

BS 1881-210:2013



BSI Standards Publication

# Testing hardened concrete

## Part 210: Determination of the potential carbonation resistance of concrete – Accelerated carbonation method

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 14, an inside back cover and a back cover.

## Foreword

### Publishing information

This part of BS 1881 is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 June 2013. It was prepared by Technical Committee B/517, *Concrete and related products*. A list of organizations represented on this committee can be obtained on request to its secretary.

### Information about this document

This part of BS 1881 is based on prTS12390-12, which received a negative vote. Consequently the CEN work item has been deleted. As this standard reflected UK experience with accelerated carbonation testing, it has been published as a British Standard with modifications to eliminate the various options.

### Relationship with other publications

BS 1881 is published in the following parts:

- BS 1881-113, *Method for making and curing no-fines cubes*;
- BS 1881-119, *Method for determination of compressive strength using portions of beams broken in flexure (equivalent cube method)*;
- BS 1881-122, *Method for determination of water absorption*;
- BS 1881-124, *Methods for analysis of hardened concrete*;
- BS 1881-125, *Method for mixing and sampling fresh concrete in the laboratory*;
- BS 1881-128, *Method for analysis of fresh concrete*;
- BS 1881-129, *Method for the determination of density of partially compacted semi-dry fresh concrete*;
- BS 1881-130, *Method for temperature matched curing of concrete specimens*;
- BS 1881-131, *Methods for testing cement in a reference concrete*;
- BS 1881-201, *Guide to the use of non-destructive methods of test for hardened concrete*;
- BS 1881-204, *Recommendations on the use of electromagnetic covermeters*;
- BS 1881-206, *Recommendations for determination of strain in concrete*;
- BS 1881-207, *Recommendations for the assessment of concrete strength by near-to-surface tests*;
- BS 1881-208, *Recommendations for the initial surface absorption of concrete*;
- BS 1881-209, *Recommendations for the measurement of dynamic modulus of elasticity of concrete*;
- DD 216, *Determination of chloride content of fresh concrete*.

### Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is "shall".

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

**Contractual and legal considerations**

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**



## Introduction

Ferrous steel reinforced concrete structures need to be durable to ensure that the intended working life is achieved. The corrosion of reinforcement induced by carbonation can play a significant role in a structure's serviceability and consequently, carbonation resistance of concrete is an important property to measure.

## 1 Scope

This part of BS 1881 describes a method for ranking the potential carbonation resistance of concrete using an accelerated carbonation test.

*NOTE 1 This test is an accelerated test because there is exposure to much higher than atmospheric levels of CO<sub>2</sub> and is at a relative humidity conducive to a maximum rate of carbonation.*

*NOTE 2 The test under reference conditions takes a minimum of 112 days comprising a minimum age of the specimen prior to conditioning of 28 days, a minimum conditioning period of 14 days and a minimum exposure to increased CO<sub>2</sub> levels of 70 days.*

*NOTE 3 The use of such test data in service-life modelling is still a matter of much academic debate and at present there is no consensus on an appropriate model.*

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

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS EN 12350-2, *Testing fresh concrete – Part 2: Slump test*

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

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

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

BS EN 12390-1, *Testing hardened concrete – Part 1: Shape, dimensions and other requirements for specimens and moulds*

BS EN 12390-2:2009, *Testing hardened concrete – Part 2: Making and curing specimens for strength tests*

BS EN 12390-3, *Testing hardened concrete – Part 3: Compressive strength of test specimens*

## 3 Terms and definitions

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

### 3.1 depth of carbonation

depth measured using a phenolphthalein solution sprayed on the freshly-split concrete surface