

RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LIMITED

2X660 MW SURATGARH STPP

VOLUME – IIB

TECHNICAL SPECIFICATION
FOR

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

SPECIFICATION NO. : *PE-TS-392-509-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-392-509-E003
VOLUME NO. : II-B
SECTION -
REV NO. : 0 DATE .08.04.2014
SHEET : 1 OF 1

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7.1	TEST LINK WITH PROTECTIVE BOX	01
7.2	20MM DIA. GS ROD, PERFORATED PIPE & FLEXIBLE COPPER BRAID	01
	TOTAL NO. OF SHEETS	= 28

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

BIDDER'S STAMP & SIGNATURE



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INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFERS

- Two signed and stamped copies of the following shall be furnished by all bidders as technical offer :
 - Unpriced Price Schedule (Annexure-I: BOQ, as enclosed with the specification).
 - A copy of this sheet ("Instructions to Bidders for Preparing Technical Offer").
 - A copy of previous sheet ("Contents").
- 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.
- 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.
- 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.
- 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.
- Any changes made by the bidder in the price schedule with respect to the item description/ quantities, notes etc. from those given in Annexure-I 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

	<p style="text-align: center;">TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS</p>	SPECIFICATION NO. PE-TS-392509-E003
		VOLUME NO. : II-B
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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.



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MATERIALS

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REV NO. : 0 <i>DATE</i> : 08.04.2014
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SECTION – 'A'
SCOPE OF ENQUIRY



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ABOVE GROUND EARTHING & LIGHTNING PROTECTION
MATERIALS

SPECIFICATION NO.

PE-TS-392-509-E003

VOLUME NO. : II-B

SECTION : A

REV NO. : 0 DATE : 08.04.2014

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 2X660 MW SURATGARH STPP at *Sriganganagar District* in *RAJASTHAN*.
- 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.



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MATERIALS

SPECIFICATION NO.	PE-TS-392-509-E003
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SECTION :	B
REV NO. :	0 DATE : 08.04.2014
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SECTION – 'B'
PROJECT INFORMATION

RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD
2X660 MW SURATGARH STPP
PROJECT INFORMATION

1.0	Owner	Rajasthan Rajya Vidyut Utpadan Nigam Ltd., Jaipur
2.0	Consulting Engineer	TATA Consulting Engineers Ltd. 73/1, St. Marks Road, Bangalore – 560 001 Tel : 080 – 6622 6000 Fax : 080 – 22274874
3.0	Location of the plant	Prabat Nagar, Suratgarh Sriganganagar district, Rajasthan.
4.0	Latitude and longitude	Latitude : 29 deg. 10 min. N Longitude : 74 deg.01 min. E
5.0	Elevation above mean sea level	186 m (approximate)
6.0	Climatic conditions	
6.1	Temperatures : Monthly basis	
	Mean of daily max.	32.8 deg.C (in the month of May)
	Mean of daily min.	17.6 deg.C (in the month of Jan)
6.2	Temperatures : Annual basis	
	Mean of daily max.	32.3 deg.C
	Mean of daily min.	19.6 deg.C
	Highest temperature recorded	50 deg.C
	Lowest temperature recorded	(-) 2.8 deg.C
	Design Ambient Temperature for Electrical Equipment design	50 deg C
6.3	Relative humidity	Varies between 21% and 81%
6.4	Annual average rain fall	312 mm
6.5	Annual mean wind speed :	4 km / hr.
7.0	Wind load	

ISSUE
R1

**RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD
2X660 MW SURATGARH STPP
PROJECT INFORMATION**

	Calculations for wind effect shall be in accordance with IS:875-1987(Part-3) taking into account the following:	
	a) Basic wind speed = 47 m/sec	
	b) Factor K1 = 1.07	
	c) Category of terrain = Category 2	
	d) K3 – as per IS 875	
8.0	Seismic data (As per IS: 1893 latest issue)	
	a) Zone	Zone II
	Designs & design coefficients shall be based on IS 1893:2002	
	Design condenser cooling water inlet temperature	33 Deg C
9.0	Auxiliary power supply:	
	Auxiliary electrical equipment to be supplied against this specification shall be suitable for operation on the following system:	
	a) For motors rated 160 kW and below.	415V AC, 3-phase, 3-wire effectively earthed.
	b) For motors rated above 160 kW and up to 1500 kW	6600V AC, 3-phase, 3-wire, 50 Hz, non-effectively earthed
	c) For motors rated above 1500kW	11000V AC, 3-phase, 3-wire, 50 Hz, non-effectively earthed
	d) For motor control centres	415V AC, 3-phase, 3/4-wire effectively earthed.
	e) DC motor starters, DC solenoids, DC alarm control and protection	220 V DC, 2-wire unearthed
	f) AC control & protective devices	110 V 1 phase, 50Hz, 2 wire AC supply. The single phase 110V AC supply shall be derived by VENDOR by providing 415V / 110 V Control transformers of adequate rating with MCCB / MCB on both the primary and secondary sides.
	g) Uninterrupted power supply	230 V, 1-phase, 50 Hz, 2-wire, AC

ISSUE
R1

**RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD
2X660 MW SURATGARH STPP
PROJECT INFORMATION**

		supply (For all instrumentation and control system equipment and solenoid valves)
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- g) Lighting fixtures and space heaters 240 V, 1 phase, 2 wire, 50Hz, solidly earthed system
- h) Construction supply 415 V, 3 phase, 4 wire, 50Hz AC supply with neutral lead solidly earthed.

- i) The above voltages may vary as follows :

All devices shall be suitable for continuous operation over the entire range of voltage and frequency indicated below without any change in their performance.

AC supply

Voltage variation $\pm 10\%$
Frequency variation $\pm 5\%$

- DC supply
- j) For instrument and control system of steam generator and steam turbine generator.

Combined voltage & frequency variation 10%
Voltage variation $+10\%$, -15%
230 V $\pm 5\%$ AC UPS, 1-phase, 50 Hz, 2-wire. The 24 V DC required for control system shall be generated from this UPS.

- 10.0 All the electrical equipment shall be designed for 50° C reference ambient temperature.



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SPECIFICATION NO. PE-TS- <i>392</i> 509-E003
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SECTION – 'C'
SPECIFIC TECHNICAL REQUIREMENTS



TECHNICAL SPECIFICATION FOR
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SPECIFICATION NO.
PE-TS-392-509-E003

VOLUME NO. : II-B

SECTION : C

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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-I (Bill of Quantities (BOQ)) enclosed.

3.0 SPECIFIC REQUIREMENTS:

3.1 Technical:

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

3.2 Quality/ Inspection:

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



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ANNEXURE-I

BOQ-CUM-PRICE SCHEDULE

S. No.	ITEM CODE	DESCRIPTION	UNIT	ORDER QTY.	LOT-1 QTY.	UNIT PRICE Rs
1	507-23008-A	FLEXIBLE COPPER BRAID FOR GATE EARTHING (REFER SHEET 2 OF PE-DG-999-509-E003 DRAWING ATTACHED WITH SPECIFICATION)	NOS	20	20	
2	507-23013-A	GI WIRE 8 SWG	MTR	10000	7000	
3	507-23058-A	GS FLAT 50 X 3 MM	MT	30	21	
4	507-23041-A	GS FLAT 50 X 10 MM	MT	30	21	
5	507-23057-A	GS FLAT 70 X 10 MM	MT	120	84	
6	507-23056-A	GS FLAT 75 X 12 MM	MT	18	13	
7	507-23023-A	GS ROD 20 MM DIA.1000MM LONG (REFER SHEET 2 OF PE-DG-999-509-E003 DRAWING ATTACHED WITH SPECIFICATION)	NOS	200	140	
8	507-23030-A	TEST LINK 150X50X6 MM GS FLAT WITH BOX (REFER SHEET 1 OF PE-DG-999-509-E003 DRAWING ATTACHED WITH SPECIFICATION)	NOS	300	210	
9	507-23051-A	GALVANISED MS PIPE AS PER IS 3043, 3000 MM LENGTH, 25NB, 2.5 MM THICKNESS WITH HOLES BELOW 1000MM ALONG THE LENGTH WITH SUITABLE CAP FUNNEL & WIRE MESH AT ONE END AND SUITABLE CAP AT OTHER END (REFER SHEET 2 OF PE-DG-999-509-E003 DRAWING ATTACHED WITH SPECIFICATION)	NOS	200	140	

NOTES:

1. The quantities will be released for manufacture in more than one lot. Lot-I 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 two months of date of approval of documents.
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.

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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-V0-392-507-E021	Within one week of award of contract
2.	GA drawings for Above Ground Earthing & Lightning Protection Materials	PE-V0-392-507-E022	Within one week of award of contract
3.	Quality Plan for Above Ground Earthing & Lightning Protection Materials	PE-V0-392-507-E023	Within one week of award of contract

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.

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ANNEXURE – III

DOCUMENTS/ DRAWINGS DISTRIBUTION SCHEDULE

S.NO.	DESCRIPTION	No. hard /soft copies	No. of CD- ROMs	REMARKS
1	Docs. /drgs. for approval (First submission)	PDF File + 2 Hard copies	NIL	
2	Drgs. / docs. for approval (Second & subsequent submission till approval)	PDF File + 2 Hard copies	NIL	
3	Final approval drgs. / docs. for Distribution after CAT-1.	PDF File + 5 Hard Copies	NIL	
4	As Built drgs./doc.	6 Hard Copies	4 CD-ROMS	
5	Operation, Erection & Maintenance manual for approval	PDF File + 2 Hard Copies	NIL	
6	Approved Operation & Maintenance Manual for distribution	PDF File + 6 Hard Copies	4 CD-ROMS	
7	Type Test Certificates/ Reports for approval	PDF+ 2 hard Copies	NIL	
8	Type Test Certificates/ Reports for distribution	6 hard Copies	6 CD-ROMS	



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PE-TS- 999 509-E003
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SECTION : D
REV NO. : 1 DATE : 29.03.2012
SHEET : 1 OF 3

SECTION 'D'
STANDARD TECHNICAL SPECIFICATIONS



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SPECIFICATION NO.	PE-TS-999-509-E003
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REV NO. :	1 DATE : 29.03.2012
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 2 of 2.

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.
- 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.



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




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- 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) Lengths of GS flat/ SWG GI wire to be supplied:
 - i) GS Flat of all sizes 4-7 meters
 - ii) SWG GI wire of different sizes 100 meters (minimum)

<div></div> <div>QUALITY PLAN</div>		CUSTOMER : RAJASTHAN RAJYA VIDYUT BIDDER/ VENDOR : UTPADAN NIGAM LIMITED		PROJECT: 2X660 MW SURATGARH STPP		SPECIFICATION : PE-TS-392-509-E003														
SHEET 1 OF 2		SYSTEM		EARTHING		ITEM : EARTHING & LIGHTNING PROTECTION MATERIALS		DOC. NO. :		REMARKS										
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	P	W	V									
1	2	3	4	5	6	7	8	9	10			11								
1.0	RAW MATERIAL 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								
1.1													2.DIMENSIONS	MA	MEASUREMENT	100%	IS - 1730	QC RECORD	3/2	-
													3.SURFACE FINISH	MA	VISUAL	100%	IS : 1079	QC RECORD	3/2	-
1.2													1.CHEM. COMP.	MA	CHEM. TEST	SAMPLE	IS - 209	QC RECORD	3/2	-
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																				
NAME																				
SIGNATURE																				
DATE																				
LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION																				
BIDDER'S/VENDORS COMPANY SEAL																				

<div><div>भारतीय विद्युत निगम लिमिटेड</div></div>		QUALITY PLAN		CUSTOMER : RAJASTHAN RAJYA VIDYUT BIDDER/ : UTPADAN NIGAM LIMITED VENDOR :		PROJECT: TITLE : STANDARD QP NO. : PE-QP-999-509-E001, REV. 0		2X660 MW SURATGARH STPP		SPECIFICATION : PE-TS-392-509-E003	
SHEET 2 OF 2		SYSTEM		EARTHING		ITEM : EARTHING & LIGHTNING PROTECTION MATERIALS		FORMAT		REMARKS	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	OF RECORD	P	W	V
1	2	3	4	5	6	7	8	9	1011		
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, SLAG, FLUX, STAIN ETC.	QC RECORD QC RECORD QC RECORD QC RECORD	3/2 3/2 3/2 3/2	- - - -	- - 2 -
3.0	FINISHED ITEMS	1.CHEMICAL 2.DIMENSIONS 3.SURFACE FINISH 4.MASS OF ZINC COATING 5.UNIFORMITY OF ZINC COATING 6.THICKNESS OF ZINC COATING 6.ADHESION	MA MA MA MA MA MA MA	CHEMICAL MEASUREMENT VISUAL CHEM. TEST CHEM. TEST ELCOMETER MECH.TEST	1 No./LOT/SIZE IS 2500 (PART 1) LEVEL S-4 IS 2500 (PART 1) LEVEL S-4 IS - 4759 IS - 4759 IS - 4759 IS-4759	IS-2062 APP. DATA SHEET/ APP. DRAWING FREE FROM BURRS, SLAG, FLUX, STAIN, ETC. IS-6745 / APP. DATA SHEET IS-2633 APP. DATA SHEET IS-2629	IS-2062 APP. DATA SHEET/ APP. DRAWING FREE FROM BURRS, SLAG, FLUX, STAIN, ETC. 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 - - - - - -
BHEL		PARTICULARS		BIDDER/VENDOR							
		NAME									
		SIGNATURE									
		DATE									
LEGEND :		1 - BHEL / CUSTOMER	2 - VENDOR	3 - SUB-VENDOR	P - PERFORM	W - WITNESS	V - VERIFICATION	BIDDER/SVENDORS COMPANY SEAL			

<div></div>		QUALITY PLAN		CUSTOMER : RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LIMITED		PROJECT: 2X660 MW SURATGARH STPP		SPECIFICATION : PE-TS-392-509-E003						
				BIDDER/ :		TITLE :		NUMBER :						
				VENDOR		QUALITY PLAN		SPECIFICATION : TECHNICAL SPECIFICATION FOR ABOVE GROUND EARTHING & LIGHTNING PROTECTION MATERIALS						
				SYSTEM : GROUNDING		ITEM : GALVANISED RIGID STEEL CONDUITS & PIPES		SECTION VOLUME III						
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	4	5	6	7	8	9	AGENCY			REMARKS	
					TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	P	W	V		
1	2	3	4	5	6	7	8	9	10	11				
1.0 CONDUITS	2.0 PIPES	1. MATERIAL	MA	MA	VISUAL,MECH, & CHEMICAL	IS - 9537	IS-9537	IS-9537	IS-9537	3	2	1		
		2. DIMENSIONS	MA	MA	MEASUREMENT	IS - 9537	IS - 9537	IS - 9537	IS - 9537	3	2	1		
		3. MECH PROPERTIES	CR	CR	TESTING	IS - 9537	IS - 9537	IS - 9537	IS - 9537	3	2	1		
		A) BENDING TEST	CR	CR	TESTING	IS - 9537	IS - 9537	IS - 9537	IS - 9537	3	2	1		
		B) COMPRESSION TEST	MA	MA	CHEM. TEST	IS-4759	IS-6745	BHEL SPEC.	IS-9537	2	1	-		
		4. GALVANISATION TEST	MA	MA	CHEM. TEST	IS-4759	IS-2633	IS-2633	IS-2633	2	1	-		
		A) WEIGHT OF ZINC COATING	MA	MA	ELCOMETER	IS-4759	BHEL SPEC.	BHEL SPEC.	BHEL SPEC.	2	1	-		
		B) UNIFORMITY OF ZINC COATING	MA	MA	VISUAL,MECH, & CHEMICAL	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1		
		C) THICKNESS OF ZINC COATING	MA	MA	MEASUREMENT	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1		
		1. MATERIAL	MA	MA	TESTING	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1		
		2. DIMENSIONS	MA	MA	TESTING	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1		
		3. MECH PROPERTIES	CR	CR	CHEM. TEST	IS-4759	IS-6745/ BHEL SPEC.	BHEL SPEC.	BHEL SPEC.	2	1	-		
A) BENDING TEST	MA	MA	CHEM. TEST	IS-4759	IS-2633	IS-2633	IS-2633	2	1	-				
B) COMPRESSION TEST	MA	MA	ELCOMETER	IS-4759	BHEL SPEC.	BHEL SPEC.	BHEL SPEC.	2	1	-				
4. GALVANISATION TEST	MA	MA	VISUAL,MECH, & CHEMICAL	IS - 1239	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1			
A) WEIGHT OF ZINC COATING	MA	MA	MEASUREMENT	IS - 1239	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1			
B) UNIFORMITY OF ZINC COATING	MA	MA	TESTING	IS - 1239	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1			
C) THICKNESS OF ZINC COATING	MA	MA	CHEM. TEST	IS-4759	IS-6745/ BHEL SPEC.	BHEL SPEC.	BHEL SPEC.	BHEL SPEC.	2	1	-			
1. MATERIAL	MA	MA	ELCOMETER	IS-4759	IS-4759	IS-4759	IS-4759	IS-4759	2	1	-			
2. DIMENSIONS	MA	MA	ELCOMETER	IS-4759	IS-4759	IS-4759	IS-4759	IS-4759	2	1	-			
3. MECH PROPERTIES	CR	CR	TESTING	IS - 1239	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1			
A) BENDING TEST	CR	CR	TESTING	IS - 1239	IS - 1239	IS - 1239	IS - 1239	IS - 1239	3	2	1			
B) COMPRESSION TEST	MA	MA	CHEM. TEST	IS-4759	IS-6745/ BHEL SPEC.	BHEL SPEC.	BHEL SPEC.	BHEL SPEC.	2	1	-			
4. GALVANISATION TEST	MA	MA	CHEM. TEST	IS-4759	IS-2633	IS-2633	IS-2633	IS-2633	2	1	-			
A) WEIGHT OF ZINC COATING	MA	MA	ELCOMETER	IS-4759	IS-4759	IS-4759	IS-4759	IS-4759	2	1	-			
B) UNIFORMITY OF ZINC COATING	MA	MA	ELCOMETER	IS-4759	IS-4759	IS-4759	IS-4759	IS-4759	2	1	-			
C) THICKNESS OF ZINC COATING	MA	MA	ELCOMETER	IS-4759	IS-4759	IS-4759	IS-4759	IS-4759	2	1	-			
NOTE : INSTRUCTIONS FOR QUALITY PLAN IS ATTACHED AS ANNEXURE - 1.														
BHEL														
PARTICULARS														
NAME														
SIGNATURE														
DATE														
BIDDER/VENDOR														
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 :

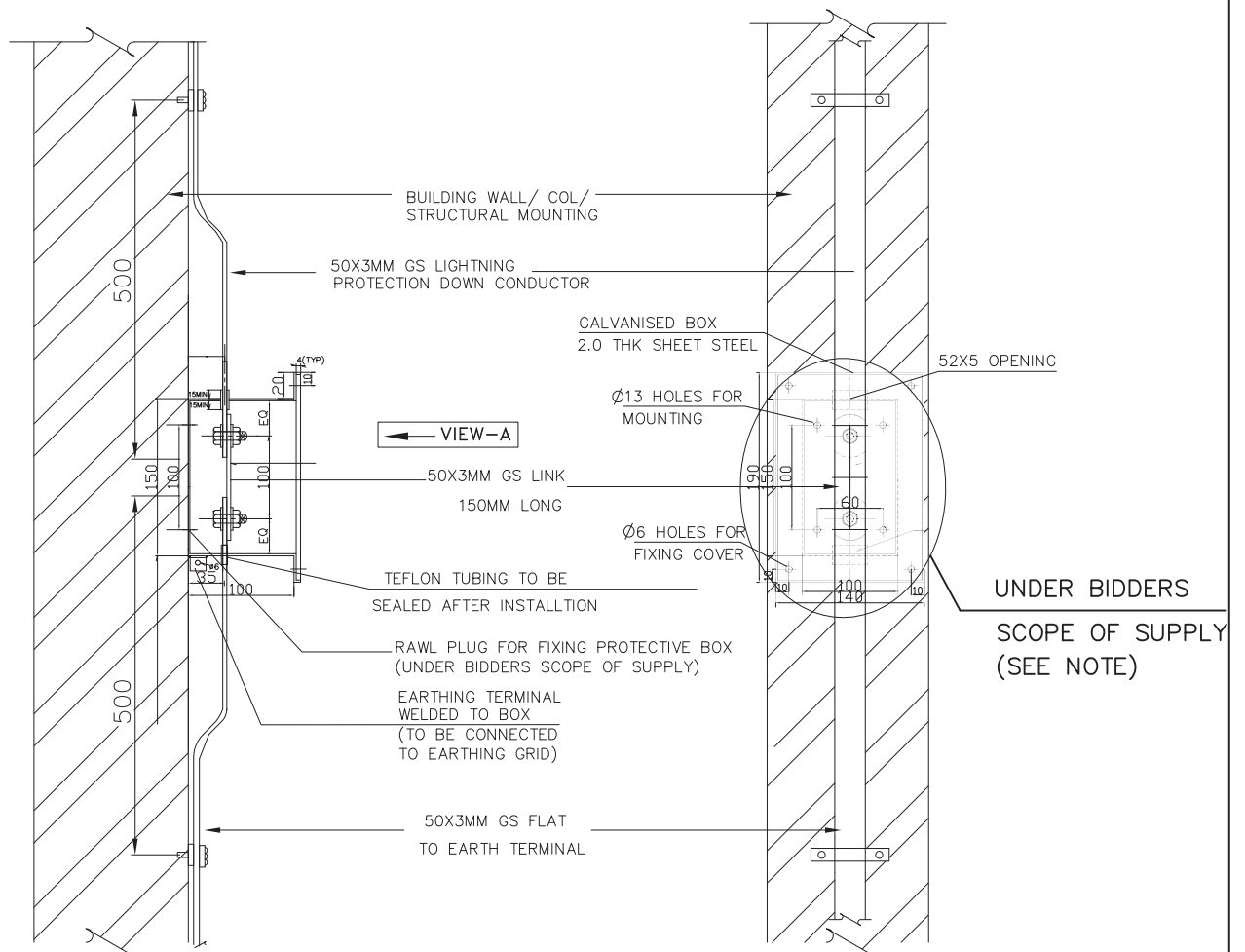
1. In absence of correlation with the test certificate(s) (e.g. material identification) samples shall be drawn by BHEL and all tests as per relevant specifications shall be carried out in their presence or in recognized Government Laboratory.
2. When materials and components are initially identified 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 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: BOX INCLUDES THE 150 MM LONG 50X3MM GS LINK ALONG WITH HARDWARES (2 NOS. OF M-6 GS NUTS & BOLTS & 4 NOS. SPRING WASHERS) & GALVANISED MS COVERING BOX (2.0 MM THICK) WITH 4 NOS. M12 SCREWS & RAWL PLUGS FOR FIXING OF THE SAME AND 4 NOS. SUITABLE NUT AND BOLT ALONG WITH WASHER FOR FIXING COVER.

DOWNCONDUCTOR SHALL BE WELDED TO STEEL STRUCTURES AT 1000MM INTERVAL OR CLEATED TO WALL AT 750MM INTERVAL.



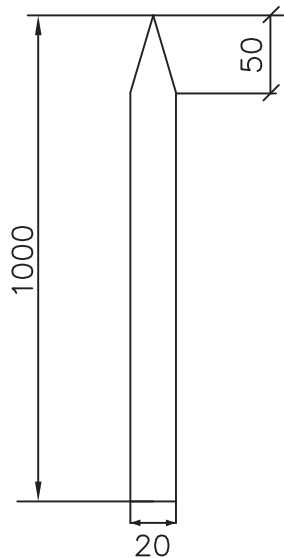
TITLE

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

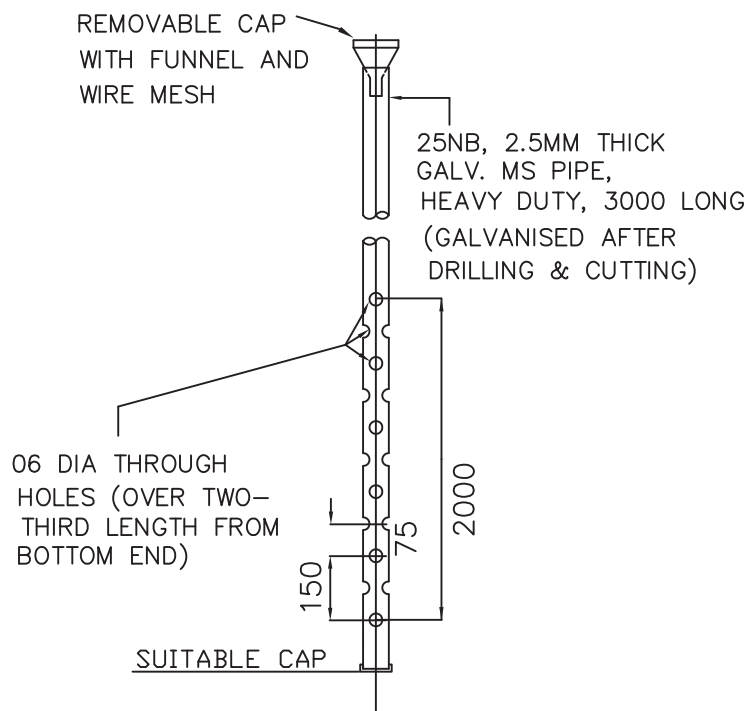
PE-DG-999-509-E003

SH 1 OF 2

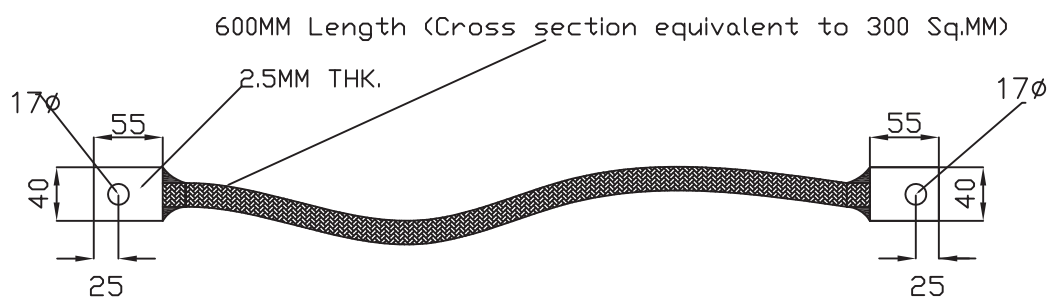
REV 1



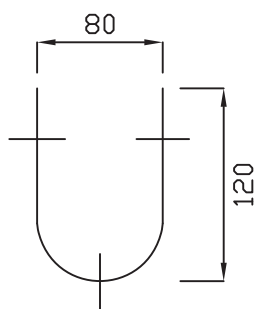
20MM DIA GS ROD
FOR LIGHTNING PROTECTION



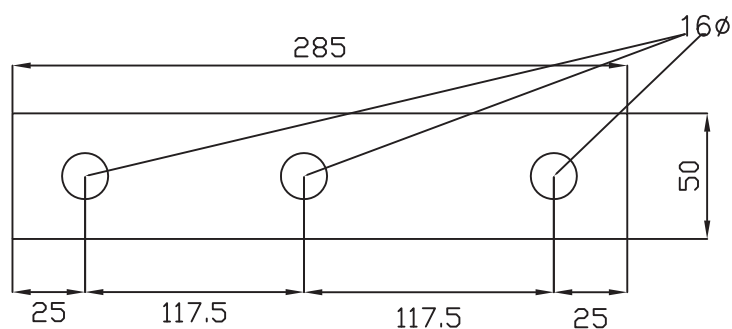
PERFORATED PIPE



FLEXIBLE BRAIDED COPPER CONDUCTOR



PLAN



TINNED COPPER 'U' CLAMP (2.5 MM THICK)



TITLE

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

PE-DG-999-509-E003

SH 2 OF 2

REV 1