

5x800 MW YADADRI TPS

SINGLE CORE CABLE TREFOIL CLAMP UBPRICED SCHEDULE

| HT CABLE | | | | |
|---|-----------------------------|---|----------------------------|-----------------------------|
| 11/11kV (UE), AL CONDUCTOR XLPE INSULATED,ARMOURED POWER CABLES | NO. OF TREFOILCLAMPS | Item Description (TREFOIL CLAMP) | UNIT- EXWORKS PRICE | TOTAL- EXWORKS PRICE |
| 1C-240 | 2667 | 38.5-46.5 | | |
| 1C-630 | 25778 | 51.5-59.5 | | |
| 3.3/3.3 KV (UE), AL CONDUCTOR XLPE INSULATED ARMOURED POWER CABLES | | | | |
| 1C-240 | 8889 | 32-38.5 | | |
| LT CABLE | | | | |
| 1C-400 Sq. mm XLPE-AI(A) FRLS | 15556 | 33.6-39 | | |
| 1C-630 Sq. mm XLPE-AI(A) FRLS | 16445 | 42-47.5 | | |
| | | | | |



**PRE-QUALIFICATION REQUIREMENTS FOR
TREFOIL CLAMPS- YADADRI TPS**

PE-TS-417-507-E015

REVISION NO. 00 DATE 27/06/2022

SHEET 1 OF 2

ITEMS: Trefoil Clamps
Vendor may be considered for evaluation for one or more of the following type of trefoil clamps:

- Type 1 – Nylon – 6 material
Type 2 – Aluminium alloy

| | |
|----|--|
| 1. | Manufactured & supplied applicable type of trefoil clamps for single core cable of minimum overall dia. of 50 mm. |
| 2. | Availability of type test certificates (for short circuit at 125kA peak or above) for the applicable type of trefoil clamps. |
| 3. | Vendor should have in-house manufacturing & testing facility for applicable type of trefoil clamps. |
| 4. | Manufacturing capacity of 10000 nos. per month for the applicable type of trefoil clamps. |
| 5. | Manufactured & supplied at least 20000 nos. trefoil clamps of applicable type in one or more orders. |
| 6. | Minimum two (2) nos. purchase orders for trefoil clamps of applicable type shall be submitted which should not be more than five (5) years old from the date of techno-commercial bid opening for establishing continuity in business. |

Notes (General points of PQR):

1. Offers of the JV companies/ Joint Bidders/ bidders having collaboration/ licensing agreement/ MOU/ Indian subsidiaries shall be evaluated as follows:

a. If bidder happens to be an Indian subsidiaries of foreign OEM, then the credentials of the foreign OEM can also be considered for meeting PQR.

b. If bidder happens to be the Joint Venture Company, then the credentials of any of JV partners can be also considered for meeting PQR.

c. If bidder happens to bid jointly with their partner, then credentials of both the partners will be considered for meeting PQR as per distribution of the work. In all such cases, lead bidder as specified in bid documents shall be responsible for overall execution of the contract and all guarantee/ warranty.

| PREPARED BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|--|--|---|--|
| NAME: AVINASH KUMAR DESIGNATION: SR. ENGINEER | NAME: NARENDRA NATH JAJWARE DESIGNATION: SR. MGR | NAME: PRAVEEN DUTTA DESIGNATION: AGM | NAME: DEBASISA RATH DESIGNATION: DH-ELECT (AGM) |



**PRE-QUALIFICATION REQUIREMENTS FOR
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PE-TS-417-507-E015

REVISION NO. 00 DATE 27/06/2022

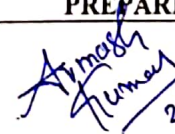
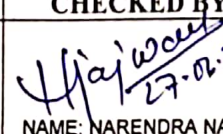
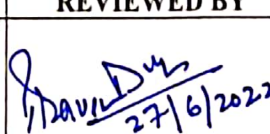
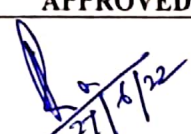
SHEET 2 OF 2

d. If bidder happens to be the having valid collaboration agreement/ MOU/ licensing agreement with some other company, then the credentials of collaborator/ MOU partner/ licensing company can also be considered for meeting PQR.

Note: If bidder(s) qualifies on the basis of credentials of his principal/ JV partner/ Collaborator/ joint bidder etc., then the principal/ JV partner/ Collaborator/ MOU partner/ joint bidder shall be responsible for overall design vetting and warranty/ guarantee of the package. The scope matrix clearly defining their respective roles including design vetting, manufacturing of critical component, E&C etc. etc. and warranty/ guarantee shall be submitted along with the offer.

2. Bidder to note that the arrangement of bidding (joint bid partners/ collaborator/ MOU partner/ licensing company etc.) once offered to BHEL as a part of bidding documents cannot be changed till the execution of the project.
3. Consideration of offer shall be subject to customer's approval of bidders, if applicable.
4. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self- attested English translated document should also be submitted.
5. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
6. After satisfactory fulfilment of the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of tender.

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| PREPARED BY | CHECKED BY | REVIEWED BY | APPROVED BY |
|---|---|--|---|
|  27/06/2022 NAME: AVINASH KUMAR DESIGNATION: SR. ENGINEER |  27-06-22 NAME: NARENDRA NATH JAJWARE DESIGNATION: SR. MGR |  27/6/2022 NAME: PRAVEEN DUTTA DESIGNATION: AGM |  27/6/22 NAME: DEBASISA RATH DESIGNATION: DH-ELECT(AGM) |

VOLUME -II
TECHNICAL SPECIFICATION
FOR
TREFOIL CLAMP

5x800 MW YADADRI TPS

SPECIFICATION NO: PE-TS-417-507-E015

REVISION: 00



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UP (INDIA) – 201301



TECHNICAL SPECIFICATION FOR
TREFOIL CLAMP

SPECIFICATION NO. PE-TS-417-507-E015

VOLUME II

SECTION

REVISION 00

DATE: 08.02.2022

SHEET 1 OF 1

CONTENTS

| Sl. No. | DESCRIPTION | NO. OF SHEETS |
|---------|---------------------------------|---------------|
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| | SPECIFIC TECHNICAL REQUIREMENTS | 02 |
| | DATA SHEET – A | 01 |
| 2.0 | SECTION- II | |
| | STANDARD TECHNICAL REQUIREMENTS | 02 |
| | STANDARD DRAWING | 01 |
| | STANDARD QUALITY PLAN | 02 |

Total nos. of sheets including cover & separator sheets = 13 sheets



TECHNICAL SPECIFICATION FOR
TREFOIL CLAMP

SPECIFICATION NO. PE-TS-417-507-E015

VOLUME II

SECTION I

REVISION 00

DATE: 08.02.2022

SHEET 1 OF 1

COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.
2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'
3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in 'BOQ-Cum-Price schedule' shall not be considered (i.e., technical description and Quantities as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE

| | | | |
|---|--|--------------------------------------|------------------|
|  | TECHNICAL SPECIFICATION FOR TREFOIL CLAMP | SPECIFICATION NO. PE-TS-417-507-E015 | |
| | | VOLUME II | |
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SECTION – I

SPECIFIC TECHNICAL REQUIREMENTS

#

| | | | |
|---|--|--------------------------------------|------------------|
|  | TECHNICAL SPECIFICATION FOR TREFOIL CLAMP | SPECIFICATION NO. PE-TS-417-507-E015 | |
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1.0 PURPOSE

This specification is intended for finalization of Contract between BHEL PEM and Bidder. Standard technical detail as indicated in the specification shall be agreed upon between BHEL PEM and bidder.

2.0 SCOPE OF ENQUIRY

2.1. Design, manufacture, inspection and testing at manufacturer's works, proper packing and delivery to site of Trefoil Clamp conforming to this specification.

2.2. It is not the intent to specify herein all the details of design & manufacture of material. However, the material shall conform in all respects to high standard of design, engineering and workmanship and shall be capable of performing in continuous commercial operation at site conditions.

2.3. Trefoil clamps (Nylon-6/Aluminium) shall meet the following requirements:

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

Other Technical details of trefoil clamps are indicated in Data sheet-A & section-II.

2.4. Technical requirements of Cable Termination & Jointing Kits are indicated in Data Sheet-A ,section I & Section-II.

2.5. The stipulation of Data Sheet-A shall prevail in case of any conflict between the stipulations of Data Sheet-A , section I & Section-II. The stipulation of section I shall prevail in case of any conflict between the stipulations of section I & Section-II.

3.0 BILL OF QUANTITIES

The bidder to quote for items as per price schedule attached with NIT.

4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

4.1 Documents required to be submitted by the bidder along with the Technical offer.

- a) Type test report as per data Sheet-A. Test Report should not be older than 5 years from 17.10.2017.

| | | | |
|---|--|--------------------------------------|------------------|
|  | TECHNICAL SPECIFICATION FOR TREFOIL CLAMP | SPECIFICATION NO. PE-TS-417-507-E015 | |
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- b) Sign & stamped copy of following documents:-
- i) "Deviation Schedule" with "NO Deviations" and bidder's signature and company stamp.
 - ii) Unpriced Price Schedule as enclosed with NIT with 'Quoted' word against each items with bidder's signature and company stamp.
 - iii) A copy of the sheet "Compliance Certificate" with bidder's signature and company stamp.
 - iv) A copy of the sheet "Content Sheet" with bidder's signature and company stamp.

5.0 Technical requirements:-

- 5.1 All single core power cables for 3 Ph. AC circuits shall be laid in trefoil formation and suitably clamped with self-locking type fire resistant nylon ties at an interval of 750 mm.
- 5.2 Clamps should have been type tested for Short Circuit Withstand Test.

6. Drawings/documents:-

6.1 Documents/drawings shall be submitted after placement of order for BHEL and customer approval which has been specified in NIT.

NOTE-

1. Vendor shall submit the dates for drawing/document submission/BHEL comments/resubmission after approval of documents.
2. In BOM each of the item to be uniquely identified with item code no. or item SI. no. Supplier to ensure that all the items which will find separate mention in the packing list are covered in detailed BOM. Supplier to give following undertaking in BOM: "The BOM provided here completes the scope (in content and intent) of material supply under PO no. ---- dtd ----- Any additional material which may become necessary for the intended application of supplied item/package will be supplied free of cost in most reasonable time."

6.2 Drawings/ documents shall be submitted through Document Management System (DMS).



TECHNICAL SPECIFICATION FOR
TREFOIL CLAMP

SPECIFICATION NO. PE-TS-417-507-E015

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Note (*) The Quality plan attached with this specification is for **Nylon-6** Trefoil clamp..
Typical drawing of Trefoil clamp (Nylon-6) is attached.

DATA SHEET - A

| S.No. | Technical Parameters | | |
|-------|-----------------------------|--|------|
| 1 | Voltage grade | 3.3kV | 11kV |
| 1.1 | Application | Indoor & Outdoor | |
| 1.2 | Material | NYLON-6 / Aluminium | |
| 1.3 | Hardware | Hot Dip Galvanised / Zinc Passivated / Cadmium Plated | |
| 2. | Type and Design | Generally conforming to Drg. No. PE-DG-999-507-E015 | |
| 3. | Sizes | To suit the ODs of cables (including tolerances in ODs) as per BOQ cum price schedule. | |
| 4. | Short Circuit Current Value | 125 kA (peak) or above | |



TECHNICAL SPECIFICATION FOR
TREFOIL CLAMP

SPECIFICATION NO. PE-TS-417--507-E015

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SECTION-II

STANDARD TECHNICAL REQUIREMENTS



TECHNICAL SPECIFICATION FOR TREFOIL CLAMP

SPECIFICATION NO. PE-TS-426-507-E015

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SECTION II

REVISION 0

DATE: 16.07.2021

Sheet 1 of 2

1.0 CODES AND STANDARDS

- 1.1 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.
- 1.2 The design, material, construction, manufacture, inspection and testing of Trefoil clamp shall conform to the latest revision of relevant standards and codes of practices.

2.0 TECHNICAL REQUIREMENTS

- 2.1 Technical particulars of Trefoil Clamp are specified in Datasheet-A.
- 2.2 The trefoil clamps shall be designed & manufactured in accordance with the best engineering practices and shall be suitable for intended purpose.
- 2.3 The Nylon-6/Aluminium trefoil clamps shall meet the following requirements
 - a) High mechanical strength
 - b) Resistance to chemicals
 - c) Non hygroscopic
 - d) Fire retardant
- 2.4 Bolts, nuts & washers used shall be hot dip galvanised / zinc passivated / cadmium plated.

3.0 QUALITY ASSURANCE, TESTING & INSPECTION

- 3.1 Bidder shall confirm compliance with the BHEL's Standard Quality Plan (PE-QP-999-507-E009) as attached with the specification without any deviations. At contract stage, the successful bidder shall submit the Quality Plan for BHEL/ ultimate customer's approval. In case bidder has reference Quality Plan 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 minor changes during QP approval.
- 3.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved Quality Plan.
- 3.3 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 equipments & components shall be deemed to be included in the bid price.
- 3.4 The bidder shall furnish the reports of all the type tests carried out, which shall conform to the latest revision of relevant standards. 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.



TECHNICAL SPECIFICATION FOR
TREFOIL CLAMP

SPECIFICATION NO. PE-TS-426-507-E015

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SECTION II

REVISION 0

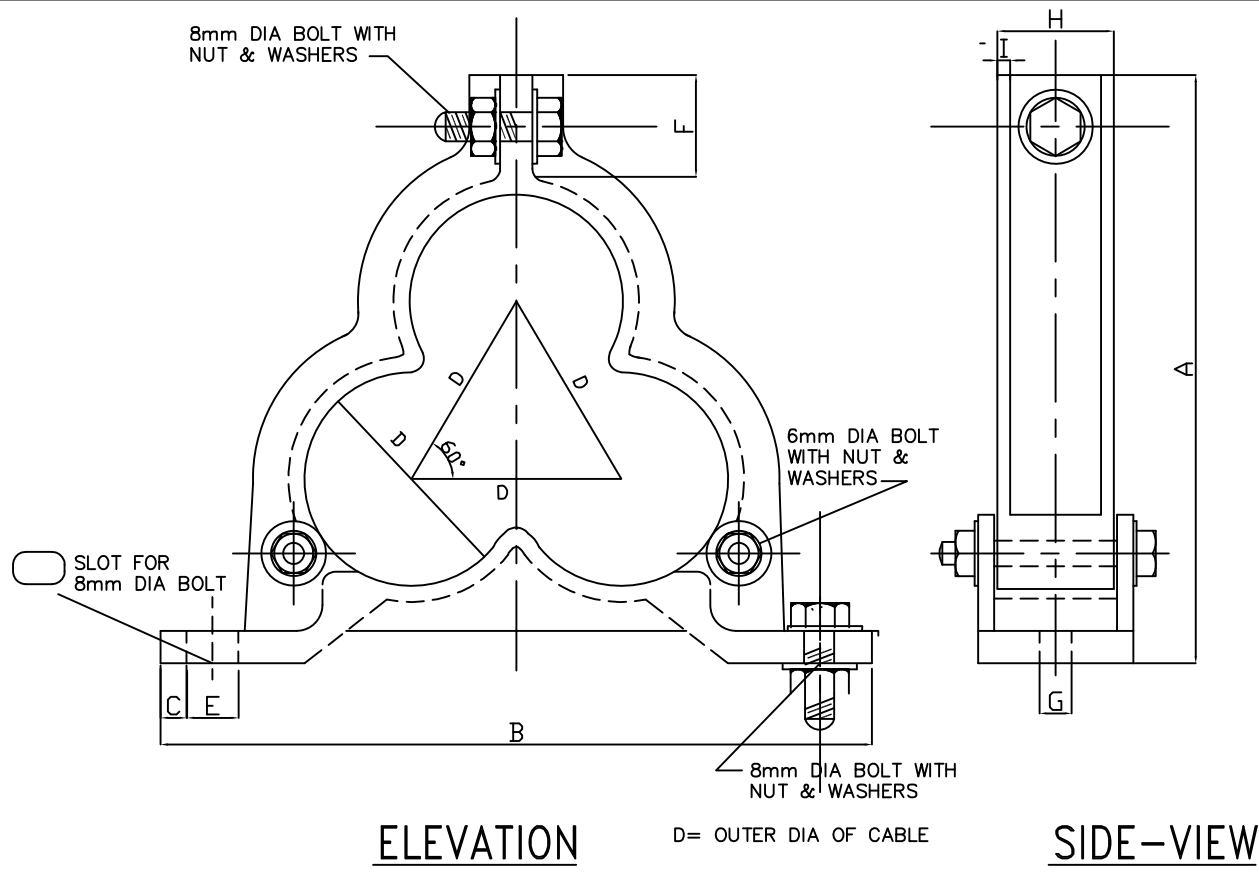
DATE: 16.07.2021

Sheet 2 of 2

3.5 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.

4.0 PACKING

Trefoil Clamp shall be packed in strong plastic bags/ strong card board container/ gunny bags to protect it against damage during transit, storage for prolonged periods and handling. It shall have proper marking over the box for easy identification.



ELEVATION

D= OUTER DIA OF CABLE

SIDE-VIEW

| A | B | C | D | E | F | G | H | I | CABLE SIZE |
|---|---|---|---|---|---|---|---|---|------------|
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

NOTES:-

1. TREFOIL CLAMPS SHALL BE OF MOULDED TYPE OF NYLON MATERIAL (NYLON-6) TYPE.
2. ALL SHARP EDGES, CORNERS AND ENDS SHALL BE ROUNDED SMOOTH.
3. ALL BOLTS, NUTS & WASHERS SHALL BE HOT DIP GALVANISED/ZINC PASSIVATED/CADMIUM PLATED.
4. MOULDING/ CASTING TOLERANCE OF TREFOIL CLAMPS SHALL BE LIMITED TO ±5%.
5. ALL DIMENSIONS ARE IN MM.
6. ALL BOLTS WITH NUTS AND WASHERS REQUIRED FOR ASSEMBLING TREFOIL CLAMP & FOR FIXING OVER CABLE TRAY SHALL BE IN VENDOR'S SCOPE & SHALL BE SUPPLIED ALONG WITH TREFOIL CLAMP.


| | | | |
|------------------|-------------|-------------|--|
| REVISIONS | | | |
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| | | | |
| | NAME | DATE | |

DRG. DESCRIPTION
TYPICAL DETAIL OF CABLE TREFOIL CLAMP


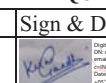
DRG. NO. PE-DG-999-507-E015



BHARAT HEAVY ELECTRICALS LTD.
PROJECT ENGINEERING MANAGEMENT
NOIDA


| | | | | | | | | | | | | | |
|--|--|------------------------------|--|-----------------|--|-------------------------------------|--|--|--|------------------|--|--|--|
|  | MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS | STANDARD QUALITY PLAN | | | | SPEC. NO : | | | | DATE: | | | |
| | | CUSTOMER : | | | | QP NO.: PE-QP-999-507-E009, REV. 01 | | | | DATE: 31.07.2020 | | | |
| | | PROJECT: | | | | PO NO.: | | | | DATE: | | | |
| | | ITEM: TREFOIL CLAMPS | | SYSTEM: CABLING | | SECTION: II | | | | SHEET 1 OF 2 | | | |

| SL NO. | COMPONENT & OPERATIONS | CHARACTERISTICS | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | | AGENCY | | | | REMARKS |
|---------------------------|------------------------|--------------------------|-------|---------------|---------------------------|---------------------------|------------------------|--|------------------|---|--------|----|---|--------------|---------|
| | | | | | M | C/ N | | | | * | D | ** | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 | | | | | | |
| 1.0 RAW MATERIAL | | | | | | | | | | | | | | | |
| 1.1 | NYLONE-6 | 1. TENSILE STRENGTH | MA | PHYSICAL TEST | LOT WISE | - | MANUFACTURERS STANDARD | MANUFACTURERS STANDARD/SUPPLIER TEST CERTIFICATE | TEST CERTIFICATE | √ | P/V | V | V | | |
| | | 2.MELTING POINT | MA | PHYSICAL TEST | LOT WISE | - | MANUFACTURERS STANDARD | MANUFACTURERS STANDARD | TEST CERTIFICATE | √ | P | V | V | | |
| 2.0 FINISHED ITEMS | | | | | | | | | | | | | | | |
| 2.1 | TREFOIL CLAMPS | 1. FINISH | MA | VISUAL | IS 2500 (PART 1) LEVEL S4 | IS 2500 (PART 1) LEVEL S4 | BHEL APPROVED DRG. | BHEL APPROVED DRG. | INSP.REP ORT | √ | P | W | W | | |
| | | 2. DIMENSION | MA | MEASUREMENT | IS 2500 (PART 1) LEVEL S4 | IS 2500 (PART 1) LEVEL S4 | BHEL APPROVED DRG. | BHEL APPROVED DRG. | INSP.REP ORT | √ | P | W | W | | |
| | | 3.TEMPERATURE CYCLE TEST | MA | PHYSICAL TEST | 3 NOS. OF EACH SIZE | 3 NOS. OF EACH SIZE | REFER NOTE - 1 | REFER NOTE - 1 | INSP.REP ORT | √ | P | W | W | | |
| | | 4.LOAD BEARING TEST | MA | PHYSICAL TEST | 3 NOS. OF EACH SIZE | 3 NOS. OF EACH SIZE | REFER NOTE - 2 | REFER NOTE - 2 | INSP.REP ORT | √ | P | W | W | | |
| | | 5.PACKING | MA | VISUAL | 100% | 100% | BHEL APPROVED DRG. | BHEL APPROVED DRG. | INSP.REP ORT | √ | P | W | - | Refer note-3 | |

| BHEL | | | | | |
|--------------|---|---------------|---|-------------|--------------|
| ENGINEERING | | | QUALITY | | |
| Prepared by: | Sign & Date | Name | Checked by: | Sign & Date | Name |
| MANISH |  | MANISH SHUKLA |  | | R.K. JAISWAL |
| Reviewed by: | | | Digitally signed by RITESH KUMAR JAISWAL Date: 2020.08.06 16:43:18 +05'30' | | |

| BIDDER/ SUPPLIER | |
|------------------|------|
| Sign & Date | Seal |
| | |

| FOR CUSTOMER REVIEW & APPROVAL | | | |
|--------------------------------|-------------|------|------|
| Doc No: | Sign & Date | Name | Seal |
| | | | |
| Reviewed by: | | | |
| Approved by: | | | |

| | | | | | |
|--|--|------------------------------|------------------------|--|-------------------------|
|  | MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS | STANDARD QUALITY PLAN | | SPEC. NO : | DATE: |
| | | CUSTOMER : | | QP NO.: PE-QP-999-507-E009, REV. 01 | DATE: 31.07.2020 |
| | | PROJECT: | | PO NO.: | DATE: |
| | | ITEM: TREFOIL CLAMPS | SYSTEM: CABLING | SECTION: II | SHEET 2 OF 2 |

NOTES:

1. 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.

2. 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.

3. Photographs of Trefoil clamp after packing to be sent to BHEL purchase group for review before issuing of MDCC.

4. Project specific Quality plan to be developed based on customer requirement.


5. BHEL reserves the right for conducting repeat test if required.

6. For export job, BHEL specification for seaworthy packing for export job to be followed.

7. Packing shall be suitable for storage at site in tropical climatic conditions.

8. Latest revision /year of issue of all the standards (IS/ASME/IEC etc.) indicated in the QP shall be referred.

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|--|
| LEGENDS: |
| *RECORDS, INDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, D: DOCUMENTATION |
| ** M: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, C: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, N: CUSTOMER, |
| P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE |
| MA: MAJOR, MI: MINOR, CR: CRITICAL |

| BHEL | | | | BIDDER/ SUPPLIER | | FOR CUSTOMER REVIEW & APPROVAL | | | |
|--------------|-----------------------|--------------|--------------|---|--|--------------------------------|------|------|--|
| ENGINEERING | | QUALITY | | Sign & Date | | Doc No: | | | |
| Sign & Date | Name | Sign & Date | Name | Seal | | Sign & Date | Name | Seal | |
| Prepared by: | M. J. KUMAR MEENA | Checked by: | KUNAL GANDHI |  | | Reviewed by: | | | |
| Reviewed by: | MA NISH MANISH SHUKLA | Reviewed by: | R.K. JAISWAL | Digitally signed by RITESH KUMAR JAISWAL Date: 2020.08.06 16:44:03 +05'30' | | Approved by: | | | |