

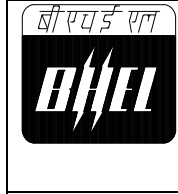
TECHNICAL SPECIFICATION
FOR
ABOVE GROUND EARTHING
&
LIGHTNING PROTECTION MATERIALS

SPECIFICATION NO.: *PE - TS - 440 - 509 - E003*

REVISION: 00



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



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

SPECIFICATION NO. PE-TS-440-509-E003
VOLUME NO.: II-B
SECTION: I
REV NO.: 00 DATE: 15.06.2023
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 19 of 19 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

<u>S.No.</u>	<i>Reference Clause No. of Section- II</i>	<i>Specific Requirement/ Change</i>
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.
	Clause 4.4	Test Link with box shall be applicable
2.	Clause 4.5	Not applicable
3.	Clause 4.6	Not applicable
4.	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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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': -
- a) Signed copy of Compliance Sheet



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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-V0-440-507-E903	As per attached delivery Schedule

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

MANUFACTURER/ BIDDER:-	QUALITY PLAN						SPEC. NO :- PE-TS-440-509-E003	DATE:-15.06.23		
	CUSTOMER : M/s TSGENCO						QP NO.:PE-V0-440-507-E903			DATE:
	PROJECT:- 4X270 MW BHADADRI TPS – FGD SYSTEM						PO NO.:-			
	ITEM: ABOVE GROUND EARTHING MATERIALS			SYSTEM:EARTHING			Inspection Category: II			SHEET 1 OF 4

Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N			9	* D	** M	C	N	
1	2	3	4	5	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%	100%	IS 2062	IS 2062	MILL TC	✓	P	V	V	REFER REMARKS AT SL. NO. 1
		2.DIMENSION	MA	MEASUREMENT	100%	100%	IS 1730	IS 1730	QC RECORD	✓	P	V	V	
		3.SURFACE FINISH	MA	VISUAL	100%	100%	IS 1079	IS 1079	QC RECORD	✓	P	V	V	
1.2	ZINC	1.CHEMICAL COMP.	MA	CHEM. TEST	SAMPLE	SAMP LE	IS 209	IS 209	QC RECORD	✓	P	V	V	

2.0	IN PROCESS:													
------------	--------------------	--	--	--	--	--	--	--	--	--	--	--	--	--

2.1	CUTTING, DRILLING	1.DIMENSIONS	MA	MEASUREMENT	100%	100%	APPROVED DATA SHEET / DRAWING	APPROVED DATA SHEET / DRAWING	QC RECORD	✓	P	V	V	
		2. SURFACE FINISH	MA	VISUAL	100%	100%	-	FREE FROM DEFECTS/ SLAG	TEST/ INSPN. REPORT	✓	P	V	V	
2.2	SURFACE PREPARATION	1. CLEANING, PICKLING, RINSING & FLUXING	MA	VISUAL	100%	100%	IS 2629	IS 2629	QC RECORD	✓	P	V	V	
		2. SURFACE FINISH	MA	VISUAL	100%	100%	IS 2629	IS 2629	QC RECORD	✓	P	V	V	
2.3	GALVANISING	1.TEMPERATURE OF BATH	MA	MEASUREMENT	CONTINUOUS	CONTINUOUS	IS 2629	IS 2629	QC RECORD	✓	P	V	V	Galvanization is to be done at galvanization plant listed in annexure-1 to quality plan.
		2. DROSS	MA	VISUAL	PERIODIC	PERIODIC	IS 2629	IS 2629	QC RECORD	✓	P	V	-	

SUPPLIER			BHEL			FOR CUSTOMER REVIEW & APPROVAL		
QUALITY ASSURANCE			QUALITY			Doc No:		
Sign & Date	Name		Sign & Date	Name		Sign & Date		Name
Prepared by:			Reviewed by:			Approved by:		

MANUFACTURER/ BIDDER:-	QUALITY PLAN					SPEC. NO :- PE-TS-440-509-E003	DATE:-15.06.23
	CUSTOMER : M/s TSGENCO					QP NO.:PE-V0-440-507-E903	DATE:
	PROJECT:- 4X270 MW BHADADRI TPS – FGD SYSTEM					PO NO.:-	
	ITEM: ABOVE GROUND EARTHING MATERIALS			SYSTEM:EARTHING		Inspection Category: II	SHEET 2 OF 4

Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					6	C/N			9	* D	**			
1	2	3	4	5			M	C/N			7	8	9	D

		3.RATE OF IMMERSION	MA	VISUAL/ MEASUREMENT	100%	100%	IS 2629	IS 2629	QC RECORD	✓	P	V	-													
		4. SURFACE FINISH	MA	VISUAL	100%	100%	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN	QC RECORD	✓	P	V	-													
3.0	FINISHED ITEMS:																									
3.1	MS FLATS	1. CHEMICAL COMP.	MA	CHEM. TEST	1 No./LOT/SIZE	1 No./LOT/SIZE	IS 2026	IS 2026	LAB TC	✓	P	V	V	Note: sample for chemical test shall be selected by BHEL& testing shall be done at NABL/ govt. approved Lab. Sampling plan for galvanization test: Inspection shall be as per table 2 of IS 4759 and same is mentioned below:-												
		2. DIMENSIONS	MA	MEASUREMENT	IS 2500 (PART 1) LEVEL S-4	IS 2500 (PART 1) LEVEL S-4	APPROVED DATA SHEET / DRAWING	APPROVED DATA SHEET / DRAWING	INSPECTION REPORT	✓	P	W	V	<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> </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
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																								
		3. SURFACE FINISH	MA	VISUAL	IS 2500 (PART 1) LEVEL S-4	IS 2500 (PART 1) LEVEL S-4	-	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECORD	✓	P	W	V													

SUPPLIER			BHEL			FOR CUSTOMER REVIEW & APPROVAL		
QUALITY ASSURANCE			QUALITY			Doc No:		
Sign & Date	Name		Sign & Date	Name		Sign & Date		Name
Prepared by:			Reviewed by:			Approved by:		

MANUFACTURER/ BIDDER:-	QUALITY PLAN						SPEC. NO :- PE-TS-440-509-E003	DATE:-15.06.23		
	CUSTOMER : M/s TSGENCO						QP NO.:PE-V0-440-507-E903			DATE:
	PROJECT:- 4X270 MW BHADADRI TPS – FGD SYSTEM						PO NO.:-			
	ITEM: ABOVE GROUND EARTHING MATERIALS			SYSTEM:EARTHING			Inspection Category: II			SHEET 3 OF 4

SI. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N			9	*	**	M	C	

		4.MASS OF ZINC COATING	MA	CHEM. TEST	REFER REMARKS	REFER REMARKS	IS-6745 /APP. DATA SHEET	APP. DATA SHEET	INSP. REPORT	✓	P	W	V	<table border="1"> <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> </table>	101-150	8	1	151-500	13	1	501-1000	20	2	1001-10000	32	3	10001 and above	50	5
101-150	8	1																											
151-500	13	1																											
501-1000	20	2																											
1001-10000	32	3																											
10001 and above	50	5																											
		5.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-4759	IS-2633	IS-2633	INSP. REPORT	✓	P	W	V	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. REPORT	✓	P	W	V																
		7. ADHESION	MA	MECH. TEST	IS-4759	IS-4759	IS 2629	IS 2629	INSP. REPORT	✓	P	W	V																
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	COMPLETENESS	MA	VISUAL	100%	100%	AS PER MFG. STANDARD / (#)	AS PER MFG. STANDARD / (#).	INSP. REPORT	✓	P	W	V	(#) REFER NOTE-4															

NOTES:

- BHEL reserves the right to perform repeat test, if required.
- 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.
- Latest revision/ year of issue of all the standards (IS/ASME/IEC etc.) indicated in QP shall be referred.
- Statutory requirements will be complied.

SUPPLIER			BHEL			FOR CUSTOMER REVIEW & APPROVAL		
QUALITY ASSURANCE			QUALITY			Doc No:		
Sign & Date	Name		Sign & Date	Name		Sign & Date		Name
Prepared by:			Reviewed by:			Approved by:		

MANUFACTURER/ BIDDER:-	QUALITY PLAN				SPEC. NO :- PE-TS-440-509-E003	DATE:-15.06.23
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	PROJECT:- 4X270 MW BHADADRI TPS – FGD SYSTEM				PO NO.:-	
	ITEM: ABOVE GROUND EARTHING MATERIALS		SYSTEM:EARTHING		Inspection Category: II	SHEET 4 OF 4

SI. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY	REMARKS
					M	C/N			9	*		
1	2	3	4	5	6		7	8	9	D	M C N	

5. Instruments used for test shall have valid calibration certificate with tractability to national level.
6. Bought out items shall be from approved vendor by TSGENCO/TCE for this project.
7. W at client column shall be considered as hold point
8. All inspection/verification/NDT reports along with material certificates shall be reviewed at the time of witness point

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

SUPPLIER			BHEL			FOR CUSTOMER REVIEW & APPROVAL		
QUALITY ASSURANCE			QUALITY			Doc No:		
	Sign & Date	Name		Sign & Date	Name		Sign & Date	Name
Prepared by:			Reviewed 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 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- 493 221 (Chhattisgarh)
19	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:

- IT SHALL BE THE RESPONSIBILITY OF THE VENDOR TO GET THE MATERIAL GALVANIZED FROM THE ABOVE LIST WITHOUT ANY COMMERCIAL IMPLICATION TO BHEL



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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



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

SPECIFICATION NO. PE-TS-440-509-E003
VOLUME NO.: II-B
SECTION: II
REV NO.: 00 DATE: 15.06.2023
SHEET : 1 OF 1

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

2.0 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:

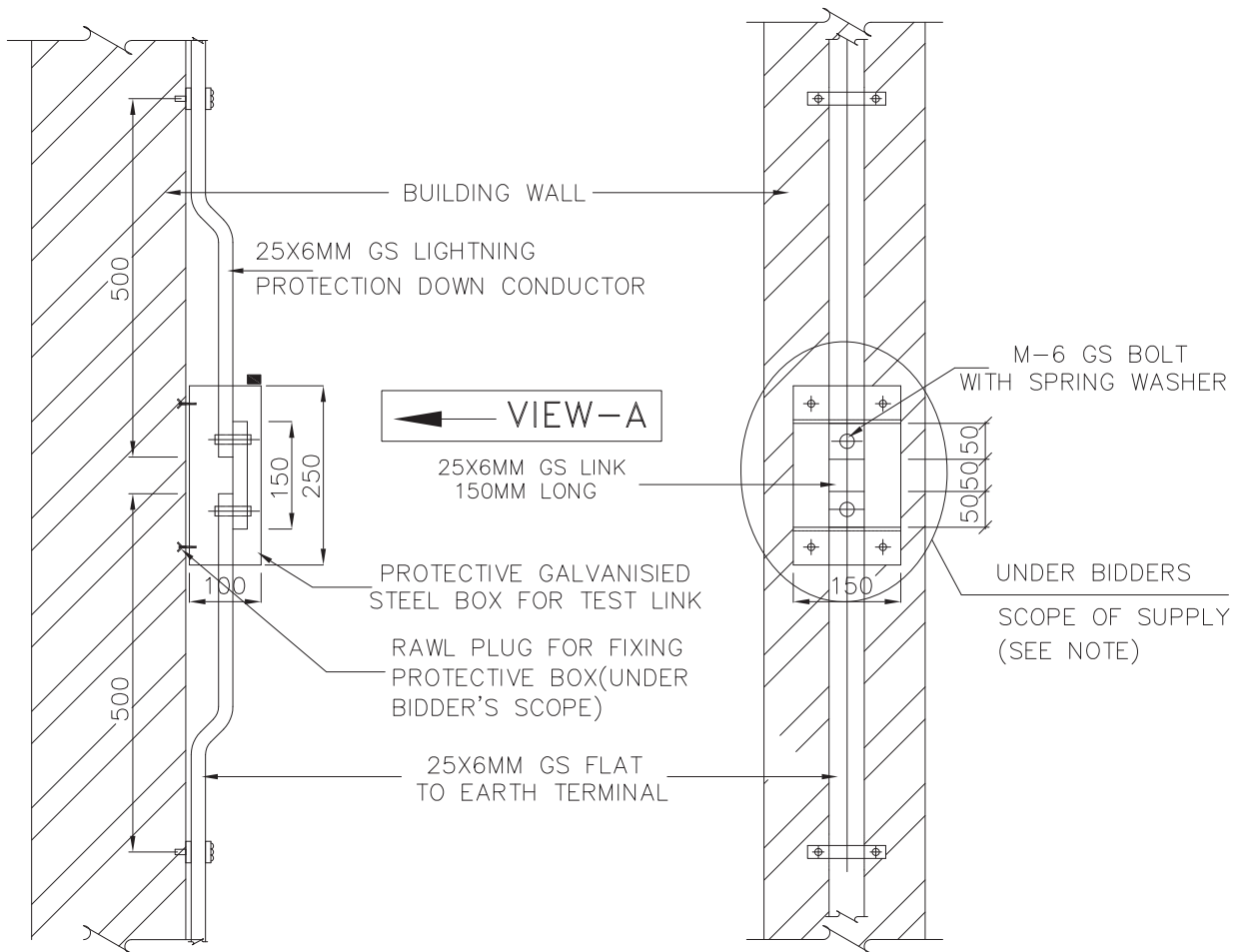
- i) MS flats 5mm thick & over 75 microns (minimum)
ii) MS flats under 5mm thickness 60 microns (minimum)
iii) Pipes/ conduits with thickness 5 mm & over. 75 microns (minimum)
iv) Pipes/ conduits with thickness under 5mm 60 microns (minimum)
v) GI Wire 20 Microns (Medium coated)

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.

f) Thickness of Pipes:

Sl. No.	Material
1	50 NB GALVANISED MS HEAVY DUTY PIPE (PERFORATED) 3M LONG



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.

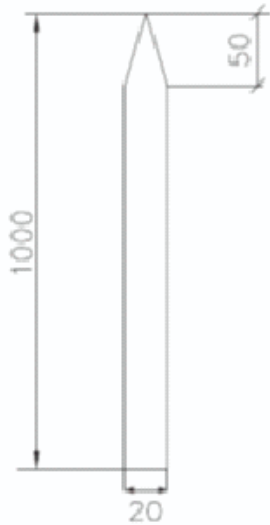


TITLE

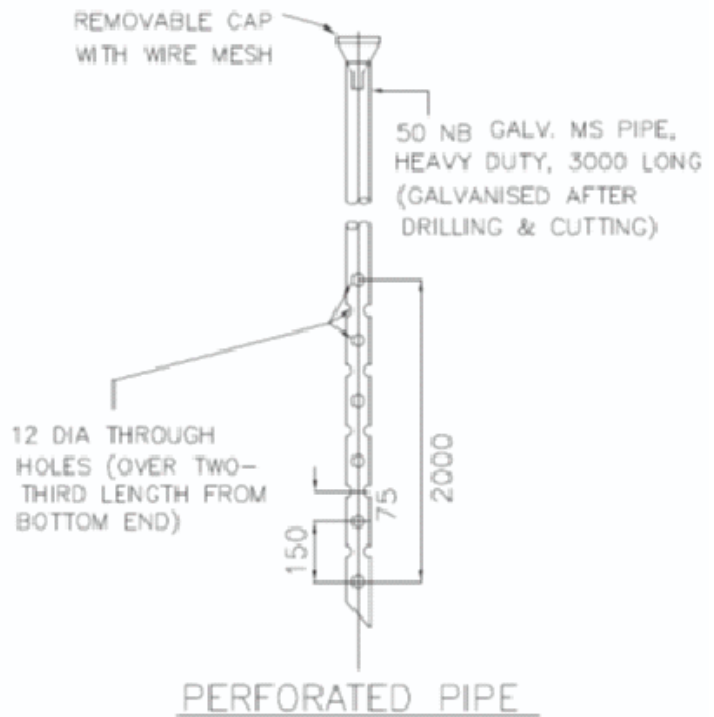
**TYPICAL DETAILS OF TEST LINK
WITH PROTECTIVE BOX**

PE-DG-999-509-E003

SH 1 OF 2



20MM DIA GS ROD
FOR LIGHTNING PROTECTION



PERFORATED PIPE



TITLE
TYPICAL DETAILS OF PERFORATED
PIPE AND 20MM DIA GS ROD

PE-DG-999-509-E003



Price Variation Formulae

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_o = Ex-works price quoted/confirmed.

FE_o = 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_o = 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_o 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.

BHEL Drawing No.	Drawing Title	Vendor Sub (Days)*	Bhel comment (Days)	Vendor Sub (Days)#	Bhel and Customer comment/Approval (Days)	Total Engg Time (Days)
Primary Documents						
PE-V0-440-507-E903	Quality Plan for Above Ground Earthing & Lightning Protection Material.	5	0	0	5	10

NOTES:

a) * 1st submission within indicated days from date of purchase order
b) # Submission (within indicated days) after incorporating all BHEL comments
c) Primary documents shall be considered for Delay analysis