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Testing concrete

Part 211: Procedure and terminology
for the petrographic examination of
hardened concrete

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Summary of pages

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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 November 2016. It was prepared by Subcommittee B/517/1, *Concrete production and testing*, under the authority of Technical Committee B/517, *Concrete*. A list of organizations represented on this committee can be obtained on request to its secretary.

Information about this document

The Applied Petrography Group (APG) set up a working party to develop a guidance document relating to the petrographic examination of hardened concrete. This guidance document was published on the Applied Petrography Group website as *APG Special Report 2* [1].

Further discussions around this document between members of the APG and other interested persons in the UK and abroad has led to the development of this part of BS 1881.

Use of this document

It has been assumed in the preparation of this part of BS 1881 that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its methods are expressed as a set of instructions, a description, or 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.

Requirements in this standard are drafted in accordance with *Rules for the structure and drafting of UK standards*, subclause J.1.1, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

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

BS 1881-211 gives a method for the petrographic examination of hardened concrete.

When applied to concrete samples, petrographic examination refers to a detailed study primarily carried out by visual and optical microscopy and the documentation of observations derived from that examination. The documented report might contain observations only, or could also include conclusions and recommendations for those requesting the study.

It is not intended that such an examination would form part of the routine assessment of the suitability of hardened concrete products. However, the procedures can provide unique and valuable information regarding the ingredients, properties and condition of hardened concrete samples. Such findings can be used in isolation, or as part of a broader programme of investigative studies.

In all cases, the procedures outlined are intended to be performed by an appropriately qualified concrete petrographer or, where specialist support procedures are used, an appropriately qualified materials technologist.

In certain cases, other analytical techniques, including but not limited to, chemical analysis, scanning electron microscopy and X-ray diffraction, might be desirable to augment the petrographical examination.

1 Scope

This British Standard describes procedures and terminology for the examination of hardened concrete and mortar. The procedures are intended to be performed by an appropriately qualified or experienced concrete petrographer.

The principal application of the method described requires the use of a polarizing petrological microscope for the examination of concretes containing Portland and other cements. The petrographic procedures outlined are applicable to the examination of samples of all types of hardened hydraulic cement-based materials, including concrete, mortar, grout, cement and gypsum-based plaster, render, terrazzo, and similar materials.

NOTE In this British Standard, the material for examination is designated as "concrete", even though the commentary is also applicable to the other mixtures, unless the reference specifically excludes a material other than concrete.

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 480-11, *Admixtures for concrete, mortar and grout — Test methods — Part 11: Determination of air void characteristics in hardened concrete*

3 Terms and definitions

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

3.1 macroscopic examination

initial examination of the sample in hand specimen with the aid of a hand lens or stereomicroscope in order to determine the general features of the concrete