

Pulverized-fuel ash

Part 1. Specification for pulverized-fuel ash for use with Portland cement

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/516, Cement and lime, to Subcommittee B/516/101, Pozzolanas, upon which the following bodies were represented:

- British Aggregate Construction Materials Industries
- British Cement Association
- British Precast Concrete Federation
- British Ready Mixed Concrete Association
- Cementitious Slag Makers' Association
- Department of the Environment (Building Research Establishment)
- Department of the Environment (Property Services Agency)
- Department of Transport
- Electricity Association
- Federation of Civil Engineering Contractors
- Quality Ash Association

This British Standard, having been prepared under the direction of the Technical Committee B/516, was published under the authority of the Standards Board and comes into effect on 15 June 1993

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The following BSI references relate to the work on this standard:
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Amendments issued since publication

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Amendment No. 1
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Portland cement

NOTE. This amendment enables processes to be used to improve the properties of pfa that were not possible under the original wording.

Revised text

Clause 1 Scope

At the end of the paragraph, insert the following.

NOTE. Requirements are specified as characteristic values except for loss on ignition for which an absolute upper limit is given.

AMD 8850/November 1995

Clause 3.4 Hard coal

In line 1 delete 'Coal with' and substitute 'Coal blend giving'.

AMD 8850/November 1995

Clause 4 Composition, production and processing

Delete paragraph 3 and substitute the following.

Pfa conforming to this specification shall be produced by processing the run-of-station pfa in such a way that it meets the requirements specified in clauses 5 to 12 and does not contribute materials that have a deleterious effect on the properties of fresh or hardened concrete or give rise to a health or safety risk.

AMD 8850/November 1995

Clause 12.2 Loss on ignition

Delete the text and substitute the following.

The loss on ignition shall have a maximum limit value of 7.0 % (*m/m*) when determined in accordance with clause 7 of BS EN 196-2 : 1995 but using an ignition time of 1 h.

AMD 8850/November 1995

Table G.3 Major defects

In line 9 delete 'Loss on ignition' from column 1 and the corresponding value from column 2.

AMD 8850/November 1995

List of references

In footnote ⁹⁾ delete 'Framewood Road, Wexham, Slough SL3 6PJ.', and substitute '3 Eatongate, 112 Windsor Road, Slough SL1 2JA.'

AMD 8850/November 1995

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Foreword

This British Standard has been revised under the authority of the Technical Committee B/516, Cement and lime. It supersedes BS 3892 : Part 1 : 1982 which is withdrawn. This standard takes account of the European Prestandard ENV 197-1 even though pulverized-fuel ash (pfa) is not included as a separate material in that standard. ENV 197-1 introduces the principle of conformity criteria by continuous inspection during manufacture for cements and this principle has been included in this revision in order that users may be provided with a similar system for the purpose of demonstrating compliance. Whenever possible in this revision, test methods from the European Standard EN 196 have been adopted.

Pulverized-fuel ash is extracted from the flue gases of furnaces fired by pulverized bituminous or other hard coal. It is a fine material, predominantly of spherical glassy particles, the bulk of which passes a 45 μm mesh sieve. To utilize its water reducing and pozzolanic properties, the finer fraction has been developed for specific use as a cementitious component of concrete with requirements additional to those of EN 450. Processing to obtain this finer fraction is referred to in EN 450. General guidance on the use of pfa is given in annex A.

Pulverized-fuel ash has been used in composite cements conforming to BS 6588 and BS 6610 and as a cementitious component of concrete for many years. Guidance on its direct use in concrete can be found in BS 5328 : Part 1, BS 6543 and BS 8110 : Part 1. Guidance on its use in mortar can be found in BRE Digest 362[1].

Information from the producer to aid the control of such uses is given in annex B of this standard.

The principal changes from the 1982 edition are as follows.

- a) A limit for chloride content has been introduced which has now to be declared on the certificate.
- b) Additional information on chemical composition is now available if requested at the time of ordering.
- c) The methods of sampling and testing, with the exception of those test methods in annexes C, D, E and F are now in accordance with EN 196.
- d) The requirements are specified as characteristic values and conformity is assessed by means of a statistical procedure for continuous inspection operated by the pfa producer (autocontrol). This includes the concept of major defects which are likely to reduce materially the usability of the pfa for its intended purpose. In addition, limits are given for acceptance inspection testing, to provide a means of assessing conformity at delivery.
- e) A requirement has been introduced for particle density based on the test in BS EN 196-6.
- f) Requirements have been introduced for initial setting time and soundness based on the tests in EN 196-3.
- g) A requirement has been introduced for calcium oxide content based on the test in EN 196-2.

h) The requirement has been removed for magnesium oxide as research has found no evidence of periclase in pfa from bituminous or other hard coals.

i) The test for the determination of pozzolanic activity index has been replaced by a requirement for strength factor.

j) Additional guidance on use, safety precautions and storage has been added.

It should be noted that BS 3892 : Part 2 contains the specifications for two grades of pfa of higher sieve residues for use in grouts for geotechnical purposes and other miscellaneous uses.

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