SP Electricity North West

Electricity Specification 348

Surge Arresters

Issue 7 July 2026

Amendment summary

Issue No/Date	Description
6 **September 2025**	Document converted into new template and standards references updated to reflect latest versions. Prepared by: Simon Rushton Approved by: Technical Policy Panel and signed on its behalf by Paul Turner, PAP Chair
7 **July 2026**	New template applied to document. No technical changes have been made. Prepared by: Adnan Ali Approved by: Technical Policy Panel and signed on its behalf by Paul Turner, PAP Chair

Contents

1. Scope

It is necessary for high voltage overhead networks and associated cables and equipment to be protected from the effects of lightning. Protection is achieved by the installation of surge arresters at appropriate points on the network.

This Electricity Specification sets out the technical requirements for the purchase of surge arresters by Electricity North West Limited (SP Electricity North West) to be used on their electricity distribution system. The surge arresters specified are of the metal oxide resistor type for application on the 6.6kV, 11kV, 33kV and 132kV systems.

2. Definitions

Approval	Sanction by the SP Electricity North West Limited Protection Systems Manager that specified criteria have been satisfied.
Contract	The agreement between SP Electricity North West Limited and the Contractor for the execution of the Works including therein all documents to which reference may properly be made in order to ascertain the rights and obligations of the parties under the said agreement.
Contractor	The person or person's firm or company, including personal representatives, successors and permitted assigns, who's Tender has been accepted by SP Electricity North West Limited.
High Voltage (HV)	A voltage exceeding Low Voltage (LV).
Low Voltage (LV)	A voltage exceeding 50V ac but not exceeding 1000V ac or a voltage exceeding 120V dc but not exceeding 1500V dc
Specification	The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract.
Sub-Contractor	Any person (other than the Contractor) named in the Contract for any part of the Works or any person to whom any part of the Contract has been sub-let with the consent in writing of the SP Electricity North West Limited Protection Systems Manager, and the legal representatives, successors and assigns of such person.
Supplier	Any person or person's firm or company who supplies goods to SP Electricity North West Limited or to its Contractor.
Tender	An offer in writing to execute work or supply goods at a fixed price.

Tenderer	The person or person's firm or company, including personal representatives, successors and permitted assigns, invited by SP Electricity North West Limited to submit a Tender.
Words	Words importing persons shall include firms and corporations; words importing the singular only, also include the plural, and vice versa where the context requires.
Work	All materials, labour and actions required to be provided or performed by the Contractor under the Contract.
Writing	Any manuscript, typewritten or printed statement under seal or hand as the case may be.
ENA TS	Electricity Networks Association Technical Specification

3. General Requirements for Approvals and Testing

3.1. Product not to be Changed

Compliance with this clause shall be in accordance with ES001.

3.2. SP Electricity North West Technical Approval

Compliance with this clause shall be in accordance with ES001.

3.3. Quality Assurance

Compliance with this clause shall be in accordance with ES001.

3.4. Formulation

Compliance with this clause shall be in accordance with ES001.

3.5. Identification Markings

Compliance with this clause shall be in accordance with ES001.

3.6. Minimum Life Expectancy

The minimum life expectancy of all products covered by this Specification is 20 years.

3.7. Product Conformity

Compliance with this clause shall be in accordance with ES001.

3.8. Confirmation of Conformance

The Tenderer shall complete the conformance declaration sheets in Appendix A. Failure to complete these declaration sheets may result in an unacceptable bid.

4. Requirements for Type and Routine Testing

Compliance with this clause shall be in accordance with ES001.

4.1. Requirement for Type Tests at Suppliers Premises

Compliance with this clause shall be in accordance with ES001.

4.2. Requirement for Routine Tests at the Supplier's Premises

Compliance with this clause shall be in accordance with ES001.

5. Technical Requirements

5.1. Type of Arrester

Surge arresters shall be of the metal oxide type without gaps, suitable for use on ac systems and shall comply with BS EN 60099-4. The list of commodity codes for arresters is shown in Appendix C.

5.2. Arrester Housing

Housings shall be polymeric. IEC 60815 defines five levels of pollution from very light to very heavy. All arresters for SP Electricity North West Limited shall have minimum creepage distances suitable for very heavy pollution at 31mm/kV.

5.3. Additional Features

If there are any additional features available such as indication of failure, the Tenderer shall state whether they are standard or optional. The Tenderer shall detail the costs associated with any optional feature.

5.4. Arrester Characteristics

5.4.1. Rated Voltage

The rated voltage of the surge arresters shall be as quoted in table 1.

System Voltage	Arrester Rated Voltage
6.6kV and 11kV	15kV
33kV	36kV
132kV	132kV

Table 1: Rated Voltage

5.4.2. Nominal Discharge Current

The nominal discharge current for all surge arresters shall be 10 000A.

5.4.3. Arrester Class

Arresters were previously classified by their line discharge class as defined in prior versions of BS EN 60099-4. The current version of this standard uses definitions of distribution class (Us< 52kV) or station class (Us>72.5kV) arresters and each of these has been specified with either light, medium or heavy duty. **Table 2** shows the old line discharge class at each voltage level in SP Electricity North West and the new equivalents to be used.

System Voltage	Line Discharge Class	Arrester Class	Arrester Duty
6.6kV and 11kV	1	Distribution	Heavy
33kV	2	Distribution	Heavy
132kV	3	Station	Light

Table 2: Arrester Class

5.4.4. Residual Voltage

The residual voltages quoted in table 3 are indicative of a preferred value.

System Voltage	Residual Voltage (kV) at current impulses with wave 8/20μs
6.6kV and 11kV	42
33kV	102
132kV	326

Table 3: Residual Voltage

5.4.5. 11kV Arrester for Mobile Phone Base Station (MPBS) Solution

An arrester is required for a specific solution on a pole mounted transformer (PMT) in providing supplies to mobile phone stations where the antennae are mounted on National Grid (NG) towers. These requirements are due to the rise of earth potential on towers and the arrester and its application is more fully covered in CP215 and ENA ER G78.

The specific requirements for this arrester are shown below. All other requirements for 11kV arresters apply where not stated below.

Characteristic	Requirement
1 second temporary over voltage (TOV)	28kV
Residual Voltage for 8/20µs, 10kA impulse	< 76kV
Minimum current rating	10kA
Minimum impulse current rating	40kA

5.4.6. Low Voltage Neutral Arrester

An arrester is to be used on the neutral point of the low voltage side of pole mounted transformers (PMTs). A specific device, the Bowthorpe Tyco Transient Voltage Clamp (TVC) is to be used for this purpose.

5.5. Mounting Arrangements

5.5.1. 6.6kV and 11kV systems

Arresters for use on the 6.6kV and 11kV systems shall be capable of being mounted at any angle so as to enable them to act as support insulators associated with dry type cable terminations. They shall be able to withstand short circuit forces without the need to provide additional bracing. The Tenderer shall provide details of the maximum cantilever force for each arrester.

The standard mounting for these arresters shall use an M12 stud with 3 nuts, 2 flat washers and 2 spring washers at each end of the arrester.

Arresters shall be mounted on brackets which are approximately 300mm apart. The arrester shall be long enough to fit this gap and provide a stud length of 61mm beyond the bracket for the fitting of the nuts, washers and connectors. A typical construction arrangement on a pole mounted transformer and auto-recloser is shown in Appendix D.

5.5.2. 33kV systems

33kV systems33kV arresters may be suitable for upright mounting only, but they shall be self-supporting without the need to provide additional bracing. The standard mounting for these arresters shall use an M16 stud with 3 nuts, 2 flat washers and 2 spring washers at each end of the arrester.

5.5.3. 132kV systems

132kV arresters shall be suitable for upright mounting and shall be provided with a pedestal base. Insulated bushings / mounts shall be supplied. Project specific details for these arresters are detailed in Appendix A.

The SP Electricity North West Protection Policy Manager may wish to propose alternative mounting arrangements during tender stage negotiations. If so, the placing of any contract will depend upon the Supplier's agreement and ability to accommodate these.

5.6. Accessories

The Tenderer shall details the costs for all accessories at the tender stage.

5.7. Drawings

Dimensioned drawings for each arrester, including weights, alternative mounting arrangements and accessories shall be supplied with the Tender. A full datasheet detailing all the arrester characteristics shall be supplied with the tender.

Drawings shall be supplied in AutoCad 2000 (dwg) and Adobe Acrobat (pdf) format files.

5.8. System Parameters

5.8.1. Frequency

The system frequency is 50Hz.

5.8.2. Voltage

The nominal and maximum system voltages are as quoted in table 4.

Nominal System Voltage	Maximum System Voltage (kV)
6.6kV	7.2kV
11kV	15kV
33kV	36kV
132kV	145kV

Table 4: System Voltage

5.8.3. Earthing

The 6.6kV, 11kV and 33kV systems are non-effectively earthed. The earthing factor is 1.73.

The 132kV system is directly earthed. The earthing factor is 1.4.

An earth fault clearance time of 3 second shall be assumed.

5.8.4. Fault Levels

The system fault levels are as quoted in table 5.

System Voltage (kV)	Maximum System Voltage (kA)
6.6	21.9
11	13.1
33	17.5
132	21.9

Table 5: System Fault Level

5.9. Mechanical Strength

Surge arresters can be used as a means of mechanical support and should be suitable for mounting at any angle between the horizontal and vertical. The arresters must therefore satisfy the mechanical loading tests specified in BS EN 60099-4.

Should the arrester fail due to overload the following shall apply:

- The arrester shall fail in a safe manner without excessive shattering and ejection of material.
- The arrester shall remain self-supporting after failure.

5.10. Weather Ageing Tests

The arrester type shall have been subjected to the 1000hr salt fog test series A in accordance with BS EN 60099-4.

6. Delivery and Off-Loading

For 132kV arresters the Tenderer shall include for delivery and offloading. Installation and commissioning are outside the scope of this contract.

7. Documents Referenced

DOCUMENTS REFERENCED	
Health and Safety at Work etc Act 1974	
Control of Substances Hazardous to Health Regulations 2002	
Manual Handling Operations Regulations 1992 (as amended)	
BS EN ISO 9001: 2015+A1:2024	Quality Management Systems. Requirements
BS EN ISO 14001: 2015	Environmental Management Systems. Requirements
IEC TS 60815: 2008	Selection and Dimensioning of HV Insulators for use in Polluted Conditions
BS EN 60099-4: 2014	Surge Arresters: Metal –oxide surge arresters without gaps for ac systems
ENA ER G78 Issue 4:2018	Recommendations for low voltage supplies to mobile phone base stations with antennae on high voltage structures
CP215	Supplies to Mobile Phone Base Stations with Antennae on High Voltage Structures
CP311 Issue 3	Equipment Approval Policy and Processes

Appendix A – General Particulars of Definite Work

(Relevant details to be completed by Purchaser)

Item	Description	
1	Site Name	
2	Site Grid Reference	
3	Number of Units	
4	Voltage	
5	Delivery Dates	

Appendix B – Commodity Codes

List of Arrester Commodity Codes

Description	Commodity Code
11kV Surge Arrester	121886
33kV Surge Arrester	121878
11kV MPBS arrester	121850
LV Neutral Arrester (Transient Voltage Clamper TVC)	121894

Appendix C – Conformance Declaration

SECTION-BY-SECTION CONFORMANCE WITH SPECIFICATION

The Tenderer shall declare conformance or otherwise for each product/service or range of products/services, section-by-section, using the following Conformance Declaration Codes.

Conformance Declaration Codes:

N/A =	Clause is not applicable/appropriate to the product/service.
C1 =	The product/service conforms fully with the requirements of this clause.
C2 =	The product/service conforms partially with the requirements of this clause.
C3 =	The product/service does not conform to the requirements of this clause.
C4 =	The product/service does not currently conform to the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform.

Manufacturer:

Product/Service Description:

Product/Service Reference:

Name:

Company:

Signature:

SECTION-BY-SECTION CONFORMANCE			
Section	**Section Topic**	**Conformance Declaration Code**	**Remarks * (must be completed if code is not C1)**
3.1	Product not to be changed		
3.2	SP Electricity North West Technical Approval		
3.3	Quality Assurance		
3.4	Formulation		
3.5	Identification Marking		
3.6	Minimum Life Expectancy		
3.7	Product Conformity		
4.1	Requirements for Type Tests at Suppliers Premises		
4.2	Requirements for Routine Tests at Suppliers Premises		
5.1	Type of Arrester		
5.2	Arrester Housing		
5.3	Additional Features		
5.4.1	Rated Voltage		
5.4.2	Nominal Discharge Current		
5.4.3	Line Discharge Class		
5.4.4	Residual Voltage		
5.4.5	11kV arrester for MPBS		
5.4.6	Low Voltage Neutral Arrester		

5.5.1	6.6/11kV Mounting Arrangements		
5.5.2	33kV Mounting Arrangements		
5.5.1	132kV Mounting Arrangements		
5.6	Accessories		
5.7	Drawings		
5.8	System Parameters		
5.9	Mechanical Strength following failure		
5.10	Weather Ageing Tests		
6	Delivery and Offloading		

* Applicable specifications shall be stated in the Remarks column where alternatives are quoted within a section. The Remarks column shall also be used to indicate cases where the products or services exceed the quoted specifications.

Additional Notes:

Appendix D – Typical Construction Drawing 6.6/11kV Arrester