

NEYVELI LIGNITE CORPORATION LIMITED

***2x500 MW NEYVELI NEW TPS
(FOR SG & TG PACKAGE)***

VOLUME – IIB

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

**SPECIFICATION NO. : *PE-TS-400/402-509-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-400/402-509-E003
VOLUME NO. : II-B
SECTION -
REV NO. : 0 <i>DATE : 18.06.2014</i>
<i>SHEET : 1 OF 1</i>

CONTENTS

S. NO	DESCRIPTION	NO. OF SHEETS
1.0	INSTRUCTIONS TO BIDDERS	01
2.0	PREAMBLE	01
3.0	SECTION – ‘A’ (SCOPE OF ENQUIRY)	02
4.0	<i>SECTION – ‘B’ (PROJECT INFORMATION)</i>	<i>03</i>
5.0	SECTION – ‘C’ (SPECIFIC TECHNICAL REQUIREMENTS)	<i>02</i>
5.1	<i>ANNEXURE-I (BOQ)</i>	<i>02</i>
5.2	ANNEXURE-II (LIST OF DRAWINGS /DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER)	01
5.3	ANNEXURE-III (DOCUMENT DISTRIBUTION SCHEDULE)	01
6.0	SECTION- ‘D’	
6.1	STANDARD TECHNICAL SPECIFICATION	03
6.2	TECHNICAL DATA SHEET-A	02
6.3	STANDARD QUALITY PLAN	04
7.0	TYPICAL DETAILS (PE-DG-999-509-E003)	
7.1	TEST LINK	01
7.2	TEST LINK WITH PROTECTIVE BOX	01
7.3	20MM DIA. GS ROD, PERFORATED PIPE & FLEXIBLE COPPER BRAID	01
7.4	SHIELDING MAST	01
	TOTAL NO. OF SHEETS	= <i>26</i>

IT IS CONFIRMED THAT OUR TECHNICAL OFFER COMPLIES WITH THE SPECIFICATION IN TOTO & THAT THERE ARE NO TECHNICAL DEVIATIONS.

BIDDER'S STAMP & SIGNATURE



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

SPECIFICATION NO.	PE-TS-400/402-509-E003
VOLUME NO. :	II-B
SECTION	-
REV NO. :	0 DATE : 18.06.2014
SHEET :	1 OF 1

INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFERS

1. Two signed and stamped copies of the following shall be furnished by all bidders as technical offer :
 - a. Unpriced Price Schedule (Annexure-IA & IB: BOQ, as enclosed with the specification).
 - b. A copy of this sheet ("Instructions to Bidders for Preparing Technical Offer").
 - c. A copy of previous sheet ("Contents").
2. No other technical submittal such as copies of type test certificates, data sheets, write-up, drawing, technical literature, etc. is required during tender stage. Any such submission, even if made, shall not be considered as part of offer.
3. No comments/ additions/ deletions shall be made by the bidder on the signed & stamped copy of the specification. Any such changes made by the bidder shall not be considered.
4. Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference in the technical offer / covering letter shall not be considered by BHEL.
5. 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.
6. Any changes made by the bidder in the price schedule with respect to the item description/ quantities, notes etc. from those given in Annexure- IA & IB of specification [Bill Of Quantities] shall not be considered (i.e., technical description, quantities, notes etc. as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE



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

SPECIFICATION NO. PE-TS-400/402-509-E003
VOLUME NO. : II-B
SECTION -
REV NO. : 0 <i>DATE : 18.06.2014</i>
SHEET : 1 OF 1

PREAMBLE

1.0 The tender document contains two (2) volumes. The bidder shall meet the requirements of all the two volumes.

1.1 **Volume-I (CONDITIONS OF CONTRACT)**

This consists of four parts as below:-

- Volume-IA : This part contains instructions to bidders for making bids to BHEL.
- Volume-IB : This part contains general commercial conditions of the tender & includes provision that vendor is responsible for the quality of item supplied by their sub-vendors.
- Volume-IC : This part contains special conditions of contract.
- Volume-ID : This part contains commercial conditions for erection & commissioning site work, as applicable.

1.2 **Volume-II TECHNICAL SPECIFICATIONS**

Technical requirements are stipulated in Volume-II which comprises of :-

- Volume-IIA : General Technical Conditions
- Volume-IIB : Technical Specification including Drawings, if any.

1.2.1 **Volume-IIB**

This volume is sub-divided into following sections:-

- Section-A : This section outlines the scope of enquiry.
- Section-B : This section provides "Project Information".
- Section-C : This section indicates technical requirements specific to the contract, not covered in Section-D.
- Section-D : This section comprises of technical specifications of equipments complete with data sheet A.

Data Sheet – A specifies data and other requirements pertaining to the Equipment.

2.0 The requirements mentioned in Section-C / Data Sheets-A of section-D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-D.



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

SPECIFICATION NO.
PE-TS-400/402-509-E003

VOLUME NO. : II-B

SECTION : A

REV NO. : 0 DATE : 18.06.2014

SHEET : 1 OF 2

**SECTION – 'A'
SCOPE OF ENQUIRY**



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

SPECIFICATION NO. PE-TS-400/402-509-E003
VOLUME NO. : II-B
SECTION : A
REV NO. : 0 DATE : 18.06.2014
SHEET : 2 OF 2

SCOPE OF ENQUIRY

- 1.0 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** as mentioned in different sections of this specification for 2X500MW NEYVELI NEW TPP at NEYVELI in TAMILNADU.
- 2.0 It is not the intent to specify herein all the details of design & manufacture. However, the equipment shall conform in all respects to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation at site conditions.
- 3.0 The general terms and conditions, instructions to bidders and other attachment referred to elsewhere are hereby made part of the tender specification.
- 4.0 The bidder shall be responsible for and governed by all requirements stipulated hereinafter.
- 5.0 Bidder shall confirm total compliance to the specification without any deviations from the technical/ quality assurance requirements stipulated.
- 6.0 The documents shall be in English language and MKS system of units.



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

SPECIFICATION NO.
PE-TS-400/402-509-E003

VOLUME NO. : **II-B**

SECTION : **B**

REV NO. : **0** DATE : **18.06.2014**

SHEET : **OF**

**SECTION – 'B'
PROJECT INFORMATION**



SALIENT FEATURES OF THE SITE & GENERAL PROJECT INFORMATION

1.1 Introduction

The project site at Neyveli has distinct location advantages, being at pit-head distance from the source of lignite supply from Mines, making it convenient for transportation of lignite by belt conveyor. Water source is readily available from the nearby mines lake. Besides, other infrastructure such as access road, railway connection etc, already exist.

1.2 Power Plant Site

The power plant site is located at Neyveli, opposite to the now defunct Fertilizer and Briquetting & Carbonization Plant, near TPS-I Expansion and TPS-II.

1.3 Project & Site Information

- | | | |
|------------------------------------|---|--|
| (i). Owner / Purchaser | : | Neyveli Lignite Corporation Limited (NLC Ltd), Neyveli, Cuddalore District, Tamil Nadu State, India |
| (ii). Consultant | : | Lahmeyer International (India) Pvt. Ltd (LII), Gurgaon, NCR, India. |
| (iii). Project Title | : | 2x500 MW Neyveli New Thermal Power Project (NNTPP) |
| (iv). Location | : | 200 kms south of Chennai and 50 kms south-west of Cuddalore |
| (v). Latitude | : | 11° 34' 00" N to 11° 35' 00" N |
| (vi). Longitude | : | 79° 26' 00" E to 79° 27' 00" E |
| (vii). Elevation above MSL | : | (+) 67 m |
| (viii). Nearest Railway Station | : | Neyveli, |
| (ix). Nearest Sea Port | : | Chennai, at a distance of 200 km |
| (x). Nearest Airport | : | Chennai, at a distance of 200 km |
| (xi). Road Access/Approach to Site | : | Connected by Chennai-Thanjavur NH 45C road and state highway connecting Cuddalore - Virudhachalam via Neyveli. Both NH and state high way roads are well connected to NLC township roads. The approach road is approximately 15 kms from Chennai-Thanjavur NH - 45C road |
| (xii). Site Meteorological Data | : | |
| • Max ambient temperature | : | 42.8° C |
| • Min Ambient Temperature | : | 26.9° C |





- Wet bulb temp : 29° C
- Max. Relative Humidity : 92 % in the month of September
- Min. Relative Humidity : 23 % in the month of May
- Rainfall : About 1265.7 mm annually (average)
- Wind direction : South West to North East direction
- Wind Speed : 97.2 km/hr (maximum recorded)
4.3 km/hr (average wind speed)
- Seismicity : As per IS: 1893 (part 4) (Zone-II)
Importance factor: 1.75.





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

SPECIFICATION NO.	PE-TS-400/402-509-E003
VOLUME NO. :	II-B
SECTION :	C
REV NO. :	0 <i>DATE : 18.06.2014</i>
<i>SHEET</i> :	<i>1 OF 2</i>

**SECTION – 'C'
SPECIFIC TECHNICAL REQUIREMENTS**



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

SPECIFICATION NO. PE-TS-400/402-509-E003
VOLUME NO. : II-B
SECTION : C
REV NO. : 0 DATE : 18.06.2014
SHEET : 2 OF 2

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-D and Datasheet-A. Project specific technical/ quality requirements/ changes are listed in Section-C.
- 1.3 The stipulations of Section-C, followed by those of Datasheet-A shall prevail in case of any conflict between the stipulations of Section-C, Datasheet-A & Section-D.

2.0 BILL OF QUANTITIES:

- 2.1 Quantity requirements shall be as per **Annexure-IA & IB (Bill of Quantities (BOQ))** enclosed.

3.0 SPECIFIC REQUIREMENTS:

3.1 Technical:

<i>S.No.</i>	<i>Reference Clause No. of Section D (if any)</i>	<i>Specific Requirement/ Change</i>

3.2 Quality/ Inspection:

<i>S.No.</i>	<i>Reference Clause No. of Section D (if any)</i>	<i>Specific Requirement/ Change</i>

	TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING MATERIALS	Doc. No. PE-TS-400/402-507-E003	
		Volume IIB	Section C
		Rev. : 0 DATE : 18.06.2014	
		SHEET : 1 OF 2	

ANNEXURE – IA
2X500 MW NLC (TG PACKAGE)
BOO CUM PRICE SCHEDULE FOR ABOVE GROUND EARTHING MATERIALS

SL. NO.	PACKAGE CODE	ITEM DESCRIPTION	UNITS	ORDER QUANTITY	Lot-1 QUANTITY	UNIT PRICE EX-WORKS (Rs)	TOTAL PRICE EX-WORKS (Rs)
1		Hot Dip Galvanized Steel Flats (to be supplied in length of 4-7 meters)					
i)	507-23021-A	75 x 10 mm	MT	8	6		
ii)	507-23042-A	75 x 5 mm	MT	4	3		
iii)	507-23017-A	50X6 mm	MT	51	36		
iv)	507-23016-A	35X6 mm	MT	1	0.5		
v)	507-23015-A	25X6 mm	MT	1	0.5		
vi)	507-23014-A	25X3 mm	MT	1	0.5		
2	507-23013-A	GI WIRE 8 SWG	Meters	2000	1400		
3	507-23008-A	FLEXIBLE COPPER BRAID FOR GATE EARTHING	NOS	11	8		
4	507-23023-A	GS ROD 20MM DIA 1000MM LONG	NOS	72	50		
5	507-23029-A	TEST LINK 150X50X6 MM GS FLAT	NOS	72	50		

Notes:

- 1 The quantities will be released for manufacture in more than one lot. LOT-1 quantities, which are indicated above, shall be released for manufacture along with LOI.
- 2 Manufacturing of LOT-I quantities shall be done after the approval of technical and quality documentation, and supply of same shall be completed within the time period stipulated in NIT.
- 3 Subsequent lots shall be cleared for manufacture based on progress of engineering and site requirements. A lead-time of two months shall be given for completion of supply of each lot from the date of clearance of the quantities.
- 4 The total quantity variation shall be limited from -30% to +30 % of the total contract value derived on the basis of the Order Quantities.

	TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING MATERIALS	Doc. No. PE-TS-400/402-507-E003	
		Volume IIB	Section C
		Rev. : 0 DATE : 18.06.2014	
		SHEET : 2 OF 2	

ANNEXURE – IB
2X500 MW NLC (SG PACKAGE)
BOO CUM PRICE SCHEDULE FOR ABOVE GROUND EARTHING MATERIALS

SL. NO.	PACKAGE CODE	ITEM DESCRIPTION	UNITS	ORDER QUANTITY	Lot-1 QUANTITY	UNIT PRICE EX-WORKS (Rs)	TOTAL PRICE EX-WORKS (Rs)
1		Hot Dip Galvanized Steel Flats (to be supplied in length of 4-7 meters)					
i)	507-23021-A	75 x 10 mm	MT	9	6		
ii)	507-23042-A	75 x 5 mm	MT	4	3		
iii)	507-23017-A	50X6 mm	MT	61	43		
iv)	507-23016-A	35X6 mm	MT	1	0.5		
v)	507-23015-A	25X6 mm	MT	1	0.5		
vi)	507-23014-A	25X3 mm	MT	1	0.5		
2	507-23013-A	GI WIRE 8 SWG	Meters	2275	1600		
3	507-23008-A	FLEXIBLE COPPER BRAID FOR GATE EARTHING	NOS	14	10		
4	507-23023-A	GS ROD 20MM DIA 1000MM LONG	NOS	86	60		
5	507-23029-A	TEST LINK 150X50X6 MM GS FLAT	NOS	86	60		

Notes:

- 1 The quantities will be released for manufacture in more than one lot. LOT-1 quantities, which are indicated above, shall be released for manufacture along with LOI.
- 2 Manufacturing of LOT-I quantities shall be done after the approval of technical and quality documentation, and supply of same shall be completed within the time period stipulated in NIT.
- 3 Subsequent lots shall be cleared for manufacture based on progress of engineering and site requirements. A lead-time of two months shall be given for completion of supply of each lot from the date of clearance of the quantities.
- 4 The total quantity variation shall be limited from -30% to +30 % of the total contract value derived on the basis of the Order Quantities.

	TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS	SPECIFICATION NO. PE-TS-400/402-509-E003
		VOLUME NO. : II-B
		SECTION : C
		REV NO. : 0 <i>DATE : 18.06.2014</i>
		SHEET : 1 OF 1

ANNEXURE – II

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

Sl. No.	Drawings/Document Description	Drawings / Document Number	Submission Schedule
1.	Technical Data Sheet for Above Ground Earthing & Lightning Protection Materials	PE-V0-400/402-507-E021	Within one week of award of contract
2.	GA drawings for Above Ground Earthing & Lightning Protection Materials	PE-V0-400/402-507-E022	Within one week of award of contract
3.	Quality Plan for Above Ground Earthing & Lightning Protection Materials	PE-V0-400/402-507-E903	Within one week of award of contract

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
ABOVE GROUND EARTHING & LIGHTNING
PROTECTION MATERIALS

SPECIFICATION NO. PE-TS-400/402-509-E003
VOLUME NO. : II-B
SECTION : C
REV NO. : 0 DATE : 18.06.2014
SHEET : 1 OF 1

ANNEXURE – III

DOCUMENTS/ DRAWINGS DISTRIBUTION SCHEDULE

DRAWING/DOCUMENT DISTRIBUTION LIST

All documents & drawings shall be in English and in metric units

Sl		LII	NLC (HQ)	NLC-SITE	BHEL SITE	PMG BHEL	PEM/ UNITS/ PSSR	REMARKS
1	Master list of drawings / document (duly indicating schedule of submission)	Soft copy	Soft copy	Soft copy		Soft copy	Soft copy (S)	
2	Drawings / document for Approval/Information (First Submission)	Soft copy + 2 prints	Soft copy + 3 prints	Soft copy + 1 print		Soft copy	Soft copy (S)	
3	Return with comments/approval	Soft copy (S)	Soft copy	Soft copy		Soft copy	Soft copy	
4	Drawings / Documents for approval (second & subsequent submissions till approval)	Soft copy	Soft copy	Soft copy		Soft copy	Soft copy (S)	
5	Drawings / documents for distribution (Approved by NLC, in cat. 1 or Received for Information)	Soft copy + 2 print (HQ+ Site)	Soft copy + 3 prints	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
6	Erection Drawings / documents	-	Soft copy + 1 print	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
7	As built Drawings / documents	Soft copy + 1 print	Soft copy + 1 print	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
8	Operation & Maintenance Manual	-	Soft copy + 1 print	Soft copy + 10 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	
9	Type Test Certificate	Soft copy	Soft copy + 1 print	Soft copy + 3 prints	Soft copy + 5 prints	Soft copy	Soft copy (S)	

NOTES:

1. The above schedule of submission does not include Docs/Drgs. of quality assurance/inspection and delivery/dispatches. QAP documents to be submitted as per distribution schedule.
2. Date of submitting soft copy is to be taken as date of submission.
3. S – Source for generation of document.



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

SPECIFICATION NO. PE-TS-999-509-E003
VOLUME NO. : II-B
SECTION : D
REV NO. : 1 <i>DATE : 18.06.2014</i> 18.06.201429.03.2012
SHEET : 1 OF 3

**SECTION 'D'
STANDARD TECHNICAL SPECIFICATIONS**



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

SPECIFICATION NO. PE-TS-999-509-E003
VOLUME NO. : II-B
SECTION : D
REV NO. : 1 DATE : 18.06.2014 18.06.201429.03.2012
SHEET : 2 OF 3

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 | : | 4-7 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, Sheet 3 of 4.
- 3.5 Shielding Mast shall be as per enclosed drawing no. PE-DG-999-509-E003, Sheet 4 of 4.

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.



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

SPECIFICATION NO. PE-TS-400/402-509-E003
VOLUME NO. : II-B
SECTION : D
REV NO. : 1 DATE : 18.06.2014 18.06.201429.03.2012
SHEET : 3 OF 3

4.2 BHEL's Standard QPs PE-QP-999-509-E001 is 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- IA & IB (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.



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

SPECIFICATION NO. PE-TS-400/402-509-E003
VOLUME NO. : II-B
SECTION : D
REV NO. : 0 DATE : 18.06.2014 18.06.2014
SHEET : 1 OF 2

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) |
| | ii) MS flats under 5mm thickness | 60 microns (minimum) |




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

SPECIFICATION NO. PE-TS-400/402-509-E003
VOLUME NO. : II-B
SECTION : D
REV NO. : 0 DATE : 18.06.2014 18.06.2014
SHEET : 1 OF 2

- 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

		QUALITY PLAN			CUSTOMER : NLC			PROJECT TITLE : 2 X 500 MW NNTPS (SG & TG PKG)			SPECIFICATION NO. :		
					BIDDER/ VENDOR :			STANDARD QP NO. : PE-QP-999-509-E001, REV. 0			SPECIFICATION TITLE:		
		SHEET 1 OF 2			SYSTEM EARTHING			ITEM : EARTHING & LIGHTNING PROTECTION MATERIALS			DOC. NO. :		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	P	W	V	11	
1.0	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	
		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	IN-PROCESS												
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				

LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION

		QUALITY PLAN			CUSTOMER :			PROJECT TITLE :			SPECIFICATION NO. :		
					BIDDER/ VENDOR :			STANDARD QP NO. : PE-QP-999-509-E001 REV. 0			SPECIFICATION TITLE:		
		SHEET 2 OF 2			SYSTEM EARTHING			ITEM : EARTHING & LIGHTNING PROTECTION MATERIALS			DOC. NO. :		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
2.3	GALVANISING	1.TEMPERATURE OF BATH	MA	TEMPERATURE INDICATOR	CONTINUOUS	IS - 2629	IS - 2629	QC RECORD	3/2	-	-	If vendor doesn't have his own galvanizing plant duly approved by BHEL PEM; then galvanizing shall be carried out at BHEL-PEM approved other galvanizing plants as per Annexure-2.	
		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	1. CHEMICAL	MA	CHEMICAL	1 No./LOT/SIZE	IS-2062	IS-2062	LAB TC	2	-	1	Note : Sample shall be selected by BHEL & testing shall be done at NABL/ govt. approved lab	
		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	IS - 4759	IS-6745 / APP. DATA SHEET	APP. DATA SHEET	INSP. REPORT	2	1	-		
		5.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS - 4759	IS-2633	IS-2633	INSP. REPORT	2	1	-		
		6.THICKNESS OF ZINC COATING	MA	ELCOMETER	IS - 4759	APP. DATA SHEET	APP. DATA SHEET	INSP. REPORT	2	1	-		
		6.ADHESION	MA	MECH.TEST	IS-4759	IS-2629	IS-2629	INSP. REPORT	2	1	-		
BHEL			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

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 :

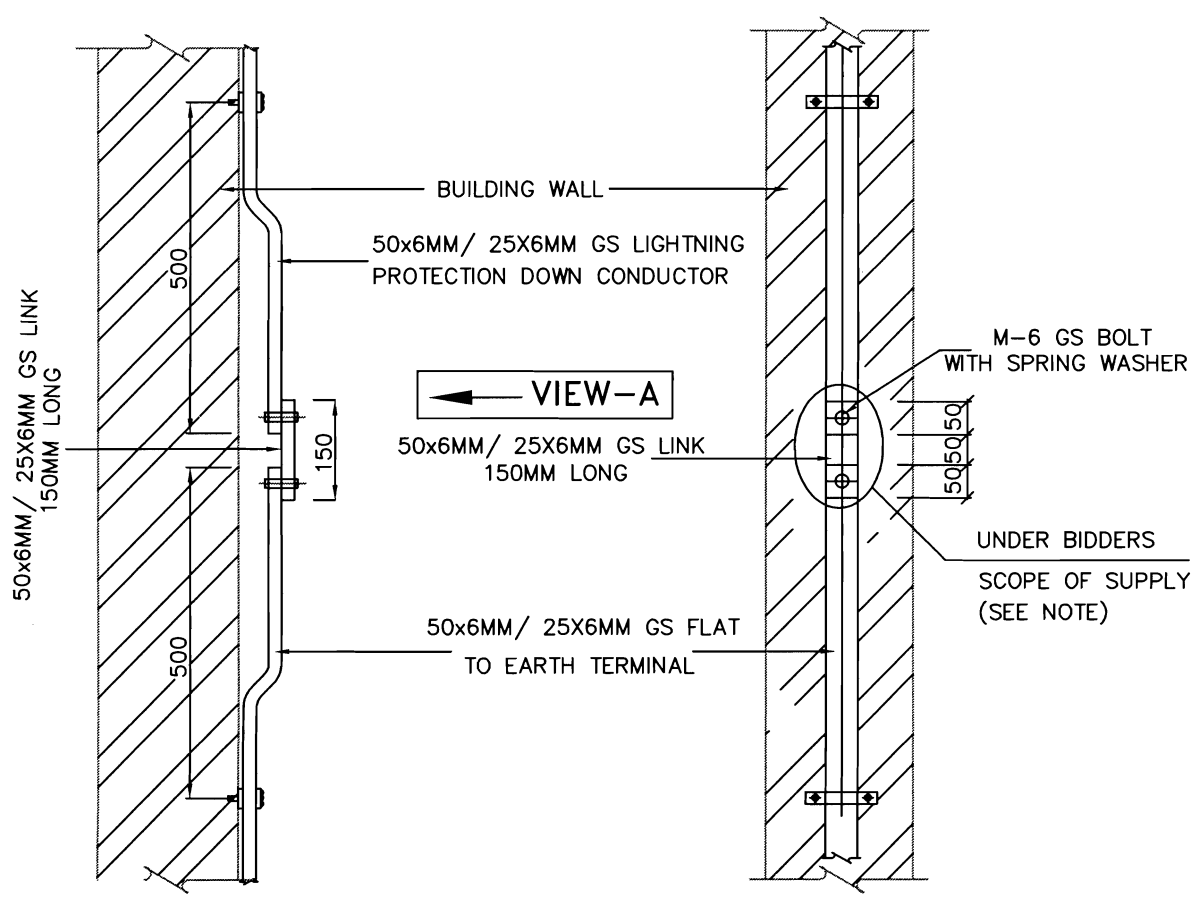
- In absence of correlation with the test certificate(s) (e.g. material identification) samples shall be drawn by BHEL and all tests as per relevant specifications shall be carried out in their presence or in recognized Government Laboratory.
- When materials and components are initially identified and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

ANNEXURE -2 of 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 GALVANISING 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	M/s Shivam Engineers & Fabricators	A0-282-284, Industrial area, South side of G.T. road, Ghaziabad, U.P.
9	GALVANISING	M/s B.G. Shirke Construction Technology Pvt. Ltd.	Office & factory : 72-76, Mundhawa, Pune - 401 036
10	GALVANISING	M/s Galbro Ispat Galvanizers Pvt. Ltd.	Gut 11 and 12, Opp. Kudus Steel Rolling mill, Wada, Thane , Mumbai

Note:- The above list doesn't include the list of BHEL - PEM approved galvanizing plants owned by BHEL - PEM registered vendor of cabling packages.



TEST LINK DETAILS

VIEW-A

NOTE: BIDDER'S SCOPE INCLUDES THE 150 MM LONG 50X6MM / 25X6MM GS LINK ALONG WITH HARDWARES (2 NOS. M-6 GS NUTS & BOLTS & 4 NOS. SPRING WASHERS)

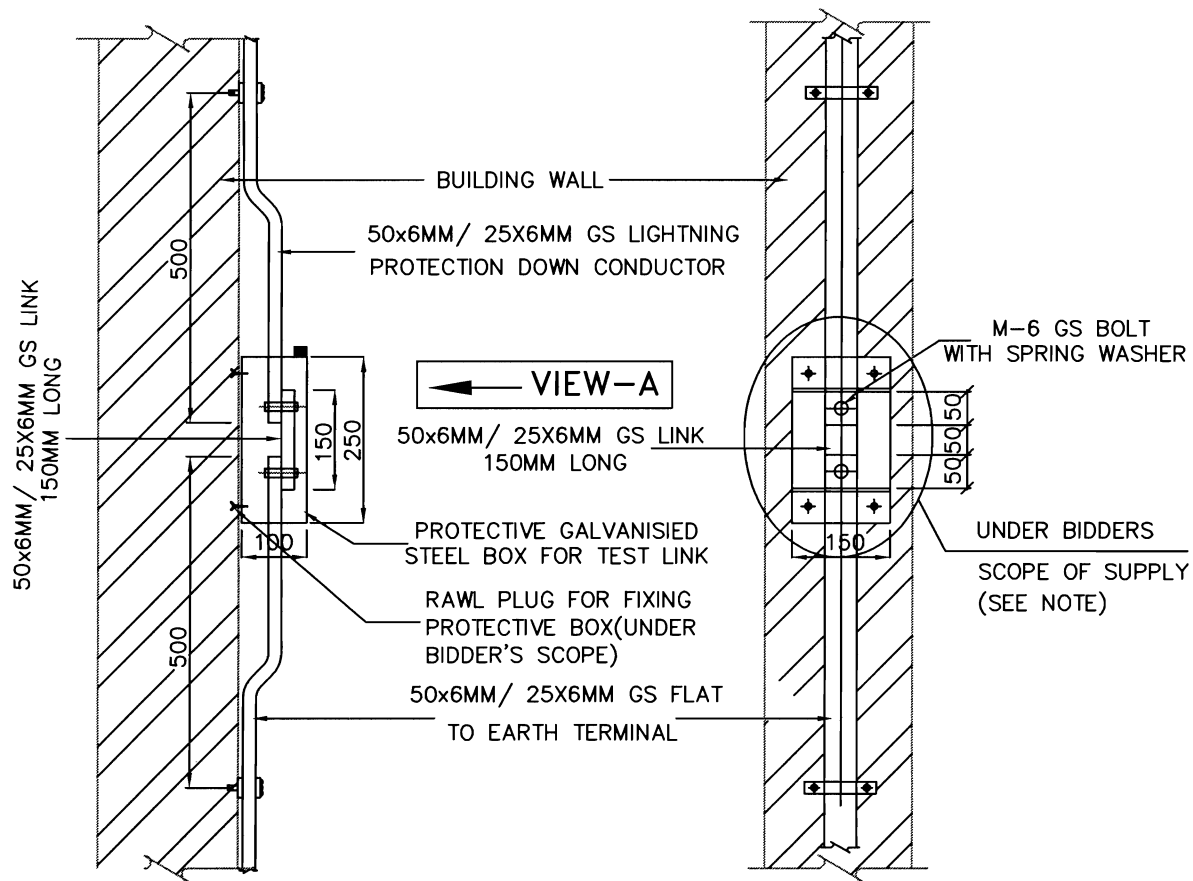


TITLE
TYPICAL DETAILS OF TEST LINK

PE-DG-999-509-E003

SH 1 OF 4

REV 0



TEST LINK 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.



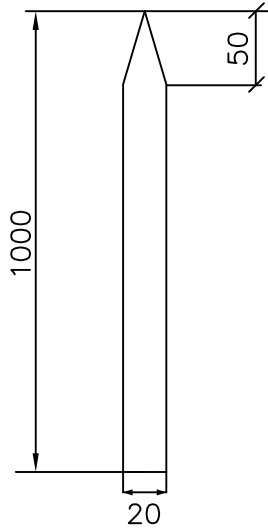
TITLE

TYPICAL DETAILS OF TEST LINK WITH PROTECTIVE BOX

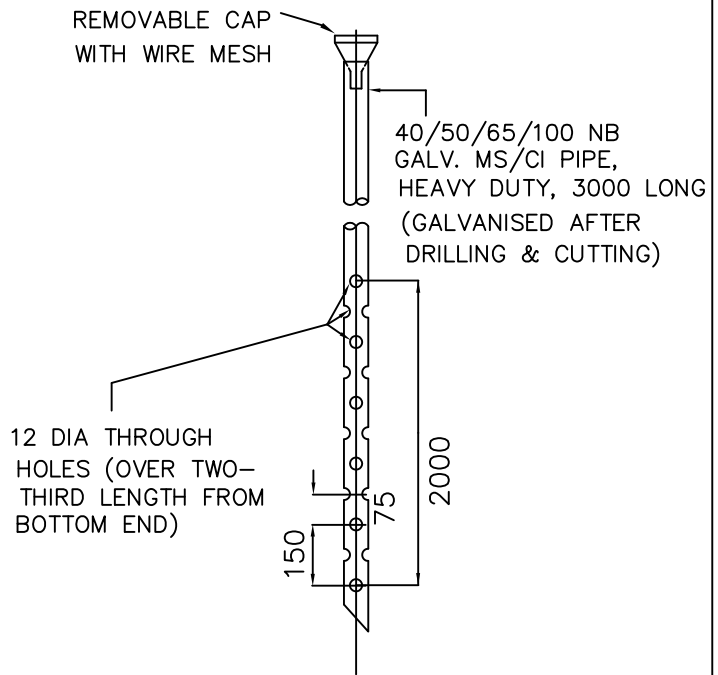
PE-DG-999-509-E003

SH 2 OF 4

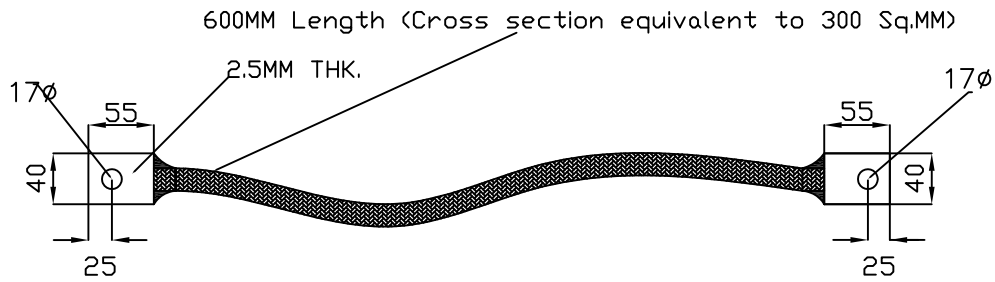
REV 0



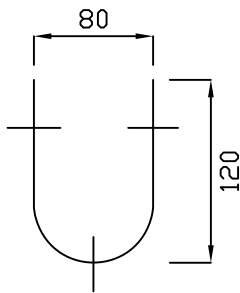
20MM DIA GS ROD
FOR LIGHTNING PROTECTION



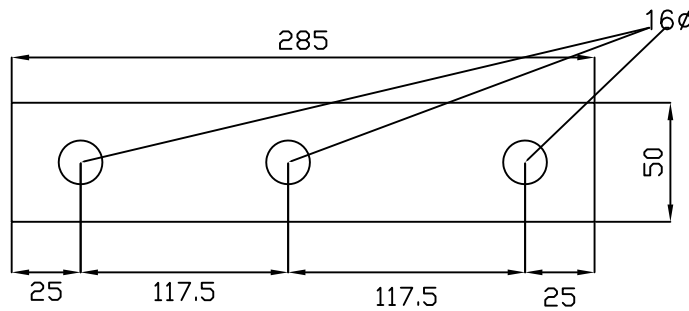
PERFORATED PIPE



FLEXIBLE BRAIDED COPPER CONDUCTOR



PLAN



TINNED COPPER 'U' CLAMP (2.5 MM THICK)



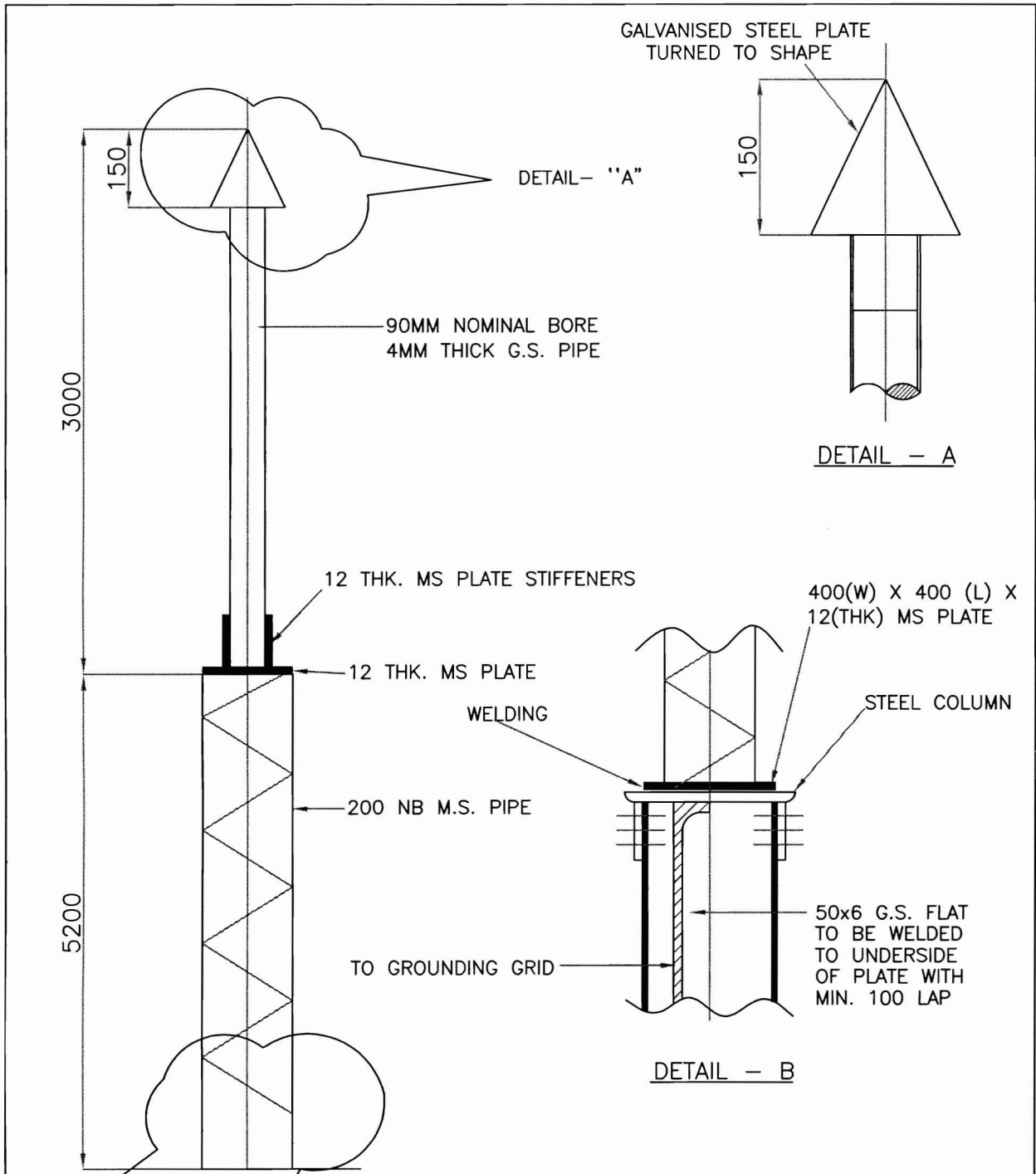
TITLE

TYPICAL DETAILS OF FLEXIBLE
BRAIDED COPPER CONDUCTOR
& 20MM DIA. GS ROD

PE-DG-999-509-E003

SH 3 OF 4

REV 0



FIXING DETAILS OF SHIELDING MAST ON TOP
STEEL COLUMNS OF POWER HOUSE BUILDING
(FOR LIGHTNING PROTECTION)

NOTES:

1. THE ABOVE SHIELDING MAST SHALL BE PROVIDED ON TOP OF "A" ROW STEEL COLUMNS OF POWER HOUSE BUILDING
2. ALL DIMENSIONS ARE IN MM.



TITLE
**TYPICAL DETAILS OF
SHIELDING MAST**

PE-DG-999-509-E003

SH 4 OF 4

REV 0