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SHEATH VOLTAGE LIMITERS

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PURPOSE AND SCOPE

This Specification forms part of a suite of documents that define National Grid requirements for new plant. The Level 2 Specifications for cable systems, TS 2.5, covers major requirements and there is a series of Level 3 Specifications covering various specific requirements.

This document is a Level 3 Specification giving the requirements for metal oxide sheath voltage limiters. TS 3.5.4 gives the requirements for sheath bonding and earthing of a cable system.

PART 1 – PROCEDURAL

1 GENERAL REQUIREMENTS

Where the cable system design requires the induced transient voltages between the metallic cable sheath and earth to be limited, sheath voltage limiters may be used. Where sheath voltage limiters are used they shall satisfy the requirement detailed in this specification.

1.1 Sheath Voltage Limiter Design

Sheath voltage limiters shall be a metal oxide design.

1.2 Sheath Voltage Limiter Identification

Sheath voltage limiters shall be identified by fitting a label detailing:

- Rated Voltage
- Nominal discharge current
- Maximum continuous operating voltage
- Manufacturer's name
- Serial number
- Year of manufacture

2 PERFORMANCE REQUIREMENTS

2.1 Nominal Discharge Current Rating

Unless otherwise agreed sheath voltage limiters shall have a nominal discharge rating not less than 10 kA.

3 TYPE TEST REQUIREMENTS

3.1 Test Report

The test report shall include details of the voltage/current relationship for each design together with a component drawing for each design detailing the length of leads, non-linear resistors manufacturer's reference, component identity and type.

3.2 Sample Requirements

Three samples of each design of single or three-phase units shall be tested.

3.3 Type Tests Sequence

All tests shall, unless otherwise agreed, be performed on the same unit.

Test Order	Test Description	Test Reference
1	Reference Voltage Measurement	3.4
2	Lightning Impulse Residual Voltage Measurement 0.2 the Nominal Discharge Current 0.5 the Nominal Discharge Current 1.0 the Nominal Discharge Current 1.5 the Nominal Discharge Current	3.5.1a
3	Impulse Conditioning (20 lightning current impulse)	3.5.1b
4	Steep Current Impulse	3.5.2
5	High Current Impulse	3.5.3
6	Operating Duty Test (i) Long Duration Current Impulse (ii) Superimpose Long Duration Current Impulse	3.6
7	Pass Criteria (Repeat Reference and Residual Voltage Measurement)	3.7

3.4 Reference Voltage Measurement

The Reference Voltage of each sample shall be measured to an accuracy of 0.01 kV d.c.

The measurement shall be performed under the conditions specified in IEC 60099-4.

3.5 Residual Voltage Tests

3.5.1 Lightning Current Impulse Tests

a) Determination of Residual Voltage Characteristics

The test shall be as specified in clause 8.3.2 of IEC 60099-4 except that the measurement shall be made using current impulses with a peak value of approximately 0.2, 0.5, 1.0 and 1.5 the nominal discharge current.

Before each test the sheath voltage limiter may be allowed to cool naturally to within 10 °C of ambient temperature.