

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

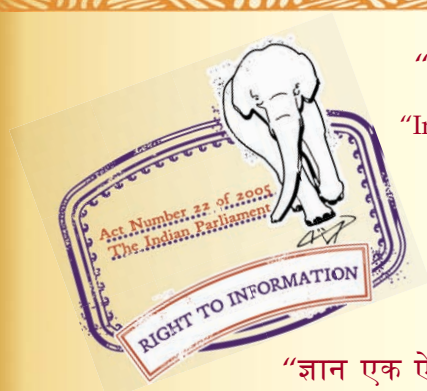
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

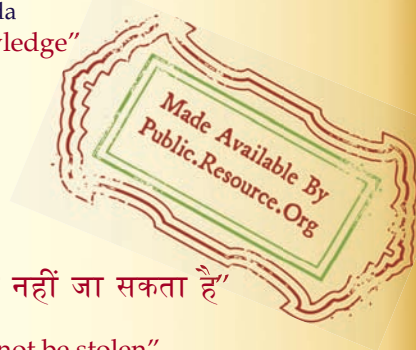
IS 10810-43 (1984): Methods of Test for Cables, Part 43:
Insulation Resistance [ETD 9: Power Cables]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

METHODS OF TEST FOR CABLES

“पुनर्षट १८८६”
“RE-AFFIRMED 1996”

PART 43 INSULATION RESISTANCE

1. Scope — Covers method of determination of insulation resistance, calculation of volume resistivity and insulation resistance constant of the dielectric material of electric cable by direct current method.

2. Significance — The dielectric material in a cable is used to insulate the conductors from one another and from ground as well as to provide mechanical support for the components. For this purpose it is desirable to have the insulation resistance as high as possible consistent with acceptable mechanical, chemical and heat resisting properties. During the manufacturing process non-uniformities may develop in the dielectric either in the form of conductive impurities in the material or in the form of mechanical imperfections in the dielectric affecting the quality of the cable. This test helps in detecting these imperfections.

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

4. Apparatus

4.1 Supply — 500 ± 50 V or 300 ± 30 V dc of adequate stability. The positive pole of the voltage supply shall be earthed.

4.2 Voltmeter — Suitable to measure the above voltages.

4.3 Screened Leads

4.4 Suitable Switch — For control of the above voltage.

4.5 Galvanometer — Sensitivity 10^{-10} A/mm.

4.6 Universal Shunt

or

Electronic Megohmmeter — Range not less than 10 million M Ω .

4.7 Standard Resistance — Value not less than 1 M Ω .

4.8 Thermostatically Controlled Water Bath

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

6. Test Specimen

6.1 The full drum length of the cable or *Min* 3 m, sample piece shall constitute the test specimen for performing the test at ambient temperature.

6.2 For performing the test at elevated temperature, *Min* 3 m, sample shall constitute the test specimen.

6.3 In case of multicore control cables (six cores and above), five cores taken from the finished cable shall be used for this test.

7. Conditioning

7.1 For carrying out this test at ambient temperature ($27 \pm 2^\circ\text{C}$) on single core armoured/screened and multicore screened (armoured or unarmoured), no special conditioning is required except that it shall be ensured that the test specimen has attained the temperature of the test room.

7.2 For belted multicore cables (armoured or unarmoured) and single core cables (unscreened and unarmoured) this test is performed by taking out the insulated cores from the finished cable (removing outer sheath, armour etc) and immersing them in water maintained at $27 \pm 2^\circ\text{C}$. The duration of immersion shall be 12 h for elastomer insulated cores and one hour for all other types of cores.

7.3 For carrying out this test at elevated temperature in case of all types of cables, the insulated cores are taken out from the finished cable (by removing outer sheath, armour and screen) and immersed in water, the temperature of which is maintained as specified in the relevant cable specification. The duration of immersion is one hour.

Adopted 14 March 1984

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Gr 1

IS : 10810 (Part 43) - 1984

7.4 For the conditions under 7.2 and 7.3, the ends of cores shall project approximately 200 mm above the water in water bath.

8. Procedure

8.1 The test specimen is connected to the insulation resistance measuring equipment. The conductor is connected to the high voltage terminal and the screen/armour or the water bath is earthed.

8.2 The insulation resistance of the test specimen is measured after electrification has continued in a regular manner for 1 min. The ambient temperature is recorded when the test is performed at ambient temperature but at the time of doing the test at elevated temperature, the temperature of the water bath is recorded. The apparatus shall be checked by comparing the values with standard resistance before taking every set of reading.

8.3 The volume resistivity or insulation resistance constant is calculated from the measured insulation resistance value.

9. Tabulation of Observations

Sample No.	Nominal Conductor Size	Material of Dielectric	Length m	Temperature °C	Observed Insula- tion Resistance MΩ
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10. Calculation — The volume resistivity and insulation resistance constant are calculated from the observed insulation resistance as indicated below:

$$\text{Volume resistivity} = \frac{2\pi L R \times 10^8}{\log_e \frac{D}{d}} \text{ ohm cm}$$

$$\text{Insulation resistance Constant } K = \frac{L R}{1000 \log_{10} \frac{D}{d}} \text{ Megohm km}$$

where

R = Measured resistance (MΩ);

L = length of cable (m);

D = diameter over insulation (excluding screens, if any), (mm); and

d = diameter over conductor (including screens, if any), (mm);

Note — In the case of shaped cores, substitute D by P and d by p

where

P = periphery of shaped insulated core (mm); and

p = periphery of shaped conductor (mm).

11. Report

11.1 Reference Specification

Sample No.	Nominal Conductor Size	Material of Dielectric	Volume Resistivity or Insulation Resistant Constant		Temperature °C
			Obtained Ω cm or MΩ km	Specified Ω cm or M Ω km	

11.2 Conclusion — The specimen meets/does not meet the requirements of the specification.