 2000-03 edition of this standard:

- editorial revision
- compressive strength to be expressed to the nearest 0,1 MPa (N/mm²) instead of 0,5 MPa (N/mm²)
- 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

EN 12504-1:2009 (E)**1 Scope**

This European Standard specifies a method for taking cores from hardened concrete, their examination, preparation for testing and determination of compressive strength.

NOTE 1 This European Standard does not give guidance on the decision to drill cores or on the locations for drilling.

NOTE 2 This European Standard does not provide procedures for interpreting the core strength results.

NOTE 3 For the assessment of in-situ compressive strength in structures and precast concrete components EN 13791 may be used.

2 Normative references

The following referenced documents are indispensable for the application 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 12390-1, *Testing hardened concrete - Part 1: Shape, dimensions and other requirements for test specimens and moulds*

EN 12390-3:2009, *Testing hardened concrete - Part 3: Compressive strength of test specimens*

EN 12390-4:2000, *Testing hardened concrete - Part 4: Compressive strength - Specification for testing machines*

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

3 Principle

Cores extracted using a core drill are carefully examined, prepared by grinding or capping and tested in compression using standard procedures.

4 Apparatus

4.1 Core drill, equipment capable of extracting cores from the hardened concrete to the dimensions set out in 5.4 to the tolerances set out in 7.3

4.2 Compression testing machine, conforming to EN 12390-4 and related to the size of specimens and their expected failure load

NOTE Concrete compression testing machines conforming to EN 12390-4 may need to be adapted to test cores. (see the Foreword of EN 12390-4:2000).

4.3 Balance or scale, capable of determining the mass of the core, as tested, to an accuracy of 0,1 % of the mass

4.4 Callipers and/or rules, capable of measuring the dimensions of the core and the steel reinforcement to an accuracy of 1 %.

4.5 Gauge, capable of establishing that the relevant flatness of the specimen is within the requirements of 7.3.a)

4.6 Squares and gauges (or other means), capable of establishing that the perpendicularity and straightness of specimens are within the requirements of 7.3.b) and 7.3.c)

5 Taking cores

5.1 General

The ratio of the maximum aggregate size in the concrete to the diameter of the core has a significant influence on the measured strength when it approaches values greater than about 1:3.

It is essential that full consideration is given to the aims of the testing and the interpretation of the data, before deciding to drill cores.

NOTE Informative Annex A provides information on the effect of aggregate size and core diameter on the strength of core specimens.

5.2 Location

Consider any structural implications resulting from taking a core prior to drilling

NOTE Cores should preferably be taken at points away from joints or edges of the concrete element and where there is little or no reinforcement.

5.3 Drilling

Unless otherwise specified, drill the cores perpendicular to the surface in such a manner as not to damage the cores. Keep the drill rigidly positioned during coring.

5.4 Length of cores

In deciding the length of cores to be taken for strength testing, take into account:

- the diameter of the core;
- the possible method of adjustment;
- whether comparison is to be made with cube strength or cylinder strength.

5.5 Marking and identification

Immediately after drilling, clearly and indelibly mark each core. Record its location and orientation within the element from which it has been drilled. If a core is subsequently cut to produce a number of specimens, mark each specimen to indicate its position and orientation within the original core.

EN 12504-1:2009 (E)**5.6 Reinforcement**

Drilling through reinforcement shall be avoided wherever possible. Ensure that cores for determination of compressive strength do not contain any reinforcing bars in, or close to, the direction of the longitudinal axis.

If transverse reinforcement is encountered, record its diameter and position in mm.

6 Examination**6.1 Visual inspection**

Carry out a visual examination of the cored specimen to identify any abnormalities.

If required, an estimation of the cores' voidage shall be made by reference to standard documentation or by comparison to a reference concrete of known voidage.

6.2 Measurements

Measurements shall be as follows:

- a) core diameter d_m shall be measured to within 1 %, from pairs of measurements taken at right angles, at the half and quarter points of the length of the core.
- b) core length, the maximum and minimum lengths shall be measured to 1 % as received and the length after completion of the end preparation, in accordance with Clause 7.
- c) reinforcement, the diameter [size] of any reinforcement shall be measured and the position, measuring from the centre of the exposed bar to the end(s) and/or axis of the core, both as received and after end preparation. Measurement shall be to the nearest mm.

If it is required to determine the density of the core, this shall be determined in accordance with the procedures given in EN 12390-7 prior to capping the ends of the core.

NOTE All measurements should be recorded.

7 Preparation of cores**7.1 General**

Prepare the ends of cores for compression tests in accordance with Annex A of EN 12390-3:2009.

7.2 Length diameter/ratios

The preferred length diameter/ratios are:

- a) 2,0 if the strength result is to be compared to cylinder strength;
- b) 1,0 if the strength result is to be compared to cube strength.

7.3 Tolerances

Prepare the specimen to within the following tolerances:

- a) for flatness, the tolerance for the end surfaces prepared by grinding or capping, using high alumina cement or sulphur, shall conform to EN 12390-1.
- b) for perpendicularity, the tolerance for the prepared ends, with respect to the side, shall comply with EN 12390-1.
- c) for straightness, the tolerance on the generating line of the core shall be 3 % of the average core diameter.

NOTE If other smaller diameter cores are tested then the tolerances above should be considered with regard to their adequacy and narrowed if necessary: for example, reduced in proportion to the actual specimen diameter to 100 mm.

8 Compression test

8.1 Storage

Record the storage condition(s) of the specimen.

If it is required to test the specimen in a saturated condition, soak in water at (20 ± 2) °C for at least 48 h before testing.

8.2 Testing

Carry out the testing in accordance with EN 12390-3 using a compression testing machine conforming to EN 12390-4. (see the Note to 4.2).

Do not test cores with cracked, hollow, or loose caps.

Remove any loose sand or other material on the surface of the specimen.

If the specimen is to be tested whilst it is still wet, remove any surface water.

Record the surface moisture condition (wet/dry) of the specimen at the time of test.

9 Expression of results

Determine the compressive strength of each specimen by dividing the maximum load by the cross-sectional area, calculated from the average diameter and express the result to the nearest 0,1 MPa (N/mm²).

10 Test report

The report shall include:

- a) description and identification of the test specimen;
- b) estimated maximum size of aggregate;
- c) date of coring;
- d) visual inspection, noting any abnormalities identified;
- e) reinforcement (when appropriate): diameter, in mm, position(s) in mm;
- f) method used for the preparation of specimen (cutting, grinding, or capping);