



SECTION – 2.30

SURGE ARRESTERS

1.0.0 INTRODUCTION

This section covers the requirements of surge arresters for 132 kV Substation.

2.0.0 SCOPE OF WORK

- 2.1.1 All existing surge arresters installed in line bays and transformer bays shall be tested to verify their operational usability.
- 2.1.2 Existing SA leakage counters / monitors shall be replaced with new units. These new monitors shall be integrated with SCADA / SAS for remote monitoring and communication.
- 2.1.3 After testing, any of the tested SA units fails to meet standards, and bidder shall include optional cost provisions for replacements in bidders scope.
- 2.1.4 The scope covers testing, replacement, integration, and supply of surge arresters for 132 kV line bays and Transformer bay.

3.0.0 CODES AND STANDARDS

The equipment to be furnished under this specification shall be in accordance with the applicable section of the latest version of the relevant IS/IEC standards including amendments, if any, except where modified and / or supplemented by this specification. Some of the applicable standards are listed below:

- a) IS 3070-3 Lightning arresters for alternating current systems – Metal oxide lightning arresters without gaps
- b) IEC 60099-4 Metal oxide surge arresters without gaps
- c) IEC 60099-5 Selection and application recommendation

4.0.0 TECHNICAL REQUIREMENTS

- 4.1.0 Lightning arresters shall be provided for all the line feeders, and transformer feeders.
- 4.2.0 Lightning arresters shall be of hermetically sealed units, self supporting construction, suitable for mounting on support structures which also shall be supplied by the Vendor.
- 4.3.0 The lightning arresters shall be of heavy duty station class and gapless type without any series or shunt gaps.
- 4.4.0 The lightning arresters shall be capable of discharging over-voltages occurring during switching of unloaded transformers, reactors and long lines.
- 4.5.0 Lightning arrester shall be capable discharging energy equivalent to specified class on two successive operations, as required by relevant standards.
- 4.6.0 The reference current of the arresters shall be high enough to eliminate the influence of grading and stray capacitance on the measured reference voltage.

5.0.0 CONSTRUCTIONAL FEATURES



- 5.1.0 The non-linear blocks shall be of sintered metal oxide material.
- 5.2.0 The lightning arresters shall be fitted with pressure relief devices suitable for preventing shattering of porcelain housing and providing path for flow of rated fault currents in the event of arrester failure. Seals shall be provided in such a way that these are always effectively maintained even when discharging rated lightning current.
- 5.3.0 The arresters shall not fail due to arrester porcelain contamination.
- 5.4.0 Porcelain housing shall be so coordinated that external flashover will not occur due to application of any impulse or switching lightning voltage upto the maximum design value for arrester.
- 5.5.0 The end fittings shall be made of corrosion proof non-magnetic material.
- 5.6.0 Arresters shall be complete with insulating base having provision for bolting to flat surface of structure. On insulating base, ground terminal bracket shall be provided. Line terminal and ground terminal shall be of stainless steel.
- 5.7.0 Each single pole unit shall be provided with discharge counter and leakage current meters mounted in sheet steel enclosure of IP 55 degree of protection. The reading of milli-ammeter and counters shall be visible through an inspection glass panel. XLPE insulated copper conductor of adequate size and length shall be used for connecting discharge counter terminal and lightning arrester earth terminal. Bypass copper shunts shall also be provided for bypassing the discharging counter for removal / maintenance of counter. The supporting structure for lightning arrester shall be provided with a mounting pad, for fixing the lightning monitor consisting of discharge counters and milli-ammeters.
- 5.8.0 Grading / corona rings and intermediate ring of hot dip galvanized steel shall be provided on each arrester unit.

6.0.0 DRAWINGS, DATA AND MANUAL

To Be Submitted After Award of Contract:

- Technical data sheets
- Dimensional general arrangement drawing
- Catalogues
- Quality plan
- Test certificates
- O&M manual

7.0.0 TESTS

- 7.1.0 The equipment offered shall be of type tested and proven type. Type test reports shall be submitted for review. All routine and acceptance tests in accordance with the latest version of applicable standard shall be conducted.
- 7.2.0 Lightning Arrester shall conform to type tests and shall be subject to routine test in accordance with IEC-99. –The following additional type tests are proposed to be conducted



- 7.3.0 Seismic Withstand Test: The seismic withstand test on the complete surge arrester shall be carried out along with the supporting structures etc. The seismic level specified shall be provided at the terminal pad of the surge arrester and any other point as agreed by the Purchaser the seismic test shall be carried out in all possible combinations of the surge arrester. The seismic test procedure shall be furnished for approval to the purchaser.

Routine Tests

- Measurement of reference voltage
- Residual voltage test of arrester unit
- Partial discharge test
- Current distribution test
- Leakage check
- Verticality check on completely assembled surge arresters

Acceptance Tests

- Measurement of power frequency reference voltage of the arrester units
- Lightning impulse residual voltage on arrester units
- Partial discharge test
- Thermal stability test on three sections
- Watt loss test
- Aging & energy capability test on blocks

8.0.0 TECHNICAL PARAMETERS

Sl. No.	Item	Data
1).	System voltage (nominal / highest)	132 / 145 kV
2).	Rated arrester voltage	120 kV
3).	Installation	Outdoor
4).	Type of earthing	Effectively earthed
5).	Type of arrester	Metal oxide / Gapless
6).	Rated frequency	50 Hz
7).	Nominal discharge current	10 kA of 8/30 microsecond wave shape
8).	Minimum discharge capability	6.5kJ/kV
9).	Continuous operating voltage at 50°C	102kV (rms)
10).	Max. residual voltage for switching impulse current	280kV (peak) at 1kA
11).	Max. residual voltage for lightning impulse current at discharge current	330kV (peak) at 10kA
12).	Max. steep current impulse at nominal discharge current	380kV (peak) at 10kA
13).	Long duration discharge class (IEC)	3
14).	High current short duration test value (4/10 micro second wave)	100kA (peak)
15).	Current for pressure relief test	31.5kA (rms)
16).	Low current long duration test value	As per IEC
17).	Partial discharge level at 1.05 COV	As per IEC