SLOVENSKI STANDARD
SIST EN 12390-2:2019

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SIST EN 12390-2:2009

Preskušanje strjenega betona - 2. del: Izdelava in nega vzorcev za preskus trdnosti

Testing hardened concrete - Part 2: Making and curing specimens for strength tests

Prüfung von Festbeton - Teil 2: Herstellung und Lagerung von Probekörpern für Festigkeitsprüfungen

Essai pour béton durci - Partie 2 : Confection et conservation des éprouvettes pour essais de résistance

Ta slovenski standard je istoveten z: **EN 12390-2:2019**

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 2: Making and curing specimens for strength tests

Essais pour béton durci - Partie 2 : Confection et conservation des éprouvettes pour essais de résistance

Prüfung von Festbeton - Teil 2: Herstellung und Lagerung von Probekörpern für Festigkeitsprüfungen

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

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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 12390-2:2019) 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of an identical text or by endorsement, at the latest by December 2019, and conflicting national standards shall be withdrawn at the latest by December 2019.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 12390-2:2009.

The compaction of specimens in the moulds using hand tamping, vibrating table, or internal (poker) vibrator are accepted as equivalent. However, it was found that the use of an internal vibrator to compact specimens of air entrained fresh concrete should only be done with caution, if loss of entrained air is to be avoided.

Curing specimens in a closely regulated humidity chamber is recognized as being equivalent to curing in water.

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).*

This edition includes the following significant technical changes with respect to EN 12390-2:2009:

a) editorial revision;

b) reference to common apparatus and specification given in EN 12350-1.

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 methods for making and curing test specimens for strength tests. It covers the preparation and filling of moulds, compaction of the concrete, levelling the surface, curing of test specimens and transporting test specimens.

NOTE This document can be used for the making and curing of specimens for other test methods.

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 206, *Concrete — Specification, performance, production and conformity*

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 Common apparatus

The apparatus listed below for the execution of this test method shall be in accordance with the specification given EN 12350-1 and EN 12390-1 as specified below;

4.1.1 Moulds, conforming to EN 12390-1.

4.1.2 Filling frame (optional).

Filling of the moulds may be simplified by using a filling frame fitted tightly to the mould.

4.1.3 Means of compacting the concrete (one of the following):

a) internal (poker) vibrator;

b) vibrating table;

c) compacting rod;

d) compacting bar.

4.1.4 Scoop.

4.1.5 Trowel or float.

4.1.6 Remixing container or tray.

4.1.7 Shovel.

4.1.8 Non-reactive mould release material.

4.1.9 Mallet.

5 Sampling

The sample shall be taken in accordance with EN 12350-1.

The sample shall be re-mixed, using the remixing container or tray and shovel, before filling the moulds.

NOTE Where specimens are to be manufactured away from the sampling location, they may be transported to the place of manufacture provided the sample is protected from dehydration and remains capable of being re-mixed.

6 Procedures

6.1 Preparation and filling of the moulds

6.1.1 Where necessary, before filling the mould, the inner surface of the mould should be covered with a thin film non-reactive release material to prevent the concrete from adhering to the mould

6.1.2 Depending on the consistence of the concrete, the height of the mould and the method of compaction, moulds shall be filled in as many layers as necessary to achieve full compaction. In the case of self-compacting concrete, the mould shall be filled in one operation and no compaction shall be applied during filling or after the mould is filled.

6.1.3 If a filling frame is used, the amount of concrete used to fill the mould shall be such that a layer of concrete remains in the filling frame after compaction. The thickness of this layer shall be 10 % to 20 % of the height of the test specimen.

6.2 Compaction of the concrete

6.2.1 General

The concrete shall be compacted immediately after placing in the moulds in such a way as to produce full compaction of the concrete with neither excessive segregation nor laitance. Each layer shall be compacted by using one of the methods described in 6.2.2 and 6.2.3.

NOTE Full compaction is achieved using mechanical vibration, when there is no further appearance of large air bubbles on the surface of the concrete and the surface becomes relatively smooth with a glazed appearance, without excessive segregation.

Further guidance on methods of compaction for concretes having different consistencies or cast in different sizes or types of moulds, may be given in provisions valid in the place of use of the concrete.

6.2.2 Mechanical vibration

6.2.2.1 Compacting with internal vibrator

Apply the vibration for the minimum duration necessary to achieve full compaction of the concrete. Avoid over-vibration, which may cause loss of entrained air.

Care should be taken not to damage the mould. The vibrator should be vertical and not allowed to touch the bottom or sides of the mould. The use of a filling frame is recommended.

NOTE 1 Laboratory tests have shown that great care is needed if loss of entrained air is to be avoided when using an internal vibrator.

NOTE 2 When compacting prismatic specimens, the internal vibrator is inserted in at least three positions evenly distributed over the length of the specimen.

6.2.2.2 Compacting with vibrating table

Apply the vibration for the minimum duration necessary to achieve full compaction of the concrete. The mould should preferably be attached to, or firmly held against the table. Avoid over-vibration, which may cause loss of entrained air.

6.2.3 Compacting by hand with compacting rod or bar

Distribute the strokes of the compacting rod, or bar, in a uniform manner over the cross-section of the mould. Ensure that the compacting rod, or bar, does not forcibly strike the bottom of the mould when compacting the first layer, nor penetrate significantly any previous layer. Subject the concrete to a sufficient number of strokes per layer, typically 25 for concretes having a consistence equivalent to slump classes S1 and S2 according to EN 206, in order to remove pockets of entrapped air but not the entrained air. After compaction of each layer, tap the sides of the mould smartly with the mallet until large bubbles of air cease to appear on the surface and depressions left by the compacting rod or bar, are removed.

6.3 Surface levelling

6.3.1 If a filling frame is used, remove it immediately after compaction is completed.

6.3.2 Remove the excess concrete above the upper edge of the mould using the trowel and carefully level the surface.

6.4 Marking

6.4.1 The test specimens shall be marked clearly and indelibly, without damaging the specimen.

6.4.2 Records shall be kept to ensure the traceability of the specimen from sampling to testing.

6.5 Curing of test specimens

6.5.1 At the place of storage, leave the test specimens in the mould for at least 16 h, but not longer than 3 days, at a temperature of (20 ± 5) °C (or (25 ± 5) °C in hot climates), protected against shock, vibration and dehydration.

NOTE As long as the concrete remains capable of being remixed, test specimens can be transported from the place of manufacture to the place of storage provided they are protected against dehydration.

If necessary, removal from the mould may be done before 16 h in special cases e.g. rapid hardening concrete, early testing.

6.5.2 After removal from the mould, cure the test specimens until tested in accordance with the procedure given in the relevant standard, in water at a temperature of (20 ± 2) °C, or in chamber at (20 ± 2) °C and relative humidity ≥ 95 %.

6.5.3 Forms of curing differing from those in 6.5.2 may be factorized to the methods described in 6.5.2.