SLOVENSKI STANDARD
SIST EN 12390-17:2019

01-december-2019

Preskušanje strjenega betona - 17. del: Določanje lezenja betona pod tlakom

Testing hardened concrete - Part 17: Determination of creep of concrete in compression

Prüfung von Festbeton - Teil 17: Bestimmung des Kriechens von Beton unter Druckspannung

Essais pour béton durci - Partie 17 : Détermination du fluage du béton en compression

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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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English Version

Testing hardened concrete - Part 17: Determination of creep of concrete in compression

Essais pour béton durci - Partie 17 : Détermination du fluage du béton en compression

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

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European foreword

This document (EN 12390-17:2019) 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of an identical text or by endorsement, at the latest by April 2020, and conflicting national standards shall be withdrawn at the latest by April 2020.

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 is based on ISO 1920-9 and ASTM C512-02.

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 for 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 10: Determination of the carbonation resistance of concrete at atmospheric levels of carbon dioxide;*

— *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;*

— *Part 17: Determination of creep of concrete in compression.*

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, 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 the United Kingdom.

1 Scope

This document describes the procedure for determining the creep (total creep, basic creep and drying creep) of hardened concrete test specimens subjected to a sustained longitudinal compressive load.

The test is suitable for specimens having a declared value of D of the coarsest fraction of aggregates actually used in the concrete (D_{max}) not greater than 32 mm.

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 and common apparatus*

EN 12390-1:2012, *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 12390-3, *Testing hardened concrete — Part 3: Compressive strength of test specimens*

EN 12390-16, *Testing hardened concrete — Part 16: Determination of the shrinkage of concrete*

EN 12504-1, *Testing concrete in structures — Part 1: Cored specimens — Taking, examining and testing in compression*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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 https://www.iso.org/obp

3.1
initial strain
strain measured immediately after the application of the test load on the specimen

3.2
creep
strain under constant load obtained in defined conditions of temperature and relative humidity

3.2.1
total creep
strain measured under constant load in defined conditions of temperature and relative humidity after subtracting initial and shrinkage strain

3.2.2
basic creep
strain measured under constant load in isothermal conditions and in the absence of moisture exchange between the specimen and the surrounding environment

3.2.3
drying creep
difference between total and basic creep

3.3
shrinkage strain
strain of specimens determined in accordance with EN 12390-16

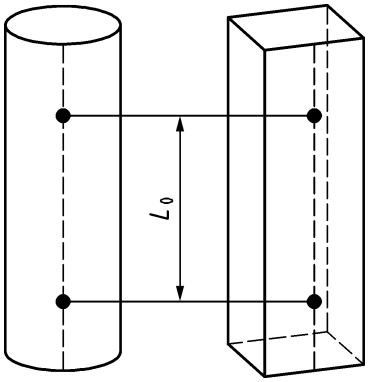
3.4
total strain:
strain measured during the test

Note 1 to entry: This strain is the sum of initial strain, creep and shrinkage.

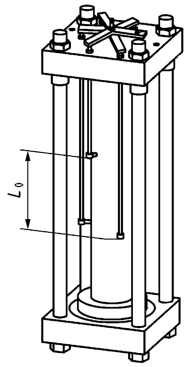
3.5
gauge length
L_0
base length
length used as reference for strain measurement

Note 1 to entry: Gauge length may be a straight line laying on the lateral surface of the specimen and parallel to the principal axis or between two planes.

3.6
measurement points
positions along a straight line laying on the lateral surface of the specimen and parallel to the principal axis (see Figure 1 a)) or in two planes (see Figure 1 b))



a) Measurement points in a line parallel to principal axis



b) Measurement points in two planes

Key
L_0 Gauge length

Figure 1 — Measurement points

4 Principle

Test specimens are subject to changes in length when subjected to a constant compressive load in defined conditions of temperature and relative humidity.

5 Apparatus

5.1 Loading frame

The loading frame shall be sufficiently rigid to ensure uniform loading of the specimen(s) and capable of applying and maintaining the required load to within ± 3 % on the specimen or group of specimens for the duration of the test, irrespective of any change in the dimension of the specimen(s).

NOTE 1 An example of a schematic diagram of a loading frame with 3 specimens operated by a hydraulic arrangement for the measurement of total or basic creep is given in Figure 2. Similar arrangements can also be used for a spring-loaded system in which only the system of loading will be different.

Load shall be measured with a maximum permissible error of ± 2 %.

The flatness tolerance for any plates or platens shall be 0,05 mm for the area in contact with the specimen.

NOTE 2 For the purpose of this document, flatness can be assessed by the measurement of straightness in four positions (see EN 12390-1:2012, Annex B).

A maximum of 3 specimens may be stacked for simultaneous loading in a single loading frame.