IS 10810-6 (1984): Methods of test for cables, Part 6: Thickness of thermoplastic and elastomeric insulation and sheath [ETD 9: Power Cables]

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Indian Standard

"पुनर्पुष्ट १९९६"

(Reaffirmed 2001)

METHODS OF TEST FOR CABLES

PART 6 THICKNESS OF THERMOPLASTIC AND ELASTOMERIC INSULATION AND SHEATH

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

1. Scope — Covers a method for verification of thickness of thermoplastic and elastomeric insulation and sheath of electric cables.

2. Significance — The thickness of insulation or sheath has been specified on the basis of voltage stress and/or mechanical forces, the covering is expected to withstand in service. The measurement of such thickness determines the limits of such dimension to ensure that the requirements of the specification are satisfactorily met.

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

4. Apparatus

4.1 Micrometer gauge capable of measuring to two decimal figures (least count 0·01 mm).

4.2 Vernier callipers capable of reading to two decimal figures (least count 0·01 mm).

4.3 Measuring microscope with linear magnification of not less than 7 times and possibility of reading at least to 0·01 mm.

4.4 Graduated magnifying glass, capable of reading at least 0·01 mm.

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

6. Test Specimen

6.1 Specimen for measuring the thickness of insulation is to be prepared in a manner suitable for different types of measuring apparatus as described in **4**. Test specimen may be of two types:

a) Core/cable piece, and

b) Slice piece.

6.2 *Core/Cable Piece* — This can be used only in case of round cores and outer sheath. A core/cable piece approximately 300 mm long is taken not less than 300 mm from the end of a factory length. All the coverings, if any, are removed from the core without damaging the insulation.

6.3 *Slice Piece* — This type of specimen is used, when measurements are to be done using optical method. For this purpose, if required, the materials inside and outside the insulation/sheath under measurement may be removed without damaging the insulation/sheath. Then a thin slice is cut along a plane perpendicular to the axis of the conductor/cable.

7. Conditioning — No special conditioning of test specimen is required. The measurements for thickness of insulation may be taken at prevailing room temperature.

8. Procedure

8.1 *For Core/Cable Piece* — A micrometer gauge or a vernier calliper shall be used. Diameter over and below the insulation/sheath shall be measured at three different points (at intervals not less than 75 mm) along the length of the specimen. At each point two measurements shall be made at right angle.

The measured average diameter below insulation/sheath shall be substracted from the average of the six measurements of diameter above insulation/sheath and the difference divided by two. The resulting value shall be taken as the average radial thickness of the insulation/sheath. Where the visual examination of the specimen reveals eccentricity, optical method shall be used by taking a slice specimen.

Adopted 14 March 1984

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8.2 *For Slice Specimen* — The sliced section of the specimen shall be placed under a measuring microscope with the plane of the slice perpendicular to the optical axis. When the inner profile of the specimen is circular, 6 measurements shall be carried out radially as far as possible equally spaced around the circumference. The first measurement shall be made at the place where thickness appears to be minimum. The sliced sections are taken from the specimen at equidistant points so that not fewer than 18 individual measurements can be made.

When the insulation/sheath covering is uneven which may be caused by the cable design or the like, the wall thickness is measured as shown in Fig. 1 and 2.

For sector shaped core, measurements shall be made at six points — three at the corners and three at the centres of the faces of the section as shown in Fig. 3.

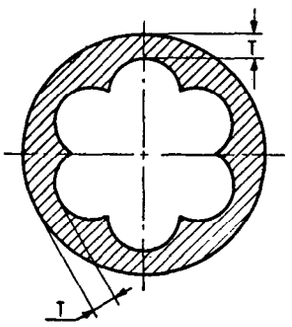

FIG. 1

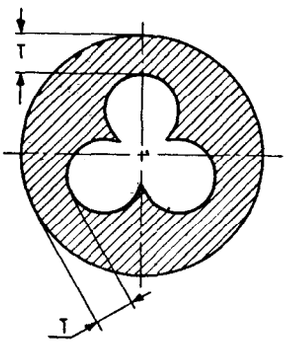

FIG. 2

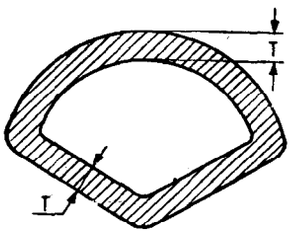

FIG. 3

T = The location of the measuring points on the sliced section.

FIG. 1 TO 3 MEASUREMENT OF WALL THICKNESS

9. Tabulation of Observations

9.1 *For Core/Cable Piece*

Observation No.	*Diameter Over Insulation/Sheath* mm	*Diameter Below Insulation/ Sheath* mm
1.		
2.		
3.		
4.		
5.		
6.		

9.2 *For Slice Piece* (By Optical Method)

Observation No.	*Thickness of Insulation/Sheath at Section*		
	A mm	B mm	C mm
1.			
2.			
3.			
4.			
5.			
6.			
Minimum			

10. Calculation

10.1 *For Core/Cable Piece*

$$\text{Average thickness of insulation/sheath} = \frac{D_0 - D_1}{2}$$

where

D_0 = average of six readings of diameter over insulation/sheath, and

D_1 = average of six readings of diameter below insulation/sheath.

10.2 *For Slice Piece* — In the case of optical method, the average of 18 measurements shall be calculated and the minimum thickness shall also be recorded.

11. Report

11.1 *Test for Thickness of Insulation/Sheath of Core:*

Cable Type

Batch No./Lot No.

Cable No./Drum No.

11.2 *Results:*

Reference Specification _____

Thickness of Insulation	*Observed*	*Specified*
Average		
Minimum		

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