British Standard

BRITISH STANDARD

BS 2484:1985

Specification for

Straight concrete and clayware cable covers

UDC 692.782 [– 033.3 + – 033.65]:621.315.23

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Cement Gypsum Aggregates and Quarry Products Standards Committee (CAB/-) to Technical Committee CAB/13, upon which the following bodies were represented:

Association of Metropolitan Authorities
British Ceramic Research Association
British Precast Concrete Federation Ltd
British Standards Society
Cement Makers' Federation
Department of Energy, Electricity Division
Electricity Supply Industry in England and Wales
Institution of Civil Engineers
National Federation of Roofing Contractors
National Federation of Terrazzo-mosaic Specialists
North Wales Slate Quarries Association
Royal Institute of British Architects
Royal Institution of Chartered Surveyors

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Amendments issued since publication

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Contents

Foreword

This revision of this British Standard has been prepared under the direction of the Cement, Gypsum, Aggregates and Quarry Products Standards Committee. This revision supersedes BS 2484:1961, which is withdrawn.

In this revision, the earlier imperial measures, with their metric equivalents, have been replaced throughout by metric units. Radius covers are not now included in the scope of this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies requirements for straight cable covers that carry a warning of the presence of underground services, e.g. electricity, telephone, gas, oil, and are manufactured from clayware (i.e. burnt clay) or from reinforced or unreinforced concrete.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Materials

2.1 Concrete

2.1.1 *Cement.* The binder shall comprise one of the following:

a) hydraulic cement that is an active hydraulic binder formed by grinding clinker and complying with BS 12, BS 1370 or BS 4027;

b) hydraulic binder, manufactured by a controlled process in which Portland cement clinker or Portland cement is combined in specified proportions with a latent hydraulic binder consisting of pulverized-fuel ash or granulated blastfurnace slag, complying with BS 146, BS 4246 or BS 6588 according to the latent hydraulic binder used;

c) hydraulic binder, manufactured in the concrete mixer by combining Portland cement complying with BS 12 with a latent hydraulic binder consisting of pulverized-fuel ash complying with BS 3892-1 or ground granulated blastfurnace slag[1)] complying with the proportions and properties given in BS 146, BS 4246 or BS 6588 according to the latent hydraulic binder used.

2.1.2 *Aggregates.* The size of aggregates shall not exceed 10 mm nominal. They shall comply with the requirements of one of the following British Standards:

a) BS 882, except for the grading requirements;

NOTE The manufacturer may modify the gradings to suit his manufacturing process.

b) BS 1047;

c) BS 3797.

NOTE The size used should be appropriate to the sections of the cover.

2.1.3 *Water.* Mixing water for concrete shall be clean and free from harmful matter in such quantities as would affect the properties of the concrete in the plastic or hardened state.

NOTE See BS 3148 for test methods and notes on the suitability of waters for concrete.

2.1.4 *Pigments.* Any pigments used shall comply with the requirements of BS 1014.

2.1.5 *Admixtures.* Any admixtures used shall comply with the requirements of BS 5075.

The total chloride content of the concrete mix arising from the aggregate together with that from any admixtures and any other source shall not exceed the limits given in Table 1, expressed as a percentage relationship between chloride ion and mass of cement in the mix.

Table 1 — Maximum total chloride content

Type or use of concrete	Maximum total chloride content expressed as percentage of chloride ion by mass of cement
	%
Steam-cured structural concrete	0.1
Concrete made with cement complying with BS 4027	0.2
Concrete containing embedded metal and made with cement complying with BS 12, BS 146 or combinations with slag or pulverized-fuel ash	0.40 for 95 % of test results with no result greater than 0.50

NOTE Marine aggregates and some inland aggregates contain chlorides. Both should be selected carefully. Wherever possible, the total chloride content should be calculated from the mix proportions and the measured chloride content of each of the constituents.

2.1.6 *Type of reinforcement.* The reinforcement shall comply with the requirements of one of the following British Standards:

a) BS 4449;

b) BS 4461;

c) BS 4482;

d) BS 4483.

2.1.7 *Location of reinforcement.* The location of the reinforcement shall be as follows:

a) for covers of nominal width up to and including 180 mm, two bars arranged longitudinally, one placed $25\ ^{+5}_{-0}$ mm from each edge;

b) for covers of nominal width 230 mm and over, three bars arranged longitudinally, one with its axis within 5 mm of the centre line, the others $25\ ^{+5}_{-0}$ mm from each edge;

c) for covers of nominal length 455 mm, two bars transversely;

[1)] A British Standard for granulated blastfurnace slag is in preparation. Until its publication, granulated blastfurnace slag in accordance with Agrément Certificate 82/1023 is suitable.

d) for covers of nominal length 610 mm and over, three or more bars transversely.

Longitudinal reinforcement shall extend to within $25\,^{+5}_{-0}$ mm of each end of the cover.

NOTE Typical location of reinforcement is shown in Figure 1.

The reinforcement shall be held in position for casting by welding or tying and a minimum cover of 15 mm maintained.

2.1.8 *Concrete mix.* Concrete mixes shall be of a grade not less than C30 as specified in BS 5328.

2.1.9 *Manufacture.* The concrete, when placed, shall have a temperature of at least 5 °C and this temperature shall be maintained until the concrete is thoroughly hardened. Aggregates and moulds shall not be used if frozen.

NOTE It is permissible to heat aggregate and water, before mixing, to a temperature not exceeding 60 °C.

The concrete shall be fully compacted and the face exposed in the mould struck off level.

NOTE Tamping, vibration, hydraulic pressure or other efficient method is appropriate.

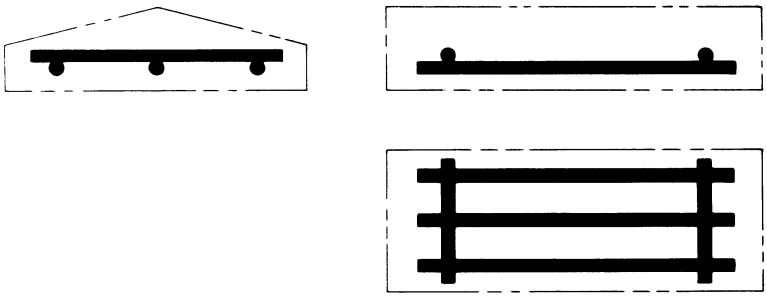
2.2 Clayware

Clayware covers shall be of burnt clay. They shall be free from cracks.

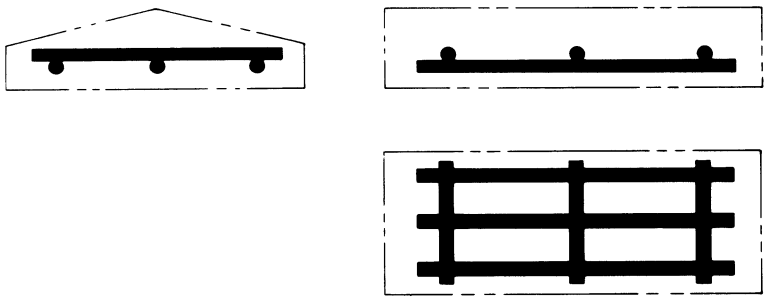
3 Shape and dimensions

3.1 Shape of cover

The underside of the cover shall be flat and the upper side shall be either flat or peaked. A concrete cover shall have one end concave, the other convex, to provide a concave/convex joint resisting lateral displacement. Clayware covers of any one pattern shall interlock laterally and, in addition, either vertically or longitudinally or both. Except for the interlocking features, the cover shall be rectangular in plan.



(a) For covers of nominal length 455 mm



(b) For covers of nominal length 610 mm and over

Figure 1 — Typical arrangement of reinforcing bars

3.2 Cover dimensions

The nominal dimensions of reinforced and unreinforced concrete covers shall be in accordance with Table 2 and Table 3 respectively.

The nominal dimensions of clayware covers shall be in accordance with Table 4.

Dimensions of concrete covers shall be subject to a tolerance of ± 4 mm on nominal length, width and thickness.

Dimensions of clayware covers shall be subject to a tolerance of $^{+0}_{-4}$ mm on nominal length, width and thickness.

Table 2 — Nominal dimensions of reinforced concrete covers

Length	Width	Thickness		
		Peaked type		Flat type
		To apex	At outer edges	
mm	mm	mm	mm	mm
455	115	50	25	40
455	150	50	25	40
455	180	65	40	50
455	230	65	40	50
455	255	65	40	50
610	455	65	40	50
762	380	65	40	50
914	150	65	40	50
914	180	65	40	50
914	230	65	40	50
914	255	65	40	50
914	280	65	40	50
914	305	65	40	50
914	330	65	40	50

Table 3 — Nominal dimensions and average breaking load of unreinforced concrete covers

Length	Width	Thickness			Average breaking load	
		Peaked type		Flat type	Peaked type	Flat type
		To apex	At outer edges			
mm	mm	mm	mm	mm	kg	kg
455	115	50	25	40	100	85
455	150	50	25	40	135	115
456 to 610	150	65	40	50	220	200
	180	65	40	50	260	235
	230	65	40	50	330	305
	255	65	40	50	365	335
	280	65	40	50	405	370
	305	65	40	50	445	405
	350	—	—	50	—	440

Table 4 — Nominal dimensions and average breaking load of clayware covers

Length	Width	Thickness			Average breaking load	
		Peaked type		Flat type	Peaked type	Flat type
		To apex	At outer edges			
mm	mm	mm	mm	mm	kg	kg
230	115	50	30	40	150	105
230	150	50	30	40	200	140
305	150	65	40	—	220	—
305	180	65	40	—	260	—
305	230	65	40	—	330	—
305	280	65	40	—	405	—
305	305	65	40	—	445	—

4 Performance

4.1 Impact strength

When tested by the method described in Appendix A and viewed with normal or corrected vision, reinforced concrete covers shall comply with either of the following:

a) in the first set of six samples, no cover shall break or show more than one crack across its full width; or

b) on testing the second set of six samples, no cover shall break or show more than one crack across its full width.

4.2 Transverse strength

When tested by the method described in Appendix B, unreinforced concrete covers and clayware covers shall withstand, without breaking, the loads given in Table 3 and Table 4, respectively.

5 Marking

5.1 The upper side of each cover shall be marked longitudinally by means of an impression or embossment $3\,^{+1}_{-0}$ mm deep with the words "DANGER" and the name of the service to be covered (e.g. "ELECTRICITY", "GAS", "OIL", "TELEPHONES").

NOTE It is permissible, on covers up to 230 mm long, to use the word "ELECTRIC" instead of "ELECTRICITY".

On peaked covers the word "DANGER" shall be impressed or embossed on one inclined face and the name of the service on the other.

The lettering shall be symmetrically spaced and of the following minimum height:

a) for covers of nominal width 150 mm or less: 20 mm;

b) for covers of nominal width greater than 150 mm: 40 mm.

5.2 Each cover shall carry also an impression or embossment of the manufacturer's name or identifying mark, together with the number and date of this British Standard, i.e. BS 2484:1985[2)].

[2)] Marking BS 2484:1985 on or in relation to a product is a claim by the manufacturer that the product has been manufactured to the requirements of the standard. The accuracy of such a claim is therefore solely the manufacturer's responsibility. Enquiries as to the availability of third party certification to support such claims should be addressed to the Director, Quality Assurance Division, BSI, PO Box 375, Milton Keynes MK14 6LO for certification marks administered by BSI or to the appropriate authority for other certification marks.

Appendix A Method of test for impact resistance of reinforced concrete covers

A.1 Apparatus

A.1.1 *Bed of dry sand,* of grading complying with the requirements for grading in BS 882. The bed is prepared on a solid floor and screeded to a thickness of 25 ± 2 mm.

A.1.2 *Tup of low carbon steel*, weighing, with guide rod, 4.5 kg ± 30 g and having a ball or hemispherical end 25 ± 0.2 mm in radius and a guide rod approximately 1 450 mm long and 20 mm in diameter.

A.1.3 *Test frame,* consisting of a box designed to accommodate the tup and to allow it to fall freely on to the cover from a height of 460 ± 2 mm.

NOTE An example of suitable apparatus is shown in Figure 2.

A.2 Procedure

A.2.1 Divide a group of 12 covers into two sets of six samples. If any in the first set breaks or shows more than one crack across its full width, test the six in the second set.

A.2.2 Place the cover the right way up on the bed and place the test frame (**A.1.3**) centrally over the cover.

A.2.3 Release the tup (**A.1.2**) so that it falls a vertical distance of 460 ± 2 mm on to the centre of the top surface of the cover.

A.2.4 Repeat the test on the same cover without moving it or rescreeding the sand bed (**A.1.1**).

A.2.5 With normal or corrected vision, inspect the upper surface of the cover for cracks. Rescreed the sand bed before testing another cover.

A.3 Test report

The test report shall include the following:

a) identification of the cover under test;

b) details of the test arrangements;

c) whether the cover under test breaks;

d) whether the cover under test shows any cracks across its full width.

Appendix B Method of test for transverse strength of unreinforced concrete and clayware covers

B.1 Apparatus

B.1.1 ***Transverse strength testing apparatus***

NOTE An example of a suitable apparatus is shown in Figure 3.

The test specimen is supported on the self-aligning bearers A and B. Bearer A is supported horizontally on two bearer screws C which carry hardened steel balls D concentric with the bearer. Bearer B is supported on one such bearer screw and ball. The load is applied through bearer E, also having one bearer screw and ball. The bearers A, B and E shall be of low carbon steel. Each is provided with two springs to hold it in position.

The bearers shall be 50 ± 1 mm in diameter and shall be longer than the width of the cover to be tested. The distance between the bearers A and B at the points of contact with the test specimen shall be 200 ± 2 mm for covers up to and including 250 mm long and 270 ± 2 mm for covers longer than 250 mm. Bearer E shall be midway between bearers A and B measured horizontally and shall rest upon the surface of the test specimen. Bearers A and B shall be in the same horizontal plane, parallel to each other and to bearer E.

B.1.2 *Means of applying a breaking load,* at a controlled rate and verified in accordance with BS 1610.

B.2 Procedure

Soak the cover in water at 18 ± 2 °C for 24 h ± 15 min immediately before testing. Mount the cover, still wet, on the bearers A and B and apply a load via bearer E at a rate of 900 ± 90 kg/min until breakage occurs.

B.3 Test report

The test report shall include the following:

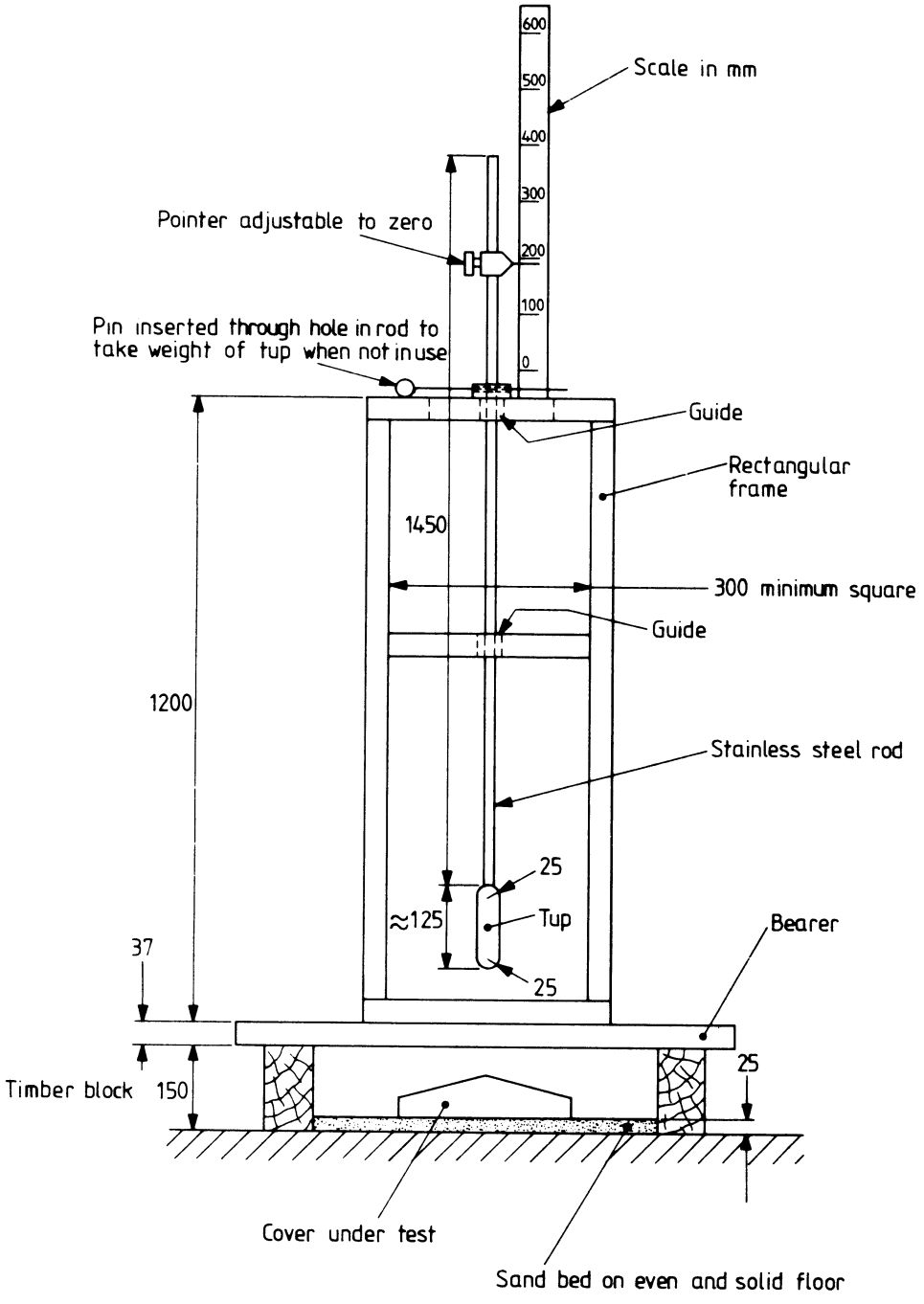
a) identification of the cover under test;

b) details of the test arrangements;

c) the breaking load to the nearest kilogram at the moment of failure;

d) the average breaking load of the samples tested;

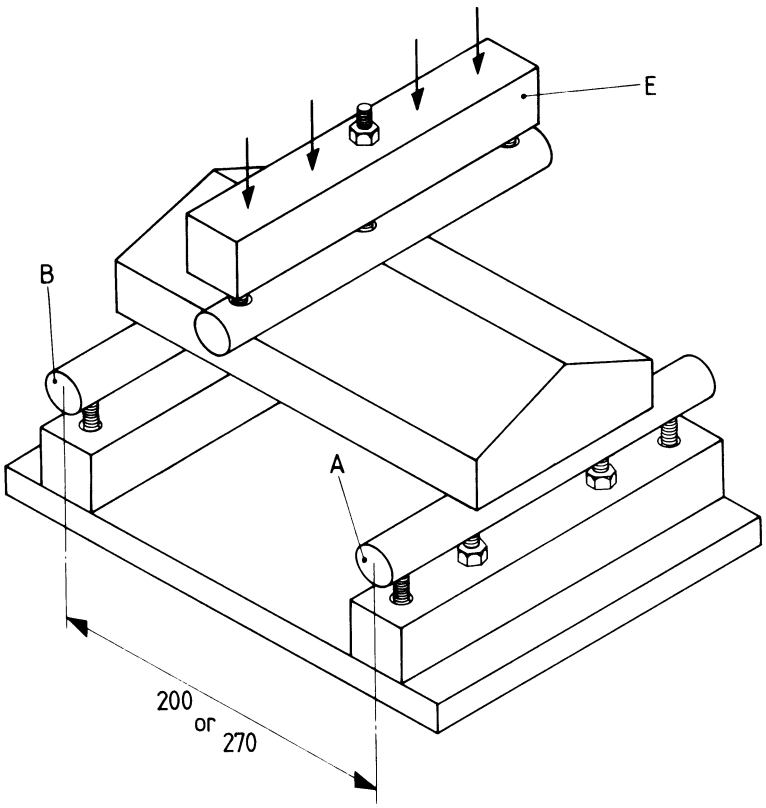
e) the minimum average breaking load for the type of cover.

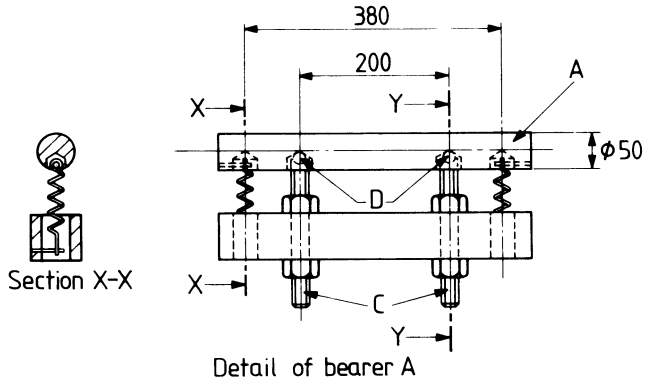


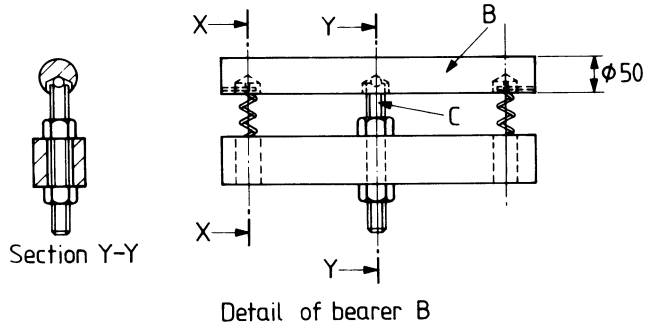
All dimensions are in millimetres.

NOTE Zero position on scale should be high enough to allow clearance between pointer ferrule and frame with tup resting on cover.

Figure 2 — Typical impact testing apparatus







All dimensions are in millimetres.

Figure 3 — Typical transverse strength testing apparatus

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Publications referred to

BS 12, *Specification for ordinary and rapid-hardening Portland cement.*
BS 146, *Specification for Portland-blastfurnace cement.*
BS 146-2, *Metric units.*
BS 882, *Specification for aggregates from natural sources for concrete.*
BS 1014, *Pigments for Portland cement and Portland cement products.*
BS 1047, *Specification for air-cooled blastfurnace slag aggregate for use in construction.*
BS 1370, *Specification for low heat Portland cement.*
BS 1610, *Materials testing machines and force verification equipment.*
BS 3148, *Methods of test for water for making concrete (including notes on the suitability of the water).*
BS 3797, *Specification for lightweight aggregates for concrete.*
BS 3797-2, *Metric units.*
BS 3892, *Pulverized-fuel ash.*
BS 3892-1, *Specification for pulverized-fuel ash for use as a cementitious component in structural concrete.*
BS 4027, *Specification for sulphate-resisting Portland cement.*
BS 4246, *Specification for low heat Portland-blastfurnace cement.*
BS 4449, *Specification for hot rolled steel bars for the reinforcement of concrete.*
BS 4461, *Specification for cold worked steel bars for the reinforcement of concrete.*
BS 4482, *Specification for hard drawn mild steel wire for the reinforcement of concrete.*
BS 4483, *Specification for steel fabric for the reinforcement of concrete.*
BS 5075, *Concrete admixtures.*
BS 5075-1, *Specification for accelerating admixtures retarding admixtures and water-reducing admixtures.*
BS 5075-2, *Specification for air-entraining admixtures.*
BS 5328, *Methods for specifying concrete, including ready-mixed concrete.*
BS 6588, *Specification for Portland pulverized-fuel ash cement.*

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