

# इंटरनेट

# मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

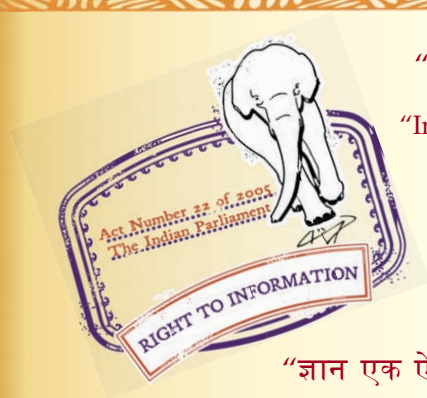
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 10810-47 (1984): Methods of test for cables, Part 47:  
Impulse test [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****PART 47 IMPULSE TEST**

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

**1. Scope** — Covers the method of impulse testing ( simulated lightning impulse ) of electric cables.

**2. Significance** — Insulating material used in high voltage electric cable may be subjected to transient over voltages resulting from nearby lightning strokes. The ability of the insulating materials to withstand these transient voltages is important in establishing the reliability of the cable insulation and the design of the cable.

**3. Terminology** — See IS : 1885 ( Part 32 ) - 1971 ' Electrotechnical vocabulary : Part 32 Cables, conductors and accessories for electricity supply ' and IS : 2071 ( Part I ) - 1974 ' Methods of high voltage testing : Part 1 General definitions and test requirements '.

#### **4. Apparatus**

**4.1 Impulse Generator and Sphere Gap** — To deliver full lightning impulse, suitable for requirements given in 4 of IS : 2071 ( Part 2 ) - 1974 ' Methods of high voltage testing : Part 2 Test procedure '.

**4.2 Current Loading Transformers** — With associated control and measuring equipment or any other suitable device to heat up the cable.

**4.3 Temperature Measuring Instrument** — 0 to 100°C.

**4.4 Cathode Ray Oscilloscope ( CRO )**

**4.5 Barometer**

**4.6 Humidity Meter**

**4.7 Impulse Peak Voltmeter** — Optional.

**4.8 Camera** — Or any other suitable arrangement for recording the oscillograms.

**5. Material** — No material other than the specimen is required except certain materials for making end terminations.

**6. Test Specimen** — 10 m length of cable. The ends shall be suitably prepared.

**7. Conditioning** — For cables other than paper insulated cables, the test specimen is to be heated to a temperature 5°C above the maximum operating temperature of the specific cable insulation.

No other conditioning is required.

#### **8. Test Procedure**

##### **8.1 Calibration of Impulse Generator**

**8.1.1** Preparatory to the application of the impulse, the generator shall be calibrated, with the positive polarity, under the following conditions:

- a) Both ends of the cable shall be connected to the impulse generator. A measuring sphere gap and an oscilloscope, with its associated voltage divider, shall be connected in parallel and remain so connected throughout the test.

**Note** — Other peak voltage measuring devices may be used in place of sphere gap.

- b) For every setting of the sphere gap, the charging voltage of the generator shall be so adjusted as to give 50 percent flashover of the gap and an oscillogram of the impulse voltage shall be taken. This procedure shall be carried out for at least three different settings of the sphere gap. The settings shall be so selected that their 50 percent flash-over voltages are approximately 50, 65 and 80 percent of the test level specified.

Adopted 14 March 1984

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**IS : 10810 ( Part 47 ) - 1984**

**8.1.2 A curve showing the charging voltage as a function of the sphere gap flashover voltages shall be drawn for this positive polarity. This curve, which should be a straight line, shall be extrapolated to determine the charging voltage necessary to obtain the specified level with positive polarity.**

**8.1.3 The ratio of the voltage divider selected shall not be disturbed during the test.**

### 8.2 Application of the Impulses at the Level Specified

**8.2.1 With sphere gap setting increased so that no flashover occurs across the gap, and with the cable maintained at the required temperature, wherever specified, the test sample shall be subjected to a series of 10 positive impulses at the voltage specified. The time interval between two successive impulses shall be just sufficient to ensure that impulse generator is charged at the correct voltage.**

**3.2.2 Immediately after the application of the 10 positive impulses, the generator shall be recalibrated for negative polarity under the conditions specified in 3.1, and a series of 10 negative impulses of the same specified voltage shall then be applied to the test assembly.**

**8.2.3 Oscillograms shall be taken of at least the first and tenth impulses in each series. The oscillograms shall include a timing oscillation.**

**8.2.4 Oscillograms shall be examined for any distortion in waveform.**

**8.2.5 The ambient temperature and the cable temperature shall be checked during the test, wherever required.**

## 9. Tabulation of Observations

| <i>Sample No.</i> | <i>Cable Description</i> | <i>Length</i><br>m | <i>Ambient Temperature</i><br>°C | <i>Test Temperature</i><br>°C | <i>Test Voltage</i><br>kV peak | <i>Polarity/<br/>No. of Shots</i> |
|-------------------|--------------------------|--------------------|----------------------------------|-------------------------------|--------------------------------|-----------------------------------|
|-------------------|--------------------------|--------------------|----------------------------------|-------------------------------|--------------------------------|-----------------------------------|

**10. Calculation —** No calculation is involved.

## 11. Report

### 11.1 Reference Specification

| Sample No. | Cable Description | Test Voltage | Observation of Oscillograms |
|------------|-------------------|--------------|-----------------------------|
|------------|-------------------|--------------|-----------------------------|

### Oscillograms — First Shot

### ***Tenth Shot***

**11.2 Conclusion —** The sample meets/dces not meet the rcquirements of the specification.

**AMENDMENT NO. 1 JANUARY 2007  
TO  
IS 10810 (PART 47) : 1984 METHODS OF TEST  
FOR CABLES**

**PART 47 IMPULSE TEST**

*(Page 1, clause 4.1)* — Substitute the following for the existing clause:

**'4.1 *Impulse Generator and Sphere Gap* — The impulse wave shape shall be in accordance with IS 2071 (Part 2) but shall have a virtual front time between 1  $\mu$ s and 5  $\mu$ s'.**

**(ET 9)**

*Indian Standard***METHODS OF TEST FOR CABLES****PART 47 IMPULSE TEST**

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Adopted 14 March 1984

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**IS : 10810 ( Part 47 ) - 1984**

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|-------------------|--------------------------|------------------------|--------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|
|-------------------|--------------------------|------------------------|--------------------------------------|-----------------------------------|------------------------------------|-----------------------------------|

**10. Calculation** — No calculation is involved.

**11. Report**

**11.1 Reference Specification** \_\_\_\_\_

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|-------------------|--------------------------|---------------------|------------------------------------|
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**Tenth Shot**

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