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BRITISH STANDARD 2484 : 1954

**CABLE COVERS
CONCRETE
AND EARTHENWARE**

BRITISH STANDARDS INSTITUTION

BRITISH STANDARD SPECIFICATION

CABLE COVERS
CONCRETE AND EARTHENWARE

B.S. 2484 : 1954

Price 2/6 net

BRITISH STANDARDS INSTITUTION

INCORPORATED BY ROYAL CHARTER

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THIS BRITISH STANDARD, having been approved by the Building Divisional Council, was published under the authority of the General Council on 7th May, 1954.

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer.

A complete list of British Standards, numbering over 2000, indexed and cross-indexed for reference, together with an abstract of each standard, will be found in the Institution's Yearbook, price 12s. 6d.

This standard makes reference to the following British Standards:—

- B.S. 12 Portland cement (ordinary and rapid-hardening).
- B.S. 146 Portland-blastfurnace cement.
- B.S. 785 Rolled steel bars and hard-drawn steel wire for concrete reinforcement.
- B.S. 882 Coarse and fine aggregates from natural sources for concrete.
- B.S. 915 High alumina cement.
- B.S. 1047 Air-cooled blastfurnace slag coarse aggregate for concrete.
- B.S. 1144 Cold twisted steel bars for concrete reinforcement.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following B.S.I. references relate to the work on this British Standard :—
Committee reference B/79
Draft for comment number CR(B)1280

CO-OPERATING ORGANIZATIONS

THE Committee responsible for the preparation of this British Standard consists of representatives from the following Government department and scientific and industrial organizations:—

British Cast Concrete Federation
British Electricity Authority and Area Boards
Cable Makers Association
Cast Stone and Concrete Federation
National Clayware Federation
National Federation of Clay Industries
Scottish Pre-cast Concrete Manufacturers Association

BRITISH STANDARD SPECIFICATION FOR

CABLE COVERS

(CONCRETE AND EARTHENWARE)

FOREWORD

This British Standard, which has been issued under the authority of the Building Divisional Council, gives requirements for concrete and earthenware cable covers of the types used to cover underground electric cables and intended, firstly, to give a warning of the presence of a cable and, secondly, to act as a protection to the cable against the blow of an excavating tool. Two methods of test are given, that for reinforced concrete covers being devised especially to take account of the presence of the reinforcement in relation to the purpose for which it is included, i.e. to tie the cover together against shattering.

For covers made from burnt clay (generally referred to as 'earthenware' covers) and those of unreinforced concrete, a transverse strength test was found to be more applicable and a better measure of quality and this type of test has been adopted.

It was considered desirable to standardize the lettering on cable covers and the two words 'Electricity' and 'Danger' were chosen as best indicating the reason for the presence of the cover. As it may be found difficult to mould the word 'Electricity' on earthenware covers 9 in. in length the use of the word 'Electric' is permissible on these covers.

So far as possible, only performance requirements are given in this British Standard and, therefore, the manufacturer is expected to design the details, such as a suitable locking device, according to the type of material being used to comply with the specification.

SPECIFICATION

PART 1. REINFORCED CONCRETE CABLE COVERS

SCOPE

1. Part 1 of this specification relates to precast reinforced concrete cable covers.

CEMENT

2. The cement used in the manufacture of the products shall comply in all respects with the requirements of one of the following British Standards:—

B.S. 12 Portland cement (ordinary and rapid-hardening)

or

B.S. 146 Portland-blastfurnace cement.

If specially ordered by the purchaser, high alumina cement, complying with the requirements of B.S. 915, 'High alumina cement', may be used.

AGGREGATE

3. Aggregate from natural sources shall comply with the requirements of B.S. 882, 'Coarse and fine aggregates from natural sources for concrete'. The aggregate crushing value, when determined in accordance with Appendix G of that standard, shall not exceed 45 per cent.

NOTE. Particular attention is called to Clause 3 of B.S. 882, which will apply to all aggregates from natural sources required for the purpose of this British Standard.

Alternatively, coarse aggregate complying with the requirements of B.S. 1047, 'Air-cooled blastfurnace slag coarse aggregate', may be used.

All aggregate shall be of a size appropriate to the sections of the products being produced but shall not exceed $\frac{3}{8}$ in. nominal size.

PROTECTION FROM FROST

4. No material which has been exposed to a temperature below freezing point shall be used until it has been completely thawed, and products shall not be moulded when the temperature of the mould itself is below freezing point.

Products already moulded shall be protected from the action of frost during at least the first 48 hours after moulding.

MOULDING

5. The covers shall be compacted by efficient tamping, vibration, hydraulic pressure or other suitable process. Where they are made under hydraulic pressure, the pressure employed shall be not less than 1000 lb/sq. in. over the entire surface receiving the pressure.

REINFORCEMENT

6. The reinforcement shall comply with B.S. 785, 'Rolled steel bars and hard-drawn steel wire for concrete reinforcement', or with B.S. 1144, 'Cold twisted steel bars for concrete reinforcement'.

The size of mild steel reinforcing rods in reinforced covers shall be as follows:—

a. For covers up to and including 7 in. in width, the reinforcement shall be two $\frac{3}{16}$ in. rods arranged longitudinally, one placed approximately 1 in. from each edge.

b. For covers 9 in. and over in width, the reinforcement shall be three $\frac{3}{16}$ in. rods arranged longitudinally, one of which shall be placed

approximately centrally and one of each of the others approximately 1 in. from each edge. The transverse reinforcement shall consist of three 12 S.W.G. (0.104 in.) wires.

except that

(i) If steel of a higher minimum ultimate tensile strength is used the cross-section of the rods may be suitably reduced

and

(ii) Hydraulically pressed covers shall be reinforced longitudinally with rods not less than $\frac{1}{8}$ in. diameter.

The longitudinal reinforcement shall extend to within 1 in. of each end of the cover. The transverse reinforcement shall be spaced approximately as shown in Fig. 2. Positioning shall be assisted by welding, tying, twisting, or other suitable method. The cover of concrete to the reinforcing bars shall be $\frac{1}{2}$ in. minimum.

DIMENSIONS OF STRAIGHT COVERS

7. The under side of the standard covers shall be flat, while the upper side may be either peaked or flat. The standard dimensions for all straight concrete covers shall be in accordance with Table 1.

TABLE 1. DIMENSIONS OF REINFORCED CONCRETE STRAIGHT COVERS

Nominal length	Width	Thickness		
		Peaked type		Flat type
		To apex	At outer edges	
in.	in.	in.	in.	in.
18	4½	2	1	1½
18	6	2	1	1½
36	6	2½	1½	2
36	7	2½	1½	2
36	9	2½	1½	2
36	10	2½	1½	2
36	11	2½	1½	2
36	12	2½	1½	2
36	13	—	—	2

NOTE. Arch type cable covers, of which Fig. 1 shows a typical design, are obtainable from some manufacturers. Such covers of necessity depart dimensionally from this standard, but should otherwise comply with its relevant requirements.

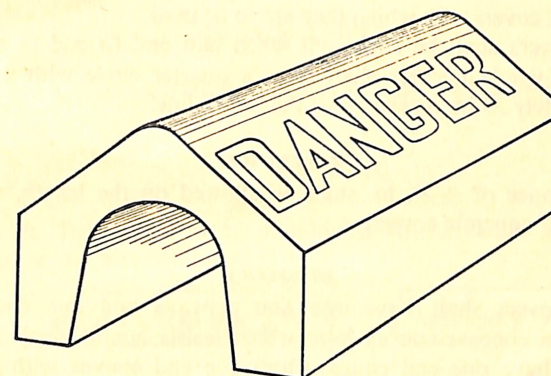


Fig. 1. Typical arch type cover

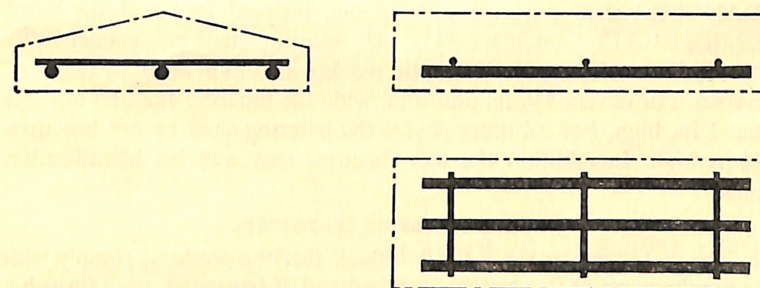


Fig. 2. One typical arrangement of reinforcing rods and transverse reinforcement

RADIUS COVERS

8. Radius covers shall be either of a similar cross-section to the straight cover, or flat and reversible, to form right or left hand bends, as required by the purchaser. The strength of either type shall be not less than that of the straight covers with which they are to be used.

The covers shall be such that when laid end to end in the locked position a whole number shall form a quarter circle with a radius of approximately 38 in. measured to the centre line.

TOLERANCES

9. A tolerance of $\pm \frac{1}{8}$ in. shall be allowed on the length, width and thickness of concrete covers.

INTERLOCK

10. The covers shall have one end concave and one end convex, providing a concave-convex joint which resists lateral displacement; or they may have one end concave and one end convex with additional joggles providing an interlocking joint to resist both lateral and vertical displacements.

LETTERING

11. The upper side of each cover shall be marked longitudinally, by means of impressions not less than $\frac{1}{8}$ in. deep, with the words 'DANGER' and 'ELECTRICITY'. On peaked covers the word 'DANGER' shall be impressed on one inclined face and the word 'ELECTRICITY' on the other. All lettering shall be symmetrically spaced. Flat radius covers shall be marked on both faces to allow of reversal. For covers $4\frac{1}{2}$ in. and 6 in. wide the lettering shall be not less than 1 in. high. For all other covers the lettering shall be not less than $1\frac{1}{2}$ in. high. In addition the manufacturer may add his identification mark.

MANUFACTURER'S CERTIFICATE

12. The manufacturer shall satisfy himself that the products comply with the requirements of this British Standard and, if requested, shall furnish a certificate to this effect to the purchaser or his representative.

TESTS BY THE PURCHASER

13. If the purchaser or his representative requires independent tests, the samples shall be taken before or immediately after delivery at the option of the purchaser or his representative. The tests shall be carried out in accordance with the requirements of this British Standard on the written instructions of the purchaser or his representative.

The manufacturer shall supply free of charge the samples which shall be selected in accordance with Clause 14, and the purchaser or his representative shall at all reasonable times have access to the place where the

PD 2431

Amendment No. 2, published 16 April, 1956

to B.S. 2484 : 1954

Cable covers, concrete and earthenware

Revision

Page 10, Table 2. Amend section headed 'Average Breaking Load' to read in the first two lines:—

Apex type	Flat type	instead of	Apex type	Flat type
230	195		300	225
305	260		400	300

They shall be subjected to two blows from the tup, both delivered from a height of 18 in. measured vertically between the centre of the

PD 2064

Amendment No. 1, published 20 December 1954

to B.S. 2484 : 1954

Cable covers, concrete and earthenware

Revision

Page 8. Clause 11. 2nd line. Delete 'not less than' and insert 'approximately.'

Page 14. Fig. 3. Dimensions of tup: Amend dimension 5 in. to read 'approximately 5 in.'

REFERENCES TO SPECIFIC REQUIREMENTS

17. *a.* The requirements for the following items shall be as specified in Part 1.

Item	Reference to Part 1
Cement	Clause 2
Aggregate	Clause 3
Protection from frost	Clause 4
Moulding	Clause 5
Radius covers	Clause 8
Tolerances	Clause 9
Interlock	Clause 10
Lettering	Clause 11
Manufacturer's certificate	Clause 12
Tests by the purchaser	Clause 13

b. The requirements for the dimensions and average breaking load of unreinforced concrete straight covers shall be as in Table 2.

c. The requirements for the following items shall be as Part 3.

Item	Reference to Part 3
Number of samples for testing	Clause 27
Test of transverse strength	Clause 28, but read 'Table 2' for 'Table 3'.

TABLE 2. DIMENSIONS AND AVERAGE BREAKING LOAD OF UNREINFORCED CONCRETE STRAIGHT COVERS

Nominal length	Width	Thickness			Average breaking load	
		Peaked type		Flat type	Apex type	Flat type
		To apex	At outer edge			
in.	in.	in.	in.	in.	lb.	lb.
18	4½	2	1	1½	300	225
18	6	2	1	1½	400	300
	6	2½	1½	2	500	450
Up to 24 in. in length	7	2½	1½	2	590	535
	9	2½	1½	2	750	690
	10	2½	1½	2	830	760
	11	2½	1½	2	910	840
	12	2½	1½	2	1000	915
	13	—	—	2	—	990

PART 3. EARTHENWARE (BURNT CLAY) CABLE COVERS

SCOPE

18. Part 3 of this specification relates to burnt clay covers, hereinafter referred to by their trade name 'earthenware' covers.

MATERIALS

19. Earthenware cable covers shall be of burnt clay and so made and fired that they shall be true in shape, well burnt throughout and free from detrimental cracks.

DIMENSIONS OF STRAIGHT COVERS

20. Except for the interlocking features, straight covers shall be rectangular in plan with the under side flat and the upper side either peaked or flat.

The dimensions for all straight covers shall be in accordance with Table 3.

TABLE 3. DIMENSIONS AND AVERAGE BREAKING LOAD OF EARTHENWARE STRAIGHT COVERS

Length	Width	Thickness			Average breaking load	
		Peaked type		Flat type	Apex type	Flat type
		To apex	At outer edge			
in.	in.	in.	in.	in.	lb.	lb.
9	4½	2	1¼	1½	320	225
9	6	2	1¼	1½	430	300
12	6	2½	1½	—	500	—
12	7	2½	1½	—	590	—
12	9	2½	1½	—	750	—
12	11	2½	1½	—	910	—
12	12	2½	1½	—	1000	—

NOTE. Arch type cable covers of which Fig. 1 shows a typical design, are obtainable from some manufacturers. Such covers of necessity depart dimensionally from this standard, but should otherwise comply with its relevant requirements.

RADIUS COVERS

21. Radius covers shall be either of a similar cross-section to the straight cover, or flat and reversible, to form right or left hand bends, as required

by the purchaser. The strength of either type shall be not less than that of the straight covers with which they are to be used.

The covers shall be such that, when laid end to end in a locked position, a whole number of covers shall form a quarter circle with a radius of approximately 36 in. measured to the centre line.

TOLERANCES

22. A tolerance of minus $\frac{1}{8}$ in. shall be allowed on the length and width of covers, and of minus $\frac{1}{16}$ in. on the thickness. The length, width and thickness may be greater than the standard dimensions.

INTERLOCK

23. All covers of similar pattern shall freely lock together laterally and in addition either vertically or longitudinally (or both).

LETTERING

24. The upper side of each cover shall be marked longitudinally by means of impressions not less than $\frac{1}{16}$ in. deep, with the word 'DANGER' and 'ELECTRICITY'. On peaked covers the word 'DANGER' shall be impressed on one inclined face and the word 'ELECTRICITY' on the other. It shall be permissible on covers only 9 in. long to use the word 'ELECTRIC' instead of 'ELECTRICITY'. All lettering shall be symmetrically spaced. Flat radius covers shall be marked on both faces to allow of reversal. For 9 in. \times 4½ in. and 9 in. \times 6 in. covers the lettering shall be not less than $\frac{3}{4}$ in. high. For all other covers the lettering shall be 1 in. high. In addition the manufacturer may add his identification mark.

MANUFACTURER'S CERTIFICATE

25. The manufacturer shall satisfy himself that the covers comply with the requirements of this specification, and shall forward a certificate to this effect upon the request of the purchaser.

TESTS BY THE PURCHASER

26. If the purchaser or his representative requires independent tests, the samples shall be taken before or immediately after delivery at the option of the purchaser or his representative. The tests shall be carried out in accordance with the requirements of this British Standard on the written instructions of the purchaser or his representative.

The manufacturer shall supply free of charge the samples which shall be selected in accordance with Clause 27, and the purchaser or his representative shall at all reasonable times have access to the place where the

cable covers are manufactured or stored, for the purpose of examining and sampling the materials and the finished products, inspecting the process of manufacture, and testing and marking samples. The manufacturer shall provide, or make arrangements for the provision of every facility and all labour required for such examination, sampling, inspecting, testing and marking of test samples before delivery, and shall provide and maintain, or make arrangements for providing, accurate apparatus for carrying out the tests required by this standard.

Unless otherwise specified at the time of the enquiry and when ordering, the cost of such tests shall be borne as follows:—

a. By the manufacturer, in the event of the results showing that the covers do not comply with the requirements of this standard.

b. By the purchaser, in the event of the results showing that the covers comply with the requirements of this standard.

NUMBER OF SAMPLES FOR TESTING

27. For the purposes of the test specified in Clause 28 the purchaser or his representative shall take fifteen covers at random from each consignment of 3000 covers or part thereof.

TEST OF TRANSVERSE STRENGTH

28. The load shall be applied at the centre of the cover at right angles to the length and midway between the supports, in the manner described in Appendix B.

The average breaking load of six covers shall first be taken.

Should the average breaking load of these six covers be equal to or greater than the values given in Table 3, the consignment shall be deemed to comply.

Should the average breaking load of the six covers be less than the limit specified in Table 3, the test shall be repeated on the further nine covers which were set aside.

Should the average of the tests on the fifteen covers be equal to or greater than the limits specified in the table, the consignment shall be deemed to comply.

Should the average of the tests on the fifteen covers be less than the limits specified in Table 3, the consignment shall be deemed not to comply.

APPENDIX A

IMPACT TESTS FOR REINFORCED CONCRETE CABLE COVERS

The cable cover to be tested is laid on a bed of dry sand of grading complying with the requirements for Class B, as specified in Table 4 of B.S. 882, 'Coarse and fine aggregates from natural sources for concrete'. The

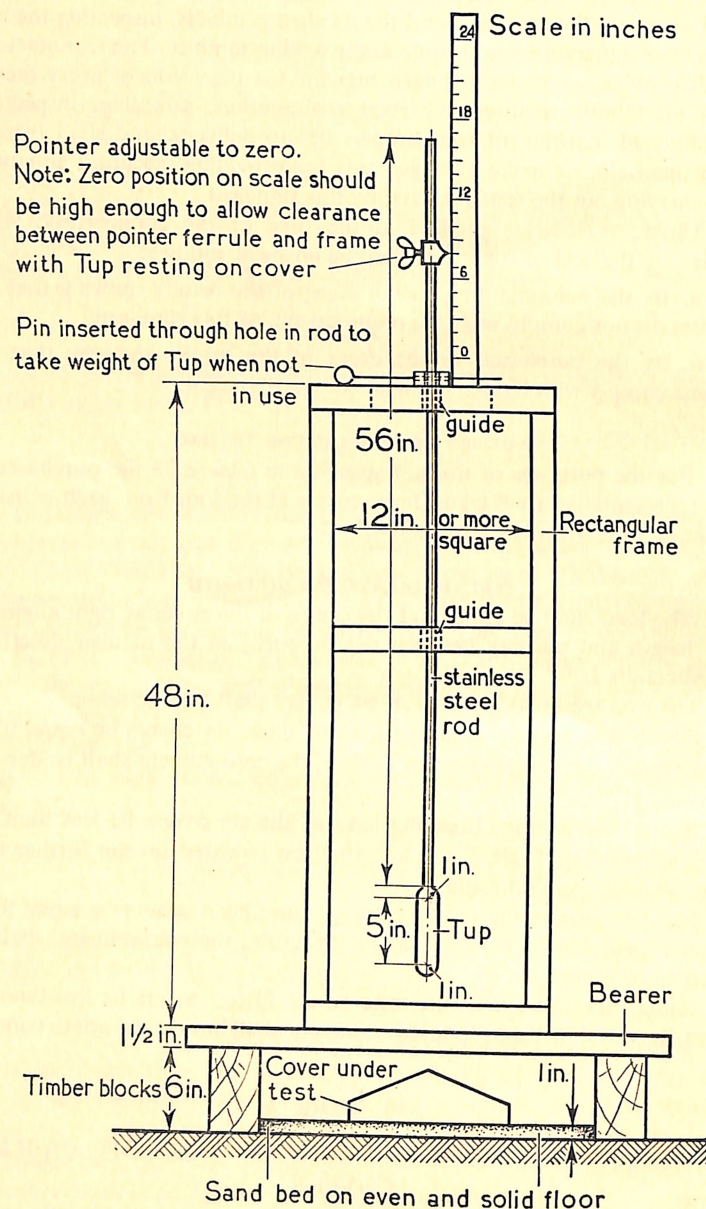


Fig. 3. Diagram of typical impact testing apparatus for testing reinforced concrete covers

bed is prepared on a solid floor and screeded to a thickness of 1 in. The sand shall not be re-screeded between the test drops on any one cover, but shall be stirred and re-screeded before testing each cover.

A mild steel tup weighing, with guide rod, 10 lb. \pm 1 oz. and having a ball end 1 in. in radius is then dropped freely from a height of 18 in. on to the centre of the top face of the cover.

A suitable type of apparatus is illustrated in Fig. 3 and consists of a wooden box frame with an internal opening measuring 12 in. \times 12 in. minimum and 48 in. in height, which stands centrally over the cover. The frame contains a mild steel tup 2 in. in diameter and approximately 5 in. in length with a hemispherical striking surface rounded to 1 in. radius, and attached to a stainless steel rod $\frac{3}{4}$ in. diameter and 56 in. long, so disposed that when raised and released it will fall freely through the guides. Near the top of the rod is an adjustable ring with a pointer attached to show the distance through which the tup is required to fall. The height of the drop shall be measured by setting the pointer at zero on the scale with the tup resting on the cover to be tested and then raising the rod to the required height as indicated by the pointer.

APPENDIX B

METHOD OF CARRYING OUT THE TRANSVERSE TEST

Six of the sample covers taken in accordance with Clause 27 shall be tested in the following manner.

The covers shall be soaked in water at approximately 15.0°C. to 20.0°C. (59°F. to 68°F.) for 24 hours immediately prior to testing and shall be tested wet.

Each cover to be tested shall be evenly supported upon two self-aligning steel bearers 2 in. in diameter, the distance between the centres of the bearers being 8 in. for covers 9 in. long and 10½ in. for earthenware covers 12 in. long and unreinforced concrete covers.

The load shall then be applied centrally at a uniform rate of 2000 lb. per minute \pm 10 per cent through a third steel bearer, also 2 in. diameter, placed midway between the supports upon the upper surface of the cover and parallel to the supports. The length of all bearers shall exceed the maximum width of the cover to be tested.

A suitable form of apparatus is shown in Fig. 4 in which the test specimen is placed 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 are of mild steel and each is provided with two springs which hold the bearers in position.

The distance between the bearers A and B at the points of contact with the test specimen is either 8 in. or 10½ in. Bearer E is midway between bearers A and B measured horizontally and rests upon the surface of the test specimen.

Bearers A and B are in the same horizontal plane, parallel to each other and to bearer E. The test specimen is placed centrally on bearers A and B. The load is applied through the bearer E.

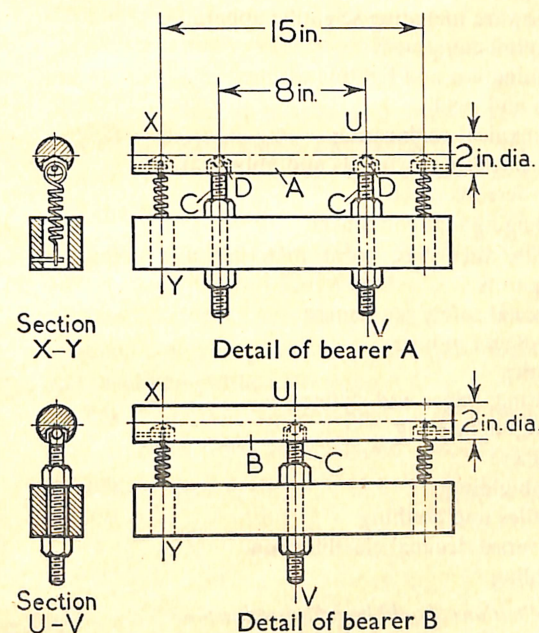
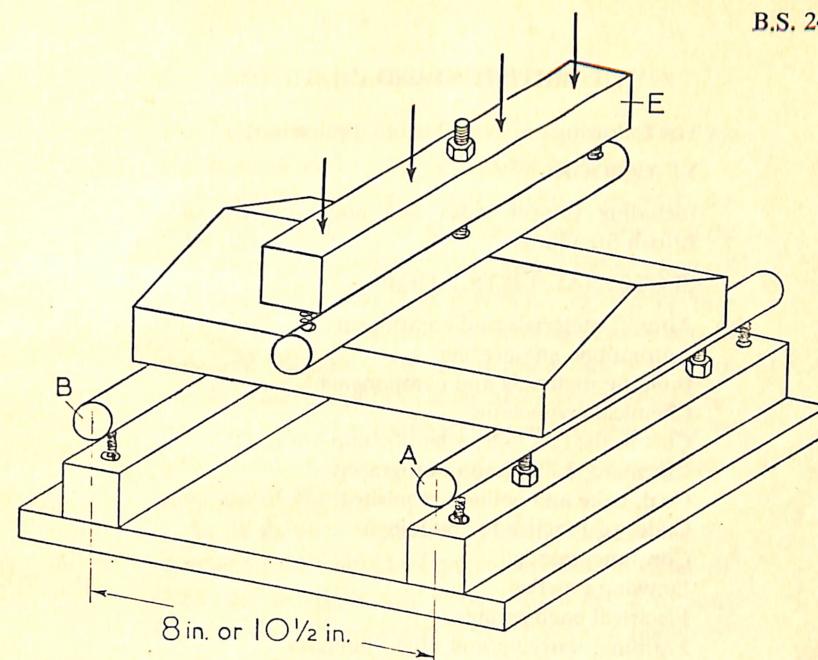


Fig. 4. Diagram of apparatus for the transverse test on unreinforced concrete covers and earthenware covers

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BRITISH STANDARDS INSTITUTION

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