Project Engineering Management

Bharat Heavy Electricals Limited

(A Govt. Of India Undertaking)

Ref. Enquiry No.: PE/PG/SGI/E-6832/2021, Dated 10.12.2021

DUE DATE
20-Dec 2021
BY 12:00 PM

Dear Ma'am / Sir,

Subject: Open Tender Enquiry for "HEAT EXCHANGER (PLATE TYPE)" for 1X660 MW WBPDCL SAGARDIGHI EXTN UNIT V Project as per Technical Specification No. PE-TS-445-179-N001 R00.

BHEL invites your offers for Design, manufacture, assembly, inspection and testing, at manufacturer's and / or his sub contractor's works, properly packed and painted for transportation and delivery of Plate Heat Exchangers along with mandatory spares complete with all accessories, special tools & tackles (if any), commissioning spares (if any), counter flanges with nuts, bolts, gaskets and coatings (wherever necessary) as specified in the Technical specification No. **PE-TS-445-179-N001 (Rev 00),** along with amendment & agreements till placement of order for **– HEAT EXCHANGER (PLATE TYPE) for 1X660 MW WBPDCL SAGARDIGHI EXTN UNIT V.**

Your offer shall be submitted in two parts strictly as per Clause-2.0 of the "**Instructions to Bidders**" of GCC Rev. 07, in sealed cover for the below mentioned equipment/system.

Item Description – HEAT EXCHANGER (PLATE TYPE)			
Sl. No.	**Project**	**TECHNICAL SPECIFICATION NO.**	**Delivery completion schedule**
1	**1X660 MW WBPDCL SAGARDIGHI EXTN UNIT V**	**PE-TS-445-179-N001 R00**	**As per annexure – A to NIT**

Your best quotation/offer for the above requirement, in line with tender terms and conditions, should be submitted **online via e-procurement system (NIC portal)**. It shall be the responsibility of the bidder to ensure that the tender is submitted **on or before the due date** by **12:00 PM.** Part-I bids shall be opened at **04:30 PM** on the due date. Kindly open the website only in Internet Explorer browser.

Note: 1. Detailed tender documents have been uploaded on following websites: - https://eprocurebhel.co.in, www.bhel.com, www.pem.bhel.com and www.eprocure.gov.in

Bidders are requested to upload their best offer on https://eprocurebhel.co.in only.

2. In case bidders are not interested to quote, please send us the regret by e-mail or letter.

ENQUIRY TERMS AND CONDITIONS:

1. Offers should be submitted/uploaded separately in two parts **online through e-procurement system** as follows:

   Part-I: TECHNO-COMMERCIAL BID **Part-II: PRICE BID**
   For detailed instructions, please refer GCC Rev 07- Instructions to Bidders.

2. Bidders shall submit their offers meeting the requirements of the following tender documents indicated in BHEL PEM GCC Rev- 07 and other Terms and Conditions included in this Enquiry Letter. Weblink of GCC Rev 07 shall be as below, **bidders may download the GCC Rev 07 from the given web link and go through the same before quoting: - https://www.pem.bhel.com/Documents/GCC/GCCRev07.pdf**

3. Bidders to note that following form the part of tender documents:
   a. General Conditions of Contract (GCC) Rev 07 comprising of: Instructions to Bidders and General Commercial Terms & Conditions
   b. Technical Specifications No. PE-TS-445-179-N001, R00
   c. Technical PQR
   d. Special Conditions of Contract (SCC Rev 00) of 1X660 MW WBPDCL SAGARDIGHI EXTN UNIT V
   e. Enquiry terms & conditions (NIT)
   f. Annexure-I Price Schedule
   g. Annexures A Delivery Schedule
   h. Annexures II, III. IV and V

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Bidders to note that offers shall be submitted strictly in accordance with the requirements of the above tender documents.

4. Any hidden conditions/deviations mentioned elsewhere in offer and standard pre-printed terms & conditions of the tenderers shall not be considered valid.

5. Tenders shall be submitted strictly in accordance with the requirements of the above-mentioned tender documents. Deviations (Technical as well as Commercial), if any, shall be listed out separately in Annexure-II of GCC Rev-07 along with reasons for taking such deviations in the bidding format in E-Procurement portal. Any deviations (Technical as well as Commercial) not mentioned in the Annexure-II of GCC Rev07 shall not be considered. Bidders to note all the points mentioned in "Notes" of Annexure-II of GCC Rev.07.

6. If any bidder has mentioned the term "Not Applicable" / "not required" / "not quoted" in BHEL price format, the same to be substantiated by the bidder. If such item is required to be supplied for system completion in future, same will be supplied free of cost by the successful bidder.

7. Tenderers must enclose the Quality Plan in the prescribed format, for approval. Equipment will be dispatched only after Purchaser's/Owner's inspection of the hold points specified in the approved Quality Plan and issue of Material Dispatch Clearance Certificate (MDCC).

8. Offers should be submitted separately in two parts **online through e-procurement system (NIC Portal) only**, however, all correspondence thereof, shall be addressed to the undersigned by name & designation and sent at the following address:

Mr. Arjun Srivastava **Dy. MGR, PG-I** **E-Mail: arjunsrivastava@bhel.in** **Ph. No. +91-120-4368839;** **Mob: 9971599688**	**Mr. Ashish Kumar Gupta** **Manager, PG-I** **E-Mail: ashishkumargupta@bhel.in** **Ph. No. +91-120-4368761;** **Mob: 9873412410**
M/s. Bharat Heavy Electricals Ltd., **Project Engineering Management,** PPEI Building, Plot No 25, Sector-16A, Noida-201301, U.P., INDIA	

9. Evaluation shall be done on Total Cost to BHEL (excluding GST) on lumpsum basis. Incomplete offer or part offer of NIT BOM/BOQ shall be summarily rejected.

10. Overall (%) variation in contract values (due to changes in the scope) shall be limited to +/-5%. This will prevail over the quantity variation Cl. No. 6.0 General Commercial Terms & Conditions of GCC, Rev. 07

11. "BHEL shall be finalizing this tender with price bid opening method and will not be conducting RA. Bidders to quote suitably. Bidders to note that this clause will supersede clause no 13 of 'Instruction to Bidders' of GCC Rev 07"

12. **MAKE IN INDIA Clause: -**

For subject tender only Class I local suppliers are eligible to bid (in line with clause no. 3 (a) of MII circular no P-45021/2/2017-PP (BE-II) Dtd-16-09-2020). In case of subsequent orders issued by 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".

The local supplier at the time of tender, bidding, solicitation, shall be required to provide self-certification as per attached Annexure-I. that as per the offered item, they meet the requirements of Class I local supplier as per the provisions of PPP-MII Order of Govt. of India and relevant circulars issued by nodal ministry w.r.t. above mentioned orders and shall give details of location(s) at which the local value addition is made.

Subject package is not divisible in nature.

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13. This is a conditional tender enquiry. Price Bid opening of a bidder shall be subjected to the following:
i) Approval of vendor by end customer i.e. (M/s WBPDCL)
ii) Techno-Commercial evaluation by BHEL.
iii) Qualification of Technical PQR
iv) Offered item should mandatorily conform to PP-MII order provisions.

14. **Delivery Completion schedule:** Refer **Annexure-A** for delivery schedule.

15. PRICE VARIATION: Prices shall be firm till completion of contract.

16. CIF is not available for this package.

17. Bidders are requested to furnish the details as per "TECHNICAL PRE-QUALIFYING REQUIREMENTS" (enclosed with the enquiry document). Along with the tender, bidders to furnish all legible & valid documents required for Technical PQR. The same shall be properly co-relating with respective clause of PQR.
Bids of only those bidders shall be evaluated who meet the Technical pre-qualifying requirements.

18. Bidders to ensure that Third party / customer issued certificates being submitted as proof of PQR qualification should have verifiable details of document / certificate issuing authority such as name & designation of Issuing Authority and its organisation contact number and e-mail Id etc. In case the same found not available, Purchaser has right to reject such document from evaluation.

19. **Freight: -** Bidders are required to quote freight amount in Priced Bid. Freight w.r.t. Percentage of Ex Works shall be mentioned in unpriced bid.

20. **For bidders (who are not registered with BHEL-PEM) -** For registration in BHEL PEM- Online registration portal is operational, Non-registered Vendors who wish to apply for registration in BHEL-PEM can apply through Online Registration Portal available at www.pem.bhel.com - vendor section - Online Supplier Registration. All credentials and/or documents duly signed and stamped related to registration can be uploaded on the website and submit the application for registration. However, registration of suppliers is not mandatory in case of open tender.

21. Bidders to note that "This This item /package/system falls under the list of items defined in para 3 of ministry of finance guideline date 20.09.16 (procurement of items related to public safety, health, critical security operations and Equipments etc.) & hence criteria of prior experience /turnover shall be same for all bidders including start up /MSME".

22. Bidders to,
- ensure compliance to Ministry of Power (MoP) Order No. 25-11/6/2018-PG dt. 02/07/2020 & Order No. 11/05/2018-Coord. dt. 23/07/2020, if applicable.
- ensure compliance of Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020.
- to submit "Model Certificate for Tenders" as per Annexure-III of Ministry of Finance (MoF) Order (Public Procurement No. 1 & 2) F. No. 6/18/2019/PPD dt. 23/07/2020.

Note: Subsequent orders/circulars to be checked and to be complied.

An undertaking regarding Model Clauses (as applicable from Annexure-III) shall be furnished along with bid documents in attached Annexure-III".

23. Due to COVID-19 pandemic condition prevailing in the country, BHEL/PEM may go for Remote Inspection of Offered items, if required. Vendors are requested to be equipped with the facilities/gadgets as indicated in the guidelines available at : https://www.pem.bhel.com/Documents/VendorSection/Vendor/Guidelines.pdf

24. 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

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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.

25. " In 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 bidders. In case more than one bidder happens to occupy L-1 status even after soliciting discounts, the L1 bidder shall be decided by a toss / draw of lots, in the presence of respective bidder(s) or their representative(s). Ranking will be done accordingly. BHEL's decision in such situation shall be final and binding."

26. Bidder agrees to submit performance security required for execution of the contract within the time period mentioned. In case of delay in submission of performance security, enhanced performance security which would include interest (SBI rate + 6%) for the delayed period, shall be submitted by the bidder. Further, if performance security is not submitted till such time the first bill becomes due, the amount of performance security due shall be recovered as per terms defined in NIT /contract, from the bills along with due interest.

27. In case of joint bidding, bidders to furnish scope matrix which should be clearly defined between them along with the offer for the complete scope as per NIT.

28. Bidders to note that GeM seller ID shall be mandatory before placement of order against this tender.

29. Bidders have to comply the Instructions to Packing List (Annexure-II).

30. The Evaluation Currency for this tender shall be INR.

31. If any bidder uploads price bid in the unpriced section (techno-commercial attachment page) of the tender in e-procurement, in that case bidder(s) shall only be responsible for such mistake and any consequences thereof. Hence all bidders are requested to be more careful at the time of uploading the Unpriced and Price Bid for Part-I and Part-II respectively to avoid mismatch.

32. All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on BHEL websites only (www.pem.bhel.com., www.bhel.com & https:// https://eprocurebhel.co.in) under subject tender reference. Bidders are requested to visit our websites from time to time to keep themselves updated. Bidders may go through the Sellers' manual & Help documents provided on E-Procurement Portal website & obtain required Digital Signature Certificate for participating in the subject Tender. For Bidders' convenience, the Helpdesk Nos. of E-Procurement (NIC) Portal is available at website i.e. https://eprocurebhel.co.in:

33. All terms and conditions shall be as per NIT, SCC of project and GCC rev. 07.

    In the event of any contradiction, the terms and conditions mentioned, the order of preference shall be as mentioned in Cl. No. 36 of GCTC of GCC Rev. 07.

34. Detailed offers are to be uploaded including the following along with the Price schedule as per BHEL format enclosed with NIT: -
    - Acceptance of BHEL-PEM GCC Rev-07
    - Acceptance of Special Conditions of Contract (SCC Rev 00) for the project.
    - Technical & Commercial Deviations, if any along with Cost of withdrawal in bidding form
    - Along with your offer, please submit a copy of this letter duly signed & stamped on each page as token of acceptance of terms & instructions conveyed.
    - Un-Priced price format duly filled in 'Quoted" or 'Q' in each column/row in bidding form
    - Filled Format of Certification reg. Local content (annexure –I)
    - Model Certificate in line with clause no. 20 of this NIT (Annexure-III).
    - Relevant documents to meet the Technical PQR

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All the above Tender Documents shall automatically become a part of the Order/Contract after its finalisation.

35. In case you are not making an offer against this enquiry, you are requested to send a regret letter so as to reach us on or before the due date.

Thanking You

Yours faithfully,
For and on behalf of BHEL-PEM

Arjun Srivastava
(DY. MGR/PG-I/BHEL-PEM)

Enclosures:

1. Technical Specification No. PE-TS-445-179-N001, Rev00
2. Technical PQR
3. SCC Rev 00
4. Annexure-I Price schedule
5. Annexure-II Deviation Sheet
6. Annexure –A: Delivery Schedule
7. Format of Certification reg. Local content (annexure –III)
8. Format of Certification reg. Land Border (annexure –IV)
9. Instructions to Packing List (Annexure-V)
10. Guideline for Remote Inspection (Annexure-VI)

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Annexure-A to Enquiry no. PE/PG/SGI/E-6832/2021, Dated 10.12.2021: Delivery Schedule

Sl. No.	Package Code	Package name	DEPTT	BHEL Drawing No	Drawing Title	Primary/Secondary	BHEL Inputs	Drg Sch for Vendors	Standard Delivery Terms for Supply Portion	Scope of Services, (if any, as per Indent) and corresponding schedule for rendering the services
3	179-11000-A	HEAT EXCHANGERS (PLATE TYPE)- PHE	MSE	PE-V5-445-179-N001	TDS -PHE	Primary		R-0 within 21 days from PO & subsequent revisions incorporating all the BHEL comments within 10 days of comments received from BHEL. BHEL shall furnish comments / approval on each submission within 18 days from receipt.	**Delivery of Main Supply:-** Within Four (04) months for SS-PHEs, from date of CAT-1 approval of Primary drawing/documents OR BHEL manufacturing clearance whichever is later, subjected to drawing/document submission/re-submission schedule as stipulated, in case of any delay in submission/re-submission of Primary drawing/ documents, then same shall be reduced from the given delivery period. Delay in BHEL's comments/approval beyond 18 days shall also be considered for delay analysis. **Delivery of Mandatory spares: -** Within Five (05) months from the date of BHEL manufacturing clearance. Separate manufacturing/dispatch clearance will be issued for mandatory spares as per SCC Rev00.	PG Test Vendor to depute its service engineer for PG Test within 15 days from BHEL's intimation (for deputing service engineer) for such site activity. For delay in deputing service engineer, LD on PG test portion shall be applicable @ ½% of the total PG test portion (excluding element of taxes) per week or part thereof, with applicable GST. However, total LD (supply + PG Test portion) shall be limited to 10% of cumulative total contract value excluding taxes and freight (supply + PG Test portion).
				PE-V5-445-179-N002	GENERAL ARRANGEMENT OF PHE	Primary				
				PE-V5-445-179-N003	SIZING CALCULATION OF PHE's	Primary				
				PE-V5-445-179-N005	QP-PHE	Primary				
				PE-V5-445-179-N004	PERFORMANCE CURVES OF PHE's	Secondary		R-0 within 20 days of approval on TDS & subsequent revisions incorporating all the BHEL comments within 10 days of comments received from BHEL.BHEL shall furnish comments / approval on each submission within 18 days from receipt.		
				PE-V5-445-179-N006	O&M MANUAL-PHE	Secondary		within 30 days of issuance of MDCC.		
				PE-V5-445-179-N007	PG TEST PROCEDURE - PHE	Secondary		within 30 days of issuance of MDCC.		

Following notes are an integral part of delivery schedule :

a. The end period specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.
b. The delivery conditions specified are for contractual LD purposes, however BHEL may ask for early deliveries without any compensation thereof.
c. Wherever schedule of drawings/documents submission / re-submission is stipulated in the Technical Specifications, same shall be superseded by delivery specified in NIT.
d. Vendor to start manufacturing activities only after obtaining specific manufacturing clearance from BHEL Purchase group.
e. In case BHEL manufacturing clearance date is later than the date of Cat-1 approval of Primary drawing/documents, then the contractual delivery period will be calculated by setting off the time gap between Cat-1 approval date of Primary drawing/documents and the manufacturing clearance date, from any delay by vendor in submission/re-submission of Primary drawing/documents.

ANNEXURE-I: PRICE SCHEDULE

PROJECT:-	**1X660 MW SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT#5)**
PACKAGE:-	**PLATE HEAT EXCHANGER**
ENQUIRY No:-	**PE/PG/SGI/E-6832/2021, Dated 10.12.2021**
VENDOR Name:-	

	DESCRIPTION OF EQUIPMENT / ITEM	DESCRIPTION 1	HSN/ SAC code	QTY	UNIT	UNIT PRICE (EX-WORKS) (Rs.)-DULY PACKED	TOTAL PRICE (EX-WORKS) (Rs.)-DULY PACKED	Freight % of total ex-works price	FREIGHT CHARGES (Rs.)	TOTAL EXWORKS + FREIGHT (Rs.)	TYPE OF GST (IGST / CGST + SGST/ CGST+ UTGST)	RATE OF GST (%)	GST AMOUNT ON (TOTAL EX-WORKS + FREIGHT) (Rs.)	TOTAL F.O.R SITE PRICE (Rs.)
Sl. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Total Price for Design, manufacture, assembly, inspection and testing, at manufacturer's and / or his sub contractor's works, properly packed and painted for transportation and delivery of Plate Heat Exchangers along with mandatory spares complete with all accessories, special tools & tackles (if any), commissioning spares (if any), counter flanges with nuts, bolts, gaskets and coatings (wherever necessary) as specified in the Technical specification No. PE-TS-445-179-N001 (Rev 00) .													
(A)	**Main Supply including E&C spares (if any)**													
A.1	**PHEs for TG Aux's**	Main Supply	84195020	3	NOS.		0.00		0.00	0.00			0.00	0.00
A.2	**PHEs for SG Aux's**	Main Supply	84195020	2	NOS.		0.00		0.00	0.00			0.00	0.00
(B)	**Site Activities**													
B.1	**Lump sum price for Site Performance Testing of all PHE (PG Test)**	Site Activity - Bidder to quote freight for site activities as zero	99833	5	NOS.		0.00			0.00		18%	0.00	0.00
(C)	**Mandatory spares (also specified in Data Sheet-A) Break-up as under:**													
C.1	**Mandatory Spares for PHEs for TG Aux's**													
C.1.1	**Plates**		84199090	5% (Rounded off to the next higher higher integer) of each type used in the system	LOT				0.00	0.00			0.00	0.00
C.1.2	**Gaskets**		84199090	30% (Rounded off to the next higher higher integer) of total requirement of each type & size used in the system	LOT				0.00	0.00			0.00	0.00
C.1.3	**Fasteners**		84199090	10% (Rounded off to the next higher higher integer) of each type used in the system	LOT				0.00	0.00			0.00	0.00
C.1.4	**Valves**		84199090	1 No. Each type, Class and Size	LOT				0.00	0.00			0.00	0.00
C.2	**Mandatory Spares for PHEs for SG Aux's**													
C.2.1	**Plates**		84199090	5% (Rounded off to the next higher higher integer) of each type used in the system	LOT				0.00	0.00			0.00	0.00
C.2.2	**Gaskets**		84199090	30% (Rounded off to the next higher higher integer) of total requirement of each type & size used in the system	LOT				0.00	0.00			0.00	0.00
C.2.3	**Fasteners**		84199090	10% (Rounded off to the next higher higher integer) of each type used in the system	LOT				0.00	0.00			0.00	0.00
C.2.4	**Valves**		84199090	1 No. Each type, Class and Size	LOT				0.00	0.00			0.00	0.00
	GRAND TOTAL						0.00		0.00	0.00			0.00	0.00
	TOTAL IN WORDS													

NOTES:	
1	Unit price quoted by bidder, as above, shall be binding for quantity variation*. *Quantity variation shall be as per Sl. no 20 of NIT
2	Price of erection & commissioning and other accessories not listed above shall be included in price of equipment & shall be supplied with the equipment.
3	Indicate all taxes, duties etc. stating whether included/ excluded in above prices.
4	Bidder shall furnish this price schedule in his price offer only.
5	Bidder to indicate cost of one site visit for four days for installation check,commissioning, trial run and PG test as per technical specification, in their price in Sl. no. 6 & 7 above. Further additional site visit per day charges shall be as obtained on prorata basis specified in Sl. no. 6 & 7 above.
6	**POINTS FOR CONSIDERATION BEFORE FILLING ABOVE PRICE SCHEDULE (Wherever applicable) :**
a	**Prices shall be firm unless otherwise specifically indicated in NIT.**
b.	In case of discrepancy in GST rate corresponding to HSN code and quoted GST, the evaluation shall be done on quoted price and correct GST rate shall be considered for ordering (limited to quoted F.O.R Site Price)
c.	Unless the context requires otherwise, in all tenders and tender related documents any reference to taxes such as ED, CST/VAT, Services. Tax etc. shall refer to GST as implemented by GOI w.e.f. 1.07.2017.
d.	CGST/SGST/UGST/IGST shall be paid at actuals against documentary evidence but restricted to the amount and percentage in the order/contract.
e.	In case, any GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry to timeline prescribed in the relevant Act for availing such ITC, or any other reasons not attributable to BHEL, tax amount shall be recoverable from the vendor/contractor along with interest levied/leviable on BHEL.
f.	All taxes and duties other than CGST/SGST/UGST/IGST shall be deemed to be included in the Ex-Works prices unless specified otherwise by the bidder in the price bid. No variation in other taxes and duties shall be payable by Purchaser.
7	In case if such items of spares indicated as “not applicable” by bidder in its offer, are found applicable at a later date during execution of the project, such items of spares are to be supplied within the ordered cost of the mandatory spares.
Notes related to Mandatory Spares:	
A) Wherever quantity has been specified as percentage (%), it shall mean percentage (%) of the total population of the PHE for the project, unless specified otherwise and the fraction will be rounded off to the next higher whole number.	
B) Wherever the quantities have been indicated for each type, size etc., these shall cover all the items to be supplied and installed.	
C) Any item indicated as "Not Applicable" by bidder but actually found applicable for that PHE, shall be supplied by bidder without any cost implication to BHEL.	

ANNEXURE - II

SCHEDULE OF TECHNICAL AND COMMERCIAL DEVIATION

PROJECT:- 1X660 MW SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT#5)

PACKAGE:- PLATE HEAT EXCHANGER

TENDER REF NO - PE/PG/SGI/E-6832/2021, Dated 10.12.2021

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
TECHNICAL DEVIATIONS									
COMMERCIAL DEVIATIONS									

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	**DESIGNATIONS**	**SIGN & DATE**	

NOTES:

1. Cost of withdrawl of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
3. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
4. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawl of deviation" column of the schedule above along with their Techno-commercial offer, whereve applicable. In the absence of same, such deviation(s) shall not be considered and offer shall be considered in total compliance to NIT.
5. Bidder shall furnish price copy of above format along with price bid.
6. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
7. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
8. For deviations w.r.t. Credit Period, Liquidated damages, Firm prices if a bidder chooses not to give any cost of withdrawl of deviation loading as per Annexure-VII, will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawl of deviation shall be taken as NIL.
9. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be considered.
10. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
11. Cost of withdrawl is to be given seperately for each deviation. In no event bidder should club cost of withdrawl of more than one deviation else cost of withdrawl of such deviations which have been clubbe together shall be considered as NIL.
12. In case nature of cost of withdrawl (positive/negative) is not specified it shall be assumed as positive.
13. In case of descrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

ANNEXURE III

1 X 660 MW WBPDCL SAGARDIGHI EXTN UNIT V

HEAT EXCHANGER (PLATE TYPE)

ENQUIRY NO. – PE/PG/SGI/E-6832/2021, Dated 10.12.2021

Letter head of Company

Ref……. Date…….

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P)-201301

Subject: - Certification regarding local content

Dear Sir,

We hereby certify that items offered by us of **HEAT EXCHANGER (PLATE TYPE) f**or **1 X 660 MW WBPDCL SAGARDIGHI EXTN UNIT V** meets the requirement of minimum local content in line with clause no. -- of NIT and the Public Procurement (Preference to Make in India), Order 2017 dated-15.06.2017, 28.05.2018, 29.05.2019, 04.06.2020 & 16.09.2020. The Percentage (%) of Local content is ……%.

We further confirm that details of location at which the local value addition is made will be our registered works at ……(address of the works)

Yours very truly

…… (authorized signatory of company)

…… (firm name)

authorized signatory
of company

ANNEXURE IV

1 X 660 MW WBPDCL SAGARDIGHI EXTN UNIT V

HEAT EXCHANGER (PLATE TYPE)

ENQUIRY NO. – PE/PG/SGI/E-6832/2021, Dated 10.12.2021

Letter head of Company

Ref……. Date…….

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P)-201301

Subject: - Certification regarding Land Border

Dear Sir,

I have read the clause regarding restrictions of procurement from a bidder of a country which shares a land border with India. I hereby certify that M/s …… (Organization name) is not from such a country and is eligible to be considered.

Note:- Bidder is requested to furnish the above undertaking on company letterhead from the highest competent authority at your end (i.e Owner, partner, CMD, Director, company secretariat etc.).

Yours very truly

…… (authorized signatory of company)

…… (firm name)

authorized signatory
of company

1 X 660 MW WBPDCL SAGARDIGHI EXTN UNIT V
HEAT EXCHANGER (PLATE TYPE)
ENQUIRY NO. – PE/PG/SGI/E-6832/2021, Dated 10.12.2021

ANNEXURE -V (INSTRUCTIONS TO PACKING LIST)

For faster verification of bills, successful bidder to submit detailed Bill of Material (BOM) at the time of drawings/ documents submission after placement of PO. Each item of the BOM to be uniquely identified with item code no. or item Sl. No. Supplier to ensure that all items which will find separate mention in the packing list are covered in this detailed BOM.

Supplier to also give the following undertaking in the BOM:
"The BOM provided herewith completes the scope (in content and intent) of material supply under PO No. ……. Dated …… Any additional material which may become necessary for the intended application of the supplied items/package will be supplied free of cost in most reasonable time.

Packing List must indicate:

a) Packing size
b) Gross weight and net weight of each package
c) Contents of the package with cross reference to BOM item code no. / Sl. No.
d) Quantity of each items separately.

The packing list must cover all the BOM items.

Supplier to give following undertaking in the packing list:

The Packing list provided herewith is as per BOM approved under PO No. -----

Guidelines for Remote Inspection of PEM BOIs

1) OBJECTIVE:

To lay down the procedure for carrying out Remote Inspection of Bought-out Items (BOIs) for PEM suppliers wherever applicable.

2) SCOPE:

It will cover suppliers for packages of PEM BOIs for various project requirements.

Invitation is sent to the suppliers for remote inspection on applications like MS Teams, Webex, etc. by BHEL.

3) MINIMUM REQUIREMENTS AT SUPPLIER'S WORKS:

i. Uninterrupted internet services

ii. Good internet bandwidth (Min 100 Mbps)

iii. Good resolution camera (2 nos) – one preferably CCTV (static at one place) and one hand hold (moving)

iv. Smart phone with minimum 8MPi camera front and back both with optical zoom facility suitable for using web applications like Webex, MicroSoft (MS) Teams, etc.

v. Computer and Scanner with good resolution

vi. Digital signatures of supplier's Quality Engineer

vii. Availability of web applications like Webex, MicroSoft (MS) Teams, as required.

viii. All Test certificates, internal test reports, calibration reports, etc. for the items offered for inspection.

ix. Availability of the above to be submitted to BHEL two days in advance before inspection.

x. Dedicated team from supplier side for facilitating inspection requirements.

xi. For ensuring proper visibility, the suggested Portable lighting sources (torch/ electric LED bulb of minimum 15 W) with no glare is to be ensured at offered job, location for remote inspection/testing. This is to be verified before start of the inspection.

xii. The GPS location co-ordinates or any method to locate inspection location shall be captured indicating the location of the Vendor-Premises of remote inspection/testing.

4) MINIMUM REQUIREMENTS AT BHEL and CUSTOMER LOCATION :

i. Uninterrupted internet services

ii. Suitable internet bandwidth

iii. Digital signatures wherever required.

iv. Availability of web applications like Webex, MS Teams, etc. as required.

v. Clearance from customer for conducting remote inspection

5) PROCEDURE:

i. Supplier will raise the inspection call in BHEL - CQIR portal.

ii. Supplier shall ensure availability of minimum requirements at supplier's works as mentioned above at point 3.

iii. Before starting the inspection, the supplier shall submit the documents (TCs, internal test reports and calibration certificates as per approved QAP) two days before the date of inspection for review by BHEL and supplier shall coordinate with BHEL and if found satisfactory, inspection shall be considered for remote.

iv. Prior to commencement of remote inspection a pre inspection meeting shall be organised by BHEL inspector with supplier to ascertain the readiness for remote inspection.

6) During inspection, supplier shall share the location on Google maps for verifying the address of the manufacturer. Location may be captured by BHEL as screenshot.

i. Inspection shall be on the basis of approved Quality Plans and associated reference documents mentioned.

ii. For witnessing inspection, supplier shall bring the mobile video camera near to the surface of the equipment or as per requirement of the inspector for clarity in viewing the test/ equipment which shall be the responsibility of supplier. Supplier shall ensure that proper lighting in available during live video streaming.

iii. Before start of the inspection, inspector shall ensure that all instruments shall have valid calibration report. Supplier shall ensure use of digital instruments preferably for inspection to the extent possible.

iv. Details of suppliers's dedicated team handling the remote inspection shall also be incorporated in the CQIR.

v. All details of inspection/ testing referred documents shall be mentioned in the CQIR. Recording of remote inspection shall be maintained by the BHEL inspector and this recording (unedited) shall be maintained at BHEL system for a minimum period of 3 years or till the warranty period whichever is later.

vi. PEM (Engineering) shall accord final technical clearance, in case of any deviation in inspected item noticed during inspection.

vii. Inspection shall be conducted by PEM-Q&BE assigned inspector along with PEM-Engg (if required). CQIR shall be prepared and maintained by PEM-Q&BE.

viii. PG will issue MDCC on the basis of acceptance of inspected items along with accepted packing photographs as per contract provisions.

7) **UNDERTAKING BY VENDOR:** Material inspected through remote inspections is meeting all technical requirements of BHEL. In case of any discrepancy from the above procedure/ material inspected, if found later, vendor will replace the materials without any cost implication to BHEL.

8) Vendor shall provide the signed and stamped of the above guidelines to BHEL as a token of acceptance.

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	PRE-QUALIFYING REQUIREMENTS (TECHNICAL) - PLATE HEAT EXCHANGERS (PHE)	DOCUMENT NO: PE-TS-445-179-N001 DTD. 23/11/21 REVISION NO: 03 DATE: 03/08/2021 SHEET: **1** of **3**

FORM NO. PEM 6100-0

ENQUIRY NO.:

PROJECT: 1X660 MW SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT#5)

PACKAGE: PLATE HEAT EXCHANGER (PHE)

1. The bidder should have designed, manufactured, tested, inspected & supplied the PHE with minimum heat load of 3528000 Kcal/hr, which have been successfully in use for at least 1 year in thermal power plant or similar industry/ application and bidder is in business of PHE on continuous basis.

2. Offers of the JV companies/ Joint Bidders/ bidders having collaboration / licensing agreement/ MOU/ Indian subsidiaries meeting the PQR at sl. no. 1 above shall be evaluated as follows:

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

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

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

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

Notes:

i) Bidder quoting on above route(s) should be manufacturer of PHE and qualifying on the basis of credentials of his principal/ JV partner/ Collaborator/ MOU partner/joint bidder/licensing Company etc., then the principal/ JV partner/ Collaborator/ MOU partner/ joint bidder/ licensing Company shall be responsible for overall design vetting and warranty/ guarantee of the package. The scope matrix clearly defining their respective roles including design vetting, manufacturing of critical component, E&C etc. and warranty/ guarantee shall be submitted along with the offer.

ii) Bidder to note that the arrangement of bidding (joint bid partners/ collaborator/ MOU partner/ licensing company etc.) once offered to BHEL as a part of bidding documents cannot be changed till the execution of the project.

3. The Bidders shall furnish following support documents for assessment of Bidder

	PRE-QUALIFYING REQUIREMENTS (TECHNICAL) - PLATE HEAT EXCHANGERS (PHE)	DOCUMENT NO: PE-TS-445-179-N001 DTD. 23/11/21 REVISION NO: 03 DATE: 03/08/2021 SHEET: **2** of **3**

w.r.t. PQR as indicated at Sl. No. 1 above:

A. Bidder's Experience list of PHE for last 5 years (as on the enquiry/NIT date) for assessment of bidder for supplying the PHE on regular basis for establishing business continuity in the enclosed format- Annexure-1.

Bidder shall furnish the PO copy of at least one executed Contract as indicated in the experience list.

B. Bidder shall furnish any one from below in support of successful performance of PHE for one year:

i. Satisfactory Performance feedback certificates from End Customer (Owner) (in English) for at least one successfully executed contract which has been in use for at least one year indicating salient features like year of commissioning of PHE, rating of project, flow & heat load of PHE, project name etc., date of issue of certificate and name/ designation of the certificate issuer for power plant/similar application industry. The time duration of satisfactory performance completion should be before the date of subject enquiry/NIT.

OR

ii. The bidder has been awarded one repeat contract for PHE from End Customer (Owner) / Purchaser (in English) for power plant/similar application industry. Repeat contract shall be considered when the second contract is given by the same purchaser/ owner after lapse of minimum 1 year from execution (viz. supply) of first contract. Supporting documents for execution of the first contract like dispatch[N2] details or commissioning report or PG test report along with the PO Copy to be furnished, if bidder intends to submit the documents for Repeat Contracts. The date of repeat contract order should not be later than the date of subject enquiry/NIT.

Notes:-

N1 - Purchase order copy, supporting drgs/technical data sheets etc. are to be submitted along with the bid for which the bidder intends to furnish the performance feedbacks / repeat contracts for reference purpose only.

N2 - Dispatch details shall include any one of the following documents:
a. Tax Invoice.
b. Site receipt/Receipted LR.
c. Customer's material dispatch clearance certificate.

N3 – Purchase order for spare items shall not be considered as repeat order qualifying criteria.

Any additional document required in support of above documents to establish the co-relation between the above documents and the supplied item shall be provided by the

	PRE-QUALIFYING REQUIREMENTS (TECHNICAL) - PLATE HEAT EXCHANGERS (PHE)	DOCUMENT NO: PE-TS-445-179-N001 DTD. 23/11/21
		REVISION NO: 03 DATE: 03/08/2021
		SHEET: **3** of **3**

	bidder.
	4. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.
	5. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder/collaborators to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
	6. After satisfactory fulfilment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.
	7. Consideration of offer shall be subject to customer's approval of bidders, if applicable.

EXPERIENCE LIST

ANNEXURE-1

EXPERIENCE LIST

PROJECT NAME	END CUSTOMER	PHE PARAMETERS			HEAT TRANSFER AREA (sq.m.)	PHE MODEL NUMBER	No. OF PHE's SUPPLIED	TYPE OF FLUID	PLATE MATERIAL	YEAR OF SUPPLY	PERFORMANE FEEDBACK CERTIFICATE ENCLOSED (Y/N)
		FLOW (Cu M/Hr.)	TEMP RISE (Deg. Cel.)	HEAT LOAD							

THE WEST BENGAL POWER DEVELOPMENT CORP. LTD (WBPDCL)

1X660 MW SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT#5)

TECHNICAL SPECIFICATION

PLATE HEAT EXCHANGERS

Specification No.: PE-TS-445-179-N001 (REV 00)

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA-201301

568972/2021/PS-PEM-MSE

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION	
		REV. NO. 00	DATE 25/11/2021

CONTENTS

This Technical Specification consists of three Sections:

Notes:

1) For detailed list of documents to be submitted by bidder in their technical offer, please refer cl. no. 10.00.00 of Section-IIA.

2) For detailed list of documents to be submitted by vendor after award of contract, please refer Datasheet-C of Section-IIA.

3) In case there is conflict in different clauses of specification, most stringent clause (as decided by BHEL / end customer) shall be followed, if no specific deviation is taken by bidder and accepted by BHEL during tender stage in that regard.

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION I	
		REV. NO. 00	DATE 25/11/2021

SECTION I

IA SPECIFIC TECHNICAL REQUIREMENTS

IB DATASHEET – A

568972/2021/PS-PEM-MSE

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION IA	
		REV. NO. 00	DATE 25/11/2021
		SHEET 1 OF 2	

1.0 GENERAL:

1.1 This enquiry covers the design, manufacture, assembly, inspection and testing at manufacturer's and/ or his sub-contractors works, painting, proper packing & delivery of the item namely PLATE HEAT EXCHANGERS complete with all mandatory spares (as applicable), accessories, commissioning & erection spares (if any), counter flanges with nuts, bolts, gaskets and coatings (wherever necessary), including special tools & tackles (if any), including site PG test (as applicable) as mentioned in this specification for 1X660 MW SAGARDIGHI THERMAL POWER EXTENSION PROJECT (UNIT#5).

The Plate Heat Exchangers complete with all accessories including special tools and tackles (if any) shall conform to the Data Sheet-A (Section IB) and other requirements of section IIA. In addition, the requirements of this Section IA including Customer Specification attached at Appendix 1 (as applicable) shall also be complied with.

1.2 The bids shall be evaluated as per NIT. Ordering shall be done as per NIT.

1.3 Bidder to quote for items as per price schedule attached in NIT.

1.4 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship, and shall be capable of performing the required duties in a manner acceptable to Engineer / Owner, who will interpret the meaning of drawing and specifications and shall be entitled to reject any component, work or material, which in his opinion is not in conformity with the duty requirements.

Note: Type of PHEs have been detailed in Data Sheet-A, Section-1B. The bidder shall include complete supplies in his scope. Part supplies offered shall disqualify the bidder's offer. Evaluation shall be combined and further details shall be indicated in NIT.

2.0 SPECIFIC REQUIREMENTS:

2.1 Design heat load of plate type heat exchangers and Inlet & Outlet temperatures of the Plate type heat exchangers on the primary and secondary side to be demonstrated at site.

Pressure drop across the Plate type heat exchanger on the primary & secondary water circuit to be demonstrated at site.

PG test at site be conducted as per clause 8.02.00 of Section-IIA. Bidder to quote Unit Rate for PG test accordingly.

2.2 The Heat transfer plate area measurement procedure and packing procedure indicated at Section-IIA are only for reference. Project specific procedures shall be submitted by the bidder during detailed engineering for approval.

2.3 Following to be complied by the bidder:

a) Supplier to submit detailed 'Bill of Material' (BoM) at the time of drawing/document

submission after placement of PO. Each item of the BoM to be uniquely identified with item code no. or item serial no.

b) Supplier to ensure that all items which will find separate mention in the packing list are covered in this detailed BoM.

c) Supplier to give following undertaking in the BoM:

"The BoM provided herewith completes the scope (in content and intent) of material supply under PO no.----------, dated ----------.
Any additional material which may become necessary for the intended application of the supplied items(s)/package will be supplied free of cost in most reasonable time."

2.4 Velocity in the PHE plates shall be so chosen such that sufficient turbulence should be maintained so as to prevent any deposition on the plate surface.

2.5 All nozzles shall be ' built-in type' and shall have a raised face.

2.6 Suitable drain and vent connections for both Primary Side and Secondary Side streams complete with double isolation valves.

3.0 The drawing / document submission schedule shall be as per NIT. MDL shall be as follows:

PACKAGE	BHEL DRG NO	DRG TITLE
PLATE HEAT EXCHANGERS (PHE)	PE-V5-445-179-N001	Technical Data sheet of PHE
	PE-V5-445-179-N002	GA drawing of PHE
	PE-V5-445-179-N003	Thermal sizing calculation of PHE
	PE-V5-445-179-N005	QAP of PHE
	PE-V5-445-179-N004	Performance curves of PHE
	PE-V5-445-179-N006	O&M MANUAL for PHE
	PE-V5-445-179-N007	PG TEST PROCEDURE -PHE

Drawings submitted shall be complete in all respects with revised drawing submitted incorporating all comments. Any incomplete drawing submitted shall be treated as non-submission with delays to bidder's account. For any clarification/ discussion required to complete the drawings, the bidder shall himself depute his personal to BHEL for across the table discussions/ finalizations/ submissions of drawings.

568972/2021/PS-PEM-MSE

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION IA- Appendix 1	
		REV. NO. 00	DATE 25/11/2021

Appendix 1

(Customer Specification)

4.00.00 **DESIGN AND CONSTRUCTION**

4.01.00 The plate type heat exchangers shall be water- water type, cooling a stream of hot D.M. Water coming from DMCW system and flowing into the heat exchangers with the help of another stream of water from ACW system.

4.02.00 The design, manufacture, performance and testing of heat exchangers shall be done as per the latest applicable IS/BS/ASTM/DIN standards and shall comply with all currently applicable standards, regulations and safety codes in the locality where the equipment shall be installed.

4.03.00 The heat exchangers shall be designed for safe, proper and continuous operation at all heat loads and liquid flows corresponding to the operating conditions. The heat exchangers shall meet the heat transfer rates as encountered during the operating conditions.

4.04.00 The quality, quantity, pressure and temperature of different water flowing through it shall be as guided elsewhere in this specification. Velocity in the PHE plates shall be so chosen such that sufficient turbulence should be maintained so as to prevent any deposition on the plate surface.

4.05.00 Design shall be suitable for:

a) Cleaning without dismantling the piping.

b) Incorporation of additional plates to the tune of 15% of the total number of plates if required later on.

4.06.00 Plates shall be packed in a frame consisting of fixed frame plates and movable pressure plates aligned at top and bottom on carrying bars of special inverted "T" section to ensure three dimensional steering and locking arrangement. Plates shall be sealed at their outer edges and around the ports by gaskets in order to prevent intermixing of hot & cold water. Thickness of pressure plates & frame plates shall conform to acceptable international codes.

4.07.00 Double sealing arrangement shall be provided around ports. The inter space between the seals shall be vented to atmosphere in order to avoid intermixing of liquids in case of gasket failure. Locally manufactured best quality gaskets shall be offered so that there is assured future supply of spare parts.

4.08.00 Plates shall be provided with sufficient thickness in order to impart sufficient rigidity particularly from handling considerations. Plates shall have contact points in order to provide inter-plate supports. The plates shall be pressed from one piece. They shall be pressed in single operation. The corrugation shall be smooth, uniform & identical for every plate.

4.09.00 In design due attention shall be given to ease of maintenance, repair and cleaning. Each plate shall be numbered in sequence; the number shall be marked by indelible ink on the plate, to permit easy reassembly.

4.10.00 The PHE bottom frame plate and supports should have fixing lugs and cleats to keep provision for enabling the Bidder to fit a trough with outlet nozzle fitted underneath to collect and drain out water in the event of leakages.

4.11.00 Thermal and mechanical stresses, vibration & noise shall be kept within the allowable limits as per relevant codes/standards. Corrosion allowance shall be provided as per code and shall be sufficient to take care of the corrosiveness of the liquids handled.

4.12.00 All nozzles shall be `built-in type' and shall have a raised face.

5.00.00 **INSPECTION AND TESTING**

5.01.00 The Bidder shall carry out the following specific tests and inspections to ensure that the equipment furnished shall conform to the requirements of this section and in accordance with applicable codes and standards.

5.01.01 All material used for manufacture of the equipment covered under this specification shall be of tested quality.

a) Plates
Chemical and physical properties and heat treatment records.

b) After pressing, visual and dimensional checks on the plates shall be made by Owner's inspector on a sampling basis.

c) After pressing, all plates shall be tested by light box or equivalent test in the presence of Purchaser's representative in order to check cracks and other surface defects. Further, 10% plates shall be randomly tested by dye-penetrant test in the presence of Purchaser's representative, all of which shall be free from defects. In both the above tests, plates without any defect only shall be accepted. Plate cleaning agent, liquid penetrant and developer shall not contain any halogen. Procedure for light box test and DP test shall be submitted to Purchaser for approval.

d) Gaskets

i) Chemical composition.

ii) Shore hardness test.

iii) Visual and dimensional checks.

e) Frame Assembly

All material for various components of frame assembly viz. main frame, pressure plate, carrying bar etc. shall be of tested quality with correlating tests certificates for chemical composition and physical properties.

f) Hydrostatic Test

Each heat exchanger shall be hydrostatically tested at a pressure of 1.5 times the design pressure. Pressure shall be applied first to both the sides of the plate at the same time, then only to one side and finally only to other side.

Pressure shall be maintained for a minimum period of sixty (60) minutes for each of the three cases above and for such additional time as may be necessary to conduct the examination for leakage. The examination shall be performed on all joints, connections and regions of high stress. Fluorescent dye shall be used during the test for ease of leak detection.

g) Test at Site

i) Performance Tests on each PHE to demonstrate guaranteed performance.

6.00.00 **DRAWINGS, DATA, CURVES AND INFORMATION**

6.01.00 Drawings, Data and Information to be furnished by the Bidder along with the Bid Proposal in addition to Technical Schedules duly filled up.

6.01.01 Outline drawings and cross sectional drawings indicating principal dimensions and weights of equipment, size and location of various nozzles, connections, nozzle sizes and foundation arrangement.

6.01.02 Calculation of overall heat transfer coefficient and heat transfer area. Detailed thermal design calculation shall be enclosed.

6.01.03 Performance curves and figures.

6.01.04 Particulars of shop tests to be conducted for the heat exchanger.

6.02.00 Drawings, Documents, Data and Information to be submitted by the Bidder after award of Contract.

6.02.01 Final version of all the drawings and data as detailed under clause no. 6.01.01 to 6.01.04 above.

6.02.02 Cross sectional drawings of heat exchangers.

6.02.03 Foundation arrangement drawings showing load data on supports, size and location of anchor bolts etc.

6.02.04 Drawings of components and details as deemed necessary.

6.02.05 Quality Assurance Plan with Test procedures.

6.02.06 Material Test Certificates.

6.02.07 Reports on shop tests and test certificates.

	TECHNICAL SPECIFICATION			Technical specification no	PE-TS-445-179-N001 (Rev 00)
	PLATE HEAT EXCHANGER			Section	IB
	DATASHEET - A			Rev	0
	1X660 MW SAGARDIGHI TPP EXTENSION (UNIT#5)			Date	25-11-2021
	PHE DESCRIPTION			PHE FOR TG AUX.	PHE FOR SG AUX.
1.0	General				
1.1	Number of Plate Heat Exchanger		Nos	Three (3) nos	Two (2) nos
1.2	Arrangement			3X50% configuration per Unit	2X100% configuration per Unit
1.3	Location			Indoor	Indoor
1.4	Primary side (Hot) Fluid			Passivated DM water (Refer enclosed water analysis)	Passivated DM water (Refer enclosed water analysis)
1.5	Secondary side (Cold) fluid			Clarified water (Refer enclosed water analysis)	Clarified water (Refer enclosed water analysis)
1.6	Connecting Pipe size	(Primary Side)	NB	500	300
		(Secondary Side)	NB	500	300
1.7	Maximum permitted Length of the PHE		mm	5000 mm (excluding reducer)	5000 mm (excluding reducer)
2.0	Design				
2.1	Design Code			Latest IS/BS/DIN/ASTM/ASME Standards	Latest IS/BS/DIN/ASTM/ASME Standards
2.2	Design Pressure		Kg/cm^2 (g)	10	10
2.3	Operating Pressure	(Primary Side)	Kg/cm^2 (g)	6.0 to 7.0 Kg/sq. cm(g)	7.5 to 8.5 Kg/sq. cm(g)
		(Secondary Side)	Kg/cm^2 (g)	3.0 to 4.0 Kg/sq. cm(g)	3.0 to 4.0 Kg/sq. cm(g)
2.4	Mechanical Design Temp.		°C	60	60
2.5	Heat Transfer per Sq.Mtr. Of Heat Transfer Plate		$Kcal/Hr./m^2$	To be Decided by Bidder	To be Decided by Bidder
2.6	Specific Heat of Fluid	(Primary Side)	Cal/gmDeg.C	1	1
		(Secondary Side)	Cal/gmDeg.C	1	1
2.7	Density of Fluid	(Primary Side)	gm/cc	1	1
		(Secondary Side)	gm/cc	1	1
3.0	Guaranteed Performance Requirements for each Heat Exchangers in fouled condition:				
3.1	Flow rate	(DMCW Side)	M^3/hr	1680	571
		(ACW Side)	M^3/hr	1680	571
3.2	Inlet temperature	(DMCW Side)	°C	46	45.3
		(ACW Side)	°C	36	36
3.3	Outlet temp	(DMCW Side)	°C	39	39
		(ACW Side)	°C	43	42.3
3.4	* Allowable pressure drop across heat exchanger from inlet to outlet in fouled conditions at 1.1 times of design flow	(DMCW Side)	MWC	7	7
		(ACW Side)	MWC	9	9
	* High pressure drop than the specified figure will not be accepted, no credit shall be, however, given for lower pressure drop in bid evaluation. Pressure drop mentioned shall be calculated against flow mentioned at S. No 3.1. Each heat exchanger shall be capable of passing a flow of at least 1.1 times the design flow rate on both primary and secondary water sides. Bidder shall indicate maximum pressure drop through the heat exchanger under this condition.				
4.0	Additional HT plates on Design Plates		%	10%	10%
5.0	Heat Transfer Coefficient/Margin				
5.1	Overall fouling resistance (minimun)		Hr m2deg C/Kcal	0.00008	0.00008

	TECHNICAL SPECIFICATION		Technical specification no	PE-TS-445-179-N001 (Rev 00)
	PLATE HEAT EXCHANGER		Section	IB
	DATASHEET - A		Rev	0
	1X660 MW SAGARDIGHI TPP EXTENSION (UNIT#5)		Date	25-11-2021
	PHE DESCRIPTION		PHE FOR TG AUX.	PHE FOR SG AUX.
5.2	Minimum corrosion allowance on heat exchanger parts of carbon steel (e.g. pressure parts,nozzles,sliding channel and frame) (refer note 11.1)	mm	1.6	1.6
6.0	Material of Construction :			
6.1	Heat Transfer Plates (Minimum acceptable plate thickness 0.6 mm). Refer Note no. 11.3		SS-316	
6.2	Plate Gasket		Nitrile rubber, 65 ± 5 Deg. shore hardness	
6.3	Compression/Fixed/Frame/Movable Pressure plates		Carbon Steel, ASTM A-283 Grade C, Epoxy painted	
6.4	Guide Rails/ bar		Carbon Steel, ASTM A-283 Grade C, with SS Cladding	
6.5	Support Beam/ column		Carbon Steel, ASTM A-283 Grade C, Epoxy painted	
6.6	Nozzle (Reducer/Expander)		SS 304	
6.7	Nozzle flanges		SS 304	
6.8	Flange/ Counter flanges		SS 304	
6.9	Tightening Bolts/Rods & Nuts		SAE 1045 epoxy painted	
6.10	Nozzle flange bolts / nuts		SA 193 B7/ SA 194 2H	
6.11	Nozzle flange gasket		3mm wire inserted Red Rubber	
6.12	Name Plate		AISI 316	
6.13	Wetted fasteners		SS-316	
6.14	Drain/Vent Valves		Body & Bonnet / Cover : ASTM-A-182 F304 Trim/Disc : ASTM-A-182 F304	
6.15	Painting			
	External Surface			
	a.) Surface Preparation		All surface other than stainless steels shall be painted. (a) Surface preparation shall be blast cleared using non-siliceous abrasive after usual wire brushing, which shall conform to Sa 2-1/2 Swiss Standard. (b) Primer coat shall consist of one coat of epoxy resin based zinc phosphate primer having minimum DFT of 100 microns. (c) Intermediate coat (or under coat) shall consist of epoxy resin based paint pigmented with Titanium dioxide with minimum DFT of 100 microns. (d) Top coat shall consist of one coat of epoxy paint suitable pigmented of approved shade and colour with glossy	
	b.) Primer			

	TECHNICAL SPECIFICATION		Technical specification no	PE-TS-445-179-N001 (Rev 00)
	PLATE HEAT EXCHANGER		Section	IB
	DATASHEET - A		Rev	0
	1X660 MW SAGARDIGHI TPP EXTENSION (UNIT#5)		Date	25-11-2021
	PHE DESCRIPTION		**PHE FOR TG AUX.**	**PHE FOR SG AUX.**
	c.) Final Paint		finish and DFT of 75 microns. Additionally finishing coat of polyurethane of minimum DFT of 25 microns shall be provided. The paint may be applied in one coat, in case high built paint is used, otherwise two coats shall be applied. Total DFT shall not be less than 300 microns.	
7.0	**Extra Carrying capacity to be provided on frame assembly.**	%	15	
8.0	**Mandatory Spares**	**Unit of Measurement**		
8.1	**Plates**	Lot	5% (Rounded off to the next higher higher integer) of each type used in the system	5% (Rounded off to the next higher higher integer) of each type used in the system
8.2	**Gaskets**	Lot	30% (Rounded off to the next higher higher integer) of total requirement of each type & size used in the system	30% (Rounded off to the next higher higher integer) of total requirement of each type & size used in the system
8.3	**Fasteners**	Lot	10% (Rounded off to the next higher higher integer) of each type used in the system	10% (Rounded off to the next higher higher integer) of each type used in the system
8.4	**Valves**	Lot	1No. Each type, Class and Size	1No. Each type, Class and Size
9.0	**Hydrotesting at Shop**			
9.1	**Hydrotesting Pressure**	Kg/cm2 (g)	1.5 times the design pressure	
9.2	**Duration of Hydrotesting**	Minutes	60	
10.0	**Performance curves and figures to be furnished during contact stage**			
10.1	Primary side water outlet temperature vs. Secondary side water inlet temperature.			
10.2	Primary side water flow (80% to 115%) vs. Pressure drop and outlet temperature (Secondary side flow – 100%)			
10.3	Secondary side water flow (80% to 115%) vs. Secondary side pressure drop and primary side outlet temp (Primary side flow – 100%)			
10.4	Primary side water outlet temperature vs. Primary side inlet temp.			
10.5	Film heat transfer coefficient curve			
10.6	Correction Curves.			
11.0	**Minimum Standard requirement of the PHE to be offered by the bidder.**			
11.1	Minimum Corrosion allowance on thickness (as per ASME Sec. VIII Div. I)			
11.2	Metallurgy specified above is bare minimum . Equivalent or Superior materials suitable for fluid handled is also acceptable subject to Customer/BHEL approval.			
11.3	Plate thickness should be adequate to withstand all operating conditions but with Minimum plate thickness of 0.6 mm (No negative tolerance allowed in thickness specified). The plates shall be pressed from one single piece with the corrugation being smooth, uniform and identical for every plate.			
11.4	The plate Heat exchangers shall be single pass type. Heat transfer plates shall be sealed at their outer edges and around the ports by gaskets in order to prevent leakage and inter-mixing of fluids.			
11.5	Double sealing arrangement shall be provided at outer edge and around ports with the inter space between the seals vented to atmosphere in order to avoid inter-mixing of liquids in case of gaskets failure.			
11.6	Each Plate shall be numbered in sequence with the number marked by indelible ink on each plate to permit easy reassembly.			
11.7	Flanges shall be as per ANSI 16.5 or equivalent. Thickness of pressure and frame plates shall be as per ASME Sect. VIII div.1.			
11.8	Painting as specified at Sl. No. 6.14 above shall be subject to customer/BHEL approval during detailed engineering. No Price implication shall be admissible on account of this.			

ANNEXURE-VII-1

ANALYSIS OF DM WATER TO BE USED FOR MAKE-UP WATER TO CONDENSER

S.No	Characteristics	Value
1.	Silica (Max.)	0.02 ppm as Sio2
2.	Iron as Fe	Nil
3.	Total hardness	Nil
4.	pH value	6.8 -7.2
5.	Conductivity	Not more than 0.1micro mho/cm excluding the effects of free CO2

ANNEXURE-VII-2

DESIGN CLARIFIED WATER ANALYSIS

S.No	PARAMETER	UNIT	Clarified Water Analysis
			Calculated
1	pH .	-	6.8-7.3
2	Sp. Cond.	µs/cm	325
3	TDS	mg/l	230
4	Turbidity	NTU	10
5	Total hardness	mg/l As CaCO3	155
6	Calcium	mg/l As CaCO3	148.8
7	Magnesium	mg/l As CaCO3	45
8	Sodium	mg/l CaCO3	45
9	Potassium		
10	P Alkalinity	mg/l As CaCO3	-
11	M Alkalinity	mg/l As CaCO3	125.3
12	Chlorides	mg/l As as CaCO3	42
13	Sulphate	mg/l As CaCO3	71.5
14	Silica (Total)	mg/l As SiO2	21
15	Silica (Reactive)	mg/l As SiO2	20
16	Silica (Collidal)	mg/l As SiO2	1
17	TOC	mg/l	6
18	COD	mg/l	45
19	BOD	mg/l	18
20	Fe	mg/lt	-

Note: Cooling water system is expected to operate at a design minimum cycle of concentration (C.O.C) of about 5 to 5.5.

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION II	
		REV. NO. 00	DATE 25/11/2021

SECTION II

IIA STANDARD TECHNICAL SPECIFICATION STANDARD QUALITY PLAN

	TITLE : STANDARD TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGER	SPECIFICATION NO. PE-TS-999-179-N001	
		VOLUME :	
		SECTION : IIA	
		REV. NO. 01	DATE : 2/5/18
		SHEET 1 OF 11	

1.00.00 **GENERAL**

This specification covers the Design, Performance requirements, Constructional Features, Materials requirements, manufacture, assembly, Inspection and Testing at Manufacturer's and/ or his sub-contractor's works and Painting requirements for delivery of Plate Heat Exchanger complete with all accessories as specified herein-after.

1.01.00 **SYSTEM DESCRIPTION**:

1.01.01 The Plate Heat Exchanger are intended to be used in closed circuit DM cooling water circuit for Cooling Hot passivated DM Water by Auxiliary Cooling Water (Clarified / Sea Water).

1.01.02 Passivated DM Water is circulated through various auxiliary coolers of TG/SG/Station Aux., in closed loop by means of pumps. This DM water picks up heat from different cooling equipment's. Heat from DM water is transferred to auxiliary cooling water (Secondary side) thru' the Plate Heat Exchangers covered under this specification.

1.01.03 The analysis of DM Water, Clarified /Sea Water (Auxiliary cooling water) to be handled by the Plate Heat Exchangers are attached as Annexure to Data Sheet-A.

1.01.04 A strainer of 2 mm size at ACW inlet lines of PHE is provided and backwashing of PHE's is not envisaged.

2.00.00 **CODES AND STANDARDS :**

2.01.00 The design manufacture and testing of the plate heat exchanger complete with all accessories, shall generally conform to the latest editions of the following appropriate standards.

2.01.01 IS/BS/DIN/US Standards regarding pressure vessels, pressure piping, pipes, valves, flanges and other as necessary.

2.01.02 IS/ BS/ DIN/ ASTM for material specification and testing procedures.

2.02.00 In case of any conflict between the above codes/ standards and this

specification, the latter shall prevail and in case of any further conflict in the matter, the interpretation of the specification by the Engineer shall be final and binding.

3.00.00 **SCOPE OF SUPPLY**:

3.01.00 The details of the Plate Heat Exchangers with the quantity, design parameters etc. to be supplied shall be as per Data Sheet-A enclosed at Section IB.

3.02.00 Each Plate Heat Exchanger (quantity and other details specified in Data Sheet-A) shall be complete with the following accessories and auxiliaries.

(i) Suitable drain and vent connections for both primary (DMCW) and Secondary Water (Raw Water/ Sea Water as applicable) streams complete with isolation valves.

(ii) Supporting arrangement complete with foundation plate channels, anchor bolts, nuts, sleeves, inserts etc.

(iii) Lifting arrangement i.e., lifting lugs, eye bolts etc.

(iv) Matching counter flanges with necessary bolts, nuts, and gaskets for all flanged terminal points, including for DMCW and ACW inlet/outlet nozzles & reducers/ expanders.

(v) Inspection ports at the End plates of the PHE.

(vi) Other accessories as required to make PHE's complete in all respects.

(vii) Commissioning spares, if any.

(viii) One Ratchet spanner for each type of PHE is included in bidder's scope of supply.

(ix) Matching piece (Reducer/Expander), with coatings (as required), to match the PHE nozzle connection with connecting pipe size at DMCW side/ ACW side as indicated in Data Sheet. In case of sea Water, Matching piece on ACW Side (Secondary) shall be flanged with coatings (as required for sea water application).

(x) Spares as applicable as per data sheet A at Section IB.

3.03.00 Finish paints for touch up painting of equipment after erection at Site in sealed containers.

3.04.00 Items though not specifically mentioned in the specification but needed to complete the equipment to meet the intent of specification, shall also be deemed to be included unless otherwise specifically mentioned in exclusions.

	TITLE : STANDARD TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGER	SPECIFICATION NO. PE-TS-999-179-N001	
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4.00.00 **EXCLUSIONS :**

The following are excluded from the bidder's scope:

4.01.00 Civil foundation works required for installation of the heat exchangers.

4.02.00 Piping, valves etc., on the external circuit of both primary and secondary water streams.

4.03.00 Erection & Commissioning of equipment at site.

5.00.00 **DESIGN AND CONSTRUCTION:**

5.01.00 **General Requirements:**

5.01.01 Unless otherwise necessary manufacturer's standard and proven models of the plate heat exchanger shall be supplied.

5.01.02 The equipment shall be capable of safe, proper and continuous operation at all heat loads and water from up to those corresponding to the operating conditions mentioned in Data Sheet-A. Vibration, noise, mechanical and thermal stresses shall be kept within allowable limits specified by relevant codes/ standards in design. Due attention shall be given to ease of maintenance, repair and cleaning.

5.01.03 Suitable corrosion allowance shall be provided wherever necessary. The corrosion allowance for the heat exchanger parts such as pressure plates (support plates), nozzles, sliding channels and frame shall be 1.6 mm (minimum).

5.01.04 Each heat exchanger shall be capable of passing a flow of at least 1.1. times the design flow rate on both primary and secondary water sides. Bidder shall indicate maximum pressure drop through the heat exchanger under this condition.

5.01.05 For the purpose of calculating dirty overall heat transfer coefficient a total fouling factor as given in Data Sheet-A shall be assumed. It is expected that the cleaning frequency shall be once in a year with the above fouling factor.

5.01.06 No back wash for the heat exchangers is envisaged.

5.02.00 **Performance Requirements:**

5.02.01 The pressure drop across plate heat exchanger from inlet to outlet in fouled conditions for primary and secondary sides, shall not be more than those

specified in Data Sheet-A, for the specified flow rates.

5.02.02 For the specified flow rate and inlet temperature, the primary side (hot fluid) outlet temperature shall not be more than that specified in Data Sheet-A.

5.02.03 In the event of failure to meet the above stipulated performance requirements, the equipment will be outrightly rejected.

5.03.00 **Construction of Heat Exchanger:**

5.03.01 Heat transfer plates shall be packed in a frame consisting of fixed frame plate and movable pressure plate and aligned at top and bottom on carrying bars. Design shall be such that cleaning is possible without dismantling the piping.

5.03.02 Heat transfer plates shall be sealed at their outer edges and around the ports by gaskets in order to prevent leakage and inter-mixing of fluids.

Double sealing arrangement shall be provided at outer edge and around ports. The interspace between the seals shall be vented to atmosphere in order to avoid inter-mixing of liquids in case of gaskets failure.

The gasket arrangement shall be such that it receives continuous support to ensure a long gasket life. The gasket should be able to retain their properties and shape over a life period of 10 years.

5.03.03 Heat transfer plates shall be provided with sufficient thickness in order to impart sufficient rigidity to the plates particularly from handling considerations. Plates shall have contact points in order to provide inter-plate supports. The recesses on the plates are suitably strengthened by a reinforcement plate.

Plate thickness shall be adequate to withstand all operating conditions as specified in Datasheet-A. Flanges shall be as per ANSI B 16.5 or equivalent. Thickness of pressure and frame plates shall be as per ASME Sec. VIII Div. 1. 25% extra capacity for additional plates shall be provided in frame.

Each plate shall be numbered in sequence. The number shall be marked by indelible ink on the plate to permit easy reassembly. The plates shall be pressed from one piece. They shall be pressed in single / progressive manner.

The corrugation shall be smooth, uniform and identical for every plate. The PHE

bottom frame plate and support should have fixing lugs and cleats to keep provision for enabling to fit trough with outlet nozzle fitted underneath to collect and drain out water in the event of leakages.

5.03.04 Frame for each heat exchanger shall have extra capacity to accommodate the additional plates if required in future because of any reason whatsoever. The extra capacity to be provided is indicated in Data Sheet-A.

The upper carrying bar and lower guide bar shall be rigid in construction without any risk or sagging or buckling, and shall facilitate easy guiding of the plates.

5.03.05 All inlet, outlet and other nozzles shall be flanged type and shall be as specified in Data Sheet-A. Counter flanges complete with gaskets, bolts, nuts and coatings (wherever necessary) shall be supplied for all the nozzle connections. The nozzle sizes of primary / secondary streams of PHEs shall be of adequate size within acceptable range of velocity. The size selection shall be subject to approval in the event of order.

5.03.06 If necessary, relief valves shall be provided on both the streams.

5.04.00 **Materials of construction :**

Material of the heat transfer plates and gaskets shall be consistent with the fluid handled. However, material specification for various parts shall be equal or superior to those specified in Data Sheet - A.

5.05.00 **Foundation And Lifting Arrangements:**

5.05.01 Plate heat exchanger shall be supplied with necessary foundation plates, anchor bolts, sleeves, nuts, inserts etc.

5.05.02 Plate heat exchanger shall be equipped with suitable lifting lugs/ eye-bolts to facilitate handling during erection and maintenance.

6.00.00 **PAINTING:**

6.01.00 The surface preparation of all exterior and interior surfaces of plate heat exchanger shall include the following:

a) Removal of oil, grease, dirt and swarf etc.,

b) Removal of rust and scale etc.,

c) Sand blasting/ shot blasing.

6.02.00 All exterior surfaces of PHEs shall be sand / shot blasted, painted with primer and finish coated with coal tar based epoxy coating of min. 250 microns thickness. Colour shade etc. shall be subject to BHEL / customer approval.

7.00.00 **SHOP INSPECTION AND TESTS:**

7.01.00 **General:**

7.01.01 Manufacturer shall conduct all tests and stage inspections as per the approved quality plan to ensure that the plate heat exchanger shall conform to the requirements of this specification and of the applicable codes/ standards.

7.01.02 All materails used for manufacture/ fabrication of the plate heat exchanger components shall be of tested quality. Relevant test certificates for chemical analysis, mechanical tests and heat treatment shall be made available before the final shop inspection. In case the relevant test certificates are not available, the manufacturer shall arrange to carry out the necessary tests required as per approved quality plan and applicable codes at his cost, for which samples shall be identified by BHEL's representative.

7.01.03 All shop tests shall be conducted in the presence of BHEL's representative and test certificates for the same shall be furnished to BHEL for approval.

7.01.04 Qualification of welding procedures and welders shall be as per ASME B&PV Code, Section-IX/applicable code.

7.02.00 **Heat Transfer Plates:**

7.02.01 Plate material used for pressing shall be furnished with mill test report showing chemical and physical properties and heat treatment records. Suitable correlating mark shall be available, so that BHEL's inspector can identify the material with test certificates before pressing the plates.

7.02.02 After pressing visual and dimensional checks on the plates shall be made in the presence of BHEL's inspector, on sampling basis.

7.02.03 The heat transfer plates from each lot of the plates shall be tested by liquid / dye penetrant test in order to check for cracks and other surface defects in presence of BHEL / customer's representative / third party (Llyods, TUV or equivalent). If any defect is detected in any of these plates, the whole lot shall be tested and plates without defects only shall be accepted. Plates cleaning agent, liquid penetrant and developer shall not contain any halogen. Procedure for DP test shall be subjected to purchaser's approval. Quantum of check shall be subject to customer's/purchaser's approval in the event of order.

7.02.04 The heat transfer plates shall be tested by light box test in order to check for cracks and other surface defects in presence of BHEL / customer's representative / third party (Llyods, TUV or equivalent). The plates without defects only shall be accepted. Procedure for Light box test shall be subjected to purchaser's approval. Quantum of check shall be subject to customer's/purchaser's approval in the event of order.

7.02.05 **Inspection Requirements**

(i) Inspection for "Pressing of plates to form whole corrugation of the heat transfer plate" shall be from third party like TUV/Lloyd and certificate shall be submitted for review of BHEL.

(ii) Minimum requirement for quality Plan shall be as per quality plan attached in the Section IIA of the specification. Manufacturing Quality Plan for PHE shall be subject to approval during detail engineering. No price implication shall be admissible to QP approval by BHEL/Customer.

(iii) Heat transfer area for the PHE shall be measured by White light scanning / similar method during contract stage to ascertain the correctness of heat transfer area.

Bidder to note that Heat Transfer Area measured by White Light Scanning should not have negative tolerance more than 3% w.r.t to the heat transfer area indicated by bidder. However in the case of negative tolerance (limited to maximum 3 percent) , bidder has to provide additional plates proportionately, as free issue, assembled into all the applicable PHE's before the Final inspection and "As built Certificate" shall be issued by the bidder accordingly. Bidder to note that negative tolerance beyond three percent shall not be accepted, however no credit shall be given to the bidder for positive tolerance of the plate area measurement.

7.03.00 **Gaskets :**

7.03.01 Certificate on Chemical composition of the gasket material shall be furnished to prove the quality. Sample testing in presence of BHEL's inspector shall also be conducted if desired.

7.03.02 Shore hardness test shall be conducted on the gasket and certificate shall be furnished. Sample tests shall also be done in presence of BHEL's inspector.

7.03.03 Visual and dimensional check on a sampling basis shall be done. Plates and gaskets assembled together, will be inspected for proper assembly.

7.04.00 **Frame Assembly:**

7.04.01 All materials for various components of frame assembly viz frame plate, pressure plate, carrying bar, guide bar, tightening/ clamping bolts and nuts etc., shall be of tested quality and test certificates for chemical composition and physical properties shall be furnished.

7.04.02 If the thickness of the plates used for frame and pressure plates is 40 mm or more the same shall be checked ultrasonically to demonstrate the absence of lamination and lack of fusion etc.

7.05.00 All weld joints used for fabrication of heat exchangers shall be subjected to suitable non-destructive examination. This shall include 100% magnetic particle examination or other suitable NDT of all welds.

7.06.00 **Nozzle and Flanged Connections:**

All materails for various nozzles, flanges, gaskets, nuts, bolts etc., shall be of tested quality and correlating test certificates for chemical and mechanical properties shall be furnished. These shall be checked for the edge preparation, fit up, orientation and satisfactory working with matching parts.

7.07.00 **Dimensional Checks**:

Dimensional checks of various components of plate heat exchanger, plate pack length etc., shall be carried out as per assembly drawings approved by BHEL.

7.08.00 **Hydrostatic Test :**

Plate heat exchanger shall by hydrostatically tested at a pressure of 1.5 times the design pressure. Pressure shall be applied first to both the sides of the plate at the same time, then only to one side and finally only to other side. Pressure shall be maintained for a minimum period of 30 Minutes for each of the three cases above and for such additional time as may be necessary to conduct the examination, for leakage. The examination shall be performed on all joints, connections and regions of high stress. Fluorescent dye shall be used during the test for ease of leak detection. There shall be no structural damage deformation of the plates.

8.00.00 **PERFORMANCE GUARANTEE AND TESTING AT SITE:**

8.01.00 **Performance Guarantee**

8.01.01 After completion of erection at site, performance test will be conducted to ensure that the plate heat exchanger operation meets the specified requirements. Rectification of all defects shall have to be done by the supplier at no extra cost to the purchaser. However the purchaser reserves the right to reject the equipment/ parts not meeting the requirement if the deficiency still persists.

8.01.02 The Plate Heat Exchanger shall be guaranteed to meet the performance requirements as given in Data Sheet-A of Section-IB and also for trouble free operation after commissioning.

8.02.00 **PG Testing at Site**

8.02.01 The guaranteed performance figures of the plat heat exchangers shall be proved by the supplier during the performance testing at site (as applicable). If the results of these tests show the non-performance of the heat exchanger to meet the guaranteed values, the supplier shall modify the heat exchanger as required to enable it to meet the guarantees.

Even If PG test is not envisaged for any project, in the event of performance shortfall at site or if insisted by customer, performance parameters (Flow, Temperature rise & Pressure drop) are to be demonstrated at site by bidder without any cost implication to BHEL.

8.02.02 All duly calibrated instruments required for PG testing including for flow

measurements shall be arranged by the bidder and taken back after the Test. The computation of flow by characteristics curve of Pumps for PG Testing of PHE's shall not be permitted.

8.02.03 It is clarified that pressure gauges and temperature gauges are provided at each PHE inlet / outlet on both primary / secondary sides and bidder can install their calibrated instruments on these locations. It is further clarified that due to layout constraints flow measuring instruments installation on pipe is not feasible. Bidder shall arrange the Ultra-sonic flow meter / similar type of instrument for PG testing.

8.02.04 At the time of performance testing, cleaning of the plates (if required) and instruments like pressure gauges, temp. Gauges, flow measuring instruments etc. shall be arranged by the bidder and no instruments shall be provided by BHEL for performance testing.

9.00.00 **QUALITY ASSURANCE & QUALITY PLAN:**

9.01.00 The Plate Heat Exchanger to be supplied shall have assured quality and workmanship.

9.02.00 Typical quality plan is enclosed in section-IIB for guidance. The bidder shall comply with these minimum requirements and shall furnish his own quality plan for approval. The quality plan shall be subjected to customer's / purchaser's approval in the event of order without any cost implication.

10.00.00 **DRAWINGS, DATA & INFORMATION TO BE SUBMITTED ALONG WITH THE OFFER:**

10.01.00 Compliance certificate (duly signed and stamped).

10.02.00 Guarantee Schedule (duly signed and stamped).

10.03.00 Thermal sizing calculations (only for reference and shall be reviewed during detailed engineering).

10.04.00 GA Drg. of PHE indicating all-important details for Layout purpose, withdrawal space required for plates, weight of assembly, nozzle & matching piece details etc. (only for reference and shall be reviewed during detailed engineering).

10.05.00 Deviation Schedule (as per NIT format; in case of nil Deviation, mention "No Deviation" in the schedule and submit).

11.00.00 **DRAWINGS, DATA & INFORMATION TO BE SUBMITTED AFTER THE AWARD OF CONTRACT:**

The drawings, data and other documents as required in Data Sheet-C shall be furnished after the award of contract.

12.00.00 **In the event of Contradictions between Section I and Section-II of the Specification, the requirements of Section-I shall prevail over the Section-II.**

	TITLE : DATA SHEET - C PLATE HEAT EXCHANGER	SPECIFICATION NO. PE-TS-999-179-N001	
		VOLUME :	
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1.00.00 **DRAWINGS, DATA AND INFORMATION TO BE SUBMITTED AFTER THE AWARD OF CONTRACT**

After the award of contract, the following drawings, data and information is to be submitted for review/ approval of BHEL as per the distribution schedule given in the enquiry.

1.01.00 Within 2 (two) weeks of the date of LOI, the following shall be submitted.

1.01.01 Data Sheet-B duly revised conforming to accepted bid.

1.01.02 Final versions of the following drawings to enable BHEL to design foundations and structures and to finalise the layout.

a) General Arrangement/ Installation drawings indicating principal dimensions, and heights of equipment being supplied, size and location of various nozzles, connections, supporting arrangement, withdrawal space, bill of quantities and materials of construction and scope of supply etc.

b) Foundation arrangement drawings showing load data on support, size and location of anchor bolts etc.

1.01.03 Sizing and calculations related to PHE/plates.

1.01.04 Performance curve and figures as indicated in Data Sheet-A (for both clean and fouled conditions).

1.01.05 Quality Plan for PHE.

1.01.06 PG Test procedure (as applicable).

1.02.00 Within the stipulated time period the following drawing/ document shall be submitted:

1.02.01 Drawings of components and details as deemed necessary.

1.02.02 Material Test Certificates.

1.02.03 Shop Tests Reports and Certificates.

1.02.04 Write-up and Instruction Manuals for Erection, Operation and Maintenance.

1.02.05 Storage Instruction.

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-179-N001, R01	DATE: 02/05/18
	CUSTOMER :		QP NO.: PE-QP-999-179-N004	DATE: 15/02/2020
	PROJECT:		PO NO.:	DATE:
	ITEM: PLATE HEAT EXCHANGER	SYSTEM: DMCW/ACW	SECTION:	SHEET 1 of 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	D	**			
					M	C/ N					M	C	N	
1.0	RAW MATERIAL INSPESTION													
1.1	Frame Plates & Pressure Plates, Counter Flanges, Connection Lining Material, Top And Bottom Carrying Bar.	Physical Properties	MA	Physical Test	1/ Heat	1/ Heat	App. Drg / Data Sheet	Relevant material Std.	Mill TC Or Lab Test Report	√	P,V	V	V	If co-related mill TCS are not available then check testing carried out by NABL lab
		Chemical Properties	MA	Chemical Analysis	1/ Heat	1/ Heat	App. Drg / Data Sheet	Relevant material Std.	Mill TC Or Lab Test Report	√	P,V	V	V	If co-related mill TCS are not available then check testing carried out by NABL lab
		Dimensions	MA	Measurement	100%	100%	Approved Drawings	Approved Drawings	Inspection Reports	√	P,V	V	V	
		Workmanship And Finish	MA	Visual	100%	100%	Approved Drawings	Approved Drawings	Inspection Reports	√	P,V	V	V	
		Lamination (Applicable For Frame And Pressure Plate Only)	CR	Ultrasonic Test	100%	100%	SA 435	SA 435	Inspection Reports	√	P,V	V	V	Applicable for plate thickness more than 25 mm only
1.2	Heat Transfer (HT) Plates/Coils	Physical Properties	MA	Physical Test	1/ Heat	1/ Heat	App. Drg. / Data Sheet	App. Drg. / Data Sheet	Mill TC Or Lab Test Report	√	P,V	V	V	**See Remark 1**
		Chemical Properties	MA	Chemical Analysis	1/ Heat	1/ Heat	App. Drg. / Data Sheet	App. Drg. / Data Sheet	Mill TC Or Lab Test Report	√	P,V	V	V	**See Remark 1**
		Dimensions	MA	Measurement	100%	Sample	Approved Drawings	Approved Drawings	Inspection Reports	√	P,V	V	V	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	19/2/20	NIKHIL DUBEY	Checked by:	19.02.20	MOHIT KUMAR
Reviewed by:	19/2/2020	VISHAL KR. YADAV	Reviewed by:	19/2/2020	RITESH KR. JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-179-N001, R01	DATE: 02/05/18
	CUSTOMER :		QP NO.: PE-QP-999-179-N004	DATE: 15/02/2020
	PROJECT:		PO NO.:	DATE:
	ITEM: PLATE HEAT EXCHANGER	SYSTEM: DMCW/ACW	SECTION:	SHEET 2 of 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY **			REMARKS
1	2	3	4	5	6		7	8	9	D	M	C	N	
					M	C/ N								
1.3	Gaskets	Dimensions	MA	Measurement	100%	Sample	Approved Drawings	Approved Drawings	Inspection Reports	√	P,V	V	V	Co-related mill TCS to be provided.
		Workmanship And Finish	MA	Visual	100%	Sample	No damage, No Surface defects.	No damage, No Surface defects.	Inspection Reports	√	P,V	V	V	
		Contour	MA	Visual	100%	Sample	Mfg. Drgs / specification	Mfg. Drgs / specification	Inspection Reports	√	P,V	V	V	
		Hardness	CR	Measurement	100%	Sample	Approved Drawings	Approved Drawings	Inspection Reports	√	P,V	V	V	
1.4	Tightening Bolts & Nuts. (Tie Rod)	Physical Properties	MA	Physical Test	1/ Heat	1/ Heat	App. Drg / data sheet	Relevant Material Std.	Mill Tc Or Lab Test Report	√	P,V	V	V	
		Chemical Properties	MA	Chemical Analysis	1/ Heat	1/ Heat	App. Drg / data sheet	Relevant Material Std.	Mill Tc Or Lab Test Report	√	P,V	V	V	
		Dimensions	MA	Measurement	100%	100%	Approved Drawings	Approved Drawings	Inspection Reports	√	P,V	V	V	
		Workmanship and Finish	MA	Visual	100%	100%	Approved Drawings	Approved Drawings	Inspection Reports	√	P,V	V	V	
		Internal Soundness (For diameter >= 40 mm)	CR	UT	100%	100%	ASTM A 388	See Remark - 4	Inspection Reports	√	P,V	V	V	UT will be carried on raw material stage.
2.0	IN PROCESS INSPECTION													
2.1	HT PLATES	Area Measurement	NA	White Light Scanning	1 per Type	1 per Type	Approved drawing/ data sheet	Approved drawing/ data sheet	Inspection Reports	√	P,V	W	V	See Remark 2

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:	19/2/20	NIKHIL DUBEY	Checked by:	19.02.20	MOHIT KUMAR		
Reviewed by:	19/2/2020	VISHAL KR. YADAV	Reviewed by:	19/2/2020	RITESH KR. JAISWAL		

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
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Reviewed by:			
Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-179-N001, R01	DATE: 02/05/18
	CUSTOMER :		QP NO.: PE-QP-999-179-N004	DATE: 15/02/2020
	PROJECT:		PO NO.:	DATE:
	ITEM: PLATE HEAT EXCHANGER	SYSTEM: DMCW/ACW	SECTION:	SHEET 3 of 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY ** M	C	N	REMARKS
1	2	3	4	5	6 M	6 C/ N	7	8	9					
		Physical Properties	MA	Physical Test	1 Sample per Heat	1 Sample per Heat	Approved drawing/ data sheet	Relevant Material Std.	Mill TC or Lab Test Report	√	P,V	V	V	
		Chemical Properties	MA	Chemical Analysis	1 Sample per Heat	1 Sample per Heat	Approved/ drawing/ data sheet	Relevant Material Std.	Mill TC or Lab Test Report	√	P,V	V	V	
		Dimension	MA	Measurement	1 Sample per Heat	1 Sample per Heat	Approved drawing/ data sheet	Approved drawing/ data sheet	Inspection Report	√	P,V	V	V	
		Workmanship And Finish	MA	Visual	100%	100%	Approved drawing/ data sheet	No scratches, cracks etc.	Inspection Report	√	P,V	V	V	
		Surface Defects And Cracks	CR	DP test	10%	2 % or min. 100 nos. whichever is higher	Manufacturer's DP test procedure (to be reviewed and approved by BHEL/Customer during contract stage)		DPT Report	√	P,V	W	V	See Remark 3
				Light Box Test/ Vacuum chamber test	100%	10%	Manufacturer's Light Box/Vacuum test procedure (to be reviewed and approved by BHEL/Customer during contract stage)		Vacuum Test Report	√	P,V	W	V	See Remark 3
		PMI testing	CR	PMI test	100 %	1 Sample per Heat	Approved drawing/ data sheet	Approved drawing/ data sheet	PMI Compliance report	√	P,V	V	V	See Remark 5

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:	19/2/20	NIKHIL DUBEY	Checked by:	19.02.20	MOHIT KUMAR
Reviewed by:	19/2/2020	VISHAL KR. YADAV	Reviewed by:	19/2/2020	RITESH KR. JAISWAL

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-179-N001, R01	DATE: 02/05/18
	CUSTOMER :		QP NO.: PE-QP-999-179-N004	DATE: 15/02/2020
	PROJECT:		PO NO.:	DATE:
	ITEM: PLATE HEAT EXCHANGER	SYSTEM: DMCW/ACW	SECTION:	SHEET 4 of 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	D	**			
					M	C/ N					M	C	N	
2.2	Welding Procedures Specification (WPS)	Correctness	MA	Verification	100%	100%	ASME SEC-IX.	ASME SEC-IX.	QW 482 ASME SEC-IX	√	P,V	V	V	Customer /BHEL/ BHEL TPI / NPCIL, EIL, LLYODS) approved WPS shall be used for welding.
2.3	Procedure Qualification Records (PQR)	Suitability	MA	Visual & Mechanical Test	100%	100%	ASME SEC-IX.	ASME SEC-IX.	QW 483 ASME SEC-IX.	√	P,V	V	V	
2.4	Welders Performance Qualification	Welder's Performance Soundness Of Welds	MA	Visual / RT & Mechanical	100%	100%	ASME SEC-IX.	ASME SEC-IX.	QW 484 ASME SEC-IX	√	P,V	V	V	Customer /BHEL/ BHEL TPI / NPCIL, EIL, LLYODS) approved WPS shall be used for welding.
2.5	Weld joint of expander/reducer.	Welding Of Outer Flange To Reducer/Expander	MA	Visual	100%	100%	Approved Drawings	Approved Drawings	Inspection Report	√	P,V	V	V	
			CR	DPT	100%	100%	Manufacturer's DP test procedure (to be reviewed and approved by BHEL/Customer during contract stage)		DPT Report	√	P,V	W	V	
2.6	PHE Structure	Workmanship and finish	MA	Measurement & Visual	100%	100%	Approved Drawings	Approved Drawings	Inspection Report	√	P,V	V	V	
2.7	Plate Gaskets	Presence Of Gasket	MA	Visual	100%	100%	Mfg. Spec.	Mfg. Spec.	Inspection Report	√	P,V	W	V	
2.8	Plate arrangement to flow diagram	Correctness	CR	Visual as per flow diagram	100%	100%	Approved Drawing	Approved Drawings	Inspection Report	√	P,V	V	-	
2.9	Assembly of tightening bolts and nuts	Squeezing of threads on T/B	MA	Visual	100%	100%	Approved Drawing / Data sheet	Approved Drawing / Data sheet	Inspection Report	√	P,V	V	-	
2.10	Plate Pack	Length	MA	Dimension Measurement	100%	100%	Approved Drawing	Approved Drawing	Inspection Report	√	P,V	V	V	

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:	19/2/20	NIKHIL DUBEY	Checked by:	19.02.20	MOHIT KUMAR		
Reviewed by:	19/2/2020	VISHAL KR. YADAV	Reviewed by:	19/2/2020	RITESH KR. JAISWAL		

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

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-179-N001, R01	DATE: 02/05/18
	CUSTOMER :		QP NO.: PE-QP-999-179-N004	DATE: 15/02/2020
	PROJECT:		PO NO.:	DATE:
	ITEM: PLATE HEAT EXCHANGER	SYSTEM: DMCW/ACW	SECTION:	SHEET 5 of 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	C/ N				D	M	C	N	
3.0	FINAL INSPESTION													
3.1	Complete Assembly	a. Conformance to GA drg.	MA	Dimension Measurement	100%	100%	Approved Drawing	Approved Drawing	Inspection Report	√	P,V	W	W	
		B. Dimensions, No. of Heat Transfer Plates, Workmanship & finish	MA	Dimension Measurement	100%	100%	Approved Drawing	Approved Drawing	Inspection Report	√	P,V	W	W	
3.2	Unbalanced hydrostatic pressure (Primary Side)	Leakage / strength of structure	MA	Hyd. Test	100%	100%	Manufacturer's Hydro test procedure (to be reviewed and approved by BHEL/Customer during contract stage)		Hydro Test Report	√	P,V	W	W	Hydro test @ 1.5 times the design pressure with 30 minutes holding time.
3.3	Unbalanced hydrostatic pressure (Secondary Side)	Leakage / strength of structure	MA	Hyd. Test	100%	100%	Manufacturer's Hydro test procedure (to be reviewed and approved by BHEL/Customer during contract stage)		Hydro Test Report	√	P,V	W	W	Hydro test @ 1.5 times the design pressure with 30 minutes holding time.
3.4	Surface Preparation for Painting	Cleanliness (dust, dirt free, oil, grease free surface), surface profile	MA	Measurement & visual	100%	100%	Tech. Specs / App. Drawings	Tech. Specs / App. Drawings	Test Report	√	P,V	V	-	Surface profile as per SA 2.5
3.5	Painting	Dry film thickness & shade	MA	Measurement & visual	100%	100%	Customer/BHEL Tech. Spec. / Approved Data sheets		Test Report	√	P,V	V	V	
3.6	Packing	Completeness	MA	Measurement & visual	100%	100%	Customer/BHEL Tech. Spec. / Approved Data sheets		Test Report	√	P,V	V	V	Packing procedure as per Annexure B. **See Remarks 7**
REMARKS:-														

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name	Seal			Sign & Date	Name	Seal
Prepared by:	19/2/20	NIKHIL DUBEY	Checked by:	19.02.20	MOHIT KUMAR			Reviewed by:			
Reviewed by:	19/2/2020	VISHAL KR. YADAV	Reviewed by:	19.2.2020	RITESH KR. JAISWAL			Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-179-N001, R01	DATE: 02/05/18
	CUSTOMER :		QP NO.: PE-QP-999-179-N004	DATE: 15/02/2020
	PROJECT:		PO NO.:	DATE:
	ITEM: PLATE HEAT EXCHANGER	SYSTEM: DMCW/ACW	SECTION:	SHEET 6 of 6

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6		7	8	9	*	**			
					M	C/ N				D	M	C	N	

1	Co-related Mill TC's to be furnished by vendor to BHEL representative during inspection stage for review. BHEL to verify physical correlation of Mill TC's with material.
2	Inspection of Heat Transfer Plate Area Measurement shall be by White Light Scanning Method from BHEL (Refer Annexure –A). In case, inspection of plate area measurement by white light scanning method of specific PHE model has been witnessed by BHEL in past project then Type test certificates are acceptable to BHEL for same. The type test certificate shall not be more than 5 years old from date of inspection.
3.	Reg. Dye Penetrant Test & Light Box Test: There shall be random witness by BHEL/ Customer at Bidder's works, in case any defect is found in any of selected % of plates, the whole lot shell be tested in presence of BHEL & Customer. H.T. Plates without defect only shall be accepted.
4.	Ultrasonic test of tie rods shall be carried out using 10 mm / 20 mm size Normal Beam Probe of frequency 2 MHz. Using this probe, the back wall echo in the sound area of bar shall be adjusted to 100% of full Screen Height (FSH). The whole bar shall be scanned under this sensitivity setting. In this sensitivity setting any defect echo indication having height greater than 20% of FSH is not acceptable.
5.	100% PMI Inspection for material grade of PHE Heat Transfer plates shall be from BHEL/ BHEL TPI. BHEL reserves the right to conduct random & independent PMI inspection on PHE's Heat Transfer plates to ascertain the plate material.
6.	BHEL reserves the right for conducting repeat test, if required.
7.	Photographs of packed material to be verified by BHEL before issuing MDCC.
8.	Project specific QP to be developed based on customer requirement.

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

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:	19/2/20	NIKHIL DUBEY	Checked by:	19.02.20	MOHIT KUMAR		
Reviewed by:	19/2/2020	VISHAL KR. YADAV	Reviewed by:	19/2/2020	RITESH KR. JAISWAL		

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
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Reviewed by:			
Approved by:			

568972/2021/PS-PEM-MSE

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION IIA	
		REV. NO. 00	DATE 25/11/2021
		SHEET 1 OF 2	

Annexure-A to Standard Quality Plan

PROCEDURE FOR MEASUREMENT OF HEAT TRANSFER SURFACE AREA OF THE PHE PLATES

Definition of Heat transfer area:-

The Heat transfer area of the PHE plate is the area of the plate participating in the heat transfer process viz. the wetted surface area inside the gasketed groove of the plate as shown in the **Annexure 1**.

Steps to Measure the Heat transfer Area:

1) The surface area of the plate shall be cleaned thoroughly.
2) Apply the developer (as used in Dye Penetrant test) over the entire surface area of the plate.
3) Fix the reference stickers at several appropriate locations on the plate.
4) White light (CFL) is projected on the plate.
5) The entire surface area including all the geometrical features of the plate (corrugations) is captured by the 3D camera.
6) The 3D image of the plate is then converted into CAD format.
7) The surface area can be measured from the 3D· CAD drawing.

568972/2021/PS-PEM-MSE

ANNEXURE-1

Heat transfer area to be measured-Shown in Hatched portion below

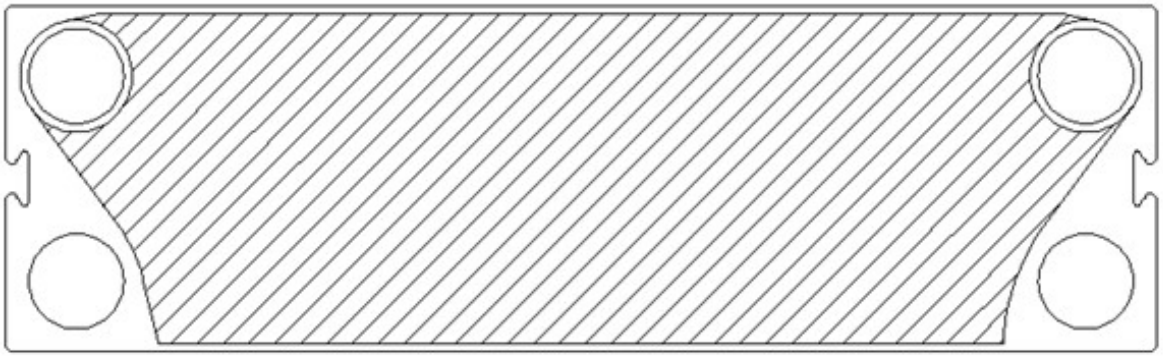

Fig. 1: Wetted Surface Area for Parallel Connection

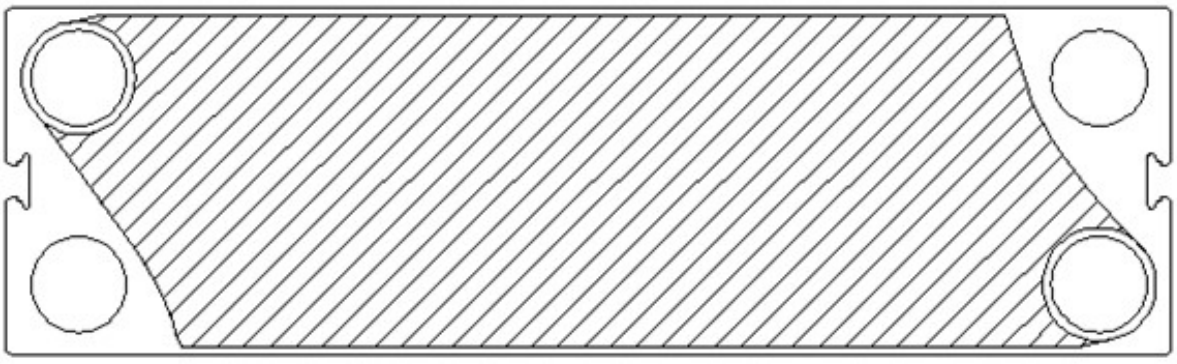

Fig. 2: Wetted Surface Area for Diagonal Connection

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION IIA	
		REV. NO. 00	DATE 25/11/2021
		SHEET 1 OF 2	

Annexure-B to Standard Quality Plan

PHE packing procedure before dispatch

1. Purpose:

The purpose of this procedure is to outline the requirements and procedures for protecting the equipment's during shipment and preserving during the storage.

2. Preparation for Packing:

- After hydro testing, operation, all fluids e.g. water etc., shall be completely drained from all PHE's, and the equipment blown dry.
- All material shall be cleaned internally and externally to remove, scale, rust fillings and any other foreign material.
- The PHE shall be placed on a strong wooden base & bolted to the wooden base using the foundation holes for further transportation upto site.

3. Protection of parts:

- Plate Heat Exchangers shall be packed in proper sizes of wooden cases. High grade woods like Rubber woods, jungle wood, hard wood, mango wood, pine wood, etc. is used for packing.
- All finished (or) machined (External C.S. Surfaces shall be protected against corrosion with corrosion resisting coating, which is easily removable (Compound shall be such that it will remain on the surface at temperature normally encountered during shipping & storage).
- All machined surfaces shall be protected from mechanical damage. All external unfinished carbon steel surfaces shall be sand blasted & shall be coated with rust preventive primer.
- Flanged opening if any shall be covered with blank flanges sealed with blank gasket of natural rubber or equivalent. Butt welded opening shall be closed with temporary closing covers. Internal threads shall be protected with metal plug sealed with Teflon tape (if applicable). External thread shall be protected with PVC sleeve.
- Wooden cases shall be covered with HDPE cloth from inside wooden box and the top. All the opening in plate heat exchanger shall be closed properly by suitably covering to prevent foreign material entering in plate heat exchanger.
- Loose material, primary and secondary a shall be packed in corrugated box and plastic
  bags with proper tagging.
- All fabricated wooden cases & crates conform to the requirement as per table given below:

Gross Weight [Kgs.]	Board Thickness	Batton / Rafter Thickness
2000 to 9000	Min. 30 mm	Min. 35 mm

9000 to 18000	Min. 50 mm	Min. 35 mm

- All the equipment shall be protected for entire period of dispatch, storage and erection against corrosion, incidental damage due to vermin, sunlight, rain, high temperature, humid atmosphere, rough handling in transit and storage. All MS parts which are not painted shall be provided with coating of grease.
- Clay Desiccant or such other moisture absorbing material in small cotton bags shall be placed and tied at various points on the equipment, wherever necessary.

4. Special tools and Spare parts:

Special tools and tackles and spares shall be packed separately with adequate identification. Such packages shall be identified as Tools/Commissioning/Operational spares.

5. Preservation

The equipment's shall be stored under closed/open space in packed condition until installation. The packages containing loose plates and gaskets are to be protected from extreme climatic conditions.

	TITLE : TECHNICAL SPECIFICATION FOR PLATE HEAT EXCHANGERS	SPECIFICATION NO. PE-TS-445-179-N001	
		SECTION III	
		REV. NO. 00	DATE 25/11/2021

SECTION III

IIIA COMPLIANCE CERTIFICATE (TO BE SUBMITTED BY BIDDER DURING TENDER STAGE).

IIIB GUARANTEE SCHDULE (TO BE SUBMITTED BY BIDDER DURING TENDER STAGE).

IIIC DATASHEET –B FORMAT (TO BE SUBMITTED BY SUCESSFUL BIDDER AFTER AWARD OF CONTRACT).

	TITLE :	SPECIFICATION NO. PE-TS-445-179-N001	
	TECHNICAL SPECIFICATION		
	FOR	SECTION IIIA	
	PLATE HEAT EXCHANGERS	REV. NO. 00	DATE 25/11/2021

COMPLIANCE CERTIFICATE

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

a.) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions/ deviations with regard to same.

b.) QP/ test procedures shall be submitted in the event of order based on the guidelines given in the specification & QP enclosed therein.
QP will be subject to BHEL/Customer approval in the event of order & customer hold points for inspection/ testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc.
The charges for 3rd party inspection (Lloyds, TUV or equivalent) for imported components shall be included in the base price of the equipment by the bidder.

c.) All drawings/data – sheets etc. to be submitted during contract shall be subject to BHEL/Customer review/ approval.
GA drawings, as submitted with offer at tender stage are for reference purpose only and shall be subject to approval during contract stage.

d.) There are no other deviations with respect to specification other than those furnished in the 'Schedule of Deviations'

e.) The offered materials shall be either equivalent or superior to those specified. Also for components where material is not specified it shall be suitable for intended duty, materials shall be subject to approval in the event of order.

f.) The commissioning spares (if any) are supplied on 'As Required Basis' & prices for same included in the base price (If bidders reply to this is "No commissioning spares are required" and if some spares are actually required during commissioning same shall be supplied by bidder without any cost to BHEL).

g.) All sub vendors shall be subject to BHEL/CUSTOMER approval.

h.) Any special tools & tackles, if required, shall be in bidder's scope.

i.) Performance Guarantees for PHE's shall stand valid as per commercial terms and conditions.

j.) Regarding bidder's association with their respective Principals (Plate & Gasket supplier) bidder confirms the following:

i. Plate supplier shall vet the thermal design of PHE at tender and contract stage and certify the adequacy of design and number of plates.
ii. Guarantee schedule duly vetted by Principal shall be submitted during contract stage.
iii. Bidders have back to back arrangement with their principal for technical guarantees.

	SCHEDULE OF PERFORMANCE GUARANTEES	SPECIFICATION NO.	PE-TS-445-179-N001
		Section	IIIB
	PLATE HEAT EXCHANGER	Rev No.	00

SL. NO.	DESCRIPTION	UNIT	GUARANTEE VALUE	GUARANTEE VALUE
			PHE FOR TG AUX.	**PHE FOR SG AUX.**
1.0	**PRIMARY SIDE (HOT WATER SIDE)**			
	CLEAN CONDITION			
a)	Flow rate	M^3/Hr.		
b)	DMCW inlet temperature	^oC		
c)	DMCW outlet temperature	^oC		
d)	Pressure drop	MWC		
2.0	**SECONDARY SIDE (COLD WATER SIDE)**			
	CLEAN CONDITION			
a)	Flow rate	M^3/Hr.		
b)	ACW inlet temperature	^oC		
c)	ACW outlet temperature	^oC		
d)	Pressure drop	MWC		
3.0	**PRIMARY SIDE (HOT WATER SIDE)**			
	FOULED CONDITION			
a)	Flow rate	M^3/Hr.		
b)	DMCW inlet temperature	^oC		
c)	DMCW outlet temperature	^oC		
d)	Pressure drop	MWC		
4.0	**SECONDARY SIDE (COLD WATER SIDE)**			
	FOULED CONDITION			
a)	Flow rate	M^3/Hr.		
b)	ACW inlet temperature	^oC		
c)	ACW outlet temperature	^oC		
d)	Pressure drop	MWC		

PARTICULARS OF BIDDER/ AUTHORISED REPRESENTATIVE	
NAME	
SIGNATURE	
DATE	

	Title **DATA SHEET - B**	SPECIFICATION NO. PE-TS-445-179-N001
BHEL	**PLATE HEAT EXCHANGER**	VOLUME **III** SECTION **B**
		SHEET 1 OF 7

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PE-TS-445-179-N001, Rev-00, Section – IA & IB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT	PARTICULARS	
1.0	**General**			
1.1	Number of plate heat exchangers being supplied.	Nos.		
1.2	Manufacturer			
1.3	Model Number/ Type			
1.4	Whether single or double pass			
1.5	Flow Pattern			
2.0	**Design**			
2.1	Design Pressure	bar (g)		
2.2	Design Temperature	^oC		
2.3	Heat Load(without LMTD correction)	KW		
2.4	Heat Load(with LMTD correction)	KW		
2.5	LMTD (Corrected)	^oC		
3.0	**Guaranteed Performance for Each Heat Exchanger (in fouled condition)**		**Primary Side (Hot Fluid)**	**Secondary Side (Cold Fluid)**
3.1	Flow rate	M^3/hr		
3.2	Inlet temperature	^oC		
3.3	Outlet temperature	^oC		
3.4	Total pressure drop across heat exchanger from inlet to outlet(including inlet & outlet nozzles) a) For design flow b) For 110% design flow rate	bar		
4.0	**Heat Transfer & Fluid flow data**		**Primary Side (Hot Fluid)**	**Secondary Side (Cold Fluid)**
4.1	Film heat transfer co-efficient	$KCal/hrM^2\ ^oC$		
4.2	Fouling factor	$M^2hr\ ^oC/KCal$		

Name of Bidder/ Vendor

Revision Number	0	1	2	3	4
Signature of Bidder/ Vendor Authorised Representative					
Date :					

568972/2021/PS-PEM-MSE

	Title **DATA SHEET - B**	SPECIFICATION NO. PE-TS-445-179-N001
BHEL	**PLATE HEAT EXCHANGER**	VOLUME **III** SECTION **B**
		SHEET 2 OF 7

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PE-TS-445-179-N001, Rev-00, Section – IA & IB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT	PARTICULARS
4.3	Overall fouling	M^2 hr^oC/KCal	
4.4	Overall heat transfer coefficient	KCal/hrM^2 ^oC	
	a) In clean conditions		
	b) In fouled conditions		
4.5	Total effective heat transfer area per heat exchanger	M^2	
4.6	Average velocity	m/s	
	a) Through ports		
	b) Through Plate Channels		
4.7	Pressure drop in ports	bar	
4.8	Pressure drop in channels	bar	
4.9	Maximum differential pressure between hot and cold fluids in plate channels (operating)	bar (g)	
5.0	**Heat Transfer Plates**		
5.1	Area of each plate	M^2	
5.2	Dimension (width x height)	mm x mm	
5.3	Thickness	mm	
5.4	Material & chemical composition		
5.5	Number of plates per heat exchanger	Nos.	
5.6	Maximum number of plates that can be accommodated in the heat exchanger frame	Nos.	
5.7	Type of corrugation		
5.8	Minimum plate pack length	mm	

Name of Bidder/ Vendor					
Revision Number	**0**	**1**	**2**	**3**	**4**
Signature of Bidder/ Vendor Authorised Representative					
Date :					

568972/2021/PS-PEM-MSE

	Title **DATA SHEET - B**	SPECIFICATION NO. PE-TS-445-179-N001
BHEL	**PLATE HEAT EXCHANGER**	VOLUME **III** SECTION **B**
		SHEET 3 OF 7

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PE-TS-445-179-N001, Rev-00, Section – IA & IB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT	PARTICULARS
	a) As per 5.5 above b) As per 5.6 above		
	Maximum plate pack length	mm	
	a) As per 5.5 above b) As per 5.6 above		
5.9	Average spacing between two plates	mm	
5.10	Hold up volume of each passage	M^3	
5.11	Port size (diameter)	mm	
6.0	**Plate Gaskets**		
6.1	Type		
6.2	Material and composition		
6.3	Thickness of gasket	mm	
6.4	Hardness of gasket		
6.5	Expected life of gasket		
7.0	**Carrying Bar**		
7.1	Type of construction		
7.2	Number per heat exchanger		
7.3	Size		
7.4	Material		
8.0	**Guide Bar**		
8.1	Type of construction		
8.2	Number per heat exchanger		
8.3	Size		
8.4	Material		
9.0	**Frame Plate**		

Name of Bidder/ Vendor					
Revision Number	**0**	**1**	**2**	**3**	**4**
Signature of Bidder/ Vendor Authorised Representative					
Date :					

568972/2021/PS-PEM-MSE

	Title **DATA SHEET - B**	SPECIFICATION NO. PE-TS-445-179-N001
BHEL	**PLATE HEAT EXCHANGER**	VOLUME **III** SECTION **B**
		SHEET 4 OF 7

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PE-TS-445-179-N001, Rev-00, Section – IA & IB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT	PARTICULARS	
9.1	Type of Construction			
9.2	Material			
10.0	**Pressure Plate**			
10.1	Type of construction			
10.2	Material			
11.0	**Supporting Columns**			
11.1	Type of Construction			
11.2	Material			
12.0	**Clamping/Gasket Compression Arrangement**			
12.1	Type of arrangement			
12.2	Tie Rod size & material (Length to take care 25% extra plates)			
12.3	Tie Rod Nuts size & material			
12.4	Nozzle flange stud size & material			
12.5	Nozzle flange Nut size & material			
13.0	**Inlet & outlet Connection Nozzles**		**Primary Side (Hot Fluid)**	**Secondary Side (Cold Fluid)**
13.1	Size	mm		
13.2	Rating			
13.3	Facing & drilling standard			
13.4	Flange material			
13.5	Are all nozzles counter-flanges, bolts, nuts, gaskets etc., are included in the		YES/NO	

Name of Bidder/ Vendor					
Revision Number	**0**	**1**	**2**	**3**	**4**
Signature of Bidder/ Vendor Authorised Representative					
Date :					

	Title **DATA SHEET - B**	SPECIFICATION NO. PE-TS-445-179-N001
BHEL	**PLATE HEAT EXCHANGER**	VOLUME **III** SECTION **B**
		SHEET 5 OF 7

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PE-TS-445-179-N001, Rev-00, Section – IA & IB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT	PARTICULARS
	offer?		
14.0	Recommended Cleaning frequency of the heat exchanger for assumed fouling factor	Months	
15.0	Is backwash necessary		YES/NO
16.0	Are all auxiliaries and accessories included in the offer		YES/NO
17.0	Are all counter-flanges with nuts, bolts and gaskets for all terminal points included in the offer?		YES/ NO
18.0	Are all heat exchangers supplied with necessary foundation plates, anchor, bolts, sleeves, inserts, lifting lugs etc., as specified.		YES/ NO
19.0	**Shop Tests & Inspection**		
19.1	Whether all the tests and inspections as detailed in the specification/ quality plan are carried out		YES/ NO
19.2	Hydrostatic Test :		
	a) Test Pressure	bar (g)	
	b) Test duration	min.	
19.3	Are all plates checked for cracks and other defects by the penetration method?		YES/NO

Name of Bidder/ Vendor					
Revision Number	**0**	**1**	**2**	**3**	**4**
Signature of Bidder/ Vendor Authorised Representative					
Date :					

568972/2021/PS-PEM-MSE

	Title **DATA SHEET - B**	SPECIFICATION NO. PE-TS-445-179-N001
BHEL	**PLATE HEAT EXCHANGER**	VOLUME **III** SECTION **B**
		SHEET 6 OF 7

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PE-TS-445-179-N001, Rev-00, Section – IA & IB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT	PARTICULARS
	If not, what percentage is checked?		
19.4	Is hardness test conducted for plate gaskets?		YES/NO
20.0	**Details of Painting**		
20.1	***Exterior surface*** a) Surface preparation b) Primer c) Finish Preparation		
20.2	***Interior Surface*** a) Surface preparation b) Primer c) Finish Preparation		
21.0	Weight of each heat exchanger a) Empty b) Flooded Flooded Weight of heat exchanger with Max. Plates	kg.	
22.0	Overall dimensions - (Length x Breadth x Height)	mm x mm x mm	
23.0	withdrawal space		
24.0	Recommended Maintenance tools and tackles furnished		Yes/No

Name of Bidder/ Vendor					
Revision Number	**0**	**1**	**2**	**3**	**4**
Signature of Bidder/ Vendor Authorised Representative					
Date :					

568972/2021/PS-PEM-MSE

	Title **DATA SHEET - B**	SPECIFICATION NO. PE-TS-445-179-N001
BHEL	**PLATE HEAT EXCHANGER**	VOLUME **III** SECTION **B**
		SHEET 7 OF 7

INSTRUCTION TO BIDDER

1. This data sheet shall be read in conjunction with Specification No. PE-TS-445-179-N001, Rev-00, Section – IA & IB.
2. Items which deviate from Specification shall be marked with an asterisk (*)

SL.NO.	ITEM	UNIT	PARTICULARS
25.0	Mesh Size of recommended Strainer	mm	
26.0	Foundation nuts and bolts supplied		Yes/No
27.0	Other information (if any)		

Name of Bidder/ Vendor					
Revision Number	**0**	**1**	**2**	**3**	**4**
Signature of Bidder/ Vendor Authorised Representative					
Date :					

PEM/PG-I BHEL, NOIDA
SPECIAL CONDITIONS OF CONTRACT (REV.00) DATED 28-04-2021
1X 660 MW SAGARDIGHI TPP EXTENSION UNIT 5

These Conditions shall be read and construed along with General Condition of Contract enclosed along with the tender enquiry. In case of any conflict or inconsistency, the condition given in special condition of contract shall prevail over the general condition of the contract and its corrigenda, if any.

1.0	**Project Name**	:	Sagardighi Thermal Power Extension Project Phase- III, Unit 5 [1X660MW, Supercritical]
2.0	**Customer**	:	West Bengal Power Development Corporation Limited.
3.0	**Consignee-Ship to Address {to be mentioned in LR/RR, consignment note}**		Construction Manager-BHEL Site office Unit-V Sagardighi Thermal Power Project P.O. Manigram, District - Murshidabad, PIN:742237, West Bengal, India
4.0	**Consignee/Buyer's Name (Bill To)** **To be mentioned in Supplier's Invoice**		For Supply Packages: (Purchase order by BHEL-PEM): Bharat Heavy Electricals Limited Power Sector – Project Engineering Management PPEI Building, Plot No.25, Sector-16A, Noida-201301 (Uttar Pradesh) GSTIN No. – 09AAACB4146P2ZC For Turnkey Packages: (LOA by BHEL-PEM and PO by BHEL-PSER, Sagardighi site): Construction manager, BHEL Site office, 1X660 MW WBPDCL SAGARDIGHI TPP EXTENSION UNIT 5 P.O. Manigram, District - Murshidabad, PIN:742237, West Bengal, India BHEL PSER GSTIN No.- 19AAACB4146P1ZC
5.0	**BHEL Site Office Address**	:	Construction Manager BHEL site office Unit-V Sagardighi Thermal Power Project P.O. Manigram, District - Murshidabad, PIN:742237, West Bengal, India
6.0	**Customer Address**	:	Deputy General Manager (I/C projects) Sagardighi Thermal Power Project P.O. Manigram, District - Murshidabad, PIN:742237, West Bengal, India
7.0	**Mode of Dispatch**	:	By Rail/Road on Door Delivery and freight Pre-Paid Basis. Nearest Railway Station :- Manigram
8.0	**Road Permit/Way Bill Required**	:	Yes. Supplier to generate the e-waybill at their end and furnish the scanned copy of e-waybill along with dispatch document to BHEL immediately on dispatch. In case of default, supplier shall be held responsible.
9.0	**Project Consultant**		DCPL
10.0	**Material Inspection Procedure**		All equipment's/items under inspection category shall be sub categorized as follows: CAT-A: QAP will be submitted to WBPDCL / DCPL for approval. Inspection activities will be jointly witnessed by BHEL QC / TPIA and WBPDCL/TPIA of WBPDCL as per approved QAP witness/hold points. CAT-B: QAP will be submitted to WBPDCL / DCPL for approval. Inspection shall be carried out by BHEL QC/TPIA only. CAT-C: These are non QAP items and shall be accepted by BHEL QC/ TPIA on the basis of review of manufacturer's test certificate / certificate of compliance (COC) / internal

inspection report/ guarantee certificate etc. issued by the equipment manufacturer itself confirming all the technical and contractual requirements. For these items, submission of QAP and approval by WBPDCL are not envisaged. However, quality of these items must be ensured through respective BHEL QC.

Vendor to give five (05) days advance notice for stage inspection and ten (10) days for final inspection.

Details for Inspection procedure involving the TPIA shall be intimated later by BHEL/ WBPDCL.

11.0	**Clearance for Dispatch of materials**		MDCC will be issued by BHEL/WBPDCL.
12.0	**Prior Dispatch intimation to BHEL Site Office and Underwriters**		YES NOTE :- One set consisting dispatch documents indicating the items dispatched (with their gross and net weights) and after informing the underwriters about the value of consignment and dispatch details to be sent to following a) BHEL Site Office b) BHEL- PEM, PPEI - Noida(U.P) c) Insurance Co. It is Vendor's responsibility to ensure availability of trucks well in advance where consignment will require more number of trucks to be deployed for dispatch. No concession for non-availability of trucks, after having given dispatch clearance shall be admissible.
13.0	**Transit Insurance**	:	By BHEL (vendor to intimate the underwriters quoting the insurance policy no. as below)
14.0	**Insurance Policy No. For intimation to Underwriters (Contact Person)**	:	Policy details and number shall be informed later
15.0	**a. Customer GST No.**	:	19AABCT3027C1ZQ
	b. BHEL-PEM GST No.	:	09AAACB4146P2ZC
	c. BHEL PSER GST No.	:	19AAACB4146P1ZC
16.0	**Unloading at site**	:	BY BHEL site for supply packages. (The supplier shall give LR wise Gross Wt. Of the consignment for the purpose of handling the consignment by BHEL site loading/unloading Contractor.) By Vendor for turnkey packages (Scope consists of supply and Erection & Commissioning). NOTE: - Please note that unloading of materials at site shall take at least 3-4 days. As such, transporters to be advised suitably before dispatch of materials in this regard. Also, no claim on a/c of delay in unloading shall be entertained.
17.0	**Storage and handling at site**	:	By BHEL site for supply packages By Vendor for Turnkey packages* (Scope consists of supply and Erection & Commissioning).

*Any shortages or damages during unloading and handling at site, including at the time of erection and commissioning, shall be made good by the Seller/ Contractor at his risk and cost, to meet the project schedule. In case of faults/ discrepancies in any material, component, sub-assembly, assembly, etc., the same shall be supplied/ replenished free of cost to enable the equipment to be put to service.

18.0 **Movement of Material within Site** : By BHEL/BHEL appointed agency for supply packages
By Vendor for Turnkey packages Scope consists of supply and Erection & Commissioning).
No movement of loose materials shall be allowed. Items are to be properly packed to ensure proper and safe transportation & storage at site.

19.0 **Paying Authority** : For packages where PEM will issue the Purchase Order: BHEL PEM will be the paying authority.
For packages where PEM will issue only the LOA and Purchase Order shall be issued by PSER: BHEL Sagardighi Site /PSER will be the paying Authority.

20.0 **Documents Required (for supply + freight payment)** : Original + 2 Copies of the following documents: -

1. Invoice checklist duly signed and stamped
2. Invoice
3. Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes original/ copy)
4. Packing List – Clearly showing number of packages, gross weight net weight.
5. Copy of BHEL MDCC
6. Guarantee Certificates as per GCC.
7. Copy of insurance Intimation.
8. PVC Calculation, and copy of all applicable indices, if PVC applicable as per NIT
9. Transporters document indicating the freight amount
10. Document as proof of Declaration by supplier that GST payment has been made on GST portal to be submitted for GST claim.
11. For claiming PVC if applicable as per NIT, invoice to be submitted on PO unit rates and PVC to be claimed as separate debit/credit note. The debit/ credit note to be submitted along with the main invoice.

21.0 **Documents Required (for MRC payment)** Original + 2 Copies of the following documents:-

a. Invoice
b. Copy of MRC
c. Proof of submission of final documents (6 sets)
d. O&M Manuals (2CD's + 15 Hardcopies)

NOTE:-
1. Customer or his representative will be involved for inspection as per approved Quality Plan.
2. MDCC will be issued by BHEL in line with approved BBU.
3. The supplier during inspection of Main supplies & Mandatory Spares by BHEL/BHEL TPIA, WBPDCL/WBPDCL-Nominee shall obtain separate MDCC for Main Supplies & Separate MDCC for Mandatory Spares in line with the approved Billing Break Up.
4. It is deemed that copy of complete set of dispatch documents along with necessary TCs will be submitted to BHEL on the date of dispatch.

22.0 **Material Certificate(MRC)** : Responsibility to obtain MRC from customer at site
a) For Supply Packages:- For supply packages BHEL- PEM will arrange MRC from BHEL Site. However supplier/contractor shall provide support for verification of material at site, if required.
b) For Turnkey Packages:- By Vendor, where Supply/ Erection and commissioning is under Vendor's scope.

23.0 **Dispatch markings** : Each box shall be marked with Capital Letters in "Red" indicating : Main Supply OR Commissioning spare OR Mandatory Spare for 1X 660 MW SAGARDIGHI TPP EXTENSION UNIT 5, P.O. Manigram, District - Murshidabad, PIN:742237, West Bengal, India
Each package/Drum delivered under the Contract shall be marked by Supplier as per details listed below and such marking must be distinct and in English Language (all previous irrelevant markings being carefully obliterated) for purposes of identification.
Each and every box(package) shall be marked with following:-
1) Name and address of the consignee.
2) Project Reference.
3) Name of Supplier
4) P.O. reference no. along with package name.
5) Packing No. (1/10, 2/10, 3/10 when there are 10 packages for one consignment)
6) The Gross weight and net weight of the package.
Besides above necessary, packing shall bear a special marking "TOP", "BOTTOM", "DO NOT TURN OVER", "DEEP DRY", "HANDLE WITH CARE", etc.
IMPORTANT

- Two copies of respective standard manufacturer's erection instruction /operation manual shall be provided for immediate reference by BHEL site.

The Copy of complete Packing list for the consignment must be put inside the Box/Boxes.
12 copies of supplier's Erection/ Instruction manuals to be given to the BHEL, PEM, PPEI-Noida and 3 copies to BHEL, PSER, Sagardighi site within 30 days of dispatch for handing over to Customer/BHEL site.

Items like pumps, Valves, Hoists, Cranes, etc. shall essentially have O&M Manuals and E&C guidelines duly enclosed in the packing box.

24.0 **Commissioning Spares** **:** The commissioning spares shall be properly packed separately in separate box and each spare shall be properly tagged giving details i.e. dispatch (to match the description given in the packing slip) to facilitate their proper identification. One Copy of Packing list must be put inside the Box.

25.0 **Mandatory Spares** **:** Supplies of spares will be separate from main supply and separate manufacturing clearance shall be given for mandatory spares. The Mandatory spares shall be properly packed separately in separate boxes & boxes should be painted in red indicating Mandatory Spares in bold letters and each spare shall be properly tagged giving details i.e. item number of the equipment in line with the WBPDCL approved BBU for Mandatory spares & Number per item (to match the description given in the packing slip) to facilitate their proper identification by ultimate customer M/s WBPDCL. One Copy of Packing List must be put inside the BOX along with Manufacturing drawing no. reference, Catalogue reference etc.

Note :- MDCC for mandatory Spares shall be issued only after receipt of detailed list of mandatory spares & photographs before final packing clearly showing mandatory spares with due tagging as per packing list (to be sent over mail/CD). Separate dispatch clearance will be issued for the mandatory spares in line with availability of customer's stores at site.

26.0 Statutory Clearance and License (For turnkey packages) : Bidder has to arrange and obtain all statutory clearances and required licenses at their own cost without any financial implication on BHEL.

27.0 Health, Safety and Environment (HSE) (For turnkey packages) : The bidder will comply with HSE (Health, Safety & Environment) requirements of BHEL and follow all applicable Operational Control Procedures (OCPs) within quoted rate/ price.
Refer Document Number: HSEP:14-SGD Rev.: 02, DATE: 01.09.2020. Refer Document

Title: Health, Safety and Environment Plan for Site Operation by Subcontractors for Sagardighi.

28.0 Responsibilities with regard to employment of Labour etc. (For turnkey packages)

: Recruitment of Local Labour:

Local labours shall be engaged for unskilled work. Preference may also be given for appointment of local people in semiskilled and skilled categories, if such suitable persons are available.

Labour Laws and Local Regulations:
The Contractor shall abide by the prevailing labour laws and shall have to obtain labour license from the appropriate authority as per the law at his cost and shall indemnify the Purchaser about his financial and other obligations arising out of labours/workers employed by him. On obtaining the labour license, the Contractor at appropriate time shall submit certified photocopy of the same to the Purchaser. The Contractor and its sub-contractor (s) shall possess valid PF & ESI Code.
Wages and Working Hours:
The Contractor shall pay rates of Wages and observe hours and conditions of labour not less favourable than those established for the trade or industry in the district where the work is carried out but not less than the applicable minimum wages or by machinery of negotiation or arbitration to which the parties are organizations of employers and trade union's representatives respectively of substantial proportions of the employers and workers engaged in the trade or industry in the district. In the absence of any rates of Wages, hours or conditions of labour so established the Contractor shall pay rates of wages and observe hours and conditions of labour which are not less favorable than the general levels of wages and hours and conditions observed by other contractor whose general circumstances in the trade or industry in which he is engaged are similar.

Contractor to furnish return of labour employed:
The Contractor shall, if required by the Engineer, deliver to the Engineer or to his office a return in such form and at such intervals as the Engineer may prescribe showing in detail category-wise number of classes of labour from time to time employed by the Contractor on the Site and such information respecting construction machinery as the Engineer may require.

The Contractor shall make his own arrangements for the engagement of all labour and provide on the Site in so far as the Contract otherwise provides, for the transport, housing, feeding and payment thereof.

The Contractor shall, so far as is reasonably practical, having regard to local conditions, provide on the Site, to the satisfaction of the Engineer an adequate supply of drinking and other water for the use of his staff and labour.

Other Requirements:

a) The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulation or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor, or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his sub-contractor(s), agents of employees.
b) The Contractor shall not give, barter or otherwise dispose of to any person or persons any arms or ammunition of any kind or permit the same as aforesaid.
c) The Contractor shall in all dealings with labour in his employment have a due regard to all recognized festivals, days of rest and religious or other customs.

d) In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local municipal or sanitary authorities for the purpose of dealing with and overcoming the same.
e) The Contractor shall at all times take all reasonable precautions to prevent any unlawful riotous or disorderly conduct by or amongst his employees and for the preservation of peace and protection of persons and property in the neighborhood of the Site against the same.
f) The Contractor shall be responsible for observance by his sub-contractor(s) of the foregoing provisions.

Contractor shall deploy only qualified and experienced engineers/ supervisors. They shall have professional approach in executing the work.

The contractor's supervisory staff shall execute the work in the most professional manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. They shall be responsible to ensure that the assembly and workmanship conform to dimensions and tolerances given in the drawings/instructions given by BHEL engineer from time to time.
The supervisory staff employed by the contractor shall ensure proper outturn of work and discipline on the part of the labour put on the job by the contractor. Also in general they should see that the works are carried out in a safe and proper manner and in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL or BHEL 's client.

If at any time, it is found that the contractor is not in a position to deploy the required engineers/supervisors/workmen due to any reason, BHEL shall have the option to make alternate arrangements at the contractor's risk and cost.

29.0 **Type of Project** Project Import Route (Non Mega)

30.0 **Taxes and duties** : i) Concessional Custom duty in line with the Essentiality certificate issued by customer shall be applicable for packages for which CIF content is available as per NIT.

ii) GST- CGST/SGST/IGST: as per GCC Rev 07 or further revisions of BHEL PEM GCC as applicable for the specific Tender enquiry.

iii) Vendor has to comply the BOCW norms as per details of activities noted vide relevant Annexure of NIT.

Information as per Annexure-1 shall be provided by supplier in the GST compliant invoice.

Vendor may collect TCS under section 206C(1H) of Income Tax Act,1961if applicable
In case, vendor collects TCS under section 206C(1H) of Income Tax Act,1961, following compliance is required.

a) TAN and PAN of vendor should appear in all invoices/claims. Copy of TAN /TCS registration is to be submitted.
b) Amount of TCS and Assessable value on which TCS has been calculated should be specified clearly in the invoice.
c) You shall be required to submit certificate of TCS in Form no. 270 within 15 days from the due date for furnishing the statement of tax collected at the source.

In case, you do not collect TCS under section 206C(1H) of Income Tax Act, 1961, following declaration is to be submitted alongwith each invoice: -

"I/We hereby declare that I/We are not required to collect TCS" under section 206C(1H) of Income Tax Act,1961, on this bill.
In event of failure to comply with the provisions of the Act, or proper certificate not issued, or if tax collected but not remitted to the Government, or for any other reason and thereby causing loss to BHEL, the same shall be recoverable from the vendor with applicable interest.
Vendor shall comply with all statutory amendment/notifications in this respect

31.0 **Construction power & Construction water**

Construction power shall be provided on free of charge. Construction water shall be provided free of cost. However, metering arrangement shall be established for measuring electricity & water consumption.

ANNEXURE -1 TO SCC

Excerpts from Chapter VI for compliance of GST Invoice as per Rule 46

TAX INVOICE, CREDIT AND DEBIT NOTES

46. Tax invoice.- Subject to rule 54, a tax invoice referred to in section 31 shall be issued by the registered person containing the following particulars, namely,-

(a) name, address and Goods and Services Tax Identification Number of the supplier;

(b) a consecutive serial number not exceeding sixteen characters, in one or multiple series, containing alphabets or numerals or special characters- hyphen or dash and slash symbolised as "-" and "/" respectively, and any combination thereof, unique for a financial year;

(c) date of its issue;

(d) name, address and Goods and Services Tax Identification Number or Unique Identity Number, if registered, of the recipient;

(e) name and address of the recipient and the address of delivery, along with the name of the State and its code, if such recipient is un-registered and where the value of the taxable supply is fifty thousand rupees or more;

(f) name and address of the recipient and the address of delivery, along with the name of the State and its code, if such recipient is un-registered and where the value of the taxable supply is less than fifty thousand rupees and the recipient requests that such details be recorded in the tax invoice;

(g) Harmonised System of Nomenclature code for goods or services;

(h) description of goods or services;

(i) quantity in case of goods and unit or Unique Quantity Code thereof;

(j) total value of supply of goods or services or both;

(k) taxable value of the supply of goods or services or both taking into account discount or abatement, if any;

(l) rate of tax (central tax, State tax, integrated tax, Union territory tax or cess);

(m) amount of tax charged in respect of taxable goods or services (central tax, State tax, integrated tax, Union territory tax or cess);

(n) place of supply along with the name of the State, in the case of a supply in the course of inter-State trade or commerce;

(o) address of delivery where the same is different from the place of supply;

(p) whether the tax is payable on reverse charge basis; and

(q) signature or digital signature of the supplier or his authorized representative:

(r) Quick Reference code, having embedded Invoice Reference Number (IRN) in it, in case invoice has been issued in the manner prescribed under sub-rule (4) of rule 48".

	PREPARED BY	CHECKED BY	REVIEWED BY	APPROVED BY
Name:	**TARUN ARYA**	**ASHUTOSH SHARMA**	**HASEEN AHMED**	**B. L. BEDI**
Designation	DY MANAGER /PEM (PG I)	DY MANAGER /PEM (PG I)	SR. MANAGER /PEM (PG I)	AGM(DH)/ PEM (PG I&II)
Signature				
Date				