



**SLOVENSKI STANDARD**  
**oSIST prEN 12504-1:2008**  
**01-september-2008**

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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

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

**Ta slovenski standard je istoveten z: prEN 12504-1**

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**ICS:**

91.100.30	Beton in betonski izdelki	Concrete and concrete products
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EUROPEAN STANDARD  
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**FINAL DRAFT**  
**prEN 12504-1**

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Will supersede 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 draft European Standard is submitted to CEN members for unique acceptance procedure. It has been drawn up by the Technical Committee CEN/TC 104.

If this draft becomes a European Standard, 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.

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

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
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## Foreword

This document (prEN 12504-1:2008) has been prepared by Technical Committee CEN/TC 104 "Concrete and related products", the secretariat of which is held by DIN.

This document is currently submitted to the Unique Acceptance Procedure.

This document will supersede 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/mm<sup>2</sup>) instead of 0,5 MPa (N/mm<sup>2</sup>)

**prEN 12504-1:2008 (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.

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

prEN 12390-3:2008, *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*

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

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**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:

- a) the diameter of the core;
- b) the possible method of adjustment;
- c) 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.

**prEN 12504-1:2008 (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 prEN 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 prEN 12390-3:2008.

**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 prEN 12390-1.
- b) for perpendicularity, the tolerance for the prepared ends, with respect to the side, shall comply with prEN 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  $(20 \pm 2)$  °C for at least 40 48 h before testing.

### 8.2 Testing

Carry out the testing in accordance with prEN 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/mm<sup>2</sup>).

## 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);

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- g) length and diameter of the core as received;
- h) length/diameter ratio of prepared specimen;
- i) surface moisture condition at time of test;
- j) date of performance of test;
- k) core compressive strength, to nearest 0,1 MPa (N/mm<sup>2</sup>);
- l) any deviations from the standard method of examination or compression testing;
- m) a declaration by the person responsible for the examination and testing that these were carried out in accordance with the standard except as detailed in item l).

The report may include:

- n) mass of the specimen, in kg;
- o) apparent density of specimen, to the nearest 10 kg/m<sup>2</sup>;
- p) condition of the specimen on receipt;
- q) curing conditions since receipt;
- r) time of test (if appropriate);
- s) age of specimen at time of test;
- t) other relevant information e.g. voidage.

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**11 Precision**

No estimate of repeatability or reproducibility is given with this test, but it is likely to be inferior to that for standard cast specimens.