

MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD.

SCHEDULE 'A'

**TECHNICAL SPECIFICATION FOR 11kV/22 kV SURGE ARRESTERS
WITH DISCONNECTOR
(SPECIFICATION NO.DIST/MM-I/11&22 kV S.A./2007)**

1.0 SCOPE:

This specification covers the design, manufacture, assembly, testing at manufacturer's works, packing and delivery of Metal Oxide (gapless) Surge arresters with Arrester Disconnecter for 11kV & 22kV systems for use in various substations/ lines in the State of Maharashtra in India.

- 1.1** It is not the intent to specify completely herein all the details of design and construction of Surge arresters with Disconnecter. However, Surge arresters with Disconnecter shall conform in all respect to the high standard of design and workmanships mentioned in Clause 5.0 and be capable of performing in continuous commercial operation upto tenderer's guarantee in a manner acceptable to Purchaser, who will interpret the meanings of drawing and specifications and shall have the power to reject any work of material which in his judgement are not in accordance therewith. The Surge arresters with Disconnecter offered shall be complete with all parts, necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of supplier's supply, irrespective of whether they are specifically brought out in the specification and commercial order or not.

The active operating part of the Arrester is housed in an opaque porcelain /polymer rubber housing whereby the serviceability status of the Arrester is not revealed, and the maintenance staff is not able to detect and replace failed Arrester. Under these circumstances failed Arrester not only fails to protect the equipment for which it is intended, but may also drain the power continuously to the ground. In order to overcome the above drawbacks associated with

distribution class Arrester failure the purchaser intends to purchase Surge Arresters with Disconnecter.

The Surge Arresters with Disconnecter is intended to perform the following operations.

- (1) Disconnect from the power system any failed Arrester to which Disconnecter is connected in series in order to prevent loss of energy to the ground.
- (2) Provide visual indication of "failed" Arrester to facilitate its timely replacement.
- (3) The Disconnecter should be suitable for retrofitting on the existing silicon- conventional Gapped/Metal Oxide Gapless distribution class Arresters of any make, for this purpose a small conducting adaptor may be provided if necessary.

2.0 SERVICE CONDITIONS:

The Surge arresters with Disconnecter and accessories shall be suitable for continuous, satisfactory operation under climatic conditions listed below: -

| | | |
|---|---|-----------|
| 1.Maximum ambient air temp. (oC) | : | 50 |
| 2.Minimum ambient air temp. (oC) in shade | : | 3.5 |
| 3.Humidity (%) | : | 10 to 100 |
| 4.Maximum altitude above mean sea level (Meter) | : | 1000 |
| 5.Maximum annual rainfall (mm) | : | 1450 |
| 6.Maximum wind pressure (kg/Sq.Mtr.) | : | 150 |
| 7.Isoceraunic level | : | 50 |
| 8.Seismic level (Horizontal accln.). | : | 0.3 g |
| 9.Moderately hot and humid tropical Climate, conductive to rust and fungus growth. | | |

3.0 SYSTEM PARTICULARS:

The equipment offered under this specification shall be suitable for 11 kV & 22 kV, 50 Hz and A.C. SYSTEM.

4.0 STANDARDS:

The Surge Arresters with Disconnecter shall conform to the latest editions available at the time of placement of orders of the Standards listed in Annexure-I.

5.0 SPECIFIC TECHNICAL REQUIREMENTS:

5.1 The Surge arresters with Disconnecter shall conform to the technical requirements as per Annexure-II.

5.2 The energy handling capability of each rating of Surge arrester with Disconnecter offered, supported by calculations, shall be furnished in the offer.

5.3 PROTECTIVE LEVELS:

The basic insulation levels of lines and equipments to be protected have been specified in relevant IS. The required protective levels of the Surge arresters with Disconnecter have been specified in Annexure-II. The protective characteristics of the Surge arresters with Disconnecter offered shall be clearly brought out in the guaranteed & other technical particulars, i.e.G.T.P.

6.0 GENERAL REQUIREMENT:

6.1 The tenderer shall submit the list of the orders executed or under execution during the last 3 years for similar type of equipments with full details in the schedule of tenderer's experience (Schedule-C).

6.2 Each individual unit of Surge arresters with Disconnecter shall be hermetically sealed and fully protected against ingress of moisture. The hermetic seal shall be effective for the entire lifetime of the arrester with disconnecter and under the specified service conditions. A suitable pressure-relieving device shall be provided to avoid damage to the external insulator in case of a severe discharge. The tenderer shall

furnish in the bid, a sectional view of the Arresters, showing details of sealing.

6.3 The corresponding units of Surge Arresters with Disconnecter of the same rating shall be interchangeable without adversely affecting the performance.

6.4 The Surge arresters with Disconnecter shall be suitable for bracket type mounting.

6.5 All the necessary flanges, bolts, nuts, clamps etc. required for assembly of complete Surge arrester with Disconnecter with accessories and mounting on purchaser's support structure shall be included in bidder's scope of supply and shall be galvanized.

6.6 The mounting details for mounting the Surge arresters with Disconnecter on purchaser's support shall be given alongwith the bid.

6.7 The minimum permissible separation between the single-phase Surge arresters with Disconnecter of a three phase bank and between Surge arrester with Disconnecter and any nearby earthed object shall be furnished by the tenderer in his bid.

6.8 PORCELAIN / POLYMER RUBBER HOUSING:

6.8.1 Porcelain / Polymer Rubber Housing shall be free from lamination cavities or other flaws affecting the mechanical and electrical strengths.

6.8.2 The porcelain/Polymer Rubber housing shall be thoroughly vitrified and non-porous. The housing shall conform to the degree of protection as per IP53 (IS 1394 part-I,1993)

6.8.3 The creepage distance of the Arrester housing shall be as indicated in Annexure-II.

6.8.4 The Surge arresters with Disconnecter housing shall conform to the requirements of IEC-99-4 specification for surge arrester without gaps for A.C. System.

6.9 GALVANISATION, NICKEL PLATING ETC.:

6.9.1 Line terminal pads, ground terminal pads, and nameplate bracket shall be hot dip galvanized as per IS 4759- 1996.

6.9.2 The material shall be galvanized only after completing shop operations.

7.0 ACCESSORIES & FITTING:

The grounding terminals shall be suitable for accommodating Purchaser's grounding.

7.1 NAME PLATE:

The Surge arresters with Disconnecter shall be provided with non-corrosive legible nameplate marked with punching or engraving the following information.

- 1) Maharashtra State Electricity Distribution Company Ltd.
- 2) Order No.
- 3) Manufacturer's name or trade mark and identification of the supplied Surge arresters with Disconnecter.
- 4) Rated voltage.
- 5) Maximum continuous operating voltage.
- 6) Type
- 7) Rated frequency.
- 8) Nominal discharge current.
- 9) Long duration discharge class.
- 10) Identification of assembly position of the unit.
- 11) Year of manufacture.

8.0 TESTS:

A . ROUTINE AND ACCEPTANCE TESTS:

8.1 No Surge arrester with Disconnecter shall be dispatched without inspection and testing. The purchaser may carry out the inspection at any stage of manufacture. The tenderer shall grant free access to the purchaser's representative at a reasonable time when the work is in progress.

8.2 All Surge arresters manufactured & to be supplied against M.S.E.D.C.L.'s tender shall be subjected to Routine & Acceptance tests as per Clause No.7.3 of IS: 3070 (Part-1) : 1985 as amended up to date.

8.3 Inspection and acceptance of any equipments under this specification by the purchaser, shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

8.4 The supplier shall keep the purchaser informed in advance, about the manufacturing programme so that arrangement can be made for inspection.

B. TYPE TESTS:

The tenderer shall furnish detailed type test reports of the offered Surge Arrestor with disconnecter for all the tests as per relevant IS and this specification. All these Type Tests shall be carried out at laboratories which are accredited by the National Accreditation Board of Testing and Calibration Laboratories(NABL) of Government of India to prove that Surge Arrestors with disconnecter offered meet the requirements of the specification. These tests should have been carried out within five years prior to the date of opening of this tender. However, the tenderers who have supplied the Surge Arrestor with disconnecter to this Company against order from Central Purchase Agency of M.S.E.D.C.L. shall be exempted from submission of type test reports against this tender provided

- (i) their offered Surge Arrestor with disconnecter are already fully type tested at Laboratories accredited by the National Accreditation Board for Testing and Calibration Laboratories(NABL) within five years prior to the date of opening of the tender
- (ii) there is no change in the design of type tested Surge Arrestor with disconnecter and those offered against this tender
- (iii) such tenderers complying (i) and (ii) above shall furnish an undertaking in the format scheduled 'F' enclosed herewith.

The detailed type test reports alongwith the relevant oscillograms/ certified drawings etc. or undertaking seeking exemption from their submission in the format schedule 'F', are to be submitted along with the offer.

The purchaser reserves the right to demand repetition of some or all the Type Tests in presence of purchaser's representative at purchaser's cost. For this purpose, the tenderer shall quote unit rates for carrying out each Type Test. However, such unit rates will not be considered for evaluation of the offer. In case the unit fails in the type tests, the complete supply shall be rejected.

The successful tenderer shall take approval / waiver of type tests from C.E.(Dist.), M.S.E.D.C.L, Prakashgad, Bandra , Mumbai prior to commencement of supply.

9.0 DOCUMENTATION:

9.1 All drawings shall conform to International Standards Organization ISO) "A" series of drawing sheet/Indian standards specification IS:656. All drawings shall be in ink and suitable for microfilming. All dimensions and data shall be in System International Units.

9.2 The tenderer shall furnish one sets of following drawings alongwith this offer:

i) General outline drawings of the complete Arrester with Disconnecter with technical parameters.

ii) Drawing showing clearance from grounded and other live objects and between adjacent poles of Surge arresters, required at various heights of Surge arresters.

iii) Mounting details, installation and commissioning instructions of Surge arresters.

iv) Details of line terminal and ground terminals.

v) The detailed dimensional drawing of Porcelain/Polymer housing such as ID, OD, thickness and insulator details such as height, profile of petticoats, angle of inclination and gap between successive petticoats, total creepage distance etc.

10. DRAWINGS :

One set of neat and clean (preferably computerized) dimensional drawing and internal construction drawing of each Surge arrester with Disconnecter shall be submitted with each copy of the tender. Drawings shall be of A-4 size only.

10.1 The successful tenderer will have to submit 3 sets of above drawings to the Chief Engineer (Dist.) & obtain approval for the same. The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk.

10.2 Approval of drawings/works by purchaser shall not relieve the supplier of any of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the latest revision of applicable standards, rules and codes of practices. The purchaser shall have the power to reject any work or material, which in his judgment is not in accordance therewith.

11.0 PACKING AND FORWARDING:

11.1 The equipment shall be packed in suitable crates so as to withstand handling during transport and out door storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbols. Wherever necessary, proper arrangement for lifting such as lifting hooks etc. shall be provided. Supplier without any extra cost shall supply any material found short inside the packing cases.

11.2 Each consignment shall be accompanied by a detailed packing list containing the following information.

- a) Name of the consignee.
- b) Details of consignment.
- c) Destination.

- d) Total weight of consignment.
- e) Sign showing upper/lower side of the crate.
- f) Handling and unpacking instructions.

11.3 The supplier shall ensure that the purchaser before dispatch approves the packing list and bill of material.

11.4 The material shall be transported within Maharashtra to the respective destination by Road Transport/Rail Transport as the case may be at the option of purchaser.

12. SCHEDULES :

The tenderer shall fill in the following schedules, which form part of the tender specification and offer. In Guaranteed Technical Particulars, the specific values shall be furnished and only quoting of IS reference " as per the drawing enclosed ", " as per M.S.E.D.C.L.'s requirement " etc. will be considered as details not furnished. If the schedules are not submitted duly filled in with the offer, the offer shall be rejected.

Schedule "C"- Tenderer's Experience

Schedule "F"- Undertaking

ANNEXURE-I

LIST OF STANDARDS

| Sr.No. | Standard Ref.No. | Title |
|--------|---|--|
| 1. | IEC-99-4/1991 | Specification for Surge arresters without gap of A.C.system. |
| 2. | ISS-3070 (Part-1)/1985 &(Part-3)/1993 | Specification for Lightning Arresters for Alternating Current Systems. |
| 3. | ISS-4759/1996 | Hot dip zinc-coating on structural steel and other allied products. |
| 4. | ISS-2633/1986 | Method for testing uniformity of coating on zinc coated articles. |
| 5. | ISS-5621/1980 | Specification for large hollow porcelain for use in electrical installation. |
| 6. | ISS-13947/1993 (Part-I) | Degree of protection provided by enclosures for low voltage switch gear and control. |
| 7. | - | Indian Electricity Rules 1956 |

NOTE

- i) For the purpose of this specification all technical terms used in this specification shall have the meaning as per IEC specification.
- ii) For the parameters of the Surge arresters with Disconnectors which are not specified in IEC specification for surge arresters, the provisions of ISS-3070 (Part-3) shall be applicable.

ANNEXURE - II

SYSTEM VOLTAGEWISE REQUIREMENTS OF PARAMETERS FOR SURGE ARRESTERS WITH DISCONNECTOR

| Sr. No. | Particulars | 11 kV | 22 kV |
|---------|---|--------------------------------|--------------------------------|
| 1 | Rated Voltage ** (kV rms) | 9 | 18 |
| 2 | Maximum Continuous Operating Voltage (M.C.O.V.) in kV rms. | 8 | 15 |
| 3 | Installation | Outdoor | Outdoor |
| 4 | Class | Distribution | Distribution |
| 5 | Type of construction | Single Column, Single Phase | Single Column, Single Phase |
| 6 | Nominal discharge current corresponding to 8/20 micro sec wave shape (kA rms) | 5 | 5 |
| 7 | Type of mounting | Bracket type | Bracket type |
| 8 | Connection (Between phase to earth P/E) | P/E | P/E |
| 9 | Long duration discharge class | 75 AMPS 1000 Micro Sec. | 75 AMPS 1000 Micro Sec. |
| 10 | Min. creepage distance of arrester housing (mm). | 300 | 600 |

**** Rated Voltage means max permissible r.m.s. value of power frequency voltage at which Surge arresters are designed to operate correctly.**

ANNEXURE - III

: SYSTEM PARTICULARS:

The surge arrester offered under this specification shall confirm to the parameters given below: -

| Sr. No. | Particulars | For 11 kV Surge Arrester | For 22 kV Surge Arrester |
|---------|---|--------------------------|--------------------------|
| 1 | Nominal system voltage (kV r.m.s.) | 11 | 22 |
| 2 | Highest system voltage (kV r.m.s.) | 12 | 24 |
| 3 | 1.2/50 microsecond impulse voltage withstand level | 75 | 125 |
| 4 | System frequency (HZ) | 50 | 50 |
| 5 | Neutral Grounding | Effectively Earthed. | Effectively Earthed. |
| 6 | Number of phases | Three | Three |
| 7 | One minute power frequency withstand voltage (kV r.m.s.) of arrester housing. | 28 | 50 |

SCHEDULE - ' C '

SCHEDULE OF TENDERER'S EXPERIENCE

Tenderer shall furnish here a list of similar orders executed / under execution by him to whom a reference may be made by Purchaser in case he considers such a reference necessary.

| SR. NO. | NAME OF CLIENT & DESCRIPTION | VALUE OF ORDER | PERIOD OF SUPPLY & COMMISSIONING | NAME & ADDRESS TO WHOM REFERENCE MAY BE MADE |
|---------|------------------------------|----------------|----------------------------------|--|
|---------|------------------------------|----------------|----------------------------------|--|

NAME OF FIRM _____

NAME & SIGNATURE OF TENDERER _____

DESIGNATION _____

DATE _____

SEAL & SIGNATURE OF THE TENDERER

SCHEDULE ' F '

PROFORMA OF UNDERTAKING

We hereby confirm that Surge Arresters with Disconnecter offered by us against this tender are of the same design and type as have been supplied to M.S.E.D.C.L. against earlier order No. _____ dated _____ and all the type test reports thereof were approved by C.E.(Dist.) vide letter No. _____ dated _____ (copy enclosed).

We further confirm that the said type tests have been carried out at the laboratories accredited by NABL within five years prior to the date of opening of the present tender.

SEAL & SIGNATURE OF THE TENDERER