

निविदा / Enquiry



भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Limited
 पारेषण व्यापार समूह / Transmission Business Group
 सामग्री प्रबंधन / Materials Management

Project : UPPTCL 765/400 KV EXTENSION AT BARA TPS

Enquiry No	Enquiry Dt	Rev No	Rev Dt	PI No	Enquiry Type	Inspection by	Due Dt	Commercial Comments	Technical Comments	Signing Authority
09Q2000163	03-Sep-19	0		09I2000212	Package		13-Sep-19	NIT TERM AND CONDITION ARE APPLICABLE.	TECHNICAL SPECIFICATION IS APPLICABLE.	RAJEEV KUMAR ROY

Document Enclosed

SN	Equipment	HSN Code	Phy Unit	Qty	Plan Dt	Comments
1	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, RIGID SPACER SUITABLE FOR QUAD BULL	0	NO	26.0000		
2	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, CORONA BELL SUITABLE FOR 4.5 INCH IPS AL TUBE	0	NO	4.0000		
3	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, BUSHING CONNECTOR SUITABLE FOR QUAD BULL	0	NO	4.0000		
4	SUPPLY- CLAMPS & CONNECTORS : 33KV, 25KA FOR 1S, 1250A, BUSHING CONNECTOR SUITABLE FOR SINGLE BERSIMIS	0	NO	4.0000		
5	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, RIGID - EXPANSION TYPE	0	NO	11.0000		
6	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, TEE CONNECTOR SUITABLE FOR QUAD BULL TO QUAD CONDUCTOR AS PER TS	0	NO	4.0000		
7	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, TEE CONNECTOR SUITABLE FOR QUAD BERSIMIS TO QUAD CONDUCTOR AS PER TS	0	NO	31.0000		
8	SUPPLY- CLAMPS & CONNECTORS : 400KV 50KA FOR 1S 2000A TEE CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS TO TWIN CONDUCTOR AS PER TS	0	NO	4.0000		
9	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, TEE CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS TO SINGLE CONDUCTOR AS PER TS	0	NO	45.0000		
10	CLAMPS & CONNECTORS CLAMPS FOR 75X12MM EARTHING STRIP ON LATTICE/PIPE STRUCTURE	0	NO	575.0000		
11	CLAMPS & CONNECTORS PG CLAMP FOR SHIELD WIRES OF DIA 10.98MM	0	NO	15.0000		
12	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, RIGID - RIGID TYPE WITH TUBE BREAK	0	NO	14.0000		
13	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, RIGID THROUGH TYPE	0	NO	7.0000		

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SN	Equipment	HSN Code	Phy Unit	Qty	Plan Dt	Comments
14	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, SLIDING THROUGH TYPE	0	NO	34.0000		
15	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, END CAP SUITABLE FOR 3 INCH IPS AL TUBE	0	NO	40.0000		
16	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, WELDING SLEEVE SUITABLE FOR 3 INCH IPS AL TUBE	0	NO	38.0000		
17	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, TEE CONNECTOR SUITABLE FOR AL TUBE 4.5 INCH IPS TO QUAD CONDUCTOR AS PER TS	0	NO	7.0000		
18	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, TEE CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS TO QUAD CONDUCTOR AS PER TS	0	NO	22.0000		
19	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 2500A, ISOLATOR (HCB) CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, EXPANSION TYPE	0	NO	10.0000		
20	SUPPLY- CLAMPS & CONNECTORS : 400KV 50KA FOR 1S 2000A ISOLATOR (HCB) CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, RIGID TYPE	0	NO	16.0000		
21	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, CB CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, EXPANSION TYPE	0	NO	13.0000		
22	SUPPLY- CLAMPS & CONNECTORS : STRAIN CLAMP FOR SHIELD WIRE 10.98MM DIA	0	NO	11.0000		
23	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, ISOLATOR (KNEE TYPE) CONNECTOR SUITABLE FOR AL TUBE 4.5 INCH IPS, RIGID TYPE	0	NO	4.0000		
24	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, ISOLATOR (KNEE TYPE) CONNECTOR SUITABLE FOR QUAD BULL	0	NO	4.0000		
25	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, BPI CONNECTOR SUITABLE FOR AL TUBE 4.5 INCH IPS, SLIDING THROUGH TYPE	0	NO	4.0000		
26	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, WELDING SLEEVE SUITABLE FOR 4.5 INCH IPS AL TUBE	0	NO	7.0000		
27	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 2500A, ISOLATOR (HCB) CONNECTOR SUITABLE FOR QUAD BERSIMIS	0	NO	13.0000		
28	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, CT CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, RIGID TYPE	0	NO	13.0000		
29	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, BPI CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, RIGID - EXPANSION TYPE	0	NO	30.0000		
30	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, BPI CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, RIGID - RIGID TYPE WITH TUBE BREAK	0	NO	7.0000		
31	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, BPI CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, SLIDING THROUGH TYPE	0	NO	19.0000		
32	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, BUSHING CONNECTOR SUITABLE FOR QUAD BERSIMIS	0	NO	4.0000		
33	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, FLEXIBLE SPACER SUITABLE FOR QUAD BERSIMIS	0	NO	80.0000		
34	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, RIGID SPACER SUITABLE FOR QUAD BERSIMIS	0	NO	70.0000		
35	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, CORONA BELL SUITABLE FOR 4 INCH IPS AL TUBE	0	NO	19.0000		
36	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, WELDING SLEEVE SUITABLE FOR 4 INCH IPS AL TUBE	0	NO	55.0000		
37	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BUSHING CONNECTOR SUITABLE FOR SINGLE BERSIMIS	0	NO	7.0000		

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SN	Equipment	HSN Code	Phy Unit	Qty	Plan Dt	Comments
38	CLAMPS & CONNECTORS CLAMP FOR 10.98MM DIA SHIELD WIRE ON LATTICE / PIPE STRUCTURE	0	NO	125.0000		
39	CLAMPS & CONNECTORS PAD CONNECTOR TO SUIT 10.98MM DIA GS WIRE AND 75X12 MM GS FLAT	0	NO	8.0000		

You are requested to submit your most competitive offer so as to reach us positively by the tender opening date & time. THE TENDERS NOT RECEIVED WITHIN SCHEDULED DATE AND TIME ARE LIKELY TO BE IGNORED. BHEL shall not be responsible for any postal delay.

In your own interest, you are advised to carefully read "the instructions to bidders". Incomplete bids and/or bids not complying with tender conditions shall be treated as non-responsive and are likely to be ignored.

In case Tender Documents are not received within 7 days of this E-mail message, intimate BHEL accordingly. If no intimation is received, it will be considered that you have received tender enquiry and delay in submission offer due to late receipt of tender documents will not be entertained.

You are requested to submit your most competitive offer as stated in Terms & conditions.

BHEL reserves the right to opt for reverse auction for obtaining best prices.

Offers Through E-MAIL / FAX / E-Procurement Portal:

WHOSOEVER DESIRES TO SEND OFFERS ON THEIR OWN RISK (COMPLETE IN ALL RESPECTS) VIA E-MAIL or FAX HAVE TO SEND THE OFFERS TO THE COMMON E-MAIL ADDRESS tenderbox@bhel.in or 0120-6748581 FAX or bhel.abc.procure.com as instructed.

THE RECEIVED EMAIL OFFERS WILL BE PRINTED BY PURCHASE COORDINATOR AND PUT THEM INTO COVERS AS PER CONVENTIONAL METHOD FOR TENDER OPENING I.E., TECHNO COMMERCIAL & PRICE OFFER SHALL BE PUT INTO TWO SEPARATE COVERS AND BOTH THE COVERS ARE KEPT IN THIRD COVER DULY SUPER SCRIBING ENQY. NO. AND DUE DATE.

OFFERS SENT TO ANY OTHER E-MAIL ID or FAX NO AND INCOMPLETE OFFERS SHALL NOT BE CONSIDERED FOR EVALUATION PURPOSE.

It is suggested that the bidders are advised to send the files with 'password protection'.

The venders who has sent offers with password, the passwords are to be forwarded to another email id: tenderbox@bhel.in

Please acknowledge the receipt of tender enquiry and fax back this letter by ticking the appropriate item below.

भारत हेवी इलेक्ट्रिकल्स लिमिटेड के लिए / for BHARAT HEAVY ELECTRICALS LTD

We acknowledge the receipt of tender.

- (a) The offer against subject enquiry shall be submitted by the scheduled date and time.
- (b) We regret to quote. The item in reference is out of our manufacturing range.
- (c) We regret because of our prior commitments.
- (d) Any other reason.

To
A K Chowdhary
Sr Dy General Manager
BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP
TOWER-A, 5th Floor,
Advant Navis IT Business Park,
Plot No-7, Sector-142, Expressway Noida
Noida-201305
Distt. Gautam BudhNagar, U.P

हस्ताक्षर और निविदाकार की सील / Signature and Seal of Tenderer

3/4/15

Ph: 0120-6748471
Fax: 0120-6748581

Enquiry No : 09Q2000163 Enquiry Dt : 03-Sep-19

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21-7
03/09/19
राजीव कुमार रॉय / Rajeev Kumar Roy
प्रबंधक (टी.बी.एस.) / Manager (T.B.S.)
भारत हेवी इंडस्ट्रीज लि. / Bharat Heavy Industries Ltd.
5th Floor, Tower A, Sector 142, Express Highway, Gurgaon, Haryana
Plot No. 7

SPECIAL TERMS & CONDITIONS

FOR CLAMPS & CONNECTORS FOR UPPTCL BARA (EXTN) PROJECT

Enquiry No:, Dated.....

1. In case any discrepancy between the requirements mentioned under special terms & conditions and general terms & conditions, special terms and conditions shall prevail.
2. For any technical clarification, kindly contact **Mr. Neeraj Kumar, Mgr (TBEM) / Mr. Sanjeev Kumar Srivastava, DGM (TBEM)**
 BHEL, Transmission Business Group
 Tower-A, 5th Floor, Advant Navis IT Business Park
 Plot-7, Sector-142, Expressway Noida, Noida-201305, UP, India
 Phone: +91 (0) 0120- 6748538/8517.
 Fax: +91 (0) 0120 – 6748580.
 e-mail : neerajkumar/sanjeev.srivastava@bhel.in.
3. For any commercial clarification, kindly contact **Rajeev Kumar Roy, Manager (TBMM);**
 BHEL, Transmission Business Group
 Tower-A, 5th Floor, Advant Navis IT Business Park
 Plot-7, Sector-142, Expressway Noida, Noida-201305, UP, India
 Phone: +91 (0) 0120- 6748484
 Fax: +91 (0) 0120 – 6748580.
 Contact No. 0120 6748484; e-mail: rajeevroy@bhel.in.
4. **Bidder to submit offer directly through E-PROCUREMENT MODE ONLY.** Bidder may visit <https://bhel.abcprocure.com>. No other mode for submission of tender is acceptable. Note: Both bids (Techno-commercial Bid & Price Bid) will be opened immediate after receipt of offer.
5. **Proposed delivery plan: IMMEDIATE.** However, vendor has to examine their best possible delivery plan & mentioned in **ACTIVITY SCHEDULE** to meet the tender delivery requirement. In case, BHEL's delivery requirement is not met by vendor(s), then a chance may be given to all such vendors to review their quoted delivery schedule in line with BHEL's delivery requirement. However, if vendor fails to meet the requisite delivery plan, then BHEL reserves the right not to consider the offer of such vendor(s).
6. **Technical specification No:** BHEL technical specification no: TB-407-316-006, REV-00 is applicable. No permissible Technical Deviation has been envisaged.
8. **PERFORMANCE BG (Refer Clause no-7 of General Terms and condition):** Option-B is applicable in case not opt any option as per NIT condition.
7. **Clause No. 2.1 of general Terms & Conditions for tender Enquiry / Contract should be as follows:**

PRICES: A. all prices shall be FIRM & Ex-works price including packing & forwarding charges. No enhancement of rate for whatsoever reasons unless and until asked by BHEL shall be allowed.

SPECIAL TERMS & CONDITIONS

FOR CLAMPS & CONNECTORS FOR UPPTCL BARA (EXTN) PROJECT

Enquiry No:, Dated.....

PROJECT STATUS: Domestic in nature. GST is applicable as per prevalent law.

8. **Defect Liability (Guarantee Specific Clause) : Clause No. 2.1 of GTC (general terms & conditions for tender enquiry / Contract) should be as follows:**

The guarantee period of the equipment shall be 12 (twelve) months from the date of taking over of plant. The date of taking over of plant shall be the date of commissioning of substation for commercial use.

Note: date of taking over of plant: 07-03-2020.

9. **LIQUIDATED DAMAGES FOR DELAYED DELIVERY (Refer Clause No: 13 of GTC) should be follow as;** In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total Purchase Order value for supply (**excluding** taxes and duties, freight & insurance as applicable) per week of delay or part thereof subject to a maximum of 10% of the total Purchase Order value for supply (**excluding** taxes and duties, freight & insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD.

10. **Clause No. 33 for Reverse Auction of NIT shall be as follows:**

"BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer.

The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be

SPECIAL TERMS & CONDITIONS

FOR CLAMPS & CONNECTORS FOR UPPTCL BARA (EXTN) PROJECT

Enquiry No:, Dated.....

considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

As a reminder to the bidders, system will flash following message (in RED Color) during the course of 'online sealed bid': *"Bidders to submit online sealed bid less than or equal to their envelope sealed bid already submitted to BHEL."*

In addition to above RA guidelines, bidder note that

(A) In case where RA is conducted successfully Reverse auction shall be conducted as per existing procedure of BHEL. Ranking of bids shall be based on final price fed by respective bidder (including H1 bidder) in reverse auction process. If L1 bid is from a 'Local Supplier', L-1 bidder may be considered for further award of work. No other Bidder shall be invited to match price of L-1 Bidder

If L1 bid is not from a 'Local Supplier', the lowest evaluated bidder among the 'Local Suppliers' based on the ranking of the price after RA, will be invited to match the L1 price provided 'Local Supplier's price is within the Margin of Purchase Preference i.e. +20% of L1 price. In case such local supplier agrees to match the price of L-1 Bidder, such local supplier may be considered for further award of work. In case such lowest eligible 'Local Supplier' fails to match the L1 price, the eligible 'Local Supplier' with the next higher bid within the Margin of Purchase Preference (i.e. 20% of L-1 Price) as above shall be invited to match the L1 price, and so on, and may be considered for award of work accordingly. In case none of the 'Local Suppliers' within the Margin of Purchase Preference (i.e. 20% of L-1 price) matches the L1 price, then the L1 bidder may be considered for award of work.

(B) In case where RA is failed, Price bid shall be opened as per reverse auction procedure of BHEL and based on the same make in India policy shall be implemented.

11. PRICE BID FORMAT: Vendor to quote as per specified price format of NIT, otherwise their offer shall be liable to be rejected.

12. IMPORTANT INSTRUCTION:

- Final acceptance of technical qualified vendor for placement of order is subject to approval of CUSTOMER.
- Bidder who are not approved by customer, needs to submit complete credential as per **ANNEXURE-I (Clause no: 6.7)** including the following documents for approval from CUSTOMER & placement of order is subject to approval of CUSTOMER.
 - i. Vendor approval letter from customers like UPPTCL /PGCIL/NTPC/ and other public and state utilities.
 - ii. Proof of supplies (PO/work order copies of above customers).
 - iii. Performance certificate (wherever applicable).
 - iv. Company profile
 - v. Financial status etc.
- All boxes / Containers are to be distinctly marked with boldly written "TBG" mark on it.

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SPECIAL TERMS & CONDITIONS

FOR CLAMPS & CONNECTORS FOR UPPTCL BARA (EXTN) PROJECT

Enquiry No:, Dated.....

- PO/LOI shall be placed to L1 bidder project wise. However evaluation shall be done based on overall quantity as per NIT.

13. Promotion of MAKE IN INDIA: For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent orders issued by the respective nodal ministry shall be applicable even if issued after issue of this NIT but before finalization of contract/PO/VO against this NIT.

In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and/ or local content in respect of this procurement, same shall be applicable. Preference to Make in India will be as per the Public Procurement (Preference to Make in India), Order 2017 available in the following link:

http://dipp.nic.in/sites/default/files/publicProcurement_MakeinIndia_15June2017.pdf

http://dipp.nic.in/sites/default/files/Revised-PPP-MII-Order-2017_28052018.pdf

For this procurement, Public Procurement (Preference to Make in India) Order, 2017" dated 15/06/2017 & 28/05/2018 and subsequent orders issued by respective nodal ministry shall be applicable even if issued after issue of this NIT but before finalization of contract /PO/VO against this NIT.

In the event of any nodal ministry prescribing higher and lower percentage of purchase preference and/ or local content in respect of this procurement, same shall be applicable.

Note: Bidder to submit FORMAT duly filled & signed and stamped by their authorized persons. It is mandatory against this NIT. Minimum Local content is 87% (being HVAC AIS SUB-STATION PACKAGE).

14. Following confirmation to be provided by vendor:

"We confirm that we have quoted as per specified price format provided along with this tender".

Note: BHEL reserves the right to cancel this enquiry at any point of time. Bids of only customer approved vendors will be processed.

NAME & SEAL OF TENDERER

Enclosed:

- Activity Schedule, commercial & technical deviation.
- Format of self-declaration of minimum local content (ANNEXURE-II).
- GENERAL TERMS AND CONDITION OF NIT.
- BHEL'S PRICE BID FORMATS.

**BHARAT HEAVY ELECTRICALS LTD.
(TRANSMISSION BUSINESS GROUP)**

GENERAL TERMS AND CONDITIONS FOR TENDER ENQUIRY / CONTRACT

This is to be submitted duly signed by bidder in original (NOT REQUIRED FOR OFFER SUBMITTED THROUGH EPS MODE). Clause-wise deviations and / or additional conditions / clarifications, if any, are to be brought out clearly in "Schedule of Commercial Deviation". Deviations and / or additional conditions / clarifications, if any, mentioned elsewhere in the bid / offer, shall not be considered.

Sr. No.	
1.	INSTRUCTION TO BIDDERS : 1.1 Sealed bids are invited for the items mentioned in the tender enquiry conforming to the NIT including Technical Specifications. Bids should be typed and free from overwriting and erasures. Corrections or additions / deletions, if any, must be clearly written and attested, otherwise offer may be rejected. 1.2 Bidder must ensure that their bid is submitted / dropped in the tender box on or before 14-00 Hrs. IST on the due date of opening, unless otherwise specified in the NIT, at the address as follows :- Tender Box, Materials Management, Transmission Business Group, Bharat Heavy Electricals Limited, 5th Floor, Tower-A, Advant Navis IT Business Park, Plot-7, Sector-142, Noida Expressway, Noida, Dist. G. B. Nagar, U. P. – 201305 1.3 In case tender enquiry is floated through the e-procurement system, offer / bid has to be submitted through the e-procurement system ONLY as per instructions given in the e-procurement portal (https://bhel.abcprocure.com). 1.4 The bids shall be opened at 14-30 Hrs. IST on the due date of opening, in the presence of participating bidders who may like to be present, unless otherwise specified in the NIT. Bids received late are liable for rejection. Bidders sending bids by courier or post will have to ensure that it is timely delivered at the above address. 1.5 Bids are to be submitted duly signed with seal in two parts :- a) Techno-commercial Bid (Part-I) – To be submitted in 2 sets (original + copy). A copy of Price Bid (Part-II) clearly mentioning all the necessary information as per format without prices "Un-Priced Bid" is also to be enclosed in Part-I Bid. b) Price Bid (Part-II) – To be submitted only in one set in a separate sealed envelope. This should not contain any Technical and / or Commercial Terms and Conditions. The rates should be quoted both in figures and words.

Sr. No.	
	1.6 The Part-I and Part-II Bids are to be sealed in separate envelopes and marked as "Techno-commercial Bid (Part-I)" and "Price Bid (Part-II)" respectively. Both the envelopes are to be kept in another common envelope and marked as "BID". Each envelope should be sealed and superscribed with tender enquiry no., item / package name, project name and due date of opening. Bidder's name and address shall also be mentioned on each envelope. 1.7 For any technical clarification, please contact official mentioned in the tender enquiry / NIT. 1.8 For any commercial clarification please contact official issuing tender enquiry / NIT. 1.9 Price bid (Part-II) should not contain any additional information / description other than given in "Un-Priced Bid" submitted with "Techno-commercial Bid (Part-I)" except prices, otherwise bid is liable for rejection. 1.10 Price Bid submitted along with the bid shall remain valid up to validity of offer. Any discount / revised offer submitted by the bidder on its own shall be accepted provided it is received before the due date and time of offer submission (i.e. Part-I Bid). The discount shall be applied on pro-rata basis to all items including optional items, if any, unless specified otherwise by the bidder. Discount offered shall be valid for full duration of validity of the offer including extension of validity, if any. Unsolicited Supplementary / Revised Price Bid submitted after the due date and time of offer submission (i.e. Part-I Bid), during validity period of offer, unless asked by BHEL, shall not be considered. Withdrawal of quotation by the bidder, at any stage after its opening, may entail suitable action against such bidder by BHEL. 1.11 The consultants / firm (and any of its affiliates) shall not be eligible to participate against tender enquiry for the related goods or works or services for the same project, if they were engaged by BHEL-TBG for the consultancy services. 1.12 In case any Foreign OEM / Foreign Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer / supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer / supplier or the manufacturer / supplier could bid directly but not both. In case bids are received from the manufacturer / supplier and the agent, bid received from the agent shall be ignored. 1.13 Non-conformities / errors / discrepancies in quoted prices in price bids shall be dealt as follows :- a) If, in the price structure quoted for the required goods / services / works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of BHEL there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly. b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

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	c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above. d) If there is such discrepancy in an offer as mentioned in (a), (b) & (c) above, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the BHEL, the bid is liable to be ignored. 1.14 In case the scope of the successful bidder / supplier against this tender enquiry includes Erection, Testing and Commissioning (ETC) of the equipment / material at site in addition to Supply, Purchase Order shall be placed for Supply Portion and Contract shall be separately awarded for ETC at Site Portion. General Terms and Conditions for Tender Enquiry / Contract mentioned herein shall be applicable for both Supply & ETC at Site. Additional Terms and Conditions for Tender Enquiry / Contract for Erection, Testing and Commissioning at Site "BHEL/TBG/GTC-ETC/2016 REV01" shall be applicable for ETC at Site only which is to be read in conjunction with General Terms and Conditions for Tender Enquiry / Contract mentioned herein. However, any breach of either the Purchase Order or the Contract shall be deemed to be breach of the other. 1.15 Taxes and Duties payable extra as per Clause No. 2.3 in NIT, if not specified/quoted clearly as extra shall be considered as included in Ex-works Price and therefore shall not be reimbursed. Taxes and duties not payable extra as per NIT shall be deemed to be included in Ex-works Price. 1.16 If the rates for taxes and duties in respect of the quoted materials and / or services assumed by the Supplier are less than the tariff prevailing at the time of tendering, Supplier will be responsible for such under quotations. However if the rates assumed are higher than the correct rates prevailing at the time tendering, the difference will be to the credit of BHEL. Note : Representative / official deputed by the bidder to witness tender opening must produce authorization letter for the same.
2.	PRICES : 2.1 Unless specifically indicated in the NIT, all prices shall be FIRM. No enhancement of rate for whatsoever reasons unless and until asked by BHEL shall be allowed. 2.2 Unless specifically indicated in the NIT, the prices shall be on INR basis. 2.3 Unless specifically indicated in the NIT, the prices are to be quoted on FOR (Site / Destination) basis excluding GST. The break-up of prices shall be as under :- a) Ex-works Price: Ex-works price including packing & forwarding charges.

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- b) Freight: Freight for door delivery up to destination / site / store are to be quoted separately.
- c) Insurance: Insurance for door delivery up to destination / site / store are to be quoted separately.
- d) Type Test Charges: If asked in the technical specification, it is to be quoted separately for each test.
- e) Charges for Supervision of Erection, Testing & Commissioning (ETC) at Site: To be quoted separately if specified in NIT/Price Schedule.
- f) Charges for Testing & Commissioning at Site: To be quoted separately if specified in NIT/Price Schedule.
- g) Charges for Erection, Testing & Commissioning at Site: To be quoted separately if specified in NIT/Price Schedule.
- h) Training Charges: To be quoted separately if specified in NIT/Price Schedule.

2.4 GST rates along with HSN/SAC code as applicable on Sr No (a) to (h) above is to be mentioned separately in percentage in both un-priced bid and price bid.

Note :

- i) Unless otherwise specified in the NIT, the purchase order shall be placed on Ex-works basis for Indian bidders.
- ii) Prices quoted by Indian bidders shall be in Indian Rupees only.
- iii) In case Supervision of Erection, Testing & Commissioning (ETC) at Site or Testing & Commissioning at Site or Erection, Testing & Commissioning at Site is also in scope of the bidder along with supply, bidder has to ensure that prices quoted for such services also are in line with special terms & conditions of the NIT, if any.
- iv) Unless otherwise specified in the NIT, Unloading at Site / Destination shall not be in the scope of the supplier.
- v) Prices in respect of Sr No (a) to Sr No (h) of Clause 2.3 above are to be quoted inclusive of all taxes & Duties, charges, Levies, royalty etc if any, excluding GST.

3. TERMS OF PAYMENT :

3.1 For Supply only in scope of the supplier

100% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows :

- LR / GR duly endorsed by BHEL Site Official.
- Material Receipt Certificate issued by BHEL Site Official.
- GST Compliant Tax Invoice
- Packing List (Case-wise)
- Copy of Transit Insurance Certificate from underwriters.
- Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management
- Guarantee Certificate
- Copy of Performance Bank Guarantee (PBG)
- Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order.

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	<i>Handwritten signature</i> 3.2 For Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier or Supply where Testing & Commissioning at Site is in scope of the supplier a) 95% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. · GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order. b) 5% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site if it is in the scope of the supplier or Certificate of successful completion of Testing & Commissioning at Site if it is in the scope of the supplier. · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.3 For Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier a) 90% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · LR / GR duly endorsed by BHEL Site Official. · Material Receipt Certificate issued by BHEL Site Official. · GST Compliant Tax Invoice · Packing List (Case-wise) · Copy of Transit Insurance Certificate from underwriters. · Material Inspection Clearance Certificate (MICC) issued by BHEL Quality Management · Guarantee Certificate · Copy of Performance Bank Guarantee (PBG) · Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management wherever specifically mentioned in the Purchase Order b) 10% of payment within 60 days from the date of receipt of complete invoice along with documents in 3 sets (original + 2 copies) as follows : · Certificate of successful completion of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management · Certificate of completion of final documentation as per Purchase Order / Technical Specification issued by BHEL Engineering Management 3.4 For Type Test Charges

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	100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with copy of Certificate of acceptance of Type Test Reports issued by BHEL Engineering Management in 3 sets (original + 2 copies) on completion of delivery (at site, if F&I is in scope of supplier) of main supplies (excluding spares) for which Type Tests are applicable. List of main supplies (excluding spares) for which Type Tests are applicable shall be certified by BHEL Engineering Management.
3.5	For Charges for Supervision of Erection, Testing & Commissioning at Site
	100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Supervision of Erection, Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies).
3.6	For Charges for Testing & Commissioning at Site
	100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of successful completion of Testing & Commissioning at Site issued by BHEL Site Official / Construction Management in 3 sets (Original + 2 copies).
3.7	For Training Charges
	100% payment along with applicable GST within 60 days from the date of receipt of complete GST compliant Tax invoice along with certificate of completion of training issued by BHEL Engineering Management in 3 sets (original + 2 copies).
	Note :
	i) Supplier has to submit invoice(s) as per PO or approved billing break-up of prices (if applicable as per NIT).
	ii) In case of supplies for overseas project, Material Receipt Certificate issued by BHEL Authorized Representative shall also be acceptable.
	iii) In case of Transit Insurance under Open Insurance Policy, Intimation / Declaration of Transit Insurance as per terms of the relevant Open Insurance Policy along with copy of Open Insurance Policy from underwriters shall also be acceptable.
	iv) Supplier has to ensure commencement of transit insurance from the date not later than LR / GR date.
	v) Supplier has to submit Tax Invoice(s). Supplier should ensure that Tax Invoice should comply all statutory requirements under GST Law to enable BHEL to avail input credit
	vi) MSMED Act, 2006 and the rules made thereunder as amended from time to time shall be applicable for release of payment to suppliers qualified & registered as Micro & Small Enterprises based on documents mentioned in the NIT for MSME.

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	vii) Supplier has to submit PBG (as per BHEL format) & Guarantee Certificate as per PO terms. viii) In case any shortages and / or damages in supplies, an amount calculated based on comments against Material Receipt Certificate issued by the BHEL Site Official shall be withheld from the supply payment against 3.1(a) or 3.2(a) above to be deemed fit by BHEL subject to a minimum of 10% of the total ex-works value of the invoice corresponding to the LR / GR against which any shortages and / or damages are reported. The withheld amount shall be released after the shortages and / or damages in supplies are supplied / replenished against Certification by BHEL Site Official. ix) Payment of GST component shall be made only if vendor has deposited the Tax and credit for the same is reflected in GSTN (GST Network). In case credit of the same is not reflected in GSTN, vendor may alternatively furnish BG of GST Amount for a period valid for not less than 1 month. In case of disallowance of credit /non reflection of credit in GSTN, amount will be recovered from supplier along with applicable Interest, penalty etc from any of his dues. x) If GST is payable by BHEL on reverse Charge Mechanism basis, vendor should ensure the submission of GST compliant Tax invoice immediately on dispatch/ performance of service. In case of non-compliance any additional charges towards interest, penalty etc, will be to vendors account. xi) TDS under GST Act, if applicable, shall be deducted unless Exemption Certificate If applicable, from the appropriate authority is furnished to BHEL along with Invoice.
4.	INTEREST LIABILITY : In case of any delay in payment due to any reason, BHEL shall not pay any interest on delayed payment. Also, no interest shall be payable by BHEL on the bank guarantee / deposit amount or balance payment or any other money which may become due owing to difference or misunderstanding or any dispute before any quasi judicial authority between BHEL and the Supplier / Contractor.
5.	GUARANTEE : The equipment / material supplied and services rendered (if applicable) shall be guaranteed to be free from all defects and faults in design & engineering, material, workmanship & manufacture and in full conformity with the Purchase Order / Contract, Technical Specifications & approved drawings / data sheets, if any, for 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is earlier. Wherever Erection, Testing & Commissioning at Site are also in the scope of the Supplier, the guarantee period shall be 18 months from the date of last delivery or 12 months from the date of commissioning, whichever is later. The defective equipment / material / component shall be replaced free of cost at site. Freight & Insurance during transit shall also be in the scope of the supplier / contractor. Any expenditure for dismantling and re-erection of the replaced equipment / material / component shall be to supplier's / contractor's account. All replacements during the guarantee period shall be delivered at site promptly and satisfactorily within a period not more than 45 days from the date of reporting the defect / rejection etc. In the event of the supplier / contractor failing to replace the defective equipment /

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	material / component within the time period mentioned above, BHEL may proceed to undertake the replacement of such defective equipment / material / component at the risk and cost of the supplier / contractor without prejudice to any other rights under the contract and recover the same from PBG / other dues of this Purchase Order / Contract or any other Purchase Order / Contract executed by the supplier / contractor. Note : i) In case of Illumination System, items viz. Lamps, Tubes, Ballast, Starters, Capacitors & Fuses will not be under Guarantee after commissioning. ii) In addition to the above guarantee period, Extended Guarantee / Warranty, if any, shall be as per NIT / Technical Specifications. iii) In case offer of agent of Foreign OEM / Foreign Principal is considered, as per Clause No. 1.12 above, Guarantee as mentioned above has to be provided by the Foreign OEM / Foreign Principal also.
6.	LATENT DEFECT : Liability for latent defects shall be for defects inherently lying within material or arising out of design deficiency which does not manifest itself during guarantee period but later and shall be limited to five years from the expiry of the guarantee period.
7.	PERFORMANCE BANK GUARANTEE (PBG) : Supplier shall arrange to submit Performance BG / deposit on a non-judicial stamp paper of appropriate value along with first invoice or within 60 days from placement of Purchase Order (PO) whichever is earlier, in line with one of the applicable options as follows :- <u>Option "A"</u> A single rolling PBG for Rs. 50 Lakhs initially valid for 18 months with claim period of 3 months extra over and above 18 months for all the Purchase Orders being executed for Transmission Business Group, BHEL. However, validity of the PBG shall be extended till 18 months from the date of last delivery with 3 months claim period extra over and above 18 months. Single Rolling PBG option shall not be applicable in case Ex-works value of the PO at the time of placement of PO exceeds Rs. One Crore. <u>Option "B"</u> PBG for 10% of the total Ex-works PO value, valid for 18 months from the date of last delivery with claim period of 3 months extra over and above 18 months. Ex-works PO value at the time of placement of PO shall be considered for calculation of the PBG amount. <u>Option "C"</u> In case the total Ex-works PO value at the time of placement of PO does not exceed Rs. Ten Lakhs, interest free Deposit of 10% of the total Ex-works PO value at the time of placement of PO in form of Demand Draft favouring "Bharat Heavy Electricals Limited" and payable at New Delhi / Delhi / Noida shall also be acceptable to BHEL in lieu of PBG, which shall be released after expiry of 21 months from the date of last delivery after deduction, if any, within 60 days from receipt of invoice in 3 sets (original + 2 copies) to be submitted by the supplier. Note : i) The Bank Guarantee shall be from any bank as per Annexure for List of Banks (32 Nos.). The original PBG should be sent by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida. ii) Extension of validity of the PBG in original, as per above clause, should be sent

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	by issuing Bank directly to AGM (Finance), TBG, BHEL, Noida at least 45 days before expiry of validity of the PBG. iii) Unless otherwise specified in the NIT, deviation taken for non-submission of PBG / Deposit, as applicable, shall not be accepted. iv) Supplier has to confirm one of the applicable options for submission of PBG / Deposit before placement of PO. v) In case of non-submission PBG / Deposit, as applicable, BHEL reserve the right for Risk Purchase as per terms of the NIT and impose Suspension of Business Dealings with the Supplier / Contractor. vi) BHEL reserve the right to encash the Bank Guarantee and forfeit the amount in the event of any default, failure or neglect on part of the Supplier in fulfilment of performance of the Purchase Order. vii) Value of the Bank Guarantee (at the time of submission) shall remain unchanged for any subsequent variations in Purchase Order value up to $\pm 20\%$. Beyond this variation of $\pm 20\%$, the Supplier shall arrange to enhance or may reduce the value of the Bank Guarantee accordingly for the total variation promptly. viii) Vendor to ensure submission of Certificate of Final Documentation / Confirmation regarding Non applicability of Final Documentation, as the case may be, as referred in clause No 9 regarding Final Documentation. BG shall be released only after submission of the same to BHEL TBMM.
8.	SUBMISSION OF DRAWINGS / DOCUMENTS FOR APPROVAL : Supplier shall submit the master document list within 7 days from date of Purchase Order / Contract, unless otherwise specified in the NIT, with planned dates for submission which shall be in line with activity schedule as per Purchase Order / Contract and shall be finalized with BHEL Engineering Management. Date of first submission of drawings / documents shall be certified by BHEL Engineering Management after the receipt of applicable drawings / documents (e.g. project specific cover sheet, GTP, OGA drawings, schemes, type test reports etc.) by BHEL. During detailed engineering stage, necessary hard copies of the engineering drawings / documents shall also be submitted by the supplier as per the Purchase Order / Contract requirement. The supplier shall also submit the packing drawings as per technical specifications. In case item(s) offered require any interface details of other item (not in the scope of supplier & required for operating the equipment), the supplier has to submit interfaces schedule along with submission of engineering drawings / documents. It shall be responsibility of the supplier to get the details of the interfaced item from BHEL before manufacturing to avoid any mismatch at site.
9.	FINAL DOCUMENTATION : Final documentation as called in the Technical /contract specification is to be submitted within 3 months from the date of first delivery of respective equipment, item/material. After submission of Final Documentation, BHEL Engineering Management (TBEM) will issue a Certificate of Completion of Final Documentation. Wherever Final Documentation is not applicable, BHEL Engineering Management (TBEM) will issue confirmation regarding the same, Vendor to submit the Certificate of Final Documentation / Confirmation regarding Non applicability of Final Documentation, as the case may be, to BHEL TBMM. In case of Non Submission of Certificate of Final Documentation / Confirmation regarding Non applicability of Final Documentation, BG will be liable for encashment.
10.	INSPECTION : BHEL / customer / third party shall inspect equipment / material before despatch. Stage inspection during manufacturing may also be carried out. Material to be despatched only after getting Material Despatch Clearance Certificate (MDCC) / MICC issued by BHEL.

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11.	DESPATCH DOCUMENTS : Despatch documents to be immediately sent to BHEL on despatch are as follows :- • Copy of Invoice • Copy of LR / GR in case of Indian suppliers or BL / AWB in case of foreign suppliers • Copy of Packing List (Case-wise) • Copy of Transit Insurance Certificate from underwriters • Copy of Guarantee Certificate
12.	DELIVERY PERIOD : Delivery / Completion requirement shall be mentioned in the NIT. Bidder to specify best delivery / completion period possible in weeks from the date of LOI / PO as per activity schedule for consideration by BHEL. Time required for type test, if applicable, is to be separately indicated. Note : LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) contracts shall be considered as delivery date.
13.	LIQUIDATED DAMAGES FOR DELAYED DELIVERY: In case of delay in execution of Purchase Order beyond the contractual delivery time, an amount of 0.5% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) per week of delay or part thereof subject to a maximum of 10% of the total Purchase Order value for supply (incl. taxes and duties, freight & insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. However, in case of staggered (lot-wise) contractual delivery schedule, an amount of 0.5% of the total delayed lot value for supply (incl. taxes, duties, freight & insurance as applicable) per week of delay or part thereof subject to maximum of 10% of the total delayed lot value (Incl taxes, duties, Freight & Insurance as applicable) shall be deducted as Liquidated Damages (LD) along with applicable GST (if any) on LD. Note : i) In case of any amendment / revision in P.O./WO, the LD shall be linked to the amended / revised Purchase Order / Contract value and delivery / completion time / schedule, if applicable. ii) LR / GR date or invoice date (whichever is later) for indigenous supplies and BL / AWB date for FOB / CIF (if applicable) for imported supplies shall be treated as the date of dispatch for levying LD as above. iv) However, for indigenous supply, if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 30 days, where distance from place of despatch as per LR / GR is upto 1000 Kms or if time period between date of receipt of material at site / destination by Site Official & the date of LR / GR or invoice (whichever is later) is more than 45 days, where distance from place of despatch as per LR / GR is more than 1000 Kms, such excess period shall also be

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	considered for LD purpose. iv) If, as per supplier, delay is not attributable to the supplier, delay analysis with documentary evidence may be submitted by the supplier at the earliest but not later than six months from the end of the financial year in which the payment is withheld. Based on the above details / documents submitted by the supplier, BHEL shall take final decision and if considered appropriate by BHEL, withheld amount (full or part as the case may be) shall be released, otherwise, full or balance withheld amount shall be treated as deduction of Liquidated Damages (LD) towards delayed delivery.
14.	VALIDITY OF OFFER : The offer shall be valid for 120 days from the due date of opening of tender (i.e. techno-commercial bid unless otherwise specified in the NIT). Prices of Spares, wherever they optional items, shall be valid till two years from the date of placement of PO.
15.	ACCEPTANCE / REJECTION OF TENDER : BHEL reserve the right to reject in full or part, any or all tender without assigning any reason thereof. BHEL also reserve right to vary the quantities as mentioned in the NIT. Acceptance of offer is subject to vendor approval by customer before opening of price bid. BHEL shall not be bound by any power of attorney granted by tenderer or by changes in composition of the firm made subsequent to award of order / contract. BHEL may however recognize such power of attorney and changes after obtaining proper legal advice, cost of which will be chargeable to the seller / contractor concerned. If the tenderer deliberately gives wrong information, BHEL reserves the right to reject such an offer at any stage or cancel the order / contract, if awarded, and forfeit the security deposit and bank guarantee.
16.	DEVIATION : The bids having deviation(s) w.r.t. tender are liable for rejection. However, BHEL, at its discretion, may load the prices for evaluation of offer with prior intimation to bidder.
17.	TENDER EVALUATION : Comparative statement shall be prepared and evaluated on total cost basis at destination/site (as per terms of NIT) considering overall quantity indicated in NIT unless contrary to same is specifically mentioned in the tender enquiry / NIT. Total cost for this purpose shall include cost of scope of work as mentioned in NIT along with applicable taxes & duties, and other services etc. (if applicable). GST input credit available to BHEL shall be reduced from prices while determining L1 status. In case all bidders are foreign & Port of Import (destination port) is same for all the bidders, evaluation of offers shall be done on CIF (Port of Import) basis. Otherwise, evaluation of offers shall be done on the basis of delivered cost at site /destination to BHEL. Further, in case of foreign bidders, marine freight & insurance are to be quoted separately & the purchase order may be placed on FOB basis with an option for delivery on CIF / CFR basis, if required, later. In case of foreign bidders, Exchange Rate (TT selling rate of State Bank of India) as on date of tender opening (Part-I Bid in case of two part bid) shall be considered. If the relevant day happens to be a bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken for tender evaluation.
18.	LOADING CRITERIA : List of permissible deviations & loading criteria thereof are as follows :- a) Payment Terms Base rate of SBI (as applicable on the date of bid opening / techno-commercial

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19.	ARBITRATION : In the event of any dispute emanating from and relating to this contract, the matter shall be referred to the sole arbitration of the person appointed by the competent authority of BHEL. Subject to aforesaid, the provisions of "The Arbitration and Conciliation Act, 1996" and the rules made thereunder as amended from time to time in India shall apply to the arbitration proceedings. The venue of arbitration shall be in New Delhi. Further there shall be no claim for any pre-reference or pendente-lite interest on the claims and any claim for such interest made shall be void. However, in case of contract with Public Sector Enterprise / Undertaking (PSE/PSU) or Govt. Dept., the extant guidelines of Govt. of India shall be followed.
20.	LEGAL SETTLEMENT : Indian Courts at New Delhi / Delhi shall have exclusive jurisdiction to decide the dispute, if any, arising out of or in respect of the contract(s) to which these conditions are applicable. Contract, including all matters connected with contract, shall be governed by the Indian Law, both substantive and procedural, for the time being in force including modification thereto.
21.	SUB-CONTRACTING : In case further subcontracting of BHEL Purchase Order / Contract or part thereof is envisaged by supplier, the same can be done after written permission is obtained from BHEL. However it shall not absolve the Supplier / Contractor of the responsibility of fulfilling BHEL Purchase Order / Contract requirements. In case of subcontracting of Purchase Order / Contract awarded by BHEL or part thereof without such permission, BHEL reserve the right to cancel the Purchase Order / Contract and source such material / component / equipment / system from any other agency at the risk and cost of the Supplier / Contractor. If Supplier / Contractor is an individual or proprietary concern and the individual or the proprietor dies or the partnership is dissolved or substantially affected, then unless BHEL is satisfied that legal representative of individual Supplier / Contractor or proprietor of proprietary concern and surviving partners of partnership firm are capable of carrying out and completing the Purchase Order / Contract, BHEL shall be entitled to cancel the Purchase Order / Contract as to its incomplete portion and

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	without being in any way liable to payment of any compensation to legal representative of Supplier / Contractor and / or to surviving partners of Supplier's / Contractor's firm on account of cancellation of the Purchase Order / Contract. Decision of BHEL that legal representatives of deceased Supplier / Contractor or surviving partners of the Supplier's / Contractor's firm cannot carry out and complete the Purchase Order / Contract shall be final and binding on the parties hereto. Terms and Conditions shall not get affected in case of de-merger / amalgamation / taking-over / re-constitution etc.
22.	RISK PURCHASE : In case the Supplier / Contractor fails to supply or fails to comply with terms & conditions of the Purchase Order / Contract or delivers equipment / material not of the contracted quality or fails to adhere to the contract specifications or fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery / completion period to justify that supplies shall be inordinately delayed beyond contractual delivery / completion period, BHEL reserve the right to cancel the Purchase Order / Contract either in whole or in part thereof without compensation to Supplier / Contractor and if BHEL so desires, may procure such equipment / material / items not delivered or others of similar description where equipment / material / items exactly complying with particulars are not readily procurable in the opinion of BHEL which is final and in such manner as deemed appropriate, at the risk and cost of the Supplier / Contractor and the Supplier / Contractor shall be liable to BHEL for any excess cost to BHEL. However, the Supplier / Contractor shall continue execution of the Purchase Order / Contract to the extent not cancelled under the provisions of this clause. Recovery amount on account of purchases made by BHEL at the risk and cost of Supplier / Contractor shall be the difference of total value of new Purchase Order (PO) value and total value of old Purchase Order for applicable items, where the total value of new PO is more than total value of old PO for applicable items, plus additional 15% of the total ex-works value of new PO as overheads. The Supplier / Contractor shall on no account be entitled to any gain on such risk & cost purchase. In case the purchase order (PO) value of the new PO is less than the PO value of the old PO, 15% of the total ex-works value of the new PO shall be recovered as overheads and the difference between the PO value of the old PO and the new PO shall not be considered for calculation of the recovery amount.
23.	ADJUSTMENT OF RECOVERY : Any amount payable by the Supplier / Contractor under any of the condition of this contract shall be liable to be adjusted against any amount payable to the Supplier / Contractor under any other Purchase Order / Contract awarded to him by any BHEL unit. This is without prejudice to any other action, as may be deemed fit, by BHEL.
24.	FORCE MAJEURE CONDITION : If by reason of war, civil commotion, act of god, Government restrictions, strike, lockout which are not in control of Supplier / Contractor the deliveries / services are delayed, Supplier / Contractor shall not be held responsible. If at any time during the continuance of the Purchase Order / Contract, the performance in whole or in part by either party of any obligations under the Purchase Order / Contract is prevented or delayed by reason of any war hostilities, acts of the public enemy, restrictions by Govt. of India, civil commotion, sabotage, fires, floods, explosion, epidemics, quarantine restrictions, strike, lock-outs or acts of God (hereinafter referred to as "event"), which are not in control of Supplier / Contractor or BHEL, then provided notice of the happening of such event is given by either party to the other within fifteen (15) days from the date of occurrence thereof, neither

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25.	MANUFACTURING QUALITY PLAN (MQP) : Supplier to submit approved MQP in line with requirement of BHEL/customer.
26.	SUPPLIER PERFORMANCE MONITORING AND RATING SYSTEM : BHEL reserve the right for evaluation of Supplier Performance Rating as per Supplier Performance Monitoring and Rating System of BHEL for necessary action. Details are available at BHEL Website www.bhel.com for reference.
27.	DEALING WITH BANNED SUPPLIERS / CONTRACTORS IN BHEL : Offers of the bidders, who are on the banned list, as also the offers of the bidders who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com for reference.
28.	ORDER OF PRECEDENCE : The order of precedence shall be as follows :- a) Special Terms & Conditions (STC) for Tender Enquiry / Contract, if any b) General Terms & Conditions (GTC) for Tender Enquiry / Contract & Additional General Terms & Conditions (GTC) for Tender Enquiry / Contract for Erection Testing & Commissioning (ETC) at Site, if applicable Provisions in (a) above shall prevail over (b). In case of conflict, between Technical Specifications and STC / GTC, bidder to seek necessary clarifications from BHEL concerned official as specified in NIT.
29.	PACKING : Packing shall be in conformity with specifications and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage. In case of shipment by sea or air, the packing shall be sea-worthy or air-worthy respectively and of international standards. Different types of spares i.e. start-up / commissioning spares and initial spares (mandatory spares and recommended O&M spares) are to be packed separately. Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate :- a) Case / Packing size (as applicable). b) Gross weight and net weight of each package. c) Detailed contents of the package with quantity of each item separately. Project, Item / Package Description, BHEL's PO No. with date & Case / Packing Mark should also be clearly mentioned on the Case / Packing and Packing List for identification. Also, Packing List must be duly signed & should include respective Invoice No. & LR No. Note : Foreign suppliers to furnish details to arrange inland transportation by BHEL. if

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	applicable, as follows :- i) No. of Packages ii) Size with Weight (Gross & Net) of each Package iii) No. of Containers with type & size required for inland transportation iv) Type of Cargo (Break Bulk / LCL / FCL) v) Customs Tariff No.
30.	COLOUR CODING : Aluminium stickers are required to be attached to large components but plastic sheet tags should be tied with small components, giving details like purchase order, description of the component, quantity etc. Tags should be of the colour as follows :- a) Main equipment : Yellow or White tag b) Start-up / Commissioning spares : Blue tag c) Mandatory spares : Pink or Red tag d) Recommended / O&M spares : Green tag
31.	MICRO, SMALL & MEDIUM ENTERPRISES (MSME) : MSMED Act 2006 as amended from time to time & extant regulations of Govt. of India for MSME will be applicable. Micro & Small Enterprises (MSE) can avail the intended benefits only if they submit along with the offer / bid, attested copies of either Acknowledgement of Entrepreneur Memorandum Part-II (EM-II certificate) having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (As per BHEL format where deemed validity of EM-II certificate of five years have expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of opening (for Techno-commercial Bid : Part-I in case of two part bid). Non-submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested (in original) by a Gazetted officer. Copy of Udyog Aadhaar Memorandum with Acknowledgement of Ministry of Micro, Small & Medium Enterprises should also be furnished.
32.	BUSINESS ETHICS / SUSPENSION OF BUSINESS DEALINGS WITH SUPPLIERS / CONTRACTORS : If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution, indulges in malpractices cheating, bribery, fraud or other misconduct or formation of cartel so as to influence the bidding process or influences the price or fails to perform or is in default without any reasonable cause etc or performs any act considered objectionable as per extant guidelines, action may be taken against such bidders/supplier/contractor as per extant "Guidelines for Suspension of Business Dealings with Suppliers/Contractors". Abridged version of same is available at BHEL website (www.bhel.com) on "Supplier Registration" Page.
33.	REVERSE AUCTION : BHEL reserve the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder or price bid submitted by the bidder through e-procurement system. This will be decided after techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. In case BHEL decides to go for Reverse Auction, only those bidders who have given their unconditional acceptance to participate in RA will be allowed to participate in the Reverse Auction. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit "online sealed bid" in the

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34.	Reverse Auction. Non-submission of "online sealed bid" by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue. General Terms and Conditions of RA are available at Annexure. Business Rules for RA shall be sent to the bidders before conducting RA. Abridged Version of "Common Guidelines for Conducting Reverse Auction" may also be seen at BHEL website (www.bhel.com) on "Supplier Registration" Page & "Tender Notifications" Page. INTEGRITY PACT : Bidders shall have to enter into Integrity Pact with BHEL, duly signed with seal in original, if specified in NIT / RFQ failing which bidder's offer shall be liable for rejection.
35.	TERMINATION OF CONTRACT : BHEL shall have the right to cancel the Purchase Order / Contract without any financial implication to BHEL if vendor approval by end user / customer is withdrawn or in case of Suspension of Business Dealings with the Suppliers / Contractors by BHEL. BHEL shall have the right to cancel Purchase Order / Contract, wholly or in part, in case they are obliged to do so on account of any decline, diminution, curtailment or stoppage of their business and in that event, the Supplier's / Contractor's compensation claim shall be settled mutually. In case of cancellation of Purchase Order / Contract for main supply, all other associated Purchase Orders / Contracts like those for Mandatory Spares / Recommended Spares / Erection, Testing & Commissioning (ETC) / Supervision of ETC, if any, would also get cancelled.
36.	SHELF LIFE : Supplier has to inform the list of the items / sub-items which have limited shelf life like consumables or those required for the first fill and shall indicate the corresponding shelf life period in the offer. Such items / sub-items shall be manufactured / despatched only after getting formal clearance from BHEL.
37.	LIMITATION OF LIABILITY : Notwithstanding any other provisions, except in cases of wilful misconduct and / or criminal negligence / acts, a) Neither the Supplier / Contractor nor BHEL shall be liable to the other, whether in Purchase Order / Contract, tort, or otherwise, for any consequential loss or damage, loss of use, loss of production or loss of profits or interest costs, provided however that this exclusion shall not apply to any obligation of the Supplier / Contractor to pay Liquidated Damages to the BHEL and b) Notwithstanding any other provisions incorporated elsewhere in the contract, the aggregate liability of the Contractor in respect of this contract, whether under the Contract, in tort or otherwise, shall not exceed total Contract Price, provided however that this limitation shall not apply to any obligation of the Vendor to indemnify BHEL with respect to Patent Infringement or Intellectual Property Rights.
38.	SHORTAGES / DAMAGES : a) Against Supply only or Supply where Supervision of Erection, Testing & Commissioning (ETC) at Site or Supply where Testing & Commissioning at Site is in scope of the supplier : Any shortages and / or damages in supplies shall be supplied / replenished free of cost by the supplier as early as possible but not later than 30 days from the

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	date of intimation by BHEL to the supplier. b) Against Supply where Erection, Testing & Commissioning (ETC) at Site is in scope of the supplier : Any shortages and / or damages in supplies and during handling / storage, erection, testing and commissioning at site shall be supplied / replenished free of cost by the Supplier / Contractor, as early as possible, to meet the contractual completion time / schedule. Note: There shall not be any extension in the contractual delivery time / schedule due to any shortages and / or damages in supplies.
39.	VARIATION OF CONTRACT VALUE / QUANTITY VARIATION : BHEL shall have the right to variation in quantities of items within $\pm 30\%$ of the total Purchase Order / Contract value at the time of placement of PO or award of Contract on overall basis for all amendments together within two years from the date of original Purchase Order / Contract or completion of execution of the Purchase Order / Contract whichever is earlier but quantities of individual items may vary to any extent or may get deleted unless otherwise specified in the technical specifications. No compensation is payable due to variation in the quantities and the Supplier / Contractor shall be bound to accept the same the contracted prices / rates without any escalation. However, if the Purchase Order / Contract is on "Lumpsum" basis, no variation of Purchase Order / Contract value shall be admissible to the Supplier / Contractor within the scope of Purchase Order / Contract, as long as the inputs remain unchanged.
40.	STATUTORY VARIATION : GST rates prevailing at the time of dispatch of goods/ completion of services shall be payable by BHEL. All other taxes, duties, charges, royalty, cess, other levies shall be deemed to be included in the Ex Works Prices /Charges quoted by bidders and no variations shall be payable in respect thereof . No other variations such as on customs duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the BHEL. Notwithstanding anything above, where the actual completion of the supply / services occurs beyond the period stipulated in the Purchase Order / Contract or any extension thereof, variations referred to above, will be limited to the rates prevailing on the dates of such agreed completion periods only. For variations after the agreed completion periods, the Supplier / Contractor alone shall bear the impact for the upward revisions and for downward revisions BHEL shall be given the benefit of reduction in applicable taxes /GST. This will be without prejudice to the levy of liquidated damages for delay in delivery / completion. If new tax is introduced by Central/ State Govt/ Municipality becomes directly applicable on items specified in Bill of Quantities/Purchase Order/Contract, full reimbursements shall be made provided it becomes applicable on items specified in Bill of Quantities. However, any additional tax implication due to delay in delivery, beyond the Contractual Delivery, attributable to supplier shall be borne by supplier.
41.	MODE OF PAYMENT : Payment shall be made directly to the Supplier / Contractor by BHEL through NEFT / RTGS.
42.	CONFIDENTIALITY : Supplier / Contractor shall, at all times, undertake to maintain complete confidentiality of all data, information, software, drawings & documents etc. belonging to BHEL and also of systems, procedures, reports, input documents, manuals, results and any other BHEL documents discussed and / or finalized during the course of execution of Purchase Order / Contract.

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43.	INDEMNIFICATION : The Supplier / Contractor shall indemnify and keep indemnified and hold harmless BHEL and its employees and officers from and against any and all claims, suits, actions or administrative proceedings, demands, losses, damages, costs and expenses and any other claim of whatsoever nature in respect of the death or injury of any person or loss of or damage to any property arising during the course and out of the execution of the Purchase Order / Contract.
44.	TITLE OF GOODS : a) Ownership of the equipment / material procured in India, shall be transferred to BHEL upon loading on to the mode of transport to be used for transportation of the said equipment / material from the works to the site / destination and upon endorsement of the dispatch documents in favour of BHEL. b) Ownership of the equipment / material to be imported into the country where the site is located, if not procured in India, shall be transferred to BHEL upon loading on the mode of transport to be used for transportation of the equipment / material from the country of origin to that country / destination and upon endorsement of despatch document in favour of BHEL. c) Notwithstanding the transfer of ownership of the equipment / material, the responsibility for care and safe custody thereof together with the risk of loss or damage thereto for whatsoever reason shall remain with the Supplier.
45.	COMPLIANCE OF STATUTORY REQUIREMENTS : The vendor shall comply with all State and Central Laws / Acts, Statutory Rules, Regulations etc., as may be enacted by the Government during the tenure of the Purchase Order / Contract and having in force and applicable to the Purchase Order / Contract and nothing shall be done by the Supplier / Contractor in contravention of any Law / Act and / or Rules / Regulations, thereunder or any amendment thereof. The Supplier / Contractor shall pay all taxes, fees, licence charges / deposits, duties, tolls, royalty, commissions or other charges which may be levied on account of any of his operations connected with the Purchase Order / Contract. In case BHEL is constrained to make any of such payments, BHEL shall recover the same from the Supplier / Contractor either from moneys due to him or otherwise as deemed fit.
46.	ACCEPTANCE OF ORDER : Supplier should acknowledge and accept the Letter of Award / Purchase Order issued by BHEL within 7 days of the issue of Letter of Award / Purchase Order. In case of any discrepancy / typographical error in issue of Purchase Order / Contract, the agreed terms & conditions, scope of work, rates / prices for placement of PO / award of contract shall be applicable and BHEL reserves the right to issue amendment(s) to PO / Contract for correction of discrepancies / typographical errors in the PO / Contract at a later date.
47.	FRAUD PREVENTION POLICY : The Bidder along with its associate / collaborators / sub-contractors / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.

Signature of Bidder (Authorized Signatory) with Date & Seal

erection procedures for Purchaser's consideration/ approval. It shall be sole discretion of Purchaser to accept or reject such alternatives and Purchaser's decision shall be binding on Bidder.

6.6 EQUIPMENT MAKES

6.6.1 The Bidder shall supply the equipment of his own make for which the Bidder is also the manufacturer provided such equipment/s meet the prequalifying conditions for individual equipment.

6.6.2 The bought-out items shall also meet the prequalifying conditions for individual equipment and their makes shall be as per approval of Engineer of Contract.

6.7 PREQUALIFYING CONDITIONS FOR THE SUPPLY OF INDIVIDUAL EQUIPMENTS/ MATERIALS:

6.7.1 (A). OPERATIONAL EXPERIENCE

Offered equipment should have given three years proven trouble free operational service in tropical climate. However in case of equipment manufactured in India under valid foreign collaboration, operating experience in tropical climate of offered collaborator's equipment, shall also be acceptable provided copy of valid collaboration agreement for the offered equipment is submitted with the proposal. Further in case of offer of imported equipment, three year operating experience shall be considered in respect of those areas only which are similar to the tropical conditions prevailing in India.

6.7.2 (B). MANUFACTURING EXPERIENCE

The indigenous manufacturers or their foreign collaborator must have manufactured at least 20% of the specified quantities of each item of identical or similar equipment.

6.7.3 (C). TESTING FACILITIES :

The manufacturer must have all necessary facilities at their works for carrying out such routine and acceptance tests as prescribed in the relevant ISS/IEC and any other routine and acceptance test as specified in the specification. Documentary evidence of existence of such facilities will be submitted along with the proposal.

6.7.4 (D). TYPE TEST FOR INDIGENOUS OR FULLY IMPORTED EQUIPMENTS:

The offered equipment must have been fully type tested as per relevant ISS and/or any other specified international standards, during the last 5 years period to be reckoned from the date of opening of tender. Photo copy of such type test reports/ certificates must be submitted along with the proposal. The test certificates of proto type manufactured and tested by foreign collaborators of the tenderers at their works shall not be acceptable for indigenously manufactured equipment.

7.0 PRICES

The Prices of all the items and services quoted in the Price Schedules shall be shall remain "Fixed and Firm" in all respects during the currency of the contract.

Item Name :	CLAMPS & CONNECTORS
Enquiry No. :	
Project :	UPPTCL BARA EXTN PROJECT
Type of project	Transmission / Thermal (Coal or Gas) / Hydro
Applicable percentage of Local Content	87 % (Minimum)

Format for Affidavit of Self certification regarding Minimum Local Content in line with PPP-MII order, 2017 if applicable, to be provided on a non-judicial stamp paper of Rs. 100/-.

Date: / /2019

I _____ S/o, _____ D/o, _____ W/o, _____ Resident of _____ hereby solemnly affirm and declare as under:

That I will agree to abide by the terms and conditions of the Public Procurement (Preference to Make in India) Order, 2017 (*hereinafter PPP-MII order*) of Government of India issued vide Notification No:P-45021/2/2017 -BE-II dated 15/06/2017, its revision dated 28/05/2018 and any subsequent modifications/Amendments, if any and

That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring entity/BHEL or any other Government authority for the purpose of assessing the local content of goods/services/works supplied by me for (*Enter the name of the Equipment/Item for Project*).

That the local content for all inputs which constitute the said goods/services/works has been verified by me and I am responsible for the correctness of the claims made therein.

That the goods/services/works supplied by me for (*Enter the name of the Equipment/Item for Project*) meets the 'Minimum Local Content' as defined in the PPP-MII order.

That the value addition for the purpose of meeting the 'Minimum Local Content' has been made by me at (*Enter the details of the location(s) at which value addition is made*).

That in the event of the local content of the goods/services/works mentioned herein is found to be incorrect and not meeting the prescribed Minimum Local Content criteria, based on the assessment of procuring agency (ies)/BHEL/Government Authorities for the purpose of assessing the local content, action shall be taken against me in line with the PPP-MII order and provisions of the Integrity pact/ Bidding Documents.

I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.

- i. Name and details of the Local Supplier
(Registered Office, Manufacturing unit location, nature of legal entity)
- ii. Date on which this certificate is issued
- iii. Goods/services/works for which the certificate is produced
- iv. Procuring entity to whom the certificate is furnished
- v. Percentage of local content claimed and whether it meets the Minimum Local Content prescribed
- vi. Name and contact details of the unit of the Local Supplier (s)
- vii. Sale Price of the product
- viii. Ex-Factory Price of the product
- ix. Freight, insurance and handling
- x. Total Bill of Material
- xi. List and total cost value of input used to manufacture the Goods/to provide services/in construction of works
- xii. List and total cost of input which are domestically sourced. Value addition certificates from suppliers, if the input is not in-house to be attached
- xiii. List and cost of inputs which are imported, directly or indirectly

For and on behalf of..... (Name of firm/entity)

Authorized signatory (To be duly authorized by the Board of Directors)

<Insert Name, Designation and Contact No.>

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SCHEDULE OF COMMERCIAL DEVIATION

This Format is to be submitted in original duly signed by bidder.
The following are the deviations/variations/exceptions from the Terms and Conditions :-

S N	CLAUSE NO. OF TERMS AND CONDITIONS	STATEMENT OF DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the Terms and Conditions.

If there is NIL deviation,even then the format to be filled as NIL DEVIATION.

Note : Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

Place :
Date :

Signature of the authorised representative of

Bidder's name :
Designation:.....
Company Seal:.....

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SCHEDULE OF TECHNICAL DEVIATION

This Format is to be submitted in original duly signed by bidder.
The following are the deviations/variations/exceptions from the Terms and Conditions :-

S N	CLAUSE NO. OF TERMS AND CONDITIONS	STATEMENT OF DEVIATION

In case, this schedule is not submitted, it will be presumed that the equipment /material to be supplied under this contract is deemed to be in compliance with the Terms and Conditions.

If there is NIL deviation,even then the format to be filled as NIL DEVIATION.

Note : Continuation Sheets of like size and format may be used as per the Bidder's Requirement and shall be annexed to this schedule.

Place :
Date :

Signature of the authorised representative of

Bidder's name :
Designation:.....
Company Seal:.....

ACTIVITY SCHEDULE FOR CLAMPS & CONNECTORS

ENQUIRY NO:....., Dated.....

SN	ACTIVITY	TIME ALLOTTED [in weeks]	CUMULATIVE TIME FROM RECEIPT OF INPUTS FROM BHEL [in weeks]	SCOPE
1.	Submission of Documents necessary for getting manufacturing clearance like drawings, Data sheet.	2	2	BY SUPPLIER
2.	Review and Approval of documents from BHEL/Customer and issue of manufacturing clearance.	2	4	BHEL SCOPE
3.	Manufacturing Time	10	14	BY SUPPLIER
4.	Inspection call	1	15	BY SUPPLIER
5.	Inspection by BHEL/Customer	1	16	BHEL SCOPE
6.	Issue of Dispatch clearance	2	18	BHEL SCOPE
7.	Dispatch	2	20	BY SUPPLIER

1. Inspection call to be issued 2 weeks in advance.
2. Supplier must ensure the completeness and correctness of the requisite documents before submission for approval. Delay in approval on account of incomplete / inadequate information shall be the responsibility of supplier.
3. Inspection call should be given in the prescribed format only. Inspection calls not in the prescribed format shall not be entertained.
4. Qty to be offered for inspection should be in accordance within Delivery-schedule – lot. BHEL reserves the right not to entertain multiple inspection calls for a Delivery – lot and delay on this account shall be the responsibility of Supplier.

Signature & Seal of

Supplier

Date:

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SCHEDULE OF PRICE BID

Enquiry No:

Date:

(BIDDERS TO STRICTLY ENSURE SUBMITTING THE PRICE BIDS IN THIS FORMAT)

PROJECT: UPPTCL BARA EXTN PROJECT

ITEM: CLAMPS & CONNECTORS

ENQUIRY NO:

SN	DESCRIPTION OF ITEM (As per Tech Spec. TB-407-316-006)	UNIT	QTY	HSN CODE	UNIT PRICE EX. WORKS (Rs.)	TOTAL EX. WORKS (Rs.)	UNIT FREIGHT & INSURANCE UP TO SITE (Rs.)	TOTAL FREIGHT & INSURANCE UP TO SITE (Rs.)	GST @..... % OF TOTAL EX- WORKS (Rs.)	GST @.....% OF (TOTAL FREIGHT & INSURANCE UP TO SITE)	TOTAL F.O.R. DESTINATION PRICE
1	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A WELDING SLEEVE SUITABLE FOR 4.5 INCH IPS AL TUBE	NO	7								
2	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, TEE CONNECTOR SUITABLE FOR QUAD BULL TO QUAD CONDUCTOR AS PER TS	NO	4								
3	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, TEE CONNECTOR SUITABLE FOR AL TUBE 4.5 INCH IPS TO QUAD CONDUCTOR AS PER TS	NO	7								
4	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, RIGID SPACER SUITABLE FOR QUAD BULL	NO	26								
5	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, ISOLATOR (KNEE TYPE) CONNECTOR SUITABLE FOR QUAD BULL	NO	4								
6	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, ISOLATOR (KNEE TYPE) CONNECTOR SUITABLE FOR AL TUBE 4.5 INCH IPS, RIGID TYPE	NO	4								
7	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, CORONA BELL SUITABLE FOR 4.5 INCH IPS AL TUBE	NO	4								
8	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, BUSHING CONNECTOR SUITABLE FOR QUAD BULL	NO	4								
9	SUPPLY- CLAMPS & CONNECTORS : 765KV, 40KA FOR 1S, 2000A, BPI CONNECTOR SUITABLE FOR AL TUBE 4.5 INCH IPS, SLIDING THROUGH TYPE	NO	4								
10	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, WELDING SLEEVE SUITABLE FOR 3 INCH IPS AL TUBE	NO	38								
11	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, TEE CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS TO SINGLE CONDUCTOR AS PER TS	NO	45								
12	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, END CAP SUITABLE FOR 3 INCH IPS AL TUBE	NO	40								
13	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BUSHING CONNECTOR SUITABLE FOR SINGLE BERSIMIS	NO	7								
14	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, SLIDING THROUGH TYPE	NO	34								
15	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, RIGID THROUGH TYPE	NO	7								
16	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, RIGID - RIGID TYPE WITH TUBE BREAK	NO	14								
17	SUPPLY- CLAMPS & CONNECTORS : 66KV, 25KA FOR 1S, 1250A, BPI CONNECTOR SUITABLE FOR AL TUBE 3 INCH IPS, RIGID - EXPANSION TYPE	NO	11								
18	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A WELDING SLEEVE SUITABLE FOR 4 INCH IPS AL TUBE	NO	55								
19	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, TEE CONNECTOR SUITABLE FOR QUAD BERSIMIS TO QUAD CONDUCTOR AS PER TS	NO	31								
20	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, TEE CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS TO QUAD CONDUCTOR AS PER TS	NO	22								
21	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, RIGID SPACER SUITABLE FOR QUAD BERSIMIS	NO	70								
22	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, FLEXIBLE SPACER SUITABLE FOR QUAD BERSIMIS	NO	80								
23	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, CT CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS RIGID TYPE	NO	13								
24	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, CORONA BELL SUITABLE FOR 4 INCH IPS AL TUBE	NO	19								
25	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, CB CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, EXPANSION TYPE	NO	13								
26	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, BUSHING CONNECTOR SUITABLE FOR QUAD BERSIMIS	NO	4								
27	SUPPLY- CLAMPS & CONNECTORS : 400KV, 50KA FOR 1S, 3150A, BPI CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, SLIDING THROUGH TYPE	NO	19								

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SCHEDULE OF PRICE BID

Enquiry No:

Date:

(BIDDERS TO STRICTLY ENSURE SUBMITTING THE PRICE BIDS IN THIS FORMAT)

PROJECT: UPPTCL BARA EXTN PROJECT

ITEM: CLAMPS & CONNECTORS

ENQUIRY NO:

SN	DESCRIPTION OF ITEM (As per Tech Spec. TB-407-316-006)	UNIT	QTY	HSN CODE	UNIT PRICE EX. WORKS (Rs.)	TOTAL EX. WORKS (Rs.)	UNIT FREIGHT & INSURANCE UP TO SITE (Rs.)	TOTAL FREIGHT & INSURANCE UP TO SITE (Rs.)	GST @% OF TOTAL EX- WORKS (Rs.)	GST @% OF (TOTAL FREIGHT & INSURANCE UP TO SITE)	TOTAL F.O.R. DESTINATION PRICE
28	SUPPLY: CLAMPS & CONNECTORS: 400KV, 50KA FOR 1S, 3150A BPI CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, RIGID - RIGID TYPE WITH TUBE BREAK	NQ	7								
29	SUPPLY: CLAMPS & CONNECTORS: 400KV, 50KA FOR 1S, 3150A BPI CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, RIGID - EXPANSION TYPE	NQ	30								
30	SUPPLY: CLAMPS & CONNECTORS: 400KV, 50KA FOR 1S, 2500A ISOLATOR (HCB) CONNECTOR SUITABLE FOR QUAD BERSIMIS	NQ	13								
31	SUPPLY: CLAMPS & CONNECTORS: 400KV, 50KA FOR 1S, 2500A ISOLATOR (HCB) CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, EXPANSION TYPE	NQ	10								
32	SUPPLY: CLAMPS & CONNECTORS: 400KV, 50KA FOR 1S, 2000A TEE CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, TQ TWIN CONDUCTOR AS PER TS	NQ	4								
33	SUPPLY: CLAMPS & CONNECTORS: 400KV, 50KA FOR 1S, 2000A ISOLATOR (HCB) CONNECTOR SUITABLE FOR AL TUBE 4 INCH IPS, RIGID TYPE	NQ	16								
	SUPPLY: CLAMPS & CONNECTORS: 33KV, 25KA FOR 1S, 1250A BUSHING CONNECTOR SUITABLE FOR SINGLE BERSIMIS	NQ	4								
35	SUPPLY: CLAMPS & CONNECTORS: STRAIN CLAMP FOR SHIELD WIRE 10 98MM DIA	NQ	11								
36	CLAMPS & CONNECTORS PG CLAMP FOR SHIELD WIRES OF DIA 10 98MM	NQ	15								
37	CLAMPS & CONNECTORS PAD CONNECTOR TO SUIT 10 98MM DIA GS WIRE AND 75X12 MM GS FLAT	NQ	8								
38	CLAMPS & CONNECTORS CLAMPS FOR 75X12MM EARTHING STRIP ON LATTICE/PIPE STRUCTURE	NQ	575								
39	CLAMPS & CONNECTORS CLAMP FOR 10 98MM DIA SHIELD WIRE ON LATTICE / PIPE STRUCTURE	NQ	125								
A	TOTAL DELIVERED COST TO BHEL=										

NOTE:

- PLEASE NOTE THAT UNPRICED COPY OF PRICE BID (i.e. WITH ALL PRICES BLANKED) SHALL BE FURNISHED ALONG WITH TECHNO-COMMERCIAL BID.
- REQUIRED COPIES OF FORMAT BE MADE & DETAILS MAY BE ANNEXED.
- THE PRICES MUST BE QUOTED IN THE PRESCRIBED UNIT ONLY.
- BHEL STANDARD SPECIFICATION NO:TB-407-316-006 IS APPLICABLE

SIGNATURE & SEAL OF TENDERER

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**BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP
ENGINEERING MANAGEMENT, NOIDA, SECTOR-142**

	BHEL Document No.		Rev		Prepared by	Checked by	Approved by																					
	TB-407-316-006		00	Name	NK	NK	SKS																					
	Type of Document		TECHNICAL SPECIFICATION		Sign	<i>[Signature]</i>	<i>[Signature]</i>																					
	Title		Clamps and Connectors		Date																							
			Group	TBEM																								
	CUSTOMER: UTTAR PRADESH TRANSMISSION CORPORATION LTD.																											
	PROJECT: Extension of 765/400kV S/S, Bara TPS (U.P.)																											
	LOI NO: 121/ESD-765kV/13/Bara/Vol-1 dated: 08/03/2019																											
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SECTION – 1

SCOPE, SPECIFIC TECHNICAL REQUIREMENTS AND QUANTITIES

1.0 SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing, loading at works and transport to site, of 765/400/66 kV Clamps and Connectors complete with all accessories.

This section covers the scope and quantities of Clamps and Connectors. The Specific Technical Requirements for the above item as specified by the customer are given in Section-2. The offered equipment shall also comply with the General Technical Requirements for the project as detailed under section-3 of this specification.

In case of any discrepancies between the requirements mentioned under Section-1/Section-2 and those specified in the Section-3, the specifications given under Section-1/Section-2 shall prevail and shall be treated as binding requirements

The scope of supplies shall be as per commercial terms and conditions enclosed separately with the enquiry.

1.1 THE EQUIPMENT IS REQUIRED FOR THE FOLLOWING PROJECT

Name of customer: Uttar Pradesh Transmission Corporation Ltd.
Name of the project: Extension of 765/400kV S/S, Bara TPS (U.P.)

Refer Section - 3 for Project Details and General Specifications.

1.2 SPECIFIC TECHNICAL REQUIREMENTS

Specific technical requirements like rated voltage, rated current, conductor details and type of connectors etc. are given in enclosed Annexure-I (Bill of Quantities for Equipment connectors). Other technical requirements for the connectors shall be as follows:

(1)	Material	765kV	400kV	66kV
(a)	For connecting ACSR Conductors	Aluminium alloy casting conforming to designation A6 of IS:617 and test shall conform to IS:617		
(b)	For connecting equipment terminals made of copper with ACSR Conductor	Bimetallic connectors made from Aluminium alloy casting, conforming to designation A6 of IS:617 with 2mm thick bimetallic lines and all test shall conform to IS:617		
(c)	For connecting G.I. wire	Galvanised mild steel shield		
(d)	Bolts, nuts and plain washers	Hot dip galvanised		
(e)	Spring washers for items 'a'	Electro galvanised mild steel suitable for atleast		

Uttar Pradesh Transmission Corporation Ltd.
Extension of 765/400kV S/S, Bara TPS (U.P.)
Technical Specification of Clamps and Connectors

Bharat Heavy Electricals Ltd.
Doc. No. TB-407-316-006, Rev 00

	to 'c'	service conditions-3 as per IS:1573		
(2)	Corona extinction voltage	508kV	320kV	---
(3)	Max. Radio interference voltage for frequency between 0.5MHz and 2 MHz	2500 micro-volt at 508kVrms	1000 microvolts at 266 kVrms	---
(4)	Fault current level(kA) for 1 second	40	50	25
(5)	Highest system voltage	800	420	72.5
(6)	Current rating	2000	3150	1250
(7)	Full wave impulse withstand voltage ((250/2500 micro sec.) dry & wet	2100kVp	1550kVp	325 kVp
(8)	Switching impulse withstand voltage ((250/2500 micro sec.) dry & wet	1550 kVp	1050 kVp	---
(9)	One minute power frequency dry withstand voltage (rms)	830kV	630kV	---
(10)	One minute power frequency dry & wet withstand voltage (rms)	---	---	140 kV
(11)	Frequency	50Hz		
(12)	Minimum thickness of any part of clamps and connector(mm)	10		

1.3 BILL OF QUANTITIES

The connectors shall be deemed to include all connector hardware along with bimetallic washers/strips/liners. 5% extra hardware and bimetallic washers/strips/liners of each type. The quantities shall be as per the enclosed Annexure-I for Bara Extension.

Please note that the quantity may vary $\pm 20\%$ at order stage. Any of the items can be completely or partly deleted.

1.4 TYPE TESTS

Bidder shall submit valid type test reports (as per relevant IEC/IS standard) for the tests carried out within last five years from the date of bid opening of Bara (02.03.2019). The reports should have been conducted on identical or similar equipment/components to those offered. The test certificates of proto type manufactured and tested by foreign collaborators of the tenderers at their works shall not be acceptable for indigenously manufactured equipment.



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In case type test reports are more than 5 years old (from 02.03.2019) or the reports of type tests are found to be technically unacceptable by BHEL/UPPCL, the type test shall be conducted by the vendor without cost and delivery implication to BHEL.

1.5 INSPECTION & TESTING

Before being fitted on the equipment, all components shall be subjected to routine tests at the Contractors factory, provided by the relevant IEC/IS standards. A detailed test report proving the successful passing of such tests shall be provided.

Prior to dispatch, the routine & acceptance tests shall be carried out on each item in accordance with the applicable IEC/IS and the material shall be offered for final inspection by BHEL and UPPCL in accordance with agreed quality plan with 3 weeks advance information. The charges for these shall be deemed to be included in the equipment price.

1.6 QUALITY PLAN

The contractor shall carry out contract works in accordance with sound quality management principles which shall include such as controls which are necessary to ensure full compliance to all requirements of the specification & applicable international standards. These quality management requirements shall apply to all activities during design, procurement, manufacturing, inspection, testing, packaging, shipping, inland transportation, storage, site erection & commissioning. Contractor shall submit detailed Quality Plan for BHEL / customer's approval.

1.7 TITLE BLOCK

The drawings / documents submitted shall be project and product specific and shall incorporate following details:

- a) Project Name : Extension of 765/400kV S/S, Bara TPS (U.P.)
- b) Customer Name : Uttar Pradesh Transmission Corporation Ltd.
- c) Contractor : BHEL
- d) Customer LOI No. : 121/ESD-765kV/13/Bara/Vol-1, Dated: 08.03.2019.



SECTION 2

GENERAL SPECIFICATION

2.1 GENERAL

This section covers the general technical requirements of Spacers, Aluminium Welding Sleeves, **Clamps and Connectors**. In case of any discrepancies between the requirements mentioned in this section and those specified in other sections of this specification, this shall prevail after Section 1 and shall be treated as binding requirements.

2.2 Applicable Standards

The spacers and clamps & connectors shall strictly conform to the following latest Indian and International standards as appropriate:

IS 617	Aluminium and aluminium alloy ingots and castings for general engineering purposes.
IS 1363 (All Parts)	Hexagon head bolts, screws and nuts of product grade C
IS 1364 (All Parts)	Hexagon head bolts, screws and nuts of product grades A and B
IS 1367 (Part I)	Technical Supply Conditions for threaded fasteners.
IS 1367 (Part 2)	Technical Supply Conditions for threaded fasteners.
IS 1367 (Part 3)	Technical Supply Conditions for threaded fasteners.
IS 1367 (Part 13)	Technical Supply Conditions for threaded fasteners.
IS 2121 (Part -1 & 2)	Specification for conductors and earthwire accessories for overhead power lines
IS 2121 (Part -3)	Specification for conductors and earthwire accessories for overhead power lines.
IS 2121 (Part -4)	Specification for conductors and earthwire accessories for overhead power lines
IS 5561	Electric power connectors.
IS 2633	Methods for testing uniformity of coating of zinc coated articles.

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IS 1573	Electroplated coating of Zinc on Iron and Steel
IS 3138	Hexagonal Bolts & Nuts (M42 to M150)
IS 4218 (Parts 1,2 & 4) IS 4218:(Part 3)	Metric Screw Threads Metric Screw Threads
IS 4218:(Part 6)	Metric Screw Threads
IS 10162	Spacers & spacer dampers for twin horizontal bundle conductors
ISO 272	Fasteners: Hexagonal Products -Width across Flats.
ISO 898	Fasteners, Screws & Studs
NEMA CC1	Electric power connectors for sub-station
NEMA CC3	Connectors for use between Aluminium or Aluminium-Copper Overhead Conductors.
IS 816	Code of practice for use of metal arc welding for general construction in mild steel.
IS 4759	Hot dip zinc coatings on structural steel and other allied products.
IS 2633	Methods for testing uniformity of coating of zinc coated articles.
IS 2629	Recommended practice for hot dip galvanising of iron and steel.

2.3 Clamps and Connectors

All the current carrying parts shall be designed and manufactured to have minimum resistance. Clamps and fittings shall be so designed that the equipment shall not be subject to any abnormal stresses due to thermal changes in conductor. All the clamps and fittings shall enable the connection to be as short as possible. Wherever possible they shall be in two separate halves. No U bolts shall be used. Corona control ring shall be of such design and shape that they will prevent visual discharge forming on the hardware assemblies. They shall have minimum thickness of 2.5mm. All similar parts, particularly the removable one shall be interchangeable with one another.

2.3.1 All power clamps and connectors shall conform to IS:5561 & NEMA CC1 and shall be made of materials listed below:

- a) For connecting ACSR Aluminum alloy casting, conforming to

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- | | | |
|--------|---|---|
| | conductors/Aluminium tube | designation A6 of IS:617 and all test shall conform to IS:617 |
| | b) For connecting equipment terminals made of copper with ACSR conductors/Aluminium tube | Bimetallic connectors made from aluminum alloy casting, conforming to designation A6 of IS:617 with 2mm thick bimetallic liner/strip and all test shall conform to IS:617 |
| | c) For connecting G.I | Galvanised mild steel shield wire |
| | d) i) Bolts, nuts & Plain, washers
ii) Spring washers for items 'a' to 'c' | i) Electro-galvanised for sizes below M12, for others hot dip galvanised.
ii) Electro-galvanised mild steel suitable for atleast service condition-3 as per IS:1573 |
| 2.3.2 | Necessary clamps and connectors shall be supplied for all equipment and connections. The requirement regarding external corona and RIV as specified for any equipment shall include its terminal fittings. If corona rings are required to meet these requirements they shall be considered as part of that equipment and included in the scope of work. | |
| 2.3.3 | Where copper to aluminium connections are required, bi-metallic clamps shall be used, which shall be properly designed to ensure that any deterioration of the connection is kept to a minimum and restricted to parts which are not current carrying or subjected to stress. The design details of the joint shall be furnished. | |
| 2.3.4 | Low voltage connectors, grounding connectors and accessories for grounding all equipment as specified in each particular case, are also included in the scope of Work. | |
| 2.3.5 | No current carrying part of any clamp shall be less than 10 mm thick. All ferrous parts shall be hot dip galvanised. Copper alloy liner of minimum 2 mm thickness shall be cast integral with aluminium body or 2 mm thick bi-metallic strips shall be provided for Bi-metallic clamps. | |
| 2.3.6 | All casting shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges and corners shall be blurred and rounded off. | |
| 2.3.7 | Flexible connectors, braids or laminated straps made for the terminal clamps for bus posts shall be suitable for both expansion or through (fixed/sliding) type connection of 4" IPS AL. tube as required. In both the cases the clamp height (top of the mounting pad to centre line of the tube) should be same. | |
| 2.3.8 | Clamp shall be designed to carry the same current as the conductor and the temperature rise shall be equal or less than that of the conductor at the specified ambient temperature. The rated current for which the clamp/connector is designed with respect to the specified reference ambient temperature, shall also be indelibly marked on each component of the clamp/connector, except on the hardware. | |
| 2.3.9 | All current carrying parts shall be designed and manufactured to have minimum contact resistance. | |
| 2.3.10 | Clamps and connectors shall be designed to be corona controlled. | |
| 2.3.11 | Bolts and nuts shall have hexagonal heads and threads as per Indian standard. Rated | |

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torque of the nuts shall be indicated on drawing.

2.3.12 For flexible connectors, braids or laminated straps shall be made from tinned copper strips or aluminium laminates depending upon the clamp. All Aluminium conductors of adequate current, mechanical stability & flexibility can also be provided.

2.3.13 **Designs:**
Responsibility of satisfactory design of the clamps/connectors to safely withstand the specified mechanical stresses and carry the rated current without exceeding the temperature rise specified, shall solely rest with the bidder.

2.3.14 **Clamps and Connectors-Tests**

Clamps and connectors should be type tested as per IS:5561 and shall also be subjected to routine tests as per IS:5561. Following type test reports shall be submitted for approval as per clause 1.4, Section-1

- i) Temperature rise test (maximum temperature rise allowed is 35°C over 50°C ambient)
- ii) Short time current test
- iii) Corona (dry) and RIV (dry) test (for 220 KV and above voltage level clamps)
- iv) Resistance test and tensile test

2.4 **SPACERS**

2.4.1 **General :**

Spacer shall conform to IS : 10162. The spacers are to be located at a suitable spacing to limit the short circuit forces as per IEC -60865. For strung buses, flexible type spacers shall be used whereas for jumpers and other connections rigid type spacers shall be used.

2.4.2 **Constructional Features**

- a) No magnetic material shall be used in the fabrication of spacers except for GI bolts and Nuts.
- b) Spacer design shall be made to take care of fixing and removing during installation and maintenance
- c) The design of the spacers shall be such that the conductor dose not come in contact with any sharp edge.

2.4.3 **Tests**

Each type of spacer shall be subjected to at least the following type tests, acceptance tests and routine tests in addition to all other tests specified in IS 10162:

A. Type Tests: Following type test reports shall be submitted for approval as per clause 1.4 of Section-1.

a) **Clamp slip tests**

The sample shall be installed on test span of twin conductor bundle string or quadruple conductor bundle string (as applicable) at a tension of 44.2kN. One of the clamps of the sample when subjected to a longitudinal pull of 2.5kN parallel to the axis of the conductor shall not slip on the conductor. The permanent displacement

between the conductor and the clamp of sample measured after removal of the load shall not exceed 1.0 mm. Similar tests be performed on the other clamps of the same sample.

- b) Fault current test as per Cl 5.14.2 of IS : 10162. Alternatively, the same can be carried by simulated short circuit method for which compressive forces shall be based on IEC-60865.

- c) Corona Extinction Voltage test (Dry)

This test shall be performed as per procedure mentioned at Annexure-A section -2. Minimum corona extinction voltage shall be 508kV (rms) line to ground for 765 kV, 320KV (rms) line to ground for 400kV, 105kV (rms) line to ground for 132kV spacers respectively.

- d) RIV Test (Dry)

This test shall be performed as per procedure mentioned at Annexure-A, Section-2. Maximum RIV level shall be as per cl. No. 2.1.1 of section -2 .

- e) Resilience test (if applicable)
- f) Tension Test
- g) Log decrement test (if applicable)
- h) Compression test.
- i) Galvanising test.

B. Acceptance Test (As per IS : 10162 (Latest Version))

- a) Visual examination
- b) Dimensional verification
- c) Movement test
- d) Clamp slip test
- e) Clamp bolt torque test (if applicable)
- f) Assembly torque test
- g) Compression test
- h) Tension test
- i) Galvanising test
- j) Hardness test for neoprene (if applicable)

The shore hardness of different points on the elastomer surface of cushion grip clamp shall be measured by shore hardness meter. It shall be between 65 to 80.

k) Ultimate Tensile Strength Test

The UTS of the retaining rods shall be measured. It shall not be less than 35 kg/Sq. Mm.

C. Routine test

- a) Visual examination
- b) Dimensional verification

2.5 Test for Aluminium Welding Sleeve

A TYPE TEST

Type test shall be conducted in accordance with IS 5082 are as follows:

- i) Chemical composition (CI 6.2)
- ii) Straightness of tube (CI 10.3 & 11.2.2)
- iii) Tensile strength testing (Mechanical test) (CI 8.1)
- iv) Conductivity (Electrical test) (CI 9.1.1). The electrical resistivity shall be determined either by direct measurement or upon machined test pieces. For determination of electrical resistivity reference may be made to IS 3635 (CI 9.1).
- v) Measurement of wall thickness and ovality of the tube shall be measured by ultrasonic method (CI 10.0)
- vi) 0.2% Proof testing on both parent metal and aluminium tube after welding (CI 8.1)
- vii) Size and dimension As per IS 2673
- viii) Elongation test

B ROUTINE TEST

In accordance with stipulations of the specification, Routine tests shall be conducted on tubular bus conductors as per IS : 5082. Also the wall thickness and ovality of the tube shall be measured by the ultrasonic method. In addition to the above tests, 0.2% proof tests on both parent metal and Aluminium tube after welding shall be conducted.

ANNEXURE-A

CORONA AND RADIO INTERFERENCE VOLTAGE (RIV) TEST

1. General

Unless otherwise stipulated, all equipment (except Auto Transformer & Shunt Reactor) together with its associated connectors, where applicable, shall be tested for external corona both by observing the voltage level for the extinction of visible corona under falling power frequency voltage and by measurement of radio interference voltage (RIV).

2. Test Levels:

The test voltage levels for measurement of external RIV and for corona extinction voltage are listed under the relevant clauses of the specification.

3. Test Methods for RIV:

- 3.1 RIV tests shall be made according to measuring circuit as per International Special-Committee on Radio Interference (CISPR) Publication 16-1(1993) Part -1. The measuring circuit shall preferably be tuned to frequency with 10% of 0.5 Mhz but other frequencies in the range of 0.5 MHz to 2 MHz may be used, the measuring frequency being recorded. The results shall be in microvolts.
- 3.2 Alternatively, RIV tests shall be in accordance with NEMA standard Publication No. 107-1964, except otherwise noted herein.
- 3.3 In measurement of, RIV, temporary additional external corona shielding may be provided. In measurements of RIV only standard fittings of identical type supplied with the equipment and a simulation of the connections as used in the actual installation will be permitted in the vicinity within 3.5 meters of terminals.
- 3.4 Ambient noise shall be measured before and after each series of tests to ensure that there is no variation in ambient noise level. If variation is present, the lowest ambient noise level will form basis for the measurements. RIV levels shall be measured at increasing and decreasing voltages of 85%, 100%, 115% and 130% of the specified RIV test voltage for all equipment unless otherwise specified. The specified RIV test voltage for 765 kV, 400 kV, 220 KV is listed in the detailed specification together with maximum permissible RIV level in microvolts.
- 3.5 The metering instruments shall be as per CISPR recommendation or equivalent device so long as it has been used by other testing authorities.
- 3.6 The RIV measurement may be made with a noise meter. A calibration procedure of the frequency to which noise meter shall be tuned shall establish the ratio of voltage at the high voltage terminal to voltage read by noise meter.

4. Test Methods for Visible Corona (Applicable for 400kV and above)

The purpose of this test is to determine the corona extinction voltage of apparatus, connectors etc. The test shall be carried out in the same manner as RIV test described above with the exception that RIV measurements are not required during test and a search technique shall be used near the onset and extinction voltage, when the test voltage is raised and lowered to determine their precise values. The test voltage shall be raised to 110% of RIV test voltage and maintained there for five minutes. In case corona inception does not take place at 110%, test shall be stopped, otherwise test shall be continued and the voltage will then be decreased slowly until all visible corona disappears. The procedure shall be repeated at least 4 times with corona inception and extinction voltage recorded each time. The corona extinction voltage for purposes of

determining compliance with the specification shall be the lowest of the four values at which visible corona (negative or positive polarity) disappears. Photographs with laboratory in complete darkness shall be taken under test conditions, at all voltage steps i.e. 85%, 100%, 115% and 130%. Additional photographs shall be taken at corona inception and extinction voltages. At least two views shall be photographed in each case using Panchromatic film with an ASA daylight rating of 400 with an exposure of two minutes at a lens aperture of f/5.6 or equivalent. The photographic process shall be such that prints are available for inspection and comparison with conditions as determined from direct observation. Photographs shall be taken from above and below the level of connector so as to show corona on bushing, insulators and all parts of energised connectors. The photographs shall be framed such that test object essentially, fills the frame with no cut-off.

For recording purpose, modern devices utilizing UV recording methods such as image intensifier may also be used.

- 4.1 The test shall be recorded on each photograph. Additional photograph shall be taken from each camera position with lights on to show the relative position of test object to facilitate precise corona location from the photographic evidence.
- 4.2 In addition to photographs of the test object preferably four photographs shall be taken of the complete test assembly showing relative positions of all the test equipment and test objects. These four photographs shall be taken from four points equally spaced around the test arrangement to show its features from all sides. Drawings of the laboratory and test set up locations shall be provided to indicate camera positions and angles. The precise location of camera shall be approved by Purchaser's inspector, after determining the best camera locations by trial energisation of test object at a voltage which results in corona.
- 4.3 The test to determine the visible corona extinction voltage need not be carried out simultaneously with test to determine RIV levels.
- 4.4 However, both test shall be carried out with the same test set up and as little time duration between tests as possible. No modification on treatment of the sample between tests will be allowed. Simultaneous RIV and visible corona extinction voltage testing may be permitted at the discretion of Purchaser's inspector if, in his opinion, it will not prejudice other test.

5. Test Records:

In addition to the information previously mentioned and the requirements specified as per CISPR or NEMA 107-1964 the following data shall be included in test report:

- a) Background noise before and after test.
- b) Detailed procedure of application of test voltage.
- c) Measurements of RIV levels expressed in micro volts at each level.
- d) Results and observations with regard to location and type of interference sources detected at each step.
- e) Test voltage shall be recorded when measured RIV passes through 100 microvolts in each direction.
- f) Onset and extinction of visual corona for each of the four tests required shall be recorded.

SECTION 3 GENERAL TECHNICAL REQUIREMENTS

1.0 GENERAL

This section stipulates the General Technical Requirements (GTR) under the Contract and will form an integral part of the Technical Specification. The provisions under this section are intended to supplement general requirements for the materials, equipments and services covered under respective equipment sections and are not exclusive. However, in case of conflict between the requirement specified in this section and requirements specified under respective equipment sections, the requirements specified under respective sections shall hold good.

It is not the intent to specify completely in technical specifications of equipments/materials all details of the design and construction of equipment. However, the equipment shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation. BHEL/UPPCL will interpret the meaning of drawing and specification and shall have the power to reject any work or material which in his judgement is not in accordance therewith. The equipment offered shall be complete with all components necessary for its effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply, irrespective of whether these are specifically brought out in this specification and/or commercial order or not.

UPTCL procures all the equipment and materials for substations, keeping into consideration the interchangeability and future extension of substation. All equipment and materials to be supplied shall conform to the UPTCL's current Bid specifications for similar equipment and materials.

2.0 COMPLETENESS OF EQUIPMENTS

2.1 Equipments furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories specified &/or normally provided with such equipment and/ or needed for erection, completion and safe operation of the equipment as required by applicable codes though they may not have been specifically detailed in the Technical Specifications. Materials and components not specifically stated in the specification but which are necessary for commissioning and satisfactory operation of the substation unless specifically excluded shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost. All similar standard components/ parts of similar standard equipment provided, shall be interchangeable with one another.

2.2 The Bidder shall supply type tested (including special test as per technical specification) equipments and materials. The test reports/details shall be furnished by the Bidder in the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable due to any design/manufacturing changes or due to noncompliance with the requirement stipulated in the Technical Specification and/or IEC/136IS, same, shall be carried out without any additional cost implication to the Purchaser. The Purchaser reserves the right to get any or all type tests conducted/ repeated. The reports for all type tests and additional type tests as per technical specification furnished by the Bidder shall be of the tests conducted within last 05(five) years prior to the date of bid opening (02.03.19). The type tests conducted should have either been conducted in accredited laboratory (accredited based on ISO/ IEC Guide 25/ 17025 or EN 45001 by the national accreditation body of the country where laboratory is located) or witnessed by UPPTCL or representative authorized by UPPTCL or Utility or representative of accredited test lab or reputed consultant.

3.0 STANDARDS

3.1 Except as modified by this Bid specification, all material and equipment shall conform to the requirement of the latest editions of relevant ISS/ IEC and other applicable standards. The equipments/ works shall be designed, engineered, manufactured, built, tested and commissioned shall be carried out in accordance with the Acts, Rules, Laws and Regulations in force in India.

3.2 In addition to meeting the specific requirements called for in the respective sections of the Technical Specification, the equipment shall also conform to the general requirement of the relevant standards which shall form an integral part of the specification. When the specific requirements stipulated in the specifications exceed or differ than those required by the applicable standards, the stipulation of the specification shall take precedence.

3.3 In the event of the Bidder offering equipment conforming to standards other than ISS/ IES standards, which ensure equivalent or better performance than that specified in the standards, the salient point of comparison between the standards adopted and relevant ISS/ IEC standards shall be indicated clearly in the proposal, along with English language version of such standard or relevant extract of the same. The equipment conforming to standards other than IS/IEC shall be subject to Purchaser's approval.

3.4 The standards mentioned in the respective equipment specifications are not mutually exclusive or complete in themselves. The equipment &/or work shall also conform to any other applicable standard, even if not specifically mentioned in these specifications.

3.5 Should the Bidder wish to depart from the provisions of the specifications, either on accounts of manufacturing practices or for any other reason, he shall clearly mention the departure and submit complete justification supported by information, drawings etc. as will enable to assess the suitability of equipment(s) offered. In the event of the Bidder's specifications, drawings, forms and tables etc. being found to disagree with the requirement of the Bid specifications at any stage, Bid specifications shall be binding, unless the departures have been duly approved in writing by the Purchaser.

4.0 PROJECT DATA

i.	Location	UTTAR PRADESH
ii.	Altitude	not exceeding 1000 Meters
iii.	Climatic Conditions	
(a)	Design maximum ambient Air Temperature	50 deg. C
(b)	Minimum ambient air temperature in shade	0 deg. C
(c)	Relative Humidity	100%Max.
(d)	Wind Load	195 Kg./ Sq.m.
(e)	Seismic Level	0.3 g
(f) I	soceraunic Level	50days/ year
(g)	Average annual rain fall	1200 mm
(h)	Hot and humid tropical Climate conducive to rust and fungus growth	

5.0 SYSTEM PARTICULARS

(i)	Rated System voltage	800kV, 420 kV, 245kV, 145kV, 36kV
(ii)	System frequency	50 Hz, This may vary by $\pm 5\%$
(iii)	Number of phases	Three

- (iv) Neutral Effectively Earthed
- (v) **Auxiliary power supply:-**
Auxiliary electrical equipment shall be suitable for operation on the following supply system:
- | | |
|--|--|
| (a) Power device (Like drive motors) | 400V, 3Phase, 4Wire 50Hz
Effectively earthed AC system. |
| (b) Lighting fixtures, space heaters, fractional Horse Power motors and control devices. | 250V, 2wire, 50Hz,
AC supply with one point grounded. |
| (c) DC alarm, Control and Protective | 2wire ungrounded DC supplies |

Devices from sub station batteries as under

- | | |
|------------------------------|-----------|
| (i) 765kV S/S | : 220V DC |
| (ii) 400 kV S/S | : 220V DC |
| (iii) 220/132kV S/S | : 110V DC |
| (iv) Communication equipment | : 48 V DC |

The above supply voltage is subject to variation as follows:

All devices must be suitable for a continuous operation over the entire range of voltage variations :

- | | |
|---------|---|
| (i) AC | Voltage may vary by $\pm 10\%$.
Frequency by $\pm 5\%$
Combined Voltage & frequency by $\pm 10\%$. |
| (ii) DC | a) 220 V may vary between 187 & 242 V
b) 110 V may vary between 93 & 121 V
c) 48 V may vary between 41 & 53 V |

6.0 SYSTEM PARAMETERS

The following system parameters shall prevail:

Sl. No.	Description of Parameters	765 kV System	400 kV System	33 kV System
1.	Nominal system voltage	765kV	400kV	33kV
2.	Maximum operating voltage of the system(rms)	800kV	420kV	36kV
3.	Rated frequency	50Hz	50Hz	50Hz
4.	No. of phase	3	3	3
5.	Rated short time current	40/50 kA for 1 Sec	40/50 kA for 1 Sec	25 kA for 3 sec
6.	Dry and wet one minute power frequency withstand voltage	830 kV	680 kV	70 kV
7.	Full wave impulse withstand voltage (1.2/50 microsec.)	2100 kVp	1550 kVp	170 kVp
8.	Corona extinction voltage	508kV	320 kV	--
9.	Max. Radio interference voltage for frequency between 0.5 MHz and 2 MHz	2500 micro-volt at 508 kV rms	1000 micro-volt at 266 kV rms	--



10.	Minimum total creepage 25mm/kV	20000 mm	10500 mm	1300 mm
11.	Min. clearances			
	Phase to phase	7600mm (for Conductor configuration) 9400mm (for rod -Conductor configuration)	4000mm (for Conductor configuration) 4200mm (for rod - Conductor configuration)	320 mm
	Phase to earth	4900mm (for Conductor structure) 6400mm (for rod- structure)	3500 mm	320 mm
	Sectional clearances	10300 mm	6500 mm	3000 mm
12.	System neutral earthing	Effectively Earthed	Effectively Earthed	Effectively Earthed

7.0 SERVICES TO BE PERFORMED BY THE EQUIPMENT

All equipments shall perform satisfactorily under various electrical, electromechanical and meteorological conditions of the installation site. All equipment shall be able to withstand all external and internal mechanical thermal and electromechanical forces due to various factors like wind load temperature variation, ice & snow (wherever applicable) short circuit etc for the equipment. The Bidder shall design the various forces which the terminal connectors of the equipment are required to withstand. All outdoor EHV equipments except marshalling kiosks shall be suitable for hot line washing. To facilitate erection of equipment, all items to be assembled at site shall be "match marked".

8.0 CLAMPS AND CONNECTORS INCLUDING TERMINAL CONNECTORS

8.1 Each equipment shall be supplied with necessary terminals and connectors as required by the design for the particular installation. The terminal connector shall be suitable for the conductor used for particular installation, which are as under as per UPPTCL's practice:

8.2 Where copper to aluminum connections are required, bimetallic clamps shall be used, which shall be properly designed to ensure that any deterioration of the connection is kept to a minimum and restricted to part which are not current carrying or subjected to stress. The design details of the joint shall be furnished to the Purchaser by the Bidder.

8.3 Low voltage connectors, grounding connectors and accessories for grounding all equipment are also included in the scope of work.

8.4 No current carrying part of any clamp shall be less than 10 mm thick. All ferrous parts shall be hot dip galvanized. Copper alloy liner of minimum 2 mm thickness shall be used with aluminum body for Bimetallic clamps.

8.5 All casting shall be free from blow holes, surface blisters cracks and cavities. Sharp edges and corners shall be blurred and rounded off.

8.6 Flexible connectors, braids or laminated straps made for the terminal clamps for bus posts shall be suitable for both expansion or through (fixed/sliding) type connection of 4" IPS AL. tube

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as required. In both the cases the clamp height (top of the mounting pad to centre line of the tube) should be same.

8.7 The clamps/ connectors shall be designed to carry the same current as the conductor and the temperature rise shall be equal or less than that of the conductor at the specified ambient temperature. The rated current for which the clamp/ connector is designed with respect to specified reference ambient temperature, shall also be indelibly marked on each component of the clamp/connector, except on hardware.

8.8 All current carrying parts shall be designed and manufactured to have minimum contact resistant.

8.9 Clamps and connectors shall be designed to be corona controlled. Corona extinction voltage for 765kV, 400kV, 220kV and 132kV class clamps shall not be less than 508,320, 156 and 105kV (rms) respectively and R.I.V. level shall not be more than specified 1000, 1000, 1000 and 500 micro volts for 765kV, 420kV, 220kV and 132Kv system at the test voltage specified.

9.0 SUPPORT STRUCTURES

9.1 The base design of all the equipments, to be installed on auxiliary structures, shall conform to the standard auxiliary structure designs presently being used in UPPTCL at 765/400/ 220/132/33kV Substations.

9.2 All equipment support structures shall be supplied along with brackets, angles, stools etc. for attaching the operating mechanism, control cabinets and marshalling box (wherever applicable) etc.

9.3 The support structures should be hot dip galvanised with minimum 610 gram/sq.m net of zinc.

10.0 COLOUR SCHEME AND CODES FOR PIPE SERVICE

The Bidder shall propose a colour scheme for the those equipments/ items for which the colour scheme has not been specified in the specification. For the approval of purchaser. The decision of Purchaser shall be final. The scheme shall include.

Finishing colour of Indoor equipment.

Finishing colour of Outdoor equipment.

Finish colour of all cubicles.

Finishing colour of various auxiliary system equipment including piping

Finishing colour of various building items.

All steel structures, plates etc. shall be painted with non-corrosive paint with a suitable primer. It may be noted that normally all electrical equipments in switchyard are painted with shade 631 of IS-5.

11.0 MATERIAL/ WORKMANSHIP

11.1 General Requirement

Where the specification does not contain references to workmanship, equipment, materials and components of the covered equipment, it is understood that the same must be new, of highest grade of the best quality of their kind, conforming to best engineering practice and suitable for the purpose for which they are intended.

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The design of the works shall be such that installation, future expansions, replacements and general maintenance may be undertaken with a minimum of time and expenses. Each component shall be designed to be consistent with its duty and suitable factors of safety, subject to mutual agreements. All joints and fastenings shall be devised, constructed and documented so that the component parts shall be accurately positioned and restrained to fulfill their required function. In general screw threads shall be standard metric threads. The use of other thread forms will only be permitted when prior approval has been obtained from the Purchaser.

Whenever possible, all similar part of the Works shall be made to gauge and shall also be made interchangeable with similar parts. All spare parts shall also be interchangeable and shall be made of the same materials and workmanship as the corresponding parts of the Equipment supplied under the Specification. Where feasible, common component units shall be employed in different pieces of equipment in order to minimize spare parts stocking requirements. All equipment of the same type and rating shall be physically and electrically interchangeable.

All materials and equipment shall be installed in strict accordance with the manufacturer's recommendation(s). Only first-class work in accordance with the best modern practices will be accepted. Installation shall be considered as being the erection of equipment at its permanent location. This, unless otherwise specified, shall include unpacking, cleaning and lifting into position, grouting, leveling, aligning, coupling of or bolting down to previously installed equipment bases/foundations, performing the alignment check and final adjustment prior to initial operation, testing and commissioning in accordance with the manufacturer's tolerances, instructions and the Specification. All factory assembled rotating machinery shall be checked for alignment and adjustments made as necessary to re-establish the manufacturer's limits. Suitable guards shall be provided for the protection of personnel on all exposed rotating and/ or moving machine parts and shall be designed for easy installation and removal for maintenance purposes. The spare equipment(s) shall be installed at designated locations and tested for healthiness.

The Bidder shall apply oil and grease of the proper specification to suit the machinery, as is necessary for the installation of the equipment. Lubricants used for installation purposes shall be drained out and the system flushed through where necessary for applying the lubricant required for operation. The Bidder shall apply all operational lubricants to the equipment installed by him.

All oil, grease and other consumables used in the Works/ Equipment shall be purchased in India unless the Bidder has any special requirement for the specific application of a type of oil or grease not available in India. In such is the case he shall declare in the proposal, where such oil or grease is available. He shall help Purchaser in establishing equivalent Indian make and Indian Bidder. The same shall be applicable to other consumables too.

A cast iron or welded steel base plate shall be provided for all rotating equipment which are to be installed on a concrete base unless otherwise agreed to by the Purchaser. Each base plate shall support the unit and its drive assembly, shall be of design with pads for anchoring the units and shall have a raised up all around and shall have threaded in air connections, of so required.

11.2 PROVISIONS FOR EXPOSURE TO HOT AND HUMID CLIMATE

Outdoor equipment supplied under the specification shall be suitable for service and storage under tropical conditions of high temperature, high humidity, heavy rainfall and environment favourable to the growth of fungi and mildew. The indoor equipments located in non-air conditioned areas shall also be of same type.

12.0 Void

13.0 FUNGI STATIC VARNISH

Besides the space heaters, special moisture and fungus resistant varnish shall be applied on parts which may be subjected or predisposed to the formation of fungi due to the presence or deposit of nutrient substances. The varnish shall not be applied to any surface of part where the treatment will interface with the operation or performance of the equipment. Such surfaces or parts shall be protected against the application of the varnish.

14.0 void

15.0 DEGREE OF PROTECTION

The enclosures of the Control Cabinets, junction boxes and Marshalling Boxes, panels etc. to be installed shall be provided with degree of protection as detailed here under:

- b) Installed out door : IP-55
- d) Installed indoor in air conditioned area : IP-31
- f) Installed in covered area : IP -52
- h) Installed indoor in non air-conditioned area where possibility of entry of water is limited: IP-41
- j) For LT Switchgear (AC & DC distribution Boards): IP-52

The degree of protection shall be in accordance with :13947 (Part-I)/ IEC-60947 (Part-I)/ IS 12063 / IEC-60529. Type test report for degree of protection test, on each type of the box shall be submitted for approval.

16.0 RATING PLATES, NAME PLATES AND LABELS

Each main and auxiliary item of substation is to have permanently attached to it in a conspicuous position a rating plate of non-corrosive material upon which is to be engraved manufacturer's name, year of manufacture, equipment name, type or serial number together with details of the loading conditions under which the item of substation in question has been designed to operate, and such diagram plates as may be required by the Purchaser. The rating plate of each equipment shall be according to IEC requirement.

All such nameplates, instructions plates, rating plates CB, CT, VT, SA, Isolators and Relay & Protection panels equipments shall be bilingual with Hindi inscription first followed by English. Alternatively two separate plates one with Hindi and the other with English inscriptions may be provided.

17.0 FIRST FILL OF CONSUMABLES, OIL AND LUBRICANTS

All the first fill of consumables such as oils, lubricants, filling compounds, touch up paints, soldering/brazing material for all copper piping of circuit breakers and essential chemicals etc. which will be required to put the equipment, covered under the scope of the specifications, into successful operation, shall be furnished by the Bidder unless specifically excluded under the exclusions in these specifications and documents.

18.0 PACKAGING AND PROTECTION

All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at site till the time of erection. The Bidder shall also submit packing details/associated drawing for any equipment/material, to facilitate the Purchaser to repack any equipment/material at a later date. The Bidder shall be responsible for any loss or damage during transportation, handling and storage due to improper



packing. Any demurrage, wharfage and other such charges claimed by the transporters, railways etc. shall be to the account of the Bidder.

All coated surfaces shall be protected against abrasion, impact, discolouration and any other damages. All exposed threaded portions shall be suitably protected with either a metallic or a non-metallic protecting device. All ends of all valves and pipings and conduit equipment connections shall be properly sealed with suitable devices to protect them from damage. The parts which are likely to get rusted, due to exposure to weather should also be properly treated and protected in a suitable manner.

19.0 SURFACE FINISH

All interiors and exteriors of tanks, control cubicles and other metal parts shall be thoroughly cleaned to remove all rust, scales, corrosion, greases or other adhering foreign matter. All steel surfaces in contact with insulating oil as far as accessible shall be painted with not less than two coats of heat resistant, oil insoluble, insulating paints. All metal surfaces exposed to atmosphere shall be given two primer coats of zinc chromate and two coats of epoxy paint with epoxy base thinner.

All metal parts not accessible for painting shall be made of corrosion resisting material. All machine finished or bright surfaces shall be coated with a suitable preventive compound and suitably wrapped or otherwise protected. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limit specified.

The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling. All external painting shall be as per shade No. 631 of IS: 5.

20.0 HOT DIP GALVANISING

All ferrous parts including all sizes of nuts, bolts, plain and spring washers, support channels, structures, shall be hot dip galvanized conforming to latest version of IS: 2629 or any other equivalent authoritative standard. However, hardware less than M12 size shall be electro-galvanized. Minimum weight of zinc coating shall be 610 gm/ sq.mm and minimum thickness of coating shall be 85 microns for all items thicker than 6 mm. For items lower than 6mm thickness, requirement of coating shall be as per relevant ASTM. For surface which shall be embedded in concrete, the zinc coating shall be 610 gm/sq. m minimum.

The galvanized surfaces shall have a continuous and uniform thick coating of zinc, firmly adhering to the surface of steel. The finished surface shall be clean and smooth and shall be free from defects like discoloured patches, bare spots, unevenness of coating, spelter which is loosely attached to the steel globules, spiky deposits, blistered surface, flaking or peeling off, etc. The presence of any of these defects noticed on visual or microscopic inspection shall render the material liable to rejection. After galvanizing, no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization.

Galvanised material must be transported properly to ensure that galvanised surfaces are not damaged during transit. Application of zinc rich paint at site shall not be allowed.

21.0 PROTECTIVE GUARDS

Suitable guards shall be provided for protection of personnel on all exposed rotation and/of moving machine parts. All such guards with necessary spares and accessories shall be designed for easy installation and removal for maintenance purpose.

22.0 TOOLS AND TACKLES

The Bidder shall supply with the equipment one complete set of all special tools and tackles for the erection, assembly, dis-assembly and maintenance of the equipment. However, these tools and tackles shall be separately packed and brought on to site.

23.0 CONTROL CABINETS, JUNCTION BOXES, TERMINAL BOXES AND MARSHALLING BOXES FOR OUTDOOR EQUIPMENT

23.1 All types of boxes, cabinets etc. shall generally conform to and be tested in accordance with IS-5039/ IS-8623, IEC-60439, as applicable, and the clauses given below.

23.2 Control cabinets, junction boxes, marshalling boxes and terminal boxes shall be made of sheet steel or aluminum enclosure and shall be dust, water and vermin proof. Sheet steel used shall be at least 2.0 mm thick cold rolled or 2.5 mm hot rolled. The box shall be properly braced to prevent wobbling. There shall be sufficient reinforcement to provide level surfaces, resistance to vibrations and rigidity during transportation and installation. In case of aluminum enclosed box, the thickness of aluminum shall be such that it provides adequate rigidity and long life as comparable with sheet steel of specified thickness.

23.3 Cabinet/boxes shall be free standing floor mounting type, wall mounting type or pedestal mounting type as per requirements. A canopy and sealing arrangements for operating rods shall be provided in marshalling boxes/ Control cabinets to prevent ingress of rain water.

23.4 Cabinet/boxes shall be provided with double hinged doors with padlocking arrangements. The distance between two hinges shall be adequate to ensure uniform sealing pressure against atmosphere. The quality of the gasket shall be such that it does not get damaged/cracked during the operation of the equipment.

23.5 All doors, removable covers and plates shall be provided gasket all around with suitably profiled EPDM/Neoprene gaskets. The gasket shall be tested in accordance with approved quality plan, IS:11149 and IS:3400. The quality of gasket shall be such that it does not get damaged/cracked during 10(ten) years of operation of the equipment or its major overhaul whichever is earlier. All gasketed surfaces shall be smooth straight and reinforced if necessary to minimize distortion and to make a tight seal. Ventilating Louvers, if provided, shall have screen and filters, the screen shall be fine wire mesh made of brass.

23.6 All boxes/ cabinets shall be designed for the entry of cables from bottom by means of weather proof and dust-proof connections. Boxes and cabinets shall be designed with generous clearances to avoid interference between the wiring entering from below and any terminal blocks or accessories mounted within the box or cabinet. Suitable cable gland plate projecting at least 150 mm above the base of the marshalling kiosk/box shall be provided for this purpose along with the proper blanking plates. Necessary number of cable glands shall be supplied and fitted on this gland plate. Gland plate shall have provision for some future glands to be provided later, if required.

23.7 A 240V, single phase, 50 Hz, 15 amp AC plug and socket shall be provided in the cabinet with ON-OFF switch for connection of hand lamps. Plug and socket shall be of industrial grade.



23.8 For illumination, a 20 Watts fluorescent tube or 15 watts CFL/LED bulb shall be provided. The switching of the fittings shall be controlled by the door switch. For junction boxes of smaller sizes such as lighting junction box, manual operated earth switch mechanism box etc., plug socket, heater and illumination is not required to be provided.

23.9 All control switches shall be of rotary type. Toggle piano switches shall not be accepted.

23.10 Positive earthing of the cabinet shall be ensured by providing two separate earthing pads. The earth wire/ strip shall be terminated on to the earthing pad and secured by the use of self etching washer. Earthing of hinged door shall be done by using a separate earth wire.

23.11 The bay marshalling kiosks shall be provided with danger plate and a diagram showing the numbering/connection/ earthing by pasting the same on the inside of the door.

23.12 a) The following routine tests along with the routine tests as per IS: 5039 shall also be conducted.

Check for wiring

Visual and dimension check

b) The enclosure of bay marshalling kiosk, junction box, terminal box shall be type tested for IP-55 as per IS: 13947. After IP-55 test, 2.5 kVrms for 1 (one) minute, insulation resistance and functional test should be conducted.

23.13 Auxiliary Switches

All the auxiliary switches shall be fully type tested as per relevant IS. The following type test reports on auxiliary switches shall be submitted:

(a) Electrical endurance test - A minimum of 2000 operation for 2A D. C. with a time constant greater than or equal to 20 millisecond with a subsequent examination of mV drop/visual defects/temperature rise test.

(b) Mechanical endurance test. A minimum of 1,00,000 operations with a subsequent checking of contact pressure test/visual examination.

(c) Heat run test on contacts.

(d) IR/HV test etc.

24.0 TERMINAL BLOCKS AND WIRING

24.1 Control and instrument leads from the switchboards or from other equipment will be brought to terminal boxes or control cabinets in conduits. All interphase and external connections to equipment or to control cubicles will be made through terminal blocks.

24.2 Terminal blocks shall be 1100 V grade and have continuous rating to carry the maximum expected current on the terminals. These shall be of moulded piece, complete with insulated/barriers stud type terminals, washers, nuts and lock nuts. Screw clamp, overall insulated, insertion type, rail mounted terminals can be used in place of stud type terminals. But preferably the terminal blocks shall be non disconnecting stud type of Elmex type CATM4, phoenix cage clamp type or equivalent. The insulating material of terminal block shall be nylon 6.6 which shall be free of halogens, fluorocarbons etc.

24.3 Terminal blocks for current transformer and voltage transformer secondary leads shall be provided with test links and isolating facilities. The current transformer secondary leads shall also be provided with short circuiting and earthing facilities.

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24.4 The terminals shall be such that maximum contact area is achieved when a cable is terminated. The terminal shall have a locking characteristic to prevent cable from escaping from the terminal clamp unless it is done intentionally.

24.5 The conducting part in contact with cable shall preferably be tinned or silver plated, however Nickel plated copper or zinc plated steel shall also be acceptable.

24.6 The terminal blocks shall be of extensible design.

24.7 The terminal blocks shall have locking arrangement to prevent its escape from the mounting rails.

24.8 The terminal blocks shall be fully enclosed with removable covers of transparent, non-deterioration type plastic material. Insulating barriers shall be provided between the terminal blocks. These barriers shall not hinder the operator from carrying out the wiring without removing the barriers.

24.9 Unless otherwise specified terminal blocks shall be suitable for connecting the following conductors on each side.

- a) All circuits except CT circuits Minimum of 2 nos. of 2.5 sq. mm copper flexible
- b) All CT circuits Minimum of 4 nos. of 2.5 sq.mm copper flexible

24.10 The arrangements shall be in such a manner so that it is possible to safely connect or disconnect terminals on live circuits and replace fuse links when the cabinet is live.

24.11 At least 20% spare terminals shall be provided on each panel/cubicle/box and these spare terminals shall be uniformly distributed on all terminal rows.

24.12 There shall be minimum clearance of 250 mm between the first bottom row of terminal block and the associated cable gland plate. Also the clearance between two rows of terminal blocks shall be a minimum of 150 mm.

24.13 The Bidder shall furnish all wire, conduits and terminals for the necessary interphase electrical connections (where applicable) as well as between phases and common terminal boxes or control cabinets.

24.14 All input and output terminals of each control cubicle shall be tested for surge withstand capability in accordance with the relevant IEC Publications, in both longitudinal and transverse modes. The Bidder shall also provide necessary filtering, surge protection, interface relays and any other measures necessary to achieve an impulse withstand level at the cable interfaces of the equipment.

25.0 LAMPS AND SOCKETS

25.1 Lamps

All incandescent lamps shall use a socket base as per IS-1258, except in the case of signal lamps.

25.2 Sockets

All sockets (convenience outlets) shall be suitable to accept both 5 Amp & 15 Amp pin round Standard Indian plugs. They shall be switched sockets with shutters.

25.3 Hand Lamp

A 240 Volts, single Phase, 50 Hz AC plug point shall be provided in the interior of each cubicle with ON- OFF Switch for connection of hand lamps.

25.4 Switches and Fuses

Each panel shall be provided with necessary arrangements for receiving, distributing, isolating and fusing of DC and AC supplies for various control, signalling, lighting and space heater circuits. The incoming and sub-circuits shall be separately provided with miniature circuit breaker/ switchfuse units. Selection of the main and Subcircuit fuse ratings shall be such as to ensure selective clearance of sub-circuit faults. Potential circuits for relaying and metering shall be protected by HRC fuses.

All fuses shall be of HRC cartridge type conforming to IS-9228 mounted on plug-in type fuse bases. Miniature circuit breakers with thermal protection and alarm contacts will also be accepted. All accessible live connection to fuse bases shall be adequately shrouded. Fuses shall have operation indicators for indicating blown fuse condition. Fuse carrier base shall have imprints to the fuse rating and voltage. All control switches shall be of rotary type. Toggle piano switches shall not be accepted.

26.0 BUSHINGS, HOLLOW COLUMN INSULATORS, SUPPORT INSULATORS

26.1 Bushings shall be manufactured and tested in accordance with IS: 2099 & IEC-60137 while hollow column insulators shall be manufactured and tested in accordance with IEC-62155/IS:5621. The support insulators shall be manufactured and tested as per IS:2544/IEC-60168 and IEC-60273. The insulators shall also conform to IEC-60815 as applicable. The bidder may also offer composite silicon rubber insulator, conforming to IEC- 61462.

26.2 Support insulators, bushings and hollow column insulators shall be manufactured from high quality porcelain. Porcelain used shall be homogeneous, free from laminations, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified tough and impervious to moisture.

26.3 Glazing of the porcelain shall be uniform brown in colour, free from blisters, burrs and similar other defects.

26.4 Support insulators/bushings/hollow column insulators shall be designed to have ample insulation, mechanical strength and rigidity for the conditions under which they will be used.

26.5 When operating at normal rated voltage there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action. No radio interference shall be caused by the insulators/bushings when operating at the normal rated voltage.

26.6 Bushing porcelain shall be robust and capable of withstanding the internal pressures likely to occur in service. The design and location of clamps and the shape and the strength of the porcelain flange securing the bushing to the tank shall be such that there is no risk of fracture. All portions of the assembled porcelain enclosures and supports other than gaskets, which may in any way be exposed to the atmosphere shall be composed of completely non hygroscopic material such as metal or glazed porcelain.

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26.7 All iron parts shall be hot dip galvanised and all joints shall be air tight. Surface of joints shall be trued up porcelain parts by grinding and metal parts by machining. Insulator/bushing design shall be such as to ensure a uniform compressive pressure on the joints.

26.8 Tests

In bushing, hollow column insulators and support insulators shall conform to type tests and shall be subjected to routine tests in accordance with IS: 2099 & IS: 2544 & IS : 5621.

27.0 MOTORS

Motors shall be "Squirrel Cage" three phase induction motors of sufficient size capable of satisfactory operation for the application and duty as required for the driven equipment and shall be subjected to routine tests as per applicable standards. The motors shall be of approved make.

27.1 Enclosures

- a) Motors to be installed outdoor without enclosure shall have hose proof enclosure equivalent to IP-55 as per IS: 4691. For motors to be installed indoor i.e. inside a box, the motor enclosure, shall be dust proof equivalent to IP-44 as per IS: 4691.
- b) Two independent earthing points shall be provided on opposite sides of the motor for bolted connection of earthing conductor.
- c) Motors shall have drain plugs so located that they will drain water resulting from condensation or other causes from all pockets in the motor casing.
- d) Motors weighing more than 25 Kg. shall be provided with eyebolts, lugs or other means to facilitate lifting.

27.2 Operational Features

- a) Continuous motor rating (name plate rating) shall be at least ten (10) percent above the maximum load demand of the driven equipment at design duty point and the motor shall not be over loaded at any operating point of driven equipment that will rise in service.
- b) Motor shall be capable at giving rated output without reduction in the expected life span when operated continuously in the system.

27.3 Starting Requirements

- a) All induction motors shall be suitable for full voltage direct-on-line starting. These shall be capable of starting and accelerating to the rated speed alongwith the driven equipment without exceeding the acceptable winding temperature even when the supply voltage drops down to 80% of the rated voltage.
- b) Motors shall be capable of withstanding the electrodynamic stresses and heating imposed if it is started at a voltage of 110% of the rated value.
- c) The locked rotor current shall not exceed six (6) times the rated full load current for all motors, subject to tolerance as given in IS:325.
- d) Motors when started with the driven equipment imposing full starting torque under the supply voltage conditions specified, shall be capable of withstanding at least two successive starts from cold condition at room temperature and one start from hot condition without injurious heating of winding. The motors shall also be suitable for three equally spread starts per hour under the above referred supply condition.
- e) The locked rotor withstand time under hot condition at 110% of rated voltage shall be more than starting time with the driven equipment of minimum permissible voltage by at least two seconds or 15% of the accelerating time whichever is greater. In case it is not possible to meet the above requirement, the Bidder shall offer centrifugal type speed switch mounted on the motor shaft which shall remain closed for speed lower than 20% and open for speeds above 20% of the rated speed. The speed switch shall be capable of withstanding 120% of the rated speed in either direction of rotation.

27.4 Running Requirements

- a) The maximum permissible temperature rise over the ambient temperature of 50 degree C shall be within the limits specified in IS:325 (for 3 - phase induction motors) after adjustment due to increased ambient temperature specified.
- b) The double amplitude of motor vibration shall be within the limits specified in IS: 4729. Vibration shall also be within the limits specified by the relevant standard for the driven equipment when measured at the motor bearings.
- c) All the induction motors shall be capable of running at 80% of rated voltage for a period of 5 minutes with rated load commencing from hot condition.

27.5 TESTING AND COMMISSIONING

The Bidder shall conduct following tests along with list of instruments and calibration certificates to the Purchaser. If any additional test is required the same shall be conducted without any extra cost to the Purchaser.

- (a) Insulation resistance.
- (b) Phase sequence and proper direction of rotation.
- (c) Any motor operating incorrectly shall be checked to determine the cause and the conditions corrected.

28 DOCUMENTATION

The successful Tenderer or Bidder shall provide the following technical information:

- General outline drawings of all major equipment
- Estimated works programme (Bar Chart)
- Completed technical data schedules
- Type Test Reports
- Quality assurance and quality control programme and organization
- Complete set of catalogues

The following additional information shall be provided before proceeding with the manufacturing, or during the manufacturing period:

- Schedule of engineering documents including drawings
- Assembly drawings, list of materials including spare parts and tools, cabling diagrams, etc.
- Instruction and service manuals
- Paint samples, if requested by UPTCL
- Test reports and certificates
- Shop inspection and testing program
- Packing drawings, if requested by UPTCL
- Marking models, if requested by UPTCL
- List of test required for commissioning
- Detailed procedure for installation
- Detailed procedure for commissioning
- Works programme and schedule (bar-chart)
- Progress report of manufacturing

The Bidder is responsible for any discrepancies, errors or omissions in the submittals whether these have been reviewed by the UPTCL or not, provided that such discrepancies, errors and omissions are not due to inaccurate information or particulars furnished in writing by the UPTCL to the Bidder. All reports or drawings must be provided in the SI unit system.

28.1 Drawings

The successful Tenderer or Bidder shall prepare and submit for review of the UPTCL, the

drawings indicated in this document. The drawings must be A1 format (841 x 594 mm), A3 (420 x 297 mm) or A4 (297 x 210 mm) format and include in the lower right-hand corner, a title block as indicated in section-1.

The successful Tenderer or Bidder shall submit, one (1) Autocad computer file on a CD-ROM Disk and by E-mail, plus four (4) paper copies of each of the drawings to the UPTCL. The copies marked by the UPTCL will be returned to the Bidder, at the latest, 30 days after presentation of these drawings. The corrected drawings will be submitted once more, following the same procedure, if necessary.

An updated Autocad computer file, plus six (6) paper copies of the final version of the drawings, must be submitted by the Bidder, at the latest one (1) month before delivery of the purchased equipment.

28.1.1 Outline and Foundation Drawings

Outline drawings must be provided to scale including dimensions, weight, reaction for design of foundations, centre of gravity for transportation and installation, in plan view, elevation, section and foundation plan including blockouts embedded parts.

Design briefs and detailed drawings must be presented for all metallic structures and supports of the substation equipment. Nameplates, to scale, must indicate test results from the factory, serial number, weight mass, etc. When available, catalogues references and codes must be indicated on the drawings.

28.1.2 Assembly Drawings

A bill of material must be provided with all assembly drawings.

Every device or apparatus must be identified using a numerical or alphanumerical system corresponding to the one used for the respective diagram. The identification will be in accordance with the ANSI C37.2 standards. The terminal blocks must be identified on the drawing as they are on the equipment itself. Every terminal block of a panel or cabinet must be identified with the number indicating the panel or cabinet it belongs to, the terminal strip identification followed by a number starting with 1 for the first terminal and finishing with the number of the last terminal from top to bottom or left to right. The Bidder shall arrange and identify the terminal blocks for exclusive use of Purchaser as show on enclosed drawing specific to each equipment. The Bidder must comply with this requirement.

The UPTCL will not accept any deviation nor will assume any cost resulting from drawing changes or modifications of wiring or cabling resulting from changes caused or originated by the Bidder. Wires originating from a device or terminal block shall be tagged at both ends with identification of remote end device terminal number using the symbols previously mentioned. Every cabinet or panel will be provided with a wiring drawing where all the devices are shown.

28.2 Technical Data Schedules

The Tenderer must fill out completely and attach to his proposal the Technical Data Schedules included in the technical specification of the equipment. The data shall include the values guaranteed by the Bidder. If any data cannot be furnished at tender stage, Bidder shall assign reasons and shall confirm to provide the same at engineering stage for approval. The Bidder shall guarantee that the equipment and the works are in accordance with all the requirements of the present specification including the data from the Technical Data Schedules. The Technical Specifications for equipment represent different types and/or ratings under a single

data schedule. Bidder shall however submit the data schedule for each type and/or rating of the equipment required for the project.

28.3 Instruction Manuals

Service and maintenance manuals including sequence of operation manuals must describe in details, the procedures and the operation instructions for the equipment and the measuring devices. The assembly method, commissioning guide, adjustment, operation and disassembly of every component, system or machine, must be described and illustrated in details. The manuals must include as well a troubleshooting procedure to locate rapidly the defective part. For preventive maintenance purposes, a list of verification point visual marking and measurements will be included. The frequency of inspections and maintenance of every component shall be described in the manuals.

The Bidder shall submit manuals that are clear, fully detailed and easily understood to ensure the appropriate operation and maintenance of the equipment.

The manuals shall include a copy of the "as built" drawings, the list of spare parts and a list of all the pieces of every component or item that makes up the equipment. The latter must include the Bidder identification, the manufacturing codes and the instructions to order the pieces. The manual shall also include an updated copy of the Technical Data Schedules of the equipment, as supplied. The Bidder shall submit the instruction and service manual for UPTCL's review at least one month before shop testing.

The Bidder shall include in every manual a copy of the tests performed on the equipment and all the accessories, and the corresponding results.

The Bidder shall provide for every apparatus, six (6) technical manuals, two (2) of which shall be properly wrapped and placed inside the cabinets, panels or control kiosks at time of delivery. In the case where there is no room for manuals, the two manuals shall be well placed and packed in a wooden crate.

28.4 Language

All technical documents such as: calculation schedules, curves, maintenance and service manuals, quality assurance control program report, plant tests and manufacturing schedule, drawings, nameplates and instructions manuals shall be presented by the Bidder to the UPTCL, shall be in the English language.

29 QUALITY CONTROL PROGRAMME

29.1 Programme

In general terms, the manufacturing quality programme shall be in compliance with ISO 9002 or later standards. The UPTCL reserves the right to verify the document pertaining to the manufacturer's quality assurance programme, as well as the application of the same in the manufacturing plant.

In general, the assembly of all the equipment components shall be carried out in the manufacturer's workshops so that it shall possible to perform inspections, tests, etc. that will ensure a subsequent satisfactory operation. The exceptions to this rule will only be possible upon UPTCL's consent.

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The UPTCL's authorized representatives shall have the right of access to the plant and to inspect and verify the quality of materials used in the manufacturing process.

The manufacturer of each major equipment shall submit Quality Assurance Programme (QAP) for the manufacturing and testing of equipment along with the drawings to UPTCL.

29.2 Plant Tests

The materials and all the equipment shall be tested as per the prescriptions of this specification. The tests shall be performed by the Bidder and certified by the authorized representative of the UPTCL.

All the required tests must be performed in order to confirm that the materials and the equipment comply with these specifications, and to allow the UPTCL to detect any material or manufacturing defects.

The results of all the tests shall be marked down in the reports containing all the necessary information to enable verification of compliance with the present specification. The test certificates shall be written in English and shall show the results and real conditions of the tests performed the circuits, oscillogrammes, environmental conditions, nameplate drawings with measured values, graphs, etc.

No later than two (2) weeks after having performed the tests, the Bidder shall submit to the UPTCL, four (4) copies of the report of all tests as a bound document. The test reports shall indicate the tests performed, instruments used, names of test personnel and provide the witness's signature as applicable. The report must also include a description of any failure that occurred while performing the plant tests, even if the test resumed after the failure.

The tests are meant to verify and determine the characteristics of the equipment. Normally, type tests shall be performed on one (1) apparatus of each type and with different technical characteristics. If type tests have been performed on identical apparatus, within a period not exceeding 5 years from 02.03.19, the results may be accepted. The routine tests are intended to reveal any defective material or manufacture non-conformity and shall be performed on all equipment supplied.

The units to be assembled in the plant (panels, cabinets, control cabinets) shall be assembled, wired, adjusted and tested in the plant, as much as possible, under the same service conditions that will prevail at the site of installation, to ensure the accuracy of the wiring and the correct operation of the equipment.

The UPTCL reserves the right to be present at any of the tests.

The equipment to be tested must be totally assembled for an inspection before the tests. The Bidder must submit to the UPTCL a detailed program of tests for review, at least one month before the tests take place. The Bidder shall inform the UPTCL in writing, at least 30 days in advance, of the date of the tests.

29.3 Stage Inspection Programme

UPTCL and/or his representative will conduct routine and/or periodic inspection of the works and material in the manufacturing of the major equipment and construction sites in various stages of the Project. The Bidder shall provide facilities and access to the UPTCL and/or his representative to inspect the workmanship and the quality of the material, manufacturing process and the installation. The Bidder shall advise the UPTCL in writing the schedule of any such routine and/or

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periodic inspection. The Bidder shall attach a copy of the completed inspection checklist or final/in-process inspection report by the Bidder's QA/QC UPTCL/inspector on every inspection request submitted to the UPTCL. The Bidder's QA/QC UPTCL/inspector shall ensure that the items for inspection covered by the Bidder's "Inspection Request" are ready prior to inspection by the UPTCL and/or his representative.

30 NAMEPLATES, LABELS AND RATING PLATES

The equipment shall be fitted with nameplates and indication plates, which must be manufactured of non-corrodible stainless steel or aluminium, with a minimum thickness of 1 mm engraved black letters on a light background, and shall be fixed to the apparatus with non-busting screws.

A rating plate shall be attached to each major and auxiliary item of equipment supplied. This plate shall be permanently engraved with the designed full load ratings, serial number, type number, date of manufacture, and other identification deemed necessary. Where required by the UPTCL, diagram plates shall also be supplied.

A nameplate shall be provided to identify the equipment supplied. The identifying inscription shall be approved by the UPTCL or conform to that designated in the appropriate sections of this Specification. Devices shall be identified by nameplates on both front and rear of all desks, panels, cubicles, etc.

Labels shall be manufactured of non-hygroscopic material with engraving of a contrasting colour or alternatively, for indoor use, of laminated plastic material with lettering engraved. The lettering should be black against white background. The materials used shall be non-fading, non-aging type, suitable for tropical conditions.

All apparatus, motors, control gear and all panels and the apparatus contained therein, shall be labelled, indicating where necessary, their purpose and the "ON" and "OFF" positions.

Upon request by the UPTCL during the approval of Nameplates and Labels, some inscriptions shall be in Hindi language.

ANNEXURE – A

CORONA AND RADIO INTERFERENCE VOLTAGE (RIV) TEST

1.0 General

Unless otherwise stipulated, all equipment together with its associated connectors, where applicable, shall be tested for external corona (for 765 kV & above) both by observing the voltage level for the extinction of visible corona under falling power frequency voltage and by measurement of radio interference voltage (RIV) for 220 kV above.

2.0 Test Levels

The test voltage levels for measurement of external RIV and for corona extinction voltage are listed under the relevant clauses of the specification.

3.0 Test Methods for RIV

3.1 RIV tests shall be made according to measuring circuit as per International Special-Committee

on Radio Interference (CISPR) Publication 16-1(1993) Part -1. The measuring circuit shall preferably be tuned to frequency with 10% of 0.5 MHz but other frequencies in the range of 0.5 MHz to 2 MHz may be used, the measuring frequency being recorded. The results shall be in microvolts.

3.2 Alternatively, RIV tests shall be in accordance with NEMA standard Publication No. 107-1964, except otherwise noted herein.

3.3 In measurement of, RIV, temporary additional external corona shielding may be provided. In measurements of RIV only standard fittings of identical type supplied with the equipment and a simulation of the connections as used in the actual installation will be permitted in the vicinity within 3.5 meters of terminals.

3.4 Ambient noise shall be measured before and after each series of tests to ensure that there is no variation in ambient noise level. If variation is present, the lowest ambient noise level will form basis for the measurements. RIV levels shall be measured at increasing and decreasing voltages of 85%, 100%, and 110% of the specified RIV test voltage for all equipment unless otherwise specified. The specified RIV test voltage for 765kV, 400kV, 220kV, 132kV is listed in the detailed specification together with maximum permissible RIV level in microvolts.

3.5 The metering instruments shall be as per CISPR recommendation or equivalent device so long as it has been used by other testing authorities.

3.6 The RIV measurement may be made with a noise meter. A calibration procedure of the frequency to which noise meter shall be tuned shall establish the ratio of voltage at the high voltage terminal to voltage read by noise meter.

4.0 Test Methods for Visible Corona

The purpose of this test is to determine the corona extinction voltage of apparatus, connectors etc. The test shall be carried out in the same manner as RIV test described above with the exception that RIV measurements are not required during test and a search technique shall be used near the onset and extinction voltage, when the test voltage is raised and lowered to determine their precise values. The test voltage shall be raised to 110% of specified corona extinction voltage and maintained there for five minutes. In case corona inception does not take place at 110%, test shall be stopped, otherwise test shall be continued and the voltage will then be decreased slowly until all visible corona disappears. The procedure shall be repeated at least 4 times with corona inception and extinction voltage recorded each time. The corona extinction voltage for purposes of determining compliance with the specification shall be the lowest of the four values at which visible corona (negative or positive polarity) disappears. Photographs with laboratory in complete darkness shall be taken under test conditions, at all voltage steps i.e. 85%, 100%, and 110%. Additional photographs shall be taken at corona inception and extinction voltages. At least two views shall be photographed in each case using Panchromatic film with an ASA daylight rating of 400 with an exposure of two minutes at a lens aperture of f/5.6 or

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equivalent. The photographic process shall be such that prints are available for inspection and comparison with conditions as determined from direct observation. Photographs shall be taken from above and below the level of connector so as to show corona on bushing, insulators and all parts of energised connectors. The photographs shall be framed such that test object essentially, fills the frame with no cut-off. For recording purpose, modern devices utilizing UV recording methods such as image intensifier may also be used.

4.1 The test shall be recorded on each photograph. Additional photograph shall be taken from each camera position with lights on to show the relative position of test object to facilitate precise corona location from the photographic evidence.

4.2 In addition to photographs of the test object preferably four photographs shall be taken of the complete test assembly showing relative positions of all the test equipment and test objects. These four photographs shall be taken from four points equally spaced around the test arrangement to show its features from all sides. Drawings of the laboratory and test set up locations shall be provided to indicate camera positions and angles. The precise location of camera shall be approved by Purchaser's inspector, after determining the best camera locations by trial energisation of test object at a voltage which results in corona.

4.3 The test to determine the visible corona extinction voltage need not be carried out simultaneously with test to determine RIV levels.

4.4 However, both test shall be carried out with the same test set up and as little time duration between tests as possible. No modification on treatment of the sample between tests will be allowed. Simultaneous RIV and visible corona extinction voltage testing may be permitted at the discretion of Purchaser's inspector if, in his opinion, it will not prejudice other test.

5.0 Test Records

In addition to the information previously mentioned and the requirements specified as per CISPR or NEMA 107-1964 the following data shall be included in test report:

- a) Background noise before and after test.
- b) Detailed procedure of application of test voltage.
- c) Measurements of RIV levels expressed in micro volts at each level.
- d) Results and observations with regard to location and type of interference sources detected at each step.
- e) Test voltage shall be recorded when measured RIV passes through 100 microvolts in each direction.
- k) Onset and extinction of visual corona for each of the four tests required shall be recorded.

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ANNEXURE – B

SEISMIC WITHSTAND TEST PROCEDURE

The seismic withstanding test on the complete equipment (for 220kV and above) shall be carried out alongwith supporting structure. The Bidder shall arrange to transport the structure from his Bidder's premises/UPPTCL sites for the purpose of seismic withstand test only.

The seismic level specified shall be applied at the base of the structure. The accelerometers shall be provided at the Terminal Pad of the equipment and any other point as agreed by the Purchaser. The seismic test shall be carried out in all possible combinations of the equipment. The seismic test procedure shall be furnished for approval of the Purchaser.

ANNEXURE - A
SCHEDULE OF TECHNICAL DEVIATIONS

Bidder shall list below all technical deviation clause wise w.r.t. tender specifications:

<u>S.No.</u>	<u>Page No.</u>	<u>Clause No.</u>	<u>Deviation</u>	<u>Reason / Justification</u>
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Any deviation not specifically brought out in this section shall not be admissible for any commercial implication at later stage. Except to the technical deviations listed in this schedule, bidder's offer shall be considered in full compliance to the tender specifications irrespective of any such deviation indicated / taken elsewhere in the submitted offer.

Date:

Tenderer's Stamp & Signature



GUARANTEED TECHNICAL PARTICULARS
(To be submitted by the supplier at the contract execution stage)

GUARANTEED AND TECHNICAL PARTICULARS FOR CLAMPS AND CONNECTORS
Shall be submitted for all applicable class

- | | |
|---|----------|
| 1) Manufacture's name and address | 1)..... |
| 2) Applicable standards | 2)..... |
| 3) Application | 3)..... |
| 4) Type | 4)..... |
| 5) For connection to | 5)..... |
| a) Conductor size and arrangement | (a)..... |
| b) Equipment terminal and arrangement | (b)..... |
| 6) Material (state percentage - composition of constituents and impurities present) | 6) |
| a) Clamp body | (a)..... |
| b) Bolts and nuts | (b)..... |
| c) Spring washers | (c)..... |
| d) Liners, if any | (d)..... |
| 7) Rated current (A) | 7)..... |
| 8) Maximum temperature rise over reference ambient temperature when carrying rated current (°C) | 8)..... |
| 9) Rated terminal load and factor of safety Kg) | 9)..... |
| 10) Minimum thickness of any part (mm) | 10)..... |
| 11) Weight of clamp complete with hardware (Kg) | 11)..... |
| 12) Machine accuracy for matching surface | 12)..... |
| 13) Service (Indoor/Outdoor) | 13)..... |

**CHECK LIST FOR INFORMATION TO BE FURNISHED WITH OFFER
RETURN THIS CHECKLIST AS PART OF THE OFFER DULY SIGNED**

The offer may not be considered if the following information and this Checklist are not enclosed with the Offer.

BHEL ENQUIRY. NO:
BIDDER OFFER REFERENCE:

1A. TECHNICAL REQUIREMENTS (FOR CLAMPS & CONNECTORS)

(1) S.No	(2)/(3) Parameter/ Requirement	(4) Yes / No	(5) Remarks in case reply in Col (4) is NO
A	Vendor is approved vendor of UPPTCL for clamps & connectors		
1.	Material of Clamps/Fittings		
a)	Clamp body (Designation 4600 of IS 617)	YES/NO	
b)	Bolts, nuts and plain washers (Electro galvanized for sizes below M12, for others hot dip galvanised.)	YES/NO	
c)	Spring washers (Spring steel -E.G)	YES/NO	
2.	Continuous current rating of the clamps/fittings (Is it compatible with the conductor rating/ equipment rating as per BOQ)	YES/NO	
3.	Maximum temperature rise (35°C) of the clamps/fittings over ambient temperature (50°C) when carrying specified fault current.	YES/NO	
4.	Minimum thickness of any part is 10 mm	YES/NO	
5.	Min Corona extinction voltage (kV)		
a)	508 kVrms for 765 kV Voltage Class	YES/NO	
b)	320 kVrms for 400 kV Voltage Class	YES/NO	
6.	All hardware required for connecting to the respective equipment terminals included in supplier scope	YES/NO	

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1B. TECHNICAL REQUIREMENTS (FOR SPACERS)

(1) S.No.	(2)/(3) Parameter/ Requirement	(4) Yes / No	(5) Remarks in case reply in Col (4) is NO
1.	Spacing between sub-conductors 450mm for Bull AAC and ACSR Bersimis conductor	YES/NO	
2.	Min Corona extinction voltage (kV)		
a)	508 kVrms for 765 kV Voltage Class	YES/NO	
b)	320 kVrms for 400 kV Voltage Class	YES/NO	

2. TYPE TESTS

Whether Type test reports of the tests conducted earlier (not more than five years from the date of bid opening i.e. **02.03.2019** on similar material submitted.

YES/NO

If type test report submitted, indicate report number.

If the valid type test reports are not available with the bidder then type test shall be conducted by the bidder free of cost

YES/NO

SIGN AND COMPANY SEAL OF AUTHORISED REPRESENTATIVE

Contact Details: Phone..... Mobile..... Email.....

ANNEXURE-I

BILL OF QUANTITIES FOR CLAMPS AND CONNECTORS FOR UPPTCL BARA EXTENSION LIST OF ABBREVIATION AND CONDUCTOR DETAILS

ABBREVIATIONS:

H:	Horizontal termination of conductor	V:	Vertical termination of conductor
TEH:	Expansion type connector for 3"/4"/4.5" IPS Al. tube	TRH:	Rigid type connector for 3"/4"/4.5" IPS Al. tube
SH:	Connector for horizontal approach of stranded single ACSR Bersimis conductor	4SH:	Connector for horizontal approach of stranded quad. ACSR Bersimis/AAC Bull conductor
2SH:	Connector for horizontal approach of stranded Twin ACSR Bersimis conductor	TRH/2SH:	Connector suitable for TRH connector on one side and SH2 connector on the opposite side.
TEH/TRH:	Connector suitable for TEH connection on one side and TRH connector on the opposite side with tube break	TRH/TRH:	Connector suitable for TRH connection on both side with tube break
B:	Bimetallic strip to be provided in clamp	Th (T):	Through type connector for 4"/5" IPS Al. tube
MSHD:	Mild steel hot dip galvanized	SCS:	Sub conductor spacing of Quad/twin conductor
S2	Suitable for Twin Conductor	S4	Suitable for Quad. Conductor

CONDUCTOR DETAIL:

4.5" IPS Al. Tube:	Outer Diameter = 120.0mm	4" IPS Al. Tube:	Outer Diameter = 114.2mm
3" IPS Al. Tube:	Outer Diameter = 88.9mm	AAC Bull	Outer Diameter = 38.25mm
ACSR Bersimis	Outer Diameter = 35.05mm		

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ANNEXURE-I

BILL OF MATERIAL FOR CLAMP & CONNECTORS

CLAMP NO.	SUPPLIER DRG. NO.	EQUIPMENT/MAKE	KV RATING	CURRENT		TERMINAL					REMARK	
				NORMAL (AMP)	SC FOR ISEC (kA)	TYPE	H/V	MATERIAL	CONNECT OR TYPE	Qty. (Nos.)		BIMETALL
VOLTAGE RATING: 765kV												
7C1		ISOLATOR	765	2000	40	PAD	H	Aluminum	^TRH	04		Suitable for 4.5" IPS Al Tube
7C2		ISOLATOR	765	2000	40	PAD	H	Aluminum	4SH	04		Suitable for Quad AAC Bull for horizontal approach Spacing 450mm
7C4		POST INSULATOR	765	2000	40	PAD	H	Cast Iron	^SLIDING (THROUGH)	04		Suitable for 4.5" IPS Al Tube
7C5		765/400kV ICT HV BUSHING	765	2000	40	STUD	H	Cu. Tined Plated	4SH	04	B	Suitable for Quad AAC Bull for horizontal approach
7C6		SPACERS (Rigid Type)	765	2000	40	-	-	-	S4	26		Suitable for Quad AAC Bull Spacing 450mm
7C7		CORONA BELL	765	2000	40	-	-	-		04		Suitable for 4.5" IPS Al Tube
7C8		SLEEVES	765	2000	40	-	-	-		07		Suitable for 4.5" IPS Al Tube
VOLTAGE RATING: 400kV												
4C1		CIRCUIT BREAKER	420	3150	50	PALM	H	Aluminum	^TEH	13		Suitable for 4" IPS Al Tube
4C2		ISOLATOR	420	2500	50	PAD	H	Aluminum	^TEH	10		Suitable for 4" IPS Al Tube
4C2A		ISOLATOR	420	2500	50	PAD	H	Aluminum	^TRH	16		Suitable for 4" IPS Al Tube
4C2B		ISOLATOR	420	2500	50	PAD	H	Aluminum	4SH	13		Suitable for Quad Bersimis for horizontal approach Spacing 450mm
4C3		CURRENT TRANSFORMER	420	3150	50	STUD	H	Cu	^TRH	13	B	Suitable for 4" IPS Al Tube
4C5		POST INSULATOR	420	3150	50	PAD	H	Cast Iron	^TEH/TRH (TUBE BREAK)	30		Suitable for 4" IPS Al Tube

ANNEXURE-I

4C6		POST INSULATOR	420	3150	50	PAD	H	Cast Iron	^TRH/TRH (TUBE BREAK)	07	Suitable for 4" IPS Al Tube
4C7		POST INSULATOR	420	3150	50	PAD	H	Cast Iron	^SLIDING (THROUGH)	19	Suitable for 4" IPS Al Tube
4C8		765/400kV ICT IV BUSHING	420	3150	50	STUD	H	Cu. Tined Plated	4SH	4	Suitable for Quad Bersimis Spacing 450mm
4C9		SPACERS (Flexible Type)	420	3150	50	-	-	-	S4	80	Suitable for Quad Bersimis Spacing 450mm
4C10		SPACERS (Rigid Type)	420	3150	50	-	-	-	S4	70	Suitable for Quad Bersimis Spacing 450mm
4C11		CORONA BELL	420	3150	50	-	-	-		19	Suitable for 4" IPS Al Tube
4C12		SLEEVES	420	3150	50	-	-	-		55	Suitable for 4" IPS Al Tube
VOLTAGE RATING: 66kV											
1C1		765/400kV ICT LV BUSHING	66	1250	25	STUD	H	Cu. Tined Plated	ISH	7	Suitable for Single Bersimis for horizontal approach
1C2		765/400kV ICT NEUTRAL BUSHING	33	1250	25	STUD	H	Cu. Tined Plated	ISH	4	Suitable for Single Bersimis for horizontal approach
1C3		POST INSULATOR	66	1250	25	PAD	H	Cast Iron	^TEH/TRH	11	Suitable for 3" IPS Al Tube
1C4		POST INSULATOR	66	1250	25	PAD	H	Cast Iron	^TRI/TRH (TUBE BREAK)	14	Suitable for 3" IPS Al Tube
1C5		POST INSULATOR	66	1250	25	PAD	H	Cast Iron	^TRH	07	Suitable for 3" IPS Al Tube
1C6		POST INSULATOR	66	1250	25	PAD	H	Cast Iron	^SLIDING (THROUGH)	34	Suitable for 3" IPS Al Tube
1C7		END CAP	66	1250	25	-	-	-		40	Suitable for 3" IPS Al Tube
1C8		SLEEVES	66	1250	25	-	-	-		38	Suitable for 3" IPS Al Tube

^ = INDICATES PROVISION FOR DAMPING CONDUCTOR (ACSR BERSIMIS COND.)

ANNEXURE-I

CLAMP NO.	SUPPLIER DRG. NO.	CLAMP DESCRIPTION	KV	CURRENT		TROUGH CONDUCTOR	TEE CONDUCTOR	Qty. (Nos.)	REMARK
				NOMINAL (A)	SC FOR ISEC.				
7C20		TEE CONNECTOR	765	2000	40	4.5" IPS Al Tube	Quad. AAC Bull	07	
7C21		TEE CONNECTOR	765	2000	40	Quad. AAC Bull	Quad. AAC Bull	04	
4C20		TEE CONNECTOR	420	3150	50	Quad. ACSR Bersimis	4" IPS Al Tube	22	
4C21		TEE CONNECTOR	420	3150	50	Quad. ACSR Bersimis	Quad. ACSR Bersimis	31	
4C22		TEE CONNECTOR	420	3150	50	4" IPS Al Tube	Twin ACSR Bersimis	04	
1C20		TEE CONNECTOR	66	1250	25	3" IPS Al Tube	Single ACSR Bersimis	45	

CLAMP NO.	SUPPLIER DRG. NO.	CLAMP DESCRIPTION		QTY. (Nos.)	MATERIAL	REMARK
D1		CLEAT CLAMP FOR EARTH STRIP 75x12 ON PIPE STRUCTURE		255	MSHDG	
D2		CLAMP FOR EARTH STRIP 75x12 ON LATTICE STRUCTURE		320	MSHDG	
D3		PG CLAMP FOR 10.98MM DIA SHIELD WIRE		15	MSHDG	
D4		CLEAT CLAMPS FOR 10.98MM DIA SHIELD WIRE ON LATTICE STRUCTURE		125	MSHDG	
D5		PAD TYPE COMPRESSION CLAMP SUITABLE FOR 10.98MM DIA SHIELD WIRE & 75x12 EARTH STRIP		08	MSHDG	
D6		STRAIN CLAMP FOR SHIELD WIRE 10.98MM DIA		11	MSHDG	