



**PRODUCT STANDARD  
HYDERABAD  
PROJECT ENGINEERING & SYATEMS DIVISION**

PY55237

Rev No. 00

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**Technical Specification for ESE Type Lightning Arrestor**

**1. SCOPE:**

This specification covers the requirements for supply, testing, packing and delivery at site, complete with all accessories for efficient and trouble-free operation for ESE Type Lightning Arrestor along with earthing requirement.

**2. PROJECT SPECIFIC INFORMATION:**

Name of the Project	1x65 MW NLC Solar PV Plant
Location	Neyveli, Cuddalore District, Tamilnadu
Resistivity of Soil	89.3 $\Omega$ -m
Type of Land	Flat Terrain and Firm Soil
Wind velocity	2.5 to 5.6 m/sec just above earth surface, Max. Wind Speed 160 Kmph
Area	40 MW- 200 Acres (Approx.) 25 MW- 125 Acres (Approx.)
Elevation from Sea Level	87m
Co-Ordinates	11.6N, 79.5E
Height of the Tip of the Panel	2.5m above ground

**3. APPICABLE STANDARDS:**

NF C 17-102	Protection against Lightning (Early Streamer Emission Lightning Protection System)
IS 3043: 1987	Code of Practice for Earthing
IS/IEC 62305	Protection against Lightning
IS 2062	Hot Rolled Low, Medium and High Tensile Structural Steel
IS 2629	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
IS 2633	Methods for testing uniformity of coating of zinc coated articles
IS 8130	Conductors for insulated electric cables and flexible cords
IEC 62561	Lightning Protection System Components

(Latest revisions & amendments are applicable).

**4. BHEL MATERIAL CODIFICATION:**

Var. No.	Description of Material	BHEL Material Code
01	ESE TYPE LIGHTNING ARRESTOR	PY9755237011

Ref. Doc

Revisions :

Refer to record of revisions :

Prepared :

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Checked:

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Approved :

JK  
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Date :

12.09.16



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**5. TECHNICAL REQUIREMENTS:**

Vendor shall supply ESE Type Lightning Protection System along with Chemical Earthing as per NFC 17-102 & IEC 62561 and accessories as follows:

- a. ESE Type Lightning Arrestor shall be as per NFC 17-102 (latest amendment). It shall have following parameters:
  - i)  $\Delta t$ : Early Streamer Warning Time shall be minimum 60 $\mu$ -sec.
  - ii) Protection Radius shall be as per NFC 17-102 clause no. 5.2.3.2. Calculation for protection of radius shall be submitted to purchaser for review along with technical offer.
- b. One down conductor shall be provided from ESE type Lightning Arrestor to Test Link/Lightning Counter and from there, two down conductors shall be provided for each ESE type Lightning Arrestor to Earth Pit via test Link. Down conductor shall be of minimum 70sq.mm Cu. Flexible. Down conductor shall be in single length. No joints are allowed in between. Conductor Insulation shall be Green color or Yellow color with green strips.
- c. Elevation Mast of Hot dip Galvanized Iron shall be installed such that ESE Type Lightning Arrestor tip shall be minimum 5 Mtrs above the tip of the equipment being protected (Refer Clause No. 2). It shall be designed to have adequate strength for wind speed as mentioned in Clause No.2. It shall be bolted with Base Plate which shall be fixed in concrete. Detailed drawing shall be submitted to purchaser for review.
- d. Lightning counter shall be provided to record no. of Lightning events. It shall have minimum 6 digits. It shall have capacity to count smallest strike. It should be a voltage sensing type counter, so that it will not register nearby strikes and static discharges due to induction effect. No external power Supply shall be provided. It shall be weather proof (IP67).
- e. Two Test Joints/Links shall be provided at the bottom.
- f. Earthing requirement shall be fulfilled as per standards. Vendor shall submit calculations for Earthing to maintain earth resistance of less than 10 $\Omega$ . (For Soil Resistivity Refer Clause No. 2)
- g. Vendor shall visit the site for demonstration of installation & commissioning of at least one set of ESE type Lightning Arrestor system.

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**6. TESTS:**

**a. Type Test:**

Type Tests shall be applicable as per NFC 17-102 Annexure C.3.  
 Following Type tests certificates are required to be submitted to purchaser for ESE Type Lightning Arrestor being offered:

1. Advance Triggering Time Test
2. Lightning Impulse Current Test

Above type tests should have been conducted within last five years as applicable on the date of enquiry in any recognized testing laboratory. Type test certificates shall be submitted to purchaser along with technical offer.

Vendor shall also furnish test certificate for resistance of the earth enhancing compound being provided as per IEC-62561 from any recognized testing laboratory during Bid Opening.

**b. Inspection & Testing:**

Following tests will be conducted in presence of purchaser/purchaser representative:

Inspection of dimensions, finish surface defects, thickness & uniformity of Zinc coating, adhesion test as per provisions of IS2062, 2629, 2633 as applicable on the date of enquiry.

Test certificate for chemical & physical properties of Raw materials i.e. Steel Flats/Rods shall be tested as per IS-2062 from NABL approved lab/government approved laboratory and same shall be made available by vendor at the time of inspection.

Vendor shall produce Factory Certificate along with Serial No. for each ESE Type Lightning Arrestor from Original Equipment Manufacturer during inspection.

**7. BOM FOR EACH LIGHTNING ARRESTOR:**

See Clause No. 13. BOM indicated is bare minimum and shall include all items required for completeness and operation of Package.



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**8. TECHNICAL DOCUMENTATION ALONG WITH BID:**

Following Documents shall be submitted along with Technical Offer:

- a. List of Deviations shall be mentioned separately under "DEVIATIONS" heading. If deviations are not mentioned explicitly then it will be deemed to meet the specs in total.
- b. Type Test Certificates as mentioned in Clause No. 6.
- c. Make, Model of Each item and Complete BOQ for Each ESE Type Lightning Arrester
- d. Calculations for Earth Resistance as per IS-3043.
- e. Calculation for Radius of Protection for ESE Type Lightning Arrester.

**9. DOCUMENTATION DURING CONTRACT EXECUTION:**

Below mentioned drawings/documents shall be submitted as per document schedule. The drawings shall have title block, which shall be obtained from purchaser before preparation of the drawings.

- i. Calculation for Radius of Protection of ESE LA being supplied as per NFC 17-102 based on Level of Protection.
- ii. Bill of Material for ESE Type Lightning Protection System.
- iii. General Arrangement drawing of ESE Type Lightning Arrester.
- iv. Installation Drawing of ESE Type Lightning Protection System
- v. Earth Pit Details along with all items
- vi. Various Connection Details and any other drawing as deemed necessary.

Sl. No	Document	Schedule
1.	First Submission of Drawings/ Documents	Within 7 days from the date of PO
2.	BHEL Comments (along with Final/ Firm inputs and revisions)	Within 7 days from the receipt of drawings in line with inputs
3.	Revised Drawings submission	Within 3 days from the receipt of commented drawings from
4.	BHEL Comments (Approval with manufacture Clearance)	Within 3 days from the receipt of revised drawings
5.	Manufacturing Cycle time, Inspection call & Delivery	Within 40 days from Manufacturing clearance date



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**10. QUALITY PLAN:**

Quality Plan for the equipment offered shall be submitted within 2 weeks of receipt of LOI/ PO and shall be as per the format to be obtained from BHEL after receipt of LOI/PO.

**11. GUARANTEE:**

Full Guarantee for the performance of the items for a period of 24 months from the date of dispatch or 18 months from the date of commissioning, whichever is earlier, shall be furnished.

**12. PACKING & DISPATCH:**

The package shall be completely suitable for outdoor storage in areas with heavy rainfall/high ambient temperature. All hardware supplied loose shall be packed in wooden box and tagged.

**13. BOM/PRICE FORMAT FOR EACH ESE TYPE :**

Sl.No.	Description	Unit Rate
1.	ESE type Lightning Arrestor	
2.	GI Mast (Lower + Upper) with adaptor head and base plate	
3.	Down Conductor	
4.	Lightning Counter	
5.	Test Link/Joint	
6.	Other Accessories (Clamp, Nut, Bolt etc.)	
7.	Chemical Earthing	

- Vendor shall fill unit rate in this format while quoting.
- Quantity of the ESE Type Lightning Arrestors may vary by +/- 10%. Unit rates as furnished by the vendor in the above format shall be applicable for the same.
- The above prices shall be kept valid till execution of the order.

