

## **Assessment of in-situ compressive strength in structures and precast concrete components**

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## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN 13791:2007 sisaldab Euroopa standardi EN 13791:2007 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 28.02.2007 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN 13791:2007 consists of the English text of the European standard EN 13791:2007.</p> <p>This document is endorsed on 28.02.2007 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p><b>Käsitlusala:</b></p> <p>This European Standard:- gives methods and procedures for the assessment of the in-situ compressive strength of concrete in structures and precast concrete components; - provides principles and guidance for establishing the relationships between test results from indirect test methods and the in-situ core strength; - provides guidance for the assessment of the in-situ concrete compressive strength in structures or precast concrete components by indirect or combined methods</p>	<p><b>Scope:</b></p> <p>This European Standard:- gives methods and procedures for the assessment of the in-situ compressive strength of concrete in structures and precast concrete components; - provides principles and guidance for establishing the relationships between test results from indirect test methods and the in-situ core strength; - provides guidance for the assessment of the in-situ concrete compressive strength in structures or precast concrete components by indirect or combined methods</p>
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ICS 91.080.30

Võtmesõnad:

ICS 91.080.40

English Version

## Assessment of in-situ compressive strength in structures and precast concrete components

Evaluation de la résistance à la compression du béton en place dans les structures et les éléments préfabriqués

Bewertung der Druckfestigkeit von Beton in Bauwerken oder in Bauwerksteilen

This European Standard was approved by CEN on 10 November 2006.

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## Foreword

This document (EN 13791:2007) 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 July 2007, and conflicting national standards shall be withdrawn at the latest by July 2007.

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 United Kingdom.

## Introduction

This European Standard provides techniques for estimating in-situ compressive strength in concrete structures and precast concrete components. Testing in-situ strength takes into account the effects of both the materials and execution (compaction, curing, etc.).

These tests do not replace concrete testing according to EN 206-1.

EN 206-1 refers to the guidance of this standard for assessing the strength in structures and precast concrete components.

The following examples illustrate where this estimate of in-situ strength of concrete may be required:

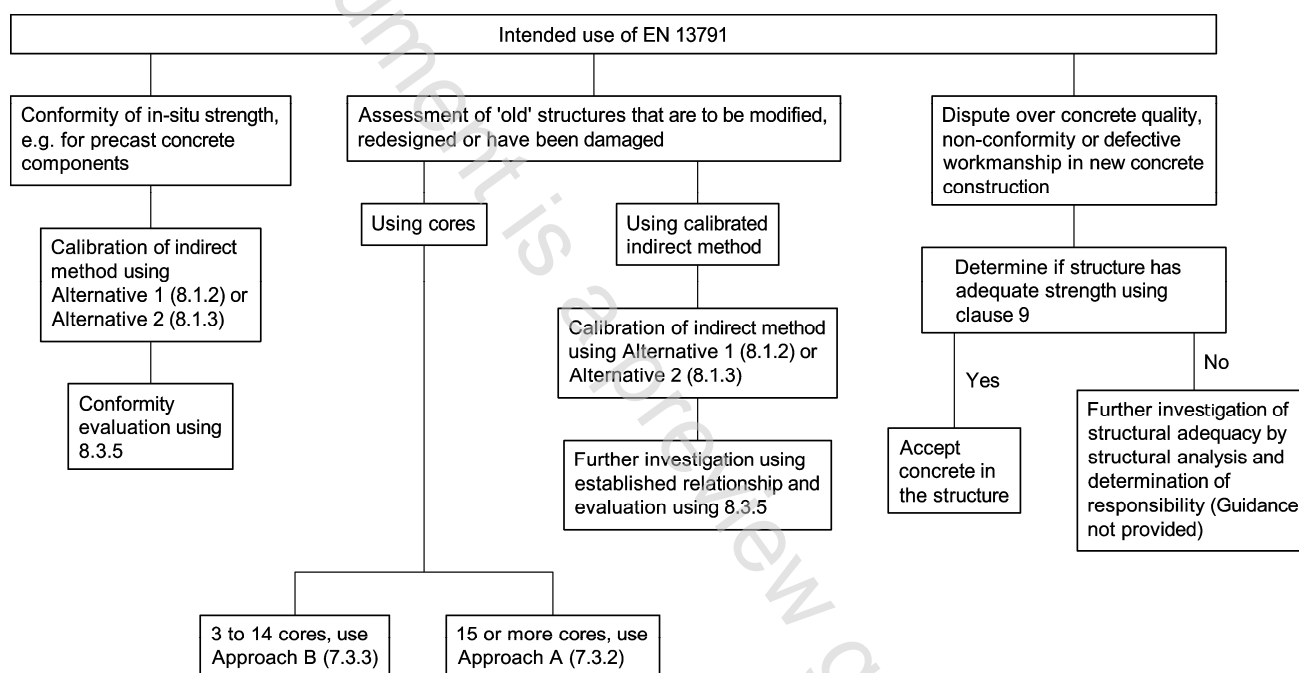
- when an existing structure is to be modified or redesigned;
- to assess structural adequacy when doubt arises about the compressive strength in the structure due to defective workmanship, deterioration of concrete due to fire or other causes;
- when an assessment of the in-situ concrete strength is needed during construction;
- to assess structural adequacy in the case of non-conformity of the compressive strength obtained from standard test specimens;
- assessment of conformity of the in-situ concrete compressive strength when specified in a specification or product standard.

Where identified in this standard, national provisions are permitted or required.

An outline of the procedures for these different uses of this standard is given in Flowchart 1.

For specific production conditions and constituent materials, development of economic design where permitted by national provisions may be possible through the assessing the partial safety factor,  $\gamma_c$  from knowledge of the in-situ compressive strength and the strength of standard test specimens.

When assessing compressive strengths in cases other than checking the quality of the concrete or the workmanship during execution or before accepting the structure for use, the appropriate reduction in the partial safety factor should be determined on a case-by-case basis according to national provisions.



Flowchart 1



## 1 Scope

This European Standard:

- gives methods and procedures for the assessment of the in-situ compressive strength of concrete in structures and precast concrete components;
- provides principles and guidance for establishing the relationships between test results from indirect test methods and the in-situ core strength;
- provides guidance for the assessment of the in-situ concrete compressive strength in structures or precast concrete components by indirect or combined methods.

This European Standard does not include the following cases:

- where indirect methods are used without correlation to core strength;
- assessment based on cores less than 50 mm in diameter;
- assessment based on less than 3 cores;
- use of microcores.

NOTE In these cases provisions valid in place of use apply.

This European Standard is not for the assessment of conformity of concrete compressive strength in accordance with EN 206-1 or EN 13369 except as indicated in EN 206-1:2000, 5.5.1.2 or 8.4.

## 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 206-1:2000, *Concrete – Part 1: Specification, performance, production and conformity*

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

EN 12504-2, *Testing concrete in structures – Part 2: Non-destructive testing – Determination of rebound number*

EN 12504-3, *Testing concrete in structures – Part 3: Determination of pull-out force*

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 206-1:2000 and the following apply.

#### 3.1

##### **standard compressive strength**

compressive strength determined on standard test specimens (cubes or cylinders) which are sampled, made, cured and tested in accordance with EN 12350-1, EN 12390-2 and EN 12390-3

#### 3.2

##### **core compressive strength**

compressive strength of a core determined in accordance with EN 12504-1

#### 3.3

##### **in-situ compressive strength**

strength in a structural element or precast concrete components expressed in terms of the equivalent strength of a standard cube or cylinder specimen

#### 3.4

##### **characteristic in-situ compressive strength**

value of in-situ compressive strength below which 5 % of the population of all possible strength determinations of the volume of concrete under consideration are expected to fall

NOTE This population is unlikely to be the same population used to determine the conformity of the fresh concrete in EN 206-1.

#### 3.5

##### **test location**

limited area selected for measurements used to estimate one test result, which is to be used in the estimation of in-situ compressive strength

#### 3.6

##### **test region**

one or several structural elements, or precast concrete components assumed or known to be from the same population. A test region contains several test locations