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cd

Testing concrete —

Part 128. Methods for analysis of fresh concrete

ICS 91.100.30

Committees responsible for this British Standard

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Association of Lightweight Aggregate Manufacturers
British Aggregate Construction Materials Industries
British Cement Association
British Civil Engineering Test Equipment Manufacturers' Association
British Precast Concrete Federation Ltd
Building Employer's Confederation
Cement Admixtures Association
Cementitious Slag Makers' Association
Chartered Institution of Water and Environmental Management
County Surveyors' Society
Department of the Environment
Department of the Environment (Building Research Establishment)
Federation of Piling Specialists
Institute of Concrete Technology
Institution of Structural Engineers
National House-building Council
Quality Ash Association
Sand and Gravel Association Limited
Society of Chemical Industry

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Foreword

This Part of BS 1881 has been prepared under the direction of Subcommittee B/517/1, Concrete production and testing. It supersedes DD 83 : 1983, which is withdrawn. Three of the five different methods for analysis of fresh concrete described in DD 83 : 1983 which are in common use have been retained in this standard.

All determine the total cement content, but in only two methods can further tests be made to determine the proportions of pulverized-fuel ash (pfa) or ground granulated blastfurnace slag (ggbs) in blended cements. Water content may be obtained by calculation, or more directly on separate samples, by drying them in a microwave oven.

If the results are used to provide a water/cement ratio, it should be realized that the tolerance on accuracy will depend on the combination of the precision data for each test for cement and water contents.

Each test relies for accuracy on calibration using the materials in the concrete mix. The tests are not intended to be used for checks on random samples of concretes with unknown constituents. Although the tests refer to British Standards for sieve sizes, they will still be applicable when European Standards are adopted, however, the size limit between coarse and fine aggregate will change.

Fine aggregate is commonly known as sand in the UK and this term will be used throughout the text of this standard.

Changes to other European Standards for cements are unlikely to affect the tests.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 26, an inside back cover and a back cover.

Method

1 Scope

This Part of BS 1881 describes the sampling procedures, treatment of samples and test methods to be used on a sample of fresh concrete to determine the cement content, the aggregate content and the water content.

All the procedures described apply to concretes made with Portland cements. Some of the methods can also be used to determine the proportions of pulverized-fuel ash (pfa) and ground granulated blastfurnace slag (ggbs).

2 References

2.1 Normative references

This Part of BS 1881 incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to, or revisions of the cited publications apply to this Part of BS 1881 only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This Part of BS 1881 refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this Part of BS 1881 the definitions in BS 6100 : Sections **6.2** and **6.3** apply, together with the following:

3.1 coarse aggregate

Aggregate retained on a 5 mm test sieve.

3.2 sand

Aggregate passing a 5 mm test sieve.

3.3 batch

Quantity of concrete mixed in one cycle of operations of a batch mixer, or the quantity discharged during 1 min from a continuous mixer, or where this is the greater volume, the quantity conveyed in a truck mixer.

3.4 concrete sample

Sample of concrete of mass sufficient to allow test samples to be extracted.

3.5 test sample

Portion of the concrete sample that is tested.

4 Sampling

4.1 General

For the test results to be valid, it is important that the procedure by which the initial concrete sample is taken from the concrete is as given in this standard. Any deviations from such procedure shall be reported.

4.2 Apparatus

4.2.1 *Scoop*, of galvanized steel or other suitable non-corrodible material, that when filled will contain about 2.5 kg of concrete.

4.2.2 *Sample containers*, made of non-corrodible metal or plastics of appropriate size, to contain the mass of concrete given in table 1.

4.3 Procedure

Using the method described in BS 1881 : Part 101, take the required number of scoopfuls of concrete necessary to provide concrete samples of appropriate mass shown in table 1 and transfer them to clean, dry containers (**4.2.2**).

Table 1. Concrete sample and test sample masses

Method of analysis	Mass of test samples kg
Buoyancy	4 ± 0.5
Constant volume (RAM)	8 ± 1
Pressure filter (Sandberg)	3 ± 0.5
Water content	2.5 ± 0.5

4.4 Certificate of sampling

Each sample shall be accompanied by a certificate of sampling, signed by the person responsible for the sampling, confirming that the sample was taken in accordance with the requirements of BS 1881 : Part 101.

5 Methods of analysis

5.1 General

Each of the three methods of analysis described in this British Standard have been used under site conditions for more than ten years and the test results have been found to be of value in the determination of the composition of fresh concrete.

Each test relies for accuracy on a calibration using the same materials as those in the concrete mix. In order to minimize the risk of an incorrect result due to operator error or apparatus malfunction, all tests shall be carried out twice. Calibrations shall be performed for each combination of constituent materials used and whenever significant changes to the materials occur, in particular the content of material finer than 150 μm.

The flow chart in figure 1 provides guidance on the appropriate method of analysis to be used for the determination of the cement, aggregate and water content.