

***RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM  
LIMITED***

**2X660 MW SURATGARH STPS, STAGE-V, UNIT-7&8**

**VOLUME – IIB**

**TECHNICAL SPECIFICATION**

**FOR**

***CABLE TREFOIL CLAMPS***

**SPECIFICATION NO: *PE-TS-392-507-E014***

**REVISION: 0**



**BHARAT HEAVY ELECTRICALS LIMITED**

**POWER SECTOR**

**PROJECT ENGINEERING MANAGEMENT**

**NOIDA, UP (INDIA) – 201301**



TECHNICAL SPECIFICATION FOR  
CABLE TREFOIL CLAMPS

SPECIFICATION NO. PE-TS- 392-507-E014

VOLUME II B

SECTION ---

REVISION 0

DATE: 23.05.14

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

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BIDDER'S STAMP & SIGNATURE



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**INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFER**

1. Two signed and stamped copies of the following shall be furnished by all bidders as technical offer :
  - a. Unpriced Price Schedule (Annexure-I: BOQ CUM PRICE SCHEDULE, 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-I of specification [Bill Of Quantities] shall not be considered (i.e., technical description, quantities, notes etc. as per specification shall prevail).

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**BIDDER'S STAMP & SIGNATURE**



## TECHNICAL SPECIFICATION FOR CABLE TREFOIL CLAMPS

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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 SPECIFICATION)

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-II B

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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SECTION – A

SCOPE OF ENQUIRY



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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 site of **CABLE TREFOIL CLAMPS** as mentioned in different sections of this specification for **2X660MW SURATGARH TPS**.
- 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 general terms and conditions, instructions to bidders and other attachment referred to elsewhere are hereby made part of the Technical 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 technical/quality assurance requirements stipulated.
- 6.0 The documents shall be in English Language and MKS system of units.



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VOLUME NO. : II-B

SECTION : B

REV NO. : 0 DATE :

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SECTION - B

PROJECT INFORMATION

SPEC.NO. TCE.5750A-H-500-001	<b>TATA CONSULTING ENGINEERS LIMITED</b>	VOLUME II SECTION – B
	<b>RRVUNL, 2 x 660 MW, Super-Critical TPS, Stage-V, Unit # 7 &amp; 8 at Suratgarh, Rajasthan</b> GENERAL PROJECT INFORMATION	SHEET 1 OF 3

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	<b>Climatic conditions</b>	
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

SPEC.NO. TCE.5750A-H-500-001	<b>TATA CONSULTING ENGINEERS LIMITED</b>	VOLUME II SECTION – B
	<b>RRVUNL, 2 x 660 MW, Super-Critical TPS, Stage-V, Unit # 7 &amp; 8 at Suratgarh, Rajasthan</b> GENERAL PROJECT INFORMATION	SHEET 2 OF 3

	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


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	<b>TECHNICAL SPECIFICATION FOR CABLE TREFOIL CLAMPS</b>	SPECIFICATION NO. PE-TS- 392-507-E014	
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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 **Cable Trefoil Clamps** conforming to this specification.
- 1.2 General technical requirements of the Cable Trefoil Clamps are indicated in Section-D. Project specific technical/ quality requirements / changes are listed in Section-C & Data Sheet-A.
- 1.3 The stipulations of Section-C, followed by those of Data Sheet-A shall prevail in case of any conflict between the stipulations of Section-C, Data Sheet - A & Section-D.

**2.0 BILL OF QUANTITIES:**

- 2.1 Quantity requirements shall be as per **Annexure-I (BOQ cum Price Schedule)** 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>

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**ANNEXURE - I**

**BOQ CUM PRICE SCHEDULE FOR CABLE TREFOIL CLAMPS**

S. No.	ITEM CODE	ITEM DESCRIPTION	UNIT	ORDER QUANTITY	UNIT PRICE (Rs.)
1	507-18121-A	TREFOIL CLAMP CABLE OD 30.1 – 35MM	NOS.	200	
2	507-18122-A	TREFOIL CLAMP CABLE OD 35.1 – 40MM	NOS.	4000	
3	507-18123-A	TREFOIL CLAMP CABLE OD 40.1 – 45MM	NOS.	6000	
4	507-18125-A	TREFOIL CLAMP CABLE OD 50.1 – 55MM	NOS.	10500	
5	507-18126-A	TREFOIL CLAMP CABLE OD 55.1 – 60MM	NOS.	1600	

**NOTES:**

- Overall dia. of cables indicated is tentative. Actual overall dia. of cables shall be furnished to successful bidder after award of the contract without any commercial implications.
- The whole quantity indicated above shall be cleared for manufacturing along with the approval of technical & quality documentation. The delivery of the cleared quantities shall be completed within (2) two months from the date of approval of technical & quality documentations. Quantities shall be taken up for manufacture by vendor after approval of technical & quality documentation.
- Balance quantities if any (including quantity variation as per Sl. No. 4 below) shall be cleared for manufacturing progressively as per site requirements & engineering progress. A lead-time of two months from the date of clearance of quantities will be given for the subsequently cleared quantities for completion of supplies.
- Based on project requirements, the variation in quantities of all items put together shall be limited to + 30% of the total contract value derived on the basis of Ordered Quantities.

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**ANNEXURE – II**

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

Sl. No.	Drawings/Document Description	Drawings / Document Number	Submission Schedule
1.	Technical Datasheet of Cable Trefoil Clamp	PE-V0-392-507-E001	Within one week of award of contract
2.	GA Drawing of Cable Trefoil Clamp	PE-V0-392-507-E002	Within one week of award of contract
3.	Quality Plan for Cable Trefoil Clamp	PE-V0-392-507-E901	Within one week of award of contract

Note: -

It may please be noted that successful bidder has not to make any fresh submittals at contract stage w.r.t. above mentioned drawings/documents. Data Sheet-A & Typical detail of Cable Trefoil Clamp as enclosed in the technical specification are to be appended with cover sheet bearing Doc. / Drg. No. & Name as stated above. The signed & stamped 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**

(VENDOR DRAWING/DOCUMENT SCHEDULE)

S. NO.	DESCRIPTION	No. hard /soft copies	No. of CD-ROMs	Submission through DMS
1	Docs. /drgs. for approval (First submission)	PDF File + 2 Hard copies	NIL	YES
2	Drgs. / docs. for approval (Second & subsequent submission till approval)	PDF File + 2 Hard copies	NIL	YES
3	Final approval drgs. / docs. for Distribution after CAT-1.	PDF File + 5 Hard Copies	NIL	YES
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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SECTION-D

STANDARD TECHNICAL SPECIFICATION



## TECHNICAL SPECIFICATION FOR CABLE TREFOIL CLAMPS

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### 1.0 SCOPE OF ENQUIRY

1.1 This specification covers the Design, Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of **CABLE TREFOIL CLAMPS** as described in different sections of this specification.

### 2.0 CODES & STANDARDS

2.1 The material, constructional features and various processes involved in manufacture shall comply with latest revision of Indian Standards.

2.2 The design, material, construction, manufacture, inspection, testing and performance of Cable Trefoil Clamps shall conform to the latest revision of relevant standards and codes of practices mentioned in 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 Bill of Quantities (Annexure - I of the specification) shall be manufactured as per Datasheet-A and project drawings enclosed with this specification.

3.2 Cable trefoil clamps shall be any one of the following type

- a) Type – I : Cable trefoil clamps made of Aluminium Alloy
- b) Type – II: Cable trefoil clamps made of Nylon – 6 material

3.3 The cable trefoil clamp shall be designed to operate satisfactorily and meet all the requirements specified in Datasheet – A.

3.4 The cable trefoil clamps shall be designed & manufactured in accordance with the best engineering practices and shall be such as has been proved to be suitable for intended purpose.

3.5 The Nylon – 6 cable trefoil clamps shall meet the following requirements

- a) High mechanical strength
- b) Resistance to chemicals
- c) Non hygroscopic
- d) Fire retardant.

3.6 Bolts, nuts & washers used shall be hot dip galvanised / zinc passivated / cadmium plated for both type of trefoil clamps.

### 4.0 QUALITY / INSPECTION:

4.1 BHEL's Standard QP (QP No. PED-507-00-Q-008/00) 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.

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



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- 4.3 The supplier shall perform all tests necessary to ensure that the material and workmanship conform to the relevant standards and comply with the requirements of the specification. Charges for all these tests for all the equipment & components shall be deemed to be included in the bid price.
- 4.4 The bidder shall furnish the reports of all the type tests carried out. 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 items to those ordered under this contract.
- 4.5 In case bidder is not able to submit report of type test(s), 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.

### 5.0 PACKING

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

### 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 copy of sheet "Contents" with bidder's signature & company stamp.
  - A copy of sheet "Instructions to bidders for preparing Technical offer" with bidder's signature & company stamp.
  - Unpriced copy of "Annexure-I (Bill of Quantities)" 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 Vendor drawing / document schedule for the project shall be as per Annexure – III.



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**DATASHEET-A**

(DE TO STRIKE OUT OPTION NOT APPLICABLE FOR THE PROJECT. BIDDER TO FURNISH THE INFORMATION FOR THE ITEMS MARKED WITH \*)

1.0 **APPLICABLE STANDARDS:**

- a) IS: 617 For cast Aluminium & its alloys – Ingots & casting for general engineering purposes - specification.
- b) IS: 1363 For hexagon head bolts, screws and nuts.
- c) IS: 1608 For Metallic materials – Tensile test at ambient temperature.

- 2.0 Voltage Grade : 11kV, 6.6kV, 3.3kV & 1.1kV
- 3.0 Application : Indoor / Outdoor
- 4.0 Material :  Type I – Aluminium Alloy  
 Type II – Nylon-6
- 5.0 Hardwares : Hot Dip Galvanised / Zinc Passivated / Cadmium Plated
- 6.0 Type & design : Generally conforming to Drg. No. PE-DG-999-507-E014
- 7.0 Sizes : To suit the ODs of cables (including tolerances in ODs) as per BOQ cum price schedule.
- 8.0 Short circuit current values (Peak) : 125KA or above

## ANNEXURE – 1

### INSTRUCTIONS FOR 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.**

		<b>QUALITY PLAN</b>			CUSTOMER : RRVNVL			PROJECT TITLE: 2X660MW SURATGARH STPP			SPECIFICATION : NUMBER : PE-TS-392-507-E014		
					BIDDER/ : VENDOR			QUALITY PLAN NUMBER: PED-507-00-Q-008/00			SPECIFICATION : TECHNICAL SPECIFICATION FOR CABLE TITLE TREFOIL CLAMP		
		SHEET 1 OF 1			SYSTEM CABLING			ITEM : TREFOIL CLAMP			SECTION		
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	
1	RAW MATERIAL	1. TENSILE STRENGTH	MA	PHYSICAL TEST	LOT WISE	MANUFACTURER'S CATALOGUE	MANUFACTURER'S OR SUPPLIER'S TEST CERTIFICATE	TEST CERTIFICATE	3/2	-	1		
		2. MELTING POINT	MA	PHYSICAL TEST	LOT WISE	MANUFACTURER'S CATALOGUE	MANUFACTURER'S OR SUPPLIER'S TEST CERTIFICATE	TEST CERTIFICATE	3/2	-	1		
2	FINISHED PRODUCT	1. FINISH	MA	VISUAL	IS 2500 (PART 1) LEVEL S4	APPROVED DRG. / TECH. SPEC.	APPROVED DRG. / TECH. SPEC.	INSPECTION REPORT	3/2	1	1		
		2. DIMENSION	MA	MEASUREMENT	IS 2500 (PART 1) LEVEL S4	APPROVED DRG. / TECH. SPEC.	APPROVED DRG. / TECH. SPEC.	INSPECTION REPORT	3/2	1	1		
		3. TEMPERATURE CYCLE TEST	MA	PHYSICAL	3 NOS. OF EACH LOT OF EACH SIZE	NOTE - A	NOTE - A	INSPECTION REPORT	3/2	1	1		
		4. LOAD BEARING TEST	MA	PHYSICAL	3 NOS. OF EACH LOT OF EACH SIZE	NOTE - B	NOTE - B	INSPECTION REPORT	3/2	1	1		

**NOTE - A**

The clamps, in unassembled condition, shall be subjected to temperature cycle test as follows:

The clamps shall be put into boiling water at a temp. of 90 to 100 degree centigrade for 15 minutes. After this, they shall be taken out and put immediately in cold water at room temp where they will be allowed to cool for 15 minutes. The entire test will comprise of 5 transfers, ie; cold to hot, hot to cold, cold to hot, hot to cold and cold to hot. After the test, the clamps should show no signs of deformity or breakage.

**NOTE - B**

After temperature cycle test, the same materials have to go undergo this test.

Samples have to be fixed and should apply loads of 25kg, 45kg and 75kg for cable OD up to 40mm, 40 to 60mm and above 60mm respectively on each side one by one for 1 minute. And then apply 10kg, 15kg and 20kg loads respectively as mentioned above in the centre for 1 minute. There should not be any breakage / deformity in the samples after the above process.

<b>NOTE : INSTRUCTIONS FOR FILLING QUALITY PLAN IS ATTACHED AS ANNEXURE - A.</b>			
BHEL	PARTICULARS		BIDDER/VENDOR
	NAME		
	SIGNATURE		
	DATE		
			<b>BIDDER'S/VENDOR'S COMPANY SEAL</b>

