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National Standards Authority of Ireland

STANDARD RECOMMENDATION

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ICS 91.100.30

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TESTING HARDENED CONCRETE - PART 10: DETERMINATION OF THE RELATIVE CARBONATION RESISTANCE OF CONCRETE

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TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

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CEN/TS 12390-10

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English Version

Testing hardened concrete - Part 10: Determination of the relative carbonation resistance of concrete

Essai pour béton durci - Partie 10: Détermination de la résistance relative à la carbonatation du béton

Prüfung von Festbeton - Teil 10: Bestimmung des relativen Karbonatisierungswiderstandes von Beton

This Technical Specification (CEN/TS) was approved by CEN on 9 June 2007 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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Foreword

This document (CEN/TS 12390-10:2007) has been prepared by Technical Committee CEN/TC 104 “Concrete and related products”, the secretariat of which is held by DIN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This test method has been prepared by CEN TC 51/WG12/TG5

This method is one of a series on testing hardened concrete comprising:

EN 12390 Testing hardened concrete

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 – Scaling[1]

Part 10: Determination of the relative carbonation resistance of concrete [1]

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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 the United Kingdom.

[1] These documents are published as CEN/TC for the time being.

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1 Scope

This is a method for evaluating the carbonation resistance of concrete mixes by comparison with a concrete mix with known carbonation resistance. It is not a method for the determination of carbonation depths in existing concrete structures. The test is carried out under controlled exposure conditions using natural levels of carbon dioxide or under natural conditions protected from direct rainfall.

If the carbonation depth of the unknown mix is equal or less than the known mix, it is be assumed that the risk of reinforcement corrosion for the new mix is equivalent to the known mix (with the same cover required for the known mix). The “reference” concrete may be any concrete with known performance in the intended place of use (environment).

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 932-1, *Tests for general properties of aggregates – Part 1: Methods for sampling*

EN 1097-5, *Tests for mechanical and physical properties of aggregates – Part 5: Determination of the water content by drying in a ventilated oven*

EN 1097-6, *Tests for mechanical and physical properties of aggregates – Part 6: Determination of particle density and water absorption*

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 12390-1, *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*

3 Principle

A concrete mix with known performance under classified exposure conditions in the place of use is chosen as the reference concrete.

From previous information or by trial mixes on the concrete under investigation, determine the mix proportions to give an equal compressive strength as the reference concrete. Two prisms and at least six compression test specimens of both reference concrete and concrete under investigation are manufactured with these mix proportions. In addition two concretes are manufactured using an 8% higher and 8% lower cement content, giving a total of 12 prisms and (at least) 36 compression test specimens. All prisms are sealed-cured until the concrete has reached 50% of the reference strength. The prisms are then exposed to one of the two storage conditions. At defined periods up to at least two years, slices are split from the prisms and the freshly split

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