

<b>Project</b>	1) Mauda FGD 2) Bhilai FGD 3) Ramagundam FGD 4) NPGCPL Nabinagar FGD 5) Korba FGD 6) BRBCL Nabinagar FGD 7) North Karanpura FGD 8) Patratu Phase-1 EPC
<b>Package</b>	<b>ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIAL</b>
<b>Subject</b>	<b>Annexure-I to Buyer ATC</b>

<b>Sl. No.</b>	<b>TERMS &amp; CONDITIONS</b>																		
1.	<b>Delivery Terms</b>	<p><b><u>(A) Delivery schedule (For North Karanpura FGD, Bhilai FGD, Ramagundam FGD &amp; Mouda FGD project):</u></b> Delivery completion shall be 90 days from the PO date</p> <p><b><u>(B) Delivery schedule (For NPGCPL Nabinagar FGD, BRBCL Nabinagar FGD Korba FGD &amp; Patratu Phase-1 EPC project):</u></b> Delivery completion shall be 120 days from the PO date</p> <p><b><u>Document submission schedule:</u></b> Shall be as below:</p> <table border="1"> <tr> <th>1st</th><th>1st</th><th>2nd</th><th>2nd</th><th></th></tr> <tr> <th>Vendor Sub (Days)</th><th>Bhel comment (Days)</th><th>Vendor Sub (Days)</th><th>Bhel and Customer comment/approval (Days)</th><th>Total Engg Time (Days)</th></tr> <tr> <td>5</td><td>0</td><td>0</td><td>5</td><td>10</td></tr> </table> <p><b>Notes:</b></p> <p>a. Supplier to start manufacturing/supply only after getting the applicable engineering Drgs. /docs approved from BHEL/End Customer.</p> <p>b. Drawings /documents submission/re-submission schedule shall be as indicated in technical specification which shall be used for progress monitoring purpose and required course correction, if any.</p> <p>c. The delivery date specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.</p> <p>d. The delivery conditions specified are for contractual purposes. However, to meet project requirement, BHEL may ask for early deliveries without any compensation thereof.</p>			1st	1st	2nd	2nd		Vendor Sub (Days)	Bhel comment (Days)	Vendor Sub (Days)	Bhel and Customer comment/approval (Days)	Total Engg Time (Days)	5	0	0	5	10
1st	1st	2nd	2nd																
Vendor Sub (Days)	Bhel comment (Days)	Vendor Sub (Days)	Bhel and Customer comment/approval (Days)	Total Engg Time (Days)															
5	0	0	5	10															
2.	<b>Validity of contract (PO rates, terms and conditions)</b>	<p>Validity of contract shall be 180 days from PO date (For North Karanpura FGD, Bhilai FGD, Ramagundam FGD, Mouda FGD project, NPGCPL Nabinagar FGD, BRBCL Nabinagar FGD Korba FGD &amp; Patratu Phase-1-EPC project).</p> <p>Vendor has to make supply of goods/services as per the delivery time mentioned above. However, due to unavoidable circumstances if delay happens in providing inputs/ clearances (inputs, Engineering approvals, deputing inspector for inspection, issuance of MDCC and any hold imposed owing to site issues etc.) for which delivery time extension is admissible as per point no.3 below, in such situation it shall be obligatory at vendor part to execute the contract at PO rates, terms and conditions where inputs/ clearances has been accorded within validity of contract. Validity period for various activities shall be as defined below or as mentioned in the NIT.</p> <p><b>Validity of the contract for main supply.</b></p>																	

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		<p>Contract shall be valid for ‘C’ days from the PO date. However, delay at vendor’s end (if any) shall be added to the validity period and contract validity shall get extended by the delay period at vendor’s end.</p> <p>For example: Original Delivery period for main supply: A (in days)  Delay at vendor’s end: B (in days beyond “A” days)  Contract validity: C+B (in days)</p> <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>B is the Vendor delay days beyond original contractual delivery period for main supply /extended delivery period owing to time taken by BHEL.</li> <li>Main supply, applicable in the contract released/ cleared for manufacturing within contractual validity period, to be supplied by vendor/supplier at PO rates, terms and conditions.</li> <li>Execution of the contract quantities released beyond contract validity period shall be decided on mutual consent basis at PO rates, terms and conditions.</li> </ol>
3.	<b>Delivery Extension: Extension of contractual delivery time</b>	<p>Delivery time mentioned in the NIT includes Engineering completion time (time for drawing/document submission/resubmission by the vendor and review/approval of the same by the BHEL/End customer), manufacturing, inspection, Packing and dispatch time. Due diligence is to be observed by the vendor to ensure timely completion of engineering and supply.</p> <p>During the execution of the contract, time loss occurred owing to the reason attributable to BHEL besides force majeure shall be considered for delivery time extension to the vendor as given below:</p> <ol style="list-style-type: none"> <li>Any Delay in providing comments/ approval on Primary drawing/documents beyond the stipulated time as specified in NIT.</li> <li>Time Loss in approval of the drawing/document as a result of increase in the iteration not attributable to the vendor (i.e. resubmission owing to end customer comments) as certified by BHEL. Time extension equivalent to the resubmission time noted in the Tech. spec/NIT and consequential increase in the approval time in lieu of increase in iteration shall be applicable. However, for incomplete re-submission time loss shall be in vendor account.</li> <li>Delay in providing engineering input/material by BHEL.</li> <li>Delay in deputing inspector for inspection and delay in release of MDCC in line with GEM ATC terms.</li> <li>Any hold put by BHEL for whatever reasons during execution of contract (within contract validity period), time extension equivalent to hold period shall be admissible. However, in the event hold period continues for more than 30 days</li> </ol>

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		<p>then, an additional fifteen days for the purposes of mobilization and demobilization of resources shall also be admissible.</p> <p>Note: Extension in delivery period if any with or without imposition of LD shall be considered after detailed delay analysis based on provisions given above. However, no delay analysis will be applicable if supply is completed within delivery schedule as specified in Purchase order.</p>
4.	<b>BID SECURITY/ Earnest Money Deposit (EMD)</b>	<p>EMD is applicable. EMD amount shall be Rs. 2.5 Lakh.</p> <p>EMD is to be submitted by the all bidders along with their bids (except Micro and Small Enterprises (MSEs) or Startups as recognized by Department for Promotion of Industry and Internal Trade (DPIIT)).</p> <p><b>Modes of deposit: -</b></p> <p>The EMD may be accepted only in the following forms:</p> <p>i) Electronic Fund Transfer credited in BHEL account (before tender opening)</p> <p style="padding-left: 40px;">BHEL-PEM account details are as follows:</p> <p style="padding-left: 80px;">Bank name, State Bank of India  Account No: 39922687394  IFSC: SBIN0017313  BRANCH-CAG II NEW DELHI</p> <p>ii) Banker's cheque/ Pay order/ Demand draft, in favour of BHEL-PEM, Noida (along with the offer).</p> <p>iii) Fixed Deposit Receipt (FDR)</p> <p>iv) Bank Guarantee from any of the Scheduled Banks.</p> <p>v) Insurance Surety Bonds.</p> <p>The EMD shall remain valid for a period of 45 (forty-five) days beyond the final bid validity period.</p> <p><b>Forfeiture of EMD</b></p> <p>I. A bidder's EMD will be forfeited if the bidder withdraws or amends its/his tender or impairs or derogates from the tender in any respect within the period of validity of the tender or if the successful bidder fails to furnish the required performance security within the specified period mentioned in the Tender.</p> <p>II. EMD by the tenderer to be withheld in case any action on the bidder is envisaged under the provisions of extant "Guidelines on Suspension of business dealings with suppliers/ contractors (abridged version of guidelines is available on <a href="http://www.bhel.com">www.bhel.com</a> )" and forfeited/ released based on the action as determined under these guidelines.</p> <p>I. Bid securities of the unsuccessful bidders shall be returned to them after expiry of the final bid validity period and latest by the 30th day after the award of the contract. However, Bid securities of unsuccessful bidders during first stage i.e. technical-</p>

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		commercial evaluation etc. shall be returned within 30 days of declaration of result of first stage i.e. technical-commercial evaluation. II. Bid security shall be refunded to the successful bidder on conclusion of the order/ receipt of a performance security. III. EMD shall not carry any interest
5.	<b>Performance Security</b>	<p>I. Initially 10% of the contract value (total order value in case of GeM POs excluding PVC/total Ex-works price in case of outside GeM POs excluding PVC). However, 5% of the contract value (as above) will be released after completion of Main Supply based on certification by Project Group.</p> <p style="text-align: center;"><b>OR</b></p> <p>II. 5% of the contract value (total order value in case of GeM POs excluding PVC/total Ex-works price in case of outside GeM POs excluding PVC). Additional 5% of the contract value will be retained from first bill &amp; subsequent bill(s) of the same contract. The retention amount will be released after completion of Main Supply based on certification by Project Group.</p> <p>III. Initial validity of performance security (for the purpose mentioning in GeM portal) shall be 24 months from PO date (Considering delivery period of 04 months + 18 months guarantee period + 2 months claim period is already mentioned in GTC cl no. 7.ii GeM 3.0). Further, extension if any shall be as per GeM Terms.</p> <p><b>Modes of deposit:</b></p> <p>Performance security may be furnished in the following forms:</p> <ol style="list-style-type: none"> <li>Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.</li> <li>Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.</li> <li>Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).</li> <li>Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).</li> <li>Insurance Surety Bond. (Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)</li> </ol>

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		<p>Performance Security is to be furnished within 30 days from the date of PO/LOA and it should remain valid for a period of 60 (sixty) days beyond the date of completion of all contractual obligations of the supplier, including warranty obligations.</p> <p><b>Forfeiture of Performance Security:</b></p> <ol style="list-style-type: none"> <li>The performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the supplier.</li> <li>PS should be refunded to the contractor without interest, after he duly performs and completes the contract in all respects but not later than 60(sixty) days of completion of all such obligations including the warranty under the contract.</li> <li>The Performance Security shall not carry any interest.</li> </ol>
6.	<b>Breach of contract, Remedies and Termination</b>	<p>“In case of Breach of Contract, BHEL shall recover 10% of the contract value from the Vendor using following instruments:</p> <ol style="list-style-type: none"> <li>encashment of security instruments like EMD, Performance Security with PEM against the said contract</li> <li>balance amount (if value of security instruments is less than 10% of the contract value) from other financial remedies i.e. available bills of the Vendor, retention amount etc. with PEM</li> <li>balance amount from security instruments like EMD, Performance Security and other financial remedies i.e. available bills of the Vendor, retention amount etc. with other units of BHEL</li> <li>if recovery is not possible then legal remedies shall be pursued”</li> </ol> <p>The balance scope shall be got done independently without Risk &amp; Cost of the failed supplier/contractor. Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract.</p>

Item Number	Item Title	Item Description	Item Quantity	Unit of Measure	Consignee ID	Delivery Period (In number of days)	Total Exw Price	Freight%	GST %	Total FOR Price
1	100 ID 13 MM THK CI PIPE PRF 3M LONG - Bhilai FGD	Item1	11	NOS.	BHILAI_PEM_CON	180				
2	GI WIRE 14 SWG - Bhilai FGD	Item2	16000	MTR	BHILAI_PEM_CON	180				
3	GS FLAT 25 X 6 MM - Bhilai FGD	Item3	4.5	MT	BHILAI_PEM_CON	180				
4	GS FLAT 50 X 6 MM - Bhilai FGD	Item4	0.5	MT	BHILAI_PEM_CON	180				
5	GS ROD 20 MM DIA.1000MM LONG - Bhilai FGD	Item5	90	NOS.	BHILAI_PEM_CON	180				
6	TEST LINK 150X25X6 MM GS FLAT WITH BOX - Bhilai FGD	Item6	90	NOS.	BHILAI_PEM_CON	180				
7	100 ID 13 MM THK CI PIPE PRF 3M LONG - Korba FGD	Item7	90	NOS.	PEM_KORBA1	180				
8	GI WIRE 14 SWG - Korba FGD	Item8	28500	MTR	PEM_KORBA1	180				
9	GS FLAT 25 X 6 MM - Korba FGD	Item9	12.6	MT	PEM_KORBA1	180				
10	GS FLAT 50 X 6 MM - Korba FGD	Item10	1	MT	PEM_KORBA1	180				
11	GS ROD 20 MM DIA.1000MM LONG - Korba FGD	Item11	240	NOS.	PEM_KORBA1	180				
12	TEST LINK 150X25X6 MM GS FLAT WITH BOX - Korba FGD	Item12	240	NOS.	PEM_KORBA1	180				
13	100 ID 13 MM THK CI PIPE PRF 3M LONG - Mouda FGD	Item13	35	NOS.	SUDHIR_MOUDA_PEM	180				
14	GI WIRE 14 SWG - Mouda FGD	Item14	16500	MTR	SUDHIR_MOUDA_PEM	180				
15	GS FLAT 25 X 6 MM - Mouda FGD	Item15	5	MT	SUDHIR_MOUDA_PEM	180				
16	GS FLAT 50 X 6 MM - Mouda FGD	Item16	0.5	MT	SUDHIR_MOUDA_PEM	180				
17	GS ROD 20 MM DIA.1000MM LONG - Mouda FGD	Item17	90	NOS.	SUDHIR_MOUDA_PEM	180				
18	TEST LINK 150X25X6 MM GS FLAT WITH BOX - Mouda FGD	Item18	90	NOS.	SUDHIR_MOUDA_PEM	180				
19	100 ID 13 MM THK CI PIPE PRF 3M LONG - NPGCPL Nabinagar FGD	Item19	30	NOS.	RAVI_NABINAGAR	180				
20	GI WIRE 14 SWG- NPGCPL Nabinagar FGD	Item20	19500	MTR	RAVI_NABINAGAR	180				
21	GS FLAT 25 X 6 MM- NPGCPL Nabinagar FGD	Item21	8	MT	RAVI_NABINAGAR	180				
22	GS FLAT 50 X 6 MM- NPGCPL Nabinagar FGD	Item22	0.5	MT	RAVI_NABINAGAR	180				
23	GS ROD 20 MM DIA.1000MM LONG- NPGCPL Nabinagar FGD	Item23	110	NOS.	RAVI_NABINAGAR	180				
24	TEST LINK 150X25X6 MM GS FLAT WITH BOX- NPGCPL Nabinagar FGD	Item24	110	NOS.	RAVI_NABINAGAR	180				
25	100 ID 13 MM THK CI PIPE PRF 3M LONG - Ramagundam FGD	Item25	60	NOS.	PEM_RAMA_CON	180				
26	GI WIRE 14 SWG - Ramagundam FGD	Item26	24000	MTR	PEM_RAMA_CON	180				
27	GS FLAT 25 X 6 MM - Ramagundam FGD	Item27	11.5	MT	PEM_RAMA_CON	180				

Item Number	Item Title	Item Description	Item Quantity	Unit of Measure	Consignee ID	Delivery Period (In number of days)	Total Exw Price	Freight%	GST %	Total FOR Price
28	GS FLAT 50 X 6 MM - Ramagundam FGD	Item28	0.5	MT	PEM_RAMA_CON	180				
29	GS ROD 20 MM DIA.1000MM LONG - Ramagundam FGD	Item29	220	NOS.	PEM_RAMA_CON	180				
30	TEST LINK 150X25X6 MM GS FLAT WITH BOX - Ramagundam FGD	Item30	220	NOS.	PEM_RAMA_CON	180				
31	100 ID 13 MM THK CI PIPE PRF 3M LONG - BRBCL Nabinagar FGD	Item31	16	NOS.	NABI_250_PEM_CON	180				
32	GI WIRE 14 SWG - BRBCL Nabinagar FGD	Item32	25000	MTR	NABI_250_PEM_CON	180				
33	GS FLAT 25 X 6 MM - BRBCL Nabinagar FGD	Item33	5	MT	NABI_250_PEM_CON	180				
34	GS FLAT 50 X 6 MM - BRBCL Nabinagar FGD	Item34	0.5	MT	NABI_250_PEM_CON	180				
35	GS ROD 20 MM DIA.1000MM LONG - BRBCL Nabinagar FGD	Item35	133	NOS.	NABI_250_PEM_CON	180				
36	TEST LINK 150X25X6 MM GS FLAT WITH BOX - BRBCL Nabinagar FGD	Item36	133	NOS.	NABI_250_PEM_CON	180				
37	FLEXIBLE COPPER BRAID FOR GATE EARTHING - Patratu TPP	Item37	20	NOS.	PATRATU_CON1	180				
38	GI WIRE 14 SWG - Patratu TPP	Item38	170000	MTR	PATRATU_CON2	180				
39	GI WIRE 8 SWG - Patratu TPP	Item39	3900	MTR	PATRATU_CON3	180				
40	GS FLAT 25 X 3 MM - Patratu TPP	Item40	4	MT	PATRATU_CON4	180				
41	GS FLAT 25 X 6 MM - Patratu TPP	Item41	24	MT	PATRATU_CON5	180				
42	GS FLAT 50 X 6 MM - Patratu TPP	Item42	6	MT	PATRATU_CON6	180				
43	GS FLAT 65 X 8 MM - Patratu TPP	Item43	89	MT	PATRATU_CON7	180				
44	GS ROD 20 MM DIA.1000MM LONG - Patratu TPP	Item44	250	NOS.	PATRATU_CON8	180				
45	TEST LINK 150X25X6 MM GS FLAT WITH BOX - Patratu TPP	Item45	250	NOS.	PATRATU_CON9	180				
46	50NB GALV MS HEAVY DUTY PIPE (PERF) 3M - Patratu TPP	Item46	95	NOS.	PATRATU_CON10	180				
47	GS FLAT 25 X 6 MM - North Karanpura FGD	Item47	4	MT	nkp_1666_pem	180				
48	GS ROD 20 MM DIA 1000MM LONG - North Karanpura FGD	Item48	45	NOS.	nkp_1666_pem	180				
49	TEST LINK 150X25X6 MM GS FLAT - North Karanpura FGD	Item49	45	NOS.	nkp_1666_pem	180				
50	50NB GALV MS HEAVY DUTY PIPE (PERF) 3M - North Karanpura FGD	Item50	35	NOS.	nkp_1666_pem	180				

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

FOR : 1) Mauda FGD  
2) Bhilai FGD  
3) Ramagundam FGD  
4) NPGCPL Nabinagar FGD  
5) Korba FGD  
6) BRBCL Nabinagar FGD  
7) Patratu Phase-1 EPC


**SPECIFICATION NO.: *PE - TS - 444 - 509 - E003***

***REVISION: 00***



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



	<b>PRE-QUALIFICATION REQUIREMENTS FOR ABOVE GROUND EARTHING MATERIALS</b>	PE-PQ-999-509-E002
		REVISION NO. 03    DATE    29/04/2016
		SHEET NO. 1 OF 1

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

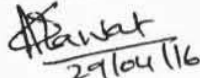
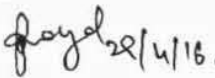
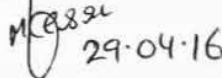
**SCOPE:** Supply : YES;    Erection & Commissioning : NO;

1	Supplied GS flats, GS rods, perforated pipe, GI stranded wire, shielding mast, 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. 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 application for registration or date of techno-commercial bid opening (as applicable) for establishing continuity in business.

**NOTE:**

Supplier to comply to "general points of PQR" available at <http://bhelpem.com/vensection/PMD/PMD.aspx>  
In case supplier is not OEM, the offer shall be evaluated as per point no 1 of "general points of PQR".

For General Points of PQR please refer sheet-2 of 2

PREPARED BY  NAME: A.K. RAWAT DESIGNATION: SR. MGR	REVIEWED BY  NAME: RAJNISH GOYAL DESIGNATION: AGM	APPROVED BY  NAME: MEENA KESRI DESIGNATION: AGM & DH(E)
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<div><div>बी.एच.ई.एल.</div><div></div></div>	<div>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</div>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: I
		REV NO.: 00    DATE: 15.09.2023
		SHEET : 1    OF 1

### CONTENTS

S. NO	DESCRIPTION	NO. OF SHEETS
1	COMPLIANCE SHEET	01
2	SECTION - 'I' (SCOPE OF ENQUIRY)	02
3	SECTION - 'II' (STANDARD TECHNICAL REQUIREMENTS)	03
	(QUALITY PLAN) + ANNEXURE 1 & 2	04
	ANNEXURE – A (APPLICABLE STANDARDS & CODES)	01
	TECHNICAL DATA SHEET	02
4	ANNEXURE-B (PRICE VARIATION FORMULAE)	01

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: I
		REV NO.: 00 DATE: 15.09.2023
		SHEET : 1 OF 3

### 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 16 of 16 of this specification.

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BIDDER'S STAMP & SIGNATURE

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: I
		REV NO.: 00 DATE: 15.09.2023
		SHEET : 2 OF 3

### 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."**

<div><div>बी एच ई रत्न</div><div></div></div>	<div>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</div>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00    DATE: 15.09.2023 SHEET : 3    OF 3

## 9.0 SPECIFIC TECHNICAL REQUIREMENTS

<u>S.No.</u>	<u>Reference Clause No. of Section- II</u>	<u>Specific Requirement/ Change</u>
1.	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.
2.	Clause 4.4	Not applicable
3.	Clause 4.5	Not applicable
4.	Clause 4.6	Not applicable
5.	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).
6.	Technical Datasheet – Clause 3.0 (f)	Not applicable

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 15.09.2023
		SHEET : 1 OF 3

## 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) |

<div><div>बीएसईएल</div><div></div></div>	<div>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</div>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 15.09.2023
		SHEET : 2 OF 3

- 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 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.

<div><div>बीएसईएल</div><div></div></div>	TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 15.09.2023
		SHEET : 3 OF 3

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 Documents to be submitted after placement of order as per NIT.



	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 15.09.2023 SHEET : 1 OF 1

### 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

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-444-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 15.09.2023
		SHEET : 1 OF 2

### 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                 | 460 gms. / sq. mtr. |
| iii) Pipes/ conduits with thickness 5 mm & over. | 610 gms. / sq. mtr  |
| iv) Pipes/ conduits with thickness under 5mm.    | 460 gms. / sq. mtr  |
| v) GI Wire                                       | 150 gms. / sq. mtr. |



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

SPECIFICATION NO. PE-TS-444-509-E003

VOLUME NO.: II-B

SECTION: II

REV NO.: 00 DATE: 15.09.2023

SHEET : 2 OF 2

f) Thickness of Pipes:

Sl. No.	Material	Size	Thickness (in mm.)
1	Cast Iron (CI)	100 ID	13.0
2	Mild Steel (MS)	25 NB, Heavy duty	4.0
3	Mild Steel (MS)	40 NB, Heavy duty	4.0
4	Mild Steel (MS)	50 NB, Heavy duty	4.5
5	Mild Steel (MS)	65 NB, Heavy duty	4.5
6	Mild Steel (MS)	100 NB, Heavy duty	5.4

1702010/2023/PS-PEM-EL

SL. NO.		COMPONENT	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	10			11
1.0		<b>RAW MATERIAL</b>											
1.1	MILD STEEL (FLATS & RODS) AS PER SPECIFICATION	1.CHEMICAL & PHYSICAL PROPERTIES	MA	VERIFICATION, OF TC'S	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													

1702010/2023/PS-PEM-EL

		QUALITY PLAN		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																											
1	2	3	4	5	6	7	8	9	P	W	V	11																											
2.3	GALVANISING	1.TEMPERATURE OF BATH	MA	TEMPERATURE INDICATOR	CONTINUOUS	IS - 2629	IS - 2629	QC RECORD	3/2	-	-	Galvanization is to be done at galvanisation plant listed in annexure-2 to quality plan.																											
		2. DROSS	MA	VISUAL	PERIODIC	IS - 2629	IS - 2629	QC RECORD	3/2	-	-																												
		3. RATE OF IMMERSION	MA	VISUAL/ MEASUREMENT	100%	IS - 2629/ MFRS PRACTICE	IS - 2629/ MFRS PRACTICE	QC RECORD	3/2	-	2																												
		4.SURFACE QUALITY	MA	VISUAL	100%	IS - 2629	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECORD	3/2	-	-																												
3.0	FINISHED ITEMS											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:- <table border="1"> <thead> <tr> <th>No. of units in a Lot</th> <th>No. of units to be selected in a sample</th> <th>Acceptance No.</th> </tr> </thead> <tbody> <tr> <td>(1)</td> <td>(2)</td> <td>(3)</td> </tr> <tr> <td>Upto 25</td> <td>3</td> <td>0</td> </tr> <tr> <td>26-100</td> <td>5</td> <td>0</td> </tr> <tr> <td>101-150</td> <td>8</td> <td>1</td> </tr> <tr> <td>151-500</td> <td>13</td> <td>1</td> </tr> <tr> <td>501-1000</td> <td>20</td> <td>2</td> </tr> <tr> <td>1001-10000</td> <td>32</td> <td>3</td> </tr> <tr> <td>10001 and above</td> <td>50</td> <td>5</td> </tr> </tbody> </table>	No. of units in a Lot	No. of units to be selected in a sample	Acceptance No.	(1)	(2)	(3)	Upto 25	3	0	26-100	5	0	101-150	8	1	151-500	13	1	501-1000	20	2	1001-10000	32	3	10001 and above	50	5
No. of units in a Lot	No. of units to be selected in a sample	Acceptance No.																																					
(1)	(2)	(3)																																					
Upto 25	3	0																																					
26-100	5	0																																					
101-150	8	1																																					
151-500	13	1																																					
501-1000	20	2																																					
1001-10000	32	3																																					
10001 and above	50	5																																					
3.1	MS FLATS	1. CHEMICAL	MA	CHEMICAL	1 No./LOT/SIZE	IS-2062	IS-2062	LAB TC	2	-	1																												
		2.DIMENSIONS	MA	MEASUREMENT	IS 2500 (PART 1 LEVEL S-4	APP. DATA SHEET/ APP. DRAWING	APP. DATA SHEET/ APP. DRAWING	INSP. REPORT	2	1	-																												
		3.SURFACE FINISH	MA	VISUAL	IS 2500 (PART 1 LEVEL S-4	FREE FROM BURRS, SLAG, ROUGHNESS, FLUX, STAIN, ETC.	FREE FROM BURRS, SLAG, ROUGHNESS, FLUX, STAIN, ETC.	INSP. REPORT	2	1	-																												
		4.MASS OF ZINC COATING	MA	CHEM. TEST	Refer Remarks	IS-6745 / APP. DATA SHEET	APP. DATA SHEET	INSP. REPORT	2	1	-																												
		5.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	Refer Remarks	IS-2633	IS-2633	INSP. REPORT	2	1	-																												
		6.THICKNESS OF ZINC COATING	MA	ELCOMETER	Refer Remarks	APP. DATA SHEET	APP. DATA SHEET	INSP. REPORT	2	1	-																												
		7.ADHESION	MA	MECH.TEST	Refer Remarks	IS-2629	IS-2629	INSP. REPORT	2	1	-																												
4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	AS PER MFG. STANDARD	AS PER MFG. STANDARD	INSP. REPORT	2	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)																																					
			PARTICULARS			BIDDER/VENDOR																																	
			NAME																																				
			SIGNATURE																																				
			DATE						BIDDER'S/VENDORS COMPANY SEAL																														
LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION																																							

## NOTES:

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

**ANNEXURE – 1****INSTRUCTIONS 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 :**

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. Wherever inspection by BHELs Purchaser/Third Party/Statutory authorities are mandatory, this shall be complied with.
7. 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.
8. This Quality Plan is also applicable to spares, if any, under scope of supply of Vendor.
9. 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

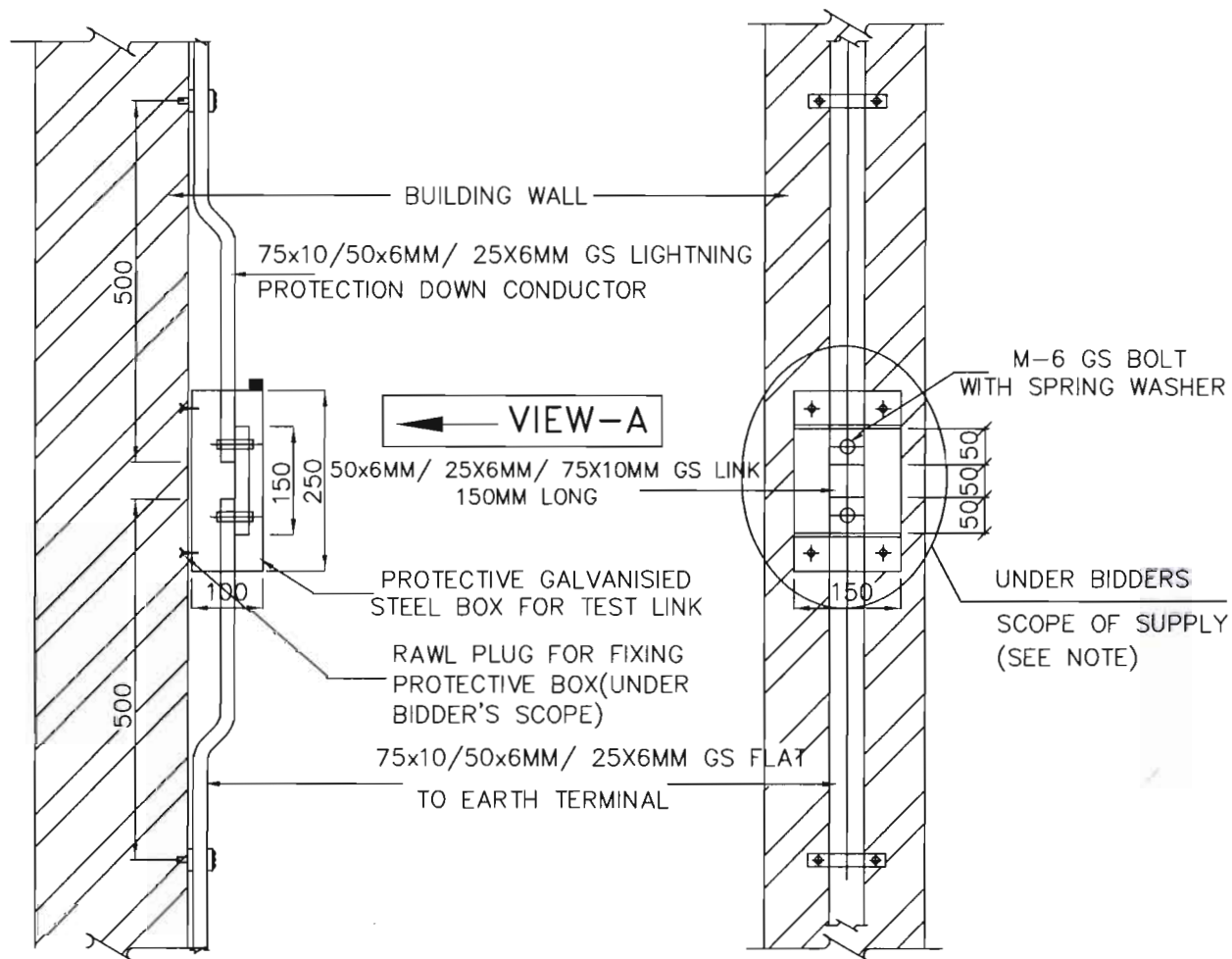
## (LIST OF BHEL- PEM APPROVED GALVANIZERS)

SL. NO.	ITEM	VENDOR NAME	ADDRESS
1	Galvanising	Jenco Industrial Corporation	Chincholi Bunder Khkar Road Near Link Road Devruwadi Malad (W) Mumbai 400064
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 Metals	G-97, MIDC, Bhutibori , Nagpur
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	Passive Infra Projects Pvt. Ltd	8th KM Stone, Sampla Kharkhoda Road, Hassangarh, Rohtak, Haryana
19	Galvanising	Rukmani Electrical & Fabricators Pvt. Ltd.	Urla Industrial Area, Urla Sarora Road, Raipur- 493 221 (Chhattisgarh) Shankharidaha Baniyarah, Jalan Industrial Complex, Gate no.3, Lane no. 4, Domjur, Howrah , W.B. - 71141
20	Galvanising	DMP Projects Pvt. Ltd.	Dulagarh Industrial Park , PS-Sankrail , Howrah -711302
21	Galvanising	Vinfab Engineers India Private Limited	Gut no. 224/1 &2 Bhiwandi Wada State Highway, Village khupri, Dist. Thane, Maharashtra -421303
22	Galvanising	Saral Projects & Processors	B-1, Industrial Area, Site-II, Amawan Road Rae Bareli
23	Galvanising	Jamna Metal Company	D - 1513, DSIDC, Narela Industrial Area Delhi - 110040, India
24	Galvanising	Brahampuri Steels Limited	172 (F) Industrial Area, Jhotwara, Jaipur-302013
25	Galvanising	Indiana Gratings PVT. LTD	F-5, MIDC Jejuri, Pune-412 303

## 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/ 25X6MM 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

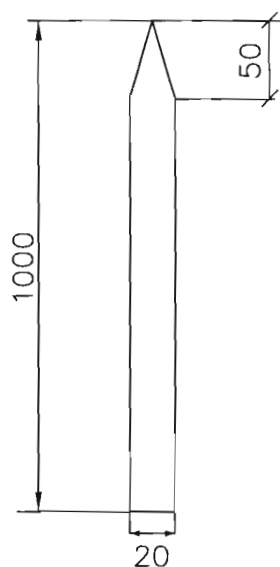
TYPICAL DETAILS OF TEST LINK  
WITH PROTECTIVE BOX

PE-DG-999-509-E003

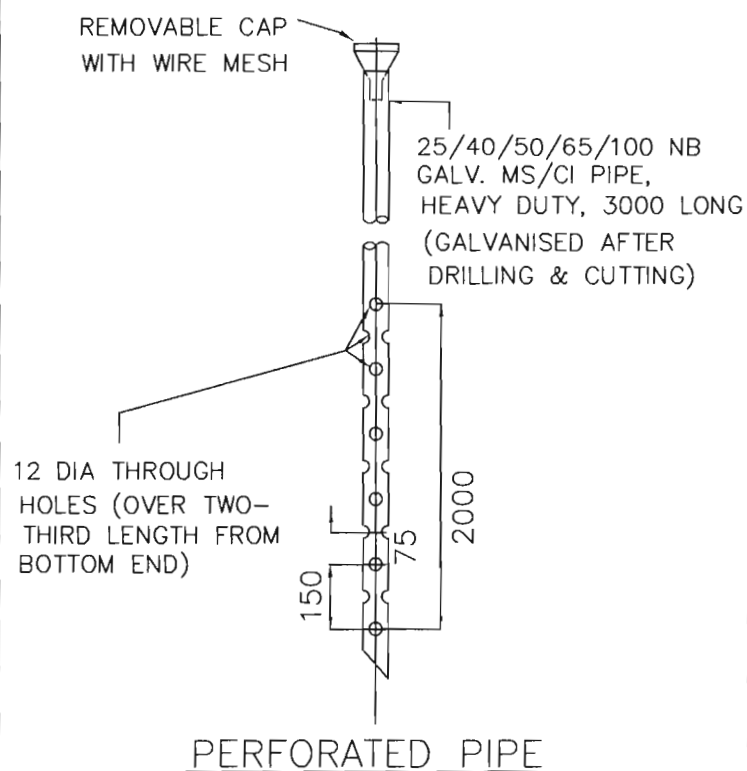
SH 2 OF 4

REV 02

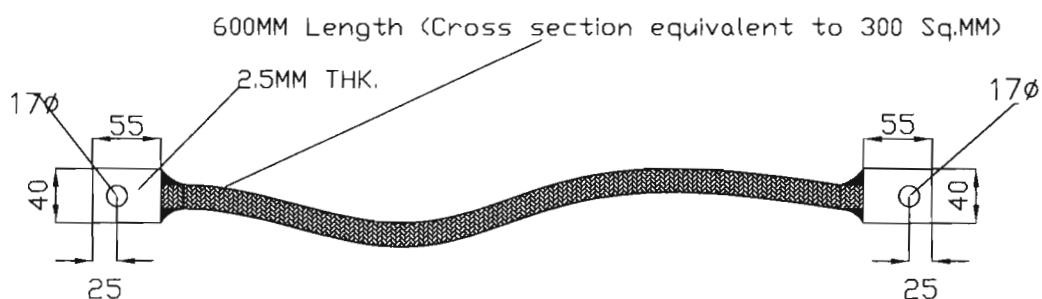




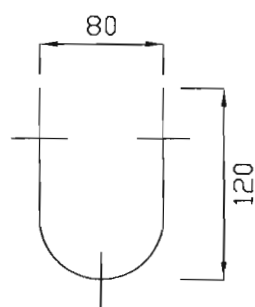
20MM DIA GS ROD  
FOR LIGHTNING PROTECTION



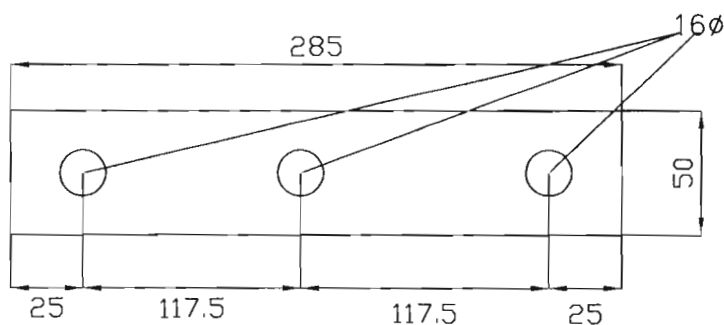
PERFORATED PIPE



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 3 OF 4

REV 02

	<u>Price Variation Formulae</u>	ANNEXURE-B
---	---------------------------------	------------

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.

FOR NORTH KARANPURA FGD PROJECT

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

**SPECIFICATION NO.: *PE - TS - 441 - 509 - E003***

***REVISION: 00***



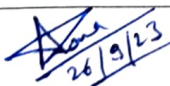
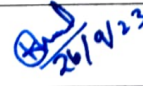
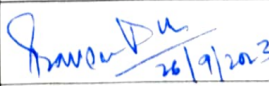
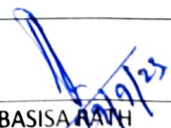
**BHARAT HEAVY ELECTRICALS LIMITED**  
**POWER SECTOR**  
**PROJECT ENGINEERING MANAGEMENT**  
**NOIDA, UP (INDIA) – 201301**

	<b>3 X 660 MW NORTH KARANPURA FGD PRE-QUALIFICATION REQUIREMENTS FOR ABOVE GROUND EARTHING MATERIALS</b>	PE-PQ-441-509-E002
		REVISION NO. 0    DATE 26/09/2023
		SHEET NO. 1 OF 1

<b>ITEMS:</b> GS flats, GS rods, perforated pipe, GI stranded wires, shielding mast, test links & flexible braided copper conductor  <b>SCOPE:</b> Supply: YES; Erection & Commissioning: NO;	
1	Supplied GS flats/GS rods/perforated pipe/GI stranded wire/shielding mast/test links & flexible braided copper conductor.
2	Vendor should have capability of supplying galvanized flats / channels/angles/structure of 4 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 from any of BHEL-PEM approved galvanizers.
4	Supplied at least 4 MT of galvanized flats/channels/angles/structure in one or more orders.
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 (General points of PQR):**

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.

PARTICULARS	PREPARED BY	REVIEWED BY	CHECKED BY	APPROVED BY
SIGNATURE & DATE:	 26/9/23	 26/9/23	 26/9/2023	 26/9/23
NAME:	ANIL RANA	KHUSHBU AGRAWAL	PRAVEEN DUTTA	DEBASISH RATH
DESIGNATION	ENGR	SR MGR	ADDL GEN MGR	ADDL GEN MGR (DH-ELECTRICAL)

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: I
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 1 OF 1

### CONTENTS

S. NO	DESCRIPTION	NO. OF SHEETS
1	COMPLIANCE SHEET	01
2	SECTION - 'I' (SCOPE OF ENQUIRY)	02
3	SECTION - 'II' (STANDARD TECHNICAL REQUIREMENTS)	03
	(QUALITY PLAN) + ANNEXURE 1 & 2	04
	ANNEXURE – A (APPLICABLE STANDARDS & CODES)	01
	TECHNICAL DATA SHEET	02
4	ANNEXURE-B (PRICE VARIATION FORMULAE)	01

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: I
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 1 OF 3

### 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 16 of 16 of this specification.

-----  
BIDDER'S STAMP & SIGNATURE

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: I
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 2 OF 3

### 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."**

<div><div>बी एच ई रत्न</div><div></div></div>	<div>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</div>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00      DATE: 27.09.2023
		SHEET : 3      OF 3

## 9.0 SPECIFIC TECHNICAL REQUIREMENTS

<u>S.No.</u>	<u>Reference Clause No. of Section- II</u>	<u>Specific Requirement/ Change</u>
1.	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.
2.	Clause 4.4	Not applicable
3.	Clause 4.5	Not applicable
4.	Clause 4.6	Not applicable
5.	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).
6.	Technical Datasheet – Clause 3.0 (f)	Not applicable



	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 1 OF 3

## 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) |

<div><div>बी एच ई सल</div><div></div></div>	TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 2 OF 3

- 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 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 : -
- 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.

<div><div>बी एच ई एल</div><div></div></div>	TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 3 OF 3

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 Documents to be submitted after placement of order as per NIT.

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 1 OF 1

### 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

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 1 OF 2

### 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                 | 460 gms. / sq. mtr. |
| iii) Pipes/ conduits with thickness 5 mm & over. | 610 gms. / sq. mtr  |
| iv) Pipes/ conduits with thickness under 5mm.    | 460 gms. / sq. mtr  |
| v) GI Wire                                       | 150 gms. / sq. mtr. |

	<b>TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING &amp; LIGHTNING PROTECTION MATERIALS</b>	SPECIFICATION NO. PE-TS-441-509-E003
		VOLUME NO.: II-B
		SECTION: II
		REV NO.: 00 DATE: 27.09.2023
		SHEET : 2 OF 2


f) Thickness of Pipes:

Sl. No.	Material	Size	Thickness (in mm.)
1	Cast Iron (CI)	100 ID	13.0
2	Mild Steel (MS)	25 NB, Heavy duty	4.0
3	Mild Steel (MS)	40 NB, Heavy duty	4.0
4	Mild Steel (MS)	50 NB, Heavy duty	4.5
5	Mild Steel (MS)	65 NB, Heavy duty	4.5
6	Mild Steel (MS)	100 NB, Heavy duty	5.4





	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				STANDARD QUALITY PLAN				SPEC. NO. : QP NO.: PE-QP-999-509-E001, R2.		DATE: 02.11.2020			
	PROJECT: ITEM: ABOVE GROUND EARTHING MATERIALS				SYSTEM: EARTHING				PO NO.:		SHEET 1 OF 5			
Sl. No.		COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS		
1	2	3	4	5	M	C/N	6	7	8	9	D	M	C	N

1.0	RAW MATERIAL:														
1.1	MILD STEEL (FLATS & RODS) AS PER SPECIFICATION	1. CHEMICAL & PHYSICAL PROPERTIES	MA	VERIFICATION OF TC'S	100%	-	IS 2062	IS 2062	IS 2062	MILL TC	✓	P	V	-	REFER REMARKS AT SL. NO. 3
		2. DIMENSIONS	MA	MEASUREMENT	100%	-	IS 1730	IS 1730	IS 1730	QC RECO RD	✓	P	-	-	
		3. SURFACE FINISH	MA	VISUAL	100%	-	IS 1079	IS 1079	IS 1079	QC RECO RD	✓	P	-	-	
1.2	ZINC	1. CHEMICAL COMP.	MA	CHEM. TEST	SAMPLE	-	IS 209	IS 209	IS 209	QC RECO RD	✓	P	V	-	
2.0	IN PROCESS:														
2.1	CUTTING, DRILLING	1. DIMENSIONS	MA	MEASUREMENT	100%	-	APPROVED DATA SHEET / DRAWING	APPROVED DATA SHEET / DRAWING	APPROVED DATA SHEET / DRAWING	QC RECO RD	✓	P	V	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	-	-	FREE FROM DEFECTS/ SLAG	TEST/ INSPN. REPO RT	✓	P	V	-	


BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL							
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Doc No:		Sign & Date		Name		Seal	
Prepared by: VIKAS KUMAR SINGH	Name: VIKAS KUMAR SINGH	Checked by: RITESH KUMAR	Sign & Date: [Signature]	Seal		Reviewed by: RITESH KUMAR		Sign & Date: [Signature]		Name		Seal			
Reviewed by: MANISH SHUKLA	Name: MANISH SHUKLA	Reviewed by: RITESH KUMAR	Sign & Date: [Signature]	Seal		Reviewed by: RITESH KUMAR		Sign & Date: [Signature]		Name		Seal			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				STANDARD QUALITY PLAN				SPEC. NO. : QP NO.: PE-QP-999-509-E001, R2.		DATE: 02.11.2020	
	PROJECT:				CUSTOMER :				PO NO.:			
	ITEM: ABOVE GROUND EARTHING MATERIALS				SYSTEM: EARTHING				SECTION: II		SHEET 2 OF 5	
Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS		
1	2	3	4	5	M	C/N	6	7	8	9	D	

2.2	SURFACE PREPARATION	1. CLEANING, PICKLING, RINSING & FLUXING	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	
2.3	GALVANIZING	1. TEMPERATURE OF BATH	MA	MEASUREMENT	CONTINUOUS	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	Galvanization is to be done at galvanization plant listed in annexure-1 to quality plan.
		2. DROSS	MA	VISUAL	PERIODIC	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	
		3. RATE OF IMMERSION	MA	VISUAL / MEASUREMENT	100%	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN	QC RECO RD	✓	P	-	-	
3.0	FINISHED ITEMS:													Note: sample for chemical test shall be


BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING				QUALITY									
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Reviewed by:	Sign & Date	Name	Seal				
VIKAS KUMAR SINGH		VIKAS KUMAR SINGH	MANISH SHUKLA		MANISH SHUKLA	RITESH KUMAR JAISWAL		RITESH KUMAR JAISWAL					
Reviewed by:													



	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				STANDARD QUALITY PLAN				SPEC. NO. : QP NO.: PE-QP-999-509-E001, R2.		DATE: 02.11.2020	
	PROJECT:				SYSTEM: EARTHING				PO NO.:			
	ITEM: ABOVE GROUND EARTHING MATERIALS								SECTION: II		SHEET 3 OF 5	
Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS		
1	2	3	4	5	M	C/N	8	9	D	M	C	N
					6	7		*	**			

												selected by BHEL& testing shall be done at NABL/ govt. approved Lab.																									
3.1	MS FLATS	1. CHEMICAL COMP.	MA	CHEM. TEST	1 No./LOT /SIZE	-	IS 2026	IS 2026	LAB TC	✓	P	V	-																								
		2. DIMENSION S	MA	MEASU REMEN T	IS 2500 (PART I) LEVEL S-4	IS 2500 (PAR T 1) LEV EL S- 4	APPROVED DATA SHEET / DRAWING	APPROVED DATA SHEET / DRAWING	INSPE CTION REPO RT	✓	P	W	-																								
		3. SURFACE FINISH	MA	VISUAL	IS 2500 (PART I) LEVEL S-4	IS 2500 (PAR T 1) LEV EL S- 4	-	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECO RD	✓	P	W	-																								
										<table><tr><td>No. of units in a Lot</td><td>No. of units to be selecte d in a sample</td><td>Accept ance No.</td></tr><tr><td>(1)</td><td>(2)</td><td>(3)</td></tr><tr><td>Upto 25</td><td>3</td><td>0</td></tr><tr><td>26-100</td><td>5</td><td>0</td></tr><tr><td>101- 150</td><td>8</td><td>1</td></tr><tr><td>151- 500</td><td>13</td><td>1</td></tr><tr><td>501- 1000</td><td>20</td><td>2</td></tr><tr><td>1001- 10000</td><td>32</td><td>3</td></tr></table>				No. of units in a Lot	No. of units to be selecte d in a sample	Accept ance No.	(1)	(2)	(3)	Upto 25	3	0	26-100	5	0	101- 150	8	1	151- 500	13	1	501- 1000	20	2	1001- 10000	32	3
No. of units in a Lot	No. of units to be selecte d in a sample	Accept ance No.																																			
(1)	(2)	(3)																																			
Upto 25	3	0																																			
26-100	5	0																																			
101- 150	8	1																																			
151- 500	13	1																																			
501- 1000	20	2																																			
1001- 10000	32	3																																			

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Doc No:		Sign & Date	
Prepared by:	MANISH SINGH	Name	VIKAS KUMAR SINGH	Sign & Date		Seal		Reviewed by:		Name	Seal
Reviewed by:	MANISH SHUKLA	Checked by:	RITESH KUMAR	Sign & Date				Approved by:			

		STANDARD QUALITY PLAN										SPEC. NO. :		DATE: 02.11.2020	
		CUSTOMER :										QP NO.: PE-QP-999-509-E001, R2.			
		PROJECT:										PO NO.:			
		ITEM: ABOVE GROUND EARTHING MATERIALS										SYSTEM: EARTHING		SECTION: II	
Sl. No.		COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS				
1	2	3	4	5	M	C/N	7	8	9	D	M	C	N		

		4.MASS OF ZINC COATING	MA	CHEM. TEST	REFER REMARKS	REFE R MARK S	IS-6745 /APP. DATA SHEET	APP. DATA SHEET	INSP. REPO RT	✓	P	W	-	10001 and above	50	5
		5.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP. REPO RT	✓	P	W	-	Note:- If the number of defective units in a lot exceeds the acceptance number as specified in col (3) of the table, the lot shall be rejected, else accepted.		
		6. THICKNESS OF ZINC COATING	MA	MEASUREMENT	IS-4759	IS-4759	APP. DATA SHEET	APP. DATA SHEET	INSP. REPO RT	✓	P	W	-			
		7. ADHESION	MA	MECH. TEST	IS-4759	IS-4759	IS 2629	IS 2629	INSP. REPO RT	✓	P	W	-			

**Note:** Items like Pipes/ Flexible Copper Braid/ GI wire/ GS Rod/ Shielding Mast/ Test link will be cleared based on COC (certificate of Compliance)

4.0	PACKING	SURFACE FINISH & COMPLETENESS	MA	VISUAL	100%	100%	AS PER MFG. STANDARD / (#)	AS PER MFG. STANDARD / (#).	INSPC. REPO RT	✓	P	W	-	(# REFER NOTE-5		
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## NOTES:

1. BHEL reserves the right to perform repeat test, if required.
2. In case of foreign supplier, all test certificates shall be furnished by the supplier, duly witnessed/ verified by supplier's TPL.

BHEL					
ENGINEERING			QUALITY		
Sign & Date	Name	Sign & Date	Name	Sign & Date	Name
Prepared by: VIKAS KUMAR SINGH	VIKAS KUMAR SINGH	Checked by: RITESH KUMAR	KUNAL GANDHI	Reviewed by: MANISH SHUKLA	MANISH SHUKLA
Reviewed by: MANISH SHUKLA	MANISH SHUKLA	Reviewed by: RITESH KUMAR	RITESH KUMAR	Approved by: JAIKUMAR	JAIKUMAR

BIDDER/ SUPPLIER			
Sign & Date	Doc No:	Sign & Date	Doc No:
Seal		Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Reviewed by:	Reviewed by:	Reviewed by:	Reviewed by:
Approved by:	Approved by:	Approved by:	Approved by:

		MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				STANDARD QUALITY PLAN				SPEC. NO : QP NO.: PE-QP-999-509-E001, R2.		DATE: 02.11.2020	
		PROJECT:								PO NO.:			
		ITEM: ABOVE GROUND EARTHING MATERIALS				SYSTEM: EARTHING				SECTION: II		SHEET 5 OF 5	
Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY		REMARKS		
1	2	3	4	5	6	7	8	9	*	D	M	C	N

3. Photographs of items duly placed inside the box just before the final packing and Photographs of the box just before dispatch to be sent to BHEL purchase group for review before issuing MDCC.

4. In case of any changes in QP commented by customer at contract stage, same shall be carried out by bidder without any implication to BHEL/ Customer.

5. Project specific QP to be developed based on customer requirement.

6. For export job, BHEL technical specification for seaworthy packing for export job to be followed.

7. Material shall be packed suitably in order to avoid damage during transit and also during storage at site in tropical climate conditions. Packing shall be suitable for storage at site in tropical climate conditions.

8. Latest revision/ year of issue of all the standards (IS/ASME/IEC etc.) indicated in QP shall be referred.

**LEGENDS:**

\*RECORDS, IDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,

\*\* M: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, C: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, N: CUSTOMER,

P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE

MA: MAJOR, MI: MINOR, CR: CRITICAL

D: DOCUMENTATION

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Reviewed by:		Name		Seal	
Prepared by:	VIKAS KUMAR SINGH	Name	VIKAS KUMAR SINGH	Checked by:	RITESH KUMAR	Sign & Date		Reviewed by:		Name		Seal	
Reviewed by:	MANISH SHUKLA	Reviewed by:	MANISH SHUKLA	Reviewed by:	RITESH KUMAR	Reviewed by:	RITESH KUMAR	Approved by:		Approved by:			

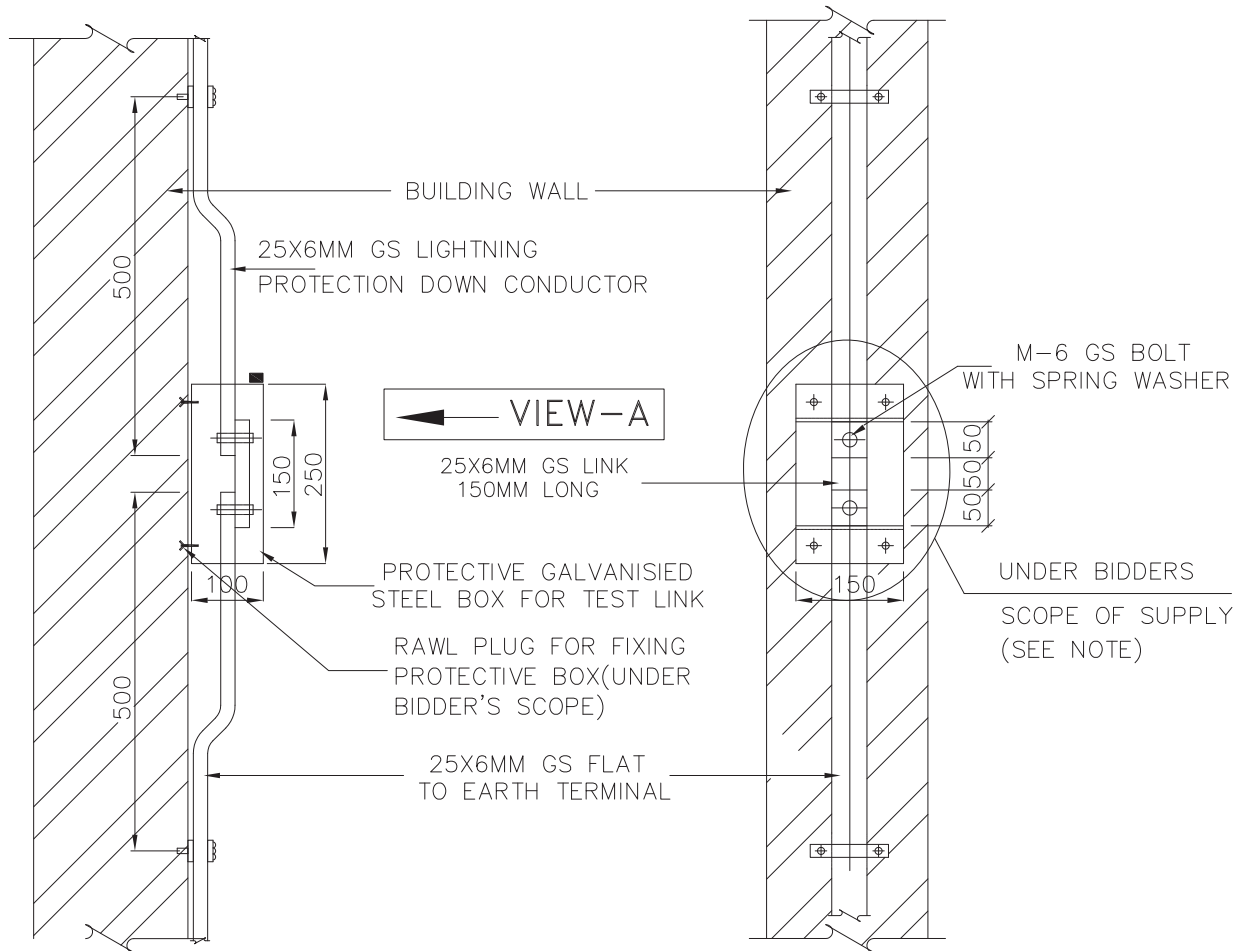
## ANNEXURE-1 to Quality Plan

## (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 400064
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 Metals	G-97, MIDC, Bhutibori , Nagpur
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 Lotton 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 (Shapur) Dist. Rajkot, India.
18	Galvanising	Passive Infra Projects Pvt. Ltd	8th KM Stone, Sampla Kharkhoda Road, Hassangarh, Rohtak, Haryana
19	Galvanising	Rukmani Electrical & Fabricators Pvt, Ltd.	Urla Industrial Area, Urla Sarora Road, Raipur- 493 221 (Chhattisgarh) Shankharidaha Baniyarah, Jalan Industrial Complex, Gate no.3, Lane no. 4, Domjur, Howrah , W.B .- 71141
20	Galvanising	DMP Projects Pvt.Ltd.	Dulagarh Industrial Park , PS-Sankrail , Howrah -711302
21	Galvanising	Vinfab Engineers India Private Limited	Gut no. 224/1 &2 Bhiwandi Wada State Highway, Village khupri, Dist. Thane, Maharashtra -421303
22	Galvanising	Saral Projects & Processors	B-1, Industrial Area, Site-II, Amawan Road Rae Bareli
23	Galvanising	Jamna Metal Company	D - 1513, DSIDC, Narela Industrial Area Delhi - 110040, India
24	Galvanising	Brahampuri Steels Limited	172 (F) Industrial Area, Jhotwara, Jaipur-302013
25	Galvanising	Indiana Gratings PVT. LTD	F-5, MIDC Jejuri, Pune-412 303

## 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 25X6MM 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

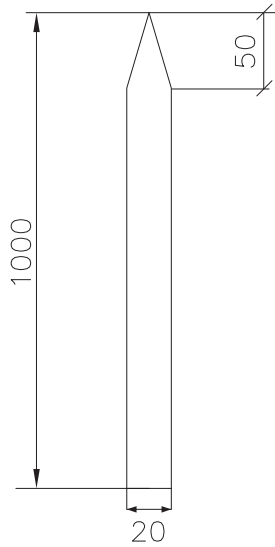
TYPICAL DETAILS OF TEST LINK  
WITH PROTECTIVE BOX

PE-DG-999-509-E003

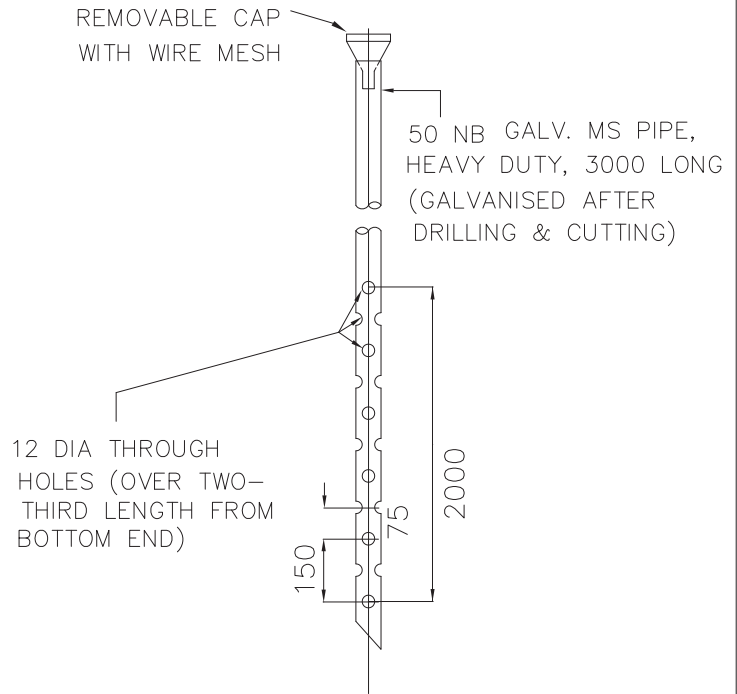
SH 1 OF 2

REV 02

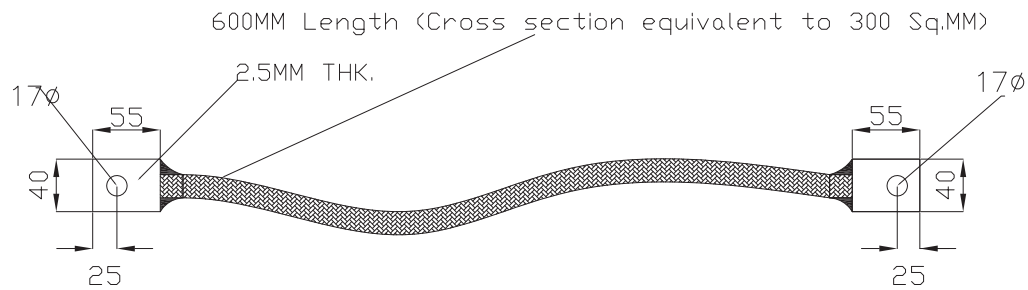
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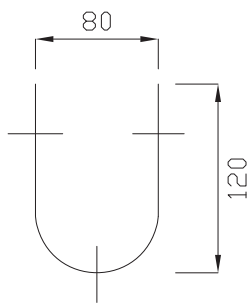
20MM DIA GS ROD  
FOR LIGHTNING PROTECTION



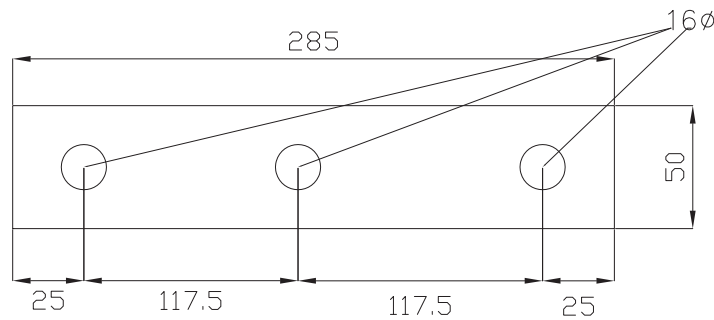
PERFORATED PIPE



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 02

	<u>Price Variation Formulae</u>	ANNEXURE-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: 2016 = 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 call.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 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.

Price variation shall be limited to +20% of total Ex-works price actually supplied and no limit on -ve price variation with base month of one month prior to date of tender enquiry for the items where PVC is applicable.