IS 10810-53 (1984): Methods of Test for Cables, Part 53: Flammability Test [ETD 9: Power Cables]

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Power Cables Sectional Committee, ETDC 59; Panel for Methods of Tests for Cables, ETDC 59/P1 [Ref : Doc : ETDC 59 (2240)]

Indian Standard

METHODS OF TEST FOR CABLES

PART 53 FLAMMABILITY TEST

1. Scope — Prescribes a method of test on electric cables under fire conditions.

2. Significance — For certain locations it may be important to use a cable which retards flame in case of a fire and is self-extinguishing when the source of fire is removed. This test is therefore carried cut on finished cables to verify this property.

3. Terminology — *See* IS : 1885 (Part 32) - 1971 ' Electrotechnical vocabulary : Part 32 Cables, conductors and accessories for electricity supply '.

4. Apparatus

4.1 *Test Chamber* — Three sided metal screen, 1 200 ± 25 mm high, 300 ± 25 mm wide and 450 ± 25 mm deep, with open front and closed top and bottom; the base shall be non-metallic. The chamber shall be provided with clamps approximately 25 mm wide and positioned so that the distance between the top of the bottom clamp and the bottom of the top-clamp is 550 ± 25 mm.

4.2 *Gas Burner*

4.2.1 The burner shall have a nominal bore of 10 mm and shall be fed with gas of such a quality that the operation of the burner is satisfactory when checked as described in **4.2.2**. The burner shall be regulated to give flame approximately 125 mm long, with an inner blue cone approximately 40 mm long.

Note — The gas burner is the conventional Bunsen burner.

4.2.2 *Check of burner operation* — The satisfactory operation of burner shall be checked as follows:

With the base of burner being horizontal, a bare copper wire 0·71 ± 0·025 mm in diameter, having a free length of not less than 100 mm shall be inserted horizontally in the flame 50 mm above the top of the burner so that the free end of the wire is vertically above the edge of the burner on the side remote from the supported end of the wire. The time required for the wire to melt shall be neither more than 6 seconds nor less than 4 seconds.

4.3 *Stop Watch* — Least count 0·1 second.

4.4 *Scale* — Least count 0·5 mm.

5. Material — No material other than the test specimen is required for performing this test.

6. Test Specimen

6.1 The test specimen shall be a piece of the finished cable, 600 ± 25 mm long.

6.2 *Number of Specimens* — One.

7. Conditioning — If the cable has a paint or lacquer finish, the sample shall be kept at a temperature of 60 ± 2°C for 4 hours before the test.

7.2 The test shall be made in an area substantially free from draughts. Draught shield may be fitted near the burner, if required.

8. Procedure

8.1 The sample shall be clamped vertically and positioned in the middle of a three sided metal screen. The cable shall be adjusted so that the bottom of the specimen is approximately 50 mm from the base of the screen. The arrangement is shown in Fig. 1.

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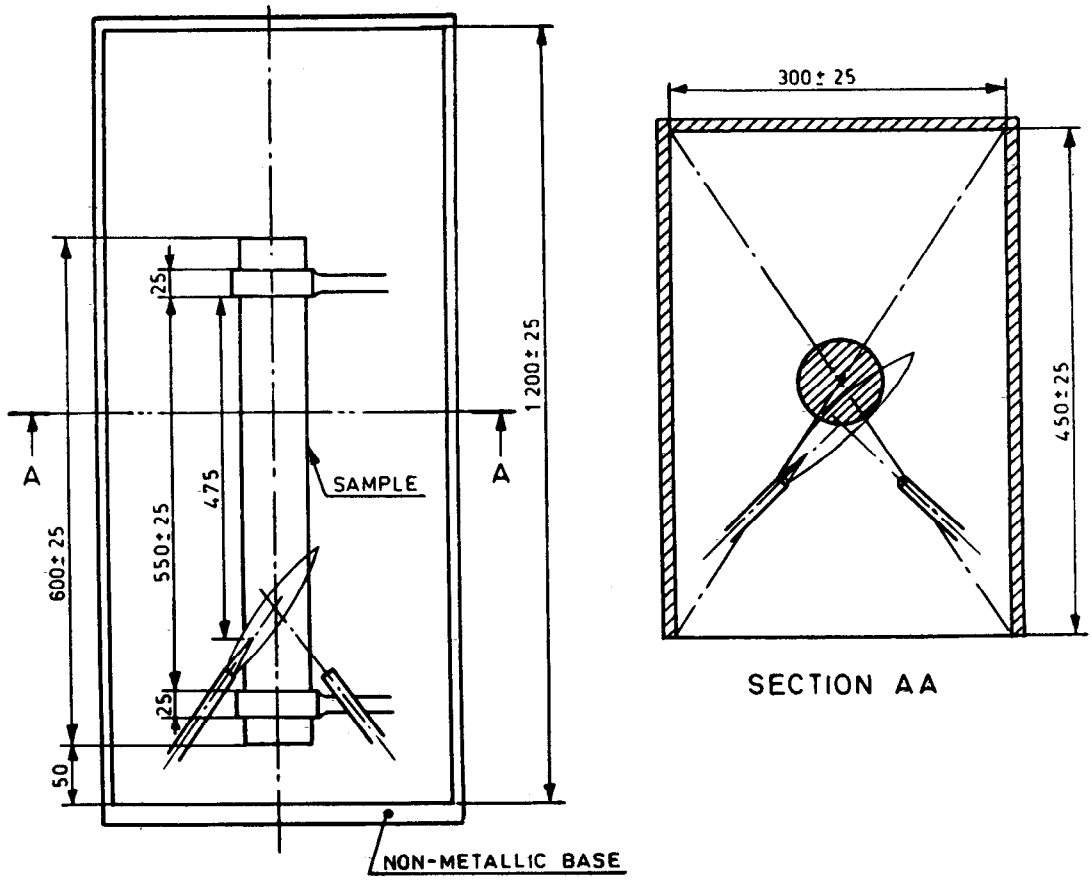

All dimensions in millimetres.

FIG. 1 ARRANGEMENT OF SAMPLE WITHIN THREE-SIDED SCREEN

8.2 *Source of Heat*

8.2.1 *For cable diameter up to and including 50 mm* — The source of heat for a sample shall be one gas burner, constructed and operated as described in **4.2** and arranged with the sample as shown in Fig. 2.

8.2.2 *For cable diameter greater than 50 mm* — The source of heat for a sample having an overall diameter greater than 50 mm shall be two gas burners constructed and operated as described in **4.2** and arranged around the sample as shown in Fig. 2.

8.3 The base of the burner shall be at an angle of 45° to the line of the sample. When the gas burner is in use, the distance of the burner from the sample shall be such that the inner blue cone of the flame is at a distance of approximately 10 mm, measured along the axis of the flame, from the surface of the cable and 475 mm below the lower edge of the top clamp.

8.4 The flame shall be applied for a continuous period of T seconds derived from the formula:

$$T = 60 + \frac{m}{25}$$

where

m is the mass in grams of the cable sample corrected to a 600 mm length.

8.5 After removal of the flame the period of burning of cable shall be noted.

After all burning has ceased, the surface of the sample shall be wiped clean, and the distance between top of charred or affected portion from lower edge of top clamp shall be measured.

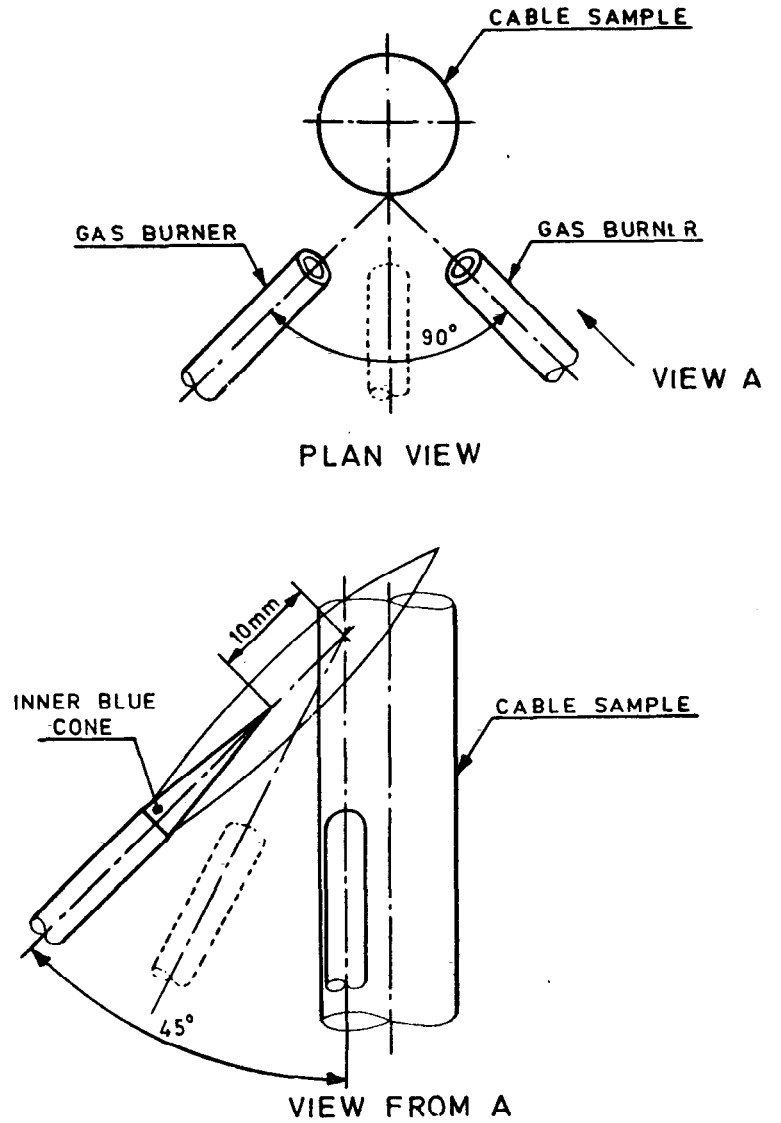

FIG. 2 ARRANGEMENT OF BURNERS FOR TEST

9. Tabulation of Observations

Specimen Number	*Cable Diameter* mm	*Number of Burners*	*Time Required for Copper (0 71 mm Dia) Wire to Melt*		*Period of Application of Flame*	*Period of Burning After Removal of Flame*	*Length of Charred or Affected Portion*	*Unaffected Portion From Lower Edge of Top Clamp*
			Burner 1 s	Burner 2 s	s	s	mm	mm

10. Calculation — The period of application of the flame '*T* seconds' is calculated using the formula given in **8.4**. No other calculation is involved.

11. Report

11.1 *Test on Electric Cable Under Fire Conditions (Flammability Test)*:

Cable Type

Batch No./Lot No.

Cable No./Drum No.

11.2 *Results*:

Reference Specification _____

Sample No.	*Period of Burning After Removal of Flame*		*Unaffected Portion of Cable*	
	Observed s	Specified s	Observed mm	Specified mm

11.3 *Conclusion* — Specimen meets/does not meet the requirements of the specification.

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