Irish Standard
I.S. EN 12390-12:2020

Testing hardened concrete - Part 12: Determination of the carbonation resistance of concrete - Accelerated carbonation method

I.S. EN 12390-12:2020

Incorporating amendments/corrigenda/National Annexes issued since publication:

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National Foreword

I.S. EN 12390-12:2020 is the adopted Irish version of the European Document EN 12390-12:2020, Testing hardened concrete - Part 12: Determination of the carbonation resistance of concrete - Accelerated carbonation method

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12390-12

January 2020

ICS 91.100.30

English Version

Testing hardened concrete - Part 12: Determination of the carbonation resistance of concrete - Accelerated carbonation method

Essais pour béton durci - Partie 12 : Détermination de la résistance à la carbonatation du béton - Méthode de la carbonatation accélérée

Prüfung von Festbeton - Teil 12: Bestimmung des Karbonatisierungswiderstandes von Beton - Beschleunigtes Karbonatisierungsverfahren

This European Standard was approved by CEN on 4 November 2019.

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

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European foreword

This document (EN 12390-12:2020) 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of an identical text or by endorsement, at the latest by July 2020, and conflicting national standards shall be withdrawn at the latest by July 2020.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.

The series EN 12390, *Testing hardened concrete*, includes 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 9: Freeze–thaw resistance with de-icing salts - Scaling (Technical Specification)*

— *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 13: Determination of the 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*

— *Part 18: Determination of the chloride migration coefficient (in preparation)*

— *Part uu: Determination of resistivity*[1]

— *Part zz: Determination of the carbonation rate of concrete under test conditions that accelerate carbonation*[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, 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 Under development.

Introduction

Reinforced concrete structures need to be durable to ensure that the intended working life is achieved. The resistance to corrosion of reinforcement induced by carbonation plays a significant role in a structure's serviceability and consequently carbonation behaviour of concrete is an important property to measure. This document specifies an accelerated test method that could be applied to cast test specimens to assess the carbonation behaviour of a concrete mix.

1 Scope

This document quantifies the carbonation resistance of concrete using test conditions that accelerate the rate of carbonation. After a period of preconditioning, the test is carried out under controlled exposure conditions using an increased level of carbon dioxide.

NOTE The test performed under reference conditions takes a minimum of 112 days comprising a minimum age of the specimen prior to curing under water of 28 days, a minimum preconditioning period of 14 days and an exposure period to increased carbon dioxide levels of 70 days.

This procedure is not a method for the determination of carbonation depths in existing concrete structures.

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 12350-2, *Testing fresh concrete — Part 2: Slump test*

EN 12350-3, *Testing fresh concrete — Part 3: Vebe test*

EN 12350-4, *Testing fresh concrete — Part 4: Degree of compactability*

EN 12350-5, *Testing fresh concrete — Part 5: Flow table test*

EN 12390-2, *Testing hardened concrete — Part 2: Making and curing specimens for strength tests*

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 http://www.iso.org/obp

3.1
carbonation rate
average rate at which the carbonation front penetrates concrete expressed as mm/√(days)

Note 1 to entry: The carbonation rate will vary depending upon the test curing, preconditioning or exposure conditions and therefore any carbonation rate has to be qualified by the conditions under which it was obtained. The abbreviation 'K_{AC}' is the carbonation rate under the test conditions specified in this document.

3.2
depth of carbonation
depth as measured using a phenolphthalein solution or an alternative indicator that results in a colour change in the range of pH 8 to pH 11 on the freshly-split concrete surface

3.3
effective time
time in days spent in the storage chamber with the concrete specimens continually exposed to carbon dioxide