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SPECIFICATION FOR PRECAST CONCRETE CABLE COVERS

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

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SPECIFICATION FOR PRECAST CONCRETE CABLE COVERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 22 August 1970, after the draft finalized by the Cement and Concrete Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Precast reinforced and unreinforced concrete covers are used for covering cables with a view to give a warning of the presence of an underground electric cable and also to protect cables against blows from excavating tools. This standard has been formulated to provide guidance in the manufacture and use of the above cable covers.

0.2.1 The cable covers have been classified based upon the description and condition where the above covers are normally used. The use of unreinforced concrete covers is recommended mainly for locations where dangers from pick-axing are not significant and in situations of secondary importance. This standard does not cover the interlocking cable covers.

0.3 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from B.S. 2484 : 1961 'Specification for cable covers (concrete and earthen)', published by the British Standards Institution.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for reinforced and unreinforced precast concrete covers for covering cables.

*Rules for rounding off numerical values (*revised*).

2. MATERIALS

2.1 Cement — The cement shall conform to IS : 269-1967* or IS : 455-1967† or IS : 1489-1967‡.

2.2 Aggregate — Aggregate from natural sources shall comply with the requirements of IS : 383-1970§. Blast furnace slag coarse aggregate or any other aggregate may be used by agreement between the purchaser and the manufacturer.

2.2.1 All aggregates shall be of a size appropriate to the sections of the products being produced but shall not exceed 10 mm nominal size.

2.2.2 Flyash and burnt clay pozzolana conforming to IS : 3812 (Part III)-1966‖ and IS : 1344-1968¶ respectively may be used as fine aggregate by agreement between the purchaser and the manufacturer taking the advantage of their pozzolanic properties.

2.3 Water — Water shall be clean and free from injurious amounts of deleterious materials and of a quality fit for drinking purposes.

2.4 Steel Wire or Rod — Steel wire or rod for reinforcement shall conform to IS : 432 (Part I)-1966**, IS : 432 (Part II)-1966††, IS : 1139-1966‡‡, IS : 1566-1967§§ or IS : 1786-1966‖‖ as agreed to between the purchaser and the manufacturer.

3. CLASSIFICATION

3.1 The precast concrete cable covers may be reinforced or unreinforced depending on the user requirements. Reinforced concrete cable covers generally provide the higher degree of safety against shattering than unreinforced concrete cable covers. Whether the concrete cable cover is to be

*Specification for ordinary, rapid-hardening and low heat Portland cement (*second revision*).

†Specification for Portland blast furnace slag cement (*second revision*).

‡Specification for Portland-pozzolana cement (*first revision*).

§Specification for coarse and fine aggregates from natural sources for concrete (*second revision*).

‖Specification for fly ash : Part III For use as fine aggregate for mortar and concrete.

¶Specification for burnt clay pozzolana (*first revision*).

**Specification for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement : Part I Mild steel and medium tensile steel bars (*second revision*).

††Specification for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement : Part II Hard-drawn steel wire (*second revision*).

‡‡Specification for hot rolled mild steel and medium tensile steel deformed bars for concrete reinforcements (*revised*).

§§Specification for hard-drawn steel wire fabric for concrete reinforcement (*first revision*).

‖‖Specification for cold-twisted steel bars for concrete reinforcement (*revised*).

reinforced or unreinforced should be decided based upon the type of protection required by the user. Use of unreinforced precast concrete cable cover is recommended for situations of secondary importance or where the danger from pick-axing are not significant.

3.2 The precast concrete cable covers generally are of two types namely with peak and flat (*see* Fig. 1 and Fig. 2). Precast concrete cable covers shall be classified as under:

Class	*Description of cable covers*	*Conditions where normally used*
EHV	Reinforced precast concrete, with peak	For underground power cables of voltage rating 22 kV and 33 kV
HVP	Unreinforced precast concrete, with peak	For power cables of voltage rating above 1·1 kV excluding 22 kV and above
HV	Unreinforced precast concrete, flat	For power cables up to and including 1·1 kV
LV	Unreinforced precast concrete, flat	

3.3 Arched type cable covers are also sometimes used, a typical design of which is shown in Fig. 3. These cable covers may be manufactured with suitable changes in dimensions to conform to the other dimensions of the standard.

4. DIMENSIONS AND TOLERANCES

4.1 Dimensions of reinforced and unreinforced precast concrete cable covers shall be as indicated in Table 1. Tolerances on length and width shall be ± 3 mm and on thickness shall be ± 2 mm.

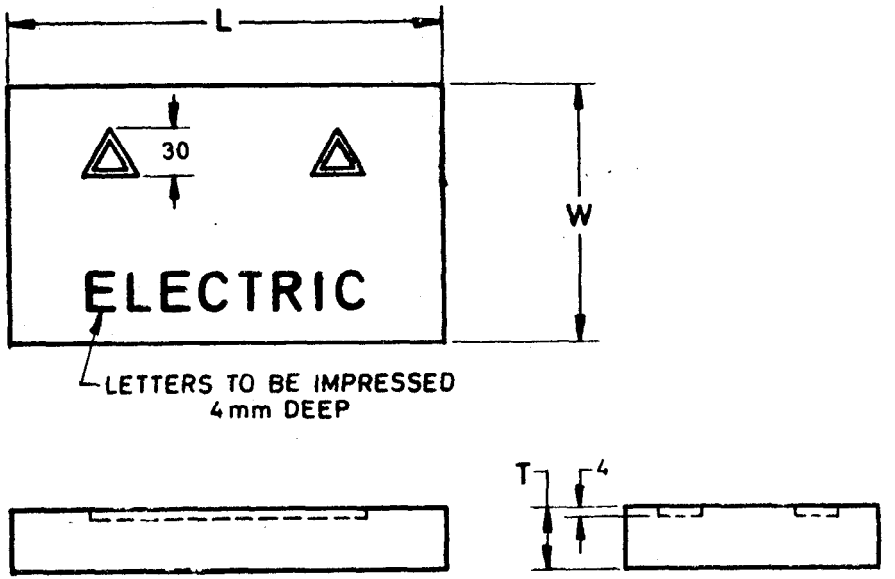
5. MANUFACTURE

5.1 The concrete used in the manufacture of cable covers shall not be of a grade lower than M 200 as in IS : 456-1964*.

5.2 Mixing — Concrete shall normally be mixed in a mechanical mixer. Mixing shall be continued until there is a uniform distribution of the materials and the mass is uniform in colour and consistency.

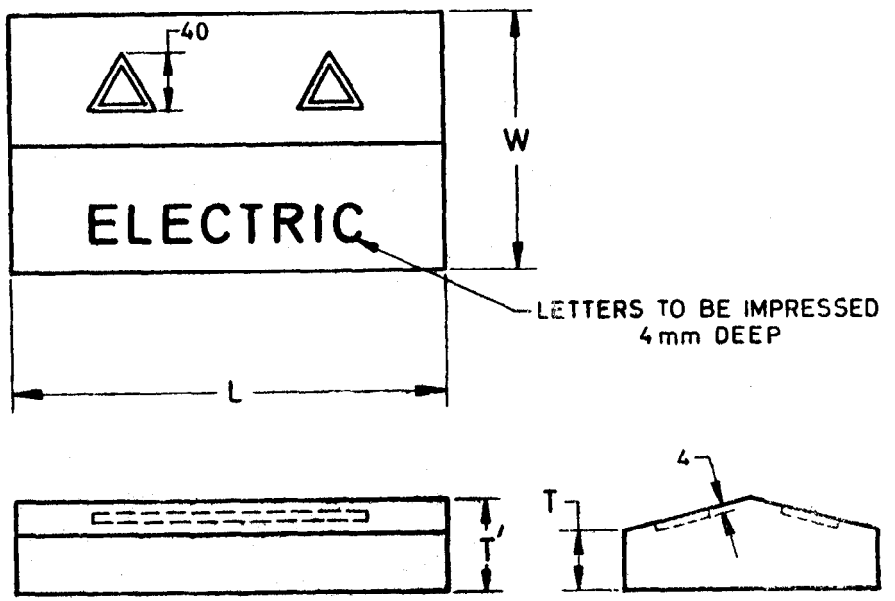
5.2.1 When hand mixing is permitted by the engineer-in-charge, it shall be carried out on a water-tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency.

*Code of practice for plain and reinforced concrete (*second revision*).



All dimensions in millimetres.

FIG. 1 TYPICAL CONCRETE CABLE COVER — FLAT TYPE



All dimensions in millimetres.

FIG. 2 TYPICAL CONCRETE CABLE COVER — WITH PEAK

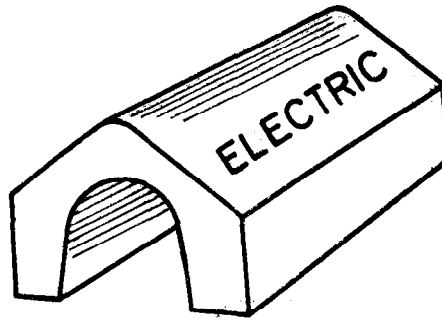


FIG. 3 TYPICAL ARCH TYPE CABLE COVER

TABLE 1 DIMENSIONS AND MINIMUM AVERAGE BREAKING LOAD OF PRECAST CONCRETE CABLE COVERS

(*Clauses* 4.1, 8.3, and *Fig.* 1 *and* 2)

SL No.	CLASS	TYPE No.	SHAPE	DIMENSIONS IN MILLIMETRES				MINIMUM AVERAGE BREAKING LOAD FOR UNREINFORCED COVERS kg
				L	*W*	*T*	*T'*	
i)	EHV	1	With peak	450	230	50	75	450
		2	With peak	600	230	50	75	750
ii)	HVP	1	With peak	300	180	40	65	300
		2	With peak	450	180	40	65	350
iii)	HV	1	Flat	300	180	40	—	300
		2	Flat	450	180	40	—	350
iv)	LV	1	Flat	250	150	40	—	200
		2	Flat	300	180	40	—	200
		3	Flat	450	180	40	—	200

5.3 Moulding — The concrete shall be compacted in the moulds by efficient tamping, vibration, hydraulic pressure or other suitable process and the face exposed in the mould struck off level. Where they are made under hydraulic pressure, the pressure employed shall not be less than 7 MN/m^2 (70 kgf/cm^2) over the entire surface receiving the pressure.

5.4 Protection from Frost — 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.

5.5 Reinforced precast concrete cable covers with peak shall be provided with mild steel reinforcement conforming to IS : 432 (Part I)-1966* as shown in Fig. 4. The provisions of reinforcement may be modified when steel of a higher ultimate tensile strength is used. Positioning of reinforcement shall be assisted by welding as shown in Fig. 4, tying or other suitable method. Similar arrangement of reinforcement shall also be adopted for flat type cable covers.

6. FINISH

6.1 The cable covers shall be free from all defects liable to affect adversely their suitability for use. The edges shall be sharp unless otherwise specified by the purchaser.

7. SAMPLING

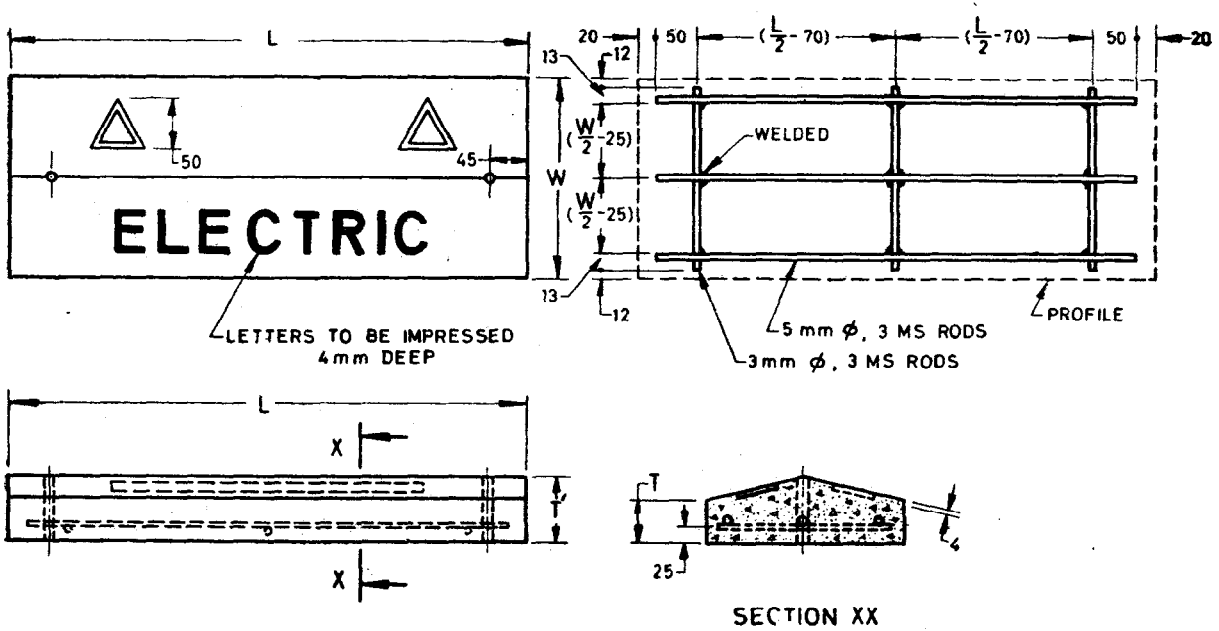
7.1 For the test of impact strength of reinforced concrete cable covers twelve samples at random for every consignment of 2 000 cable covers or less and a further twelve samples for every further 12 000 cable covers or part of 12 000 cable covers, comprising the same consignment shall be taken.

7.2 For the test of transverse strength of unreinforced concrete cable covers fifteen samples at random from each consignment of 3 000 cable covers or part thereof shall be taken.

8. TEST AND CRITERIA OF CONFORMITY

8.1 Precast cable covers of reinforced concrete shall be tested for impact strength as in **8.2** and those of unreinforced concrete for transverse strength as in **8.3**.

*Specification for mild steel and medium tensile steel bars and hard-drawn steel wire for concrete reinforcement : Part I Mild steel and medium tensile steel bars (*second revision*).



NOTE — Reinforcement as in peaked type shall also be provided for flat type reinforced concrete cable covers.

All dimensions in millimetres.

FIG. 4 DETAILS OF REINFORCEMENT IN PEAKED TYPE CONCRETE CABLE COVER

8.2 Impact Strength — The samples of reinforced concrete cable covers taken as described in **7.1** shall be tested in the manner described in Appendix A using an equipment shown in Fig. 5. They shall be subjected to two blows from the tup, both delivered from a height of 460 mm measured vertically between the centre of the top surface of the cable cover being tested and the striking end of the tup, the point of impact being the centre of the cable cover for both blows. When tested in this manner there shall result not more than one transverse crack, that is a crack across the full width of the cable cover.

8.2.1 Each group of samples being tested shall be divided into two batches of equal number of samples. In the event of one sample in the first batch failing to conform with the requirement specified in **8.2**, then all the samples of the second batch shall be tested. If all the samples of the second batch pass, the consignment shall be deemed to conform to the requirements of this standard, but if even one sample in the second batch fails, the consignment shall be deemed not to conform to the requirements of this standard.

8.3 Transverse Strength — The samples of unreinforced concrete cable covers taken as described in **7.2** shall be tested in the manner described in Appendix B using an equipment shown in Fig. 6. The averge 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 1, the consignment shall be deemed to conform to this standard. Should the average breaking load of the six covers be less than the limit specified in Table 1, the test shall be repeated on 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 Table 1, the consignment shall be deemed to conform to this standard. Should the average of the tests on the fifteen covers be less than the limits specified in Table 1, the consignment shall be deemed not to conform to this standard.

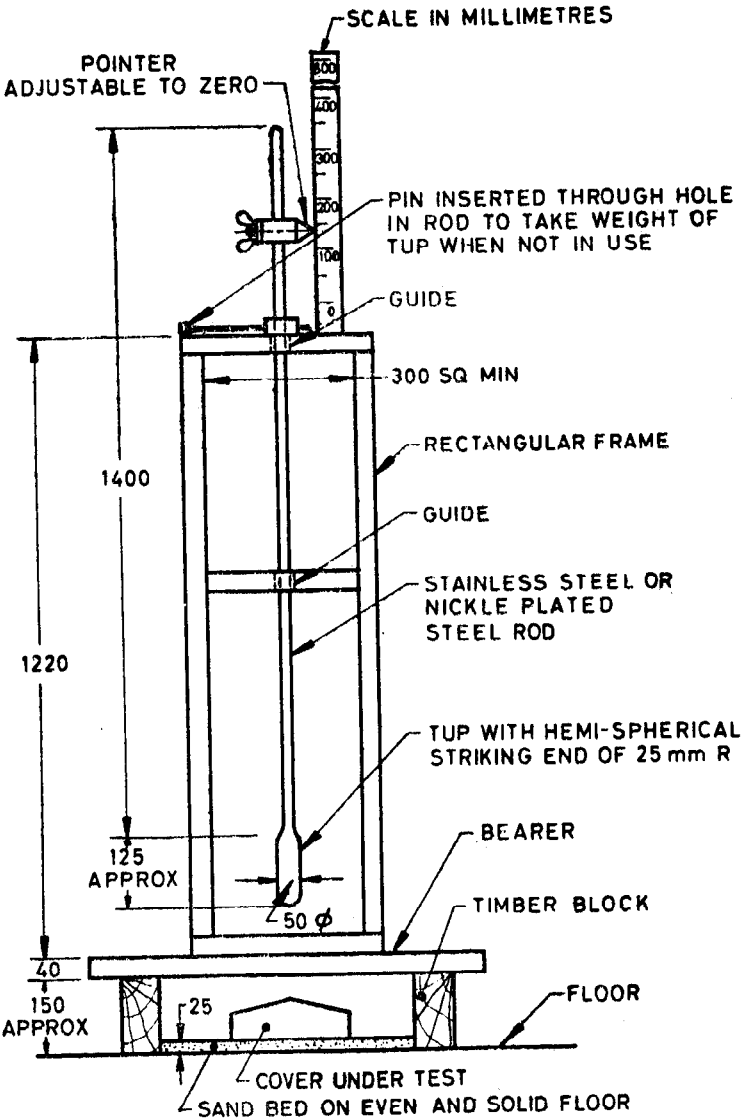
9. MARKING

9.1 The upper side of each cable cover shall be marked longitudinally by means of impression 4 mm deep with words " ELECTRIC △ " in accordance with Fig. 1 and 2. Identification markings, such as the name of the utility, may also be marked longitudinally by means of impression 4 mm deep, if the purchaser so desires.

9.2. BIS Certification Marking

The product may also be marked with Standard Mark.

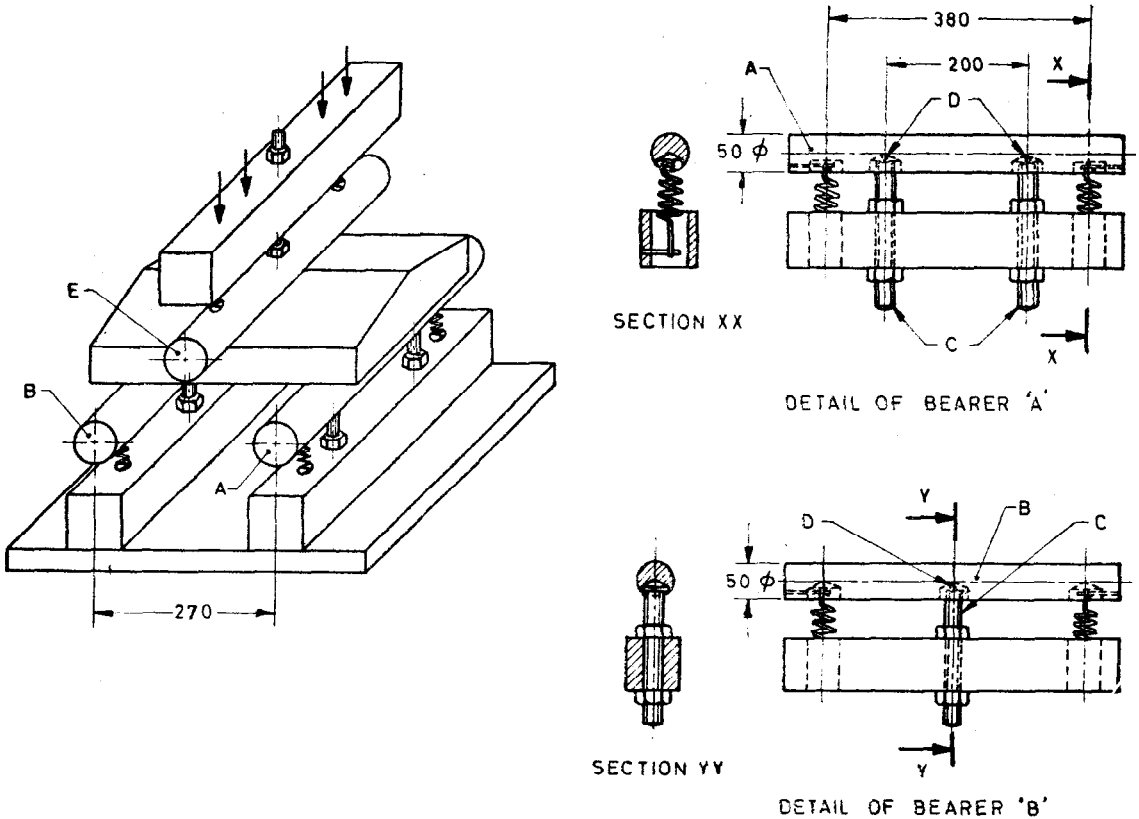
9.2.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.



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

All dimensions in millimetres.

FIG. 5 DIAGRAM OF TYPICAL IMPACT TESTING APPARATUS FOR TESTING REINFORCED CONCRETE CABLE COVERS



All dimensions in millimetres.

FIG. 6 DIAGRAM APPARATUS FOR TRANSVERSE TEST ON UNREINFORCED CONCRETE CABLE COVERS

APPENDIX A

(*Clause* 8.2)

IMPACT STRENGTH TEST FOR REINFORCED CONCRETE CABLE COVERS

A-1. PROCEDURE

A-1.1 The cable cover to be tested shall be laid on a sand bed (*see* Fig. 5). The bed is prepared on a solid floor and screeded to thickness of about 25 mm. The sand shall not be re-screeded between the test drops on any one cable cover, but shall be stirred and re-screeded before testing each cable cover.

A-1.2 A mild steel tup with guide rod weighing 4·50 $\pm$ 0·3 kg and having a ball end 25 mm in radius is then dropped freely from a height of 460 mm on to the centre of the top face of the cover.

NOTE — The apparatus illustrated in Fig. 5 may be used for this test which consists of a wooden box frame with a minimum internal opening of 300 × 300 mm and 1 220 mm in height and stands centrally over the cover.

APPENDIX B

(*Clause* 8.3)

TRANSVERSE STRENGTH TEST FOR UNREINFORCED CONCRETE CABLE COVERS

B-1. PROCEDURE

B-1.1 The cover sample to be tested shall be soaked in water at approximately 15 to 20°C for 24 hours immediately before testing and shall be tested wet. Each cover to be tested shall be evenly supported upon two self-aligning steel bearers 50 mm in diameter, the distance between the centres of the bearers being 270 mm (*see* Fig. 6). The load shall then be applied centrally at a uniform rate of 9 000N/minute $\pm$10 percent through a third steel bearer also 50 mm in diameter placed midway between the supports upon the upper surface of the cover and parallel to the supports. The length of all the bearers shall be more than the width of the cover to be tested.

NOTE — The apparatus illustrated in Fig. 6 may be used for this test. 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. Bearers *A* and *B* are in the same horizontal plane and are parallel to each other and to bearer *E*.

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