IS 10810-60 (1988): Methods of test for cables, Part 60: Thermal stability of PVC insulation and sheath [ETD 9: Power Cables]

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Indian Standard (Reaffirmed 2005)

METHODS OF TEST FOR CABLES

PART 60 THERMAL STABILITY OF PVC INSULATION AND SHEATH

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

1. Scope — Covers a method to test the thermal stability of PVC insulation or sheath of electrical cables.

2. Significance — The thermal stability is an accelerated method to determine the rate of degradation of PVC compound with time under the influence of temperature. Compounds with high thermal stability can withstand continuous processing temperatures and it is an indication of performance of the cable at normal and elevated temperatures in actual usage.

3. Terminology — Thermal stability is the indication time in minutes, for the PVC compound at 200°C, after it has been kept in the test apparatus. This is indicated by the red colouration on *p*H paper produced by the evolution of hydrochloric acid.

4. Apparatus

4.1 *Thermostatically Controlled Heating Apparatus* — for a temperature specified in the standard for the type of cable, or if the temperature is not specified in the cable standard, at 200 ± 0·5°C.

4.2 *Glass Test Tubes* — 110 mm long with an outer diameter of approximately 5 mm and inner diameter of 4·0 ± 0·5 mm.

4.3 *Stop Watch or Suitable Time Meter*

4.4 *Thermometer* — least count of 0·1°C.

5. Material — Universal indicating paper strips approximately 15 mm long and 3 mm wide of *p*H range 1 to 10.

6. Test Specimen

6.1 Strips each of mass 50 ± 5 mg, cut from insulation or sheath to be tested shall be taken. For small thickness, specimen may consist of two or more strips.

6.2 *Number of Specimens* — Three.

7. Conditioning — Material shall be conditioned at 27 ± 2°C and relative humidity of 50 ± 5 percent for 24 hours.

8. Procedure

8.1 Each specimen shall be introduced into the test tube as described in **4.2**. The specimen shall occupy the bottom of the test tube and project not more than 30 mm above the bottom.

8.2 A strip of dry universal indicating paper shall be inserted into the open end of the glass tube so that the strip protrudes about 5 mm out of the tube and is held in position.

8.3 The glass tube shall be placed into the heating apparatus which has already attained the test temperature specified. The glass tube shall be inserted into the heating apparatus for a depth of 60 mm.

8.4 The time taken for the universal indicating paper to change colour from a *p*H value of 5 to a *p*H value of 3 shall be measured, or the test continued for the specified duration without the colour change occurring. The colour change point shall be considered to have been reached when the red colouring of the universal indicating paper characteristic of a *p*H value of 3 is just becoming visible. The universal indicating paper shall be renewed (specially for long duration stabilities) towards the end of the expected test time every 5 to 10 minutes, so that the change point is better visible.

Adopted 25 May 1988 | | Gr 1

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9. Tabulation of Observations

Test Specimen No.	Compound Description/ Cable Insulation/Sheath Description	T_1 h min	T_2 h min	Thermal Stability T in Minutes
1				
2				
3				

where,

T_1 = time at which the test tube with specimen is inserted into the heating bath, and

T_2 = final time to reach the colour change of the *p*H paper into red (*p*H 3).

10. Calculation — If the time of keeping the specimen is T_1 and final time is T_2, thermal stability $T = T_2 - T_1$ in minutes.

11. Report

11.1 *Thermal Stability Test*

Cable Type

Cable No./Drum No.

11.2 *Results*

Reference Specification _____

Test Specimen No.	Temperature	Time, minutes	
		Observed	Specified

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

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