

**TECHNICAL SPECIFICATION**  
**FOR**  
***ABOVE GROUND EARTHING***  
**&**  
***LIGHTNING PROTECTION MATERIALS***

**SPECIFICATION NO.: *PE - TS - 435 - 509 - E003***

***REVISION: 00***



**BHARAT HEAVY ELECTRICALS LIMITED**  
**POWER SECTOR**  
**PROJECT ENGINEERING MANAGEMENT**  
**NOIDA, UP (INDIA) – 201301**

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-435-509-E003
		VOLUME NO.: II-B
		SECTION: I
		REV NO.: 00 DATE: 12.04.2023
		SHEET : 1 OF 1

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### COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same
2. There are no deviations with respect to specification other than those furnished in the 'schedule of deviations'
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in 'BOQ-Cum-Price schedule' of the specification shall not be considered (i.e., technical description & quantities as per the specification shall prevail).
6. Price variation formulae provided on Sheet 18 of 18 of this specification.

-----  
BIDDER'S STAMP & SIGNATURE

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### SCOPE OF ENQUIRY

#### 1.0 SCOPE

This specification covers the Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of **ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS**.

- 2.0 The bids shall be evaluated as per NIT.
- 3.0 The bidder shall be responsible for and governed by all requirements stipulated hereinafter.
- 4.0 Bidder shall confirm total compliance to the specification without any deviations from technical/quality assurance requirements stipulated.
- 5.0 The documents shall be in English Language and MKS system of units.
- 6.0 The quality plan enclosed forms the minimum requirement but not limited to be adhered by the bidder.

#### 7.0 GENERAL TECHNICAL INSTRUCTIONS

- i) BHEL's / Customer representatives shall be given access to the shop in which the Above Ground Earthing & Lightning Protection materials are being manufactured or tested and all test records shall be made available to them.
- ii) The material covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and Material Dispatch Clearance Certificate (MDCC) is issued by BHEL / Customer.
- iii) The bidder to quote for items as per price schedule attached with NIT.
- iv) After issuance of purchase order, the successful bidder shall submit the QP for BHEL/ end customer's approval. In case bidder has reference QP agreed with end customer, same can be submitted after issuance of purchase order for BHEL/ end customer's approval. There shall be no commercial implication to BHEL on account of QP approval. Inspection shall be carried out in line with QP approved for the project.
- v) Inspection will be conducted by BHEL and/or their authorized representatives as per the inspection schedule agreed for the project. The inspection schedule will be submitted by the bidder for BHEL's approval. The cost of all tests and inspections will be deemed to have been included in the contract.
- vi) Refer Section-II for detailed technical specification, Code & Standards, Tests & Inspection, Drawings & Documents, and Packing.

#### 8.0 Supplier to also give the following undertaking in the BOM:

**"The BoM provided herewith completes the scope (in content and intent) of material supply under PO No. -----, dated -----. Any additional material which may become necessary for the intended application of the supplied item(s)/package will be supplied free of cost in most reasonable time."**



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**9.0 SPECIFIC TECHNICAL REQUIREMENTS**

<b><u>S.No.</u></b>	<b><u>Reference Clause No. of Section- II</u></b>	<b><u>Specific Requirement/ Change</u></b>
1.	Clause 4.6	Not applicable
2.	Clause 7.1	Clause 7.1 shall be read as follows: Bidders shall furnish following documents as the part of their technical offer: - a) Signed & stamped copy of Compliance Certificate. b) "No Technical Deviation" certificate w.r.t. this specification.
3.	Clause 7.3	Clause 7.3 shall be read as follows: Documents required after award of LOI/PO shall be as per NIT (to be submitted by successful bidder).

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### TECHNICAL DATASHEET

#### **1.0 GALVANIZED MS MATERIALS FOR ABOVE GROUND EARTHING AND LIGHTNING PROTECTION SYSTEMS**

- a) Material: Hot Rolled Mild Steel
- b) Type: Hot-dip galvanized

#### **3.0 SURFACE TREATMENT**

Galvanising:

- a) Pre-treatment As per IS 2629 prior to galvanization
- b) Type Hot dip galvanization.
- c) Applicable Standard IS 2629

d) Minimum thickness:

- |  |                            |
|--|----------------------------|
| i) MS flats 5mm thick & over                     | 75 microns (minimum)       |
| ii) MS flats under 5mm thickness                 | 60 microns (minimum)       |
| iii) Pipes/ conduits with thickness 5 mm & over. | 75 microns (minimum)       |
| iv) Pipes/ conduits with thickness under 5mm     | 60 microns (minimum)       |
| v) GI Wire                                       | 20 Microns (Medium coated) |

e) Min. weight:

- |  |                     |
|--|---------------------|
| i) MS flats 5mm thick & over                     | 610 gms. / sq. mtr. |
| ii) MS flats under 5mm thickness                 | 610 gms. / sq. mtr. |
| iii) Pipes/ conduits with thickness 5 mm & over. | 610 gms. / sq. mtr  |
| iv) Pipes/ conduits with thickness under 5mm.    | 610 gms. / sq. mtr  |
| v) GI Wire                                       | 150 gms. / sq. mtr. |

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f) Thickness of Pipe:

Sl. No.	Material	Size	Thickness (in mm.)
1	Mild Steel (MS)	65 NB, Heavy duty	4.5

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### STANDARD TECHNICAL REQUIREMENTS

#### 1.0 INTENT OF SPECIFICATION

- 1.1 This specification covers the design, manufacture, inspection & testing, packing at manufacturer's works and delivery to site of **Above Ground Earthing & Lightning Protection materials**.
- 1.2 The intent of specification is not to specify all details of design & construction of material. The material shall, however, conform in all aspects to high standard of design, engineering and workmanship and be capable of performing in continuous operation up to & after bidder's guarantee period in manner acceptable to purchaser who will interpret the drawings & specification and shall have power to reject any work or material which in his judgement is not in full accordance with this specification.

#### 2.0 CODES AND STANDARDS

- 2.1 The material shall comply with all currently applicable safety codes and statutory regulations of India as well as of the locality where the material is to be installed.
- 2.2 The design, material, construction, manufacture, inspection, testing and performance of **Above Ground Earthing & Lightning Protection materials** shall conform to the latest revision of relevant standards and codes of practices as per Annexure-A.
- 2.3 **In case of conflict between the applicable reference standard and this specification, this specification shall govern.**

#### 3.0 SCOPE OF ENQUIRY

- 3.1 Bidder shall quote for **Above Ground Earthing & Lightning Protection materials** in accordance with various sections of this specification. The system shall be complete in all aspects, for satisfactory operation, in accordance with this specification & technical particular.

#### 4.0 TECHNICAL REQUIREMENTS

- 4.1 Technical particulars of Above Ground Earthing & Lightning Protection materials are specified in Technical Datasheet.
- 4.2 Straight lengths of hot dip galvanised MS materials as per project specific requirement shall be supplied in standard lengths as below:
- |    |                              |   |                      |
|----|------------------------------|---|----------------------|
| a) | MS Flats of all sizes        | : | 4-7 metres           |
| b) | SWG wires of different sizes | : | 100 metres (minimum) |

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- 4.3 All finished galvanized MS material shall be free from sharp edges, corners, burs & unevenness.
- 4.4 Test link without box & Test link with box shall be as per enclosed drawing no. PE-DG-999-509-E003.
- 4.5 Flexible braided Copper Conductor of 600 mm length (cross section equivalent to 300 sq.mm) with tinned copper clamp connected by U-bolt for fence gate earthing shall be as per enclosed drawing no. PE-DG-999-509-E003.
- 4.6 Shielding Mast shall be as per enclosed drawing no. PE-DG-999-509-E003.
- 4.7 Necessary fixing hardware shall be provided along with each accessory as specified in drawings enclosed.

## 5.0 QUALITY ASSURANCE, TESTING & INSPECTION

- 5.1 BHEL's Standard QP (PE-QP-999-509-E001) enclosed forms the minimum requirement but not limited to be adhered by the bidder. After issuance of purchase order, the successful bidder shall submit the QP for BHEL/ end customer's approval. In case bidder has reference QP agreed with end customer, same can be submitted after issuance of purchase order for BHEL/ end customer's approval. There shall be no commercial implication to BHEL on account of QP approval. Inspection shall be carried out in line with QP approved for the project.
- 5.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per quality plan approved for the project.
- 5.3 The supplier shall perform all tests necessary to ensure that the material and workmanship conform to the relevant standards and comply with the requirements of the specification. Charges for all these tests for all the equipment & components shall be deemed to be included in the bid price.

## 6.0 PACKING

- 6.1 The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling.

## 7.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

- 7.1 Bidders shall furnish following documents as the part of their technical offer for 'Rate Contract': -
- Complete signed & stamped copy of this specification.
  - "No Technical Deviation" certificate w.r.t. this specification.
  - Unpriced 'Price Schedule' after mentioning "Quoted" against the items quoted.

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7.2 After issuance of purchase order, following information shall be furnished by BHEL: -

- a) Title Sheet
- b) Updated list of BHEL-PEM approved Galvanizers (Refer Annexure-2 to Quality Plan)

7.3 Following documents/drawings shall be submitted after placement of order for specific project for BHEL & customer's approval: -

Sl. No.	Drawings/Document Description	Drawings / Document Number	Submission Schedule
1.	Quality Plan for Above ground earthing & Lightning protection material.	PE-V0-XXX-507-E903	Within one week of issuance of purchase order for specific project


7.4 Documents shall be submitted through document management system (DMS).


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ANNEXURE - A

APPLICABLE STANDARDS & CODES

For Hot rolled carbon sheets & strips.	IS: 2062
For Mild Steel Wire	IS: 280
For Surface pre treatment	IS: 2629
For Hot dip galvanising of steel	IS: 2629
For Hot dipped galvanised coating on round steel wires	IS: 4826
For Testing of zinc coating	IS: 2633
For Determining of mass of zinc coating	IS: 6745
For Rolling & cutting tolerances of hot rolled steel products	IS: 1852
For Hot dip zinc coating on structural steel & other allied products	IS: 4759
For Tubes, Tubulars and other Wrought Steel Fittings	IS: 1239

		QUALITY PLAN			CUSTOMER :			PROJECT TITLE :			SPECIFICATION NO. :		
					BIDDER/ VENDOR			STANDARD QP NO. : PE-QP-999-509-E001, REV. 01			SPECIFICATION TITLE:		
SHEET 1 OF 2		SYSTEM EARTHING			ITEM : EARTHING & LIGHTNING PROTECTION MATERIALS			DOC. NO. :					
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	P	W	V	11	
1.0	<b>RAW MATERIAL</b>												
1.1	MILD STEEL (FLATS & RODS) AS PER SPECIFICATION	1.CHEMICAL & PHYSICAL PROPERTIES	MA	VERIFICATION, OF TCS	100%	IS:2062	IS:2062	MILL TC	3	-	1/2	Refer note in Remark at Sl. No.3	
		2.DIMENSIONS	MA	MEASUREMENT	100%	IS - 1730	IS - 1730	QC RECORD	3/2	-	-		
		3.SURFACE FINISH	MA	VISUAL	100%	IS : 1079	IS : 1079	QC RECORD	3/2	-	-		
1.2	ZINC	1.CHEM.COMP.	MA	CHEM.TEST	SAMPLE	IS - 209	IS - 209	QC RECORD	3/2	-	1/2		
2.0	<b>IN-PROCESS</b>												
2.1	CUTTING, DRILLING	1.DIMENSIONS	MA	MEASUREMENT	100%	APP. DATA SHEET/ APP. DRAWING	APP. DATA SHEET/ APP. DRAWING	QC RECORD	2	-	1		
		2.SURFACE FINISH	MA	VISUAL	100%	FREE FROM DEFECTS & SLAG	FREE FROM DEFECTS & SLAG	QC RECORD	2	-	1		
2.2	SURFACE PREPARATION	1.CLEANING PICKLING, RINSING, & FLUXING	MA	VISUAL	PERIODIC IN EACH SHIFT	IS:2629	IS:2629	QC RECORD	2	-	-		
		2.SURFACE QUALITY	MA	VISUAL	100%	IS:2629	IS:2629	QC RECORD	2	-	-		
BHEL			PARTICULARS			BIDDER/VENDOR							
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				
<b>LEGEND :</b> 1 - BHEL/ CUSTOMER      2 - VENDOR      3 - SUB-VENDOR      P - PERFORM      W - WITNESS      V - VERIFICATION													

		<b>QUALITY PLAN</b>			CUSTOMER :			PROJECT TITLE :			SPECIFICATION NO. :		
					BIDDER/ VENDOR :			STANDARD QP NO. : PE-QP-999-509-E001 REV. 01			SPECIFICATION TITLE:		
SHEET 2 OF 2		SYSTEM EARTHING			ITEM : EARTHING & LIGHTNING PROTECTION MATERIALS			DOC. NO. :					
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
2.3	GALVANISING	1.TEMPERATURE OF BATH 2. DROSS 3. RATE OF IMMERSION 4.SURFACE QUALITY	MA MA MA MA	TEMPERATURE INDICATOR VISUAL VISUAL/ MEASUREMENT VISUAL	CONTINUOUS PERIODIC 100% 100%	IS - 2629 IS - 2629 IS - 2629/ MFRS PRACTICE IS - 2629	IS - 2629 IS - 2629 IS - 2629/ MFRS PRACTICE FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECORD QC RECORD QC RECORD QC RECORD	3/2 3/2 3/2 3/2	- - - -	- - 2 -	Galvanization is to be done at galvanisation plant listed in annexure-2 to quality plan.	
3.0	<b>FINISHED ITEMS</b>												
3.1	MS FLATS	1. CHEMICAL 2.DIMENSIONS 3.SURFACE FINISH 4.MASS OF ZINC COATING 5.UNIFORMITY OF ZINC COATING 6.THICKNESS OF ZINC COATING 7.ADHESION	MA MA MA MA MA MA MA	CHEMICAL MEASUREMENT VISUAL CHEM. TEST CHEM. TEST ELCOMETER MECH.TEST	1 No./LOT/SIZE IS 2500 (PART 1 LEVEL S-4 IS 2500 (PART 1 LEVEL S-4	IS-2062 APP. DATA SHEET/ APP. DRAWING FREE FROM BURRS, SLAG, ROUGHNESS, FLUX, STAIN, ETC.	IS-2062 APP. DATA SHEET/ APP. DRAWING FREE FROM BURRS, SLAG, ROUGHNESS, FLUX, STAIN, ETC.	LAB TC INSP. REPORT INSP. REPORT	2 2 2	- 1 1	1 - -	Note: sample for chemical test shall be selected by BHEL& testing shall be done at NABL/ govt. approved Sampling plan for galvanization test: Inspection shall be as per table 2 of IS 4759 and same is mentioned below:-	
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	AS PER MFG. STANDARD	AS PER MFG. STANDARD	INSP. REPORT	2	1	-	Note: Refer Note 1	
Note: Items like Pipes/ Flexible Copper Braid/ GI wire/ GS Rod/ Shielding Mast/ Test link will be cleared based on COC (certificate of Compliance)													
<b>BHEL</b>			<b>PARTICULARS</b>			<b>BIDDER/VENDOR</b>							
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				
<b>LEGEND :</b> 1 - BHEL/ CUSTOMER      2 - VENDOR      3 - SUB-VENDOR      P - PERFORM      W - WITNESS      V - VERIFICATION													

**NOTES:**  
 1. PHOTOGRAPHS OF COMPLETE ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS AFTER PACKING TO BE SENT TO BHEL PURCHASE GROUP FOR REVIEW BEFORE ISSUING MDCC.

ANNEXURE – 1INSTRUCTIONS FOR FILLING QUALITY PLAN

The Quality Plan shall include all the Quality Control Measures and Checks adopted by the Vendor to ensure that the material/component/assembly/services supplied by him meet/will meet the requirements as per specifications and good practices. They shall include all stages of operation such as materials, processes, manufacture, assembly, packing and despatch. The following guide lines may be noted:

- Column 1- Serial Number
- Column 2- Component/Operation- The component and/or operation being checked shall be given here.
- Column 3- Characteristics check- The characteristics being checked shall be given here, e.g., chemical composition, mechanical properties, leak tightness, surface defects etc..
- Column 4- Category -'CR' stands for critical characteristic - affecting safety of equipment and personnel  
'MA' stands for major Characteristic - affecting safety of equipment and personnel  
'MI' stands for minor characteristic - affecting appearance etc.
- Column 5- Type/Method of check e.g. chemical analysis tensile testing, hydraulic test, visual examination radiography etc.
- Column 6- Extent of check, such as, 100, 10, 1 percent etc.
- Column 7- Reference Documents - Documents, such as technical specification, drawings, standard specifications (IS, BS ETC.) procedure, etc. according to which check is done.
- Column 8- Acceptance Norms - Standards etc. according to which acceptability or otherwise of the characteristics being checked is decided.
- Column 9- Format of Record - Formats, log sheets, reports, etc. in which the observations are recorded. Standard log sheets, reports, formats etc. of the Vendors shall be numbered and such reference numbers shall be included here.
- Column 10- Agency - The agency which performs the test/instruction shall be written in sub-column 'W'  
The agency which verifies test certificates/inspection records and carries out audit check of the components/operation shall be written in sub-column 'V'
- The agencies are codified as 1,2 & 3
- '1' stands for (BHEL)
- '1' \* means the operation shall be cleared by BHEL before the start of the next operation.
- '2' Stands for Vendor
- '3' stands for sub-Vendor of the Vendor and so on.
- Example :
- Entry '3' in column 'P' means test./inspection to be performed by sub-Vendor's QC
- Entry '2' in column 'W' means test./inspection to be witnessed by Vendor's QC
- Entry '1' in column 'V' means verification shall be done by BHEL and next stage to be started only after the hold point is cleared by BHEL
- Column 11- Remarks - Any special remarks shall be given here.

## NOTES :

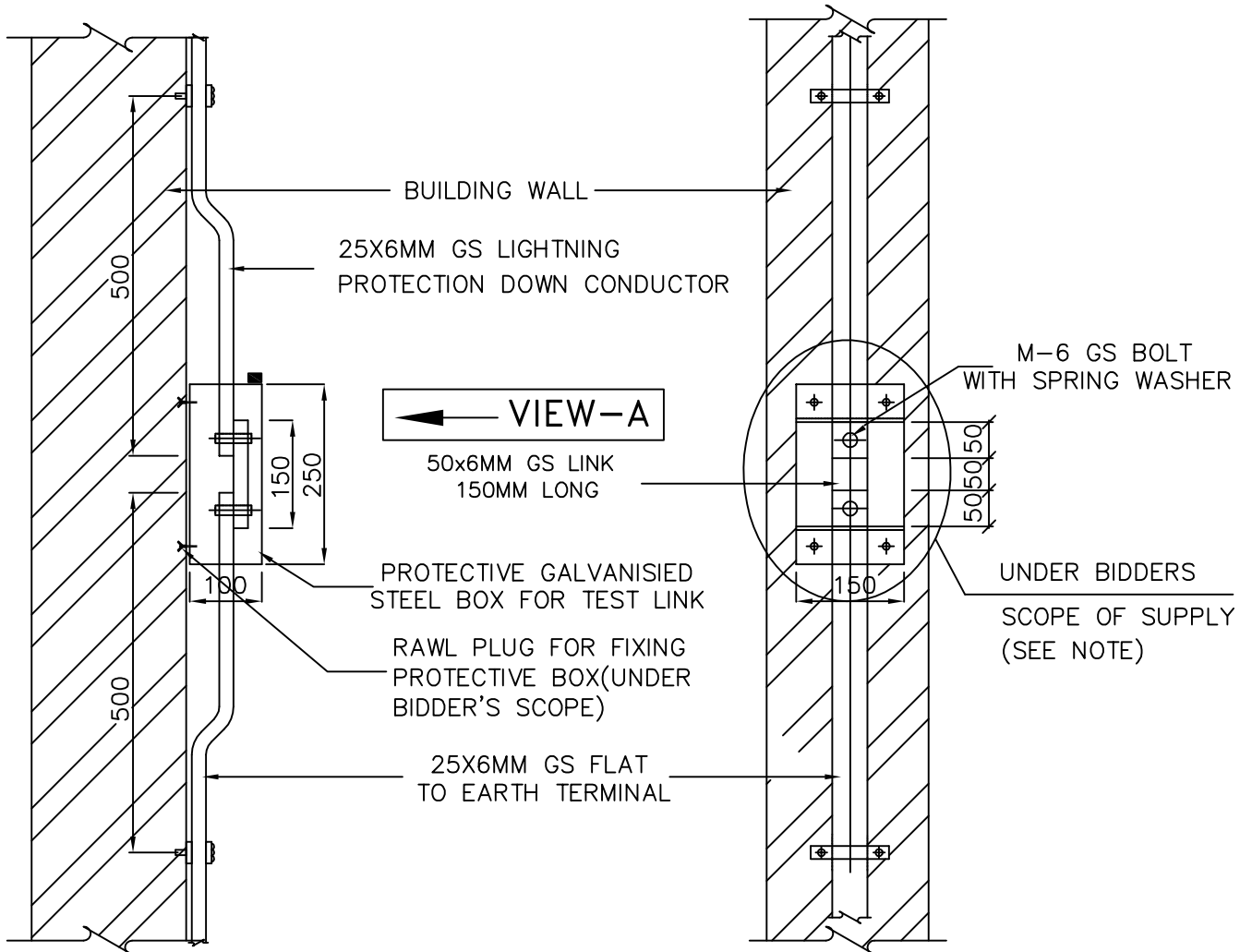
- In absence of correlation with the test certificate(s) (e.g. material identification) samples shall be drawn by BHEL and all tests as per relevant specifications shall be carried out in their presence or in recognized Government Laboratory.
- When materials and components are initially identified and stamped by BHEL QS engineer, the identification marks shall be preserved till despatch. Wherever this is not possible, the identification mark shall be transferred to the components in the presence of BHEL QS Engineer unless otherwise agreed.
- For castings and forgings integral test specimens shall be provided, When this is not possible for casting, they shall be poured in the presence of BHEL QS Engineer unless otherwise, if witnessing of test by BHEL is called for.
- When welders qualified by reputed inspection agencies or statutory bodies are not available, qualification tests shall be conducted in the presence of BHEL QS Engineer.
- This Quality Plan is liable to be modified as per the requirements of approved drawings and changes in technical specifications/drawings. If there are contradictions in respect of column 7 & 8 between this Quality Plan and the approved drawings specifications, the latter shall prevail.
- Wherever inspection by BHELs Purchaser/Third Party/Statutory authorities are mandatory, this shall be complied with.
- Inspection reports, log sheets, test reports/certificate. etc. shall be furnished to BHEL at the appropriate stages or at the time of final inspection, as required.
- This Quality Plan is also applicable to spares, if any, under scope of supply of Vendor.
- The quality plan shall be submitted in minimum 4 copies with a soft copy of the same or in line with contract requirements.

**ANNEXURE-2 to Quality Plan  
(LIST OF BHEL- PEM APPROVED GALVANIZERS)**

SL NO.	ITEM	VENDOR NAME	ADDRESS
1	GALVANISING	Jenco Industrial Corporation	Chincholi Bunder Khkar Road Near Link Road Devruwadi Malad (W) Mumbai
2	GALVANISING	National Galvanizing Company	66, Barrackpore Kamarhatt Trunck Road Calcutta-700058
3	GALVANISING	Sigma Galvanising Pvt. Ltd.	Plot No.C-169, TTC, MIDC Ind Area Navin Mumbai-400705
4	GALVANISING	B.P. Projects PVT LTD	167A, Vivekananda Road Kolkata-700006
5	GALVANISING	Standard Galvanisers	Makardah Road, Kabar Para, Bankra, Howarah -711403
6	GALVANISING	Steel Products	National Highway No. 6, Chamrail, Kona, Howrah-711114
7	GALVANISING	Unitech Fabricators & Engineers Pvt. Ltd.	Village- Ajab Nagar, P.O. -Molla Simlla, P.S. - Singur, Dist - Hoogly, Pin-712223
8	GALVANISING	Shivam Engineers & Fabricators	A0-282-284, Industrial Area, South Side of G.T. Road, Ghaziabad, U.P.
9	GALVANISING	B.G. Shirke Construction Technology Pvt. Ltd	72-76, Mundhawa, Pune - 401 036
10	GALVANISING	Galbro Ispat Galvanizers Pvt. Ltd.	GUT 11 AND 12, OPP. Kudus Steel,Rolling Mill, Wada, Thane, Mumbai
11	GALVANISING	Eros Infrastructures Pvt. Ltd.	G-97, MIDC, Bhutibori , Nagpur-441108, Maharashtra
12	GALVANISING	Industrial Perforation (India) Pvt. Ltd.	Ganganagr, Katakhal, Kolkata-700132
13	GALVANISING	Indmark Formtech Pvt. Ltd.	Phase - 3, E - 11 / 1, M. I. D. C., Chakan, Pune - 410 501, Maharashtra, India.
14	GALVANISING	Namdhari Industrial Traders Pvt. Ltd.	Village Latton Dana, Chandigarh Road, Ludhiana
15	GALVANISING	Neha Galvaniser	Jalan Industrial Estate, Gate No-1, 1st Right Choise Lane, Near N.G-6, Jangalpur, PO Domjur Howrah - 700071, West Bengal, India
16	GALVANISING	Patny Systems (P) Ltd.	Unit-IV, Sy No. -228/9, Plot No. 6, IP Kuchavaram, Toopran(M) Dist.-Medak, Telegana - 502336
17	GALVANISING	Parmar Metal Company	Survey No.207,Veraval (Shapar) Dist. Rajkot, India.
18	GALVANISING	Rukmani Electrical & Components Pvt Ltd	Urla Industrial Area, Urla Sarora Road, Raipur 493221(Chhattisgarh)
	GALVANISING	Rukmani Fab & Gal Pvt Ltd	Shankharidaha Baniyarah, Jalan Industrial Complex, Gate no.3, Lane no. 4, Domjur, Howrah , W.B .- 711411
19	GALVANISING	DMP Projects Pvt.Ltd.	Dulagarh Industrial Park , PS-Sankrail , Howrah -711302
20	GALVANISING	Vinfab Engineers India Private Limited	Gut no. 224/1 &2 Bhiwandi Wada State Highway, Village khupri, Dist. Thane, Maharashtra -421303
21	GALVANISING	Saral Projects & Processors	B-1, Industrial Area, Site-II, Amawan Road Rae Bareli
22	GALVANISING	Brahampuri Steels Limited	172 (F) Industrial Area, Jhotwara, Jaipur-302013
23	GALVANISING	Indiana Gratings PVT. LTD	F-5, MIDC Jejuri, Pune-412 303
24	GALVANISING	M/s AVAIDS TECHNOVATORS PVT. LTD.	131, MATSYA INDUSTRIAL AREA, ALWAR RAJASTHAN

## NOTES:

1. ANY CHANGE IN THE ABOVE LIST SHALL BE INFORMED AT THE TIME OF SPECIFIC PROJECT REQUIREMENT AND NO COMMERCIAL IMPLICATION SHALL BE ALLOWED ON THIS ACCOUNT.
2. IT SHALL BE THE RESPONSIBILITY OF THE VENDOR TO GET THE MATERIAL GALVANIZED FROM THE ABOVE LIST WITHOUT ANY COMMERCIAL IMPLICATION TO BHEL.



**TEST LINK WITH BOX DETAILS** VIEW-A

**NOTE:** BIDDER'S SCOPE INCLUDES THE 150 MM LONG 50X6MM GS LINK ALONG WITH HARDWARES (2 NOS. OF M-6 GS NUTS & BOLTS & 4 NOS. SPRING WASHERS) & 250X150X100 MM GALVANISED MS COVERING BOX (1.6 MM THICK) WITH 4 NOS. M12 SCREWS & RAWL PLUGS FOR FIXING OF THE SAME.



TITLE

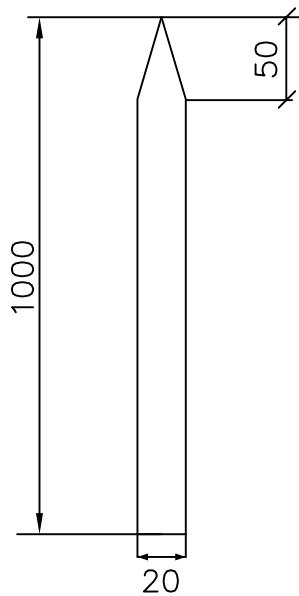
TYPICAL DETAILS OF TEST LINK  
WITH PROTECTIVE BOX

PE-DG-999-509-E003

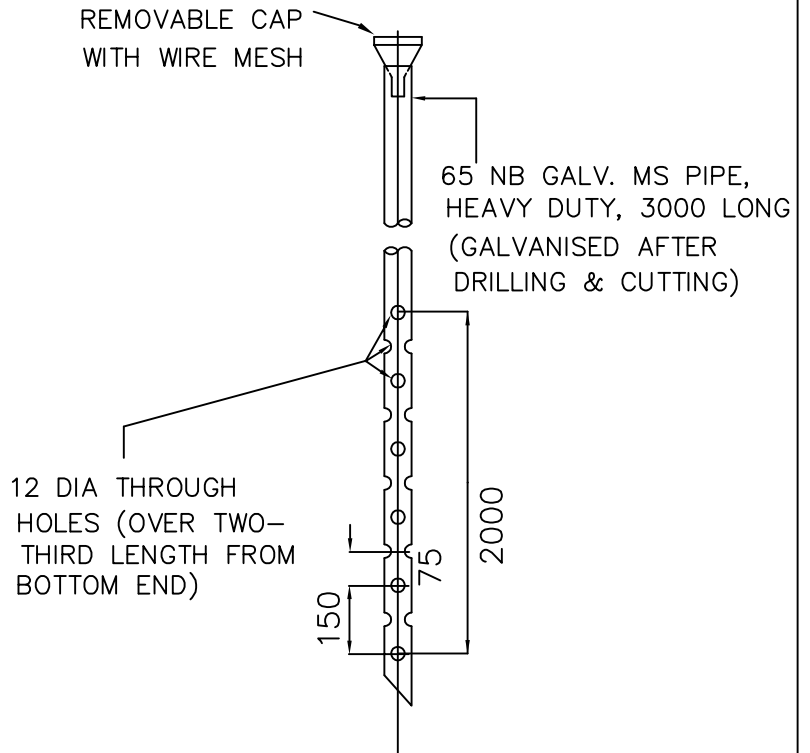
SH 1 OF 2

REV 00

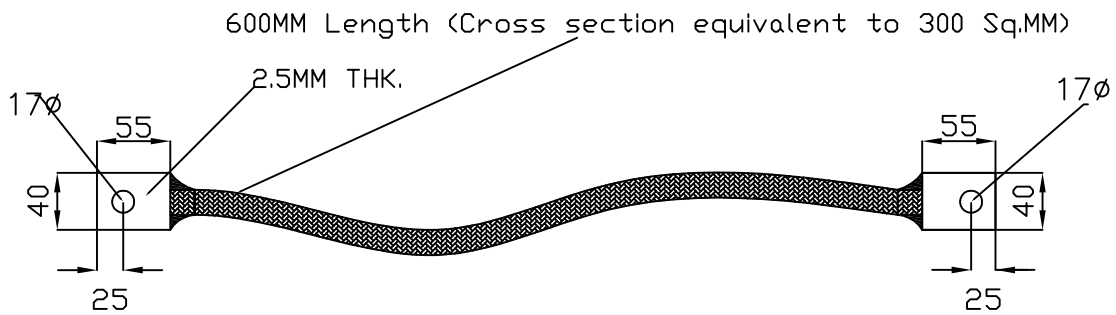
1422723/2023/PS-PEM-EL



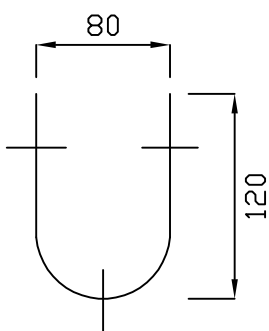
20MM DIA GS ROD  
FOR LIGHTNING PROTECTION



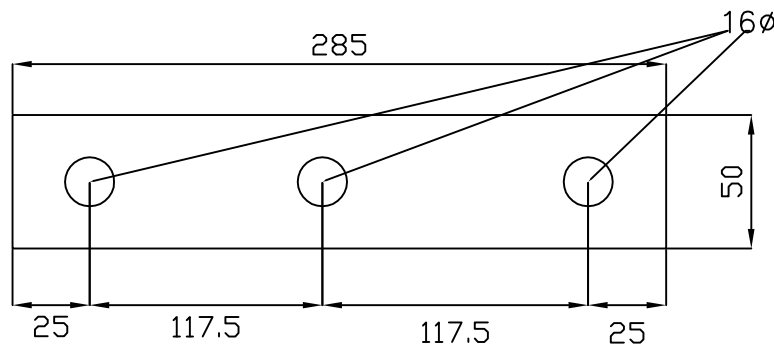
PERFORATED PIPE



FLEXIBLE BRAIDED COPPER CONDUCTOR



PLAN



TINNED COPPER 'U' CLAMP (2.5 MM THICK)

TITLE



TYPICAL DETAILS OF FLEXIBLE  
BRAIDED COPPER, 20 MM DIA.  
GS ROD & PERFORATED PIPE

PE-DG-999-509-E003

SH 2 OF 2

REV 00

	<u>Price Variation Formulae</u>	<b>ANNEXURE-B</b>
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Prices shall be variable as per following PVC formulae:-

ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS	
$P = P_o/100 (20 + 70 (Fe/Fe_o) + 10 (W/ W_o) )$	Indices to be taken from IEEMA Circular ( PVC/LA conductor-LME) for the applicable month.

Wherein,

P = Ex-works price payable as adjusted in accordance with the price variation clause.

P<sub>o</sub> = Ex-works price quoted/confirmed.

FE<sub>o</sub> = Price of High Tensile Galvanized Steel Wire in Rs./MT of appropriate size. This price is applicable prevailing as on 1st working day of the month **one** month prior to date of tender enquiry.

W<sub>o</sub> = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100). This index number is as applicable on the first working day of the month, **one** month prior to date of tender enquiry.

FE = Price of High Tensile Galvanized Steel Wire in Rs./MT of appropriate size. This price is applicable prevailing as on first working day of the month **one** month prior to the date of inspection.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100). This index number is as applicable on the first working day of the month, **one** month prior to the date of inspection call.

**NOTE: PVC shall be applicable for 'GS FLATS & GI WIRES' only.**

Price of FE & FE<sub>o</sub> shall be of 3.00 to 4.09 mm High Tensile Galvanized Steel Wire.

**2 x 660MW UDANGUDI STPP STAGE-I**  
**BOQ CUM PRICE SCHEDULE OF AGLP MATERIAL**

S.No.	Item Code	ITEM	UOM	PEM QUANTITY	ISG QUANTITY	TOTAL BOQ
1	507-23021-A	GS Flat 75X10	MT	-	44	44
2	507-23020-A	GS Flat 65X8	MT	29		29
3	507-23017-A	GS Flat 50X6	MT	56	50	106
4	507-23065-A	GS FLAT 32x5 MM	MT	-	1	1
5	507-23015-A	GS Flat 25X6	MT	17	4	21
6	507-23014-A	GS Flat 25X3	MT	3	1	4
7	507-23010-A	GI Wire 14 SWG	MTR	460000	1000	461000
8	507-23013-A	GI Wire 8 SWG	MTR	-	1000	1000
9	507-23066-A	GI Wire 6 SWG	MTR	-	1000	1000
10	507-23012-A	GI Wire 4 SWG	MTR	-	750	750
11	507-23052-A	65mm dia GALV MS PIPE (Perforated) 3m long	NOS	32	110	142
12	507-23008-A	Flexible Braided Copper Conductor for gate earthing	NOS	-	10	10
13	507-23023-A	20mm dia Galvanised MS Rod 1m long	NOS	-	30	30
14	507-23030-A	TEST LINK 150X50X6 MM GS FLAT WITH BOX	NOS	-	30	30



**PRE-QUALIFICATION REQUIREMENTS FOR  
ABOVE GROUND EARTHING MATERIALS  
2X660 MW UDANGUDI SUPERCRITICAL STPP**

PE-PQ-435-509-E002

REVISION NO. 0, DATE 19-04-2023

SHEET 1 OF 1

**ITEMS :** GS flats, GS rods, perforated pipe, GI stranded wires, test links & flexible braided copper conductor

**SCOPE:** Supply : YES; Erection & Commissioning : NO;

1	Supplied GS flats/GS rods/perforated pipe/GI stranded wire/ test links/flexible braided copper conductor.
2	Vendor should have capability of supplying galvanized flats/channels/angles/structure of 40 MT per month.
3	Vendor has his own galvanization plant. Vendor to furnish details of galvanizing process, zinc bath details, type of furnace, details of temperature monitoring, details of ETP etc. OR Vendor should get galvanization of earthing material done from any of BHEL-PEM approved galvanizers.
4	Supplied at least 300 MT of galvanized flats/channels/angles/structure in one or more orders and at least 100 MT in a single order.
5	Minimum two (2) nos. purchase orders for galvanized flats/channels/angles/structure shall be submitted which should not be more than five (5) years old from the date of techno-commercial bid opening for establishing continuity in business.

**Notes:**

1. Consideration of offer shall be subject to customer's approval of bidders, if applicable
2. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self- attested English translated document should also be submitted.
3. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
4. After satisfactory fulfilment of the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of tender.

<b>PREPARED BY</b>	<b>CHECKED BY</b>	<b>REVIEWED BY</b>	<b>APPROVED BY</b>	
 19/4/2023 NAME: NIDHI RAWAT DESIGNATION: Dy. Mgr	 19/04/2023 NAME: ANKUR ARORA DESIGNATION: Mgr	 19.4.23 NAME : AYAN SAHA DESIGNATION: DGM	 19/04/2023 NAME : SANDEEP LODH DESIGNATION: Sr. DGM	 19/4/2023 NAME: DEBASISA RATH DESIGNATION: DH ELECT(AGM)