

**TELANGANA STATE POWER
GENERATION CORPORATION LIMITED**

5 X 800MW YADADRI TPS

VOLUME – II

**TECHNICAL SPECIFICATION
FOR**

***ABOVE GROUND EARTHING
& LIGHTNING PROTECTION MATERIALS***

**SPECIFICATION NO. : *PE-TS-417-509-E003*
REVISION : 0**



**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-417-509-E003
VOLUME NO. : II
SECTION - I
REV NO. : 0 DATE : 30.04.2018
SHEET : 1 OF 1

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	TOTAL NO. OF SHEETS	= 18



**TECHNICAL SPECIFICATION FOR
OIL FILLED SERVICE TRANSFORMER**

SPECIFICATION NO. **PE-TS-417-509-E003**

VOLUME-II

COMPLIANCE CERTIFICATE

REVISION 00

DATE: 30.4.18

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 deviation 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).

BIDDER'S STAMP & SIGNATURE



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**SECTION – 'I'
SPECIFIC TECHNICAL REQUIREMENTS**



**TECHNICAL SPECIFICATION FOR
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1.0 SCOPE OF ENQUIRY

- 1.1 This enquiry covers the supply of Above Ground Earthing & lightning protection materials conforming to this specification.
- 1.2 General technical requirements of Above Ground Earthing & Lightning Protection Materials are indicated in Section-II and Datasheet-A. Project specific technical/ quality requirements/ changes are listed in Section-I.
- 1.3 Bidder shall confirm total compliance to the specification without any deviations from technical/quality assurance requirements stipulated.
- 1.4 The documents shall be in English Language and MKS system of units.
- 1.5 The quality plan enclosed forms the minimum requirement but not limited to be adhered to by the bidder
- 1.6 The stipulations of Section-I, followed by those of Datasheet-A shall prevail in case of any conflict between the stipulations of Section-I, Datasheet-A & Section-II.

2.0 BILL OF QUANTITIES:

- 2.1 Quantity requirements shall be as per **Annexure-I (Bill of Quantities (BOQ))** of NIT.

3.0 SPECIFIC REQUIREMENTS:

- 3.1 Technical:

1.	Heavy Duty (Perforated) 100 ID,13 MM THICK , 3 m long CI Pipe with removable funnel & wire mesh, as per drawing no. PE-DG-999-509-E003.
2.	TEST LINK 150X75X10 MM GS FLAT WITH PROTECTIVE BOX as per drawing no. PE-DG-999-509-E003.
3.	MS sheet of 14 SWG shall be hot rolled mild steel sheet perforated type.

S.No.	Reference Clause No. of Section II (if any)	Specific Requirement/ Change
1.	4.2 a) MS Flats of all sizes : minimum 6 metres	a) MS Flats of all sizes 4-7 metres

- 3.2 Quality/ Inspection:

S.No.	Reference Clause No. of Section II (if any)	Specific Requirement/ Change
1.	Clause no. 4.2 – "BHEL's Standard QPs (PED-509-00-Q-001/03) & (PED-507-00-Q-006/02)...."	Shall be read as "BHEL's Standard QP (PE-QP-999-509-E001)....."

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ANNEXURE – A

LIST OF DRAWINGS / DOCUMENTS TO BE FURNISHED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT

Sl. No.	Drawings/Document Description	Drawings / Document Number	Submission Schedule	Resubmission Schedule
1.	Technical Data Sheet for Above Ground Earthing & Lightning Protection Materials	PE-V0-417-509-E021	Within one week of award of contract	Within one week of comments
2.	GA drawings for Above Ground Earthing & Lightning Protection Materials	PE-V0-417-509-E022	Within one week of award of contract	Within one week of comments
3.	Quality Plan for Above Ground Earthing & Lightning Protection Materials	PE-V0-417-509-E903	Within one week of award of contract	Within one week of comments

It may please be noted that successful bidder is not to make any fresh submittals at contract stage w.r.t. above mentioned drawings/documents. Technical datasheet, GA drawings & Quality Plan as enclosed in the technical specification is to be appended with cover sheet bearing drawing/document number & description as stated above.

The signed & stamped copy for the same shall be submitted by successful bidder to BHEL within one week of award of contract without making any changes in the contents of the drawing/document.



TECHNICAL SPECIFICATION FOR
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SPECIFICATION NO. PE-RC-999-509-E003

VOLUME NO. : II

SECTION : II

REV NO. : 01 DATE : 10/02/2016

SHEET : 1 OF 4

QUALITY PLAN

		QUALITY PLAN		CUSTOMER :		PROJECT TITLE :		SPECIFICATION NO. :			
COMPONENT/OPERATION		SHEET 1 OF 2		BIDDER/ VENDOR		STANDARD QP NO. : PE-QP-999-509-E001, REV. 01		SPECIFICATION TITLE:			
SL. NO.	CHARACTERISTIC CHECK	SYSTEM CAT.	EARTHING TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	DOC. NO. : AGENCY	REMARKS		
1	2	3	4	5	6	7	8	9	10		
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	MILL TC	3	1/2	Refer note in Remark at Sl. No.3
1.2	ZINC	1.CHEM.COMP.	MA	CHEM.TEST	SAMPLE	IS - 1730	IS - 209	QC RECORD	3/2	-	1/2
2.0	IN-PROCESS	2.DIMENSIONS	MA	MEASUREMENT	100%	IS - 1730	IS - 1730	QC RECORD	3/2	-	-
2.1	CUTTING, DRILLING	3.SURFACE FINISH	MA	VISUAL	100%	IS : 1079	IS : 1079	QC RECORD	3/2	-	-
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									
LEGEND :		1 - BHEL/CUSTOMER	2 - VENDOR	3 - SUB-VENDOR	P - PERFORM	W - WITNESS	V - VERIFICATION	BIDDER'S/VENDORS COMPANY SEAL			

BHEL		CUSTOMER :		PROJECT TITLE :		SPECIFICATION NO. :																															
QUALITY PLAN		BIDDER/ VENDOR		STANDARD QP NO. : PE-QP-999-509-E001 REV. 01		SPECIFICATION TITLE:																															
SL. NO.	COMPONENT/OPERATION	SHEET 2 OF 2	CHARACTERISTIC CHECK	SYSTEM CAT.	EARTHING TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	DOC. NO. : AGENCY	REMARKS																										
											P	W	V																								
1	2	3	4	5	6	7	8	9	10	11																											
2.3	GALVANISING	1. TEMPERATURE OF BATH 2. DROSS 3. RATE OF IMMERSION 4. SURFACE QUALITY	MA MA MA MA	TEMPERATURE INDICATOR VISUAL VISUAL/ MEASUREMENT VISUAL	CONTINUOUS PERIODIC 100% 100%	IS - 2629 IS - 2629 IS - 2629/ MFRS PRACTICE IS - 2629	IS - 2629 IS - 2629 IS - 2629/ MFRS PRACTICE FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECORD QC RECORD QC RECORD QC RECORD	3/2 3/2 3/2 3/2	- - 2 -	Galvanization is to be done at galvanisation plant listed in annexure-2 to quality plan.																										
3.0	FINISHED ITEMS																																				
3.1	MS FLATS	1. CHEMICAL 2. DIMENSIONS 3. SURFACE FINISH 4. MASS OF ZINC COATING 5. UNIFORMITY OF ZINC COATING 6. THICKNESS OF ZINC COATING 7. ADHESION	MA MA MA MA MA MA MA	CHEMICAL MEASUREMENT VISUAL CHEM. TEST CHEM. TEST ELCOMETER MECH. TEST	1 No./LOT/SIZE IS 2500 (PART 1) LEVEL S-4 IS 2500 (PART 1) LEVEL S-4 Refer Remarks Refer Remarks Refer Remarks Refer Remarks	IS-2062 APP. DATA SHEET/ APP. DRAWING FREE FROM BURRS, SLAG, ROUGHNESS, FLUX, STAIN, ETC. IS-6745 / APP. DATA SHEET IS-2633 APP. DATA SHEET IS-2629	LAB TC INSP. REPORT INSP. REPORT INSP. REPORT INSP. REPORT INSP. REPORT INSP. REPORT	2 2 2 2 2 2 2	- 1 1 1 1 1 1	1 - - - - - -	Note: sample for chemical test shall be selected by BHEL & testing shall be done at NABL/ govt. approved Sampling plan for galvanization test. Inspection shall be as per table 2 of IS 4759 and same is mentioned below:- <table border="1"> <thead> <tr> <th>No. of units in a sample</th> <th>No. of units to be selected</th> <th>Acceptance No.</th> </tr> </thead> <tbody> <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> 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.			No. of units in a sample	No. of units to be selected	Acceptance No.	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 sample	No. of units to be selected	Acceptance No.																																			
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																																			
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DATE																																					
LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION																																					
BIDDER/S/ VENDORS COMPANY SEAL																																					

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, Maryana
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.



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SECTION 'II'
STANDARD TECHNICAL SPECIFICATIONS



**TECHNICAL SPECIFICATION FOR
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1.0 SCOPE OF ENQUIRY

- 1.1 This specification covers the Design, Manufacture, Assembly, Testing and Inspection at vendor's/sub vendor's works, Packing and despatch to site of **ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS** as described in various sections of this specification.

2.0 CODES & 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 material" shall conform to the latest revision of relevant standards and codes of practices as per Technical datasheet-A.
- 2.3 In case of conflict between the applicable reference standard and this specification, this specification shall govern.

3.0 DESIGN REQUIREMENTS AND CONSTRUCTIONAL FEATURES

- 3.1 All items listed in the BOQ-Cum-Price Schedule for Above Ground Earthing & Lightning Protection Material (Annexure - I of the specification) shall be manufactured as per Technical Datasheet-A and Project drawings enclosed with this specification.
- 3.2 Straight lengths of hot dip galvanised MS materials as per project specific requirement shall be supplied in the standard lengths as below:
- | | | | |
|----|------------------------------|---|----------------------|
| a) | MS Flats of all sizes | : | minimum 6 metres |
| b) | SWG wires of different sizes | : | 100 metres (minimum) |
- 3.3 All finished materials (after galvanization) shall be free from sharp edges, corners, burs & unevenness.
- 3.4 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 as per enclosed drawing no. PE-DG-999-509-E003,

4.0 QUALITY / INSPECTION

- 4.1 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 this specification. Charges for all these tests for all the equipments & components shall be deemed to be included in the bid price.



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4.2 BHEL's Standard QPs (PED-509-00-Q-001/03) & (PED-507-00-Q-006/02) are enclosed for reference. However, at contract stage, the successful bidder shall submit the QP for BHEL/ ultimate customer's approval. In case bidder has reference QP agreed with ultimate customer, same can be submitted for specific project after award of contract for BHEL/ ultimate customer's approval. There shall be no commercial implication to BHEL on account of QP approval.

4.3 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved quality plan.

4.4 At the time of final inspection, 1 sample / lot /size shall be randomly selected by inspector for testing chemical & physical properties at NABL / govt. Approved laboratories. Further, the test certificates shall be submitted to BHEL for review / approval before dispatch of material.

5.0 PACKING

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

Test links with Protective boxes & fixing hardware shall be packed separately to avoid damage.

6.0 DELIVERY

The delivery shall be as per NIT (Notice Inviting Tender).

7.0 DOCUMENTATION

7.1 Documents to be submitted by the bidder along with the bid.

- a) A copy of sheet " List of Contents" with bidder's signature & company stamp
- b) A copy of sheet "Instructions to bidders for preparing Technical offer" with bidder's signature & company stamp.
- c) Unpriced copy of "Annexure-I (Bill of Quantities Cum Price Schedule)" with bidder's signature & company stamp.

No other documentation is required to be submitted as technical offer. Any information contained in other parts of the offer (e.g. covering letter, annexures, etc.) which is deviating from specification requirements in any way shall not be considered by BHEL as part of offer.

7.2 Documents to be submitted by successful bidder after award of contract shall be as per Annexure-II.

7.3 Document distribution schedule for the project shall be as per Annexure-III.



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TECHNICAL DATASHEET-A

1.0 APPLICABLE STANDARDS:

- | | | |
|----|--|-----------------|
| a) | For Hot rolled carbon sheets & strips. | IS: 2062 |
| b) | For Mild Steel Wire | IS: 280 |
| c) | For Surface Pre-treatment | IS: 2629 |
| d) | For Hot dip galvanising of steel | IS: 2629 |
| e) | For Hot dipped galvanised coating on round steel wires | IS: 4826 |
| f) | For Testing of zinc coating | IS: 2633 |
| g) | For Determining of mass of zinc coating | IS: 6745 |
| h) | For Rolling & cutting tolerances of hot rolled steel products | IS: 1852 |
| i) | For Hot dip zinc coating on structural steel & other allied products | IS: 4759 |
| j) | For Tubes, Tubulars and other Wrought Steel Fittings | IS: 1239 |

2.0 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:

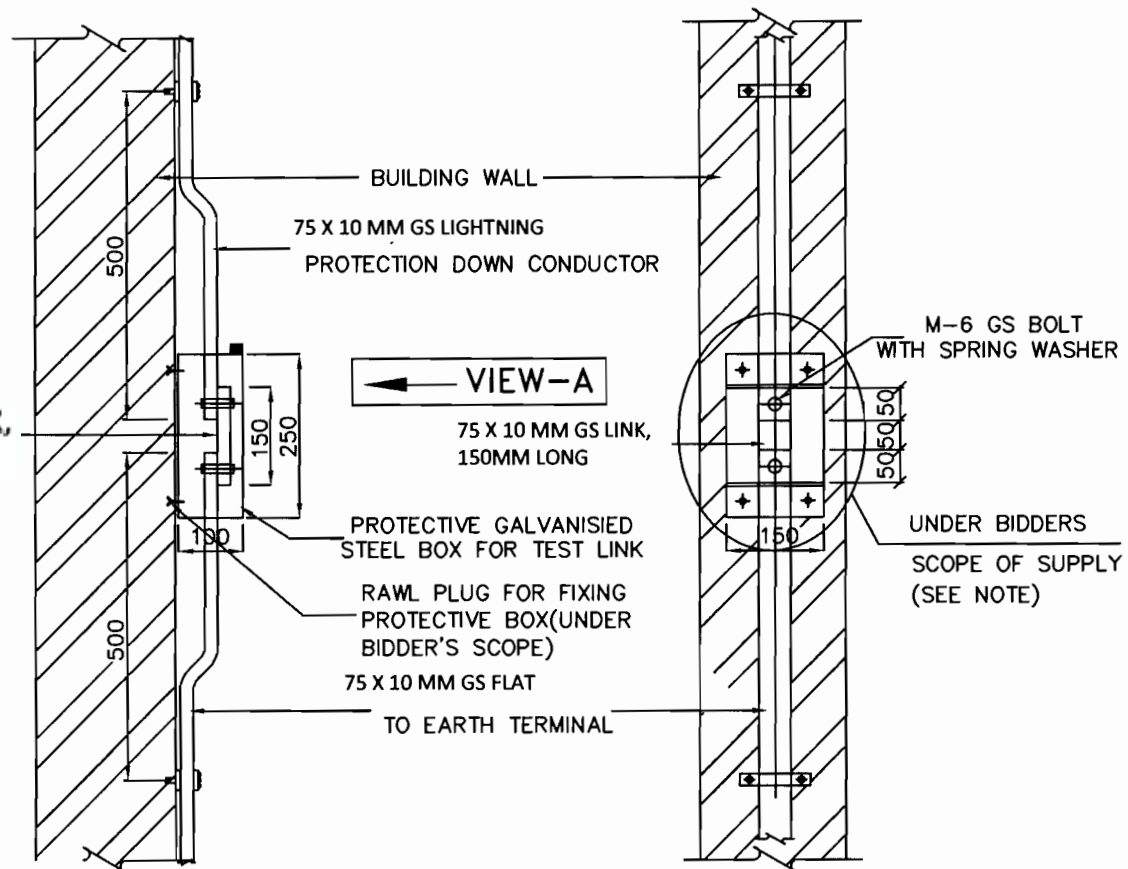
- | | | |
|----|------------------------------|---------------------------------------|
| a) | Pre-treatment | As per IS 2629 prior to galvanization |
| b) | Type | Hot dip galvanization. |
| c) | Applicable Standard | IS 2629 |
| d) | Minimum thickness: | |
| | i) MS flats 5mm thick & over | 75 microns (minimum) |



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

SPECIFICATION NO.
PE-TS-417-509-E003
VOLUME NO. : II
SECTION : II
REV NO. : 0 DATE : 13.04.2018
SHEET : 2 OF 2

- | | |
|---|----------------------------|
| 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 |
- vi) Tests for galvanising:
- a) Weight of zinc coating as per IS : 6745
 - b) Thickness of zinc coating as per IS : 4759
 - c) Galvanised coating on round steel wires as per IS: 4826
 - d) Uniformity of zinc coating as per IS : 2633
 - e) Adhesion as per IS: 2629



TEST LINK DETAILS

VIEW-A

NOTE:

BIDDER'S SCOPE INCLUDES THE 150 MM LONG 75X10MM 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.



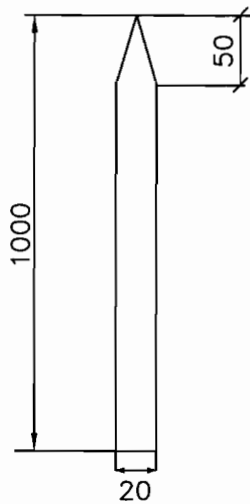
TITLE

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

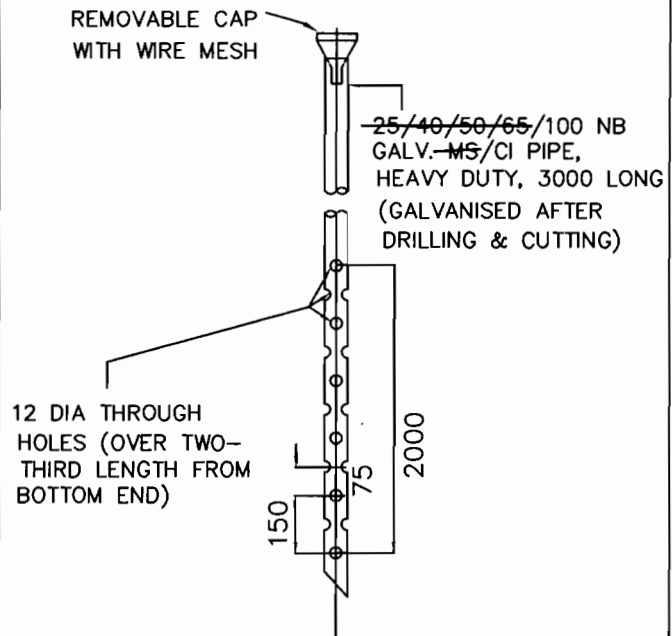
PE-DG-999-509-E003

SH 1 OF 2

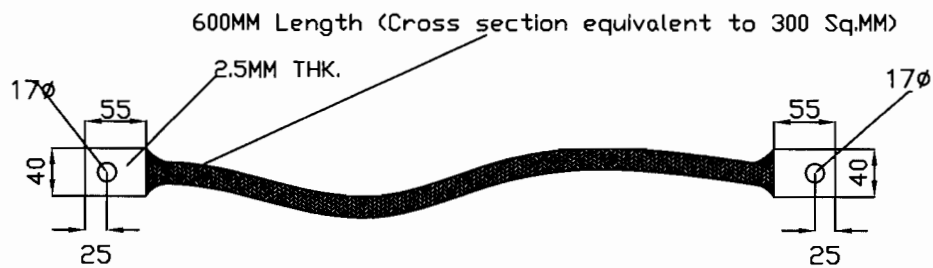
REV 1



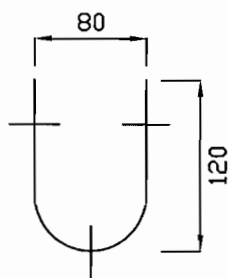
20MM DIA GS ROD
FOR LIGHTNING PROTECTION



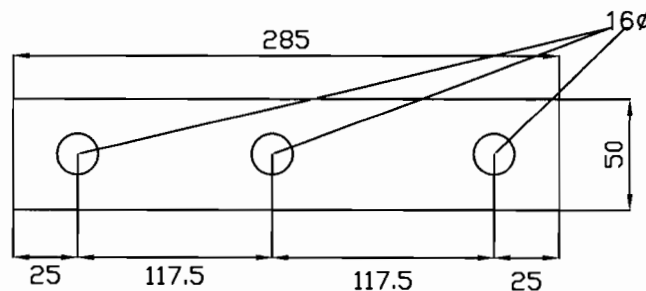
PERFORATED PIPE



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 1