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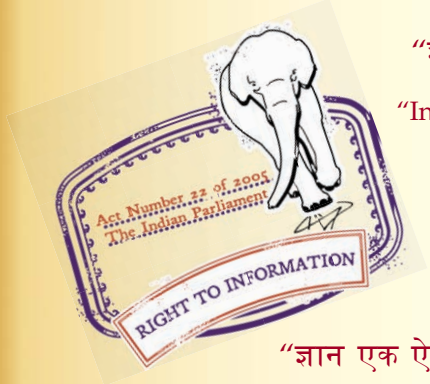
"पुराने को छोड नये के तरफ"
Jawaharlal Nehru
"Step Out From the Old to the New"

IS 10810-42 (1984): Methods of test for cables, Part 42: Resistivity test of armour wires and strips and conductance test of armour (wires/strips) [ETD 9: Power Cables]



"ज्ञान से एक नये भारत का निर्माण"
Satyanarayan Gangaram Pitroda
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"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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Indian Standard (Reaffirmed 2001)

METHODS OF TEST FOR CABLES

PART 42 RESISTIVITY TEST OF ARMOUR WIRES AND STRIPS AND CONDUCTANCE TEST OF ARMOUR (WIRES/STRIPS)

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

1. Scope — Covers method for determination of the resistivity of the armour wires and strips used in electric cables and the conductance of the armour of electric cables.

2. Significance — In case of short circuit faults the armour has to carry the short circuit current. The resistivity of the armour must be maintained within the designed value so that there is no excess temperature rise above the designed value and also there is no excess voltage rise.

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

4. Apparatus

4.1 *Kelvin Double Bridge* — Accuracy 0·2 percent having current and potential terminals.

or

Wheatstone Bridge — Accuracy 0·5 percent.

4.2 *Source for dc Supply* — Corresponding to the requirements of the bridge.

4.3 *Sensitive Galvanometer*

4.4 *Suitable Connecting Leads*

4.5 *Thermometer* — Least count 1°C.

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

6. Test Specimen

6.1 The length of sample of 1 m of armour wire/strip shall constitute the test specimen.

or

The drum length of cable shall constitute the test specimen.

6.2 The length of the test specimen should be the length which lies between the potential terminals.

6.3 *Number of Specimens* — One.

7. Conditioning — No special conditioning is necessary except that it is to be ensured that the test specimen has attained the ambient temperature.

8. Procedure

8.1 The test specimen is connected to the resistance measuring bridge. Adequate care is to be taken in this connection to minimize contact resistance.

8.2 The resistance of the test specimen is measured and the ambient temperature is recorded.

8.3 The armour resistivity of individual wires/strips and conductance of armour is calculated.

9. Tabulation of Observations

Sample No.	*Length* m	*Size of Armour Wire/Strip*	*Cable Description*	*Temperature* °C	*Observed Resistance* ohms

Adopted 14 March 1984

Gr 2

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10. Calculation

10.1 The resistivity of the armour wires/strips is calculated from the observed resistance as indicated below:

$$\rho = \frac{R_{20} \times A}{100 \times L}$$

where

ρ = armour wire/strip resistivity in ohm cm at 20°C;

R_{20} = armour resistance at 20°C = observed resistance at ambient temperature × temperature correction factor according to Table 1;

L = length of test specimen (m); and

A = area of test specimen (mm^2).

Note — The area of armouring wires/strips is determined as indicated below:

a) For round wires from diameter by the formula $\frac{\pi}{4}d^2$, and

b) For strips from the volume obtained by immersion in a measuring cylinder and the length.

10.2 The conductance of the armour of electric cable is calculated as indicated below :

$$\text{Percent conductance} = \frac{R_c \times L}{R_t \times k \times 1\,000} \times 100$$

where

R_t = observed armour resistance in ohms at ambient temperature;

k = temperature correction factor of armour (*see* Table 1);

l = length of test specimen (m); and

R_c = conductor resistance of the cable in conductor in the ohm/km at 20°C (Refer test for conductor resistance).

11. Report

11.1 *Reference Specification*_____

Sample No.	*Armour Wire/ Strip Size*	*Cable Description*	*Resistivity, ohm-cm at 20°C*		*Conductance, Percent*	
			Obtained	Specified	Obtained	Specified

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

TABLE 1 TEMPERATURE CORRECTION FACTORS FOR MILD STEEL WIRES AND STRIPS

(*Clause* 10.2)

Temperature °C	Temperature Correction Factor *k*
10	1·052 6
11	1·047 1
12	1·041 7
13	1·036 3
14	1·030 9
15	1·025 6
16	1·020 4
17	1·015 2
18	1·010 1
19	1·005 0
20	1·000 0
21	0·995 0
22	0·990 1
23	0·985 2
24	0·980 4
25	0·975 6
26	0·970 9
27	0·966 2
28	0·961 5
29	0·956 9
30	0·952 4
31	0·947 9
32	0·943 4
33	0·939 0
34	0·934 6
35	0·930 2
36	0·925 9
37	0·921 7
38	0·917 4
39	0·913 2
40	0·909 1
45	0·888 9
50	0·869 6
55	0·851 1
60	0·833 3
65	0·816 3
70	0·800 0
75	0·784 3

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TO
IS 10810 (PART 42) : 1984 METHODS OF TEST FOR CABLES

PART 42 RESISTIVITY TEST OF ARMOUR WIRES AND STRIPS AND CONDUCTANCE TEST OF ARMOUR (WIRES/STRIPS)

(*Page* 2, *clause* **10.1**) — Substitute:

$$'\rho = \frac{R_{20} \times A'}{10\,000 \times L} \quad \textit{for} \quad '\rho = \frac{R_{20} \times A'}{100 \times L}$$

(*Page* 2, *clause* **10.2**, *line* 6) — Substitute symbol '*L*' *for* '*l*'.

(*Page* 2, *clause* **10.2**, *line* 7) — Substitute the following for the existing:

'*R*c = resistance of main/power conductor in cable in ohm/km at 20°C (as per IS 8130).'

(ET 9)

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