

**BANGLADESH-INDIA FRIENDSHIP POWER COMPANY
(PVT.) LIMITED, BANGLADESH**

**2X660 MW MAITREE STPP,
RAMPAL, BANGLADESH**

**TECHNICAL SPECIFICATION
FOR
BARE GROUND CONDUCTOR FOR ABOVE GROUND EARTHING**

SPECIFICATION NO. : PE-TS-421-509-E001, (REV. 00)



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UP**



DOCUMENT TITLE

**TECHNICAL SPECIFICATION OF
BARE GROUND CONDUCTOR FOR
ABOVE GROUND EARTHING**

SPECIFICATION NO. PE-TS- 421-509-E001

VOLUME II B

SECTION C

REVISION 0

DATE: 24.11.2017

SHEET 1 OF 1

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NOTE: PACKING SHALL BE AS PER “TECHNICAL SPECIFICATION FOR SEAWORTHY PACKING FOR EXPORT JOBS’ DOC. NO. PE-TS-888-100-A001

TOTAL NO. OF SHEETS = 25
(INCLUDING COVER/ SEPARATOR SHEETS)

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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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-I: to Section-C : BOQ , as enclosed with the specification) with bidder's signature and company stamp.
 - b. A copy of this sheet ("Instructions to Bidders for Preparing Technical Offer"), with bidder's signature and company stamp.
 - c. A copy of previous sheet ("List of Contents"), with bidder's signature and company stamp.
2. No 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. Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference elsewhere/ covering letter of technical offer shall not be considered by BHEL.
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 conductor description/ quantities, notes etc. from those given in Annexure-I to Section-C 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



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PREAMBLE

1. The Tender documents contain Two (2) volumes. The bidder shall meet the requirements of all 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 vender shall be 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.

1.3 VOLUME – IIB

This volume is sub-divided in to following sections:-

Section – A This section outlines the Intent of Specification

Section – B This section provides “Project Information”.

Section – C This section indicates Technical Requirements specific to Contract, not covered in Section - D

Section – D This section comprises of Technical Specifications of Equipments Complete with Data Sheets A & C.

Data sheet - A: - Specific data and other requirements pertaining to the equipments.

Data sheet - C: - Not Applicable



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SECTION A

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SECTION - 'A'

SCOPE OF ENQUIRY



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SPECIFICATION NO. PE-TS- 421-509-E001

VOLUME II B

SECTION A

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SCOPE OF ENQUIRY

- 1.0 This specification covers the design, manufacture, inspection and testing at manufacturer's works, proper packing and delivery to Haldia port of ABOVE GROUND EARTHING MATERIALS as mentioned in different sections of this specification for the project as indicated in Section B (Project Information).
- 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 up to bidder's guarantee.
- 3.0 The bidders shall be responsible for and governed by all requirements stipulated hereinafter.
- 4.0 Requirements of specification including SQP shall be agreed upon for total compliance by bidders without any deviations. Price offers of only those bidders complying with this requirement shall be acceptable.
- 6.0 The documents shall be in English language and MKS system of units.



TITLE :
TECHNICAL SPECIFICATION OF
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GROUND EARTHING

SPECIFICATION NO.	PE-TS-421-509-E001
VOLUME NO. :	II-B
SECTION :	B
REV NO. :	0 DATE : 24.11.2017
SHEET :	1 OF 2

SECTION 'B'

PROJECT INFORMATION



**PROJECT: 2x 660 MW BIFPCL MAITREE
KHULNA STPP (BANGLADESH)**

PROJECT INFORMATION

OWNER	BANGLADESH INDIA FREINDSHIP POWER COMPANY LIMITED (PVT)
CONSULTANT	FICHTNER
NAME OF PROJECT	2x 660 MW BIFPCL MAITREE KHULNA STPP (BANGLADESH)
Site Location	RAMPAL UPAZILA,BAGHEERAT DISTRICT,RAJNAGAR UNION (14 KM NORTHEAST OF MONGLA PORT & 14 KM NORTHWEST OF SUNDARBANS) LATITUDE: 22 DEG. 37 MIN. 00 SEC. N TO 22 DEG. 34 MIN. 30 SEC N LONGITUDE: 89 DEG. 32 MIN. 00 SEC E TO 89 DEG. 34 MIN. 05 SEC. E
Climatic Conditions:	
Temperature :	
Highest Temp Recorded	36.9 ⁰ C
Lowest Temp Recorded	12.2 ⁰ C
Relative Humidity	Varies between 20% and 90%
Tidal Range	1.2 m to 3.1 m
Maximum surface rainfall	349mm per day
Rain fall Intensity for design of Storm Water Drains	As per Bangladesh Standards by considering the maximum rainfall intensity of 95 mm/hr for a one hour rainfall with 50 year return period
Wind Load	a) Calculations for wind effect shall be in accordance with as per Bangladesh National Building Code -2012, Part 6, Chapter 2.4. And Basic Wind Speed is 73m/sec
Seismic Data	a) Zone- I as determined by Bangladesh National Building code (BNBC-2012).However, design shall be by Site specific seismic data which shall be furnished by Customer.



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SECTION - 'C'

SPECIFIC TECHNICAL REQUIREMENTS



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1.0 SCOPE OF ENQUIRY

- 1.1 This enquiry covers the supply of stranded tinned bare copper earthing conductor conforming to this specification as detailed below.
- 1.2 General technical requirements of the stranded tinned bare copper earthing conductor are indicated in Section-D and Datasheet-A. Project specific technical/ quality requirements/ changes are listed below.
- 1.3 Stranded tinned bare copper earthing conductor shall conform in all respects to the requirements stipulated in all the above parts of the specification.
- 1.4 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 and Section-D.

2.0 BILL OF QUANTITIES:

- 2.1 Quantity requirements shall be as per Annexure-I (Bill of Quantities (BOQ)) enclosed.
- 2.2 Delivery schedule (i.e. contractual calendar dates) for the package shall be given separately to the bidders for compliance. Supplies shall be completed conforming to the lot requirements stipulated in the BOQ within the overall delivery schedule.

3.0 SPECIFIC TECHNICAL REQUIREMENTS

- 3.01 The conductors shall be manufactured as per latest revision of relevant Indian Standard and shall also meet requirements of IEC.

3.1 Specific technical requirements shall be as listed below :**3.1.1 Technical:**

<i>S. No.</i>	<i>Reference Clause No. of Section D (if any)</i>	<i>Specific Requirement/ Change</i>
1	2.4.1 b, c & d	To be read as 2.4.1 (b) "The type tests are required to be conducted as indicated in Datasheet-A and the same shall be offered for inspection (conduction of type tests shall be witnessed by BHEL). Bidder to indicate unit price of conductor inclusive of type test charges. No separate charges shall be payable for type tests.
2	2.4.1 e	Cl. no. may be read as 2.4.1 c
3	3.1	Conductor shall be supplied in steel drums as per applicable IS with epoxy resin paint.
4	4.1	Two signed and stamped copies of the following shall be furnished by all bidders as technical offer: (i) Unpriced Price Schedule (Annexure-I of Section-C: BOQ, as enclosed with the specification) with bidder's signature and company stamp. (ii) A copy of "Instructions to Bidders for Preparing Technical Offer" sheet, with bidder's signature and company stamp.



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(iii) A copy of "List Of Contents" sheet, with bidder's signature and 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.

3.1.2 Packing:

<i>S. No.</i>	<i>Reference Clause No.</i>	<i>Specific Requirement/ Change</i>
1	3.1 of Section –D & 11.1.2 of Spec. No. : PE-TS-888- 100-A001	Conductor shall be supplied in steel drums as per applicable IS/ international standard, with epoxy resin paint. The dimensions mentioned in the specification shall be considered as the minimum requirement for drums." The successful bidder shall submit Steel Drum Drawing for approval without any commercial implications.

3.1.3 Quality/ Inspection:

<i>S. No.</i>	<i>Reference Clause No. of Section D (if any)</i>	<i>Specific Requirement/ Change</i>
1	2.2	The BHEL standard QP enclosed with the specification shall be submitted by vendor at contract stage for approval without any commercial implication to BHEL.

3.1.4 The successful bidder shall submit the standard list of raw material suppliers/ sub-vendors for approval without any commercial implications. Changes to the same, if proposed by any bidder, shall be to BHEL approval.

3.1.5 *Quality Plan applicable for project :*
BHEL Standard Quality Plan no. PED-507-00-Q-002/02 (Enclosed with specification)

3.1.6 The successful bidder shall be required to submit drgs/ docs. as per ANNEXURE-II

3.1.7 Document distribution schedule for project shall be as per ANNEXURE-III.

3.1.8 The stranded tinned bare copper earthing conductors shall confirm to relevant IEC standards. IS standards referred in the specification or any part there of (Data Sheet-A, QP, BOQ etc.) shall be read as the corresponding relevant IEC standards only. However for steel drums relevant IS standards only shall be applicable.

3.1.9 Conductors shall be supplied in non-returnable heavy construction steel drums. All ferrous parts shall be treated with suitable rust protective finish or coating to avoid rusting during transit and storage. Packing of the conductor shall be sea-worthy. For sea worthy packing of equipments/items, Seaworthy packing for export jobs, enclosed Doc. (No. PE-TS-888-100-A001) is to be followed.



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ANNEXURE – I TO SECTION - C

[BILL OF QUANTITIES]

	BIPCL 2X660 MW TISHREEN TPS. TECHNICAL SPECIFICATION OF BARE GROUND CONDUCTOR FOR ABOVE GROUND EARTHING	SPECIFICATION NO. PE-TS-421-509-E001	
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ANNEXURE -I

BOQ-CUM-PRICE SCHEDULE FOR ABOVE GROUND EARTHING MATERIALS

Sr. No.	Item code	Conductor size (sq. mm)	Unit	Ordered Quantity (metres)	Lot-1 Quantity (metres)	Drum length (metres)	HSN Code	UNIT PRICE (EX-WORKS) Rs
STRANDED TINNED BARE COPPER EARTHING CONDUCTOR GENERALLY CONFORMING TO RELEVANT IEC								
(i)	509-15002-A	16 sq.mm.	MTR	16000	12000	1000		
(ii)	509-15003-A	35 sq.mm.	MTR	1000	1000	1000		
(ii)	509-15004-A	50 sq.mm.	MTR	500	500	500		
(i)	509-15006-A	95 sq.mm.	MTR	1000	1000	1000		
(i)	509-15007-A	240 sq.mm.	MTR	38000	27000	1000		

Notes:

- All the quantity shall be released for manufacture along with LOI.
- Manufacturing of quantity shall be released along with LOI after the approval of technical and quality documentation, and supply of same shall be completed within two months of date of approval of documents.
- Subsequent lots shall be cleared for manufacture based on progress of engineering and site requirements. A lead time of three months shall be given for completion of supply for each subsequent lot from date of clearance of the quantities.
- Unit Price schedule enclosed with this specification. The unit prices shall apply for adjustment of variation in quantity as stipulated above.
- The total quantity variation shall be limited to (+/-) 30 % of the total contract value derived on the basis of the Order Quantities.
- Standard drum length shall be 1000/ 500 metres. Tolerance on individual drum length shall be +/- 5%
- Overall tolerance on total dispatched quantity shall be (-) 2% and (+) 0%. Conductor consumed for testing and inspection shall be to bidder's account.
- The conductor shall conform to relevant IEC standards. IS standards referred to shall be read as the corresponding relevant IEC standards only. However for steel drums, relevant IS/ International standard shall be applicable.



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ANNEXURE-II**VENDOR DRAWING / DOCUMENTATION SCHEDULE**

Sl. No.	Drawings/Document Description	Drawings / Document Number	Submission date by vendor
1	Technical Data Sheet for stranded bare copper earthing conductor	PE-V0-421-509-E001	Within two weeks from the date of LOI
2	Cross-sectional Drawings for stranded bare copper earthing conductor	PE-V0-421-509-E002	Within two weeks from the date of LOI
3	Quality Plan for PVC power & control cables	PE-V0-421-509-E003	Within two weeks from the date of LOI
4	Type test reports for tests conducted	PE-V0-421-509-E004	Within a week from the of conduction of type tests
5	Cross-sectional drgs. of steel drums	PE-V0-421-509-E005	Within two weeks from the date of LOI
6	Recommended Field Quality Plan	PE-V0-421-509-E006	Within two weeks from the date of LOI

	<p style="text-align: center;">DOCUMENT TITLE</p> <p style="text-align: center;">TECHNICAL SPECIFICATION OF BARE GROUND CONDUCTOR FOR ABOVE GROUND EARTHING</p>	SPECIFICATION NO. PE-TS- 421-509-E001	
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ANNEXURE-III

Nos. OF DRAWINGS/ DOCUMENTS REQUIRED FROM VENDOR

Unless agreed otherwise, **five (5) hard copies** and **three (3) sets of electronic copies** of all documents are to be submitted in the English language. In addition, operation and maintenance manuals shall be translated into Bangla and provided as paper copies and in electronic format. Electronic Copies shall be submitted in primary original data format (e.g. DOC, XLS, DWG) as well as in a printable non-proprietary document format (e.g. PDF).

All documentation shall comply with uniform documentation instructions according to Customer/BHEL's requirements. Detailed requirements of documentation will be determined during contract execution by the Customer/BHEL.



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SECTION-D

STANDARD TECHNICAL SPECIFICATION



DOCUMENT TITLE

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1.0 TECHNICAL REQUIREMENTS

1.1 Technical requirements for stranded tinned bare copper earthing conductor shall be as indicated in this section, in addition to those specified in Section-C and Datasheet-A as attached for project specific requirements.

2.0 QUALITY ASSURANCE REQUIREMENTS

2.1 Bidder shall confirm compliance with the BHEL Quality Plan as attached with the specification without any deviations. Minor changes in Quality Plan (which shall be to customer approval during contract stage) shall be without any commercial implication.

2.2 In the event of BHEL Quality Plan not being applicable for a project (as indicated in section-C of the project specification), the successful bidder shall submit the Manufacturing Quality Plan (MQP) for approval by BHEL/ Owner (as applicable) [during detailed engineering stage without any commercial implications](#).

2.3 Bidders shall submit the list of proven sub-vendors for raw materials, which will be subject to BHEL/ customer approval.

2.4 Type testing requirements and routine/ acceptance testing requirements shall be as detailed below.

2.4.1 Type Tests on Conductors

- a. All stranded bare copper earthing conductor to be supplied shall conform to type tests as per relevant standards and proven type.
- b. The bidder shall furnish the reports of all the type tests listed in Table-1 in Datasheet-A carried out in within last five years of the date of bid opening. These reports should be for the tests conducted either in government approved third party laboratory or witnessed by client (such as major utilities/ industries) on identical/ similar stranded bare copper earthing conductor to those ordered under this contract.
- c. In case bidder is not able to submit report of type test(s) conducted in last five years, or in case type tests report(s) are not found to be meeting the specification/ relevant standard requirements, then all such tests shall be conducted under this contract by the bidder free of cost to BHEL, and reports shall be submitted for approval. No charges shall be paid for testing under such circumstances. BHEL reserves the right to witness the testing for which due notice shall be given by the vendor.
- d. Irrespective of the bidder furnishing type test report as indicated above, BHEL may get type tests conducted as indicated in Datasheet-A and the same shall be offered for inspection (conduction of type tests shall be witnessed by BHEL). Separate price shall be quoted for the conduction of type testing per lot, which shall be used for cost comparison. A maximum of three lots shall be considered for price comparison purposes on account of type testing. However, type-testing charges shall be paid as per type test conducted.
- e. Minor changes in the final Type Test Procedures (which shall be to approval during contract stage) shall be without any commercial implication.

2.4.2 Routine and Acceptance Tests

- a. Routine testing shall be conducted in line with the applicable standards and as per the Manufacturing Quality Plan approved for the project for every lot offered for inspection.
- b. Acceptance tests shall be conducted on every lot offered for inspection as per details indicated in Datasheet A.
- c. Cost of conduction of routine and acceptance testing shall be deemed to have been included in the quoted supply prices.



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2.4.3 Cost of stranded tinned bare copper earthing conductor consumed for testing shall be to bidder's account.

3.0 Packing

3.1 Stranded tinned bare copper earthing conductor shall be supplied in non-returnable heavy construction drums. All wooden parts shall be manufactured from seasoned wood treated with copper naphthenates/ zinc naphthenates (refer IS: 401). All ferrous parts shall be treated with suitable rust protective finish or coating to avoid rusting during transit and storage. BIS certification mark shall be stamped on each cable drum.

4.0 PROJECT SPECIFIC TECHNICAL AND QUALITY DOCUMENTATION TO BE SUBMITTED

4.1 By All Bidders

As technical offer signed and stamped copy of following:

- a) Section B (Project Information)
- b) Section C (Specific Technical Requirements)
- c) Annexure-I to section C (Bill of Quantities)
- d) Datasheet- A

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.

4.2 By Successful Bidder (for approval during contract stage)


- a. Technical Datasheet .
- b. Cross-section drawings of the conductors
- c. BHEL Standard Quality Plan
- d. Type Test Reports
- e. Cross-sectional drgs. of steel drums
- f. Field Quality Plan


4.3 Two copies of the above documentation shall be submitted for first review. Number of copies to be submitted for second and subsequent submissions (till Cat-I approval is accorded), and those for final distribution prints of approved documentation and test certificates shall be as indicated separately in section C.


4.4 Wherever required, soft copy of all approved technical/ quality documentation shall be submitted as specified without any additional commercial implication. Soft copies may be required both in native file format (e.g. MS Word/ MS Excel) as well as PDF files.



QUALITY PLAN		CUSTOMER :			PROJECT			SPECIFICATION :				
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		BIDDER/ VENDOR :			QUALITY PLAN NUMBER PED-507-00-Q-002/02			SPECIFICATION TECH. SPEC. FOR BARE COPPER TITLE EARTHING CONDUCTOR				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS 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
1.0	RAW MATERIAL											
1.1	PVC Compound(for insulation and sheath)	1. Physical properties	MA	Physical Tests	Sample	IS-5831/BHEL Specification	IS-5831/BHEL Specification	Log Book/ Test Cert.	3/2	-	2	Not Applicable
		2. Elec.Properties	MA	Electrical Tests	Sample	-do-	-do-	-do-	3/2	-	2	
		3. Make & Type	MA	Visual	100%	Plant Std.	Plant Std.	-do-	2	-	-	
1.2	Galvanised steel wire/strip	1. Phy.and Elec. Properties	MA	Physical & Electrical Tests	Sample*	IS-3975 BHEL Specification	IS-3975/BHEL Specification	-do-	3/2	-	2	Not Applicable
		2. Dimension	MA	Measurement	-do-	-do-	-do-	-do-	3/2	-	2	
		3.Galvanization Quality	MA	Galv. Tests	-do-	-do-	-do-	-do-	3/2	-	2	
1.3	Copper/Aluminium Rods/ Wires	1. Physical Properties	MA	Physical Tests	-do-	IEC 60228 AND BHEL Specification	IEC 60228 AND BHEL Specification	-do-	3/2	-	2	
		2. Chemical Composition & purity	MA	Chemical analysis	-do-	-do-	-do-	-do-	3/2	-	2	
		3.Electrical properties	MA	Electrical Tests	-do-	-do-	-do-	-do-	3/2	-	2	
		4.Dimension	MA	Measurement	-do-	-do-	-do-	-do-	3/2	-	2	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE					BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN SHEET 2 OF 5			CUSTOMER : BIFPCL, KHULNA, BANGLADESH BIDDER/ : VENDOR		PROJECT TITLE 2X660 MW MAITREE STPP QUALITY PLAN NUMBER PED-507-00-Q-002/02 ITEM :CONDUCTOR			SPECIFICATION : NUMBER PE-TS-421-509-E001 SPECIFICATION TECH. SPEC. FOR BARE COPPER TITLE EARTHING CONDUCTOR		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
2.0	IN PROCESS											
2.1	Wire Drawing , Tinning and Annealing	1. Physical, Electr. Finish & dimension	CR	Phy.&Elect. Tests Visual & Meas.	Sample	BHEL Specn. IEC 60228	BHEL Specn. IEC 60228	Log Book	2	-	1	
		2. Chemical test for Tinning	CR	Chemical Test	Sample	-do-	-do-	-do-	2	-	-	
2.2	Stranding of wires	1. No.of wires	MA	Counting	Sample	Vendors/BHEL Specn. & Apprd. Data Sheet & Relevant IEC	Vendors/BHEL Specn. & Apprd. Data Sheet & Relevant IEC	-do-	2	-	-	
		2. Sequence, lay length & Direction	MA	Visual, Meas	Sample	-do-	-do-	-do-	2	-	-	
		3 Surface Finish	MA	Visual	Sample	-do-	-do-	-do-	2	-	-	
		4.Dimension	MA	Measurement	Sample	-do-	-do-	-do-	2	-	-	
2.3	Core Insulation (No repair permitted)	1. Surface finish	MA	Visual	100%	-	Free from bulging burnt particles lumps, cuts & Scratches.	-do-	2	-	1	Not Applicable
		2 Insulation thickness	CR	Measurement	Sample	Appd.data sheet IS-1554	Appd.data sheet IS-1554	-do-	2	-	-	
			PARTICULARS		BIDDER/VENDOR							
BHEL			NAME									
			SIGNATURE									
			DATE					BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN SHEET 3 OF 5		CUSTOMER : BIFPCL, KHULNA, BANGLADESH		PROJECT TITLE 2X660 MW MAITREE STPP			SPECIFICATION : NUMBER PE-TS-421-509-E001			
				BIDDER/ VENDOR		QUALITY PLAN NUMBER PED-507-00-Q-002/02			SPECIFICATION TECH. SPEC. FOR BARE COPPER TITLE EARTHING CONDUCTOR			
		SYSTEM		ITEM :CONDUCTOR		SECTION			VOLUME III			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS 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
2.4	Core Laying	3. Concentricity #	CR	Measurement	Sample	Mfr's Std./Appd. data sheet	Mfr's Std./Appd. data sheet	Log Book	2	-	1	# To be checked at starting & finish end of Extruded Length
		4 Dia over insulation	MA	Measurement	Sample	-do-	-do-	-do-	2	-	-	
		5. Spark Test or Water Immersion test	CR	Electrical	100%	Mfr's Std.	Mfr's Std.	-do-	2	-	1	
		6. Core identification	MA	Visual	100%	IS-1554	IS-1554	-do-	2	-	-	
		1. Dia over laidup core	MA	Measurement	Sample	-do-	-do-	Log Book	2	-	-	
2.5	InnerSheath Extrusion	2.Sequence of lay, Lay length & direction up core	MA	Visual & Meas.	Sample	Mfrs.Std./relevant IS	Mfrs.Std./relevant IS	-do-	2	-	-	Not Applicable
		1. Surface finish	MA	Visual	100%	--	Free from bulging, burnt particles, lumps cuts & scratches.	-do-	2	-	-	
		2. Sheath thickness	MA	Measurement	Sample	IS-5831, IS-1554 data sheet	IS-5831, IS-1554 data sheet	-do-	2	-	-	
2.6	Armouring	3.Dia over inner sheath	MA	-do-	-do-	-do-	-do-	-do-	2	-	-	Not Applicable
		1. No.of wires/Strips	MA	Counting	At the start of the process	BHEL Specn./ Appd. Data sheet IS-3975 & IS-1554	BHEL Specn./ Appd. Data sheet IS-3975 & IS-1554	-do-	2	-	-	
		2. Lay Direction	MA	Visual	-do-	-do-	-do-	-do-	2	-	-	
			PARTICULARS		BIDDER/VENDOR							
BHEL			NAME									
			SIGNATURE									
			DATE									
												BIDDER'S/VENDORS COMPANY SEAL

		QUALITY PLAN SHEET 4 OF 5		CUSTOMER :		PROJECT			SPECIFICATION :														
				BIFPCL, KHULNA, BANGLADESH		TITLE 2X660 MW MAITREE STPP			NUMBER PE-TS-421-509-E001														
SL. NO.		COMPONENT/OPERATION		CHARACTERISTICS CHECK		BIDDER/ VENDOR		QUALITY PLAN			SPECIFICATION TECH. SPEC. FOR BARE COPPER												
						SYSTEM		NUMBER PED-507-00-Q-002/02			TITLE EARTHING CONDUCTOR												
1		2		3		4		5		6		7		8		9		10		11			
						CAT.		TYPE/ METHOD OF CHECK		EXTENT OF CHECK		REFERENCE DOCUMENT		ACCEPTANCE NORM		FORMAT OF RECORD		AGENCY		REMARKS			
																		P		W		V	
2.7	Outer Sheath Extrusion	3. Lay Length	MA	Visual, Meas.	At the start of the process	BHEL Specn./ Appd. Data sheet IS-3975 & IS-1554	BHEL Specn./ Appd. Data sheet IS-3975 & IS-1554	Log Book	2	-	-	Not Applicable											
		4. Coverage	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-												
		5. Dia over armouring	MA	Measurement	-do-	-do-	-do-	-do-	2	-	-												
		1. Surface Finish	MA	Visual	100%	-	Free from Bulging Burnt particles, lumps, cuts & scratches	Log Book	2	-	-												
		2. Sheath thickness	MA	Measurement	Sample	IS-5831 & IS-1554 Data Sheet	IS-5831 & IS-1554 Data Sheet	Log Book	2	-	-												
		3. Dia over outer sheath	MA	Measurement	Sample	-do-	-do-	-do-	2	-	-												
2.8	Finished CONDUCTOR/ Conductor	4. Marking	MA	Visual	100%	IS-1554 & BHEL Specn.	IS-1554 & BHEL Specn.	Test Report	2	-	-												
		1. Routine Test	CR	Elec. & Meas.	100%	IEC-60228 & BHEL Specn	IEC-60228 & BHEL Specn	Test Report	2	-	1												
		2. Type.	CR	Elec., Phy & Meas.	Sample *	-do-/Apprd.data sheet	-do-/Apprd.data sheet	Test Report	2	-	1	* One Drum/Size/Lot											
3.0	Final Inspection	1. Finish & Length	MA	Visual	(See remark)	BHEL specn. IEC-60228	Free from Bulging Burnt particles, lumps, cuts & scratches	Test Report	2	1	-	One drum each for in a Lot											
				PARTICULARS		BIDDER/VENDOR																	
BHEL				NAME																			
				SIGNATURE																			
				DATE								BIDDER'S/VENDORS COMPANY SEAL											

SL. NO.		COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1		2	3	4	5	6	7	8	9	P	W	V	11
			2. Dimension	MA	Measurement	As per IS/ relevant IEC	Appd.Data Sheet/ IEC-60228	Appd.Data Sheet/ IEC-60228	Test Report	2	1	-	
			3. Armouring - Coverage No.of Wires/Strips	MA	Visual & Meas.	As per IS	-do-	-do-	-do-	2	1	-	Not Applicable
			4. Marking/Colour Coding	MA	Visual	-do-	-do-	-do-	-do-	2	1	-	Not Applicable
			5. Acceptance Tests	CR	Phy & Elect. Tests	-do-	-do-	-do-	-do-	2	1	-	
			6. Type	CR	Measurement	(SEE REMARK)	BHEL Specn. Apprd.Data Sheet	BHEL Specn. Apprd.Data Sheet	-do-	2	1	-	Type Test shall be witnessed on one sample per type of every lot
			<p>NOTES:-</p> <p>(A) JOINTS IN WIRE SHALL BE AS PERMITTED BY IS / BHEL SPECIFICATION. VENDOR TO CERTIFY THE SAME.</p> <p>(B) CONDUCTOR ENDS SHALL BE SEALED AS PER BHEL SPECIFICATION</p> <p>(C) RECORD OF RAW MATERIAL, PROCESS & ALL STAGES SHALL BE CERTIFIED BY VENDORS QC. AND ARE LIABLE TO AUDIT CHECK BY PURCHASER.</p> <p>(D) WHEREVER EXTENT OF CHECK FOR STAGE IS MENTIONED AS SAMPLES, THE SAME SHALL BE AS PER VENDORS SAMPLING PLAN</p> <p>(E) VENDOR SHALL FURNISH COMPLIANCE CERTIFICATE TO THE INSPECTION AGENCY CONFIRMING THE PACKING AS PER BHEL SPECIFICATION.</p> <p>LEGEND : P : PERFORMER W: WITNESSER V: VERIFIER (1) BHEL/BHEL's CUSTOMER: 2-VENDOR : 3 SUB VENDOR</p>										
			PARTICULARS			BIDDER/VENDOR							
BHEL			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				



DOCUMENT TITLE

**TECHNICAL SPECIFICATION OF
BARE GROUND CONDUCTOR FOR
ABOVE GROUND EARTHING**

SPECIFICATION NO. PE-TS- 421-509-E001

VOLUME II B

SECTION D - I

REVISION 0

DATE: 24.11.2017

SHEET 1 OF 2

DATASHEET A



DOCUMENT TITLE

**TECHNICAL SPECIFICATION OF
BARE GROUND CONDUCTOR FOR
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SPECIFICATION NO. PE-TS- 421-509-E001

VOLUME II B

SECTION D - I

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DATE: 24.11.2017

SHEET 2 OF 2

DATA SHEET-A**DS-AI. SPECIFIC TECHNICAL REQUIREMENTS**

1.0	Type of Conductor	Stranded tinned
2.0	Standard applicable in general	IEC 60228 / Relevant IEC
3.0	Cross sectional area of conductors and quantities	As per BOQ, Annexure-I to Section-C
4.0	CONDUCTOR	
(a)	Material	Copper
	Grade and Class	Stranded, tinned annealed high conductivity, Class 2
(b)	Standard Applicable	As per relevant IEC
(c)	Shape	Circular as per IEC
(d)	Min. number of strands	As per relevant IEC
5.0	STEEL DRUMS	
(a)	Type & construction	As per applicable IS/ International standard
(b)	Standard drum length	<i>1000m/ 500m (±) 5% (as specified in BOQ)</i>

DS-AII. TYPE/ ACCEPTANCE TEST REQUIREMENTS**A. Type Test Conduction:**

- Tests for which an asterisk sign (*) is indicated in the 'Conduction Required as Type Test' column shall be conducted on one size of conductor to be selected by purchaser at the time of testing as type tests. The same may be witnessed by BHEL/ Owner, for which due notice shall be given by the vendor.

B. Acceptance Test Conduction:

- Tests for which a hash sign (#) is indicated in the 'Conduction Required as Acceptance Test' column shall be conducted as acceptance tests.
- Sampling:
Sampling for acceptance tests shall be as per Appendix-A (Clause 15.2.1) of IS: 1554 Part-I or as per relevant IEC/ International standard as decided by BHEL.

<u>S. No.</u>	<u>TEST</u>	<u>CONDUCTION REQUIRED AS</u>	
		<u>Type Test</u>	<u>Acceptance Test</u>
1.0	Tests for Conductor		
	Annealing test	*	#
	Persulphate test	*	#
	Resistance test	*	#

Note: The stranded bare copper earthing conductor shall confirm to relevant IEC standards. In case, IS standards are referred to wherever; bidder has to follow equivalent IEC/ International standard. If same is not available, IS standard can be followed.