



**GUJARAT ENERGY TRANSMISSION
CORPORATION LTD.**

**SARADAR PATEL VIDYUT BHAVAN,
RACE COURSE, BARODA – 390 007.**

**TECHNICAL SPECIFICATIONS
FOR**

**400 kV, 220 kV & 132 kV LIGHTNING
ARRESTORS (SURGE ARRESTORS)**

SPECIAL INSTRUCTIONS TO BIDDER

Please read following instructions carefully before submitting your bid.

1. All the drawings, i.e. elevation, side view, plan, cross sectional view etc., in AutoCAD format and manuals in PDF format, for offered item shall be submitted. Also the hard copies as per specification shall be submitted.
2. The bidder shall submit Quality Assurance Plan for manufacturing process and Field Quality Plan with the technical bid.
3. The bidder shall have to submit all the required type test reports for the offered item. In absence of this the evaluation shall be carried out accordingly as non submission of type test reports.
4. The bidder must fill up all the point of GTP for offered item/s. Instead of indicating “refer drawing, or as per IS/IEC”, the exact value/s must be filled in.
5. All the points other than GTP, which are asked to confirm in technical specifications must be submitted separately with the bid.
6. The bidder is required to impart training in view of manufacture, assembly, erection, operation and maintenance for offered item, at his works, to the person/s identified by GETCO, in the event of an order, free of cost. The cost of logistics will be bear by GETCO.
7. Please note that the evaluation will be carried out on the strength of content of bid only. No further correspondence will be made.
8. The bidder shall bring out all the technical deviation/s only at the specified annexure.
9. The bidder should indicate manufacturing capacity by submitting latest updated certificate of a Chartered Engineer (CE).

QUALIFYING REQUIREMENT DATA

(For Supply)

Bidder to satisfy all the following requirements.

- 1) The bidder shall be Original Equipment Manufacturer (OEM). The offered equipment have to be designed, manufactured and tested as per relevant IS/IEC with latest amendments.
- 2) The minimum requirement of manufacturing capacity of offered type, size and rating of equipment shall be **5 times (for 400 kV LA) and 7 times (for 132 & 220 kV LA) of tender / bid quantity**. The bidder should indicate manufacturing capacity by submitting latest updated certificate of a Chartered Engineer (CE).
- 3) Equipment proposed shall be of similar or higher rating and in service for a minimum period of THREE (3) years and satisfactory performance certificate in respect of this is to be available and submitted.
- 4) The bidder should clearly indicate the quantity and Single Value Contract executed during last FIVE (5) years, for the offered equipment. Bidder should have executed one single contract during last five years for the quantity equivalent to tender / bid.

The details are to be submitted in following format,

Sr. No	ITEMS SUPPLIED TO	ORDER REFERENCE No. & DATE	ITEMS	QUANTITY	ORDER FULLY EXECUTED. YES/NO	STATUS, IF ORDER UNDER EXECUTION	REMARK
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- 5) Equipment offered shall have Type Test Certificates from accredited laboratory (accredited based on ISO/IEC Guide 25 / 17025 or EN 45001 by the National accreditation body of the country where laboratory is located), as per IEC / IS / technical specification. **The type test reports shall not be older than TEN years and shall be valid as on the last date of submission of bid**

TECHNICAL SPECIFICATION
FOR 400 kV, 220 kV & 132 kV LIGHTNING ARRESTORS (SURGE ARRESTOR)

1.0 SCOPE :

- 1.1** This specification covers the design, Engineering manufacture, stage testing, inspection and testing before dispatch, packing and delivery at Destination at the discretion of the purchaser of Metal oxide (gapless) surge arresters with discharge counter, insulating base and other accessories for 400 KV / 220KV & 132KV system, specified herein for their satisfactory operation in various Sub-Stations of the state.
- 1.2** It is not the intent to specify completely here in all the details of design and construction of surge Arrestors. However, Surge Arresters shall conform in all respect to the high standard of design and workmanship and be capable of performing in continuous commercial operation up to Bidder's guarantee in a manner acceptable to purchaser who will interpret the meanings of drawings and specifications and shall have the power to reject any work or material which in his judgment are not in accordance therewith. The Arresters and discharge counters 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 supply, irrespective of whether they are specifically brought out in the commercial order or not.
- 1.3** *The scope also includes supply of hot dip galvanized support structures having adequate design, if indicated in Schedule - A of respective tender. The base plan and top plan of structures shall be as per drawing attached herewith. The successful bidder shall have to submit design calculation for offered structure.*

2.0 STANDARDS :

- 2.1** The Surge Arresters shall conform to the latest editions and amendments available at the time of supply of the standards listed hereunder.

Sr. No.	Standard Ref. No.	Title
1.	IEC-60099-4 (2014) Ed3.0	Specification for Surge Arresters without gap for AC system
2.	15086(Part-4):2017	Specification for Metal-oxide surge arresters without gaps for a.c systems.

3. **IS:2633 Method for testing uniformity of coating on zinc coated articles.**
4. **IS : 62155 Specification for Hollow Porcelain Insulator**
5. **--- Indian Electricity Rules, 1956.**

Note:

1. For the purpose of this specification all technical terms used hereinafter shall have the meaning as per IEC specification.
2. For the parameters of the Arrester which are not specified in IEC specification for Surge Arresters, the provisos of IS 15086(part-4):2017 shall be applicable.

2.1 Equipment meeting with the requirements of other authoritative standards, which ensure equal or better quality than the standards mentioned above shall be acceptable. Where the equipment offered by the Bidder conforms to other standards, salient points of difference between the standards, adopted and the specified standards shall be clearly brought out in the offer. Four (4) copies of the reference standards in English language shall be furnished alongwith the offer.

3.0 CLIMATIC CONDITIONS :

The climatic and isoceraunic conditions at site are given below :

I	Altitude above mean sea level (Mtrs.)	Not exceeding 1000
II	Maximum ambient air temperature °C	50
III	Max. daily average ambient air temp. °C	35
IV	Relative humidity for design of equipment %	95
V	Max. yearly weighted average temp. °C	30
VI	Min.annual rail fall in (mm).	3.5
VIII	Climate	Moderately hot and humid climate
IX	Isoceraunic level	30
X	Average No. of thunder storm days per annum. (Nos.)	30
XI	Max. wind pressure Kg. / m ²	150
XXI	Earth quake acceleration (G)	0.08X2g

3.1.1 The Surge Arrestors offered shall be suitable for continuous operations at their full rated capacity under the above conditions.

3.1.2 Since substations are situated near the Industrial Area and in polluted atmosphere, the equipment offered shall be suitable for heavily polluted atmosphere.

3.1.3 All Surge Arrestors with associated items supplied against this specification shall be given tropical and fungicidal treatment in view of the adverse climate conditions prevailing at site.

4.0 **PRINCIPAL PARAMETERS :**

The Surge Arrestors offered under this specification shall conform to the parameters given below:

Sr. No.	Particulars	System Voltage (KV rms) 400-220-132
1.	Nominal system voltage (KV rms)	400-220-132
2.	Highest system voltage (KV rms)	420-245-145
3.	1.2/50 Microsecond impulse voltage withstand level	
	(a) Transformers and Reactors (KVP)	1300-1050-650
	(b) Other equipments and lines (KVP)	1425-1050-650
4.	Switching withstand impulse voltage of all equipments and lines (KVP)	1050-NA-NA
5.	(a) One minute P.F. withstand voltage of arrester housing (Dty) (KV rms).	630-460-275
	(b) ---Do --- but wet	630-460-275
5.1	Maximum Continuous Operating Voltages, kV min.	290/162/96
5.2	Energy absorption capability, in kJ/kV	7kJ/kv for 132 & 220kV & 10kj/kV for 400kV
6.	Pressure Relief Class (KA rms)	40
7.	Anticipated levels of temporary over voltage and its duration	
	(a) Voltage	1.3 times rated voltage of arrester
	(b) Duration (Seconds)	1 to 10
8.	System frequency (Hz)	50 \pm 1.5 -
9.	Neutral Grounding	Effectively earthed
10.	Number phase	Three
11	Ratio of switching impulse residual voltage to rated voltage of arrester	Not more than two
12	Arrester Classification	SM for 132 & 220 kV & SH for 400 kV
13	Max RIV when energized at MCOV	1000 micro volts
14	Partial discharge value	50 pc (max)
15	Minimum creepage distance (mm)	10500-6125-3625
16 (a)	Terminal connector for 132 & 220 kV class LA	Bimetallic compression type Twin Moose ACSR 350mm spacing suitable for Horizontal and Vertical take off.

16 (b)	Terminal connector for 400 kV class LA	<i>i) Bimetallic compression type Twin Moose ACSR 350mm spacing suitable for Horizontal and Vertical take off. OR ii) suitable for 4" IPS (Type and quantity will be given during detailed engineering)</i>
17	Type of mounting	Pedestal (on structure)
18	Arrester rated voltage, kV	360-198-120 for 400-220-132 kV LA
19	Nominal Discharge current, kA	20-10-10 for 400-220-132 kV LA
20	Repetitive charge transfer rating Qrs in coulombs	2.4-1.6-1.6 C for 400-220-132 kV LA
21	Cantilever Strength (for 1 minute withstand test) (in kg)	350-150-150 for 400-220-132 kV LA
22	Maximum deflection at above cantilever load (in mm)	200-125-50 for 400-220-132 kV LA
23	PCD	353-353-262 for 400-220-132 kV LA

5.0 **GENERAL TECHNICAL REQUIREMENTS:**

- 5.1** The Surge Arrester shall conform to the technical requirements as per 4.0 above
- 5.2** Calculation for the energy handing capability of each rating of Arrester offered shall be furnished in the offer.
- 5.3** **The Arrester shall be design A type &** shall be fitted with pressure relief devices and are diverting ports and shall be tested as per the requirements of IEC specification for minimum prospective symmetrical fault current as specified under clause 4.0 (6) above.
- 5.4** The grading ring on each complete arrester for proper stress distribution shall be provided, if required, for attaining all the relevant technical parameters.

5.5 Protective Levels:

The basic insulation levels and switching impulse withstand levels of the lines and equipment to be protected, have been specified under clause 4.0, "Principal parameters". The protective characteristics of the Arresters offered shall be clearly specified in the schedule of guaranteed technical particulars.

5.6 General Requirements:

- 5.6.1 The materials and components not specifically stated in this specification but which are necessary for satisfactory operation of the surge arrestors are deemed to be included in the scope of supply unless specifically excluded.
- 5.6.2 Each individual unit of Surge arrester shall be hermetically sealed and fully protected against ingress of moisture. The hermetic seal shall be effective for the entire life time of the Arrester and under the service conditions as specified. The Bidder shall furnish sectional view of the Arrester, showing details of sealing employed. The details like material, cross section/thickness etc shall be indicated in cross sectional drawing.
- 5.6.3 The Bidder shall furnish in the offer, a sectional view of pressure relief device provided in the surge Arrester offered.
- 5.6.4 The surge Arrester shall be suitable for hot line washing.

5.7 Construction :

- 5.7.1 All the units of Arresters of same rating shall be interchangeable without adversely affecting the performance.
- 5.7.2 The Surge Arresters shall be suitable for pedestal type mounting.
- 5.7.3 All the necessary flanges, bolts , nuts, clamps etc. required for assembly of complete Arrester with accessories and mounting on support structure, to be the purchaser shall be included in Bidder's scope of supply.
- 5.7.4 The drilling details as per IEEMA guidelines for mounting the Arrester on purchaser's support shall be furnished to the successful Bidder.
- 5.7.5 The minimum permissible spacing between the Surge Arrester and any earthed object shall be indicated by the Bidder in his offer.

5.7.6 The Aluminum Grading Ring on each complete 198 kV & 360 kV arrester for proper stress distribution shall be provided.

5.7.7 The Aluminum Corona Ring shall be provided for each 360 Kv arrester.

5.8 Porcelain Housing:

5.8.1 All porcelain housing shall be free from lamination cavities or other flaws affecting the maximum level of mechanical and electrical strengths

5.8.2 The porcelain shall be well vitrified and non-porous.

5.8.3 The creepage distance of the arrester housing shall be as stated cl. 4.0

5.8.4 The porcelain petticoat shall be preferably of self-cleaning type (Aerofoil design.) The details of the porcelain housing such as height. Angle of inclination, shape of petticoats, gap between the petticoats, diameter (ID and OD) etc., shall be indicated by the Bidder in his offer in the form, of a detailed drawing.

5.8.5 The Arrester housing shall conform to the requirements of draft IEC **60099-4** specification.

5.9 Galvanization. Nickel Plating etc..

5.9.1 All ferrous parts exposed to atmosphere shall be hot dip galvanized as per IS 2633 / IS **15086** Part **IV** as amended from time to time., Tinned copper/brass lugs shall be used for internal wiring of discharger counter. Screws used for electrical connections shall be either made of brass or nickel plated

5.9.2 Line terminal pads ground terminal pads and name plate brackets shall be hot dip galvanized.

5.9.3 The material shall be galvanized only after completing all shop operations.

5.10. Accessories and Fittings.

5.10.1 The discharge counter shall be provided for the Arresters. The discharge counter shall be provided with millimeter for measuring the leakage current and shall not require any DC or AC Aux. Supply. It shall be for outdoor use. The installation of discharge counter shall not adversely affect the arrester performance.

5.10.2 The discharge counter shall register operation whenever lightning or any other type of Surge strikes the Surge Arrester.

5.10.3 All necessary accessories and earthing connection leads between the bottom of the Arrester and the discharge counter shall be in the supplier's scope. The discharge counter shall be so designed that the readings of discharges recorded by the counter and the readings of millimeter shall be clearly visible through an inspection window to a person standing on ground. The minimum height of support shall be 2.5 M. **The live part to plinth level clearance shall be maintained as follow;**

400 kV – 8000 mm

245 kV – 5500 mm

145 kV – 4600 mm.

5.11 Each Surge Counter shall have terminals of robust construction for connection to earthing lead and these shall be suitably arranged so as to enable the incoming and outgoing connection to be made with minimum bends. **The connection of LA to Surge Monitor shall be made from bottom of surge monitor and there shall not be any opening on top of surge monitor. *The connecting cable shall be double PVC sheathed stranded copper flexible twin cables of 50 sqmm, duly ferruled by copper lugs on both sides. The length of cable shall be 2 Meter each.***

5.11.1 The grounding terminals shall be suitable for accommodating Purchaser grounding connection to steel earth mat. Proper functioning of the Surge Arrester shall be ensured by the Bidder.

5.11.2 The mounting of LA shall be suitable as per structure drawing attached. If required necessary MS, HDG 8 mm thick adaptor plate

with both PCD drilled in, shall be supplied as a part of supply.

5.12 Name Plate :

Each surge arrestor shall be provided with non-rusting and non-corroding name plate bearing arrestors Identification as per IEC Specification indelibly marked with the following information:

1. GUJARAT ENERGY TRANSMISSION CORPORATION LTD
2. Order No.
3. Manufacturer's name or trademark and identification no. of the Arrestor being supplied.
4. Rated voltage.
5. Maximum continuous operating voltage.
6. Type
7. Rated Frequency.
8. Nominal discharge current.
9. **Arrester Designation**
10. **Rated Short Circuit rating(kA).**
11. B.I.L. of the equipment to be protected.
12. Year of manufacture.

6.0 TESTS :

6.1 Lighting Arrestor 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

i) **Seismic Withstand Test:**

The seismic withstand test on the complete surge arrestor shall be carried out alongwith the supporting structures etc. The seismic level specified shall be provided at the terminal pad of the surge arrestor and any other point as agreed by the Purchaser the seismic test shall be carried out in all possible combinations of the surge arrestor. The seismic test procedure shall be furnished for approval to the purchaser.

6.2 Test Charges and Test Schedule:

6.2.1 Type Test:

All the Lightning Arrester offered shall be fully type tested as per relevant standard (latest edition) at the Government approved laboratory of the eligible county or independent internationally recognized testing laboratory. The Bidder shall furnish one set of the type test reports for the Lighting Arrester of the type and Design offered by him along with the offer. The Type Test report shall not be older than TEN years and shall be valid as on the last date of submission of bid, otherwise the offer will not be considered.

The following type test reports shall be submitted with the technical bid. The offer submitted without valid type test report shall be evaluated accordingly.

S N	List of Type test reports
	Tests on metal oxide blocks
1	Steep Current Impulse Residual Voltage test
2	Lightning impulse Residual voltage test
3	Switching impulse Residual voltage test
4	Repetitive charge transfer test
5	Operating duty test
6	P. F. voltage v/s time characteristic
7	Reference voltage test
8	Test to verify long term stability under continuous operating voltage
	Tests on Arrester Housing
9	Impulse voltage withstand test on insulator
10	P.F. (Wet) voltage withstand test on insulator
11	Bending moment test
	Tests on Arrester
12	Artificial pollution test (IEEE-C62.11)
13	Seismic withstand test
14	Short-Circuit Tests
15	Partial Discharge Test
16	Radio Interference voltage test
17	Heat Dissipation Behavior verification of test sample.
18	Cantilever test on complete arrester as per requirement of Clause4.0.
	General
19	STC on Terminal connector (40 kA for 3 sec)
20	Degree of Protection test on counter/surge monitor
21	Uniformity of Zinc coating

However the purchaser reserves the right to demand repetition of some or all the type tests in the presence of purchaser's representative.

6.2.2 ACCEPTANCE AND ROUTINE TESTS:

All acceptance and routine tests as stipulated in the relevant standards

shall be carried out by the supplier in presence of Purchaser's representative.

The following acceptance tests & sampling as per IS:15086 shall be carried out in presence of GETCO representative.

SN	List of Acceptance test reports
1	Lightning Impulse residual voltage test on complete arrester / unit of arrester
2	Reference voltage test
3	Seal leakage check test
4	Partial discharge test
5	Visual / Dimensional check
6	Special thermal stability test
7	Galvanization test on metal parts
8	Functional (operational) tests on surge monitor/counter at nominal discharge currents (a) 100 Amps with 8/20 microsecond wave shape. (b) 10 KA with 8/20 microsecond wave shape.
9	Sealing test: Water dip test at 1.5m depth from top of Surge Arrester for 30 minutes shall be performed during assembly of Surge Arrester stacks (followed by other routine tests, i.e. P.D. measurement, reference Voltage, Residual Voltage & IR Measurement).
10	Surge monitors shall be routinely tested for water dip test at 1.5m depth for 30 minutes. No water vapours shall be visible on the monitor glass.

6.3 Acceptance tests, whenever possible shall be conducted on the complete arrester unit. The number of samples to be subjected to acceptance tests shall be decided by the purchaser at the time of actual testing.

The following routine test reports shall be submitted.

S N	List of Routine test reports
1	Measurement of reference voltage
2	Lightning Impulse Residual voltage test
3	Seal leakage check test
4	Partial discharge test
5	Tests on discharge counter
6	Visual / Dimensional check
7	Sealing test: Water dip test at 1.5m depth from top of Surge Arrester for 30 minutes shall be performed during assembly of Surge Arrester stacks (followed by other routine tests, i.e. P.D. measurement, reference Voltage, Residual Voltage & IR Measurement). on any one randomly selected sample from every 50 (Fifty) or below nos. of LA offered for inspection, shall be carried out and report shall be submitted.
8	Surge monitors shall be routinely tested for water dip test at 1.5m depth for 30 minutes. No water vapors shall be visible on the monitor glass. on any one randomly selected sample from every 50 (Fifty) or below nos. of LA offered for inspection, shall be carried out and report shall be submitted.

7.0 INSPECTION:

- I) The Purchaser shall have access at all items to the works and all other places of manufacture, where the Lightning Arrester are being manufactured and the Bidder shall provide all facilities for unrestricted inspection of the suppliers works raw materials, manufacture of all the accessories and for conduction of necessary tests as detailed herein.
- II) The successful Bidder shall keep the purchaser informed in advance of the time of starting and of the progress of manufacture of equipment in its various stages so that arrangements could be made for stage inspection.
- III) No material shall be dispatched from its point of manufacture unless the material has been satisfactorily inspected and tested.
- IV) The acceptance of offered surge arrester shall in no way relieve the successful Bidder of his responsibility for meeting all the requirement of this specification and shall not prevent subsequent rejection if such equipment is later found to be defective.

8.0 QUALITY ASSURANCE PLAN :

8.1 The Bidder shall invariably furnish following information alongwith his offer. Information shall be separately given for offered surge arrester / Items / parts (associated with it) with surge arrester.

1. Statement giving list of important raw materials names of sub-suppliers for the raw material, list of standards according to which the raw material are tested, list of tests, normally carried out on raw material in presence of Bidder's representative, copies of test certificates.
2. Information and copies of test certificates as in (I) above in respect of bought out items.
3. List of manufacturing facilities available.
4. Levels of automation achieved and list of areas where manual processing exists.
5. List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of such tests and inspections.
6. Special features provided in the equipment to make it

maintenance free.

7. List of testing equipment available with the supplier for final testing of equipment specified and test plant limitation, if any, vis-à-vis the type, special, acceptance and routine tests specified in the relevant standards. These limitations shall be very clearly brought out (If any) from specified test requirements.

8.2 The successful Bidder shall within commencement period of order submit the following information to the purchaser.

- I) List of raw material as well as brought out accessories and the name of the material as well as brought out accessories and the names of sub-suppliers selected from those furnished along with the offer.
- II) Type test certificates of the raw material and brought out accessories.
- III) Quality assurance plan (QAP) with hold points for purchaser's inspections **shall be submitted with technical bid and in the event of an order for approval**. The QAP and purchaser hold points shall be discussed between the purchaser and the supplier before the QAP is finalized.
- IV) Field Quality Plan shall be submitted with technical bid and in the event of an order for approval.**
- V) Operation and Maintenance manuals shall be submitted with technical bid and in the event of an order for approval**

The bidder shall invariably furnish following information alongwith the offer.

- a) Names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested, list of tests normally carried out on raw materials in presence of supplier's representative, copies of test certificates.
- b) Information and copies of test certificates in respect of bought out accessories.
- c) List of manufacturing facilities available.
- d) Level of automation achieved and lists of areas where manual processing still exists.

- e) List of areas in manufacturing process, where stage inspection is normally carried out for quality control and details of such tests and inspections.
- f) List of testing equipments available with supplier for final testing equipment and test plant limitation if any, vis-à-vis the type, special , acceptance and routine test specified in the relevant standards. These limitations shall be very clearly brought out in the specified test requirement.

8.3 The successful bidder shall submit the routine test certificates of bought out items and raw materials at the time of routine testing of the fully assembled arrester.

9.0 DOCUMENTATION :

9.1 All drawings shall conform to International standards organization (ISO) “A” series of drawing sheets / Indian standards specifications IS:11065. All drawings shall be in ink and suitable for microfilming. All dimensions and data shall be in S.I.Units

9.2 The Bidder shall furnish one set of following drawings alongwith the offer:

- General outline drawings of the complete arrester with technical parameters.
- Drawing showing clearance from grounded and other live objects and between adjacent poles of surge Arresters, required at various heights of surge Arresters.
- Drawing showing details of pressure relief devices.
- Detailed drawing of discharge counters alongwith the writing and schematic drawing of discharge counter and meter.
- Outline drawing of insulating base.
- Details of grading rings, if used.
- Mounting details of Surge Arresters.
- Details of line terminal and ground terminals.
- Details and dimensions of ZnO block.
- Volt-time characteristics of Surge Arresters.
- Details of galvanizing being provided on different ferrous parts.
- Details of Master name plate and individual unit name plate.
- The detailed dimensional drawing of porcelain housing such as ID, OD thickness and insulator details such as height, profile of petticoats, angel of inclination and gap between successive petticoats, total minimum creep age distance etc.

In the event of an order the bidder has to submit the above drawings in three sets for approval during commencement period and after the approval, the set of approved copies of drawings in hard copy and soft copy (AutoCAD format) shall be sent as follows:

Each consignee----- 3 sets

Each respective Suptd. Engr. - 2 sets

Chief Engineer (Project)—2 sets

9.3 TEST REPORTS :

- I) Four copies of acceptance test reports shall be furnished to the purchaser and arresters with accessories shall be dispatched only after approval of these test reports.
- II) All records of routine test reports shall be maintained by the supplier at his works for periodic inspection by the purchaser.
- III) Record of all test reports of tests conducted during manufacture shall be maintained by the supplier. These shall be produced for verification as and when requested for by the purchaser.

10.0 PACKING & FORWARDING:

10.1 The arrester shall be packed in suitable crates so as to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the arrester & their accessories 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. Any material found short inside the packing cases shall be supplied by supplier without any extra cost.

10.1 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.

g) Bill of materials indicating contents of each package.

- 10.2** The supplier shall ensure that the packing list and bill of material are approved by the Purchaser before dispatch.
- 10.3** The material shall be transported within India to the respective destination by Road Transport / Rail Transport as the case may be at the option of the purchaser.
- 10.4** Loose material e.g. bolts, nuts etc. shall be packed in gunny bags and sealed in polythene bags with proper tagging
- 10.5** Components containing glass shall be carefully covered with chock absorbing protective material such as Thermocol.
All opening in the equipment shall be tightly covered, plugged or capped to prevent dust and foreign material from entering in.
All spares parts shall be packed and created for long storage conditions at site.
- 10.6** The scope of supply shall include a supply of 2.5 % extra quantity of bolts, nuts, washers, split pins cotter pins and such other small loose items free of cost.
- 10.7** Erection and Maintenance Manuals :
- 10 copies of bound manuals containing instructions for erection, operation and maintenance of the Zinc Oxide surge arrestor alongwith all relevant information and drawings shall be supplied, marked erection drawings shall identify the components, parts of the equipment as shipped to enable Engineer / Purchaser to carryout erection with his own personnel. All drawings and data shall be annotated in English language. All dimensions shall be in metric system.

SCHEDULE – A

GUARANTEED TECHNICAL PARTICULARS FOR 400 KV / 220KV / 132 KV SURGE ARRESTERS.

(To be filled in by the bidder)

- 1 Name of Manufacturer
2. Arrester **Designation** & Type (with mfr type designation)
3. Applicable Standard.
- 3.a Nos. of unit per phase**
- 3.b Nos. of ZnO blocks per unit**
- 4.a Rated Arrester Voltage (kV) of complete unit
- 4.b Rated system voltage (kV)
5. Max continuous operating voltage (MCOV) – (kV)
6. i)Nominal Discharge Current (KA) with 8/20
Micro-second wave
ii)Max resistive component of cont current at
MCOV-mA crest
iii)Max capacitive component of cont current at
MCOV -mA crest
7. **Repetitive charge transfer rating**
8. Min. Energy Discharge Capability (KJ/KV rating)
as per IEC
9. Max. switching current impulse residual voltage (KVP)
 - i) 1000 Amps.
 - ii) 250 Amps.
10. Max. residual voltage with 1 micro – second

- current –wave at 10 KA (KVP)
11. Maxi. Residual voltage with 8/20 micro second wave (KVP)
 - i) 5 KA
 - ii) 10 KA
 - iii) 20 KA
 12. **Short Circuit rating**
 13. Lighting impulse withstand voltage of Arrester housing with 1.2/50 micro-second wave (KVP)
 14. One minute power frequency withstand voltage of housing (dry /wet) – KV (RMS)
Max RIV at cont operating vol.(-micro volts)
 15. High Current short duration impulse withstand level with 4/10 micro-second wave (KA) peak.
 16. Over –voltage withstand capability – KV
 - a) 100 Seconds
 - b) 10 Second
 - c) 1.0 Second
 - d) 0.1 Second
 17. A) Reference Voltage (KV)
b) Reference Current (KA)
 18. Number of Units per phase and rating of each unit

19. Minimum total creepage distance (mm)
20. Total weight of Arrester (kg.)
21. Total weight of structure (kg.)
22. Maxi. Cantilever strength of LA (Including Wind Load)
23. Overall Height of LA (mm)
Cantilever strength of assembled arrester.
(Kg/Cm)
24. Maxi. Distance recommended from equipments to be protected by LA (mm)
25. Min. distance between grounded object (mm)
26. Min. distance between Arrester phase legs (mm)
27. Clamp and connectors.
 - a) Material and composition of clamp and connector
 - b) Rated current
 - c) Max. Temperature rise when carrying short time current as specified.
28. a) Type test carried out on the similar arrester.
29. Any other particulars.
30. **Details of metal oxide block**

Reference voltages

Material

Diameter

Height

31 Details of structure

Material

Hot dip galvanizing, zinc coating in gms/m²

Mounting dimensions

Name of firm -----

Signature of Bidder -----

Designation & Seal -----



Dated: 08.09.2020

TTR validity amendment-1

(Addendum to Technical Specification for validity of type test reports for major electrical equipments)

Sr. No.	Name of test/ Equipment	Type test reports validity (In Years)
i.	On Line Tap Changer (OLTC)	10
ii.	Power Transf. Bushing/ Reactor Bushing	7
iii.	Transformer/reactor fittings and accessories.	10
iv.	Circuit Breaker	10
v.	Isolators	10
vi.	Lightning Arrestors	10
vii.	Wave Trap	10
viii.	Instrument Transformer	7
ix.	Low Voltage (LV) & Medium Voltage (MV) Switchgear	10
x.	Cable & associated joints	10
xi.	Capacitors	10
xii.	Energy Meters [including smart meters & Availability Based Tariff (ABT) meters]	5
xiii.	Conductors & earth wire	10
xiv.	Insulators(Porcelain/ Glass)	10
xv.	Composite Insulators	5
xvi.	Power Line Carrier Communication (PLCC)/Fibre Optic (FO) cable/Optical Ground Wire (OPGW)	5
xvii.	Terminal connectors of all major equipments including transformers	10

Note: Type test reports shall be valid as on the last date of submission of bid.



Dated: 08.09.2020

TTR validity amendment-2

(Addendum to Technical Specification for validity of type test reports of *all the equipments*)

The validity of type test reports to be submitted with technical bid shall be considered as per following:

“Type test reports shall be valid as on the last date of submission of bid”