



**SLOVENSKI STANDARD**  
**SIST EN 12390-7:2019**

**01-oktober-2019**

**Nadomešča:**  
**SIST EN 12390-7:2009**

---

**Preskušanje strjenega betona - 7. del: Gostota strjenega betona**

Testing hardened concrete - Part 7: Density of hardened concrete

Prüfung von Festbeton - Teil 7: Dichte von Festbeton

Essai pour béton durci - Partie 7 : Masse volumique du béton durci

**Ta slovenski standard je istoveten z: ~~SAMPLE~~ EN 12390-7:2019**

---

**ICS:**

91.100.30      Beton in betonski izdelki      Concrete and concrete products

**SIST EN 12390-7:2019**

**en,fr,de**

**SAMPLE**

EUROPEAN STANDARD

EN 12390-7

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2019

ICS 91.100.30

Supersedes EN 12390-7:2009

English Version

## Testing hardened concrete - Part 7: Density of hardened concrete

Essais pour béton durci - Partie 7 : Masse volumique du béton durci

Prüfung von Festbeton - Teil 7: Dichte von Festbeton

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

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, 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: Rue de la Science 23, B-1040 Brussels**

<b>Contents</b>		<b>Page</b>
European foreword.....		3
1	Scope .....	5
2	Normative references .....	5
3	Terms and definitions .....	5
4	Apparatus.....	5
5	Test specimens.....	6
6	Procedures.....	7
6.1	General.....	7
6.1.1	Determination of mass.....	7
6.1.2	Determination of volume .....	7
6.2	Mass of as-received specimen.....	7
6.3	Mass of water saturated specimen .....	7
6.4	Mass of oven-dried specimen .....	7
6.5	Volume obtained by water displacement.....	7
6.5.1	General.....	7
6.5.2	Mass in water.....	8
6.5.3	Mass in air.....	8
6.5.4	Calculate the volume of the specimen .....	8
6.6	Volume obtained by measurement.....	8
6.7	Volume obtained by using designated dimensions (cubes only) .....	8
7	Test result.....	9
8	Test report.....	9
9	Precision.....	10
Bibliography.....		11

## European foreword

This document (EN 12390-7:2019) 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 12390-7:2009.

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

**EN 12390-7:2019 (E)**

This edition includes the following significant technical changes with respect to EN 12390-7:2009:

- editorial revision;
- technical corrections.

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.

**SAMPLE**

## 1 Scope

This document specifies a method for determining the density of hardened concrete. It is applicable to lightweight, normal-weight and heavy-weight concrete.

It differentiates between hardened concrete in the following states:

- 1) as-received;
- 2) water saturated;
- 3) oven-dried.

The mass and volume of the specimen of hardened concrete are determined and the density calculated.

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

## 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 Apparatus

**4.1 Callipers and rules**, with a maximum permissible error of 0,5 % of the dimension, for measuring the dimensions of the specimens.

**4.2 Balance**, equipped with a stirrup for weighing the specimen in both air and water with a maximum permissible error of 0,1 g of the mass.

**4.3 Water tank**, fitted with a device to maintain the water at a constant level and of sufficient size to allow the specimen on the stirrup to be fully immersed to a constant depth (see Figure 1).

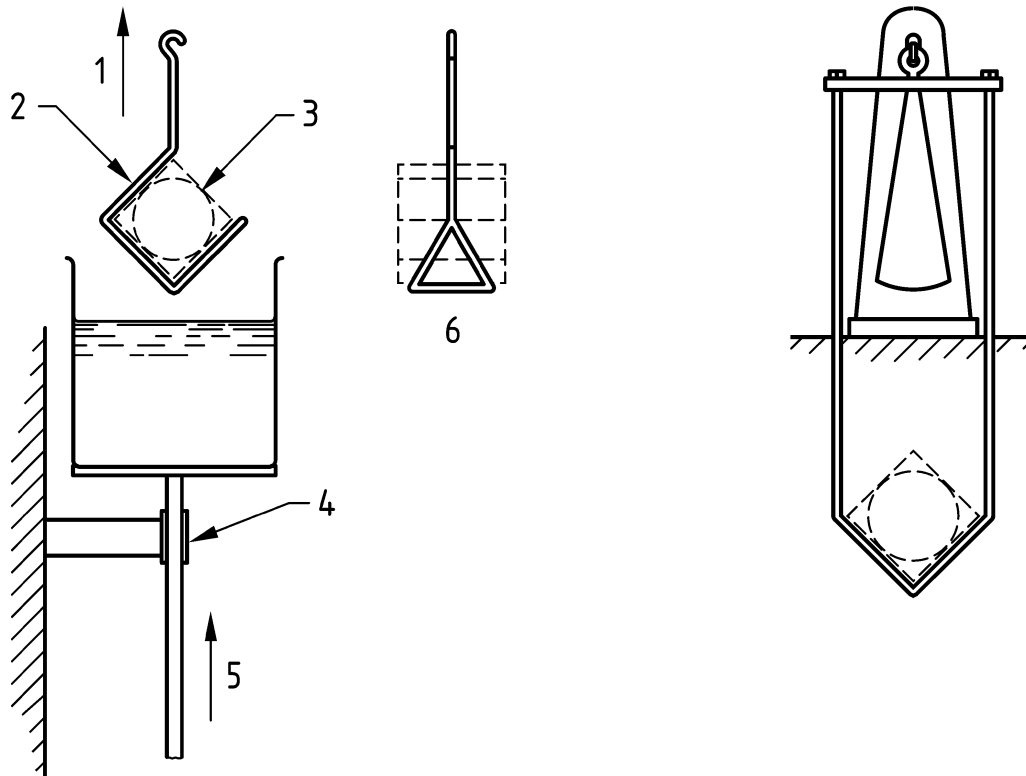
If the reading of the balance is affected to within the accuracy required due to the displacement of water when immersing the specimen, then the tank should be fitted with a device to maintain the water at a constant level. The tank should be of sufficient size to allow the specimen to be fully immersed.

**4.4 Ventilated oven**, in which the temperature is capable of being controlled at  $(105 \pm 5)$  °C.

NOTE The apparatus required depends upon the method selected for determining the volume of the specimen.

**4.5 Moist cloth.**

## EN 12390-7:2019 (E)



a) Stirrup suspended beneath balance mechanism

b) Alternative form of stirrup suspended beneath balance mechanism

**Key**

- 1 balance
- 2 stirrup
- 3 concrete specimen
- 4 guide
- 5 water tank is moved vertically
- 6 side view of stirrup

**Figure 1 — Typical stirrup arrangement for the determination of the volume of concrete specimens by water displacement**

## 5 Test specimens

The minimum volume of a specimen shall be 0,785 l. If the declared value of  $D$  of the coarsest fraction of aggregates actually used in the concrete ( $D_{\max}$ ) exceeds 25 mm, the minimum volume (in  $\text{mm}^3$ ) shall be not less than  $50 D^3$ , where  $D$  is the declared coarsest fraction of the aggregate in mm.

Normally, the entire specimen as received shall be used for the determination. If the shape or size of a specimen is such that it is not possible to use all of it, a smaller specimen may be broken or sawn from the original.

Capped specimens shall not be used.



## 6 Procedures

### 6.1 General

#### 6.1.1 Determination of mass

This European Standard recognizes three conditions under which the mass of a specimen can be determined:

- a) as-received;
- b) water saturated;
- c) oven-dried.

#### 6.1.2 Determination of volume

This European Standard recognizes three methods for determining the volume of the specimen:

- a) by water displacement (reference method);
- b) by calculation using actual measurements;
- c) for cubes, by calculation, using checked, designated dimensions.

NOTE 1 The precision of the method depends on the method selected for measuring the volume of the specimen. Measurement of volume by the water-displacement method is the most precise, followed by calculation using measurement of actual dimensions and lastly calculation using checked, designated dimensions.

NOTE 2 The limitation to cubes in 6.1.2 c) of using designated dimensions in calculation of volume is due to the greater tolerance on length, according to EN 12390-1, of other specimen shapes.

### 6.2 Mass of as-received specimen

Weigh the as-received specimen  $m_r$ , to a maximum permissible error of 1 g of the mass of the specimen. Record the value indicated in kg.

### 6.3 Mass of water saturated specimen

Immerse the specimen in water at  $(20 \pm 2)^\circ\text{C}$  until the mass changes by less than 0,2 % in 24 h, wiping the surplus water from the surface before each weighing. Record the value of the saturated mass  $m_s$ , in kg.

Specimens of concrete cured in water for at least 72 h prior to testing, may be assumed to be saturated to a constant mass.

### 6.4 Mass of oven-dried specimen

Dry the specimen in a ventilated oven at  $(105 \pm 5)^\circ\text{C}$  until the mass changes by less than 0,2 % in 24 h. Before each weighing, cool the specimen to near room temperature in a dry airtight vessel or desiccator. Record the value of the oven-dried mass  $m_o$  as indicated, in kg.

### 6.5 Volume obtained by water displacement

#### 6.5.1 General

Ensure that the specimen is a saturated condition.