

E-TENDER SPECIFICATION

No. BHE/PW/PUR/KDNSH-CNI/3293

Scope of Work: DISMANTLING OF EXISTING ELECTRICAL AND C&I SYSTEM, HANDING OVER MATERIAL TO CUSTOMER, HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) WORKS FOR RENOVATION & MODERNIZATION OF ONE UNIT OF KADANA PUMPED HYDRO POWER PLANT FOR PUMP MODE OPERATION INCLUDING SCADA OF ALL 04 UNITS (U1 To U4).

VOLUME I - TECHNICAL BID

THIS TENDER SPECIFICATION CONSISTS OF:

Notice Inviting Tender	
Volume-IA	Technical Conditions of Contract
Volume-IB	Special conditions of Contract
Volume-IC	General conditions of Contract
Volume-ID	Forms & Procedures
Volume-IE	Technical Annexures
Volume II	Price Bid



CONTENTS		
Volume No	Description	Hosted in website bhel.com (Briefly) and detailed in BHEL e-Procurement Portal as files titled
NIL	Tender Specification Issue Details	(Part of <u>Vol-IA-3293</u>)
NIL	Notice Inviting Tender	(Part of <u>Vol-IA-3293</u>)
I-A	Technical Conditions of Contract with Drawings	Vol-I-A-3293
I-B	Special Conditions of Contract	Vol-I-BCD-3293
I-C	General Conditions of Contract	(Part of Vol-I-BCD-3293)
I-D	Forms & Procedures	(Part of Vol-I-BCD-3293)
II	Price Bid Specification as specified in E-Procurement Portal	Volume-II-Price Bid-3293

Bharat Heavy Electricals Limited

(A Government of India Undertaking)

Power Sector - Western Region

345-Kingsway, Nagpur-440001

E-TENDER SPECIFICATION

No. BHE/PW/PUR/KDNSH-CNI/3293

Scope of Work: DISMANTLING OF EXISTING ELECTRICAL AND C&I SYSTEM, HANDING OVER MATERIAL TO CUSTOMER, HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) WORKS FOR RENOVATION & MODERNIZATION OF ONE UNIT OF KADANA PUMPED HYDRO POWER PLANT FOR PUMP MODE OPERATION INCLUDING SCADA OF ALL 04 UNITS (U1 To U4)..

EARNEST MONEY DEPOSIT: Refer Notice Inviting Tender

LAST DATE FOR TENDER SUBMISSION Refer Notice Inviting Tender

THESE TENDER SPECIFICATION DOCUMENTS CONTAINING VOLUME-I AND VOLUME- II ARE ISSUED TO:

M/s.

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PLEASE NOTE:
THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.

For Bharat Heavy Electricals Limited

GM (Purchase)

Place: Nagpur
Date:

3293

NOTICE INVITING TENDER

Bharat Heavy Electricals Limited

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Date: 25-09-26

NOTICE INVITING TENDER (NIT)
NOTE: BIDDER MAY DOWNLOAD FROM WEB SITES

To,

Dear Sir/Madam,

Sub : **NOTICE INVITING E-TENDER**

Sealed offers in two part bid system (National competitive bidding (NCB) ~~or International Competitive Bidding (ICB)~~ are invited from reputed & experienced bidders (meeting PRE QUALIFICATION CRITERIA as mentioned in Annexure-1) through E-Procurement Portal <https://eprocurebhel.co.in> only, for the subject job by the undersigned on the behalf of BHARAT HEAVY ELECTRICALS LIMITED as per the tender document. Following points relevant to the tender may please be noted and complied with.

1.0 Salient Features of NIT

S No.	ISSUE	DESCRIPTION
i	TENDER NUMBER	BHE/PW/PUR/KDNSH-CNI/3293
ii	Broad Scope of job	DISMANTLING OF EXISTING ELECTRICAL AND C&I SYSTEM, HANDING OVER MATERIAL TO CUSTOMER, HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) WORKS FOR RENOVATION & MODERNIZATION OF ONE UNIT OF KADANA PUMPED HYDRO POWER PLANT FOR PUMP MODE OPERATION INCLUDING SCADA OF ALL 04 UNITS (U1 To U4)..
iii	DETAILS OF TENDER DOCUMENT	
A	Volume-IA	Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc. Applicable
B	Volume-IB	Special Conditions of Contract (SCC) Applicable
C	Volume-IC	General Conditions of Contract (GCC) Applicable
D	Volume-ID	Forms and Procedures Applicable
E	Volume-IE	Technical Annexures Applicable
F	Volume-II	Price Schedule (Absolute value). Applicable
iv	Issue of Tender Documents	Tender documents will be available for downloading from BHEL website (www.bhel.com) or e-procurement portal (https://eprocurebhel.co.in) as per schedule below: Start: 30-09-26, Time :13:00 Hrs Closes: 12-10-2026, Time: 13:00 Hrs Brief information of the tenders shall also be available at central public procurement portal. (https://eprocure.gov.in/epublish/app) Applicable
v	DUE DATE & TIME OF OFFER SUBMISSION	Date: : 12-10-2026, Time :13:00 Hrs The bidder should submit their offer online only in e- Applicable

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S No.	ISSUE	DESCRIPTION	
		Procurement portal at https://eprocurebhel.co.in <u>Bidders are requested to upload their offer well in advance in order to avoid last minute congestion at this website.</u> Hard copy bid or bids through E-mail / fax shall not be accepted.	
vi	OPENING OF TENDER (Techno-Commercial Bid)	Date: : 12-10-2026, Time: 17:00 Hrs Notes: (1) In case the due date of opening of tender becomes a non-working day, then the due date & time of offer submission and opening of tenders get extended to the next working day. (2) Bidder may depute representative to witness the opening of tender. For e-Tender, Bidder may witness the opening of tender through e-Procurement portal only.	Applicable
vii	EMD AMOUNT	NIL - Note: BIDDER TO SUBMIT BID SECURITY DECLARATION FORM- ANNEXURE-14 Important Note: Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC	Applicable
viii	COST OF TENDER	NIL	Not Applicable
ix	LAST DATE FOR SEEKING CLARIFICATION	One day before due date of offer submission. Along with soft version also, addressing to undersigned & to others as per contact address given below: 1) Name: Chaitram Patel Designation: Sr. Engineer Deptt: Purchase Address: Floor no. 5 & 6, Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Mobile-8055451608 Email : chaitram@bhel.in 2) Name: Biraj Roy Designation: Sr. Manager Deptt: Purchase Address: Floor no. 5 & 6, Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Mobile-9587886706 Email : biraj@bhel.in 3) Name: Varun Vaidya Designation: Sr. Manager Deptt: Purchase Address: Floor no. 5 & 6, Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Mobile-9792334127 Email : vvaidya@bhel.in	Applicable

Registered Office: BHEL House, Siri Fort, New Delhi - 110 049, India
Website: www.bhel.com

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S No.	ISSUE	DESCRIPTION	
		4) Mr. VK Arya Designation: GM Deptt: Purchase Address: Floor no. 5 & 6, Shree Mohini Complex, 345 Kingsway, Nagpur-440001 Email: vkarya@bhel.in	
x	SCHEDULE OF Pre Bid Discussion (PBD)	---	Not Applicable
xi	INTEGRITY PACT & DETAILS OF INDEPENDENT EXTERNAL MONITOR (IEM)	1) Dr. Sarat Kumar Acharya, Ex-CMD, NLC 2) Shri R. Mukundan, IRPS (Retd.) 3) Shri Madan Lal Meena, IAS (Retd.)	Not Applicable
xii	Latest updates	Latest updates on the important dates, Amendments, Correspondences, Corrigenda, Clarifications, Changes, Errata, Modifications, Revisions, etc to Tender Specifications will be hosted in BHEL webpage (www.bhel.com)-->Tender Notifications ->View Corrigendum), & on e-tender portal https://eprocurebhel.co.in and not in the newspapers. Bidders to keep themselves updated with all such information.	

2.0 The offer shall be submitted as per the instructions of tender document and as detailed in this NIT. Bidders to note specifically that all pages of tender document, including these NIT pages of this particular tender together with subsequent correspondences shall be submitted by them, duly signed digitally using Class III DSC & uploaded in E-Procurement Portal, as part of offer. **Rates/Price including discounts/rebates, if any, mentioned anywhere/in any form in the techno-commercial offer other than the Price Bid, shall not be entertained.**

3.0 Not Used

4.0 Unless specifically stated otherwise, bidder shall deposit EMD as per clause 1.9 of General Conditions of Contract.

For Electronic Fund Transfer the details are as below-:

NAME OF THE BENEFICIARY	BHARAT HEAVY ELECTRICALS LTD
ADDRESS OF THE COMPANY	5th Floor, SHREE MOHINI COMPLEX 345, KINGSWAY, NAGPUR
NAME OF BANK	STATE BANK OF INDIA
NAME OF BANK BRANCH AND BRANCH CODE	SBI, NAGPUR MAIN BRANCH , CODE-00432
CITY	NAGPUR
ACCOUNT NUMBER	40227423158
ACCOUNT TYPE	MC-C C Clean (C&I)
IFSC CODE OF THE BENEFICIARY BANK BRANCH	SBIN0000432
MICR CODE OF THE BANK BRANCH	440002002

(Note -: In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, shall be sent to the officer inviting tender within a reasonable time, failing which the offer is liable to be rejected.

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(Note -: In case of E-Tenders, proof of remittance of EMD should be uploaded in the E-Procurement Portal and originals, as applicable, shall be sent to the officer inviting tender within a reasonable time, failing which the offer is liable to be rejected.

5.0 Procedure for Submission of Tenders:

This is an E-tender floated online through our E-Procurement Site (<https://eprocurebhel.co.in>). The bidder should respond by submitting their offer online only in our e-Procurement platform at (<https://eprocurebhel.co.in>). Offers are invited in two-parts only.

Documents Comprising the e-Tender

The tender shall be submitted online ONLY EXCEPT EMD (in physical form) as mentioned below:

a. Technical Tender (UN priced Tender)

All Technical details (e.g. Eligibility Criteria requested (as mentioned below)) should be attached in e-tendering module, failing which the tender stands invalid & may be REJECTED. Bidders shall furnish the following information along with technical tender (preferably in pdf format):

- i. Earnest Money Deposit (EMD) furnished in accordance with NIT Clause 4.0. ~~Alternatively, documentary evidence for claiming exemption as per clause 29 of NIT.~~
- ii. Technical Bid (without indicating any prices).

b. Price Bid:

- i. Prices are to be quoted in the attached Price Bid format online on e-tender portal.
- ii. The price should be quoted for the accounting unit indicated in the e-tender document.

Note:

- It is the responsibility of tenderer to go through the Tender document to ensure furnishing all required documents in addition to above, if any. Any deviation would result in REJECTION of tender and would not be considered at a later stage at any cost by BHEL.
- A person signing (manually or digitally) the tender form or any documents forming part of the contract on behalf of another shall be deemed to warrantee that he has authority to bind such other persons and if, on enquiry, it appears that the persons so signing had no authority to do so, the purchaser may, without prejudice to other civil and criminal remedies, cancel the contract and hold the signatory liable for all cost and damages.
- A tender, which does not fulfil any of the above requirements and/or gives evasive information/reply against any such requirement, shall be liable to be ignored and rejected.

DO NOT'S

Bidders are requested NOT to submit the hard copy of the Bid. In case offer is sent through hard copy/fax/telex/cable/electronically in place of e-tender, the same shall not be considered. Also, uploading of the price bid in prequalification bid or technical bid may RESULT IN REJECTION of the tender.

Digital Signing of e-Tender

Tenders shall be uploaded with all relevant PDF/zip format. The relevant tender documents should be uploaded by an authorized person having Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION digital signature certificate (DSC).

The Requirement:

1. A PC with Internet connectivity &
2. DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION)

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BHEL has finalized the e-procurement service Provider:-
NIC PORTAL (<https://eprocurebhel.co.in>)

For E-PROCUREMENT ASSISTANCE & TRAINING, NIC PORTAL HELPDESK CONTACTS AS PER FOLLOWING:

For any technical related queries, please call at 24 x 7 Help Desk Number

0120-4001 002

0120-4200 462

0120-4001 005

0120-6277 787

1. Peter Raj, NIC, Ph: 9942069052

Email Support: support-eproc@nic.in

Other details/update yourself from : <https://eprocurebhel.co.in>

The process of utilizing e-procurement necessitates usage of **DSC (Digital Signature Certificate) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION)** and you are requested to procure the same immediately, if not presently available with you. Please note that only with DSC, you will be able to login the e-procurement secured site and take part in the tendering process.

The contact details of the DSC certifying authority:-
please refer <http://www.mca.gov.in/> → MCA SERVICES → DSC SERVICES

Vendors are requested to go through seller manual available on <https://eprocurebhel.co.in>.

~~**Procedure for Submission of Tenders (To be used in case of Paper bid only):** The Tenderers must submit their Tenders to Officer inviting Tender, as detailed below:~~

- ~~● PART-I consisting of 'PART-I A (Techno Commercial Bid)' & 'PART-I B (EMD)' in two separate sealed and superscribed envelopes (ENVELOPE-I & ENVELOPE-II)~~
 - ~~● PART-II (Price Bid) - in sealed and superscribed envelope (ENVELOPE-III)~~
- ~~One set of tender documents shall be retained by the bidder for their reference~~

6.0 ~~The contents for ENVELOPES and the superscription for each sealed cover/Envelope are as given below. (All pages to be signed and stamped) (To be used in case of Paper bid only):~~

Sl. no.	Description	Remarks
	Part-I A	
	ENVELOPE - I superscribed as:- PART-I (TECHNO COMMERCIAL BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: CONTAINING THE FOLLOWING:-	
i. —	Covering letter/Offer forwarding letter of Tenderer.	
ii. —	Duly filled-in 'No Deviation Certificate' as per prescribed format to be placed after document under sl no (i) above. Note: a. In case of any deviation, the same should be submitted separately for technical & commercial parts, indicating respective clauses of tender against which deviation is taken by bidder. The list of such deviation shall be placed after document under sl no (i) above. It shall be specifically noted that deviation recorded elsewhere shall not be entertained. b. BHEL reserves the right to accept/reject the deviations without assigning any reasons, and BHEL decision is final and binding.	

Registered Office: BHEL House, Siri Fort, New Delhi - 110 049, India
Website: www.bhel.com

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	i). In case of acceptance of the deviations, appropriate loading shall be done by BHEL ii). In case of unacceptable deviations, BHEL reserves the right to reject the tender	
iii.	Supporting documents/ annexure/ schedules/ drawing etc. as required in line with Pre-Qualification criteria. It shall be specifically noted that all documents as per above shall be indexed properly and credential certificates issued by clients shall distinctly bear the name of organization, contact ph. no, FAX no, etc.	
iv.	All Amendments/Correspondences/Corrigenda/Clarifications/Changes/ Errata etc. pertinent to this NIT.	
v.	Integrity Pact Agreement (Duly signed by the authorized signatory)	If applicable
vi.	Duly filled-in annexures, formats etc. as required under this Tender Specification/NIT	
vii.	Notice inviting Tender (NIT)	
viii.	Volume – I A : Technical Conditions of Contract (TCC) consisting of Scope of work, Technical Specification, Drawings, Procedures, Bill of Quantities, Terms of payment, etc.	
ix.	Volume – I B : Special Conditions of Contract (SCC)	
x.	Volume – I C : General Conditions of Contract (GCC)	
xi.	Volume – I D : Forms & Procedures	
xii.	Volume – II (UNPRICED – without disclosing rates/price, but mentioning only 'QUOTED' or 'UNQUOTED' against each item	
xiii.	Any other details preferred by bidder with proper indexing.	

	PART-I-B	
	<u>ENVELOPE – II superscribed as:</u> PART-I (EMD) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: <u>CONTAINING THE FOLLOWING:-</u>	
	Earnest Money Deposit (EMD) in the form as indicated in this Tender	

	PART-II	
	<u>PRICE BID</u> consisting of the following shall be enclosed	
	<u>ENVELOPE-III</u> superscribed as: PART-II (PRICE-BID) TENDER NO : NAME OF WORK : PROJECT: DUE DATE OF SUBMISSION: <u>CONTAINING THE FOLLOWING</u>	
i	Covering letter/Offer forwarding letter of Tenderer enclosed in Part-I	
ii	Volume II – PRICE BID (Duly Filled in Schedule of Rates – rate/price to be entered in words as well as figures)	

	OUTER COVER	
	<u>ENVELOPE-IV (MAIN ENVELOPE / OUTER ENVELOPE)</u> superscribed as: TECHNO-COMMERCIAL BID, PRICE BID & EMD TENDER NO: NAME OF WORK: PROJECT: DUE DATE OF SUBMISSION:	

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	CONTAINING THE FOLLOWING:	
i	⊖ Envelopes I ⊖ Envelopes II ⊖ Envelopes III	

- **SPECIAL NOTE: All documents/ annexures to be submitted should be uploaded in respective places in the E-Tender portal as per the list mentioned given in this NIT. BHEL shall not be responsible for any in-complete documents.**

7.0 Deviation with respect to tender clauses and additional clauses/suggestions in Techno-commercial bid / Price bid shall NOT be considered by BHEL. Bidders are requested to positively comply with the same.

8.0 BHEL reserves the right to accept or reject any or all Offers without assigning any reasons thereof. BHEL also reserves the right to cancel the Tender wholly or partly without assigning any reason thereof. Also BHEL shall not entertain any correspondence from bidders in this matter (except for the refund of EMD).

9.0 Assessment of Capacity of Bidders:

Bidder's capacity for executing the job under tender shall be assessed based on its 'LOAD and PERFORMANCE' and 'TURNOVER', as per the following:

- I. **LOAD:** Load takes into consideration **ALL** the contracts of the Bidder under execution with BHEL Regions, irrespective of whether they are similar to the tendered scope or not. The cut off month for reckoning 'Load' shall be the last Month preceding the month corresponding to the 'latest date of bid submission', in the following manner -
(**Note:** For example, if latest bid submission is in Jan 2026, then the 'load' shall be calculated up to and inclusive of Dec 2025)

Total number of LOAs in hand = Load (P)

Where 'P' is the sum of all LOAs under execution with BHEL Regions as on the cut off month defined above, excepting LOAs which are on Long Hold, or yet to start, or whose evaluation has been completed upto last month preceding the month corresponding to the 'latest date of bid submission'.

For example, if latest bid submission is in Jan 2026, then the

- i) LOA with start date in Dec-2025 shall be considered in Load.
- ii) LOA with finish date in Dec-2025 shall not be considered in Load.

- II. **PERFORMANCE:** Here 'Monthly Performance' of the bidder for all the packages (under execution/ executed during the 'Period of Assessment' in all Power Sector Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced shall be taken into consideration. The 'Period of Assessment' shall be 6 months preceding and including the cut off month. The cut off month for reckoning 'Period of Assessment' shall be the 2nd Month preceding the month corresponding to 'latest date of bid submission', in the following manner:

(**Note:** For example, if 'latest date of bid submission' is in Jan 2026, then the 'performance' shall be assessed for a 6 months' period up to and inclusive of Nov 2025 (i.e. from June 2025 to Nov 2025), for all the unit wise identified packages (refer Table I))

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- i). Calculation of Overall 'Performance Rating' for 'Similar Package/Packages' for the tendered scope under execution at Power Sector Regions for the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for all the similar Package/packages', divided by the total number of Package months for which evaluation should have been done, as per procedure below:

- a) $P_1, P_2, P_3, P_4, P_5, \dots, P_N$ etc. be the packages (under execution/ executed during the 'Period of Assessment' in all Regions of BHEL) **SIMILAR** to the packages covered under the tendered scope, excepting packages not commenced. Total number of similar packages for all Regions = P_T (i.e. $P_T = P_1 + P_2 + P_3 + P_4 + \dots + P_N$)
- b) Number of Months ' T_1 ' for which 'Monthly Performance Evaluation' as per relevant formats, should have been done in the 'Period of Assessment' for the corresponding similar package P_1 . Similarly T_2 for package P_2 , T_3 for package P_3 , etc. for the tendered scope. Now calculate cumulative total months ' T_T ' for total similar Packages ' P_T ' for all Regions (i.e. $T_T = T_1 + T_2 + T_3 + T_4 + \dots + T_N$)
- c) Sum ' S_1 ' of 'Monthly Performance Evaluation' Scores ($S_{1-1}, S_{1-2}, S_{1-3}, S_{1-4}, S_{1-5}, \dots, S_{1-T_1}$) for similar package P_1 , for the 'period of assessment' ' T_1 ' (i.e. $S_1 = S_{1-1} + S_{1-2} + S_{1-3} + S_{1-4} + S_{1-5} + \dots + S_{1-T_1}$). Similarly, S_2 for package P_2 for period T_2 , S_3 for package P_3 for period T_3 etc. for the tendered scope for all Regions. Now calculate cumulative sum ' S_T ' of 'Monthly Performance Evaluation' Scores for total similar Packages ' P_T ' for all Regions (i.e. ' $S_T = S_1 + S_2 + S_3 + S_4 + S_5 + \dots + S_N$ ')
- d) **Overall Performance Rating ' R_{BHEL} ' for the Similar Package/Packages** (under execution/ executed during the 'Period of Assessment') in all the Power Sector Regions of BHEL

Aggregate of Performance scores for all similar packages in all the Regions

= -----

Aggregate of months for each of the similar packages for which performance

should have been evaluated in all the Regions

S_T
= -----
 T_T

- e) Bidders to note that the risk of non-evaluation or non-availability of the 'Monthly Performance Evaluation' reports as per relevant formats is to be borne by the Bidder.
- f) Table showing methodology for calculating 'a', 'b' and 'c' above

Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)

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Sl. No.	Item Description	Details for all Regions							Total
(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)	(x)
1	Similar Packages for all Regions → (under execution/ executed during period of assessment)	P ₁	P ₂	P ₃	P ₄	P ₅	...	P _N	Total No. of similar packages for all Regions = P_T i.e. Sum (Σ) of columns (iii) to (ix)
2	Number of Months for which 'Monthly Performance Evaluation' as per relevant formats should have been done in the 'period of assessment' for corresponding Similar Packages (as in row 1)	T ₁	T ₂	T ₃	T ₄	T ₅	...	T _N	Sum (Σ) of columns (iii) to (ix) = T_T
3	Monthly performance scores for the corresponding period (as in Row 2)	S ₁₋₁ , S ₁₋₂ , S ₁₋₃ , S ₁₋₄ , ... S _{1-T1}	S ₂₋₁ , S ₂₋₂ , S ₂₋₃ , S ₂₋₄ , ... S _{2-T2}	S ₃₋₁ , S ₃₋₂ , S ₃₋₃ , S ₃₋₄ , ... S _{3-T3}	S ₄₋₁ , S ₄₋₂ , S ₄₋₃ , S ₄₋₄ , ... S _{4-T4}	S ₅₋₁ , S ₅₋₂ , S ₅₋₃ , S ₅₋₄ , ... S _{5-T5}		S _{N-1} , S _{N-2} , S _{N-3} , S _{N-4} , ... S _{N-TN}	-----
4	Sum of Monthly Performance scores of the corresponding Package for the corresponding period (as in row-3)	S ₁	S ₂	S ₃	S ₄	S ₅	...	S _N	Sum (Σ) of columns (iii) to (ix) = S_T

- ii). Calculation of Overall 'Performance Rating' (R_{BHEL}) in case at least 6 evaluation scores for 'similar Package/Packages' for the tendered scope ARE NOT AVAILABLE, during the 'Period of Assessment':

This shall be obtained by summing up the 'Monthly Performance Evaluation' scores obtained by the bidder in all Regions for ALL the packages, divided by the total number of Package months for which evaluation should have been done. ' R_{BHEL} ' shall be calculated subject to availability of 'performance scores' for at least 6 'package months' in the order of precedence below:

- 'Period of Assessment' i.e. 6 months preceding and including the cut-off month
- 12 months preceding and including the cut-off month
- 24 months preceding and including the cut-off month

In case, R_{BHEL} cannot be calculated as above, then Bidder shall be treated as 'NEW VENDOR'. Further eligibility and qualification of this bidder shall be as per definition of 'NEW VENDOR' described in 'Explanatory Notes'.

- iii). Factor "L" assigned based on Overall Performance Rating (R_{BHEL}) at Power Sector Regions:

Registered Office: BHEL House, Siri Fort, New Delhi - 110 049, India
Website: www.bhel.com

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Sl. no.	Overall Performance Rating (R_{BHEL})	Corresponding Value of 'L'
1	≥ 60 and < 62	NA
2	≥ 62	0.45

- iv). Performance Systems: The performance rating as mentioned in II (i) and (ii) above, shall be calculated as per Online Systems i.e. Contractor Performance Evaluation System (CPES) and Safety Performance Evaluation System (HSEPES). The scores assigned in HSEPES shall be scaled down to 10 and assigned in CPES against the category "HSE" (mentioned in Form F-15).

III. i) 'Assessment of Capacity based on 'LOAD and PERFORMANCE':

- a) 'Assessment of Capacity of Bidder' is based on the Maximum number of LOAs for which a vendor is eligible, considering the performance scores of similar packages, as below:

Max number of-LOA $P_{Max} = (R_{BHEL} - 60)$ divided by corresponding value of 'L', i.e. $(R_{BHEL} - 60)/L$

Note:

- i). In case the value of P_{Max} results in a fraction, the value of P_{Max} is to be rounded off to next whole number
ii). For $R_{BHEL} \geq 60$ and < 62 , $P_{Max} = '5'$

The Bidder shall be considered 'Qualified' on 'Performance basis' as per 'Assessment of Capacity of Bidder' for the subject Tender if $P \leq P_{Max}$
(Where P is calculated as per clause 'I' above)

- b) In addition to above, the contractor shall be considered disqualified for ongoing tender(s) of BHEL, in case contractor fails to obtain an overall average score of 6 or more than 6 (six) (in the scaled down scores of HSEPES) out of 10 considered for Performance Rating as per sl no II (ii), in a period of '6 months preceding and including the cut-off month'. The period of '6 months preceding and including the cut-off month' can be extended to 12 months and further to 24 months, to account for 'performance scores' for at least 6 'package months'.

In case 6 HSE evaluation scores are not available then overall average of available HSE scores in last 24 months will be considered for disqualification as above.

Bidders who did not qualify this condition shall not be considered under the provisions of clause 9 IV (iv) of NIT.

ii) Assessment of Capacity based on 'TURNOVER':

If the 'value of contracts in hand' across all PS Regions by a contractor is less than the product of "maximum of 'annual average turnover for last 3 years' or 'latest FY turnover' of the Contractor and multiplying factor", then such bidder shall be considered qualified on 'Annual Average Turnover basis'. The 'value of contracts in hand' will be computed by summing up "50% of the annualized awarded value of each contract" unless performance evaluation is not closed in the online CPES.

Based on the performance rating of the Contractor, the above mentioned multiplying factor shall be as below:

Sl. no.	Overall Performance Rating (R_{BHEL})	(Multiplying factor to Turnover)
1	< 60	0
2	≥ 60 and ≤ 62	1.0
3	> 62 and ≤ 65	1.5

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4	> 65 and ≤ 70	2.0
5	> 70 and ≤ 75	2.5
6	> 75 and ≤ 80	3.0
7	> 80	3.5

'Assessment of Capacity of Bidder':

The bidder will be considered qualified for the tender if it qualifies on 'Load and Performance basis' as well as on 'Average Annual Turnover basis'.

However, 'Consortium Partner' shall be considered qualified based on only 'Overall Performance Rating ≥60' and HSE criteria (as per Sl. No. III i) (b)) (they will be regarded pre-qualified on other criteria).

IV. Explanatory note:

- i). Similar package means Boiler or ESP or Piping or Turbine or Civil or Structure or Electrical or C&I etc. at the individual level irrespective of rating of Plant and irrespective of whether the subject tender is a single package or as part of combined/composite packages. Normally Boiler, ESP, Piping, Turbine, Electrical, C&I, Civil, Structure etc. is considered individual level of package. For example, in case the tendered scope is a Boiler Vertical Package comprising of Boiler, ESP and Power Cycle Piping (i.e. the 'identified packages as per Table-1 below), the 'PERFORMANCE' part against sl.no. II above, needs to be evaluated considering all the identified packages (i.e. Boiler, ESP and Power Cycle Piping) and finally the Bidder's capacity to execute the tendered scope is assessed in line with III above.
- ii). Identified Packages (Unit wise)

Table-1

Civil	Electrical and C&I	Mechanical	EPC BOP
i). Enabling works ii). Pile and Pile Caps iii). Civil Works including foundations iv). Structural Steel Fabrication & Erection v). Chimney vi). Cooling Tower vii). Others (Civil)	i). Electrical ii). C&I iii). Others (Elect. and C&I) iv). Electrical Enabling Works	i). Boiler & Aux (All types including CW Piping if applicable) ii). Power Cycle Piping/Critical Piping iii). ESP iv). LP Piping v). Steam Turbine Generator set & Aux vi). Gas Turbine Generator set & Aux vii). Hydro Turbine Generator set & Aux viii). Turbo Blower (including Steam Turbine) ix). Material Management x). FGD xi). ACC xii). Others (Mechanical)	i). Engineering ii). Supply

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- iii). Bidders who have not been evaluated for at least six package months in the last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions, shall be considered "NEW VENDOR".

A 'NEW VENDOR' shall be considered qualified subject to satisfying all other tender conditions.

A 'NEW VENDOR' if awarded a job (of package/ packages identified under this clause) shall be tagged as "FIRST TIMER" on the date of LOA from BHEL.

The "FIRST TIMER" tag shall remain till completion of all the contracts against which vendor has been tagged as First Timer or availability of 6 evaluation scores within last 24 months preceding and including the Cut-off month in the online BHEL system for contractor performance evaluation in BHEL PS Regions. However, in case six months have passed after award of contract against which vendor has been tagged as First Timer and no evaluation score is available till the Cut-off month, then the "FIRST TIMER" tag shall be removed.

A Bidder shall not be eligible for the next job as long as the Bidder is tagged as "FIRST TIMER" excepting for following:

- the Tenders have been opened on or before the date of the bidder being tagged as 'FIRST TIMER' or
- in the last 24 months preceding and including the Cut-off month, the average of the available evaluation scores being ≥ 60 and average of available HSE scores ≥ 6 .

After removal of 'FIRST TIMER' tag, the Bidder shall be considered 'QUALIFIED' for the future tenders subject to satisfying all tender conditions including 'Assessment of Capacity of Bidders'.

- iv). Consequent upon applying the criteria of 'Assessment of Capacity of Bidders' detailed above on all the bidders qualified against Technical and Financial Qualification criteria, if the number of qualified bidders reduces to less than four, then for further processing of the Tender, BHEL at its discretion reserves the right to also consider the bidders who are "not qualified" as per criteria of 'Assessment of Capacity of Bidders', excluding the bidders disqualified on basis of HSE (as per Sl. No. III i) (b)), and for this, procedure described in following four options shall be followed:

- a) All the bidders having Overall Performance Rating ('R_{BHEL}') ≥ 60 shall be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
- b) If even after using option "a", the number of qualified bidders remains less than four, then in addition to bidders considered as per option "a", "First timer" bidders for whom no performance score is available in the system upto and including the Cut Off month, shall also be considered qualified against criteria of 'Assessment of Capacity of Bidders'.
- c) If even after using option "a" and "b" the number of qualified bidders remains less than four, remaining bidders shall be "listed" as per their descending order of Overall Performance Rating ('R_{BHEL}') or average of available performance scores for "First timer" bidders upto and including the Cut Off month.
Bidders as per option "a", "b" and additional top bidders as "listed" above shall be considered qualified against criteria of 'Assessment of Capacity of Bidders' to make the total numbers of qualified bidders as four.

In case, from the "listed" bidders, more than 1 "listed" bidder are having the same average performance score, then all such bidders shall be considered.

Example-

3 bidders are considered from "a" and "b".

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From remaining "listed" bidders, 3 top bidders have same average performance scores. Then all 3 "listed" bidders shall be considered.

Note:- In case, the number of bidders qualified against Technical and Financial Qualification criteria itself is less than four, then all bidders shall be considered qualified against criteria of 'Assessment of Capacity of Bidders' for further processing of tender.

- v). 'Under execution' shall mean works in progress as per the following:
- a. Up to supply of 95% of Contract Value of Main Supply BOQs in case of Supply Packages.
 - b. Up to approval of 90% of drawings as per MDL, ensuring approval of all drawings/docs required for construction/erection & commissioning purposes, in case of Engineering Packages.
 - c. Up to execution of 90% of anticipated Contract Value in case of Civil/ MM/ Structural/ Turbo Blower Packages
 - d. Up to Steam Blowing in case of Boiler/ ESP/ Piping Packages
 - e. Up to Synchronization in all Balance Packages
- vi). Contractor shall provide the latest contact details i.e. mail-ID and Correspondence Address to SCT Department, so that same can be entered in the Contractor Performance Evaluation System, and in case of any change/discrepancy same shall be informed immediately. Login Details for viewing scores in Contractor Performance Evaluation System shall be provided to the Contractor by SCT Department.
- vii). Performance Evaluation for Activity Month shall be completed latest by 18th of Evaluation Month (i.e. month next to Activity Month). In case scores are not acceptable, Contractor can submit Review Request to GM Site/ GM Project/ PD latest by 23rd of Evaluation Month. However, acceptance/rejection of 'Review Request' solely depends on the discretion of GM Site/GM Project/ PD. After acceptance of Review Request, evaluation score shall be reviewed and the score after completion of review process shall be acceptable and binding on the contractor. Review process shall be completed by end of Evaluation Month.
- viii). Project on Hold due to reasons not attributable to bidder -
- a. **Short hold:** Evaluation shall not be applicable for this period, however, Loading will be considered.
 - b. **Long hold:** Short hold for continuous six months and beyond or hold on account of Force Majeure shall be considered as Long Hold. Evaluation as well as Loading shall not be considered for this period.

Performance evaluation as specified above in this clause is applicable to Prime bidder and Consortium partner (or Technical tie up partner) for their respective scope of work

10.0 Since the job shall be executed at site, bidders must visit site/ work area and study the job content, facilities available, availability of materials, prevailing site conditions including law & order situation, applicable wage structure, wage rules, etc. before quoting for this tender. They may also consult this office before submitting their offers, for any clarifications regarding scope of work, facilities available at sites or on terms and conditions.

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- 11.0 For any clarification on the tender document, the bidder may seek the same in writing or through e-mail and/or through e-procurement portal <https://eprocurebhel.co.in>, as per specified format, within the scheduled date for seeking clarification, from the office of the undersigned. BHEL shall not be responsible for receipt of queries after due date of seeking clarification due to postal delay or any other delays. Any clarification / query received after last date for seeking clarification may not be normally entertained by BHEL and no time extension will be given.
- 12.0 BHEL may decide holding of pre-bid discussion [PBD] with all intending bidders as per date indicated in the NIT. The bidder shall ensure participation for the same at the appointed time, date and place as may be decided by BHEL. Bidders shall plan their visit accordingly. The outcome of pre-bid discussion (PBD) shall also form part of tender.
- 13.0 In the event of any conflict between requirement of any clause of this specification/ documents/drawings/data sheets etc. or requirements of different codes/standards specified, the same to be brought to the knowledge of BHEL in writing for clarification before due date of seeking clarification (whichever is applicable), otherwise, interpretation by BHEL shall prevail. Any typing error/missing pages/ other clerical errors in the tender documents, noticed must be pointed out before pre-bid meeting/submission of offer, else BHEL's interpretation shall prevail.
- 14.0 Unless specifically mentioned otherwise, bidder's quoted price shall deemed to be in compliance with tender including PBD.
- 15.0 Bidders shall submit Integrity Pact Agreement (Duly signed by authorized signatory who signs in the offer), if applicable, along with techno-commercial bid. This pact shall be considered as a preliminary qualification for further participation. The names and other details of Independent External Monitor (IEM) for the subject tender is as given at point (1) above.

"Integrity Pact (IP)"

- (a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Sl. No.	IEM	Email
1.	Dr. Sarat Kumar Acharya, Ex-CMD, NLC	iem1@bhel.in
2.	Shri R. Mukundan, IRPS (Retd.)	iem2@bhel.in
3.	Shri Madan Lal Meena, IAS (Retd.)	iem3@bhel.in

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- (c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

Registered Office: BHEL House, Siri Fort, New Delhi - 110 049, India
Website: www.bhel.com

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Details of contact person(s):

Name:	Sh VK Arya /GM(Purchase)	Biraj Roy/ Sr.Manager (Purchase)	Varun Vaidya/Sr Manager
Dept:	Purchase Department		
Address:	Floor No. 5 & 6, Shreemohini Complex, 345 Kingsway, Nagpur-440001		
Email:	vkarya@bhel.in	biraj@bhel.in	vvaidya@bhel.in
Phone:		9587886706	9792334127

16.0 The Bidder has to satisfy the Pre-Qualifying Requirements stipulated for this Tender in order to be qualified. The Price Bids of only those bidders will be opened who will be qualified for the subject job on the basis of satisfying the Pre-Qualification Criteria specified in this NIT as per Annexure-I (as applicable), past performance etc. and date of opening of price bids shall be intimated to only such bidders. BHEL reserves the right not to consider offers of parties under HOLD.

17.0 In case BHEL decides on a 'Public Opening', the date & time of opening of the sealed PRICE BID shall be intimated to the qualified bidders and in such a case, bidder may depute one authorized representative to witness the price bid opening. BHEL reserves the right to open 'in-camera' the 'PRICE BID' of any or all Unsuccessful/Disqualified bidders under intimation to the respective bidders.

18.0 Validity of the offer shall be for **six months** from the latest due date of offer submission (including extension, if any) unless specified otherwise.

19.0 **Reverse Auction:** "BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com (<https://www.bhel.com/guidelines-reverse-auction-2024>))." for this tender. RA shall be conducted among all the techno-commercially qualified bidders.

Price Bids of all the techno-commercially qualified bidders shall be opened and same shall be considered as initial bids of bidders in RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.

20.0 On submission of offer, further consideration will be subject to compliance to tender & qualifying requirement and customer's acceptance, as applicable.

21.0 In case the bidder is an "Indian Agent of Foreign Principals", 'Agency agreement has to be submitted along with Bid, detailing the role of the agent along with the terms of payment for agency commission in INR, along with supporting documents.

22.0 The bidders shall not enter into any undisclosed M.O.U. or any understanding amongst themselves with respect to tender.

23.0 Consortium Bidding (or Technical Tie up) shall be allowed only if specified in Pre-Qualifying Requirement (PQR) criteria, and in such a case the following shall be complied with:

23.1 Prime Bidder and Consortium Partner or partners are required to enter into a consortium agreement for the said contract with a validity period of six months initially. In case bidder becomes L1, Consortium Agreement valid till contractual completion period shall be submitted to BHEL before signing the contract. Consortium Agreement shall be kept valid till scope of work awarded to consortium partner(s) as per contract is completed.

23.2 'Standalone' bidder cannot become a '**Prime Bidder**' or a '**Consortium bidder**' or '**Technical Tie up bidder**' in a consortium (or Technical Tie up) bidding. Prime bidder shall neither be a consortium partner to other prime bidder nor take any other consortium partners. However, consortium partner

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may enter into consortium agreement with other prime bidders. In case of non-compliance, consortium bids of such Prime bidders will be rejected.

23.3 Number of partners for a Consortium Bidding (or Technical Tie up) including Prime Bidder shall be NOT more than 3 (three).

23.4 Prime Bidder shall be as specified in the Pre-Qualification Requirement, else the bidder who has the major share of work.

23.5 In order to be qualified for the tender, Prime Bidder and Consortium partner or partners shall satisfy (i) the Technical 'Pre Qualifying Requirements' specified for the respective package, (ii) "Assessment of Capacity of Bidder" as specified in clause 9.0.

23.6 Prime Bidder shall comply with additional 'Technical' criteria of PQR as defined in 'Explanatory Notes for the PQR'.

23.7 Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified

23.8 In case customer approval is required, then Prime Bidder and Consortium Partner or partners shall have to be individually approved by Customer for being considered for the tender.

23.9 Prime Bidder shall be responsible for the overall execution of the contract.

23.10 In case of award of job, Performance shall be evaluated for Prime Bidder and Consortium Partner or partners for their respective scope of work(s) as per prescribed formats.

23.11 In case the Consortium partner or partners back out, their SDs shall be encashed by BHEL and BHEL shall take necessary action as per extant guidelines. In such a case, other consortium partner or partners meeting the PQR have to be engaged by the Prime Bidder, and if not, the respective work will be withdrawn and executed on risk and cost basis of the Prime Bidder. The new consortium partner or partners shall submit fresh SDs as applicable.

23.12 In case "Prime Bidder withdraws" or "insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder/ consortium bidders",

- consortium bids will be rejected
- BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL's interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL.

23.13 After execution of work, the work experience shall be assigned to the Prime Bidder and the consortium partner or partners for their respective scope of work. After successful execution of the scope of work of Consortium partner under direct order of BHEL, the Prime Bidder shall be eligible for becoming a 'standalone' bidder for works similar to that for which consortium partner was engaged, for subsequent tenders unless otherwise specifically mentioned elsewhere.

Execution for the scope of work of consortium partner shall mean:

- i. "BOILER LIGHT UP" in respect of Boiler/CFBC/ESP.
- ii. Achievement of physical Quantities as per respective PQRs in respect of Civil, Structures, Piling and CHP Civil.

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23.14 The consortium partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value. In case there are two consortium partners, then each partner shall submit SD equivalent to 0.5% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value. However, Prime Bidder has also option for submission of SD on behalf of consortium partner (s).

SD submitted by Consortium Partner(s) may be released in case corresponding scope of work of the respective Consortium partner(s) has been completed upto the extent of 80% based on certification by Construction Manager and concurrence by the prime bidder.

23.15 In case of a Technical Tie up, all the clauses applicable for the Consortium partner shall be applicable for the Technical Tie up partner also.

24.0 The bidder shall submit/upload documents in support of possession of 'Qualifying Requirements' duly self-certified and stamped by the authorized signatory, indexed and properly linked in the format for PQR. In case BHEL requires any other documents/proofs, these shall be submitted immediately.

25.0 The bidder may have to produce original document for verification if so decided by BHEL.

26.0 The consultant / firm (and any of its affiliates) shall not be eligible to participate in tender(s) for the related works or services for the same project, if they were engaged for the consultancy services.

27.0 Guidelines/rules in respect of Suspension of Business dealings, Vendor evaluation format, Quality, Safety & HSE guidelines, Experience Certificate, etc. may undergo change from time to time and the latest one shall be followed. The abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' is available on www.bhel.com on "supplier registration page".

28.0 The offers of the bidders who are on the banned/ hold list and also the offer of the bidders, who engage the services of the banned/ hold firms, shall be rejected. The list of **banned/ hold firms** is available on BHEL web site www.bhel.com.

28.1 Integrity commitment, performance of the contract and punitive action thereof:

28.1.1 Commitment by BHEL:

BHEL commits to take all measures necessary to prevent corruption in connection with the tender Process and execution of the contract. BHEL will during the tender process treat all Bidder(s) in a transparent and fair manner, and with equity.

28.1.2 Commitment by Bidder/ Supplier/ Contractor:

- (i) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.
- (ii) The bidder/ supplier/ contractor will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to relevant guidelines issued from time to time by Govt. of India/ BHEL.
- (iii) The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the prices or acts or omits in any manner which tantamount to an offence punishable under any provision of the

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Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extent guidelines of the company available on www.bhel.com and / or under applicable legal provisions.

29.0 Micro and Small Enterprises (MSE)

Any Bidder falling under MSE category, shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer.

Type under MSE	SC/ST owned	Women owned	Others (excluding SC/ ST & Women Owned)
— Micro			
— Small			

Note: – If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category.

a) MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011-MA dtd. 09/11/2016 office of AS & DC, MSME) only if they submit along with the offer, attested copies of either Udyam Registration Certificate or EM-II certificate having deemed validity (five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or Udyog Aadhar Memorandum (UAM) & Acknowledgement or EM-II Certificate along with attested copy of a CA certificate (format enclosed as Annexure – 3) where deemed validity of EM-II certificate of five years has expired applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if 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 by a Gazetted officer. Documents submitted by the bidder may be verified by BHEL for rendering the applicable benefits.

30.0 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.

31.0 PREFERENCE TO MAKE IN INDIA:

For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/Non-Local Supplier and purchase preferences to Class I local supplier, is as defined I Public Procurement (Preference to Make in India), Order 2017 dated **19.07.2024** issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.

31.1 Compliance to Restrictions under Rule 144 (xi) of GFR 2017

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of this Clause shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT).
- II. “Bidder” (including the term ‘tenderer’, ‘consultant’ or ‘service provider’ in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. “Bidder from a country which shares a land border with India” for the purpose of this Clause means: -

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- a. An entity incorporated established or registered in such a country; or
- b. A subsidiary of an entity incorporated established or registered in such a country; or
- c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
- d. An entity whose beneficial owner is situated in such a country; or
- e. An Indian (or other) agent of such an entity; or
- f. A natural person who is a citizen of such a country; or
- g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.

IV. The beneficial owner for the purpose of (III) above will be as under:

1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation

- a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company.
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements.
2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership.
 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person has ownership of or entitlement to more than fifteen percent of the property or capital or profits of the such association or body of individuals.
 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.

VI. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority.

Note:

- (i) The bidder shall provide undertaking for their compliance to this Clause, in the Format provided in **Annexure-11**.
- (ii) Registration of the bidder with Competent Authority should be valid at the time of submission as well as acceptance of the bids.

32.0 Bid should be free from correction, overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection.

All overwriting/cutting, etc., will be numbered by bid opening officials and announced during bid opening.

33.0 In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss/ draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

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Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

34.0 The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/ guidelines.

35.0 Grievance Redressal Mechanism: To promote transparency and ensure fair treatment of all bidders, a structured Grievance Redressal Mechanism is in place to address any concerns or issues arising during the tendering process.

Suppliers/Contractors are requested to follow the below escalation process for grievance resolution:

1. First Level: Any grievance should initially be addressed to the designated Dealing Officer, whose contact details are provided in the Notice Inviting Tender (NIT).

2. Second Level: If the issue remains unresolved, it may be escalated by lodging a formal grievance through the SUVIDHA Portal: <https://suvidha.bhel.in/suvidha/>. Responses will be provided in accordance with the defined escalation matrix."

36.0 Order of Precedence:

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

- a. Amendments/Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL
- b. Notice Inviting Tender (NIT)
- c. Price Bid
- d. Technical Conditions of Contract (TCC)—Volume-1A
- e. Special Conditions of Contract (SCC) —Volume-1B
- f. General Conditions of Contract (GCC) —Volume-1C
- g. Forms and Procedures —Volume-1D

It may please be noted that guidelines/ circulars/ amendments/ govt. directives issued from time to time shall also be applicable.

For BHARAT HEAVY ELECTRICALS LTD

(General Manager - Purchase)

Enclosure:

- 1.0 Annexure-1: Pre Qualifying Requirements.
- 2.0 Annexure-2: Check List.
- 3.0 ~~Annexure-3: Certificate by Chartered Accountant~~
- 4.0 Annexure-4: Reverse Auction Process Compliance Form

Registered Office: BHEL House, Siri Fort, New Delhi - 110 049, India
Website: www.bhel.com

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- 5.0** Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process
 - 6.0** Annexure-6: RA Price Confirmation and Breakup
 - 7.0** Annexure-7: Integrity Pact
 - 8.0** Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR
 - 9.0** Annexure-9: Declaration reg. Related Firms & their areas of Activities
 - 10.0** Annexure-10: Declaration regarding minimum local content
 - 11.0** Annexure-11: Declaration regarding compliance to restrictions under rule 144 (xi) of GFR 2017
 - 12.0** Annexure 12: Important information.
 - 13.0** Annexure-13 Declaration/Undertaking regarding Conflict of Interest among Bidders
 - 14.0** Annexure-14 - Bid Security Declaration Form

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ANNEXURE-1

PRE QUALIFYING CRITERIA

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JOB	DISMANTLING OF EXISTING ELECTRICAL AND C&I SYSTEM, HANDING OVER MATERIAL TO CUSTOMER, HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) WORKS FOR RENOVATION & MODERNIZATION OF ONE UNIT OF KADANA PUMPED HYDRO POWER PLANT FOR PUMP MODE OPERATION INCLUDING SCADA OF ALL 04 UNITS (U1 To U4)...

S No	PRE QUALIFICATION CRITERIA	Bidders claim in respect of fulfilling the PQR Criteria	
		Applicability	
A	Submission of Integrity Pact duly signed (if applicable) (Note: To be submitted by Prime Bidder & Consortium /Technical Tie up partner jointly in case Consortium bidding is permitted, otherwise by the sole bidder)	Not Applicable	
B	B Technical PQR Bidder shall essentially meet all the Qualifying Requirements i.e. B.1 & B.2 & B.3 as under, in the last seven years as on latest date of bid submission: B.1 Bidder should have executed similar work for any one of the following in the last seven years from latest date of bid submission: B.1.1 One (1) work (as defined below) of value not less than 77.77 Lakhs. OR B.1.2 Two (2) works (as defined below) each of value not less than 48.60 lakhs. OR B.1.3 Three (3) works (as defined below) each of value not less than 38.8 lakhs. Similar Works Definition: Electrical or C&I or Electrical and C&I works shall be considered as similar works. AND B.2.1 Executed Erection and Commissioning of “Electrical or C&I or Electrical & C&I works for BTG/GT/Power Plant”. OR B.2.2 Executed Renovation and Modernization (R&M) works of “Electrical or C&I or Electrical and C&I works for BTG/GT/Power Plant”. AND	Applicable	

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	B.3 Bidder should have executed Electrical works consisting of erection and commissioning of Transformers (at least 60% of highest tendered MVA rating of Transformer i.e., at least 11 MVA). Note: • Bidder should satisfy all both B.1 & B.2 & B.3 of the PQR. • AMC & Overhauling work shall not be considered.		
C-1	FINANCIAL TURNOVER Bidders must have achieved an average annual financial turnover (audited) of ₹ 29.16 Lakhs or more over last three Financial Years (FY) i.e. '2022-23 ,2023-24 & 2024-25'	Applicable	
C-2	NETWORTH (only in case of Companies) Net worth of the Bidder based on the latest Audited Accounts as furnished for 'C-1' above should be positive.	Applicable	
C-3	PROFIT Bidder must have earned profit in any one of the Five Financial Years as applicable in the last Five Financial Years ("2020-21, 2021-22, 2022-23, 2023-24 & 2024-25' as on date)". Bidders to submit audited Balance sheet and Profit & Loss statement for the years as supporting documents.	Applicable	
C-4	Bidder must not be under Insolvency Resolution Process or Liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/authorities, which will render him ineligible for participation in this tender, and shall submit undertaking (Annexure-8) to this effect	Applicable	
D	Assessment of Capacity of Bidder to execute the work as per sl no 9 of NIT (if applicable) Applicable, The "Assessment of Capacity of Bidders" for this Tender shall be carried out by considering the identified packages i.e. "Others - Electrical & C&I"	Applicable	
E	Approval of Customer (if applicable)	Applicable	BY BHEL
F	Price Bid Opening Note: Price Bids of only those bidders shall be opened who stand qualified after compliance of criteria A to E		BY BHEL
G	Consortium tie-ups	Not Applicable	

Explanatory Notes for the PQR (unless otherwise specified in the PQR):

Explanatory Notes for PQR B.1 (Technical)

1. The evaluation currency for this tender shall be INR.
2. For the criteria (B.1), actual executed value shall be considered.
3. Value of work is to be updated with indices for "All India Avg. Consumer Price index for industrial workers" and "Monthly Whole Sale Price Index for All Commodities" with base month as per last month of work execution and indexed up to three (3) months prior to the month of latest due

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date of bid submission as per following formula-

$$P = R + 0.425 \times R \times \frac{(X_N - X_0)}{X_0} + 0.425 \times R \times \frac{(Y_N - Y_0)}{Y_0}$$

Where

P = Updated value of work

R = Value of executed work

X_N = All India Avg. Consumer Price index for industrial workers for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).

X₀ = All India Avg. Consumer Price index for industrial workers for last month of work execution

Y_N = Monthly Whole Sale Price Index for All Commodities for three months prior to the month of latest due date of bid submission (e.g. If latest bid submission date is 02-Mar-17, then bid submission month shall be reckoned as March'17 and index for Dec'2016 shall be considered).

Y₀ = Monthly Whole Sale Price Index for All Commodities for last month of work execution

Explanatory Notes for Technical Criteria (B2):

1. VOID
2. Unless otherwise specified, for the purpose of "B2 Technical Criteria", the word 'EXECUTED' means achievement of milestones as defined below -
 - a. "ACHIEVEMENT OF PHYSICAL QUANTITIES" as per PQRs.
 - b. "READINESS FOR COAL FILLING" of at least one Bunker, in respect of Mill Bunker Structure.
 - c. "CHARGING" in respect of Power Transformers/ Bus Ducts/ "HT/LT Switchgears" / "HT/LT Cabling".
 - d. For C&I works: "SYNCHRONISATION" in case of power project (Excluding Nuclear Projects) / "WORK EXECUTION of the value as defined in PQR" in case of industry & Nuclear Projects.
 - e. "BOILER LIGHT UP" in respect of Boiler / CFBC / ESP.
 - f. "CHARGING OF ATLEAST ONE PASS" in respect of ESP(R&M)
 - g. "GAS IN" in respect of HRSG.
 - h. "STEAM BLOWING" in respect of Power Cycle Piping.
 - i. "HYDRAULIC TEST"/ ANY OTHER EQUIVALENT TEST LIKE "100% RT/UT OF WELDED JOINTS" of the system in respect of Pressure parts/ LP Piping/CW Piping.
 - j. "FULL LOAD OPERATION OF THE UNIT" in respect of Insulation work.
 - k. "SYNCHRONISATION" in respect of STG / GTG.
 - l. "SPINNING" in respect of HTG.
 - m. "GAS IN" in respect of FGD
3. Boiler means HRSG or WHRB or any other types of Steam Generator.
4. Power Cycle piping means Main Steam, Hot Reheat, Cold Reheat, HP Bypass.
5. For the purpose of evaluation of the PQR, one MW shall be considered equivalent to 3.5 TPH where ever rating of HRSG/BOILER is mentioned in MW. Similarly, where ever rating of Gas Turbine is mentioned in terms of Frame size, ISO rating of the same in terms of MW shall be considered for evaluation.

Explanatory Notes for PQR -C (Financial):

C-1:

- i. Bidder to submit Audited Balance Sheet and Profit and Loss Account for the respective years as indicated against C-1 above.
- ii. Evaluation of Turnover criteria shall be calculated from the Audited Balance Sheet and Profit & Loss Account for the three Financial Years (FY).

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- iii. In case audited Financial statements have not been submitted for all the three years as indicated against C-1 above, then the applicable audited statements submitted by the bidders against the requisite three years, will be averaged for three years.
- iv. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by Chartered Accountant.

C-2: Net Worth (Only in case of companies) of the bidder should be positive.

Note: Net worth shall be calculated based on the latest Audited Accounts as furnished for 'C-1' above.

Net worth = Paid up share capital + Reserves

C-3: Bidder must have earned profit in any one of the **Five** financial years as applicable in the last **Five** financial years as furnished for 'C-1' above.

Note: PROFIT shall be PBT earned during any one year of last **Five** financial years as in 'C-1' above.

C-4: Bidder must not be under Bankruptcy Code Proceedings (IBC) by NCLT or under Liquidation / BIFR, which will render him ineligible for participation in this tender, and shall submit undertaking to this effect.

Common Explanatory Notes:

1. For evaluation of PQR, in case Bidder alone does not meet the pre-qualifying technical criteria B1 above, bidder may utilize the experience of its Parent/ Subsidiary Company along with its own experience, subject to following:
 - a. The parent company shall have a controlling stake of $\geq 50\%$ in the subsidiary company (as per Format-1).
 - b. The Parent Company/ Subsidiary Company of which experience is being utilized for bidding shall submit Security Deposit(SD) equivalent to 1% of the total contract value
 - c. The parent/ subsidiary company and bidder shall provide an undertaking that they are jointly or severally responsible for successful performance of the contract (as per Format-2).
 - d. In case Bidder is submitting bid as a Consortium Partner, option of utilizing experience of parent/subsidiary Company can be availed by Prime Bidder only.
 - e. Parent Company/ Subsidiary Company of which experience is being used for bidding, cannot participate as a 'Standalone Bidder' or as a 'Consortium bidder'.
2. Completion date for achievement of the technical criteria specified in the 'B' above should be in the last 7 years ending on the 'latest date of Bid Submission' of Tender irrespective of date of the start of work. Completion date shall be reckoned from the "Financial Year quarter of bid submission". (for e.g. -Work completed on 01.01.2014 shall be considered even if latest date of bid submission is 20.03.2021).
3. "Executed" means the bidder should have achieved the technical criteria specified in the Common QR even if the Contract has not been completed or closed.
4. In case the Experience/PO/WO certificate enclosed by bidders do not have separate break up of prices for the E&C portion for Electrical and C&I works (i.e. the certificates enclosed are for composite order for supply and erection of Electrical and C&I and other works if any), then value of Erection & Commissioning for the Electrical and C&I portion shall be considered as 15% of the price for supply & erection of Electrical and C&I.
5. Following shall be complied with in case of consortium:
 - a. The Prime Bidder and Consortium Partner(s) are required to enter in to a consortium agreement and certify to BHEL regarding existence and validity of their consortium agreement

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- in line with validity period mentioned in NIT.
- b. Prime Bidder and Consortium partners shall be approved by Customer for being considered for the tender (applicable if customer approval is required).
 - c. Number of partners including prime Bidder shall be NOT more than 3 (three).
 - d. Prime Bidder alone shall necessarily comply with “B1 Technical Criteria” except for mechanical package where B1 criteria is not applicable.
 - e. Prime Bidder and Consortium Partner shall together comply with the ‘Pre-Qualification Requirements’ specified for the respective category of technical requirement as per “B2 technical criteria”.
 - f. Prime Bidder shall comply with all other Pre Qualifying criteria for the Tender unless otherwise specified.
 - g. All other conditions shall be read in conjunction with clause no 23.0 of NIT.
 - h. Prime Bidder shall be the Bidder who has a major share of work.
 - i. Prime Bidder shall be responsible for the overall execution of the Contract.
 - j. Performance shall be evaluated for Prime Bidder and the Consortium partner for their respective scope of work.
 - k. In case the Consortium partner backs out, another consortium partner meeting the QRs, has to be engaged by Prime Bidder and if not, the respective work will be withdrawn and executed on risk and cost basis of the prime bidder.
 - l. In case Prime Bidder withdraws or insolvency / liquidation / winding up proceedings have been initiated / admitted against the Prime Bidder, BHEL reserves the right to cancel, terminate or short close the contract or take any other action to safeguard BHEL’s interest in the Project / Contract. This action will be without prejudice to any other action that BHEL can take under Law and the Contract to safeguard interests of BHEL
 - m. After successful execution of one work with a consortium partner under direct orders of BHEL, the Prime Bidder shall be eligible for becoming a ‘standalone’ bidder for works similar to that for which consortium partner was engaged, for subsequent tenders.
 - n. The Consortium partner shall submit SD equivalent to 1% of the total contract value in addition to the SD to be submitted by the Prime Bidder for the total contract value.

BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURNISH RELEVANT DOCUMENT INCLUSIVE OF WORK ORDER AND WORK COMPLETION CERTIFICATE ETC IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

Credentials submitted by the bidder against “PRE QUALIFYING CRITERIAS” shall be verified for its authenticity. In case, any credential (s) is/are found unauthentic, offer of the bidder is liable to the rejection. BHEL reserves the right to initiate any further action as per extant guidelines for Suspension of Business Dealings.

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Format-1

Certificate for relationship between Parent Company / Subsidiary Company and the bidder

To,

.....

.....

Dear Sir,

Sub: Bid for NIT Nodated..... for "....." (name of the tender).

We hereby certify that M/s..... is Parent Company/ Subsidiary Company of M/s.....(the bidder) and details of equity holding of the Parent Company in Subsidiary Company as on(not earlier than seven days prior to the Bid Submission Date) are given as below:

Name of Parent Company	Name of Subsidiary Company	Percentage of Equity Holding of Parent Company in Subsidiary Company

(Insert Name and Signature of Statutory Auditor or practicing Company Secretary of the Bidder)

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Format-2

Undertaking from the Parent Company/ Subsidiary Company of the bidder
(On the Letter Head of Parent Company/ Subsidiary Company, as applicable)

From,
Name:
Full Address:

Telephone No.:
E-mail address:
Fax/No.:

To,

Dear Sir,

We refer to the NIT No dated for " " (name of the Tender).

"We have carefully read and examined in detail the NIT/Tender Terms and Conditions, including in particular, Clause of the NIT/Tender, regarding submission of an Undertaking, as per the prescribed Format 1 of the NIT/ Tender.

We confirm that M/s.....(the Bidder) has been authorized by us to use our Technical capability for meeting the Technical Criteria as specified in Clause.....of the PQR of the NIT/Tender referred above.

We agree to submit the Security Deposit equivalent to 1% of the total contract value in addition to Security Deposit to be submitted by Bidder as per Clause.....of the NIT/Tender for fulfillment of all obligations in terms of provisions of the contract, in the event of(the Bidder) being selected as the Successful Bidder.

We confirm that we along with M/s.....(the bidder), are jointly or severally responsible for successful performance of the contract.

We confirm that our company shall not participate in the above tender as a 'Standalone Bidder' or as a 'Consortium bidder' and also shall not authorize any other bidder to use our Technical capability for the above tender.

All the terms used herein but not defined, shall have the meaning as ascribed to the said terms under the referred NIT/Tender.

Signature of Managing Director/Authorized signatory of Parent/ Subsidiary Company

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CHECK LIST

1	Name and Address of the Tenderer		
2	Details about type of the Firm/Company		
3.a	Details of Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
3.b	Details of alternate Contact person for this Tender	Name : Mr/Ms Designation: Telephone No: Mobile No: Email ID: Fax No:	
4	EMD DETAILS	DD No: _____ Date : _____ Bank : _____ Amount: _____ <u>Please tick (/) whichever applicable:-</u> ONE TIME EMD / ONLY FOR THIS TENDER	
5	Validity of Offer	TO BE VALID FOR SIX MONTHS FROM DUE DATE	
		APPLICABILITY (BY BHEL)	ENCLOSED BY BIDDER
6	Whether the format for compliance with PRE QUALIFICATION CRITERIA (ANNEXURE-I) is understood and filled with proper supporting documents referenced in the specified format	Applicable	YES / NO
7	Audited profit and Loss Account for the last three years	Applicable/Not Applicable	YES/NO
8	Copy of GST & PAN Card	Applicable/Not Applicable	YES/NO
9	Whether all pages of the Tender documents including annexures, appendices etc. are read understood and signed	Applicable/Not Applicable	YES/NO
10	Integrity Pact	Applicable/Not Applicable	YES/NO
11	Offer Forwarding Letter / Tender Submission Letter	Applicable/Not Applicable	YES/NO
12	Declaration by Authorized Signatory	Applicable/Not Applicable	YES/NO
13	No Deviation Certificate	Applicable/Not Applicable	YES/NO
14	Declaration confirming knowledge about Site Conditions	Applicable/Not Applicable	YES/NO
15	Declaration for relation in BHEL	Applicable/Not Applicable	YES/NO

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16	Non-Disclosure Certificate	Applicable/ Not Applicable	YES/NO
17	Bank Account Details for E-Payment	Applicable/ Not Applicable	YES/NO
18	Capacity Evaluation of Bidder for current Tender	Applicable/ Not Applicable	YES/NO
19	Tie Ups/Consortium Agreement are submitted as per format	Applicable/ Not Applicable	YES/NO
20	Power of Attorney for Submission of Tender/Signing Contract Agreement Power of Attorney of Consortium Partner.	Applicable/ Not Applicable	YES/NO
21	Analysis of Unit rates	Applicable/ Not Applicable	YES/NO
22	Annexure-5: Authorization of representative who will participate in the online Reverse Auction Process	Applicable/ Not Applicable	YES/NO
23	Annexure-6: RA Price Confirmation and Breakup	Applicable/ Not Applicable	YES/NO
24	Annexure-8: Undertaking as per PQR C4 of Annexure-1 i.e. PQR	Applicable/ Not Applicable	YES/NO
25	Annexure-9: Declaration reg. Related Firms & their areas of Activities (x) Other Tender documents as per this NIT.	Applicable/ Not Applicable	YES/NO
26	Annexure-10 Declaration regarding minimum local content	Applicable/ Not Applicable	YES/NO
27	Annexure-11: Declaration regarding compliance to restrictions under rule 144 (xi) of GFR 2017	Applicable/ Not Applicable	YES/NO
28	Annexure-13 Declaration/Undertaking regarding Conflict of Interest among Bidders	Applicable/ Not Applicable	YES/NO
29	Annexure-14- Bid Security Declaration Form	Applicable	YES

NOTE: STRIKE OFF 'YES' OR 'NO', AS APPLICABLE. TENDER NOT ACCOMPANIED BY THE PRESCRIBED ABOVE APPLICABLE DOCUMENTS ARE LIABLE TO BE SUMMARILY REJECTED.

DATE :

AUTHORISED SIGNATORY

(With Name, Designation and Company seal)

ANNEXURE-3

~~Certificate by Chartered Accountant on letter head~~
(applicable upto 31st March 2021 in line with MSME notification no. S.O. 2119 (E), dated 26th June 2020)

This is to Certify that M/S _____
(hereinafter referred to as 'company') having its registered office at _____
_____ is registered under MSMED Act 2006, (Entrepreneur
Memorandum No (Part - II)/ Udyam Registration Certificate No. _____ dtd: _____
_____, Category: _____ (Micro/Small/Medium)). (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited
financial year _____ as per MSMED Act 2006 is as follows:-

1. ~~For Manufacturing Enterprises:~~ Investment in plant and machinery (i.e. original cost excluding land and building and
the items specified by the Ministry of Small Scale Industries vide its notification No. S.O.1722(E) dated October 5, 2006:
1. _____ Rs _____ Lacs
2. ~~For Service Enterprises:~~ Investment in equipment (original cost excluding land and building and furniture, fittings and other
items not directly related to the service rendered or as may be notified under the ~~MSMED Act, 2006~~:
2. _____ Rs _____ Lacs
3. ~~For Enterprises (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum):~~ Investment in plant and machinery
or equipment is Rs. _____ Lacs and turnover is Rs. _____ Lacs (as notified in MSME notification no. S.O. 2119
(E) dated 26.06.2020)
4. ~~For Enterprises (having EM-II Certificate/ valid NSIC Certificate or Udyog Aadhar Memorandum):~~ Investment in plant and machinery
or equipment is Rs. _____ Lacs and turnover is Rs. _____ Lacs (as notified in MSME notification no. S.O. 2119
(E) dated 26.06.2020)

~~3. _____ (Strike off whichever is not applicable)~~

4. _____
The above investment of Rs _____ Lacs is within permissible limit of
5. _____ Rs _____ Lacs for
_____ Micro / Small / Medium (Strike off which is not applicable)
6. _____ Category under MSMED Act 2006.

~~7. _____ Or~~

8. _____ The enterprise has been graduated upward from its original category (micro/small/medium) (strike off which is not
applicable), the enterprise shall maintain its prevailing status till expiry of one year from the close of year of registration, as
notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of MSME.

~~9. _____ Or~~

10. _____ The enterprise has been reverse-graduated from its original category (micro/small/medium) (strike off which is not
applicable), the enterprise will continue in its present category till the closure of the financial year and it will be given the
benefit of the changed status only with effect from 1st April of the financial year following the year in which such change took
place, as notified vide S.O. No. 2119 (E) dated 26.06.2020 published in the gazette notification dated 26.06.2020 by Ministry of
MSME.

11. _____ Date:

(Signature)

Name:

Membership Number:

Seal of the Chartered Accountant

Reverse Auction Process Compliance Form

(The bidders are required to print this on their company's letterhead and sign, stamp before RA)

To

- M/s. {Service provider
- Postal address}

Sub: Agreement to the Process related Terms and Conditions

Dear Sir,

This has reference to the Terms & Conditions for the Reverse Auction mentioned in the RFQ document for {Items} against BHEL enquiry/ RFQ no. { BHE/PW/PUR/RGM/SH/3293} dt. {.....}

This letter is to confirm that:

- 1) The undersigned is authorized official/ representative of the company to participate in RA and to sign the related documents.
- 2) We have studied the Reverse Auction guidelines (as available on www.bhel.com), and the Business rules governing the Reverse Auction as mentioned in your letter and confirm our agreement to them.
- 3) We also confirm that we have taken the training on the auction tool and have understood the functionality of the same thoroughly.
- 4) We also confirm that, in case we become L1 bidder, we will FAX/ email the price confirmation & break up of our quoted price as per Annexure - 6 within **two** working days (of BHEL) after completion of RA event, besides sending the same by registered post/ courier both to M/s. BHEL and M/s. {Service provider.}

We, hereby confirm that we will honor the Bids placed by us during the auction process.

With regards

Signature with company seal

Name:

Company / Organization:

Designation within Company / Organization:

Address of Company / Organization:

Sign this document and FAX/ email it to M/s {Service provider} at {.....} prior to start of the Event.

Authorization of representative who will participate in the on line Reverse Auction Process:

1	NAME OF THE BIDDER	
2	NAME & DESIGNATION OF OFFICIAL	
3	POSTAL ADDRESS (COMPLETE)	
4	TELEPHONE NOS. (LAND LINE & MOBILE BOTH)	
5	E-MAIL ADDRESS	
6	NAME OF PLACE/ STATE/ COUNTRY, WHEREFROM S/HE WILL PARTICIPATE IN THE REVERSE AUCTION	

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[ANNEXURE-6](#)

Reverse Auction price confirmation and breakup
(To be submitted by L1 bidder after completion of Reverse Auction)

To

- M/s. Service provider
- Postal address

CC: M/s BHEL

BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Sub: Final price quoted during Reverse Auction and price breakup

Dear Sir,

We confirm that we have quoted.

Rs.{____in value & in words_____} for item(s) covered under tender enquiry No. {
BHE/PW/PUR/KDNSH-CNI/3293} dt.{...}

Total price of the items covered under above cited enquiries is inclusive of {Packing & forwarding, GST, E.D., C.S.T., freight and insurance charges up to {.....} District,{.....} State and Type Test Charges etc., (exclusive of service tax), other as per NIT}

as our final landed prices as quoted during the Reverse Auction conducted today {date} which will be valid for a period of {__ in nos. & in words __} days.

The price break-up is as given below.

Total

=====

- Rs. in value & in words

=====

Yours sincerely,

For _____

Name:

Company:

Date:

Seal:

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract(s) for

"E-Tender Spec No: BHE/PW/PUR/KDNSH-CNI/3293." (hereinafter referred to as "Contract"). The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint panel of Independent External Monitor(s) (IEMs), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1- Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles: -
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - 1.1.3 The Principal will exclude from the process all known prejudiced persons.

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- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

- 2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption.—The Bidder(s)/ Contractor(s) commits himself to observe the following principles during participation in the tender process and during the contract execution.
- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and shall await their decision in the matter.

Section 3 - Disqualification from tender process and exclusion from future contracts

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If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process, terminate the contract, if already awarded, exclude from future business dealings and/ or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 - Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above , the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee , whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) years (to be reckoned from date of bid submission) with any other company in any country conforming to the anti-corruption approach in India that could justify his exclusion from the tender process. The date of such transgression, for the purpose of disclosure by the bidders in this regard, would be the date on which cognizance of the said transgression was taken by the competent authority. The transgression(s), for which cognizance was taken even before the said period of three years, but are pending conclusion, shall also be reported by the bidders.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason or action can be taken as per the separate "Guidelines on Suspension of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of a joint venture, all the partners of the joint venture should sign the Integrity Pact. In case of Sub-contracting, the Principal Contractor shall be solely responsible for the adherence to the provisions of IP by the sub-contractor(s).
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity Pact or violate its provisions.

Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors

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.....
If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 -Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact on receipt of any complaint by them from the bidder(s).
- 8.2 The IEMs are not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as /Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.
- 8.5 The role of IEM is advisory and the advice of IEM is non- binding on the Organization. However, as IEMs are invariably persons with rich experience who have retired as senior functionaries of the government, their advice would help in proper implementation of the IP.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of the tendering process, the matter should be examined by the full panel of IEMs jointly, who would look into the records, conduct an examination, and submit their joint recommendations to the Management. In case the full panel is not available due to some unavoidable reasons, the available IEM(s) will conduct examination of the complaints. Consent of the IEM(s), who may not be available, shall be taken on record.
- 8.7 The IEMs shall examine all the representations/grievances/ complaints received by them from the bidders or their authorized representative related to any discrimination on account of lack of fair play in modes of procurement and bidding systems, tendering method, eligibility conditions, bid evaluation criteria, commercial terms & conditions, choice of technology/ specifications etc.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the Principal should be looked into by the CVO of the Principal.

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- 8.10 If the IEMs have reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code / Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact is signed by both the parties. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, the same shall be binding and continue to be valid despite the lapse of this Pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 10.5 Only those bidders / contractors who have entered into this Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.

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- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. If required, the Principal may adopt any mediation rules for this purpose. However, not more than five meetings shall be held for a particular dispute resolution. The fees/expenses on dispute resolution shall be equally shared by both the parties. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as per the terms & conditions of the Contract.

For & On behalf of the Principal
Contractor
(Office Seal)

Place _____

Date _____

Witness: _____
(Name & Address) _____

For & On behalf of the Bidder/
(Office Seal)

Witness: _____
(Name & Address) _____

UNDERTAKING

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Dear Sir/Madam,

Sub: DECLARATION REGARDING INSOLVENCY/ LIQUIDATION/ BANKRUPTCY PROCEEDINGS

Ref: NIT/Tender Specification No: BHE/PW/PUR/KDNSH-CNI/3293

I/We, _____
declare that, I/We am/are not under insolvency resolution process or liquidation or Bankruptcy Code Proceedings (IBC) as on date, by NCLT or any adjudicating authority/authorities, which will render us ineligible for participation in this tender.

Sign. of the AUTHORISED SIGNATORY
(With Name, Designation and Company seal)

Place:
Date:

ANNEXURE-9

DECLARATION

Date: _____

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Sub: Details of related firms and their area of activities

Dear Sir/ Madam,

Please find below details of firms owned by our family members that are doing business/ registered for same item with BHEL, _____ (NA, if not applicable).

1	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	
2	Material Category/ Work Description	
	Name of Firm	
	Address of Firm	
	Nature of Business	
	Name of Family Member	
	Relationship	

Note: I certify that the above information is true and I agree for penal action from BHEL in case any of the above information furnished is found to be false.

Regards,

(_____)

From: M/s _____
Supplier Code: _____

Address: _____

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Annexure-10

**DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH
REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH
JUNE, 2020 AND SUBSEQUENT ORDER(S)**

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

--

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref : 1) NIT/Tender Spec No: BHE/PW/PUR/KDNSH-CNI/3293

2) All other pertinent issues till date

We hereby certify that the items/works/services offered by..... *(specify the name of the organization here)* has a local content of _____ % and this meets the local content requirement for 'Class-I local supplier' / 'Class II local supplier' ** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

- | | |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |

...

...

...

Thanking you,
Yours faithfully,

(Signature, Date & Seal of
Authorized Signatory of the Bidder)

**** - Strike out whichever is not applicable.**

Note:

1. Bidders to note that above format Duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).
3. In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.

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ANNEXURE-11

DECLARATION REGARDING COMPLIANCE TO RESTRICTIONS UNDER RULE 144 (xi) OF GFR 2017

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

--

To,
GM-PURCHASE
BHEL-PSWR, 345, KINGSWAY, NAGPUR-440001

Dear Sir,

Sub: Declaration regarding compliance to Restrictions under Rule 144 (xi) of GFR 2017

Ref : 1) NIT/Tender Spec No: BHE/PW/PUR/RGM/SH/3293,

2) All other pertinent issues till date

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries. I certify that _____ *(specify the name of the organization here),*

a. is not from such a country

b. has been registered with the Competent Authority *(attach valid registration by the Competent Authority, i.e., the Registration Committee constituted by the Dept. for Promotion of Industry and Internal Trade (DPIIT));*

and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. *(attach relevant valid registration, if applicable)*

I hereby certify that we fulfill all requirements in this regard and is eligible to be considered.

Thanking you,
Yours faithfully,

**(Signature, Date & Seal of
Authorized Signatory of the Bidder)**

Note: Bidders to note that in case above certification given by a bidder, whose bid is accepted, is found to be false, then this would be a ground for immediate termination and for taking further action in accordance with law and as per BHEL guidelines.

ANNEXURE-12

IMPORTANT INFORMATION

E -Tender for this work is invited by BHEL PSWR NAGPUR and offer shall be submitted through BHEL e-procurement portal only. All correspondences regarding this tender shall be through E-procurement portal.

Postal Address:

GM /Purchase BHEL PSWR,
SRIMOHINI COMPLEX, Floor No. 5 & 6, 345 KINGSWAY, NAGPUR 440001, INDIA

Following are the concerned BHEL officials to whom bidders can contact in case of any difficulty:

Engineer Purchase, Email: chaitram@bhel.in, Mob: 8055451608

Sr.Manager /Purchase, email: vvoidya@bhel.in,

GM Purchase, Email: vkarya@bhel.in. Ph: +91 - 712 - 2858 - 633

1. Refer the abridged version of extant 'Guidelines for suspension of business dealings with suppliers/ contractors' which is available at www.bhel.com on "supplier registration page" at the following link: https://www.bhel.com/sites/default/files/suspension_guidelines_abridged.pdf
2. "Pradhan Mantri Kaushal Vikas Yojna: The contractor shall, at all stages of work deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/Industrial Training Institute/ National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed/ certified by State/ Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled/semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs.100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding".
3. All Statutory Requirements as applicable for this project shall be complied with.
4. **Conflict of Interest among Bidders/ Agents:**
"A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. ***The bidder found to have a conflict of interest shall be disqualified.*** A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:
a) they have controlling partner (s) in common;
or

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b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; **or**

c) they have the same legal representative/agent for purposes of this bid; **or**

d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or

e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; or

f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorize only one agent/dealer. There can be only one bid from the following:

1. The principal manufacturer directly or through one Indian agent on his behalf; **and**
2. Indian/foreign agent on behalf of only one principal;

or

g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; **or**

h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business.

Treatment of cases regarding conflict of interest:

The bidder notes that a conflict of interest would said to have occurred in the tender process and execution of the resultant contract, in case of any of the following situations:

- i) If its personnel have a close personal, financial, or business relationship with any personnel of BHEL who are directly or indirectly related to the procurement or execution process of the contract, which can affect the decision of BHEL directly or indirectly;
- ii) The bidder (or his allied firm) provided services for the need assessment/ procurement planning of the Tender process in which it is participating;
- iii) Procurement of goods directly from the manufacturers/ suppliers shall be preferred. However, if the OEM/ 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

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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 both the manufacturer/ supplier and the agent, bid received from the agent shall be ignored. However, this shall not debar more than one Authorised distributor (with/ or without the OEM) from quoting equipment manufactured by an Original Equipment Manufacturer (OEM) in procurements under a Proprietary Article Certificate.

- iv) A bidder participates in more than one bid in this tender process. Participation in any capacity by a Bidder (including the participation of a Bidder as a partner/ JV member or sub-contractor in another bid or vice-versa) in more than one bid shall result in the disqualification of all bids in which he is a party. However, this does not limit the participation of an entity as a sub-contractor in more than one bid if he is not bidding independently in his own name or as a member of a JV.

The Bidder declares that they have read and understood the above aspects, and the bidder confirms that such conflict of interest does not exist and undertakes that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s), in this regard. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, the same will be considered as a violation of the tender conditions, and suitable action shall be taken by BHEL as per extant policies/ guidelines

5. **BHEL 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."**
6. **Following clause shall form part of the HSE documents issued under Chapter IX of Volume IB 'Special Conditions of Contract'**

"In case of any financial deduction made by Customer for lapses of safety other than what is provided elsewhere in the contract, the same shall be charged on back-to-back basis on the defaulting contractor without prejudice to any other right spelt anywhere in the tender /contract".

- ~~7. The clause 2.7.9.1 below is added under the heading "Rights of BHEL" of General Conditions of Contract Volume-IC GCC:~~

~~2.7.9.1 Provision of Penalty in case of slippage of Intermediate Milestones:~~

- ~~i) Two major Intermediate Milestones are mentioned as M1 & M2 in Chapter VI: Time Schedule of Vol IA Technical Conditions of Contract.~~
- ~~ii) In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to Form 14.~~

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- ~~iii) In case delay in achieving M1 Milestone is solely attributable to the contractor, 0.5% per week of Executable Contract Value*, limited to maximum 2% of Executable Contract Value, will be withheld.~~
- ~~iv) In case delay in achieving M2 Milestone is solely attributable to the contractor, 0.5% per week of Executable Contract Value*, limited to maximum 3% of Executable Contract Value, will be withheld.~~
- ~~v) Amount already withheld, if any against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 Milestone.~~
- ~~vi) Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.~~
- ~~vii) Final deduction towards LD (if applicable as per clause 2.7.9 above), on account of delay attributable to contractor shall be based on final delay analysis on completion / closure of contract. Withheld amount, if any due to slippage of identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.~~
- ~~viii) In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted into recovery.~~

~~* **Executable Contract Value** – Value of work for which inputs/ fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone.~~

8. Acceptance of Bank Guarantee (BG)

Revision in Acceptance of Bank Guarantee (BG) Clause no. 1.10.3 (iii) of Vol I C GCC:

Clause No. 1.10.3 (iii) of Vol IC GCC is revised as below: -

“Bank Guarantee issued by:

- a. Any of the BHEL consortium bank listed below:

State Bank of India
ABN Amro Bank N.V.
Bank of Baroda
Canara Bank
Citi Bank N.A.
Corporation Bank
Deutsche Bank
HDFC Bank Ltd.
The Hongkong and Shanghai Banking Corporation Ltd
ICICI Bank Ltd.
IDBI Ltd.
Punjab National Bank
Standard Chartered Bank
State Bank of Travancore
State Bank of Hyderabad
Syndicate Bank

- b. Any public sector Bank (other than consortium banks) with a clause in the text of Bank Guarantee that **“It is enforceable at Nagpur, Maharashtra”**.

- c. Any private sector banks, with a clause in the text of Bank Guarantee that **“It is enforceable by being presented at any branch of the bank”**.

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Note: “Bank Guarantees issued by Co-operative Banks are not acceptable”.

9. Broad Terms & Conditions of Reverse Auction:

In continuation to Clause 19.0 of NIT (Notice Inviting Tender) following are the broad terms and conditions of Reverse Auction:

“BHEL shall be resorting to Reverse Auction (RA) (Guidelines as available on www.bhel.com) (<https://www.bhel.com/guidelines-reverse-auction-2024>) for this tender. RA shall be conducted among the techno-commercially qualified bidders.

Price bids of all techno-commercially qualified bidders shall be opened and same shall be considered for RA. In case any bidder(s) do(es) not participate in online Reverse Auction, their sealed envelope price bid along with applicable loading, if any, shall be considered for ranking.”

Note: -

- 1. In case of enquiry through e-procurement the sealed electronic price bid (e-bid) is to be treated as sealed envelope price bid.*
- 2. Reverse Auction will be conducted if two or more bidders are techno-commercially qualified.*
- 3. Wherever RA is opted in a tender, the techno-commercially qualified H1 will not be allowed to participate in RA. In case more than one H1 bidder quote the same rate, the Price Offer received last, as per the time log of the Portal, shall be removed first, on the principle of last in, first out by the system.*
- 4. However, H1 will be allowed to participate in RA in the following cases:*
 - a) If number of techno-commercially qualified bidders are only 2 or 3.*
 - b) In case Primary product of only one OEM is left in contention for participation in RA on elimination of H1.*
 - c) For cases where there are more than 3 techno-commercially qualified bidders, if lowest bidder in sealed price bid is non-MSE and H-1 is eligible MSE and H-1 price is coming within price band of 15% of Non-MSE lowest bidder.*
 - d) For cases where there are more than 3 techno-commercially qualified bidders, if lowest bidder in sealed price bid is non-MII and H-1 is eligible MII and H-1 price is coming within price band of 20% of Non-MII lowest bidder.*

10. Bidder to strictly follow all the necessary guidelines issued by Customer, District Magistrate, State Government and Central government to control Pandemic/Epidemic outbreak. The related towards quarantine Centre/Medical expenses etc., if any, shall be in the bidder's scope.

11. Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC.

12. OVER RUN COMPENSATION Clause no. 2.12 of Vol I C GCC: Not Applicable

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13. PRICE VARIATION COMPENSATION: Not applicable.

14. Clause no. 2.24 of GCC PERFORMANCE GUARANTEE FOR WORKMANSHIP: Defect liability period shall be as per 2.24 of GCC with the amendment in Cl 2.24.1 shall be 12 months.

15. LIQUIDATED DAMAGES/PENALTY: 2.7.9 of GCC with the amended of Liquidated Damage/Penalty at the rate of 0.5% of the contract value, per week of delay or part thereof subject to a maximum of 5% of the contract value.

16. Clause 2.27 LIMITATION ON LIABILITY of General Conditions of contract for services/works has been amended as below:

“Notwithstanding anything to the contrary in this Contract or LOA or Work Order or any other mutually agreed document between the parties, the maximum liability, for damages, of the contractor, its servants or agents, shall under no circumstances exceed an amount equal to the Price of the Contract or the Work Order. Neither party shall be liable to the other for any indirect or consequential loss or damage, including but not limited to loss of use, loss of profits, or loss of contracts, or special, punitive, exemplary losses whatsoever, arising out of or in connection with this contract.

This shall not be applicable on the recoveries made by Customer from BHEL on account of Contractor, any other type of recoveries for workmanship, material, T&P etc. due from the contractor.”

This shall be the part of General Conditions of Contract for this tender.

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Annexure-13 (Declaration/Undertaking regarding Conflict of Interest among Bidders)

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

GM/Purchase
BHEL PSWR
Floor No. 5 & 6, Shree Mohini Complex,
345-Kingsway, Nagpur-440001

Dear Sir/Madam,

Sub: Declaration/Undertaking regarding Conflict of Interest among Bidders

E-Tender Specification No: BHE/PW/PUR/KDNSH-CNI/3293

Job: DISMANTLING OF EXISTING ELECTRICAL AND C&I SYSTEM, HANDING OVER MATERIAL TO CUSTOMER, HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) WORKS FOR RENOVATION & MODERNIZATION OF ONE UNIT OF KADANA PUMPED HYDRO POWER PLANT FOR PUMP MODE OPERATION INCLUDING SCADA OF ALL 04 UNITS (U1 To U4)..

The Bidder declares that they have read and understood the aspects stated in **Sl No. 4 of Annexure-12 above**, and the bidder confirms that such conflict of interest does not exist and undertakes that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s), in this regard. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

In case, the Bidder is found having indulged in above activities, the same will be considered as a violation of the tender conditions, and suitable action shall be taken by BHEL as per extant policies/guidelines.

**Signature of the Authorised Signatory
(With Name, Designation and Company seal)**

Place:

Date:

BHEL PSWR
Notice Inviting Tender

E-Tender Spec No: BHE/PW/PUR/KDNSH-CNI/3293

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Annexure-14 for Bid Security Declaration

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

GM/Purchase
BHEL PSWR
Floor No. 5 & 6, Shree Mohini Complex,
345-Kingsway, Nagpur-440001

Dear Sir/Madam,

Sub: Bid Security Declaration

1. **E-Tender Specification No:** BHE/PW/PUR/KDNSH-CNI/3293
2. **Job:** DISMANTLING OF EXISTING ELECTRICAL AND C&I SYSTEM, HANDING OVER MATERIAL TO CUSTOMER, HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) WORKS FOR RENOVATION & MODERNIZATION OF ONE UNIT OF KADANA PUMPED HYDRO POWER PLANT FOR PUMP MODE OPERATION INCLUDING SCADA OF ALL 04 UNITS (U1 To U4)..
3. I/We Mr/ Ms..... authorised person to sign the bid documents for tender pertaining to the captioned scope do hereby declare that I/We have gone through the entire tender documents including terms and condition mentioned in the tender documents and undertake to comply with them.
4. I/We further declare that we will not withdraw our bid or modify our offer during the period of validity of the bid after the deadline for submission of such documents.
5. If I/we withdraw or modify the bids during the period of validity, or if I/We are awarded the contract and fail to sign the contract, if applicable or to submit security deposit as defined in the tender document/LOA, we will be suspended for the period of time as specified in the tender document from being eligible to submit bids/proposals to BHEL.

Signature of the Authorised Signatory
(With Name, Designation and Company seal)

Place:

Date:

3293

TECHNICAL CONDITIONS OF CONTRACT (TCC)

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – I: Project Information

1.0	Project Information		
1.1	1	OWNER	: GUJRAT STATE ELECTRICITY CORPORATION LIMITED (GSECL).
	2	PROJECT	: RENOVATION & MODERNIZATION OF ONE UNIT (U1) OF KADANA PUMPER HYDRO POWER PLANT FOR PUMPED MODE OPERATION & SCADA OF ALL 04 Units (U1 To U4).
	3	PROJECT RATING	: 4X60 MW Hydro Set
	4	LOCATION	: Kadana Hydroelectric Plant, Dist – Mahisagar, Gujarat
	5	NEAREST RAILWAY STATION	: Godhra Railway Station- 75 Kms from project site
	7	NEAREST AIRPORT	: Ahmedabad - 150 Kms
	8	MAIN ROAD HIGHWAYS	: Gujarat State Highway 2A

The bidder is advised to visit and examine the site of WORKS and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into the CONTRACT. All costs for and associated with site visits shall be borne by the bidder. The information given here in under is for general guidance and shall not be contractually binding on BHEL/ Owner. This information's may change during detailed engineering. All relevant site data/ information as may be necessary shall have to be obtained/ collected by the Bidder.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: Scope of Works

Title:

DISMANTLING OF EXISTING ELECTRICAL AND C&I SYSTEM, HANDING OVER MATERIAL TO CUSTOMER, HANDLING AT SITE STORES/STORAGE YARD, TRANSPORTATION TO SITE OF WORK, COMPLETE ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF **ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) WORKS** FOR RENOVATION & MODERNIZATION OF ONE UNIT OF **KADANA PUMPED HYDRO POWER PLANT** FOR PUMP MODE OPERATION INCLUDING **SCADA OF ALL 04 UNITS (U1 To U4)**.

Brief Scope of Work

The scope of work includes dismantling of existing **Electrical System** and **Control & instrumentation system** and its transportation to Employer's workshop/stores as per employer's guidance. Transportation from place of storage to erection site, erection, testing, pre-commissioning and commissioning of Electrical System and Control & Instrumentation system and handing over in fully operable condition satisfactorily to employer.

Cabling package, C&I package, Transformers, equipment & associated auxiliaries for the following: -

1. Cable tray & Accessories.
2. HT/LT power cables (generally arm/unarmored), LT control cables, instrument cable (generally arm/unarmored, screened or unscreened).
3. Junction boxes for electrical, Control & Instrument system and push button.
4. Structural steel.
5. Static Excitation System/Modification in existing static excitation system.
6. Static Frequency Converter.
7. Switchgears / MCC.
8. Starter panel/Local starter boxes/Power distribution boxes /marshalling boxes.
9. DCS panels, control & instrument panel, UCB, LCB, HMI, OWS/EWS, control desk etc.
10. Erection and commissioning of UPS, ACDB etc.
11. Erection and commissioning of Control panels.
12. Erection and commissioning of Digital Governing System.
13. Erection and commissioning of Vibration Monitoring System for Generator and Turbine.
14. Erection and Commissioning of the instruments is under the scope of Bidder.
15. Plant trial run, resolving any deficiencies observed and handing over the system to customer.
16. Others equipment.

ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) SYSTEM:

Complete dismantling, erection and commissioning of the system are in Bidder's scope.

(A) Erection:

Being R&M work, erection consists of two major parts:

- 1) Proper identification and dismantling of existing system wise panels, control desks, cables, marshalling panels, electrical panels, switchgear panels, JBs, Instruments, cable trays, cables etc.
- 2) Erection/ installation of new system wise panels, control desks, marshalling panels, electrical panels, switchgear panels, JBs, Instruments etc with proper glanding and termination of old field cables, laying and termination of new cables.

(1) Proper Identification and Dismantling:

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(Dismantling of system wise panels, control desks and HMI)

- All existing cables are armored and lifted up through panel bottom gland plate with proper glanding. Because of the weight of the cable, glanding is necessary and to be maintained in new DDCMIS panels. Proper identification of the cables with core wise usage details to be established before removal of termination/ disconnection.
- After de-glanding, all cables with proper identification tags can be pulled down. Now old panels can be removed. Existing base frame with anti-vibration pads if cannot be re-used for new DDCMIS panels, to be removed.
- Removal of existing panels and re-accommodation of all panels with required base frames and anti-vibration pads with base frame grouting / welding and extending.
- Fabrication of base frames for panels/ cabinets is in Bidder's scope. Bidder must provide material test certificate along with supply material as per BOQ.
- Existing control desk and minimum back up console panel excluding electrical panel are required to be removed and replaced by Bidder.
- The required civil works for floor cut-outs for additional panels to be located in existing free space in existing relay room/Control room.

(2) Erection/ Installation of new system wise panels, electrical panels, switchgear panels, control desks, HMI, marshalling panels, Junction Boxes, Instruments etc.:

- a. New power supply cables are to be laid and terminated as per requirement.
- b. Existing cut-out size if necessary to be modified.
- c. Minor Civil works like modification in cut out for panels, making approach through walls, breaking of concrete floors to suite DCS Panels, Electrical Panels and Switchgear Panels erection etc. wherever required.
- d. Base frames with anti-vibration pads to be erected and properly grouted after proper alignment.
- e. Panel earthing where ever required to be extended.
- f. New panels/ desks are to be installed.
- g. Modification/ laying of trays, conduits as per system requirement.
- h. Gland plate of required size and number of gland holes to be fixed/ erected.
- i. Glanding, lifting, dressing, clamping and termination of identified old and new cables in new panels, marshalling panels, supply distribution systems, power supply units and HMI including all peripherals.
- j. Extension of earthing system as per requirement.

(B) Commissioning:

Systems commissioning is a critical activity and hence following conditions are to be fulfilled:

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Bidder has to ensure availability of expert commissioning team to successfully commission new Electrical and DDCMIS system.

Commissioning of the system will comprise of activities in three parts viz. Pre-commissioning, Trial and Tuning.

1. Pre-commissioning:

- i) Pre-commissioning activities starts with the powering of new panels/ HMI system.
- ii) Analog and Binary field input signal loop tests and correct signal validation.
- iii) Analog and Binary output signal to field and HMI tests and validation.
- iv) Interfacing relay pick up through O/P modules and auxiliary contact changeover.
- v) Proper window alarm through binary O/P.
- vi) Proper HMI signal/ event validation.
- vii) Inter-panel signal validation.
- viii) HT/ LT breakers cold trial in “TEST POSITION”
- ix) Motorized valves limit switches, torques switches correct status validation.
- x) HT/ LT auxiliaries’ permissive, interlock and protection checking with breaker in test position.

Trials:

Trials are to be taken to ensure proper functioning of the following:

- i) HT/ LT auxiliaries’ actual trial with valid permit.
- ii) Motorized valves actual open/ close with designed permissive and interlocks operation.
- iii) Solenoid operated valves actual trials.
- iv) Function testing of auto control loops in limited final control element action.
- v) HT auxiliaries permissive, interlock and protection trials.
- vi) System wise interlock and protection trials with correct alarm and event recording.

NOTE:

Trials to be hold up in case any concerned parameter is not available because of new system.

PRE-SHUTDOWN WORK:

1. Mobilization of site within 07 days from the date of LOI or as informed by BHEL.
2. Arranging Gate pass, Insurance, medical fitness certificate, police verification & Accommodations to the contract personnel.
3. Shifting of material and T&Ps to and from the site.
4. Shifting of materials from Customer (owner) store to site.
5. Laying of Cables, Cable Trays, Junction Boxes (JB’s), Instrument Calibration, Ferrule Printing, Cable Tag preparation, etc.
6. Any work pertaining to this contract that the Customer (Plant Owner) provides the permit for may be carried out during pre-shutdown.

MECHANICAL WORKS:

All the mechanical work involved in up-gradation of Electrical and C&I system is in the scope of Bidder.

NOTE:

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1. **If, at any stage during execution, no work front is available in any area within the defined scope, the Bidder shall demobilize their manpower based on a mutually agreed Minutes of Meeting (MoM).** The Bidder must commit to resuming work at the site with full manpower once the front becomes available. Any delay in this regard will not be acceptable under any circumstances. The Bidder shall keep their Tools and Plants (T&P) at the site at their own risk.
2. In the event of temporary demobilization, the Bidder shall maintain a minimum workforce at the site to ensure the safety and security of dismantled items.
3. **No additional cost shall be payable to the Bidder for temporary demobilization. However, the Bidder will be provided with one week's advance notice prior to remobilization.**
4. Whatever things required for complete Electrical and C&I up-gradation of KADANA Pumped Hydro Plant shall be in the scope of work, irrespectively whether it is specifically mentioned in the enquiry specification/ scope of work or not.

2.1 GENERAL REQUIREMENTS.

2.1.1

The intent of specification is to procure services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

2.1.2

The work covered under this specification is of highly sophisticated nature, requiring the best quality of workmanship, engineering and construction management. The contractor should ensure proper planning and successful & timely completion of the work to meet the overall project schedule. The contractor must deploy adequate quantity of tools & plants, measuring instruments, calibrating equipment, modern/ latest construction aids etc. He must also deploy adequately trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor should match requirement of sophistication involved with the items mentioned in the BOQ.

2.1.3

The work shall be executed under the usual conditions without affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

2.1.4

Contractor shall erect, align and commission all the equipment and auxiliaries as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods/ sequences adopted in erection of similar sets elsewhere.

2.1.5

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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The services, tests and support to be provided by the agency for the work mentioned in the various sections of this tender are indicative and not exhaustive, but not limited to these for the completion of the work in all respects.

2.1.6

The work to be carried out under the scope of this specification covers the complete work of loading, handling, transporting, unloading, preassembly, dismantling, erection, calibration, testing, pre-commissioning tests, commissioning of systems, trial run of various auxiliaries, achieving various activities till handing over of the unit to BHEL's customer, providing maintenance team to cater to guarantee responsibilities and maintenance thereafter. The work shall conform to dimensions and tolerances specified in various drawings that will be provided during the erection. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done departmentally or by engaging other agencies and recoveries will be affected from contractor's bills towards expenditure incurred including 30% departmental charges.

2.1.7

Contractor shall dismantle, calibrate, erect, commission all the equipment, cabinets/panels, instruments and cabling etc. as per sequence prescribed by BHEL at site. The sequence of dismantling/ erection / commissioning methodology will be decided by the BHEL engineers depending upon the availability of materials/work fronts etc. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of dismantling/ erection / commissioning adopted in erection / commissioning of similar jobs or for any reasons whatsoever.

2.1.8

The services, tests and support to be provided by the agency for the work mentioned in the various sections of this tender are indicative and not exhaustive, but not limited to these for the completion of the work in all respects.

2.1.9

Plant materials should not be used for any temporary supports/ scaffolding/ preparing pre-assembly bed etc.

2.1.10

The contractor shall have total responsibility for all equipment and materials in his custody at contractor's stores, or any loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL Engineer's instructions. The machined surfaces/ finished surfaces should be greased and covered.

2.1.11

At all stages of work, equipment/ materials in the custody of contractor, including those erected, will have to be preserved as per the instructions of BHEL.

2.1.12

The terminal points as decided by BHEL shall be final and binding on the contractor for deciding the scope of work and effecting payment for the work done.

2.1.13

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Descriptions of certain packages appearing in the rate schedule are available in this section to give general idea to tenderer about the type of equipment to be erected, calibrated, tested and commissioned.

2.1.14

During the course of dismantling, erection, testing and commissioning of electrical and C&I work, certain rework/ modification/ rectification/ repairs/ fabrication etc., will be necessary on account of feedback from various power stations or units already commissioned and/or units under erection and commissioning and also on account of design discrepancies and manufacturing defects and site operation/ maintenance requirements. Contractor shall carryout such rework / modification / rectification / fabrication repairs etc. promptly and expeditiously. Daily log sheets indicating the details of work carried out, man-hours, consumables used etc., shall be maintained by the contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per clauses 2.15 of GCC

2.1.15

The contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work (excepting, those specifically included in BHEL scope). However, necessary steel will be provided from the scrap/ surplus materials available at site.

2.1.16

All tools, tackles, fixtures, equipment's, materials, manpower, supervisors/ engineers, consumables, electrodes including oxygen, acetylene argon etc gases, primers, paints etc. required for this scope of work shall be provided by the contractor. All expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies. Electrodes shall be baked / dried in the electrode drying oven (range 375 – 425 deg C) to the temperature and period specified by BHEL Engineer before their use. Necessary drying oven / portable oven shall be provided by the contractor at his cost.

2.1.17

All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipment/components for checking and cleaning, fabrication of tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing of cut outs/openings for mounting of console inserts, modules, indicators, recorders, drilling of holes for gland entries, reaming, scrapping, cable laying, dressing, fitting up etc. as may be applicable in such erection works are treated as incidentals to erection work and are necessary to complete the work satisfactorily shall be carried out by the contractor as part of the work.

2.1.18

The contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipment from theft/ fire/ pilferage and any other damages and losses.

2.1.19

Equipment's /instruments required to be erected for this work, though not limited to but are generally as per rate schedule. For any items or class of work not specified herein but required for total completion of work, the same shall be carried out as per BHEL requirement. However, the payment of these items/class of work shall be regulated as per the General Condition of the contract. Contractor shall provide necessary resources for completion of such work within the stipulated time schedule. Value of such work shall be

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – II: Scope of Works

included while computing the total value of work finally executed for all contractual purposes, particularly for contract variation purpose.

2.1.20

The surfaces of foundations shall be dressed to bring the top surface of the foundations to the required level, prior to placement of equipment/equipment bases on the foundations. All the equipment/equipment bases shall be grouted and finished as per these specifications unless otherwise recommended by the equipment manufacturer. The concrete foundation surfaces shall be properly prepared by chipping, grinding as required to bring the top of such foundation to the required level, to provide the necessary roughness for bondage and to assure enough bearing strength.

2.1.21

Contractor shall prepare Marked-Up drawings incorporating modifications and deviations from original drawings or prepare fresh sketch for actual installation / connection details if need be, that can be converted to "As-built" drawing.

2.1.22

Contractor shall abide by the safety/ security rules and regulations as per the requirement of BHEL and BHEL's customer. Contractor shall obtain information about all safety and security norms of BHEL and BHEL's customer well in advance. BHEL will not admit any claims whatsoever on account off Contractor's non-familiarization of site safety and security regulations.

2.1.23

The work under this scope being quite sophisticated and also quite extensive, for proper planning, monitoring, reporting, etc of ongoing works, the contractor shall establish his own computer(s) and printer(s) at his site office, along with suitable operator(s), consumables, etc. *Non-establishment of above equipment will attract penalty @ Rs 10000 (Rupees Ten thousand only) per month.*

BHEL uses its own software SOMS (Site Operation and Management System) for total project execution and billing. The contractor shall also provide adequate and suitable manpower for updating / entries into SOMS in BHEL computers at site.

2.1.24 Electronic Earth Pit

If required, erection of separate electronic earth pit for new system will be in scope of bidder including material.

2.2 Collection, Transportation and Handling of materials

2.2.1

The contractor shall take delivery of equipment, materials from the storage yard/ stores/sheds of BHEL/Customer. He shall also make arrangements for verification of equipment, safe custody, watch and ward of equipment after it has been handed over to bidder till these are fully erected, tested and commissioned and taken over by the customer. The contractor should note that the transport of

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equipment's to erection site, assembly yards, etc. should be done by the prescribed route in the most professional manner without disturbing other on- going works of various contractors. Special equipment (whichever applicable) such as laboratory equipment's, measuring and control equipment's, gauges, panels, console inserts, switches, transmitters, controllers, power cylinders, cables, conduits etc. shall be stored when taken over by the contractor in appropriate manner as per BHEL's instructions. The contractor should also note that while taking delivery of materials from BHEL stores (open/closed), it may be necessary to handle other items which could be blocking the exit route of the materials. The dismantled material shall also be transported from site to the place designated by the Customer. *This aspect shall be taken care of in the quoted rates and no extra payment shall be done in this regard.* It shall be the contractor's responsibility to arrange necessary cranes/tractors, trailer, trucks, slings, labour, etc., etc., for transport of equipment to and from site to designated location as decided by BHEL/ Customer.

2.2.2 Void

2.2.3

The contractor shall hand over all parts/materials remaining extra over the normal requirement with proper identification tags in a packed condition to BHEL/Customer stores. In case of any misuse or use over actual design requirements, BHEL reserves the right to recover the cost of parts/materials used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.

2.2.4

The contractor shall take delivery of the components, equipments and special consumables from the storage area/sheds of BHEL/customer after getting the approval of the engineer/customer on standard indent forms to be specified by BHEL/customer. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

2.2.5

Overhauling, cleaning, revisioning, servicing of equipment / instruments, valves etc. during erection and commissioning stages will be arranged by the contractor. However, gaskets /packing for replacement will be provided by BHEL free of cost. All equipments shall be preserved and protected before and after erection as per the advice of BHEL engineer.

2.2.6

The contractor should take all reasonable care to protect equipment and materials under his custody either in his stores or at site. Copper tubing, brass fittings, brass valves etc. forming an integral part of equipment or system are liable to greater damages / pilferages /theft / losses. It will be responsibility of contractor to arrange for adequate security round the clock for protection from such damages / pilferages / theft / losses.

2.2.7

All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc. shall be used for unloading and/or handling of the equipment without the specific written permission of the engineer. The equipment from the storage yard shall be moved to the actual site of erection/location at the appropriate time as per the direction of BHEL engineer to avoid damage/loss of such equipment at site.

2.2.8

The contractor shall collect all scrap materials periodically from various levels of power house, working area of the power station, auxiliary and piping around power station and collect the same at one place

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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earmarked for the same. Loads of scraps are to be shifted to a place earmarked by BHEL. Failure to collect the scrap is likely to lead to accidents and as such BHEL reserves the right to collect and remove the scrap at contractor's risk and cost if there is any failure on the part of contractor in this respect.

2.2.9

All the surplus, damaged, unused materials, package materials, containers, special transporting frames, gunny bags etc. shall be returned to the BHEL stores/customer's stores by the contractor.

2.2.10

All pipes and tubes, equipment, instruments issued to contractor and kept at site for erection shall be covered with plastic caps/steel caps or shall be closed with suitable plugs by the contractor.

2.2.11

The contractor shall ensure that all the packing materials and protection devices used for the various equipments during transit and storage are removed before these equipments are erected in position.

2.2.12

Contractor shall plan and transport equipment/components from storage yard/sheds to erection site and erect them in such a manner and in a sequence that material accumulation at site should not lead to congestion. Materials shall be stacked neatly, preserved and stored in the contractor's shed and work areas in an orderly manner. It may be specifically noted that the space available in the power plant is limited and accumulation of material may lead to the necessity of shifting and restacking the materials to enable other agencies to carry on with their work or to comply with customer's requirements. If required, the contractor shall arrange shifting of surplus material expeditiously failing which the same will be arranged by BHEL and all charges together with departmental charges at 30% will be recovered from his bills.

2.2.13

House-keeping in the erection and pre-assembly area is as important as the well-planned and orderly work. The access to site for inspection approaches by BHEL and customer engineers and leading of the material shall be made available by the contractor at all times. The shifting and re-shifting of erection materials, tools and plants and clearance of restrictions, filling of ditches, undulation near the preassembly area is the responsibility of the contractor. Contractor should visit the site and acquaint himself with all restrictions and difficulties that he may encounter during erection/commissioning stages.

2.3 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST COMMISSIONING

The work is also inclusive of various commissioning activities of BHEL scope. The various activities, tests, trial runs may have to be repeated till satisfactory results are obtained and also to satisfy the requirements of customer/ consultant/ statutory authorities like, electrical inspector etc.

2.3.1

The contractor shall perform various activities during pre-commissioning, integrated testing, post-commissioning stages of equipment covered under this tender specification. It is responsibility of contractor to arranged tools & plants, test equipment, experienced engineers and technicians. Contractor

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shall earmark separate manpower for respective commissioning areas and they shall not be disturbed /diverted for other work. The contractor's commissioning group shall work as per the instruction of BHEL Engineer and they shall coordinate day-to-day activity with other agency and BHEL/ Customer. The testing activity may have to be repeated till satisfactory results are obtained and also to satisfy the requirement of Customer / statutory Authority.

2.3.2

The contractor shall simultaneously start testing & commissioning activities for equipment's to match the mile stone activities of the project.

2.3.3

The mobilization of these commissioning groups shall be such that planned activities are taken up in time and also completed as per schedule and work undertaken round the clock if required. It is responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools & tackles / testing equipment with BHEL Engineers and arrange for the same. If at any time the requisite manpower, consumables, testing equipment etc are not arranged then BHEL shall make alternative arrangements and necessary recoveries with overhead cost will be made from the running bills.

2.3.4

Contractor shall cut/ open work, if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over without any extra payment.

2.3.5

It shall be specifically noted that the contractor may have to work round the clock and in shifts during the pre-commissioning and commissioning period along with or without BHEL engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.

2.3.6

In case any rework/ repair / rectification/ modification / fabrication etc is required because of contractor's faulty workmanship which are noticed during the commissioning of, at any stages, the same shall be rectified by the contractor at his cost. If during the commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement is required, the same shall be carried out by the contractor promptly and expeditiously. Claims of contractor, if any, for such works will be dealt as per clauses 2.15 of GCC

2.3.7

During the commissioning activities and carrying out various tests, if any of temporarily work such mounting of test equipment / cabling etc are required, the contractor shall carry out such work without any extra cost. The same shall be removed after completion of the activity.

2.3.8

During this period, though BHEL/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for complete requirement of men and required Tools & Plants, Consumables, Scaffolding and approaches etc., till such time the commissioned unit is taken over for trial operations.

2.3.9

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The contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the contractor.

2.3.10

The pre-commissioning activities will start in a phased manner to meet the various milestones and shall continue till equipments are commissioned fully with all connected equipment / devices or handed over to customer for regular operation. In this duration other erection activities such as cabling etc., shall be carried out by other agencies even though equipments are partially commissioned / charged. In order to co-ordinate the work such as issue of safety permit, normalization and compliance of other requirement, contractor shall keep team of experienced engineer, supervisor, technician and helper in each shift as decided by BHEL Engineer. The team shall take instruction from BHEL Engineer for day-to-day work and shall not be diverted for other work. No extra payment shall be made for their services.

2.3.11

For electrical works, 415 volts and above, the contractor has to bring qualified electricians.

2.3.12

Certain systems may be supplied with portable programming units, which are to be connected at various locations during pre-commissioning to handing over. Necessary cabling interconnecting the programming units and other connected panels has to be carried out by the contractor and are to be dismantled after work. For the purpose of testing, monitoring, commissioning, etc., these programming units will have to be repeatedly connected and disconnected at various locations. These will be considered as part of commissioning activities and no separate payment will be entertained for the above.

2.3.13

It is the responsibility of contractor to provide for necessary labour, tools and tackles and consumables till the completion of work under these specifications even in case dismantling, erection, testing and commissioning of this work is delayed due to reasons not attributable to the contractor.

2.3.14

Simultaneous commissioning activities will be in progress in various areas. All these works need specialized gangs including electricians/instrument mechanics in each area. Contractor shall earmark separate manpower for various commissioning activities. This manpower shall not be disturbed or diverted.

The mobilization of these commissioning gangs shall be such that planned activities are taken up in time and also completed as per schedule and the work undertaken round the clock if required. It is the responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools and tackles with BHEL engineer and arrange for the same. If at any time the requisite manpower, consumables, T&P are not arranged then BHEL shall make alternate arrangements and necessary recoveries with overhead cost will be made from the bills of the contractor.

2.3.15

During commissioning activities and carrying out various tests, minor items like gauges, manometers, etc., have to be temporarily erected and put in service to suit the commissioning activities. BHEL will provide the necessary gauges and equipment. Contractor has to carry out the erection, calibration, dismantling of the same. After completion of activities the temporary systems have to be removed and returned to stores. No extra charges will be payable towards these.

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2.3.16 Commissioning

- During pre-commissioning, commissioning, post commissioning and trial operation stages of various systems, certain category of manpower with T&P and consumables will have to be provided to BHEL commissioning engineers exclusively at their disposal. It shall be the responsibility of the contractor to provide Engineers, Electricians, technicians, Helpers, Fitters etc along with necessary consumables, hand tools, calibration equipment etc, for the various commissioning activities in progress. During shutdown period there could be requirements of separate commissioning gangs simultaneously in even up to 05 to 06 areas. Contractor has to augment the manpower as and when required as per work demand and necessity at site. The quoted rates shall include this.
- Before the plant is put into initial operation the Contractor shall be required to conduct test to demonstrate to the BHEL/Customer that each item of the plant is capable of correctly performing the functions for which it was specified and its performance, parameters etc. are as per the specified/approved values. These tests may be conducted concurrently with those required under commissioning sequence. Decision of BHEL engineer shall be final and binding on contractor.

2.3.17 Calibration, Testing & Commissioning

Calibration, testing & commissioning activity as specified in this technical specification and rate schedule against various equipment, devices, systems etc. are broadly classified below. However, there may be some overlapping between the activities (dismantling, erection, calibration and testing, commissioning). The classification of activity is only a guideline for understanding the total volume of work in each activity. The contractor shall have no claim for performing or providing manpower for such overlapping work, which is also within the scope of the work.

(A) Calibration

Verification after drawing of material of various types, range of the field devices with respect to instrument schedule, data sheet or system document.

- Codification of instruments as per system tag numbers
- Calibration / adjustment of instrument as per system requirement / set values.
- Providing head correction in case of pressure measurement as per calculated values or actual measured value for the instrument, which are used for interlock protections / monitoring. This is generally applicable for turbine / generator, lube oil systems, lube oil system of fans etc.
- Verification of installation of instruments for range, type, tag number as per physical location of process point as per process, instrumentation diagram.
- Checking and ensuring the proper function of instrument.
- All the recorders shall be made functional with proper chart movement and ink marking (if applicable).
- Preparation of computerized calibration certificates in the formats specified by BHEL Engineers and getting those signed by the customer is in the scope of the contractor.

(B) Erection

- Verification of installation as per drawing and document for the correctness of cabling, JBs, impulse pipe, various field device, panels, instruments etc.

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- Continuity check and IR value check of cables.
 - Verification of correction of cable termination with respect to instrument, electrical hook-up diagram, panel interconnection diagram, JB schedule.
 - Checking earthing of the equipments and cable shield wire continuity.
 - Energizing the functional group control panels and field devices.
 - All cable glands/piping/tubing to be fixed as per installation requirement before commissioning.

(C) Testing, Commissioning & Trial Operation

- Checking/verification of binary/analogue input and output signal from field and panel and up to recording/indicating instrument/HMI monitors.
- Checking the operating electrical/pneumatic drive through functional group panel, remote control desk, HMI, CRT operation and repeatability and smooth operation to be checked.
- Checking the interlock, protection and alarm for various process by simulation of field devices/process changes.
- Functional check of sub-loop control, sub group control and auto loop and fine tuning.
- Adjustment of limit switches/feedback position transmitter checking the actuator for correct Limit switch operation for correct position indication and repeatability shall be ensured.
- Motor IR value measurement, bearing/winding RTD checking, drying out of motor, providing assistance for trial run of motor which includes monitoring temperature rise winding/bearing during trial run.
- Contractor shall prepare calibration/testing report/protocols.
- During trial run of various systems, if the performance of any instrument is found erratic, unsatisfactory and requires re-adjustment, re-calibration etc., the defect shall be attended by contractor.
- Observing and checking the performance of the various devices on load/process variation. Any deficiencies/defect noticed during the variable load conditions, the same should be attended properly.
- Observe the proper functioning of sub-group/sub-loop control.
- Check the operation of various controls in manual/auto mode for smooth functioning.
- Clearing of all bad / invalid signals noticed during commissioning.
- Providing necessary assistance during restart of the unit is in scope of this specification. Smooth operation and availability of all instrument/controls of the systems installed under the scope herein, shall be ensured by the contractor. Contractor shall provide adequate number of skilled manpower and T&P for this purpose. Interruption during restart till stable operations at full load or any mutually agreeable load for reasons attributable to the Contractor may result in re-start of the unit all over again, consequential extension in Time Schedule / Contract Period shall be to the contractor's account.
- If any small wiring correction or minor modification in control panel wiring is noticed during the commissioning, it shall be carried out as a part of commissioning activity.

(D) Post-commissioning

- Contractor shall rectify the defect observed/informed by customer during the restart of the Unit

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- Contractor shall submit the as-built drawing as per guidelines and instruction of BHEL engineer.
- After restart/handling over of the equipment, if due to unforeseen reasons, certain works crop up, the contractor shall provide all the assistance.

(E) Tests & PG Test Assistance

- 1) Suitable skilled manpower, along with Tools & Plants (T&P) and Erection & Commissioning (E&C) support, shall be provided to assist during the Performance Guarantee (PG) Test.
- 2) Upon completion of erection and commissioning of the machine, the bidder shall provide necessary assistance for conducting the Performance Guarantee (PG) Test. This includes running the machine in PSP (generation + pump) mode for 02 cycles in normal working parameter.
- 3) Continuous operation test i.e., 72 Hrs continuous tests at full load (If net head & availability of water permits) after commissioning.
- 4) Bidder has to provide assistance during PG Test. PG Test shall be completed within 6 months from the date of commissioning.

One PSP cycle means the following:

Running the machine in turbine mode till maximum TWL suitable for pumping operation is reached. Subsequently, running the machines in pump mode to pump the water back to upper reservoir till the minimum TWL suitable for pumping operation is reached.

However, the above is subject to the following considerations:

- 1) Availability of water in the upper & lower reservoirs.
- 2) Availability (or requirement) of power from the grid.

Machine will be tested in Pump Mode Operation. Contractor shall keep their team until all the performance test is over.

2.4 CABLE TRAYS/ CABLE DUCTS WITH SUPPORTS AND ACCESSORIES

2.4.1

Various types of sheet metal, galvanized cable tray, i.e. Perforated, ladder type, seal metal duct, solid bottom tray, shall be provided in standard lengths along with accessories like hardware, bends, reducers, coupler plate, tray covers and tray clamps etc.

2.4.2

Installation of cable tray/cable duct shall include cutting, laying, jointing, supporting, drilling holes in the support, providing tees/reducers/bends/clamps as per tray route layout, fabrication of bends/tees/reducers from straight length, fixing of tray covers, welding of tray on support, cleaning and application of cold galvanizing paint on weld joints (supply of paint is in the scope of contractor). *Installation of tray/duct covers, wherever provided, will be done as a part of tray erection and no extra rates will be payable.*

2.4.3

In case cable trays are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instance.

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2.4.4

Before start of work support structure/ cable tray work in cable vault, the existing cables of fire alarm system, power and control cables are to be protected to avoid the damage from fire, cutting welds and etc.

2.4.5

Cable trays/ducts have to be routed underground in cable trench, over head on structure, valves, floors etc. for various applications such as cable laying, copper tubes, conduits, thermocouple, temperature gauge capillary etc.

2.4.6

The cable trays shall be supported in general at a span of 1.5m horizontally and at a distance of 1m vertically. All sharp edges and burr shall be removed.

2.4.7

Cable tray on the top tier shall have cover whenever running below pipes.

2.4.8

Cable trays shall be numbered as per layout drawing before laying of cables.

2.5 CABLE LAYING (POWER/CONTROL/INSTRUMENTATION: SHIELDED/ UNSHIELDED/PLUG-IN/COAXIAL/UTP/STP/DATA HIGHWAY, ARMOURED/ UN-ARMOURED, SINGLE/ MULTI-CORE, PVC/HR PVC/FRLS/ TEFLON/PTFE/ XLPE INSULATION, OPTICAL FIBER, ETC.)

2.5.1

Cable laying includes cutting to the required length, laying in overhead/underground cable trench/through pipes/flexible conduits, dressing/clamping in tray, drilling of holes in gland plates in panels and junction box, glanding, splicing, dressing of spliced wire inside the panel and JBs, providing PVC numerical/alphabetical / printed ferrules, termination by using crimp type copper tinned/aluminium lugs, insulated/un-insulated, termination (crimp, soldering, etc.), plug-in connections with insert type crimping, providing identification PVC/aluminium cable tags (at both the ends and at 15 m intervals throughout the route length and also at each bend), continuity checking, insulation resistance checking, high voltage test on HT cables. Contractor to arrange adequate numbers of his own ferrule printing machines.

2.5.2

All cables shall be provided with minimum of 2mm thick aluminum sheets as cable identification tags indicating cable designation in accordance with the cable schedule. The cable tags shall be provided at the ends as per cable schedule, when the cable changes direction/ elevation. The cable tags shall be of aluminum with the number punched on it and securely attached to the cable by not less than two turns of 20 SWG GI wire conforming to IS:280. Alternatively, cable may also provide cable tags made of nylon, cable marking ties with cable number heat stamped on the cable tags.

2.5.3

For buried cable, the marker shall project at least 150mm above ground and shall be spaced at an interval of 20m and at every change of direction.

2.5.4

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All the cables shall be clamped to the cable trays/ support structure with the help of clamps. Cables to be strapped to tray at interval not greater than 300mm. All power cables shall be clamped individually and control cables shall be clamped in groups of 3 or 4 cables. Clamps for multicore cables shall be fabricated out of 25x3mm aluminum flats. Single core power cables shall be laid in trefoil formation and suitably clamped with Al cast/ Glass Fiber Clamp. All sharp edges and burr shall be removed. Erection Agency shall carry out the plant cabling works in line with customer/ consultant's Technical Specification.

2.5.5

Cables to be strapped to tray at interval not greater than 300mm.

2.5.6

Laying of Power, Control, DC supply Cable and Signal Cables are to be laid as per identified cable tray. In case of non-availability of cable tray, cable shall be laid with permission of BHEL.

2.5.7

Laying, etc of Optical fibre cables on cable trays /cable trench shall necessarily be done using flexible conduit

2.5.8

Damaged cable drums also to be used within the quoted rates. No extra compensation for difficulty in cable laying due to damaged drums shall be made.

2.5.9

Entry to the panels and JB's may be at top, sides or bottom. All cables are required to be properly supported and clamped near to the JB/panel.

2.5.10

Spare holes in the panels/ Instruments/ Actuators/ Motors/ JB's/ etc. shall be sealed by the contractor using suitable method (The cost of work and Materials such as aluminum sheet or Adhesive tape/ Plugs etc. shall be within the quoted rates for laying of cables).

2.5.11

Wherever cable glanding is not possible, either due to the gland plate size limitations or more number of cable entries, prefab plug-in cables, etc., for such cases cables may have to be lifted inside the panel by either making cut-out in gland plate and providing rubber profile for sharp edge protection or alternatively, providing 4" or 6" PVC pipe coupling gland and these pipe coupling gland shall be supplied by contractor within the quoted rate of cable laying.

2.5.12

Copper tinned lugs of various types (pin, ring, fork, snap-on) upto 4 sq.mm, PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metallic, clamping and dressing material with hardware, PVC sleeves etc. shall be supplied by the contractor within the quoted rates for cable laying. The quality of material shall be got approved from BHEL engineer prior to their use on job.

2.5.13

All care should be taken to avoid abrasion, tension, twisting, kinking, and stretching of cables during installation.

2.5.14

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Cable shielding – all signal cables are supplied with bare shielded copper wire/with braided wire shield. Generally, shield wire is kept isolated at instrument/field device end and continuity is maintained through JBs and grounded at panel end only. While terminating the shield wire either in panel or JBs, PVC sleeves are to be used to avoid two-point earthing.

2.5.15

Wherever cables run through ducts, conduits, valves, etc., they shall be sealed using fire/weather proof compound. In addition to this, cable entry in panels, MCCs, instruments, electrical actuators etc., are also required to be sealed. The required material for doing so shall be included by contractor in the cabling scope.

2.5.16

Many of the cable trays and cables have to be laid in cable trenches. For this purpose, the covers of the trenches have to be opened for working at site and whenever the cables are to be laid in existing cable tray, all safety precautions have to be observed.

After completing the work, the trenches have to be cleaned and covers put back into position. Contractor shall also carry out de-watering from the trenches if required and arrange pumps etc., at his cost.

2.5.17

Looping wire at terminal block of panels and electrical actuator as shown in the inter-connection diagrams or as required is to be done by contractor at no extra cost.

2.5.18

Contractor shall carefully plan the cutting schedule of each cable drum in consultation with site engineer such that wastages are minimized. In any case, the wastage shall not exceed the limits mentioned in this contract. Recovery will be made in case the wastages are exceeding the wastage allowances fixed in this contract.

2.5.19

The erection contractor shall make every effort to minimize wastage during erection work. In any case, **the wastage shall not exceed the following limits;**

Sl. No.	Item	% Wastage on issued Qty
1.	Fabrication steel	2
2.	Each size of power cables	1
3.	Each size of control/Instrument cables	2
4.	Impulse pipe/tubes/GI pipes/copper tube	1

If, however, the bidder quotes for more wastage than specified above, the excess portion will be considered for adjustment during the tender evaluation at the quoted supply rate of material.

If the actual wastage be more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill.

2.5.20

In case of HT cable, cutting schedule is to be followed as provided by BHEL.

2.5.21

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The HT/ LT Power and control cabling work shall be carried out in advance so that same can be terminated at panel end as the clearance is ready from the panel E&C side.

2.5.22

The termination and connection of cables shall be carried out strictly in accordance with manufacturer's instruction, drawings, and/ or as directed by the BHEL. The work shall include all clamping, fitting, fixing, soldering, tapping, compound filling, cable jointing, crimping, shorting, and grounding as required for the complete job. Cables shall be checked for insulation resistance before and after jointing. All erection consumables shall be in Erection Agency's scope. Termination and connection shall be carried out in such a manner as to avoid strain on the terminals. Cables shall be marked with cable numbers as per applicable drawing.

2.5.23

Control cable cores entering control panel/ switchgear/ MCC etc. shall be neatly bunched and served with PVC perforated tape to keep it in position at the terminal block.

2.5.24

Termination and connection shall be carried out in such a manner as to avoid strain on the terminals. Cables shall be marked with cable numbers as per applicable drawing.

2.5.25

All cable entry points shall be properly sealed and made vermin proof and dustproof. Unusual opening, if any, shall be effectively closed. Sealing work shall be carried out with approved sealing compound having fire withstand capability for at least 03 hours.

2.5.26

The rate of laying for LT power, control and signal cable is inclusive of glanding and termination at both ends.

2.5.27

The LT Power, Control and Signal Cable straight through Jointing Kits (if required) shall be in Contractor's scope of supply. The rate of supply, and erection of these kits will be part of laying rates. No separate rate is applicable on this account.

2.5.28

The unit rates for the HT cable termination are exclusive of unit rates for laying of HT cables. termination kits for HT cables (3.3kV and above) shall be supplied by BHEL.

2.5.29

Ferrules shall be installed on all control cables cores in all junction boxes and at all terminations. The ferruling shall be cross ferruling. The ferrules shall carry terminal numbers as per drawings. All ferrules shall be colored, plastic & interlocked type. Spare cores shall also be similarly provided with ferrules, crimped with lug and aped on the ends. Spare cores shall be ferruled with individual cable number, crimped with lug and aped on the ends.

2.5.30

Terminal Connections:

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The types of cable terminations are generally as detailed below:

- 1) All field cables in package are crimp type of different sizes.
- 2) All JB's are both side screw type.
- 3) All console tiles wiring: screwed or plug-in type to be fabricated at site.

2.5.31

For removal of existing Cables, Cable Induction meter of applicable Voltage is mandatory to confirm that the cable is charged or not.

2.5.32

Existing/old cables are to be disconnected from old Panels and re-connected to the new Electrical/DCS Panels. If the existing cables are short in length, same has to be joined by straight lugs of various types (pin, ring, fork, snap-on) upto 4 sq.mm and reconnected to the new Panels.

2.5.33

Unit rate quoted for cable lying shall include the activities as defined above.

2.6 JUNCTION BOXES

Different types of junction boxes are to be erected by the contractor like junction boxes below 48 ways and above 48 ways. The junction boxes are to be located at the locations jointly decided at site during erection. The junction boxes are to be erected on the frames fabricated at site. Brief work will include:

- a. Checking of installation for correctness.
- b. Functional checking/ adjustment of JB/ PB for their system.
- c. Hardware for erection (Like Nuts, Bolts and Washers etc.) where ever is required shall be in the scope of the contractor.

2.7 Void

2.8 STRUCTURAL STEEL FABRICATION AND INSTALLATION (Instrument/ Junction Box Frame/ Panel Base Frame/ Cable Tray & Misc. Structures Fabrication)

2.8.1

Structural steel material like MS angles, channels, beams, flats, plates etc. shall be used for fabrication of panel base frame, cable tray supports, canopies, instrument and junction box frames, impulse pipe/instrument air pipe supports and instruments etc.

2.8.2

This shall include cutting into size, conduiting of end connections, if required, welding, grinding of excess weld deposits, drilling of holes for mounting of device/instrument, installation at location, levelling, alignment, providing bracings, painting etc. No gas cut holes will be permitted. Contractor to follow the BHEL supplied welding schedule and welding procedures.

2.8.3

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In case, structural cable trays, bends, tees, reducers etc., are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instances.

2.8.4

Frame installation/cable tray accessories' installation at site may involve mounting either on concrete floor by grouting/using anchor fasteners or on steel structure by welding etc. *All consumables including anchor fasteners shall be arranged by the contractor.*

2.8.5

All the fabricated supports/frames shall be applied with one coat of primer red oxide paint before installation and two coat of synthetic enamel of prescribed shade of final paint,. If required, BHEL shall prescribe time gap between first and second coat of final paint. Supply of paint, primer etc. are in contractor's scope.

2.8.6

In certain packages, galvanized members of junction box frames and instrument racks shall be supplied in cut to sizes and frame assemblies are required to be done as per drawing by bolting/welding. The installation rate as quoted shall include the assembling of the frames.

2.8.7

Gas cutting of tray/impulse pipe support and gas cut holes in frame shall be avoided. Only drilled hole shall be permitted in frame etc.

2.8.8

All the fabricated supports/ frames for instruments, brackets/ racks, support steel work for tubing impulse lines/ instruments trays, pipes, electrical equipment, etc., shall be epoxy painted after shot blasting (as applicable) and surface preparation as per painting specifications. Paints and other associated items are in the scope of the contractor.

2.8.9

Hardware for erection (Like Nuts, Bolts and Washers, etc.) where ever is required shall be in the scope of the contractor.

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2.9 INSTALLATION OF PANELS

2.9.1

Electrical control panels, electronic control panels, etc., are normally supplied in suite of either one/two/three/four/five or loose shipping sections with integral base frame or loose supplied.

These panels may have to be installed as stand alone or in groups consisting of number of panels in each row, depending upon the plant layout and foundation arrangement.

2.9.2

The panels shall be transported from stores to the place of installation in vertical position. Care shall be taken such that the switches, lamps, instruments etc. mounted on the panel do not get damaged during transit.

2.9.3

Installation of panel shall include **construction/ fabrication of base frame**, levelling, alignment, fixing of anti-vibration pads, removal of side covers, fixing of cubicle interconnection hardware, bus bar jointing, wiring interconnection, welding and grouting of panels and base frames, mounting of panel canopy wherever supplied as part of panel, drilling of gland plates and sealing of cable entries. In certain case where canopies are not supplied but have to be fabricated out of MS sheets (to be arranged by the Bidder), payment will be done on square meter basis after all requisite documents

2.9.4

Panels have to be shifted to their locations through floor openings, temporary openings like floor grills, door etc. which shall be part of work and no claim whatsoever will be entertained with regard to non-availability of opening as per shortest route etc. Panel have to be erected at different locations and elevation in TG, GTG hall, LT & HT switchgear room, unit control room, etc.

2.9.5

Panel and instruments once erected in position should be properly protected using necessary care to prevent ingress of dust/moisture. This will have to be periodically cleaned and surroundings have to be kept tidy. Necessary canopies for Instruments and JBs shall be provided.

2.9.6

Wherever the panels to be mounted on cable trenches, channel supports have to be provided across the cable trench over which the base frame of panel shall be mounted. For such work, structural steel fabrication, installation rates shall be applicable.

2.9.7

Normally the panels shall be supplied with instruments, relays, meters, electronic modules etc. mounted and pre-wired. However, if these are supplied loose / separately for safety in transit, contractor shall mount/wire such devices as part of the panel installation work and no separate rates shall be applicable unless otherwise *specifically* listed in the rate schedule.

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2.9.8

Supplier's instruction manuals, packing slips, door keys etc. received along with the panels will be handed over to BHEL's engineer on opening of the panels and record of receipt of such things shall be maintained by contractor.

2.9.9

Regular cleaning of the panels as per the instruction of BHEL engineer till handing over of the set to customer is to be carried out by the contractor free of cost.

2.9.10

No separate payment shall be made for replacement of any devices like electronic modules, relays, conductors, terminal block, push buttons etc. which are found defective during pre-commissioning / post-commissioning of any equipment / item.

2.9.11

For the panels erected by other agencies, commissioning/calibration work and troubleshooting has to be carried out by the contractor as part of testing and commissioning work as per the quoted rates.

2.9.12

Associated civil works like drilling, chipping, punching holes and opening in concrete floors, slabs and brick walls, grouting, related to Rack, support fabrication and installation, associated civil works required for installation of control panels, Junction boxes etc., shall be included in the erection cost of such items. Also all associated civil works like chipping away and making good as necessary in floor slab/wall for cabling / earthing etc., as required are included in the scope for which no separate payment is applicable. The scope also includes supply of grouting material, if any. Mechanical works as per BOQ is also in the scope of the contractor.

2.9.13

Control & Instrumentation system panels are based on max-DNA/metso-DNA distributed digital control philosophy. This system is having communication through UTP cables amongst themselves. The system consists of computer network with servers and workstations and various peripherals like printers, etc. Optical fibre cables are also used for communication, especially for larger distances. The various components/devices are generally located in control room/computer room/diagnostic and shift in charge room. Some panels (viz. network panels) are also located in outdoor plants and other units.

2.10

The entire work of dismantling, erection, testing, commissioning of the connected devices/equipment as listed in rate schedule is to be carried out including laying of peripherals cables (either plug-in or plugs to be fabricated at site), placement of computer furniture in computer room as per lay out. The computer furniture shall be supplied either assembled or in knocked down condition, which have to be assembled at site. The quoted rate shall be inclusive of cable laying, termination and placement of furniture against each device as given in the rate schedule.

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2.11 BATTERY/ BATTERY CHARGER/ UPS

30KVA, 230V AC, 1Ph, 50Hz UPS System (along with ACDB, Battery, BHMS etc.)

2.11.1

Ni-Cd/Lead Acid (or similar type) Batteries will be supplied loose along with battery interconnection in the series/ parallel links/ bus bar, lugs, steel/ wooden battery stand either assembled or knocked down condition, cables and associated charger and UPS system.

2.11.2

In case of Ni-Cd (or similar type) batteries are normally supplied in charged condition, due care shall be exercised while handling/ installation of the same. If the battery charge is found to be less than the required level, the charging/ discharging cycle shall be carried out as per instruction of BHEL engineer.

2.11.3

Battery charging/ discharging is a continuous process and skilled manpower shall be deployed by the contractor round-the-clock.

2.11.4

Contractor shall arrange suitable load, cables, safety equipment and consumables for discharging the battery during charging and discharging cycle at his cost.

2.11.5

Contractor shall provide skilled manpower for periodic maintenance after the battery are fully charged for the activities such as checking of electrolyte level, specific gravity, topping up with distilled water and cleaning till the set is handed over to customer and record of the same shall be maintained and submitted before handing over of the system.

2.12 FIELD INSTRUMENTATION

2.12.1

Various type of primary/secondary indicating/recording instrument for pressure, temperature, flow, level and analytical measurement shall be supplied either loose or mounted along with the equipment.

2.12.2

Scope of work under erection/calibration/testing/commissioning shall include calibration, setting, adjustment, writing instrument tag number with paint, report making, installation, servicing, minor repairs/servicing, putting instrument into service, signal checking from field up to the functional group panels and remote indicating instrument, functional checks, interlock and protection/alarm checks by simulating the field devices, troubleshooting during pre-commissioning/post-commissioning till system is handed over to the customer.

2.12.3

It is the responsibility of contractor to make erection, calibration/testing protocols for various electrical and C&I equipment/devices and they should get duly certified by customer/BHEL engineer and should be submitted to BHEL engineer regularly. However, sample formats will be given by BHEL and have to be printed by contractor in adequate numbers.

2.12.4

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Contractor shall establish calibration laboratory with adequate facilities and they should arrange standard test instruments duly calibrated from recognized agencies and calibration report of the same to be submitted prior to start of calibration of the field instruments/devices.

2.12.5 Void

2.12.6

Installation of instrument shall also include drilling of holes and tapping for mounting of instrument and local instrument frames/panels and supply of hardware for mounting of the instrument.

2.12.7

Some devices line solenoid valves, position feedback transmitters, limit switches, air filter regulators, airlock relays, positioners etc., are supplied assembled along with mechanical equipments like pneumatic control valves, power cylinders, trip valves, dampers, motorized actuators, etc. These will need removal, calibration/testing, re-fixing, adjustment, etc., and commissioning. Separate payment shall not be made for this. The rates quoted for the commissioning of these equipments (viz., pneumatic control valves, power cylinders, trip valves, dampers, etc.) should take care of the above. Also, the contractor shall remove such devices prior to erection either at site or at store to avoid damages/pilferages and keeping in safe custody and the same shall be installed prior to commissioning of such equipment.

2.12.8 Void

2.12.9

Sometimes recalibration of equipments may become necessary due to reasons not attributable to the contractor, e.g. Lapse of Time after first calibration, Need for change in range/parameter, etc. If re-calibration is required due to no fault of the contractor, the rates payable for re-calibration shall be as under:

Recalibration Charges = 60% of the Percentage Stage Payment for Calibration as per split-up defined in Terms of Payment

The contractor shall keep record of such instrument with the reason for re-calibration and certified by the BHEL Engineer.

Note: For recalibration of skid mounted items or other systems where lump-sum rates are quoted, the recalibration charges, if admissible, will be calculated from the relevant unit rates quoted for same / similar items elsewhere in the rate schedule. The decision of BHEL Engineer shall be final and binding on the contractor.

2.12.10

For the very few cases where required, the contractor shall carry out re-orientation of bottom/top entry arrangement for process connection if needed due to site condition in existing instrument rack/enclosure/JB and re-location of existing instrument including removing of the existing tubing and re-installation of the same at appropriate location due to any change in grouping of the instrument and no extra payment shall be applicable.

2.12.11

In certain cases, instruments / devices are supplied on equipment or drawn by other agencies as part of mechanical package. The same are to be received or to be collected from other agencies for keeping in safe

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custody to avoid damages. The same are to be erected back after calibration for which unit rate shall be applicable for erection and calibration. Contractor shall maintain record of such instrument duly certified by BHEL engineer. However for removal of such instrument, no separate rate/payment shall be applicable.

2.13 UNIT CONTROL DESK AND COMPONENTS

2.13.1

Unit control desk will be supplied in a single shipping section for erection at site.

2.13.2

Console Inserts shall be supplied either mounted on console grid or supplied loose. Also, the items (indicators, pushbuttons, etc.) of the console insert may be supplied mounted in the console insert or may be supplied loose. The lump-sum rates quoted for console inserts should take the above into consideration. No separate payment will be done for the erection of individual components of console inserts. However, for the other items like recorders, indicators, etc., unit rate shall be applicable. Alarm facia on the control desk may be supplied mounted or loose. Mounting these, if required, will not attract any extra payments. The commissioning of these will constitute a part of the panel commissioning from where the alarm is driven.

2.14 MISC. OTHER INSTRUMENT/ EQUIPMENT ERECTION, CALIBRATION AND COMMISSIONING.

2.14.1

Wherever panels & control valves have been erected by the mechanical contractor, calibration/ commissioning has to be carried out by the contractor.

2.14.2

Dimension and weight as mentioned against control panels, MCCs, etc. in rate schedule are only approximate and there may be changes in dimension and weight in actual supply of the equipment and no rate variation shall be applicable on this account.

2.14.3

Wherever brief description of the system is given under various sub-heads, it is only for the understanding system requirements. It does not indicate the total specification of work. For such system, other clauses are also applicable wherein work details are specified.

2.14.4

Normally, cable glands on junction boxes side are received in mounted condition. While terminating the cables as per drawings, the cable glands are to be removed and fixed. Wherever cable glands are not received along with junction boxes, the cable glands as per the requirement will be provided by BHEL and the contractor has to make necessary holes/ adjust the available holes in the JB for fixing these. No separate payment will be made for drilling of holes and fixing the cable glands to the junction boxes. Nameplates for JB's will be supplied separately. These are to be suitably written and fixed onto the JB's. Wherever nameplates for JB's are not supplied, the JB no. are to be written with paint on JB's for identification. Separate payment will not be made for this.

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2.14.5

The push buttons and indicators in C&I systems are provided as loose with different type of connectors. The fixing of connectors and their wiring from push buttons to indicators shall be the responsibility of contractor. No separate payment will be made for fixing of connectors. The cable laying and termination charges will be paid as per applicable rate schedule.

2.15 GUIDELINES FOR ERECTION

2.15.1 Air Piping

All instrument air pipelines shall be isolated from the instruments and pressurized pneumatically to maximum work pressure. They shall then be isolated from the source of pressure and fall shall be less than 1 psi in 20 minutes.

2.15.2 Pneumatic Signal Lines

All pneumatic signal lines shall be disconnected and blown through with instrument air. The line shall be blanked off and pressurized pneumatically 20 psi and checked with soap solution for leaks and attended accordingly.

2.15.3 Instruments and Equipment

- a. All field mounted instruments are to be located in such a way as not to obstruct walk-ways or plant equipment access but shall be easily accessible for maintenance. Hand rails shall not be used for mounting or supporting instruments.
- b. Racks/ stands and supports for instruments and transmitters shall be fixed on RCC column/ floor by chipping and grouting or by welding to steel structure. In no case these shall be welded to floor grills.
- c. When installing flow and pressure transmitters/ switches for Liquid/ steam/ condensate vapor services, the instrument is to be mounted below its primary element or tapping point. For gas service applications, the instrument is to be mounted above Primary element tapping point.
- d. During erection and commissioning stage, the site mounted instrument shall be protected suitably. Contractor shall provide suitable security arrangement in main control room, and other areas where equipment are positioned, at no extra cost.
- e. Contractor shall arrange for own firefighting equipment for the materials stored under contractor's custody.

2.15.4 Sub-assemblies

- a. All subassemblies should be kept in a separate place where it is easily accessible.
- b. Subassemblies should have a protective cover in case it is stored without wooden packing/ case to prevent accumulation of dust. Silica gel packets should also be kept along with it.
- c. Subassemblies should not be stacked one above the other.

2.15.5 Loose items

The loose items supplied for the main equipment falls into various categories like tools, cables, prefabricated cables, console inserts, recorders, VDU/CRT, other display units, printers, sensors and transducers, cable glands, cable ducts, frames, racks, etc. These are to be categorized and stored separately.

2.15.6 Guidelines for handling of electronic modules

- a. All the electronic modules shall be handled by qualified persons only.
- b. Electronic modules should only be touched when it is absolutely essential to do so.

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- c. Before touching any electronic module, the operator should discharge the static electricity by earthing himself or better still, ensure constant discharge by wearing an earthed wrist strap.
- d. The operator should not wear clothing made entirely from synthetic fibres, but a mixture containing at least 65% cotton.
- e. The PCB should always be held by front panel or by module frame and electronic components/connectors should never be touched.
- f. The electronic modules should not be placed close to television sets or CRT units.
- g. Soldering irons and any other tools used must be grounded.
- h. All modules using CMOS components are packed in antistatic bags when transported loose to avoid ESD failures. The antistatic bags must always be used to transport modules at site from one place to the other.

2.15.7 Welding, Non-destructive testing etc.

- a. Installation of equipment involves good quality welding, NDE checks etc.
- b. Welder deployed for aluminum welding shall have experienced and approved by BHEL and BHEL's Customer after due qualification process/ testing.
- c. Welding of all structural steel & aluminum shall be done only by the qualified and approved welders.
- d. All the welders shall be tested and approved by BHEL engineer/ Customer's quality engineer before they are actually engaged on work though they may possess IBR/ other certificate. BHEL reserves the right to reject any welder without assigning any reason.
- e. The welded surface shall be cleaned of slag and painted with primer paint to prevent corrosion. For this paint will be supplied by the contractor.
- f. Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.
- g. Certain types of coated welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also, during execution, the coated welding electrodes have to be carried in portable ovens.

2.16 ELECTRICAL CABLING, EARTHING AND ABOVE GROUND EARTHING

2.16.1 ELECTRICAL CABLING/ WIRING

- a. All the cables will be properly laid in cable trays, dressed and clamped with aluminum flats. The cable will be terminated at both ends with suitable lugs and printed ferrules and will be glanded properly. Suitable equipment and consumables for ferrule printing has to be arranged by the contractor at his own cost. For cable identification, the contractor shall provide at his cost aluminium tags at regular intervals (as per cable schedule) through each run of cable.
- b. All electrical connections shall be tested for polarity and proper connections.
- c. Insulation test of the various circuits shall be done.
- d. The checking of operation of individual equipment and instruments to which the cabling/ wiring connected shall also be done by the contractor.
- e. Wherever supplied, GI cable trays shall be of bolted construction only with fixing screws and coupler plates.
- f. Sharp bends of cable trays shall be avoided in all type of cable trays.
- g. Installation of cable racks and supports structure shall be carried out in all the required areas. Steel embedment shall be provided in the cable trenches, ceiling slabs and concrete blocks for installing the cable racks and support structures.
- h. Ladder perforated type cable trays shall be used in cable trenches and vertical risers.
- i. Cable racks in the trenches and control room are to be shared with other contractors installing cables in different areas wherever required. Contractor shall cooperate with the other contractors in sharing the cable trays and proper dressing and clamping the cables.
- j. Where power and control cables are to be laid in the same route, suitable barriers to segregate them physically shall be employed.

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- k. Space equal to the diameter of cable shall be provided between power cables of six over 50 mm in diameter.
- l. When cables pass through floors, walls etc., it shall be passed through a pipe for mechanical protection and the pipe ends sealed suitably.
- m. Care shall be taken to avoid short bending and kinking of conductor damaging insulation and stressing the cable beyond pulling force recommended by the manufacturer. Cable shall be protected at all times from mechanical damage.
- n. The minimum radius of formed bend of an insulated cable shall be 12d for un-armoured cables and 15d for armoured cables where 'd' is the overall diameter of the cables.
- o. No cable shall be laid in ducts or trenches where other services such as oil pipes, steam or water pipes are laid.
- p. Where cabling passes through brickwork or concrete work, the contractor shall provide suitable local protection against mechanical damage wherever necessary.
- q. The layout of all cables shall be arranged to give adequate clearance from other services and cables shall be routed to avoid hot zones. No extra cost shall be considered for rework.
- r. Jointing of cables shall be avoided as far as practicable. However, jointing if at all necessary shall be done by crimping type cable joints after getting approval of BHEL engineer.
- s. The cable schedules indicating cable sizes, tentative cables routing information will be furnished by BHEL at site to the contractor. Required steel inserts on cable trenches, will be provided by BHEL. The contractor shall design number of cable/ racks to accommodate the cables on racks/ trays properly.
- t. Detailed specification shall be as per instruction of site engineer.

2.16.2 EARTHING INSTALLATIONS

- a. All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all equipment supplied by BHEL.
- b. The earthing conductors shall be of mild steel/ GI strip/ wires. All connections from equipment to main earthing conductors shall be made as illustrated in earthing drawing/ as per instruction of BHEL engineer. Suitable "Cu" Lugs are to be supplied for earthing with GI wire by the agency where ever is required.
- c. A continuous earthing conductor shall be installed in all cable trays and securely clamped to each tray section by suitable connectors to form a continuous earthing system. When two or more trays supporting power cables run in parallel, a continuous earthing conductor shall be provided on trays only with tap offs to the control cable trays. All valve and damper motors and rapping motors will be earthed to this conductor.
- d. All joints in the earthing system shall be welded type. Earthing connections to all equipment including motors shall be bolted type.
- e. Earthing connections shall be free from tinning scale paint, enamel, grease, rust or dirt at the time of making joint.
- f. Metallic sheaths, screens/ shields and armour of all multicore cables shall be bonded and earthed.
- g. Earthing conductors along their run on columns, beams, walls etc. shall be supported by suitable cleats at intervals as specified by BHEL site engineer.
- h. Welded joints on GI earthing conductors shall be painted as mentioned in the Typical Arrangement drawing.

2.16.3 ABOVE GROUND EARTHING

- a. The contractor shall carry out above ground earthing for all Electrical equipment, which may be erected by him, or some other agency. Different type of earthing materials shall be supplied and the contractor shall lay and connect the earthing materials as per site requirement and as detailed in drawings. Unit rate for earthing material shall be paid on running meter basis.
- b. All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all the equipment supplied by BHEL.

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- c. Parts of all electrical equipment and machinery not intended to be live shall have two separate and distinct earth connections each to conform to the stipulation of the Indian Electricity Rules and apparatus rated 240V and below may have single earth connections.
- d. Generally, risers are provided near the structure/ equipment foundation, in case risers are not visible and buried below the foundation level, contractor shall carry out necessary earth excavation for connecting the above ground earthing strips. Wherever welding is involved necessary protective coating shall be applied on weld joints.
- e. The earthing conductors shall be mild steel/ G.I. strips/ wires. All connections from the equipment to the main earthing conductors shall be made as illustrated in earthing drawings. A copy of earthing drawing shall be provided to the successful bidder.
- f. A continuous earthing conductor shall be installed in all cables trays and securely clamped to each tray section by suitable connectors to form a continuous earthing system. When two or more trays supporting power, cables run on parallel a continuous earthing conductor shall be provided on one tray only with tap-offs to the control cable trays. All valve and damper motor and rapping motors will be earthed to this conductor.
- g. If the equipment is not available at the time of earthing conductor laying tap connections from the main earthing conductor shall be brought out up to slab equipment foundation level with at least 200mm spare length left for further connections to equipment earthing terminals.
- h. Entire system shall be earthed in accordance with the provisions of the relevant IEC recommendations/ IS code of practice IS 3043-1947 and further amendments thereof and Indian Electricity Rules, so that the values of the step and contact potentials in case of faults are kept within safe permissible limits.
- i. If any outer shops and buildings as well as the electrical sub-stations and electrical rooms are also in contractor's scope, a ring main earthing system will be provided. Ring main earthing systems shall again be interconnected as a network to power plant main earthing mat. Internal earthing ring in the electrical equipment room shall be provided by the contractor irrespective of whether equipment of the area is in their scope or not.
- j. For different floors in a building, localized internal earthing ring shall be formed and connected to the ground earthing through vertical risers. The earthing mat shall be common to both power and lighting installations.
- k. A minimum of two spare earth rings will be provided in each floor of the building for earthing future building.
- l. Each RCC steel column of the building will be interconnected to the floor-earthing grid in basement/ ground floor.
- m. For protective earthing separate conductor shall be used for flow of earth fault current.
- n. Contractor shall carry out minor civil i.e. chipping of floor (where earth strip is to be laid on floor), removal of topsoil for laying earth strip in switchyard area, etc.
- o. It is the responsibility of contractor to provide skilled manpower for periodic maintenance after the initial commissioning till handing over the system to customer. During this period the activities are to be carried out such as checking the electrolyte & specific gravity of individual battery, topping up of electrolyte, cleaning etc.

2.17 TRANSFORMERS

Input Transformer

3Ph. 17.4 MVA, 11/3.50-3.50kV, CONVERTER DUTY TRANSFORMER,

Output Transformer

3Ph. 16MVA, 11/3.20-3.20kV, CONVERTER DUTY TRANSFORMER,

The scope of work under this head is defined as below.

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- a. Contractor shall transport the transformer tanks & accessories of HT/LT power transformer and other transformers as mentioned above from BHEL or Customer stores/ Storage yard to respective foundation of unit.
- b. The shifting operation may require dragging either on ground with suitable arrangement or dragging after fixing of wheels on rail track. It may also require turning of transformer at suitable locations en-route to foundation. The contractor shall arrange wooden sleepers, winches, jacks, rails, crane, plates etc. at his cost for this operation. However, all loose accessories shall have to be shifted from stores/storage yard.
- c. The transformers shall be handled in such a manner so that no jerk is transferred to the core, winding and internals of the transformer.
- d. Transformers are generally supplied in partly assembled condition. Accessories, like radiators, conservator tank, pipes, fittings, hardware's, gaskets, buchholz relay, marshaling box, relief vent, valves, pumps, cooling fans, cables, bushings, radiator headers/fans, rollers, tap changer drive unit, cables of various sizes for interconnection from marshaling control box to field devices, bushing turrets (as applicable) shall be supplied loose.
- e. Placement on plinth, alignment with respect to the foundation and lay out drawings.
- f. Internal inspection to verify the intactness of core and winding, tap changer leads, off-load switch/on load tap changer, measurement of core and core bolt insulation.
- g. In case transformers are supplied partly oil filled/ gas filled, after internal inspection, the transformer shall be kept under vacuum (for a period to be decided by site engineer) and treated oil to be filled up to required level.
- h. Each drum of oil to be tested for BDV and if BDV is less, then each drum should be filtered separately. This treated oil to be filled in the transformers and auxiliaries.
- i. Contractor shall arrange storage tank of approx. 10 kl capacity, internally sand blasted and with one coat of oil resistance paint. Oil from drums to be transferred in storage tank and filtration to be carried out to achieve the required BDV/ withstand value. This treated oil to be filled in the transformers and auxiliaries. However, for low capacity transformer, a separate storage tank for mass filtration may not be required.
- j. All the accessories shall be assembled/ mounted as per OGA drawings and these should be thoroughly cleaned by spirit prior to installation.
- k. Contractor shall arrange required testing equipment for carrying out electrical test like voltage ratio, turn ratio, vector group, magnetic balance, winding resistance measurements, insulation resistance, Resistivity, SFRA and TAN Delta Test etc. as applicable.
- l. Contractor shall discuss and finalize installation and testing activity procedure with BHEL/customer prior to starting the work.
- m. Tests are also required to be conducted on Current Transformer, Potential Transformer & prior to /after installation. Contractor shall also carryout oil processing / filtration to achieve the desired results before charging and handing over of the entire system.
- n. Internal inspection on receipt of Transformer at site in presence of supplier is made mandatory. There may be time gap between first inspection and second inspection (which may be just before assembly of transformer accessories). If applicable, Nitrogen cylinders of appropriate purity shall be arranged by contractor as a part of scope of work within the quoted rates for transformer.
- o. The Erection, Testing and Commissioning of GT, ST, UAT, and other auxiliary transformers shall be in line with the Approved Field Quality Plans and as per instruction of Site Engineers/ Manufacturers.

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2.18 STATIC FREQUENCY CONVERTER (SFC) PANEL

SYSTEM DESCRIPTION

Static Frequency Converter is a system for starting and accelerating large synchronous machines. SFC takes power from the supply grid at constant voltage and constant frequency, and converts it into power of variable voltage and frequency in order to start and accelerate the synchronous machine synchronously. The machine is then synchronized to the supply grid and SFC is disconnected. Since this is made of solid-state devices and has no moving parts, it is also called Static Starter.

One of the applications of the SFC is starting of higher capacity motors used in pumps of Pump Storage projects. The pumps are started and accelerated to near full speed and synchronized to supply grid.

Two primary functions of SFC are:

- 1) Convert the 50Hz fixed voltage power form the supply grid to variable frequency variable voltage power.
- 2) To accelerate the motor up to base speed and regulate the speed of the motor as required by synchronizer controls.

Each Set consists of: -

- i. Input Transformer Panel: 1 No
 - ii. Reactor: 1 No
 - iii. Converter & Inverter: 1 No
 - iv. Output Breaker/Isolator: 1 No
 - v. Output Transformer Panel: 1 No
 - vi. Control Panel: 1 No
-
- a. Contractor shall transport the SFC Panel as mentioned above from BHEL stores/ Storage yard to respective foundation of unit.
 - b. All the accessories shall be assembled/ mounted as per OGA drawings and these should be thoroughly cleaned by spirit prior to installation.
 - c. Tests are also required to be conducted on SFC as per BHEL/Customer instructions

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2.19 DIGITAL GOVERNING SYSTEM

Each set consists of: -

- a. Microprocessor Based Digital Governor Controller
- b. Programming tool kit (Laptop with software)
- c. Speed Sensing Device (Toothed wheel with magnetic pick up)
- d. Hydro Mechanical Cabinet for G.V./R.V. (Servo proportional based)
- e. Hydraulic Over speed device with mounting arrangement & piping
- f. Modification in governor feedback system of Guide Vanes
- g. Modification in governor feedback system of runner
- h. Modification in governor oil pipeline (Piping & fitting for local Modification)
- i. Cable for termination between (EHGC, HMC, control desk, switches & indicating meters)

2.20 VIBRATION MONITORING SYSTEM (VMS) FOR GENERATOR AND TURBINE

System comprises of transducers with integral cables, weldable pads, wall mounted cabinet including monitors. The pads required to be welded on SS block on Generator/Turbine/HT motors end shield and fan bearing housing. In case of pad sizes more than the SS block provided on motor, contractor shall get the pads machined as per the required size and blue matching to be carried out before welding on bearing housing. No extra charges will be applicable. Fabrication of all support, Frame for JB or Probe shall be in the scope of contractor.

2.21 TREFOIL CLAMP

As per this tender, suitable trefoil clamps shall be supplied by the BHEL as quantities mentioned in the BOQ.

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2.22 FINAL PAINTING

2.22.1

The contractor shall provide all the primer, paint, and other consumables like brush, cleaning agents etc. All T&P, manpower, supervision is in contractor's scope. Painting shall be carried out as per color scheme approved by BHEL/ BHEL customer. The color, shade etc. shall be as per specification. Painting schedule will be furnished at site.

2.22.2

All the fabricated frames, instrument racks, Junction box frame, trays / impulse pipes, supports, panel base frame, etc., wherever applicable shall be first painted with one coat of primer paint (metal red oxide) and then two coats of synthetic enamel paint of approved shade (decided by BHEL Engineer) after thoroughly cleaning the surface of dust, rust, scale, grease, oil, etc., by wire brushing, scrapping or any other suitable method. The quoted rates should be inclusive of all these including supply of paints and consumables.

2.22.3

Other equipment like JB's, Panels, transmitter racks, Local gauge boards etc., shall be painted with two coats of synthetic enamel paint. The quoted rates should be inclusive of application of two final coats of synthetic enamel paint. All the consumables such as wire brush, other cleaning materials, painting implements, etc., is to be arranged by the contractor at his own cost. All equipment painting will be done by spray painting. The quoted rates should be inclusive of all these including supply of paints and consumables.

2.22.4

Cable trays shall, in general, be connected by bolted joints. However, in some cases welding of joints may be required. All the weld joints of GI cable trays and GI structural members shall be applied with a coat of cold galvanizing zinc paint. Paint, etc. shall be arranged by contractor at his cost.

2.22.5

Touch-up painting of LT MCC/ Control Panels or any other equipment / devices wherever necessary.

2.22.6

Full (Spray) painting of transformers, bus ducts with two coats of paint as per specification if applicable.

2.22.7

All the weld joints of GI cable trays and GI structural members shall be applied with red oxide and aluminium paint and then coated with bitumen.

2.22.8

Impulse pipes shall be applied with one coat of primer red oxide paint and two coats of synthetic enamel of prescribed shade of final paint as instructed by BHEL Engineer/ painting schedule. BHEL may prescribe a time gap between first coat and second coat of final paint. Paint, primer, brush, etc. supply is in the scope of the contractor. Colour codes for impulse piping, etc. will be as per standard codes/ mother pipe.

2.22.9

STRUCTURAL

Structural components may be supplied without any primer/ paint coat. The surface of such items shall be cleaned as per specifications and then coated with two coats of Primer.

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2.22.10

Colour Banding, Legend and Identification Marking, Direction marking etc. shall be in scope of the contractor.

2.22.11

The contractor shall provide the Primer (ROZC as per IS:2074) for the scope of painting work indicated in Section-4 as well as for protection of site weld joints and gas cut locations. Contractor shall also arrange to provide the required thinner and other consumables, T&P etc. required for application of ROZC Primer. All paints and thinners shall be sourced only from BHEL approved manufacturers. Some of them are as listed under:

- M/ s Asian Paints
- M/ s Berger paints
- M/ s Jenson & Nicholson
- M/ s Shalimar Paints
- M/ s Akzo Nobel
- M/ s Kansai Nerolac Paints

In order to have consistency in painting system, it is preferable that all the supplies are sourced from one single manufacturer.

2.22.12

Irrespective to scopes of painting & supply of paint mentioned elsewhere it is to be noted that supply of paint, primers, other consumables etc. for all primer/ painting works to be done by the contractor, shall be in Contractor's scope. No dispute shall be entertained on the above matter.

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Chapter – III: Facilities in the scope of Contractor/ BHEL

(Scope Matrix)

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.1	PART I ESTABLISHMENT			
3.1.1	FOR CONSTRUCTION PURPOSE:			
a	Open space for office (as per availability)	Yes		Bidder shall arrange Porta Cabin for office use and Location will be jointly decided.
b	Open space for storage (as per availability)	Yes		Location will be finalized after joint survey with owner
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipment, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Firefighting equipment like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	FOR LIVING PURPOSES OF THE BIDDER			
a	Open space for labor colony (as per availability)		Yes	<i>Agency has to make his own arrangement at his own cost.</i>
b	Labor Colony with internal roads, sanitation, complying with statutory requirements		Yes	
3.2	ELECTRICITY			
3.2.1	Electricity For construction purposes of Voltage 415/440 V			Chargeable; The charges for the actual energy consumed by the Contractor shall be Recovered by BHEL based on the prevalent rate of GSECL + Applicable Taxes / Duties, if any. <i>Any penalty due to non-maintenance of power factor by the customer shall be passed on to the contractor.</i>
a	Single point source	Yes		
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	

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Chapter – III: Facilities in the scope of Contractor/ BHEL
(Scope Matrix)

Sl. No	Description	Scope / to be taken care by		Remarks
		BHEL	Bidder	
	PART I			
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	Electricity for the office, stores, canteen etc of the bidder			<i>Agency has to make his own arrangement at its own cost.</i>
a	Single point source	Yes		
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.2.3	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc			<i>Agency has to make his own arrangement at its own cost.</i>
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
3.3	WATER SUPPLY			Chargeable, if applicable.
3.3.1	For construction purposes			<i>Agency has to make his own arrangement at its own cost.</i>
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	<u>Water supply for bidder's office, stores, canteen etc</u>			
a	Making the water available at single point	Yes		
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	<u>Water supply for Living Purpose</u>			
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4	LIGHTING			

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III: Facilities in the scope of Contractor/ BHEL

(Scope Matrix)

Sl. No	Description PART I	Scope / to be taken care by		Remarks
		BHEL	Bidder	
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3 At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
a	Telephone, fax, internet, intranet, e-mail etc		Yes	
3.6	COMPRESSED AIR wherever required for the work		Yes	
3.7	Demobilization of all the above facilities		Yes	
3.8	TRANSPORTATION			
a	For site personnel of the bidder		Yes	
b	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

Sl. No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
3.9	ERECTION FACILITIES			
3.9.1	Engineering works for construction:			
a	Providing the erection drawings for all the equipment covered under this scope	Yes		

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Chapter – III: Facilities in the scope of Contractor/ BHEL

(Scope Matrix)

Sl. No	Description PART II	Scope / to be taken care by		Remarks
		BHEL	Bidder	
b	Drawings for construction methods	Yes		<i>In consultation with BHEL</i>
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	<i>In consultation with BHEL</i>
d	Shipping lists etc for reference and planning the activities	Yes		
e	Preparation of site erection schedules and other input requirements		Yes	<i>In consultation with BHEL</i>
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments		Yes	<i>In consultation with BHEL</i>
g	Weekly erection schedules based on Sl No. e		Yes	<i>In consultation with BHEL</i>
h	Daily erection / work plan based on Sl No. g		Yes	<i>In consultation with BHEL</i>
i	Periodic visit of the senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two weeks.		Yes	
j	Preparation of preassembly bay		Yes	
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself		Yes	
l	Arranging the materials required for preassembly		Yes	
m	HSE Permits, Approvals, Requirements		Yes	

3.10 ERECTION CONDITIONS OF CONTRACT

The Bidder upon signing of the Contract shall, in addition to a Project coordinator, nominate another responsible officer as his representative at Site suitably designated for the purpose of overall responsibility and coordination of the Works to be performed at Site. Such a person shall function from the Site office of the Bidder during the pendency of Contract.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – III: Facilities in the scope of Contractor/ BHEL

(Scope Matrix)

3.11 ELECTRICAL SAFETY REGULATIONS

3.11.01 In no circumstances will the Contractor interfere with fuses and electrical equipment belonging to the other Contractor or Customer

3.11.02 Before the Contractor connects any electrical appliances to any plug or socket belonging to the other Contractor or Customer, he shall:

- 1) Satisfy BHEL/Customer that the appliance is in good working condition.
- 2) Inform the BHEL/Customer of the maximum current rating, voltage and phase of the appliances.
- 3) Obtain permission of the BHEL/Customer detailing the socket to which the appliances may be connected. The BHEL/Customer will not grant permission to connect until he is satisfied that the appliance is in good condition and is fitted with a suitable plug.
- 4) The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.

3.11.03 No electric cable in use by the other Contractor/ Customer will be disturbed without permission. No weight of any description will be imposed on any such cable and ladder or similar equipment will rest against or be attached to it.

3.11.04 No repair work shall be carried out on any live equipment. The equipment must be declared safe by the BHEL/Customer and a permit to work issued before any work is carried out.

3.11.05 The Contractor shall employ the necessary number of qualified, full time electricians to maintain his temporary electrical installation.

3.12 WELDING PROCEDURE

The welding of all equipment, piping, pressure parts shall be in accordance with qualified welding procedures. The welders must be qualified in accordance with the latest applicable and statutory requirements.

3.13 ACCESS TO SITE AND WORKS ON SITE

3.13.01 Suitable access to site and permission to work at the Site shall be accorded to the Contractor by the BHEL/Customer in reasonable time.

3.13.02 The execution of the Works, no person other than the Contractor or his duly appointed representative, and workmen, shall be allowed to do work on the Site, except by the special permission, in writing by the BHEL/Customer or his representative.

3.14 FACILITIES TO BE PROVIDED BY THE CUSTOMER

3.14.01 ELECTRICITY

The Contractor shall be provided with electricity on chargeable basis for the purposes of the Contract, only at two locations in the Customer's Site and at 415V voltage level. The Contractor shall make his own further distribution arrangement. All temporary wiring must comply with local

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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regulations and will be subject to Customer's inspection and approval before connection to supply. The free supply of power will not be provided for the use in the labor and staff colony.

3.14.02 WATER

Contractor shall make all arrangements himself for the supply of construction water as well as potable water for labor and other personnel at the worksite/colony.

3.15 FACILITIES TO BE PROVIDED BY THE CONTRACTOR

3.15.01 Contractor's site office Establishment: The Contractor shall establish a site office at the site and keep posted an authorized representative for the purpose of the contract.

3.15.02 Contractor shall deploy labour workers whose police verification is carried out. Contractor has to give under taking for the same while obtaining the gate pass. Contractor has to submit police verification record of his labour /workers to Dy. Commandant, CISF, CSTPS/A.D. Security, CSTPS.

3.15.03 Contractor shall obtain gate pass with receipt of work order & start the work as per directives of contract operating authority, otherwise action as deemed fit shall be taken against Contractor.

3.16 TOOLS, TACKLES AND SCAFFOLDINGS

The Contractor shall provide all the construction equipment, tools, tackles and scaffoldings required for pre-assembly, installation, testing, commissioning of the equipment covered under the Contract. He shall submit a list of all such materials to BHEL/Customer before the commencement of pre-assembly at Site. These tools and tackles shall not be removed from the Site without the written permission of the BHEL/Customer. The Contractor shall arrange Dozer, Hydra, Cranes, Trailer, truck, etc. for the purpose of fabrication, dismantling, erection and commissioning, and material management to and from the site.

3.17 CLEANLINESS

3.17.01 The Contractor shall be responsible for keeping the entire area allotted to him clean and free from rubbish, debris etc. during the period of Contract. The Contractor shall employ enough number of special personnel to thoroughly clean his work-area at least once in a day. All such rubbish and scrap material shall be stacked or disposed in a place to be identified by the Customer. Materials and stores shall be so managed to permit easy cleaning of the area. In areas where equipment might drip oil and cause damage to the floor surface, a suitable protective cover of a flame resistant, oil proof sheet shall be provided to protect the floor from such damage.

3.17.02 Similarly, the offices and the residential areas of the Contractor's employees and workmen shall be kept clean and neat to the entire satisfaction. Proper sanitary arrangements shall be provided by the Contractor, in the work-areas, office and residential areas of the Contractor.

3.18 SECURITY

The Contractor shall have total responsibility for all equipment and materials in his custody stores, loose, semi-assembled and/or erected by him at Site. The Contractor shall make suitable security

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arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss. All materials of the Contractor shall enter and leave the Site only with the written permission of the BHEL in the prescribed manner.

3.19 PROTECTION OF PROPERTY AND CONTRACTOR'S LIABILITY

3.19.01 The Contractor shall be responsible for any damage resulting from his operations. He shall also be responsible for protection of all persons including members of public and employees of the BHEL/Customer and the employees of other Contractors and Sub- Contractors and all public and private property including structures, building, other plants and equipment and utilities either above or below the ground.

3.19.02 The Contractor will ensure provision of necessary safety equipment such as barriers, sign - boards, warning lights and alarms, etc. to provide adequate protection to persons and property.

3.19.03 The Contractor shall follow and comply with all the Safety Rules, standards, code of practices of Customer and relevant provisions of applicable laws pertaining to the safety of workmen, employees, plant and equipment as may be prescribed from time to time.

3.20 Equipment Installation

a) General Requirements

i) The Contractor shall furnish all construction materials, tools and equipment other than that being supplied by BHEL and shall perform all work required for complete installation of all control and instrument equipment furnished under this specification. This clause is to be read in conjunction with relevant clauses, instructions, guidelines etc. mentioned elsewhere in this document.

ii) The Contractor shall coordinate his work with other suppliers/contractors where their instruments and devices are to be installed under specifications.

(iii) Bidder has to work along with other agencies working at same unit, bidder to maintain co-ordination with them.

b) Regulatory Requirements

All installation procedures shall confirm with the accepted good engineering practice and with all applicable governmental laws, regulations and codes.

c) Cleaning

All equipment shall be cleaned of all sand, dirt and other foreign materials immediately after removal from storage and before the equipment is brought inside the power plant building or to other installation sites. All piping and tubes shall be air blown.

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d) Equipment Assembly

Equipment installed under these specifications shall be assembled if shipped unassembled. The equipment shall be dismantled and reassembled as required to perform the installation and commissioning work described in these specifications.

e) Void

f) Free-Standing Equipment

Free-standing Cabinets shall be attached to the floor, concrete equipment bases or supporting steel as indicated on relevant drawings/documents. The cabinets shall be shimmed for proper alignment before bolting them to the floor or welding of base frame as required. Adjacent enclosures shall be shimmed to maintain mutually level appearance before they are attached to floor. Vibration dampening mounts shall be installed between supporting structures and panels when specified.

g) Non-free Standing Equipment :

Non-free standing local enclosures and cabinets shall be mounted in accessible locations on columns, walls, or stands in locations as indicated on the Customer's Plant Arrangement Drawings or as per instruction of BHEL engineer which shall be final and binding on contractor. Bracket and stands shall be fabricated as required to install the local enclosures and cabinets in a workman like manner

ii) Rough edges and welds on all fabricated supports shall be ground smooth. The supports shall be finished as per painting schedule previously mentioned.

h) Equipment Checkout

(i) All equipment shall be cleaned after installation. Equipment subject to pressure differentials shall be checked for leakage.

(ii) After erection, all equipment having moving parts, having electrical apparatus, or subject to pressure differentials shall be trial-operated.

i) Defects

(i) All defects in erection shall be corrected to the satisfaction of the BHEL/ Customer and the Project Manager. The dismantling and reassembly of Contractor furnished equipment to remove defective parts, replace parts, or make adjustments shall be included as a part of the work under these specifications.

NOTE: DEFECT LIABILITY PERIOD SHALL BE 12 MONTHS FROM THE DATE OF MACHINE SYNCHRONIZATION AND WORKED/TESTED SUCCESSFULLY IN PUMP MODE WHICH EVER WILL BE LATER.

j) Equipment Protection

(i) All equipment to be erected under these specifications shall be protected from damage of any kind from the time of contract award until commissioning of each unit.

(ii) The equipment shall be protected during storage as described herein.

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(iii) Equipment shall be protected from weld spatter during construction.

(iv) Suitable guards shall be provided for protection of personnel on all exposed rotating or moving machine parts. All such guards with necessary spares and accessories shall be designed for easy removal and maintenance.

(v) Equipment having glass components such as gauges, or equipment having other easily breakable components, shall be protected during the construction period with plywood enclosures or other suitable means. Broken, stolen, or lost components shall be replaced by the Contractor.

(vi) Machine finished surfaces, polished surfaces, or other bare metal surfaces which are not to be painted, such as machinery shafts and couplings shall be provided temporary protection during storage and constructional periods by a coating of a suitable non- drying, oily type and rust preventive compound.

3.21 ARRANGEMENT OF SAFETY ENGINEERS ALONG WITH COMPLIANCE OF ALL HSE REQUIREMENTS: -

1) Two (02) Nos Safety Engineers are to be deployed by the contractor for complete duration of R&M works in consultation with BHEL Site-In-Charge. Safety Engineer should be qualified from approved institute. Certificate shall be produced at the time of deployment.

2) Bidder has to fulfil all HSE related requirement at site.

3) In Addition to BHEL safety conditions in tender, Bidder has to fulfill GSECL safety norms at site
(KINDLY REFER Annexure-B)

3.22 ARRANGEMENT OF ELECTRICAL and C&I EXPERTS: -

One (01) No. C&I and One (01) No. Electrical experienced experts are to be deployed by the contractor for complete duration of R&M works with prior approval of BHEL.

3.23 ARRANGEMENT OF QUALITY ENGINEERS: -

Two (02) Nos Quality Engineers are to be deployed by the contractor for complete duration of R&M works in consultation with BHEL Site-In-Charge. Quality Engineer should be qualified from approved institute. Certificate shall be produced at the time of deployment.

3.24 Bidder is to provide one office boy in each shift for BHEL Office.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&Ps and MMEs To Be Deployed by Contractor

A: TOOL & PLANTS

List of major testing & measuring equipment/ tools and tackles to be arranged/ brought by contractor.

S. No.	Description	UoM	Qty
1	DC power supply 0-250 V, 10 A make “Aplab” or equivalent (variable source)	Nos.	2
2	DC shunt 400 A 75 mV	Nos.	As required
3	Decade resistance box	Sets	4
4	Digital Tong tester AC 5/ 10 and 25/ 60/ 300 A of reputed make	Nos. Each	2
5	Digital Tong tester DC 30/ 60/ 300 A	Nos.	1
6	Earth Resistance Tester	Nos.	1
7	Ferrule printing machine	Nos.	2
8	Fire proof tarpaulin		As required
9	Function Generator	Nos.	1
10	Inclined manometer (+/-) 300 mm water column	Nos.	2
11	Industrial type vacuum cleaner	Nos.	2
12	Insulation Tester Hand Operated 250V/ 500V/ 1000V rated mains/ battery operated	Nos.	2
13	Manometers (+/-) 500 mm mercury column with hand bulb for lab and small manometer for field purpose.	Nos.	As required
14	Multi-meters		
	A) Digital, 3½ digit HIL/ Fluke or any reputed make	Nos.	3
	B) Digital, 6 ½, 4 ½ digit Motwane/ HIL/ Fluke or any reputed make	Nos.	3
15	Oil temperature bath suitable to calibrate the instruments range 0 – 200 °C with standard temperature gauges and thermostatic control	Nos.	2
16	Portable air compressor with drier and regulator make “Toshniwal/ Khosla” or any reputed make rated for 7 to 10 kg/ cm ²	Nos.	As required
17	Rheostat	Nos.	2
18	RTD/ Pt 100 source	Nos.	2
19	Single Phase Variac 250 V, 8 A	Nos.	2
20	Soldering iron “Soldron” make 25 W	Nos.	2
21	Standard gauges 12” dial size make “Budenberg” or “H Guru” or “Odin” or any reputed make		

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&Ps and MMEs To Be Deployed by Contractor

	A) -1- 0 kg/ cm ² pressure gauge(vacuum gauge)	Nos.	As required
	B) 0 – 5 or 6 kg/ cm ² pressure gauge	Nos.	As required
	C) 0 – 10 kg/ cm ² pressure gauge	Nos.	As required
	D) 0 – 25 kg/ cm ² pressure gauge	Nos.	As required
	E) 0 – 60 kg/ cm ² pressure gauge	Nos.	As required
	F) 0 – 100 kg/ cm ² pressure gauge	Nos.	As required
	G) 0 – 250/ 0 - 600 kg/ cm ² pressure gauge	Nos.	As required
	H) 0.2 to 1 kg pressure gauge	Nos.	As required
22	Standard milliamps/ millivolts source of reputed make. Range 0 to 60 mA and 0 to 100 mV	Nos.	2
23	Temperature Gun Digital Type	Nos.	1
24	Three Phase Variac 05 A	Nos.	2
25	250V/500V/1000/5000V rated Hand operated megger Mains/battery operated		As required
26	Digital Megger		As required
27	HV Test Kit		As required
28	Wheatstone bridge		As required
29	Micro ohmmeter		As required
30	Torque wrench (12-60 Nm,50-225 Nm)		As required
31	Primary current injection kit		As required
32	Secondary current injection kit up to 300 amp		As required
33	Digital Tachometer non-contact type 0 to 4000 rpm		As required
34	Relay testing kit		As required
35	DC Ammeter, DC Voltmeter		As required
36	Voltmeter AC, Ammeter AC		As required
37	Oil specific gravity and PPM measuring equipment		As required
38	Dew point measurement instrument		As required
39	Oscilloscope		As required
40	Electric blower		As required
41	Equip. & consumables for LPI/MPI test on impulse pipes		
42	Three phase distribution board with complete setup for drawl & distribution of construction power		As required
43	Electric cables for drawl & distribution of construction power, heating machines		As required

HANDLING EQUIPMENTS

S. No.	Description	UoM	Qty
1	Trailer along with pulling unit		As required

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&Ps and MMEs To Be Deployed by Contractor

2	Mobile Cranes, trucks etc. for transportation and erection of equipment		As required
3	Hydraulic Lifting Machine /Hydraulic Jacks/ Pallet Truck of 5 Ton Capacity	Nos.	02
4	D-shackles		As required
5	Manila ropes		As required
6	Nylon Slings		As required
7	Steel wire ropes		As required
8	Chain Pulley Blocks 5/ 10 T		As required
9	Turn buckles		As required
10	Oil filtration machine and tank		As required
11	Transformer oil testing kit		As required

MAJOR T&Ps

1	24V AC Transformer & Hand lamps		As required
2	Cable Rollers		As required
3	Copper tube bender and cutter sizes 6mm, 8mm, 1/ 2", 1/ 4"		As required
4	Crimping tool up to all sizes of Cables under scope of work	Nos. Each	5
5	Die sets for threading up to 2" pipe.	Nos.	2
6	Distribution boards with power cable complete as required		As required
7	Drilling machines 1/ 4", 1/ 2", 3/ 4" & 1"	Nos. Each	2
8	Electrician tool kit	Sets	8
9	Electrode drying ovens		As required
10	Ferrule printing machine	Nos.	2
11	Fire extinguishers (Type: as required)	Nos.	5
12	Flood light fittings	Nos.	10
13	Grinding machine	Nos.	8
14	Measuring instruments like Micrometres and Callipers	Sets Each	2
15	Mechanical tool kit for fitters	Sets	5
16	Painting brush		As required
17	Personal computer and accessories, Printer	Sets	1
18	Pipe bending machine – 2" size	Nos.	4
19	Safety belts (Full body Safety Harness) and Safety helmets		As required
20	Spirit level	Nos.	4
21	Tap sets for both BSP and MPT threads up to 1" each	Sets Each	2
22	TIG Welding Set	Nos.	4
23	Welding Generators		As required
24	Welding Transformers		As required
25	Hydraulic Crimping Tool		As required
26	Dewatering Pump		As required
27	Winding resistance kit (Dry type transformer with accuracy		As required

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IV: T&Ps and MMEs To Be Deployed by Contractor

	of 0.1% and 0-100-amps range)		
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The following materials/ consumables are to be arranged by the contractor as part of the contractual scope.

S. No.	Description
1	Welding electrodes for welding AS/ CS/ SS pipe and other welding from BHEL approved vendors only
2	Filler wire for argon welding
3	Argon, oxygen and acetylene gas
4	Provision for temporary scaffoldings.
5	GI "U" clamps with nuts and washers for impulse and GI pipe clamping.
6	Round aluminium tags (30mm dia. x 3mm thick)
7	Teflon tape and insulation tape.
8	Hold tight/ bitumen tape for GI pipe coupling.
9	Required paints and primer from BHEL approved vendors only.
10	Solder wire (60/ 40)
11	Protocol/ calibration report sheets as per BHEL format.
12	Panel/ JB sealing compound material (for cable entry from bottom/ top of panel).
13	PVC cable tie, aluminium strip and hardware for clamping of cables, copper tube, and temperature gauge capillary.
14	Copper lugs up to 4 sq. mm, PVC sleeve of different size, PVC button & tape
15	Ferrules (PVC) and suitable for ferrule printing.
16	Saddle GI & Saddle Epoxy
17	Nylon Grips
18	Wooden Screw & Machine Screw
19	Reducer, PVC Brush & Sleeves
20	GI Bolts 'U' Clamps fixing
21	Aluminum paint for pole & MS structure painting

NOTE: The above list is only indicative. The contractor to arrange all consumables as requirement to complete the scope of work.

NOTE:

- a) Instruments shown above are for the regular works only. However, separate sets of tools and instruments are to be arranged and provided to commissioning gang. If contractor fails to arrange the testing instruments as listed above, BHEL site will arrange the instruments at the cost of contractor.
- b) The list of instruments/ equipment to be brought by the contractor as shown above is only indicative. Any other instruments/ equipment are required for the execution of the work is to be necessarily arranged by the contractor. The testing/ calibration instruments which are used to be duly calibrated in the interval prescribed by BHEL engineer from the BHEL approved agencies. And test certificate to be furnished.

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Chapter – IV: T&Ps and MMEs To Be Deployed by Contractor

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- c) The testing/ calibration instruments which are used to be duly calibrated in the interval prescribed by BHEL Engineers from the reputed agencies decided by BHEL and test certificate to be furnished. Contractor to submit calibration report from recognized agency prior to deployment of same at site and periodical calibration of the same to be arranged by contractor as per procedure of BHEL.
 - d) **Other than the aforesaid, one computer, printer and other necessary peripherals will have to be maintained by the contractor in his site office.**

Note:

Non-Compliance in T&P Deployment:

If the contractor delays the deployment of Tools & Plants (T&P), deploys them for a shorter duration than scheduled, experiences abnormal T&P downtime, or fails to deploy T&P as per BHEL's instructions, BHEL reserves the right to arrange the required T&P either from its own fleet or through an external agency. In such events, the actual hiring and operational costs, along with applicable overhead charges, shall be recovered entirely from the contractor."

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – V: T&Ps and MMEs To Be Deployed by BHEL on Sharing Basis

List of T&P/instruments and consumables that will be made available by BHEL free of hire charges (on sharing basis).

1	EOT crane in shall be made available on sharing basis for handling panels	
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Note:-

Skilled EOT Crane operators, for round the clock working is in bidder's scope.

Above T&P will be provided on sharing basis only. Contractor has to plan his activities well in advance and inform BHEL Engineer in charge/ Construction Manager the date of actual use. The decision of BHEL Engineer in-charge/ CM on this will be final and binding.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

6.0 TIME SCHEDULE AND MOBILIZATION:

6.1 INITIAL MOBILIZATION

After receipt of fax/email LOI, contractor shall discuss with project manager/ construction manager regarding initial mobilization. **Contractor shall reach site, make his site establishment and be ready to commence the erection work within 07 days from the date of issue of letter of intent or as per the directions of construction manager/ project manager of BHEL.** Resources shall be progressively augmented to match the schedule of milestones and commissioning.

THE CONTRACTOR HAS TO SUBSEQUENTLY AUGMENT HIS RESOURCES IN SUCH A MANNER THAT THE ENTIRE WORK IS COMPLETED TO MATCH SCHEDULE OF THE PROJECT.

TIME SCHEDULE:

Time Schedule is the essence of this contract. The Subcontractor shall complete the entire scope of work within **120 days**, commencing from the start of Erection & Commissioning activities and culminating in **successful synchronization of the machine and its trial running in Pump Mode.**

The above **120-day period shall include all activities associated with the dismantling, erection, testing, commissioning, synchronization, and trial running of one Unit, and the SCADA works for all four (04) Units.**

Note:

1. The Contractor may be required to carry out de-mobilization and re-mobilization depending on site conditions and availability of the shutdown. No separate charges shall be payable for such de-mobilization and re-mobilization.
2. The stipulated period of **120 days shall be exclusive of the period involved in de-mobilization and subsequent re-mobilization.** The de-mobilization/re-mobilization period shall not be considered as part of the 120-day execution period.
3. Pre-shutdown activities: 15 days (before actual start of E&C work)
4. Post-shutdown activities: 15 days (For attending Punch Points)
5. **PG Test shall be completed within 06 months from the date of commissioning/ running in pump mode.**

TENTATIVE SHUTDOWN SCHEDULE: 01st Nov-2026.

6.2 DEFINITION OF WORK COMPLETION

The contractor's scope of work under these specifications will be deemed to have been completed in all respect, only when all the activities are completed satisfactorily and so certified by BHEL site in charge. The decision of BHEL in this regard shall be final and binding on the contractor.

6.3 MATERIAL RECONCILIATION

The contractor shall do material re-conciliation periodically.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VII: Terms of Payment

The progressive monthly payment for dismantling, erection, testing and commissioning on accepted price of contract value for works will be released as per the break up given hereinafter:

<u>TERMS OF PAYMENT FOR C&I</u>		
Sl. No.	Activity/Work Description	% of unit rate
A	Main E&C Equipment/Items	
(I)	PRO RATA PAYMENTS (90%)	
1.0	Cable tray and accessories	
1.1	Fabrication and fixing/welding/bolting in position	65%
1.2	Earthing of cable trays	15%
1.3	Tagging of cable trays (painting cable tray numbers on sides)	5%
1.4	Covering of trays where ever envisaged	5%
	Total =	90%
2.A	Cable laying (Power Cables)	
2.A.1	Laying of cables	50%
2.A.2	Glanding, Termination and tagging of cables	15%
2.A.3	Dressing and clamping of cables	10%
2.A.4	Testing and charging of cables	15%
	Total =	90%
2.B	Cable laying (Control and Signal Cables)	
2.B.1	Laying of cables	50%
2.B.2	Glanding, Termination and tagging of cables	15%
2.B.3	Dressing and clamping of cables	10%
2.B.4	Shielding of cables	5%
2.B.5	Testing and charging of cables	10%
	Total =	90%
3.0	Junction box/Push button station (local)	
3.1	Erection including fixing of terminal blocks where ever applicable	75%
3.2	Name plate fixing where ever applicable , Labelling (both inside and outside) and Commissioning of connected equipment	15%
	Total =	90%
4.0	STATIC EXCITATION SYSTEM (Modification in logic and hardwired signal exchange of existing static excitation system)	
4.1	Modification, Pre-commissioning checks, Charging of panel and Loop testing etc	75%
4.2	System commissioning	15%
	Total =	90%
5.0	Vibration Monitoring System (VMS): For Generator & Turbine	
5.1	Erection/Fixing loose supplied components, including tubing/hose etc	35%
5.2	Calibration/Local testing - commissioning readiness	30%
5.3	Local Commissioning & Loop Testing as required	10%
5.4	System Commissioning or Remote Commissioning as required	15%
	Total =	90%

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6.0	Static Frequency Converter (SFC) Panel	
6.1	Erection and alignment	55%
6.2	Fixing of loose items/instruments where ever applicable	5%
6.3	Pre-commissioning checks, Charging of panel and Loop testing etc	15%
6.4	System commissioning	15%
	Total =	90%
7.0	Panels/Cubicles/Desks/Racks/Enclosures/PLCs/UPS/Batteries	
7.1	Erection and alignment	55%
7.2	Fixing of loose items/instruments where ever applicable	5%
7.3	Pre-commissioning checks, Charging of panel and Loop testing etc	15%
7.4	System commissioning	15%
	Total =	90%
8.0	HMI (Central Control Room, CCR equipment)	
8.1	Erection and alignment	50%
8.2	Fixing of loose items/instruments where ever applicable	10%
8.3	Pre-commissioning checks, Charging and Loop testing etc	15%
8.4	System commissioning	15%
	Total =	90%
9.0	Transformer	
9.1	Placement on foundation and alignment	25%
9.2	Erection of associated auxiliaries/ assemblies, oil filling, etc.	30%
9.3	Dry out including oil filtration	15%
9.4	Pre-commissioning checks/Testing	10%
9.5	Charging and Painting (as applicable)	10%
	Total =	90%
10.0	Digital Governing System	
10.1	Erection	55%
10.2	Alignment	10%
10.3	Testing	15%
10.4	Commissioning & Completion	10%
	Total =	90%
11.0	Miscellaneous Structural steel including frames for Panels/Racks/Instruments, supports for cable tray/pipes/tubes, Canopies etc	
11.1	Fabrication, Erection, Alignment, Welding/bolting and where ever applicable chipping/grouting/painting	70%
11.2	Erection of associated Items/Equipment/Systems as applicable	20%
	Total =	90%
12.0	Dismantling	
12.1	Old cable removal and Dismantling of existing DCS Panels from Site.	45%
12.2	Shifting of existing/old Panels from site to Customer's store/designated area.	20%
12.3	Disconnection, Reconnection of existing cables	15%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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12.4	Completion	10%
	Total =	90%
13.0	Miscellaneous items / Other Items (Items not covered under above heads)	
13.1	Erection	55%
13.2	Alignment	10%
13.3	Testing	15%
13.4	Completion	10%
	Total =	90%
14.0	Electronic/Instrumentation Earth Pit Preparation including all materials required for earth pit.	
14.1	Fabrication, erection, alignment, welding/ bolting of earthing/ lightning protection strips; earth pits completion	75%
14.2	Testing/commissioning/Connection to equipment	15%
	Total =	90%
15.0	Civil Works	
15.1	Modification in cut-out, making holes, breaking concrete floors etc	50%
15.2	Finishing	10%
15.3	Clean-up	15%
15.4	Completion	15%
	Total =	90%

(II) STAGE/MILESTONE PAYMENTS (10%)

Mobilization of Manpower and Resources	2%
Rolling and Synchronisation	1%
Area cleaning, temporary structures cutting/removal and return of scrap	1%
Punch List points/pending points liquidation	1%
Material Reconciliation	1%
Completion of Contractual Obligation	1%
Arrangement of safety engineers along with compliance of all HSE requirements	1%
Arrangement of Electrical and C&I Experts (Qty-01 No. each)	2%
Total for Milestone/Stage payments	10%
OTHERS	
Laboratory Instruments installation and demonstration where ever applicable	100%
PG Test Instruments installation (50%) and removal (50%)	100%

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VIII: Taxes & Duties

8.0 TAXES, DUTIES, LEVIES (Rev 14 dated 09/10/2020)

1. All taxes excluding GST, GST Cess & BOCW Cess but including, Royalties, fees, license, deposits, commission, any State or Central Levy and other charges whatsoever, if any, shall be borne by you and shall not be payable extra.
2. Any increase of the taxes excluding GST, GST Cess & BOCW Cess, at any stage during execution including extension of the contract shall have to be borne by the contractor. Quoted/ accepted rates/ price shall be inclusive of all such requirements. Please note that since GST on output will be paid by BHEL separately as enumerated below, your quoted rates/ price should be after considering the Input Credit under GST law at your end.
3. **GST :**
The successful bidder shall furnish proof of GST registration. GST along with Cess (as applicable) legally leviable & payable by the successful bidder as per GST Law, shall be paid by BHEL. Hence Bidder shall not include GST along with Cess (as applicable) in their quoted price.
4. GST charged in the Tax Invoice/Debit note by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return
5. E-invoicing under GST has been implemented with effect from 1st October 2020 for all the taxable persons having turnover more than the threshold limit in any preceding financial year from 2017-18 onwards. Therefore, for all the taxable persons falling under the purview of E-invoice, it is mandatory to mention a valid unique Invoice Reference No. (IRN) and QR code as generated from E-Invoicing portal of the Government for the purpose of issuing a valid Tax Invoice. Only an E-invoice issued in the manner prescribed under rule 48(4) of CGST Rules shall be treated as valid invoice for reimbursement of GST amount.
If the successful Bidder is not falling under the purview of E-Invoicing then he has to submit a declaration in that respect along with relevant financial statements.
6. Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred there under) wherein the 'Bill To' details will as below:
BHEL GSTN – As per **Annexure -1**
NAME -- Bharat Heavy Electricals Limited
ADDRESS – Site address
7. Bidder to immediately intimate on the day of removal of Goods (in case of any supply of goods) to BHEL along with all relevant details and a scanned copy of Tax Invoice to below email ids to enable BHEL to meet its GST related compliances :-
Email id ---- to be intimated later on.
In case of delay in submission of the abovementioned documents on the date of dispatch, BHEL may incur penalty /interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from the successful bidder, if such delay is not attributable to BHEL.
8. In case of raising any Supplementary Tax Invoice (Debit / Credit Note) Bidder shall issue the same containing all the details as referred to in Section 34 read with Rule 53.
9. Bidder shall note that in case GST credit is delayed/ denied to BHEL due to delayed / non receipt of goods and /or tax invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or any

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VIII: Taxes & Duties

other reasons not attributable to BHEL, GST amount shall be recoverable from the vendor along with interest levied / leviable on BHEL, as the case may be.

10. Bidder shall upload the Invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the bidder along with interest levied / leviable on BHEL.
11. Way Bill: Successful Bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract.

The Bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, Road Permit/ Way Bill, if required, shall be arranged by the contractor and BHEL will not supply any Road Permit/ Way Bill for this purpose.

12. **New taxes and duties:-**Any New taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period including extension, if the same is not attributable to you, shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.

Benefits and/or abolition of all existing taxes must be passed on to BHEL against new Taxes, if any, proposed to be introduced at a later date.

In case any new tax/levy/duty etc. becomes applicable after the date of bidder's offer but before opening of the price bid, the bidder must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of the price bids. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

13. For transportation work, bidder shall declare in his quotation whether he is registered under GST, if yes, whether he intends to claim GST on forward charge basis. In absence of this declaration, BHEL will proceed further with the assumption that bidder intends not to claim GST on forward charge basis. However, in case of GST registered transporter, the amount to the extent of goods and service tax will be retained till BHEL avails the credit of GST. Further, transporter shall issue tax invoice which inter alia includes gross weight of the consignment, name of the consigner and the consignee, registration number of vehicle in which the goods are transported, details of goods transported, details of place of origin and destination, GSTIN of the person liable for paying tax whether as consigner, consignee or goods transport agency, and also containing other information as mentioned under rule 46.
14. **TDS under Income Tax shall be deducted at prevailing rates on gross invoice value from the running bills unless exemption certificate from the appropriate authority/ authorities is furnished.**
15. **TDS under GST shall be deducted at prevailing rates on applicable value from the running bills.**
16. **TCS under Income Tax 1961 has been implemented with effect from 1st October 2020 for every seller having turnover more than threshold limit during financial year immediately preceding**

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VIII: Taxes & Duties

financial year in which the sale of goods is carried out, who receives any amount as consideration for sale of any goods of the value or aggregate of such value exceeding threshold limit other than export of goods or who is already covered under other provision of section 206C, collect from the buyer, TCS as per applicable rates of the sale consideration exceeding threshold limit subject to following conditions

- i. Buyer shall be as per clause (a) of section 206C- (1H)
- ii. Seller shall be as per clause (b) of section 206C- (1H)
- iii. No TCS is to be collected, if the seller is liable to collect TCS under other provision of section 206C or the buyer is liable to deduct TDS under any provision of the Act and has deducted such amount.

If Successful Bidder is falling under the purview of TCS then he has to submit a declaration in that respect along with relevant financial statements before the start of work or if bidder is falling under preview of TCS during the work in progress then bidder is compulsorily required to submit relevant financial statement in the beginning of the respective FY.

For TCS claim, vendor has to submit relevant documents required as per Income Tax Act.

17. Refer Annexure – 2 for BOCW Act & Cess Act.

ANNEXURE-1

State wise GSTIN no.s of BHEL

Sl. No	Projects under state	GSTIN
1	Andhra Pradesh	37AAACB4146P7Z8
2	Bihar	10AAACB4146P1ZU
3	Chhattisgarh	22AAACB4146P1ZP
4	Gujarat	24AAACB4146P1ZL
5	Jharkhand	20AAACB4146P5ZP
6	Madhya Pradesh	23AAACB4146P1ZN
7	Maharashtra	27AAACB4146P1ZF
8	Orissa	21AAACB4146P1ZR
9	Telangana	36AAACB4146P1ZG

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – IX: Specific Inclusions and Exclusions

SPECIFIC INCLUSIONS

SPECIFIC INCLUSIONS MATRIX

Sr. No.	Description	Scope/ to be taken care by		Remarks
		BHEL	Bidder	
1	Lugs up to 4 sq. mm size	-	Yes	
2	Lugs beyond 4 sq. mm size	Yes	-	For GI wire earthing
3	Paint, primer and consumables		Yes	
4	LT cable straight through jointing Kits		Yes	
5	HT Termination Kits	Yes	-	
6	Clamps with hardware (Trefoil explicitly mentioned in BOQ)	Yes	-	For single core HT cable
7	Clamps with hardware		Yes	As per requirement for LT cables
8	Identification tags/ name plates with, PVC/ metals, sleeve and clamps with hardware for cables at both end and field instruments. PVC ties, Buttons and tap		Yes	
9	Steel for fabrication	Yes	-	
10	Cable ferruling numbers and characters.	-	Yes	
11	Cable Markers	-	Yes	
12	Paint, primer and consumables.		Yes	

NOTE: The aforesaid inclusions should not be construed as exhaustive. They are meant for general guidelines. BHEL reserves the right to include or exclude any item which is required for completing the job as per rates indicated in rate schedule. Contractor should carry out all such jobs as per the instructions of BHEL Engineer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – X: Special Terms & Conditions

SPECIAL TERMS AND CONDITIONS:

1. The bidder shall submit following documents to the BHEL Engineer in charge before starting of the work at site: -
 - a) Valid labour license of total Nos. of labours.
 - b) **Valid labour Insurance policy to cover all the workers.**
 - c) **Medical Fitness Certificate of each worker issued by registered medical practitioner (Fitness test will be prescribed by customer/GSECL) however Covid-19 test report shall be optional. Cost on medical test shall be borne by bidder.**
 - d) **Police verification of each workmen.**
 - e) A photocopy of employment card issued to each worker as per format prescribed in factory rules.
 - f) List of safety appliance provided by the contractor to their workers with receipt.
 - g) Valid test certificate issued by competent authority as per factory rules for the T&P (like pulling / lifting devices, slings, machines etc.) to be utilized at site.
 - h) List of personnel's and workers deputed / deployed along with their full address proof, Police verification etc., shall be get done of his workers by the contractor.
 - i) Submission of Indemnity Bond.
2. Bidder shall visit site well in advance for identification & to ensure availability of required special T&P as well as other infrastructure required.
3. **During execution of site it may be required to close the site temporarily, in this case De-Mobilization & Re mobilization charges shall not be payable.**
4. All consumables required for the overhauling will be bidder's scope.
5. Subcontractor must prepare PERT CHART/BAR CHART. Daily monitoring will be done jointly and log sheets of important activities should be noted down and signed jointly.
6. Daily work planning, scheduling & reviewing of work will be done by the party every morning & evening and programme must be submitted on daily basis to EIC. Party also to submit the progress exception report.
7. Round the clock working under expert supervision shall be ensured by the contractor deploying two equal parallel strength of groups in 12 hrs. Shift with equal T&P for all the jobs so as to complete the work in stipulated period or earlier.
8. The names of working persons like Site in-charge, supervisors, electricians, fitters etc. to be deployed during the job with full details has to be submitted stating their area of work and experience and specialization of the work to site in-charge before the start of work. BHEL may ask to change/delete the person not found suitable for the work at any point of time during execution of job. For any addition and deletion of the working person prior permission from BHEL shall be taken.
9. Subcontractor should mobilize additional resources such as plant, equipment's, material as may be required by site in-charge to improve the progress of the work if the progress of the work is not satisfactory.
10. Subcontractor should get registered under relevant sales tax and or work contract Act (VAT) where the jobs are executed.
11. If the duration of work continues beyond stipulated period due to any reason, no claim for compensation will be entertained.
12. The work details are brief & for Subcontractor knowledge only. Subcontractor will have to do all the related works as per requirement.
13. The contractor will be responsible to pay the damages to the property of Board or individual caused by his worker during the course of contract. If the contractor fails to pay the same it will be recovered from his bill.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – X: Special Terms & Conditions

14. No compensation claimed for idle labor for any reason will be entertained by BHEL.
15. Successful bidder is to obtain necessary “No Dues” certificate before de-mobilization from site.
16. Spinning of machine is the essence of the contract.
17. Contractor shall arrange vehicle for his manpower transportation.
18. **Scaffolding pipes, clamp, Jallies & 40 mm thick wooden planks are to be arranged by Sub-contractor for various platforms and Safety will be taken on priority basis. Also Scaffolding should be match with the profile of DT.**
19. **Sufficient Halogen Lamps shall be in the scope of bidder.**
20. **Skilled EOT Crane operators, for round the clock working for two cranes are in bidder’s scope.**
21. **Bidder has to fulfil all HSE related requirement at site.**

NOTE:

1. **The specific (minor) work which is not mentioned in the scope of work but required to be carried out for completion of subject work is in the bidder’s scope.**
2. **Decision of BHEL site in charge regarding interpretation of the scope of work shall be final.**

LIAISON WITH ALL STATUTORY AUTHORITIES:

- a) Compliance of statutory provisions, whether mentioned in this contract or not shall be binding on the contractor.
- b) If there is any change in labour laws after the contract has been awarded, then the new law shall automatically be binding on the contractor.
- c) No additional financial compensation shall be paid by BHEL to the contractor on account of increased expenditure caused by a) and b) above.
- d) Liasoning with local commercial tax dept. to obtain Coml. Tax exemption certificate.

PAYMENT TO WORKERS:

- a) Payment to workers shall be done through bank account only.
- b) The contractor shall intimate the day of payment at least three days in advance in writing along with copy of the pay sheet and attendance cards.
- c) All workmen shall be covered by PF Rules irrespective of their period of employment.

SUBMISSION OF DOCUMENTS:

The contractor shall submit following documents at appropriate time either before or during the execution of the work and as directed by Site in-Charge.

1. Test certificates of Pulling and Lifting machines and appliances (in applicable format).
2. Details of workers to be deployed with name, address, category.
3. Details of supervisory staff to be deployed.
4. Authorization for receipt of materials and for signing of Measurement Books etc,
5. Labor license specific to the contract.
6. List of T&P brought into plant premises along with their serial numbers and dates/years of purchase.
7. All the Staff/Workers deputed for the Job should have Insurance Cover and document in this regard should be submitted along with 1st RA Bill.
8. List of consumables brought into plant premises along with their serial numbers and dates/years of purchase, along with test certificates wherever applicable.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – X: Special Terms & Conditions

9. Insurance policy for the workers to be deployed in this contract.
10. Safety undertaking.
11. Copy of ESI certificate to be furnished.
12. Proof of Payment of GST.

The contractor shall submit following documents in report form within 15 days from commissioning of unit after the overhaul/shut down work is completed:

- Details of work executed.
- Measurements against different schedules in compiled form.
- Material issue details.
- Material consumption details.
- Material returns details.
- Details of retrenchment benefits given to workmen.
- Details of issue of PF slip to workmen.
- Details of settlement of accident benefits if any to workmen
- Copies of pay sheets to workmen.
- Details and proof of remittance of PF to workmen (before final bill).
- No dues clearance from different stores of customer
- Valid labour license

Statutory Inspection

Please refer General and Special Conditions of Contract. In addition to it the scope includes getting the approvals from the statutory authorities (like IBR, smoke nuisance inspector, anti-pollution authorities, labour officials). This includes arranging for inspection visits of such authorities periodically as per requirement, submitting documents etc. and payment of fees connected with it. Bidder will have to get certificate for the work in confined area/space from the government registered/approved/certified agency before the work start. Fee/charges shall be borne by bidder.

All the necessary certificates and statutory licenses required to carry out this scope of work are to be arranged by the contractor at his own cost. Also refer clause - ELECTRICAL INSPECTORATE'S APPROVAL given below:

ELECTRICAL INSPECTORATE'S APPROVAL:

1. The contractor shall arrange necessary statutory inspections and obtain certificates for the installation work at his cost. Contractor is responsible for getting Electrical Inspector / statutory authority's approval for all electrical installation covered in his scope.

2. All electrical installation covered in contractor's scope is to be inspected / approved by the electrical inspector / statutory authority. For getting electrical inspector approval, contractor shall arrange the following:

- a. Work Completion certificate for all the equipment covered in the contract.
- b. Details of Equipments (specification)
- c. Copy of Test results conducted at site for all the equipment.
- d. Any other documents as required by statutory authority. Any expenditure related to documentation shall be borne by contractor.
- e. Contractor shall carry out the modifications / rectifications if any as suggested by the authority at his own cost. However, it is not applicable for equipment erected by Mechanical contractor.
- f. **Valid Electrical Contractor's License of Gujarat state.**

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – X: Special Terms & Conditions

g. Valid Supervisory Competency Certificate.

Safety:

Contractor should engage at least One Qualified Engineer in each shift during the contract period. Strict Safety measures have to be followed at Site. Contractor shall also adhere to all the safety provisions of our customer. In case violation of any provision at site fine of Rs.500/- to Rs.2000/- at the discretion of our site in-charge shall be imposed for each of such occasion and shall be recoverable from the contractor's bill.

1. All T&P like pulling and lifting machine, chain pulley blocks, slings, D-shackles should be maintained in proper working condition. Necessary test certificate has to be submitted by contractor for lifting tools & tackles.
3. The contractor shall be fully responsible for the safety of his workers.
4. The Use of ISI mark safety helmet, ISI mark safety shoes, Goggles, hand gloves, ear plugs and nose mask is a must. In addition to this, a full body (safety) harness, face shield must be provided to workers carrying out work at height & cutting/ welding/ grinding respectively. Gas cutting set with flash back arrester etc. should be provided by the contractor and should ensure the use of these safety equipment's, all PPE by his worker while working.
5. Scaffolding should be erected properly and strong enough with hand rails and it should not be used before getting it checked by Engineer-in-charge.
7. The contractor shall be solely responsible for the safety of his workers & employees. The contractor must ensure that the persons working in specialized nature jobs/ skilled jobs/ working with the welding machines, grinders, cutting set & other special T&P shall be having experience & expertise to perform that job. Contractor should engage physically and mentally fit manpower. The electrical connection / repair jobs shall be done only by the electricians.
8. The contractor shall ensure that prior to start of work all his workers shall get the safety training.
9. The contractor shall also take care for the safety of the equipments & persons working in the vicinity.
10. Customer at its own discretion may decide to recheck / retest some or all of the T&P / machines of the contractor inside the plant premises.
11. The helmets, safety shoes and safety belts issued by the contractor shall be conforming to relevant IS standards.
12. The contractor shall maintain the first aid box at site.

13. PROVISION OF PPEs

- Personnel Protective Equipment (PPEs), in adequate numbers, will be made available at site & their regular use by all concerned will be ensured
- The following matrix recommends usage of minimum PPEs against the respective job.

SI.NO	Type of Work	PPEs
1	Concrete and asphalt mixing	Nose mask, hand glove, apron and gum boot
2	Welders/Grinders/Gas cutters	Welding/face screen, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB. Helmet fitted with welding shield is preferred for welders
3	Stone /concrete breakers	Ear muffs, safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Respiratory mask, Hand glove, safety goggles
6	Work at height	Double lanyard full body harness, fall arrestor (specific cases)
7	Painting	Plastic glove, Respirators (particularly for spray painting)

- The PPEs shall conform to the relevant standards as below and bear ISI mark.

Relevant is-codes for personal protection

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Chapter – X: Special Terms & Conditions

IS:2925-1984	Industrial safety Helmets
IS:4770-1968	Rubber gloves for electrical purpose.
IS:6994-1973(Part-I)	Industrial safety Gloves (Leather & Cotton Gloves)
IS:1989-1986	Leather Safety boots and shoes.
IS:5557-1969	Industrial and safety rubber knee boots.
IS:6519-1971	Code of practice for selections care and repair of Safety foot wear.
IS:11226-1985	Leather Safety footwear having direct molding sole.
IS:5983-1978	Eye protectors.
IS:9167-1979	Eye protectors.
IS:1179-1967	Eye & face protection during welding
IS:3521-1983	Industrial Safety Belt and Harness
IS:8519-1977	Guide for selection of industrial Safety equipment for body protection
IS:9473-2002, 14166-1994, 14746-1999	Respiratory Protective Devices

The list is not exhaustive. The safety officer may demand additional PPEs based on specific requirement.

NOTE: All employee of vendor should wear company uniform along with company logo at work place.

Important Safety Conditions: -Agency has to ensure utmost safety at all associated workplace/s. Penalty for non-compliance of safety rules each time.

- i. Non-using safety shoes per person per occasion - Rs.1000
- ii. Non-using safety helmet per person per occasion - Rs.1000
- iii. Non-using safety belt per person per occasion - Rs.1000

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

SCHEDULE OF ITEMS & WEIGHTAGES

This Chapter consists of Part A & Part B of Volume II “Price bid”:

<u>CONTENTS</u>	
Description	Remarks
Part A: Instructions to the Bidders	Instructions
PART B: % weightage for amount of individual items of Schedule of quantity	Schedule of items Quantities and Factor for deriving Item Rate from the accepted Lump sum Price

Part A: Instructions to the Bidders

1. **Bidders shall quote Total Lump-sum Price for the entire scope of work in Rupees in VOL-II PRICE BID at BHEL E-procurement Portal.** Any other entry elsewhere in the offer of the bidder shall be treated as Null and Void.
2. BHEL has fixed the Factors of individual items of Schedule of Quantity w.r.t. the total lump sum price (as quoted by the bidder). These item wise factors are available in Chapter-XI of Volume I TCC. Also schedule of items & Quantities are also available in Chapter-XI of Volume I TCC.
3. Based on the pre-fixed factors and the quoted total lump sum price, total amount against each item shall be derived by BHEL by multiplying the respective factors with total lump sum price.
4. Unit rate shall be derived by dividing the total amount against each item by total quantity as given in BOQ.
5. Item rates thus derived shall be rounded off to two decimal places. Rounding off may lead to minor variation in the total lump sum price. This will be adjusted by BHEL by very minor adjustment of the derived item rates. This will be done to arrive at the exact quoted/accepted Lump sum price given by the bidder.
6. For only the convenience of bidders, BHEL has issued an excel sheet with all requisite formulae as detailed above. However, this excel sheet shall not form part of contract document.

PART B: % weightage for amount of individual items of Schedule of quantity w.r.t. the total price (as quoted by the bidder in part C of Vol-II-Price Bid Specification)

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

BILL OF QUANTITIES (BOQ)

Sr. No.	Description of Items	UOM	Qty	Factor
E1	Cable Trays & Accessories			
E1A	Cable Trays complete with Coupler Plates, Fasteners, Clamps and fixing hardwares etc. Erection including Support and Covers Fabrication.			
E1A.1	Galvanised Ladder type cable tray, W=600mm	Meter	2250	0.0472796
E1A.2	Galvanised Ladder type cable tray, W=300mm/150mm	Meter	720	0.0128473
E1A.3	Galvanised Perforated type cable tray, W=150mm/100mm	Meter	600	0.0076473
E1A.4	Galvanised Perforated type cable tray, W=50mm	Meter	600	0.0051113
E1B	MS ACCESSORIES FOR GALVANIZED LADDER TYPE CABLE TRAY			
E1B.1	Horizontal Elbow (90 Degree) 600MM	PCS	20	0.0008444
E1B.2	Vertical Elbow (90 Degree Outside) 600MM	PCS	20	0.0008444
E1B.3	Vertical Elbow (90 Degree Inside) 600MM	PCS	20	0.0008444
E2	Cable Laying including Earthing Wire			
E2.A	Laying of Power Cables including Earthing wire, Termination & Jointing			
E2.A.1	1C X 500 SQMM	Meter	6375	0.0572728
E2.A.2	1C X 630 SQMM	Meter	13600	0.0707483
E2.A.3	LT Cable AL, 1C X 120 SQMM	Meter	500	0.0025948
E2.A.4	LT Cable AL, 3.5C X 25 SQMM	Meter	500	0.0020640
E2.A.5	2C X 2.5 SQMM / 3C X 2.5 SQMM	Meter	1800	0.0034617
E2.A.6	4C X 2.5 SQMM	Meter	500	0.0014552
E2.A.7	7C X 1.5 SQMM	Meter	1000	0.0026050
E2.A.8	2CX6 SQMM, Al	Meter	5083	0.0113603
E2.A.9	2CX10 SQMM, Al	Meter	1980	0.0072282
E2.A.10	1C X 35 SQMM	Meter	200	0.0006762
E2.B	Instrumentation Cables			

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

E2.B.1	Instrumentation Cable: 4P x 0.5 sq mm armoured /unarmoured-Overall Shielded (OA) or Individual & Overall shielded (I& OA)	Meter	6800	0.0144474
E2.B.2	Instrumentation Cable: 8P x 0.5 sq mm armoured / unarmoured-Overall Shielded (OA) or Individual & Overall shielded (I& OA)	Meter	1000	0.0027900
E2.B.3	Instrumentation Cable: 2P x 1.5 sq mm armoured / unarmoured-Overall Shielded (OA) or Individual & Overall shielded (I& OA)	Meter	265	0.0005394
E2.B.4	Instrumentation Cable: 4P x 1.5 sq mm armoured / unarmoured-Overall Shielded (OA) or Individual & Overall shielded (I& OA)	Meter	300	0.0006107
E2.B.5	Instrumentation Cable: 8P x1.5 sq mm armoured / unarmoured-Overall Shielded (OA) or Individual & Overall shielded (I& OA)	Meter	490	0.0013671
E2.B.6	Instrumentation Cable: 12P x 1.5 sq mm armoured / unarmoured-Overall Shielded (OA) or Individual & Overall shielded (I& OA)	Meter	1665	0.0059341
E2.B.7	Network UTP Cables in flexible GI pipes(special termination using UTP connectors involved)	Meter	1800	0.0063022
E3	Junction box/Push Button station			
E3.1	Junction boxes upto 48 way	No	10	0.0016969
E4	STATIC EXCITATION SYSTEM			
E4.1	Modification in logic and hardwired signal exchange of existing static excitation system	Set	1	0.0072486
E5	Vibration Monitoring System (VMS): For Generator & Turbine			
E5.A	FIELD DEVICES/Bearing, Casing Vibration Sensor			
E5.A.1	Bearing Casing Vibration Sensors	No	32	0.0019866
E5.A.2	Extension Cable, SS armored, 10 meter length	No	32	0.0019866
E5.A.3	Mounting Blocks for Bearing Casing Vibration Sensors	No	16	0.0009933
E5.B	FIELD DEVICES/Non-contact probe			
E5.B.1	Non-contact Probe with 1m integral cable	No	20	0.0012416
E5.B.2	Non-contact Probe Extension Cable 8m length, armoured	No	20	0.0012416

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

E5.B.3	Mounting Bracket, L shaped modular type for fixing Shaft Vibration Probe & Phase Marker Probe.	No	20	0.0012416	
E5.B.4	Non-contact Probe Driver (Driver to be housed in the DIN-RAIL inside JB)	No	20	0.0012416	
E5.C	Field Junction Box				
E5.C.1	JB-12 way (+20% spare TB) Junction Box 5 1/P Glands & 2 O/P Glands, FRP material	No	15	0.0025702	
E5.C.2	Calibration Kit	No	1	0.0006208	
E6	Static Frequency Converter (SFC) Panel				
E6.1	Transportation from Stores/Storage Yard to erection site, erection, assembly, testing and commissioning of STATIC FREQUENCY CONVERTER (SFC). Each Set consists of Control Module Panel, Thyristor Stacks Panel and DC Link Panle. Will be supplied in 3 Shipping Sections and have to be assembled at site. Tentative Dimensions and Weights of each Shipping Section is as below: a) SS-1: 600X600X2200 (WXDXH) mm, Weight= 200 KG b) SS-2: 3600X1200X2570 (WXDXH) mm, Weight= 6160 KG c) SS-3: 2400X1200X2570 (WXDXH) mm, Weight= 2900 KG	Set	2	0.0441461	
E6.2	SFC Output Breaker Panel Dimensions: 2400X1500X2100 (WXDXH) mm Approx Weight: 1000 KG	No	2	0.0148189	
E6.3	PLC Interface Panel Dimensions: 2200X800X2000 (WXDXH) mm Approx Weight: 1000 KG	No	1	0.0074094	
E6.4	11KV 1250A SINGLE THROW ISOLATOR INDOOR PANEL Dimensions: 800X1200X2100 (WXDXH) mm	No	1	0.0027649	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

E7	Panels/Cubicles/Racks/Enclosures/PLCs/UPS/Batteries				
E7.1	DCS Panels/Electrical Panels/Network Panels/UCB/LCB/EHGC etc Each set consisting of: redundant processor module, I/O modules, power supply modules, relays, HMI etc. for local control indication & monitoring of generating units. Tentative Dimensions and Weights of Single Suite is as below: Approx. Dimensions (WDXH): 800X800X2200 MM Approx. Weight: 400 Kg (Single Suite) Note: The Panels may be supplied as suite of 1,2,3, 4 or 5.	No	30	0.082	9484
E7.2	230V AC UPS System (along with ACDB, Battery, BHMS etc.) 30KVA, 230V AC, 1Ph, 50Hz Panel Dimensions: a) UPS: 800 (W) X 962 (D) X 1870 (H) MM b) Bypass SCVS: 620 (W) X 962 (D) X 1870 (H) MM a) Cable Alley: 400 (W) X 900 (D) X 1750 (H) MM BHMS Dimesnions: 665 (W) X 460 (D) X 1338 (H) MM ACDB-1 Dimesnions: 850 (W) X 300 (D) X 1100 (H) MM ACDB-2 Dimesnions: 850 (W) X 300 (D) X 1100 (H) MM Battery Banks (02 Sets) : 2V, VRLA, 110 Cells Breaker Box: 350 (W) X 200 (D) X 450 (H) MM	Set	1	0.014	44119
E7.3	415V ACDB Approx Dimensions: 600 (W) X 300 (D) X 800 (H) MM	Set	1	0.002	22119
E8	HMI (Central Control Room, CCR equipment)				
E8.1	Operator Work Station along with accessories	No	3	0.001	6381
E8.2	Engineering Workstation (EWS)	No	1	0.000	5460
E8.3	Info Server Workstation	No	2	0.001	0920
E8.4	A4 Size Color Laser Printers	No	2	0.000	4964
E8.5	2 Section Operator Desk/ Plant Control Desk	Set	1	0.002	5281

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

E8.6	Computer Furniture (Approximate qty: Computer Table-03 nos, Printer Table-02 nos, Chairs-05 nos)	Set	1	0.004	6962
E9	Transformer				
E9.1	Input Transformer 3Ph. 17.4 MVA, 11/3.50-3.50kV, CONVERTER DUTY TRANSFORMER Including all accessories, piping, cabling etc. Transportation up to foundation, Assembly Testing and Commissioning of Outdoor Transformer along with HV/LV/LVN Porcelain Bushings, radiators, conservator, marshalling panel, HV cable box with connecting chamber, Buchholz relay, cable box supports, PRV, piping, NGR etc. TOTAL WEIGHT : 27,000 Kg. (Approx.)	No	2	0.117	1439
E9.2	Output Transformer 3Ph. 16MVA, 11/3.20-3.20kV, CONVERTER DUTY TRANSFORMER Including all accessories, piping, cabling etc. Transportation up to foundation, Assembly Testing and Commissioning of Outdoor Transformer along with HV/LV/LVN Porcelain Bushings, radiators, conservator, marshalling panel, HV cable box with connecting chamber, Buchholz relay, cable box supports, PRV, piping, NGR etc. TOTAL WEIGHT : 25,000 Kg. (Approx.)	No	2	0.117	1439
E10	Digital Governing System	Set	1	0.045	2650
E10.1	Microprocessor Based Digital Governor Controller	No	1		Included in E10
E10.2	Programming tool kit (Laptop with software)	No	1		
E10.3	Speed Sensing Device (Toothed wheel With magnetic pick up) Wiring, Calibration and Testing	Set	1		
E10.4	Hydro Mechanical Cabinet for G.V./R.V. (Servo proportional based)	No	1		
E10.5	Hydraulic Over speed device with mounting arrangement, wiring, testing commissioning work & associated piping works	No	1		

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

E10.6	Modification in governor feedback system of Guide Vanes/Runner Feedback Position Transducer for Guide Vane and Runner	Set	1		
E10.7	Modification in governor oil pipeline (Piping & fitting of Gov.& HMC for local Modification)	Set	1		
E11	Miscellaneous Structural steel including frames for Panels/Racks/Instruments/Supports for Cable Trays/Pipes/Tubes/Canopies etc				
E11.1	Structural Steel for fabrication (MS angle, Channel, Plate etc)/ Cable Tray Structural steel fabrication and installation	KGS	13500	0.033	2579
E12	Dismantling & Removal of Panels/Items from site and handover to Customer's store				
E12.1	Dismantling, loading and handling of existing DCS Panels from Site to Customer's store . Approx Size: 900x700x2440 mm (including removal and deglanding and proper marking of removed cables for re-use)	No	20	0.037	8869
E12.2	Disconnection, Reconnection of existing cables connections (Number of Terminations)	No	3000	0.010	1676
E13	Other Items				
E13A	HT CABLE TERMINATION/JOINTING KITS (Armoured/Un-armoured)				
E13A.1	TERM. KIT 1C X 500 SQMM	No	80	0.023	7716
E13A.2	TERM. KIT 1C X 630 SQMM	No	160	0.047	5433
E13A.3	JOINTING KIT 1C X 500 SQMM	No	15	0.006	3621
E13A.4	JOINTING KIT 1C X 630 SQMM	No	25	0.010	6035
E13B	Trefoil Clamps				
E13B.1	Trefoil Clamps suitable for 1CX500 SQMM and 1CX630 SQMM Cable	No	4050	0.071	4044

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – XI: BOQ & Weightage/Factor Details

E14	Electronic/Instrumentation Earth Pit Preparation including all materials required for earth pit.	No	1	0.0046347	
E15	Civil works: Minor Civil works like modification in cut out for panels, making approach through walls, breaking of concrete floors to suite DCS and Electrical Panels etc. wherever required.	Lot	1	0.0061587	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents

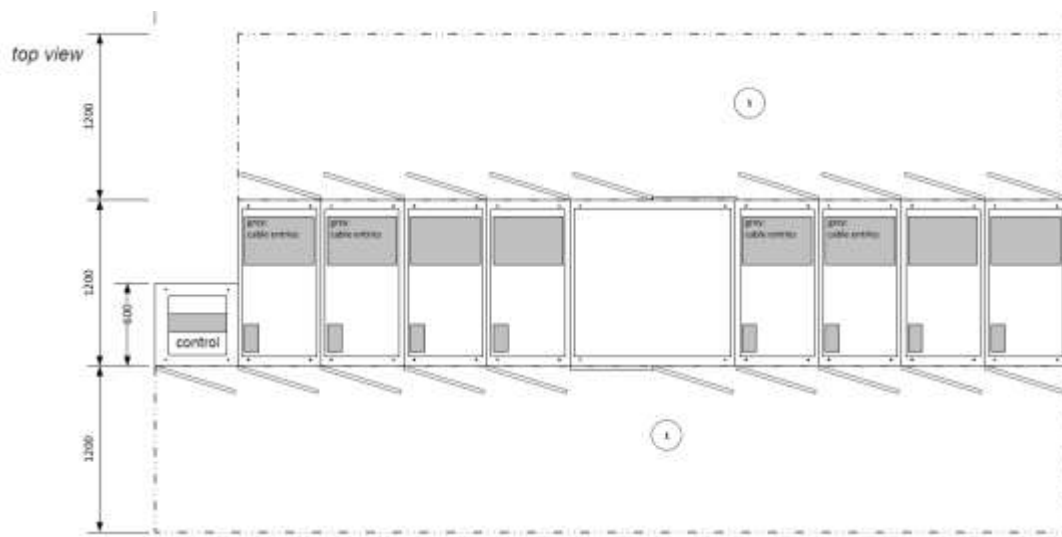
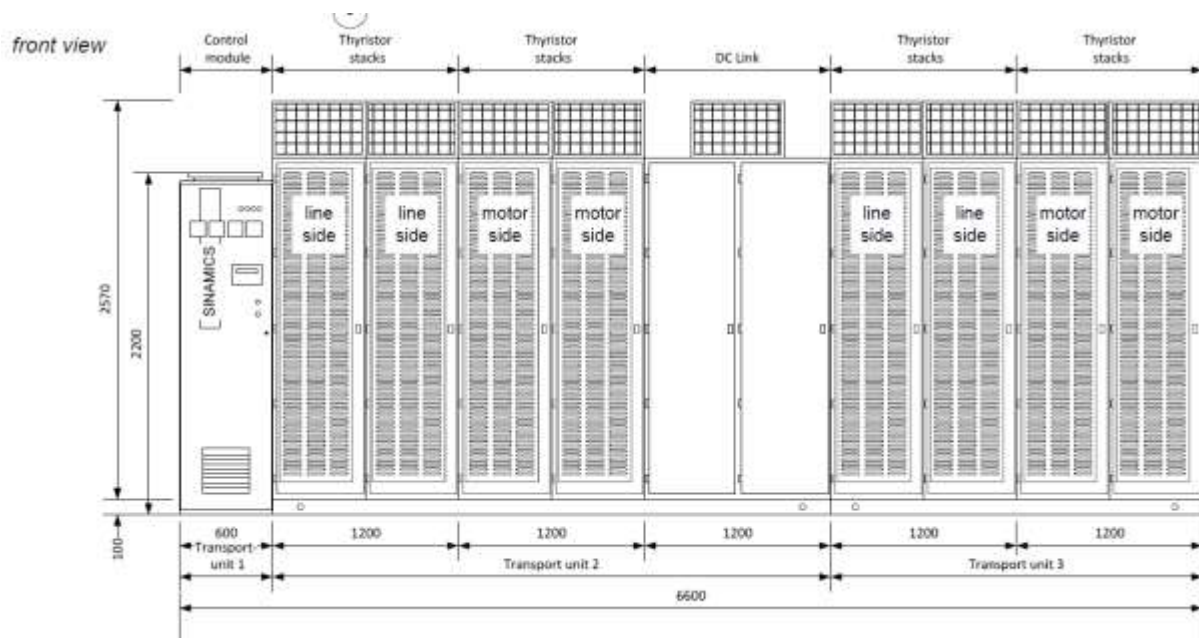
Sr. No	Drawing Description
1	OGA of SFC Panel
2	OGA of SFC Output Breaker Panel
3	OGA of PLC Panel
4	OGA of UCB/ DCS Panels
5	GA Drawing of Input Transformer
6	GA Drawing of Output Transformer

Note: - The above drawings are reference purpose only. These drawings may change and vendor will have to execute the work as per final approved drawings and instruction of BHEL engineer.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents

1. OGA of SFC Panel



Weight:

Trans. unit 1: 200 kg
Trans. unit 2: 6160 kg
Trans. unit 3: 2900 kg

colour: RAL 7035

Type of protection:
Power section IP41
Control section IP41

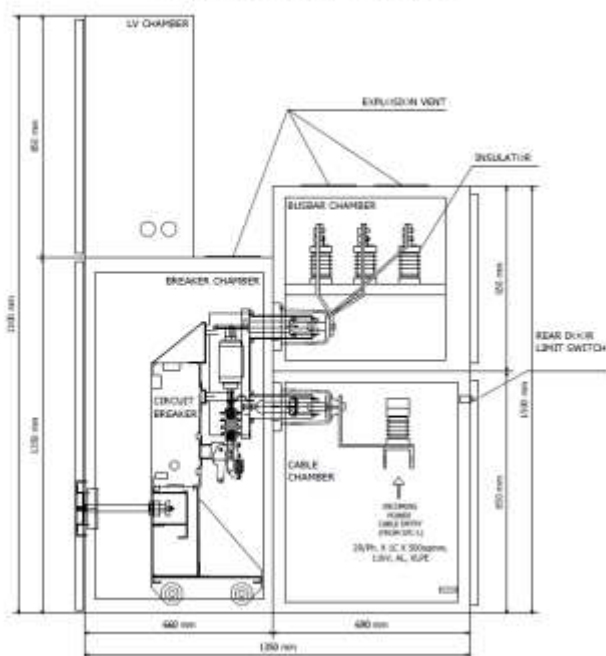
Storage and transport: -25 °C to +70 °C
Operating temperature : +5°C to +42°C

Dimensions w/o side walls / doors

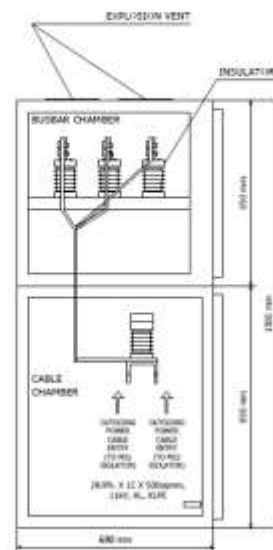
TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents

INCOMER-1 PANEL SIDE VIEW

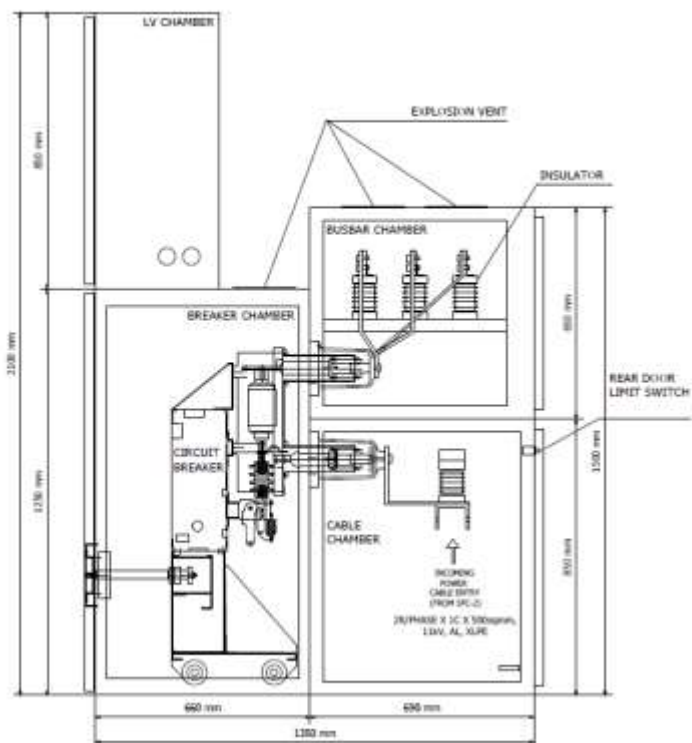


**OUTGOING CABLE BOX SIDE VIEW
(INCOMER-1 SIDE)**

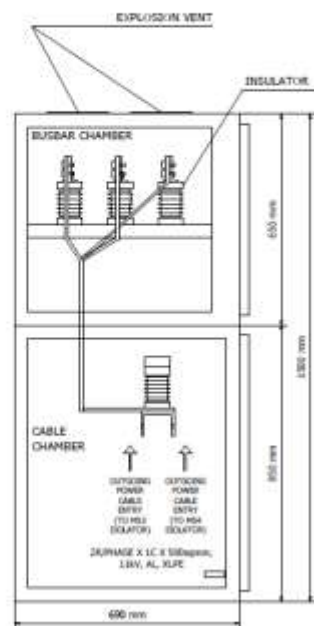


NOTE : MAIN BUS BAR IS EXTENSIBLE TYPE FOR FUTURE CONNECTION.

INCOMER-2 PANEL SIDE VIEW



**OUTGOING CABLE BOX SIDE VIEW
(INCOMER-2 SIDE)**



NOTE : MAIN BUS BAR IS EXTENSIBLE TYPE FOR FUTURE CONNECTION.

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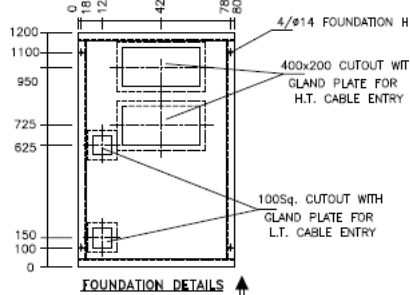
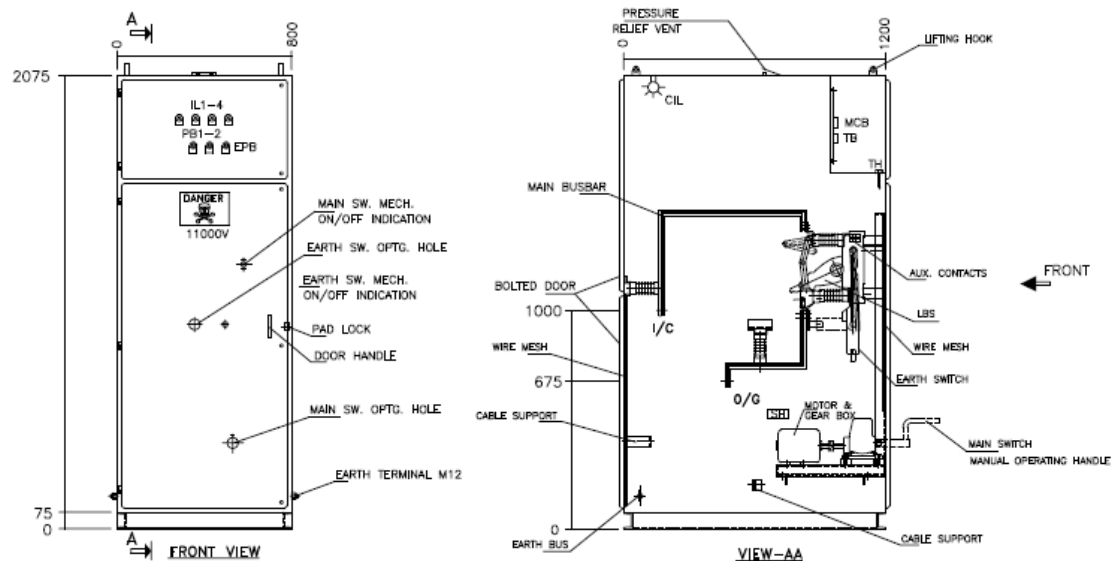
Technical Conditions of Contract –Volume I A (Part I: Contract Specific Details)

E-Tender Spec No: BHE/PW/PUR/KDNSH-CNI/3293

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Chapter-XII Drawings / Documents



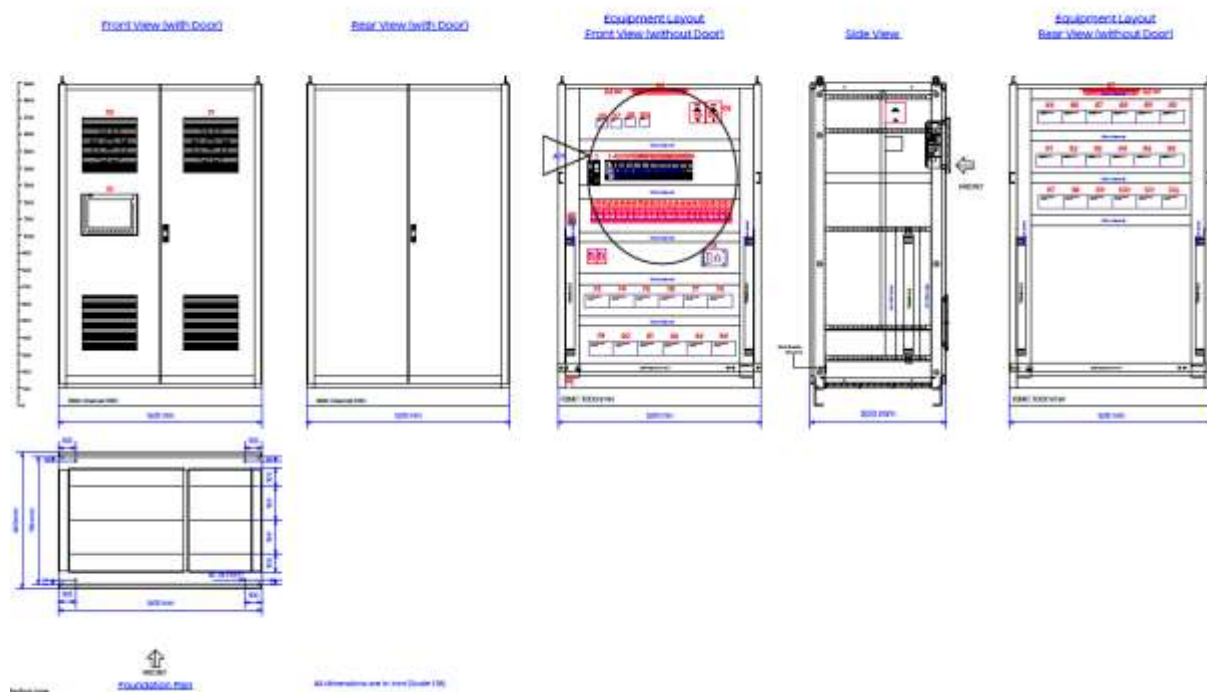
NOTE:-

- ISOLATOR TERMINATION WILL BE SUITABLE FOR 2 Runs/Phase of
11KV (UE) 1C x500sqmm Al conductor , XLPE insulated Armoured power Cable

TECHNICAL CONDITIONS OF CONTRACT (TCC)

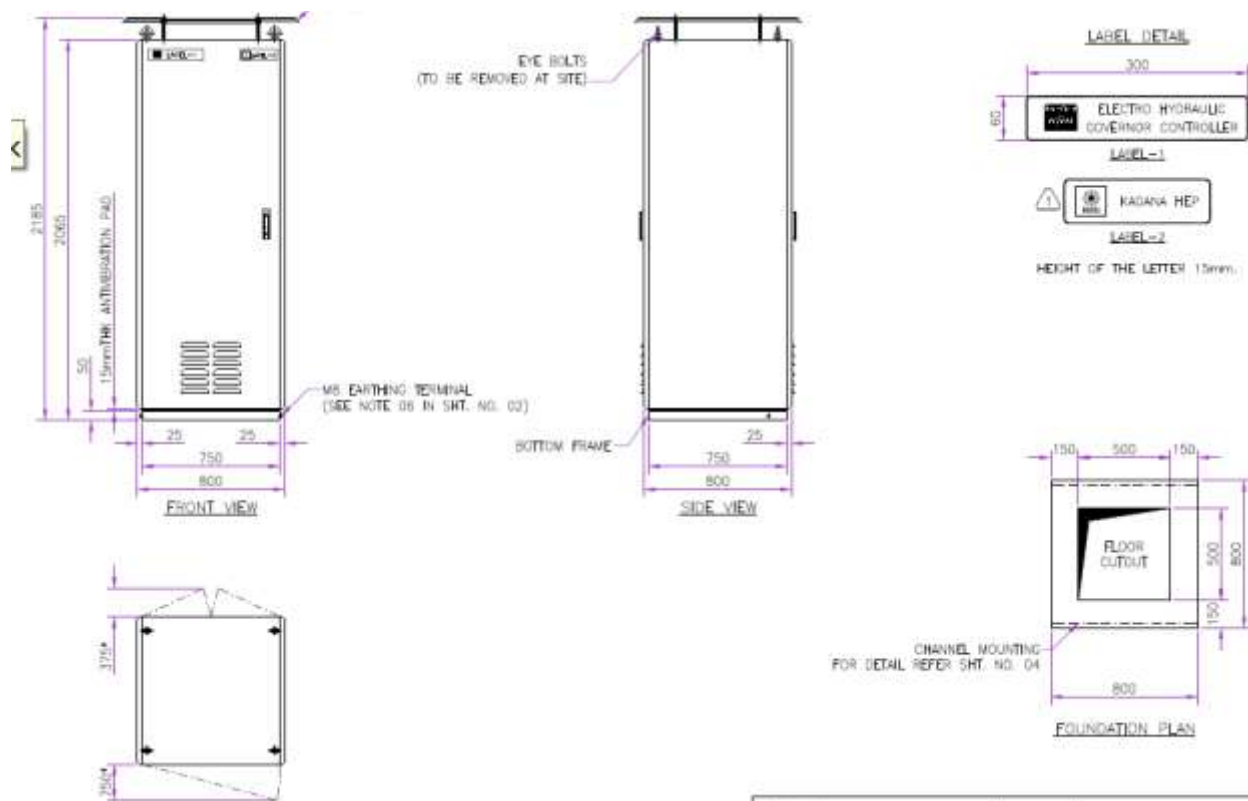
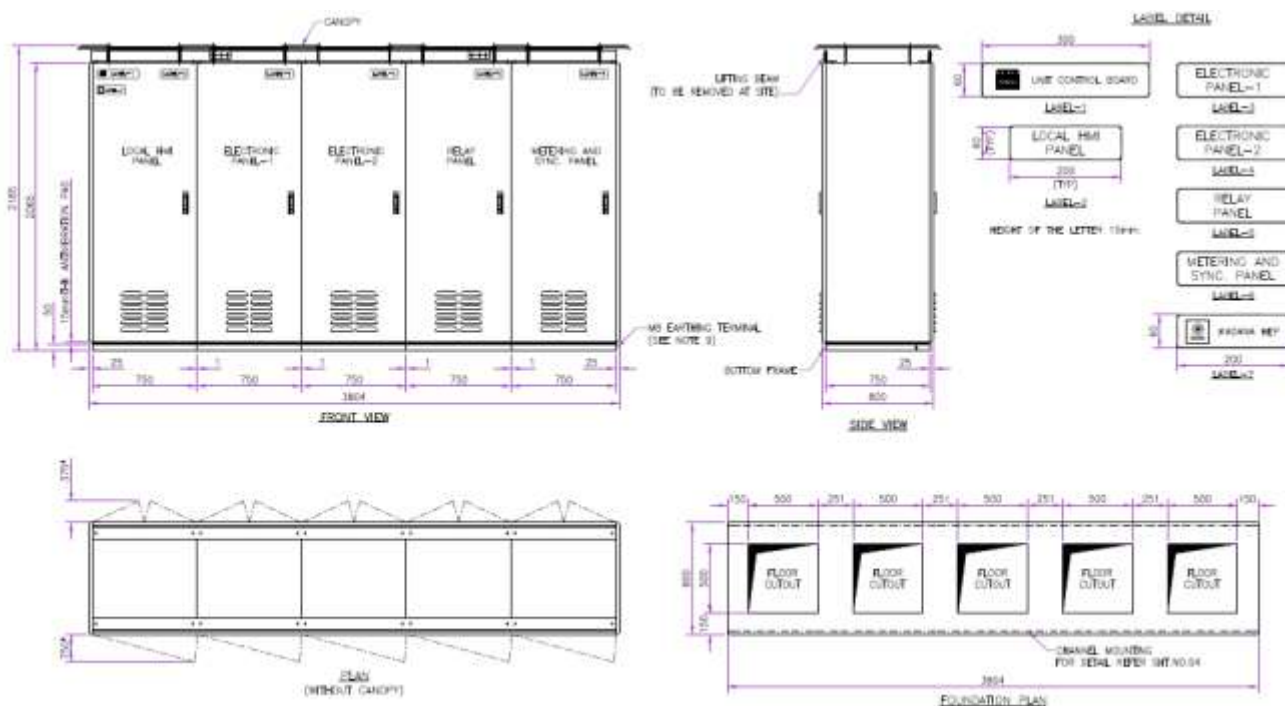
Chapter-XII Drawings / Documents

3. OGA of PLC Panel



TECHNICAL CONDITIONS OF CONTRACT (TCC) Chapter-XII Drawings / Documents

4. OGA of UCB/ DCS Panels

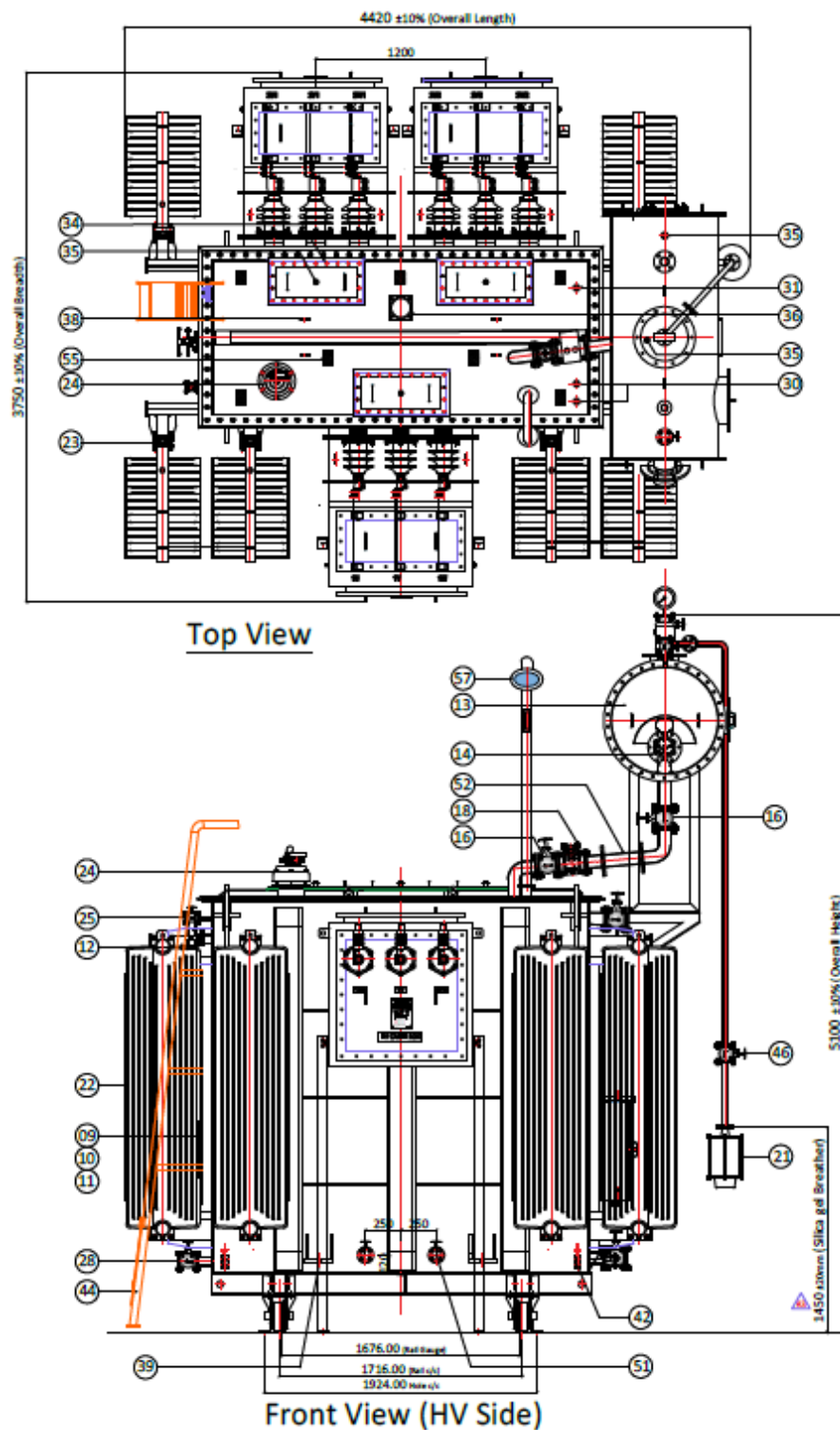


TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents

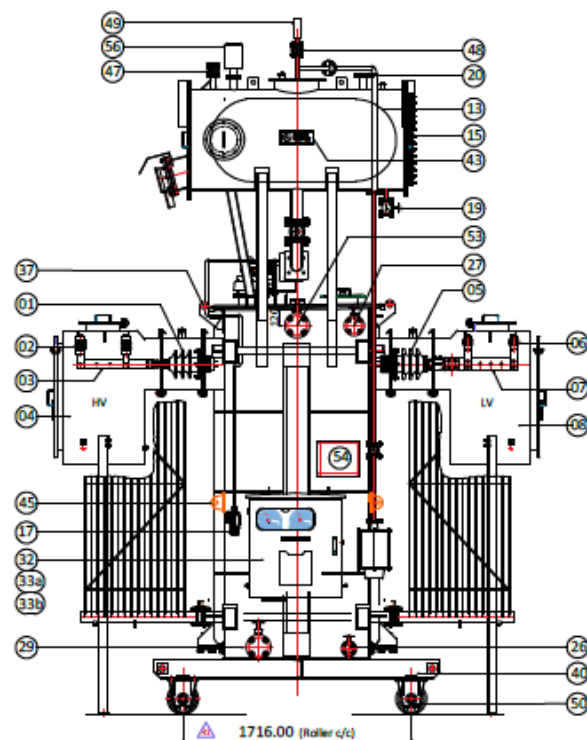
5. GA Drawing of Input Transformer

(3Ph. 17.4 MVA, 11/3.50-3.50kV, CONVERTER DUTY TRANSFORMER)

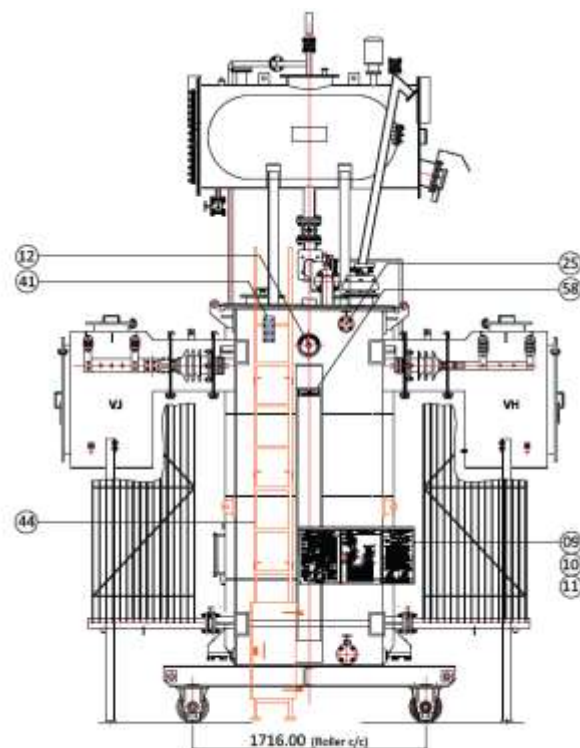


TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents



R.H. Side View



L.H. Side View

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Chapter-XII Drawings / Documents

NOTES:-

- i. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.
- ii. TOLERANCE FOR DIMENSIONS : $\pm 10\%$,
ROLLER / MOUNTING HOLE c/c : $\pm 10\text{mm}$.
- iii. HV CABLE ENTRY FROM BOTTOM SIDE.
- iv. LV CABLE ENTRY FROM BOTTOM SIDE.
- v. RADIATOR : DETACHABLE, FIN TYPE RADIATORS WITH AIR RELEASE PLUG,
DRAIN PLUG AND LIFTING LUG, PROVIDED WITH 2Nos. SHUTOFF VALVES IN EACH RADIATORS.
- vi. MATERIAL OF HV/LV. WINDINGS ARE ELECTROLYTIC GRADE COPPER.
- vii. EARTHING BRIDGES OF COPPER ARE PROVIDED FOR ALL GASKET JOINTS. (EARTHING
EQUIPOTENTIAL STRIPS/BRAIDS / BRIDGES OF COPPER ARE PROVIDED ON ALL GASKET JOINTS.)
- viii. ALL CABLES UPTO MARSHALLING BOX FROM VARIOUS ACCESSORIES THROUGH COVERED
CABLE TRAY NOT SHOWN SHALL BE PART OF INDCOIL'S SCOPE.
- ix. * THUS MARKED ITEMS ARE TO BE DISMANTLED AT THE TIME OF DESPATCH.
- x. THE TANK TOP COVER, THE MARSHALLING BOX AND THE HEADERS OF RADIATORS, SHALL BE OF
SUCH A CONSTRUCTION SO AS TO PREVENT ACCUMULATION OF WATER.
- xi. MIN. ELECTRICAL CLEARANCE IN CABLE BOX AS PER CBIP

	Ph. to Ph.	Ph. to Earth
HV. (CABLE BOX)	130mm	80mm.
LV. (CABLE BOX)	90mm	70mm.

- xii. 2 Ltr. EXTRA TOUCH UP PAINT SHALL BE SUPPLIED ALONG WITH EACH TRANSFORMER.
- xiii. THE TRANSFORMER SHALL BE SUPPLIED WITH FIRST FILL OF MINERAL OIL AS PER IS. 335.
& 10% EXTRA TRANS. OIL SHALL BE SUPPLIED IN NON RETURNABLE SEALED CONTAINERS.
- xiv. ALL VALVES EXCEPT RADIATOR VALVES SHALL BE OF GUN METAL.
ALL VALVES OPENING TO ATMOSPHERE SHALL BE PROVIDED WITH BLANKING PLATE &
ALL VALVES SHALL BE LOCKABLE TYPE.
- xv. CANOPY SHALL BE PROVIDED FOR CONSERVATOR GASKET JOINTS,
CABLE BOX TOP SIDE JOINTS, BUCHHOLZ RELAY AND PRV.
- xvi. ALL ELECTRICAL PARAMETERS WILL HAVE TOLERANCE AS PER IS: 2026 / IEC. 60076 /
CBIP 317 / NEMA-TR1 & IEEE 519 / ANSI
- xvii. ALL HARD WARE UP TO M12 SHALL BE OF STAINLESS STEEL & ABOVE M12 SHALL BE HOT
DIP GALVANIZED.
- xviii. PAINT : (EXTERNAL PAINT) - EPOXY PAINT, SHADE RAL 7032 (Min. 100 microns)
(INTERNAL PAINT) - OIL RESISTANT & OIL INSOLUBLE.
- xix. Lifting eyes or lugs on all parts dismantled of transformer, requiring independent handling
during assembly or dismantling viz. Marshalling Box, HV / LV Cable Box Conservator, Radiator etc.
- xx. PROVISION FOR NIFPS SYSTEM SHALL BE AS PER CTR MAKE.
- xxi. Ref. Page No. 02 for PARTS LIST (BILL OF MATERIAL)
- xxii. FITTINGS SUCH AS RATING PLATE, DEHYDRATING BREATHER, TEMPERATURE INDICATOR &
GAS COLLECTING DEVICE SHALL BE MOUNTED AT CONVENIENT HEIGHTS OF NOT MORE THAN
1500mm FROM PLINTH LEVEL.
- xxiii. ELECTRO STATIC Cu. SHIELD PROVIDED BETWEEN HV. & LV. WINDING AND CONNECTED TO
ACTIVE PART INTERNALLY.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents

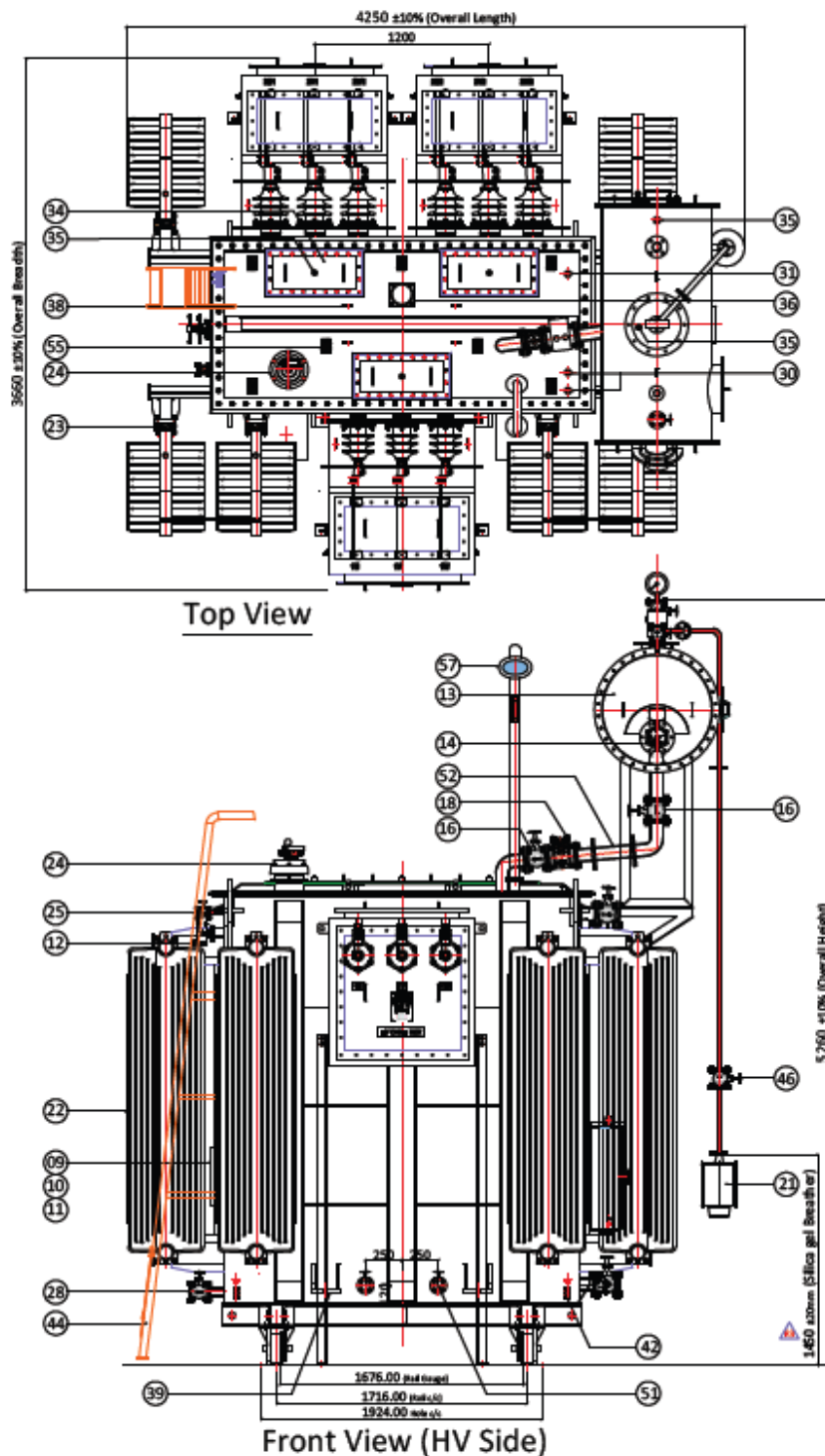
17.4MVA ONAN 3Ph. CONVERTER DUTY TRANSFORMER	
SPECIFICATION AS PER IS: 2026 / IEC. 60076 /	
CBIP 317 / NEMA-TR1 & IEEE 519 / ANSI	
RATING	: 17.4MVA (Cont. Rating : 7.8MVA)
No. OF PHASES	: THREE
FREQUENCY	: 50Hz. ±3% Variation
NO LOAD VOLATGE	{ HV : 11kV (DELTA) ±10% Variation
	LV-1 : 3.50 kV (DELTA) (8.7MVA)
	LV-2 : 3.50 kV (STAR) (8.7MVA)
TAPS ON PRIMARY	: +5% TO -5% IN STEPS OF 2.5% THROUGH OCTC
COMBINED VOLTAGE & FREQUENCY VARIATION : ±5%	
VECTOR GROUP	: Dd0y11
RATED CURRENT	{ HV. : 913 Amps
	LV-1 : 1435 Amps
	LV-2 : 1435 Amps
NO LOAD LOSSES	: 15 kW
LOAD LOSS @ 75°C	: 125 kW
IMPEDANCE @ 75°C	: 11.0 % (± IS Tol.)
INSULATION LEVEL	{ HV. : 12 / 28 (rms)/75 (P) kV
	SEC. : 3.6 / 20 (rms)/60 (P) kV
COOLING	: ONAN
INSULATION CLASS	: A
DESIGN AMB. TEMP	: 50°C
TEMP. RISE- OIL/WDG	: 50°C / 55°C
WINDING MAT.	: Electrolytic Grade COPPER
OIL AS PER IS.335	: 6,850 Kg. / 7,700 Ltr. (Approx.)
CORE & COIL Wt.	: 14,000 Kg.
TANK & FITTINGS Wt.	: 6,150 Kg.
TOTAL WEIGHT	: 27,000 Kg. (Approx.)
PAINT (External)	: Epoxy Paint, Shade RAL 7032
	Min. thickness : 100 micron
INSTALLATION	: SUITABLE FOR OUTDOOR
Duty cycle of ON Time (X) = 900 Secs.,	
OFF Time (Y) =2700 Secs. for 3 consecutive cycles	
followed by pause of 3600 Secs. before next cycle start.	

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents

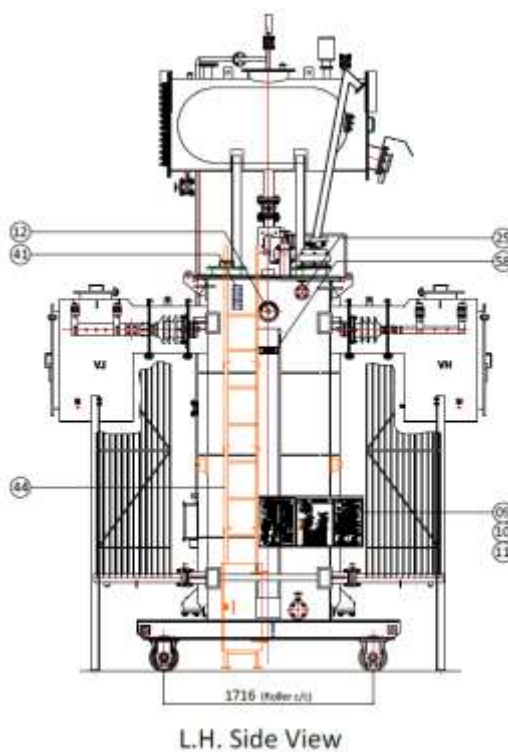
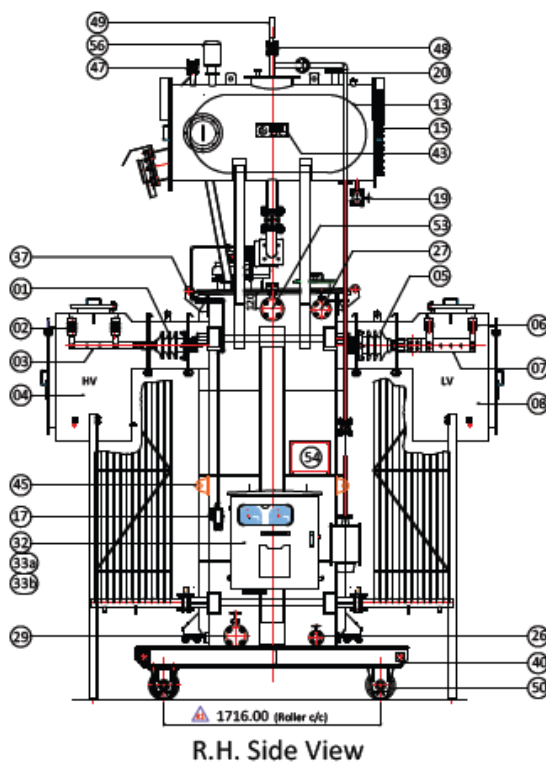
6. GA Drawing of Output Transformer

(3Ph. 16MVA, 11/3.20-3.20kV, CONVERTER DUTY TRANSFORMER)



TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents



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NOTES:-

- i. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.
- ii. TOLERANCE FOR DIMENSIONS : $\pm 10\%$,
ROLLER / MOUNTING HOLE c/c : $\pm 10\text{mm}$.
- iii. HV CABLE ENTRY FROM BOTTOM SIDE.
- iv. LV CABLE ENTRY FROM BOTTOM SIDE.
- v. RADIATOR : DETACHABLE, FIN TYPE RADIATORS WITH AIR RELEASE PLUG,
DRAIN PLUG AND LIFTING LUG, PROVIDED WITH 2Nos. SHUTOFF VALVES IN EACH RADIATORS.
- vi. MATERIAL OF HV/LV. WINDINGS ARE ELECTROLYTIC GRADE COPPER.
- vii. EARTHING BRIDGES OF COPPER ARE PROVIDED FOR ALL GASKET JOINTS. (EARTHING
EQUIPOTENTIAL STRIPS/BRAIDS / BRIDGES OF COPPER ARE PROVIDED ON ALL GASKET JOINTS.)
- viii. ALL CABLES UPTO MARSHALLING BOX FROM VARIOUS ACCESSORIES THROUGH COVERED
CABLE TRAY NOT SHOWN SHALL BE PART OF INDCOIL'S SCOPE.
- ix. * THUS MARKED ITEMS ARE TO BE DISMANTLED AT THE TIME OF DESPATCH.
- x. THE TANK TOP COVER, THE MARSHALLING BOX AND THE HEADERS OF RADIATORS, SHALL BE OF
SUCH A CONSTRUCTION SO AS TO PREVENT ACCUMULATION OF WATER.
- xi. MIN. ELECTRICAL CLEARANCE IN CABLE BOX AS PER CBIP

	Ph. to Ph.	Ph. to Earth
HV. (CABLE BOX)	130mm	80mm.
LV. (CABLE BOX)	90mm	70mm.

- xii. 2 Ltr. EXTRA TOUCH UP PAINT SHALL BE SUPPLIED ALONG WITH EACH TRANSFORMER.
- xiii. THE TRANSFORMER SHALL BE SUPPLIED WITH FIRST FILL OF MINERAL OIL AS PER IS. 335.
& 10% EXTRA TRANS. OIL SHALL BE SUPPLIED IN NON RETURNABLE SEALED CONTAINERS.
- xiv. ALL VALVES EXCEPT RADIATOR VALVES SHALL BE OF GUN METAL.
ALL VALVES OPENING TO ATMOSPHERE SHALL BE PROVIDED WITH BLANKING PLATE &
ALL VALVES SHALL BE LOCKABLE TYPE.
- xv. CANOPY SHALL BE PROVIDED FOR CONSERVATOR GASKET JOINTS,
CABLE BOX TOP SIDE JOINTS, BUCHHOLZ RELAY AND PRV.
- xvi. ALL ELECTRICAL PARAMETERS WILL HAVE TOLERANCE AS PER IS: 2026 / IEC. 60076 /
CBIP 317 / NEMA-TR1 & IEEE 519 / ANSI
- xvii. ALL HARD WARE UP TO M12 SHALL BE OF STAINLESS STEEL & ABOVE M12 SHALL BE HOT
DIP GALVANIZED.
- xviii. PAINT : (EXTERNAL PAINT) - EPOXY PAINT, SHADE RAL 7032 (Min. 100 microns)
(INTERNAL PAINT) - OIL RESISTANT & OIL INSOLUBLE.
- xix. Lifting eyes or lugs on all parts dismantled of transformer, requiring independent handling
during assembly or dismantling viz. Marshalling Box, HV / LV Cable Box Conservator, Radiator etc.
- xx. PROVISION FOR NIFPS SYSTEM SHALL BE AS PER CTR MAKE.
- xxi. Ref. Page No. 02 for PARTS LIST (BILL OF MATERIAL)
- xxii. FITTINGS SUCH AS RATING PLATE, DEHYDRATING BREATHER, TEMPERATURE INDICATOR &
GAS COLLECTING DEVICE SHALL BE MOUNTED AT CONVENIENT HEIGHTS OF NOT MORE THAN
1500mm FROM PLINTH LEVEL.
- xxiii. ELECTRO STATIC Cu. SHIELD PROVIDED BETWEEN HV. & LV. WINDING AND CONNECTED TO
ACTIVE PART INTERNALLY.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XII Drawings / Documents

16MVA ONAN 3Ph. CONVERTER DUTY TRANSFORMER	
SPECIFICATION AS PER IS: 2026 / IEC. 60076 /	
CBIP 317 / NEMA-TR1 & IEEE 519 / ANSI	
RATING	: 16MVA (Cont. Rating : 7.15MVA)
No. OF PHASES	: THREE
FREQUENCY	: 50Hz. ±3% Variation
NO LOAD VOLATGE	HV : 11kV (DELTA) ±10% Variation LV-1 : 3.20 kV (DELTA) (8MVA) LV-2 : 3.20 kV (STAR) (8MVA)
TAPS ON PRIMARY	: +5% TO -5% IN STEPS OF 2.5% THROUGH OCTC
COMBINED VOLTAGE & FREQUENCY VARIATION : ±5%	
VECTOR GROUP	: Dd0y11
RATED CURRENT	HV. : 840 Amps LV-1 : 1443.38 Amps LV-2 : 1443.38 Amps
NO LOAD LOSSES	: 10 kW
LOAD LOSS @ 75°C	: 115 kW
IMPEDANCE @ 75°C	: ≤ 7.0 % (without +ve Tol.)
INSULATION LEVEL	HV. : 12 / 28 (rms)/75 (P) kV SEC. : 3.6 / 20 (rms)/60 (P) kV
COOLING	: ONAN
INSULATION CLASS	: A
DESIGN AMB. TEMP	: 50°C
TEMP. RISE- OIL/WDG	: 50°C / 55°C
WINDING MAT.	: Electrolytic Grade COPPER
OIL AS PER IS.335	: 5,560 Kg. / 6,250 Ltr. (Approx.)
CORE & COIL Wt.	: 13,400 Kg.
TANK & FITTINGS Wt.	: 6,040 Kg.
TOTAL WEIGHT	: 25,000 Kg. (Approx.)
PAINT (External)	: Epoxy Paint, Shade RAL 7032 Min. thickness : 100 micron
INSTALLATION	: SUITABLE FOR OUTDOOR
Duty cycle of ON Time (X) = 900 Secs.,	
OFF Time (Y) =2700 Secs. for 3 consecutive cycles	
followed by pause of 3600 Secs. before next cycle start.	