



An ISO 9001
Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli-620 014, Tamil Nadu, India
Dept: MATERIALS MANAGEMENT/BOI

Annexure – A- Terms and Conditions

ACCEPTANCE OF TECHNO - COMMERCIAL TERMS AND CONDITIONS BY THE BIDDERS

Description of the Equipment:		Boiler Circulating Water Pump along with its Commissioning Spares, Special Tools, Mandatory Spares and Erection & Commissioning Support.
Projects		Sagardighi 1x660MW project
BHEL Tender No. & Date		1802100225 dated 10.12.2021
Name of the firm (Bidder)		:
Address		:
Contact details		<u>Contact person 1</u> Name: Designation: Office Phone: Mobile: e-mail: <u>Contact person 2</u> Name: Designation: Office Phone: Mobile: e-mail:
<i>To be filled by bidder</i>		
Sl. No.	Terms and conditions	Vendor's confirmation
1 (a)	Technical: Boiler Circulating Water Pump with Instrumentation along with its Commissioning Spares, Special Tools and Mandatory Spares as per the list of Specification covered in LIST OF ENCLOSURES TO SPECIFICATION FOR BOILER CIRCULATING WATER PUMP (Specification No. BCWP_SPEC_COVER) Main Supply: covered in Enquiry Sl. Nos. 10 to 140 Commissioning Spares: covered in Enquiry Sl. No. 150 Mandatory Spares: covered in Enquiry Sl. Nos. 160 to 240 Special tools: covered in Enquiry Sl. No. 250	
1 (c)	Quality Plan shall be submitted by bidder in line with the SQP attached with enquiry and any additional requirements applicable for the offered system. Supply shall be as per the quality plan approved by BHEL/end customer. IBR Form III-C to be submitted by supplier.	
1 (c)	Pre-qualification requirement (PQR): Offer shall be considered only if bidder is meeting Tender Prequalification requirement (Annexure-B). Vendor to comply with	

	Pre-Qualification requirement of the tender and submit along with their technical bid - the credentials and other documents as indicated in the PQR in the format prescribed. Otherwise their offer will get rejected.	
1 (d)	<p>Evaluation method The tender will be evaluated on total package basis. Evaluation shall be on total landed cost to BHEL on FOR destination basis. Currency of evaluation shall be INR. Rate quoted in Foreign currencies will be converted to INR by multiplying with the Exchange rate (SBI TT Selling rate) as on the technical bid opening date. If the date of opening happens to be a bank holiday, then the forex rate as on previous bank (SBI) working day shall be taken.</p>	
1 (e)	Vendor shall quote as per the enclosed price Schedule format only.	
1 (f)	Vendor offers will be considered for price bid opening subject to fulfilment of techno commercial suitability and sub vendor approval by end customer against each Package. Previous supply credentials shall be submitted by vendors for taking up for sub vendor approval by end customer.	
1 (g)	<p>Inspection by BHEL/ Customer. Inspection and testing requirements are to be carried out as per the specification and BHEL/ end customer approved QAP and all test certificates are to be submitted in complete set as indicated in our specification/QAP. In case of order, vendor to give the inspection notification for all witness test as per the QP for BHEL/end customer 60 days before date of inspection. HOT TYPE TEST: Vendor to quote mandatorily for hot type test charges for one pump. The price will be considered for calculating total cost to BHEL and arriving L1 vendor.</p>	
2 (a)	<p>Firm Price: The quoted / finalised rates shall be Firm till execution of the supplies. Offer with PVC clause will not be considered.</p>	
2 (b)	The Tender will be operated in two part bid system. One-part consisting of PQR, Technical bid with Commercial terms & conditions and other part is Price Bid. Based on the PQR compliance, technical suitability and sub vendor approval by end customer, vendors will be short-listed. The price Bid of short listed vendors will be opened on a suitable date with due intimation to vendors. Reverse Auction is not applicable for this tender.	
3 (a)	<p>Delivery term: Indigenous Suppliers The quote shall be on FOR Sagardighi project site basis inclusive of Packing, forwarding, Freight. Transit Insurance is under BHEL scope @0.12%. Import Supplier: Import vendors to submit offers on CFR (Cost & Freight), Chennai port</p>	

	(LILO – Liner in Liner Out) basis. Port of loading should be indicated without fail. Port of discharge should be Chennai.	
4 (a)	<p>Payment terms:</p> <p>Indigenous Supplier (Non MSE) Payment term is 100% direct payment after 60 days from the date of dispatch against site acknowledgement and against 10% PBG valid for the warranty period.</p> <p>Indigenous Supplier (MSE) Payment will be as per MSMED Act, 2006 against 10% PBG valid for the warranty period. Supplier quoting for MSME payment term should submit Udyam Registration Certificate along with Part-I bid.</p>	
4 (b)	<p>Import Supplier BHEL Payment term is 100% payment on CAD basis after 60 days from the date of receipt of documents, specified in PO, at BHEL bank against 10% PBG valid for the warranty period. Respective bank charges to respective account. If supplier insists for LC, only Usance LC with 60 days credit will be opened one month prior to material readiness, further loading @ 1.5% on the offered value will be considered. Hence supplier shall intimate the material readiness accordingly for opening of L.C. LC validity period will be 90 days and for any extension, applicable charges will be to supplier's account.</p>	
4 (b)	No deviation is permitted in payment term. Any deviation on the above term is liable for rejection.	
4 (c)	<p>Performance Bank Guarantee: BHEL require a performance Bank Guarantee for due performance of the items covered in the enquiry to a value of 10% of supply value covering the Guarantee/Warranty period. The PBG shall be in BHEL format (Format attached) which is to be opened in any one of the banks mentioned under List of Consortium Banks attachment. All banks charges shall be to vendor account only. Any deviation on PBG leads to rejection of offer.</p>	
5 (a)	<p>Liquidated damages (LD):</p> <p>a) Time is the essence of the contract.</p> <p>b) The ordered items shall be delivered as per the delivery period mentioned in the Purchase Order.</p> <p>c) In case the supplier supplies the ordered items beyond the delivery period specified, Liquidated Damages -LD - as detailed below will be levied from the supplier without prejudice to any other relief /compensation available to BHEL, Tiruchirapalli under any other condition of the contract/applicable legal provisions.</p> <p>d) Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order(PO) would make the supplier liable to an un-conditional LD at the rate of 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of Purchase order value.</p> <p>e) Any deviation from the above LD clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value).</p>	

	<p>f) Indigenous: For “FOR Delivery terms”, Lorry way bill date / e-way bill date whichever is later will be taken for LD calculation.</p> <p>g) Import: For CFR terms, BL date will be considered for LD calculation.</p> <p>h) Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers. Hence applicable GST shall also be recoverable from suppliers on LD amount. Debit note will be issued by BHEL for this amount, indicating the respective supply invoice number.</p>	
5(b)	In case of PO placements, drawings, data sheets, pump characteristic curves, test procedures and quality plan (for mechanical & electrical items separately) shall be submitted within 8 weeks from the date of PO as per the Annexure-V of specification- Document submission schedule.	
6 (a)	<p>Guarantee Period: We require a guarantee for equipment supplied, for a period of 48 months from the date of supply or 36 months from the date of commissioning, whichever is earlier.</p>	
6 (b)	<p>Repair & replacements: Within the guarantee period, vendor has to replace / rectify the defective/ damaged items on free of cost within a reasonable time of reporting from our end. All incidental charges like freight, insurance and customs duty are to your account only. The defective parts and components shall be collected by your Indian agent or / authorized person, only after completing the replacement / repairs. The defective parts / components will not be returned back to vendor works. If the supplier fails to replace / rectify the defective/ damaged items on free of cost within 30 days of reporting from our end, the same shall be treated as failure to execute the contract and actions as per the Guidelines for Suspension of Business Dealings with Suppliers /Contractors available in the webpage: http://www.bhel.com/vender_registration/vender.php. would be taken against such supplier.</p>	
6 (c)	<p>Guarantee / Warranty Period: No Deviation is permitted. If still vendor offered any deviation on the Guarantee / warranty period, it may lead to rejection of offer.</p>	
6 (d)	<p>Erection and Commissioning support: The price for Erection and Commissioning support needs to be mandatorily quoted by the seller. Rate shall be in terms of price per man-day for erection and commissioning support. If commissioning engineer is deputed from Indian office, then the payment will be released in INR only. Conversion of foreign currency to INR shall be as per clause 1(d). This service will be utilized by BHEL-site through Power sector regions. Separate PO will be released by BHEL-site through Power Sector regions to avail the vendor's supervision service. During this period, vendor should also ensure that motor cavity is filled as per correct vendor procedure of flushing fill and drain line and ensure that motor internal filter is not clogged before boiler</p>	

	<p>operation. All the expenses like to & fro charges, incidentals, boarding & lodging at site are to be borne depending upon the actual duration of erection and commissioning support availed, the payment will be paid by BHEL- Power Sector regions based on the vendor quoted amount (price per man-day). The price calculated for 14 days of erection and commissioning per pump will be considered for price comparison for arriving Total cost to BHEL.</p>	
<p>6(e)</p>	<p>Training of BHEL/ Customer engineers (optional): Vendor should submit an optional price for providing training to end customer & BHEL personnel at the works of BCW pump manufacturer for 5 man month period. The BHEL / Customer personnel will make their own travel / lodging / boarding arrangements. Depending upon the actual duration of training man months availed, the payment will be proportionately reduced on the vendor quoted amount (if period is lesser than 5 man months). Vendor to confirm this clause while quoting for training. However, the price quoted for training will not be considered for calculating Total Cost to BHEL and arriving L1 vendor</p>	
<p>7</p>	<p>Duty benefits for import vendors a) Whether PTA/ CEPA or any other agreement/treaty between respective Governments/Countries exists and the same is applicable for your supplies w.r.t this Enquired Items/tender. b) If yes, mention the Concessional Customs Duty (Such Duty Benefits) % c) Documentary proof for the applicable Concessional Customs Duty (eg. PTA/ CEPA or other agreement) shall be submitted along with the Part-1 bid. d) Relevant documents and details to avail the above concessional duty benefits by BHEL shall be submitted by the supplier along with dispatch documents. e) In the event of seller failing to provide appropriate documents along with dispatch documents for purchasers to avail disclosed concessional duty benefits in India, financial loss, so incurred, will be to the seller's account. Note: Evaluation of the Price bids will be based on the above details only and unless mentioned/furnished by the vendor, Customs Duty benefit will not be applied for evaluation purposes.</p>	<p>YES / NO SUBMITTED/NOT SUBMITTED CONFIRMED/NOT CONFIRMED CONFIRMED/NOT CONFIRMED</p>
<p>8</p>	<p>Risk purchase clause: a. In the event of any successful Tenderer's failure to fulfil any of the tender / Contract obligations including supply of whole or any part of the ordered items as per Contract / Agreement, BHEL has the right to terminate the contract and purchase from elsewhere, at the risk and cost of the defaulted supplier, either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated in the contract or if the same were not available, the best and nearest available substitute thereof. The supplier shall be liable for the additional expenditure/difference in Cost, if any,</p>	

	<p>including consequential losses which BHEL may sustain by reason of risk purchase in addition to the applicable LD as per the Purchase order/contract.</p> <p>b. The decision of BHEL with regard to the additional expenditure / difference in cost and consequential losses incurred by BHEL shall be final and binding on the supplier.</p> <p>c. The amount recoverable under risk purchase shall be recovered from the defaulted supplier in all or any of the following manners:</p> <ul style="list-style-type: none"> • from dues available in the form of Bills payable to defaulted supplier, SD, BGs against the same contract. • from the dues payable to defaulted supplier against other contracts in the same Region/Unit /any other region/unit. • In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted supplier. 	
9	<p>Suspension of Business Dealings:</p> <p>The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.</p> <p>If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India or does anything which is actionable under the Guidelines for Suspension of Business dealings, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on www. bhel.com and/or under applicable legal provisions. Guidelines for suspension of business dealings is available in the webpage.</p>	
10 (a)	<p>Delivery Period:</p> <p>For Main supply, Commissioning spares & Special tools:</p> <p>Delivery Period shall be later of the following:</p> <ul style="list-style-type: none"> • 4 months from the date of final document approval (GA drawing, data sheet, test procedure, Quality plan including motor cooler QP) OR • 12 months + hot type test time (if applicable) indicated by vendor in 10 (b) from the date of PO. Hot type test time will be applicable only if the hot type test is conducted. <p>For Mandatory Spares:</p> <p>Delivery Period shall be 52 weeks from the date of final document approval.</p> <p>Delivery period indicated above is without Hot type test.</p> <p>Material shall be dispatched after obtaining dispatch clearance from BHEL.</p>	

	A call on the requirement of Hot type test will be taken after the award of PO and will be intimated to supplier. In case of requirement of Hot Type test, separate instruction on time line will be intimated to supplier and the same shall be binding on the supplier.	
10(b)	Vendor to indicate time required for conducting Hot type test.	
11	Vendor to quote all the tools required for assembly, disassembly and maintenance. Vendor should not assume that certain tools are available locally. In case of problem arising during hydrotest/ assembly/maintenance at a later date due to non-availability of certain tools, it will be vendor's responsibility to solve it at no extra cost to BHEL (the list of special tools is not specified by us as it varies from vendor to vendor depending on the BCWP). Vendor to submit a complete list of required items with sizes like bolts, pullers, hydraulic torque wrenches with pump and with suitable sockets and extension bars, double wrenches, sockets, screw drivers, tapes etc., as applicable.	
12	Documents are to be submitted along with technical bid (Part-1) 01. Covering letter 02. Unpriced offer. 03. Documents mentioned in Cl. No. 3.6.5 of the specification (BWCP_MAIN SPEC) 04. Vendor Quality Plan 05. Third party non-disclosure agreement 06. Self-Certification as per Make In India clause 07. MSE Certificates (if applicable) 08. Filled up and signed Integrity Pact attached along with the enquiry Documents are to be submitted along with Price bid (Part-2) 01. Priced offer Note: All the pages of documents are to be signed and sealed by authorized signatory of the company/supplier. Any query during enquiry stage shall be replied within three days failing which offer may be rejected as non-responsive.	
13	Offer Validity: 120 days minimum from techno commercial bid opening (Part-1)	
14	O & M manuals: Detailed O&M manuals shall be furnished. Three soft copies of O&M manuals in (CD ROM) compact disc to be submitted. The submitted O&M instruction manuals should include instrumentation manuals in addition to pump and motor. One hard copy and one CD should be sent along with transit assembly to site directly.	
15	Kindly indicate the GST No of your Firm	
16	Kindly Indicate the HSN Code for all items	
17	Please indicate the applicable GST % (IGST)	
18.	Response to Tenders for Indigenous supplier will be entertained only if the vendor has a valid GST registration number which should clearly	

	have mentioned in the offer. If any specific exemption is available, a declaration with due supporting documents need to be furnished for considering the offer.	
19.	Supplier shall mention their GSTN registration number in all their invoices and invoices shall be in the format as specified/prescribed under GST laws. Invoices shall necessarily contain Invoice number (in case of multiple numbering system is being followed for billing like SAP invoice no, commercial invoice no etc., then the Invoice No which is linked/uploaded in GSTN network shall be clearly indicated), item description as per PO, Quantity, Rate, Value, applicable taxes with nomenclature (like IGST, SGST, CGST & UTGST) separately, HSN/ SAC Code, etc.	
20.	All invoices shall bear the HSN Code for each item separately (Harmonized System of Nomenclature)/ SAC code (Services Accounting Code).	
21.	Invoices will be processed only upon completion of statutory requirement and further subject to following: <ul style="list-style-type: none"> • Vendor declaring such invoice in Form GST ANX-1 • Receipt of Goods or Services and Tax invoice by BHEL 	
22.	As the continuous uploading of tax invoices in GSTN portal (in GST ANX-1) is available for all (i.e. both Small & Large) tax payers under proposed new GST Return System, all invoices raised on BHEL may be uploaded immediately in GST portal on despatch of material /rendering of services. The supplier shall ensure availability of Invoice in GST portal before submission of invoice to BHEL. Invoices will be admitted by BHEL only if the invoices are available in GSTN portal (in BHEL's GST ANX-2).	
23.	In case of discrepancy in the data uploaded by the supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note or debit note (details also to be uploaded in GSTN portal) for the shortages or rejections in the supplies or additional claims, within the calendar month informed by BHEL.	
24.	In cases where invoice details have been uploaded by the vendor but failed to remit the GST amount to GST Department (Form PMT-08 or Form GST RET-01 to be submitted) within stipulated time, then GST paid on the invoices pertaining to the month for which GST return not filed by the vendor will be recovered from the vendor along with the applicable interest (currently 24% p.a) and all subsequent bills of the vendor will not be processed till filing of the GST return by the vendor	
25.	In case GST credit is denied to BHEL due to non-receipt or delayed receipt of goods and/ or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount claimed in the invoice shall be disallowed to the vendor.	
26.	Where any GST liability arising on BHEL under Reverse Charge (RCM), the vendor has to submit the invoices to BHEL well within the timeline	

	prescribed in GST Law, to enable BHEL to discharge the GST liability. If there is a delay in submission of invoice by the vendor resulting in delayed payment of GST by BHEL along with Interest, then such Interest payable or paid shall be recovered from the vendor.	
27.	Under GST regime, BHEL has to discharge GST liability on LD recovered from suppliers/contracts. Hence applicable GST shall also be recoverable from suppliers/contractors on LD amount. For this Tax Invoice will be issued by BHEL indicating the respective supply invoice number.	
28.	GST TDS will be deducted as per Section 51 of CGST Act 2017 and in line with Notification 50/2018 – Central Tax dated 13.09.2018. GST TDS certificate which will be generated in GST portal subsequent to vendor accepting the TDS deduction in the GST portal, will be issued to the vendor.	
29.	A declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL	
30.	<p>MSE VENDOR:</p> <p><i>i. If L1 vendor is an MSE vendor entire project package will be ordered on L1 vendor.</i></p> <p><i>ii. If a Non MSE vendor is coming as L1, then L1 prices will be counteroffered on MSE vendor who is quoting price within the price band L1+15% and if they are agreeing, purchase order will be awarded for full/complete supply of total tendered value to MSE.</i></p> <p><i>iii. If more than one MSE vendors are available in the L1+15% price band then lowest of the MSE vendor will be selected for counteroffering. If lowest MSE vendor is not accepting it will be counteroffered to the next MSE vendor in the price band and so on.</i></p> <p><i>iv. Finally if none of the MSE vendor in the price band is not accepting it will be ordered on L1 non MSE vendor.</i></p> <p>Payment for MSE Indigenous vendors will be as per MSMED Act, 2006</p> <p>MSE suppliers can avail the intended benefits only if they submit along with the offer, attested/notarized copy of Udyam Registration certificate.</p> <p>Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry, in case of any deficiency in the above required documents or in case the documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal even if submitted earlier.</p>	

31.	<p><u>Make in India:</u> For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/ Non- Local supplier and purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 04.06.2020 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.</p> <p>The local supplier at the time of tender, bidding or solicitation shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.</p>	
32.	<p><u>General Packing Requirements for both indigenous & import vendors</u></p> <ul style="list-style-type: none"> • Pump, motor and heat exchanger should be shipped with glycol and water mixture filled to site. Dry preservation during transit is not acceptable. Vendor also to provide wet preservation procedure for short/ long time storage at site. • Packing should ensure the healthiness of the Equipment including all electrical Accessories which may be stored for longer period (up to 2 years) at Site conditions (open to atmosphere). • All openings (Fluid, Pneumatic & Electric) shall be firmly capped. • Items shall be packed in suitable enclosure (to prevent damage/rusting due to Seashore atmospheric conditions) from all four sides and also it should be covered with polythene to make it water proof. • Packing and struts shall be used to arrest rolling of items and to avoid transit damage. • Limit switches and such components shall be encapsulated properly with suitable material like Thermocol. • Suitable arrangement (lugs/hooks) for loading and unloading of the equipment in packed condition at site. <p><u>Additional Packing Requirements (for import vendors):</u></p> <ul style="list-style-type: none"> • Packing shall be sea worthy. 	
33.	<p><u>Conditions for Import Suppliers</u> The preferred shipment mode “Containerized Cargo or Break Bulk” shall be specified clearly in the offer.</p> <p><u>FOR CFR INCO TERMS – CONTAINERIZED CARGO</u></p> <ul style="list-style-type: none"> ○ For CFR terms, moved through CONTAINERS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis including extra charges, if any, like Container Imbalance Charges, Trade Imbalance charges or any other 	

charges payable to the Liner. No other charges other than the quoted Freight rate will be paid by BHEL excepting applicable Terminal Handling Charges, Container cleaning Charges, DO charges to Shipping Liner at Discharge Port. 14 FREE DAYS FOR Container detention shall be provided.

- In case of shipment through Containers on CFR basis, the BL should bear the endorsement that “14 free days for Container Detention is applicable”.

FOR BREAKBULK CARGO:

- For CFR terms, moved through BREAK BULK BASIS (Suppliers should clearly specify this in their offer) it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis.
- The materials will be Custom cleared from Port itself.

Important Information for Import Suppliers:

- Indian Customs has imposed a penalty on late filing of Bill of Entries (Air/Sea Shipments) by the importer. Bill of Entry is Required to be Filed Latest by the End of Day Preceding the Day (including Holidays) of Arrival of the Vessel for sea shipments and by the end of same day on arrival of air shipment. Penalty for not filing Bill of Entry within the specified time period is Rs.5000/- per day (for Initial 03 days) & Rs.10000/- per day (thereafter).
- The vendor should submit the Non-Negotiable Documents (Air Way Bill/Bill of Lading, Commercial Invoice, Packing List, Certificate of Origin, etc.) either by email or post/courier to BHEL well before the landing of cargo at final port of discharge, giving sufficient lead time for BHEL to process the procedures that are to be done before arrival of vessel at discharge port.
- Vendor will be held responsible for the penalty arises against the late filing of Bill Of entry due to:
 - a. Non availability of Non-Negotiable Documents (NNDs) before the cargo arrival
 - b. Discrepancy in documents
 - c.Short landing of Consignments (For shipments on CFR/CPT/CIF/CIP – Chennai Port)
- For all the shipments of the contracts (POs) finalized on CFR - Chennai Port basis:
 - (i) Delivery Orders involving multiple agencies like liners/freight forwarders are not allowed. There must be a single agency office at the final discharge Port (Chennai) for issuing the Delivery Order to BHEL.
 - (ii) The detention/demurrage charges arising due to the nomination of containers under single BL to different/ multiple CFS by the liner will be deducted from Vendor’s bills only.

(iii) The detention/demurrage charges arise due to the delay in collection of Delivery Orders from multiple agencies of liner/freight forwarder also whose offices are not at available Chennai, the same amount will be deducted from Vendor's bills only.

(iv) Apart from the normal charges like Terminal Handling Charges, Container cleaning Charges, Delivery Order Charges at final port of discharge no other charges will be borne by BHEL.

(v) The liner/freight forwarders should be properly communicated by the Vendor for not to claim such charges for issuing Delivery Order. If the liner/freight forwarder claims such charges in their invoices, the same amount will be deducted from the Vendor bills without any prior intimation in order to avoid the delay in Customs clearance. The likely additional/hidden costs or charges are:

- CIC - Container Imbalance Charges/Surcharges
- EIC - Equipment Imbalance Charge/Surcharges
- CAF - Container/Currency Adjustment Factor
- BAF - Bunker adjustment Factor
- RDS - Rupee Depreciation Surcharge
- CDS - Currency Depreciation Surcharge
- PCS - Port Congestion Surcharge
- LSS - Low Sulphur Surcharge
- Devanning Charges

Transport Conditions for Import:

The Original Documents (Bill of Lading, Invoice, Packing List, Certificate of Origin & Test Certificate) shall reach BHEL well in advance before the vessel arrival. The soft copies of the above shall be forwarded to BHEL immediately after shipment.

- 14 FREE DAYS for Container detention at final port of destination shall be provided and the same to be endorsed in the Bill of Lading. If there is no free day or less than 14 free days provided by the supplier, the actual cost incurred towards detention charges due to non-availability of above said free days will be recovered from the supplier Invoice.
- In the event of delayed submission of documents/ non-submission of documents by the supplier as per the mutually agreed terms, an amount up to 5% of the invoice value will be retained towards detention/ demurrage & other charges and the difference if any between actual charges and recovery will be settled separately through supplementary invoice.

	<ul style="list-style-type: none"> ○ In such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a “Surrender Bill of Lading”. ○ Otherwise, No-objection Certificate shall be issued to the Liner, authorizing BHEL to get the Delivery Order without producing the Original Bill of Lading. ○ This is required to ensure avoidance of detention/ demurrage at Chennai Sea-port that may arise in case of delayed presentation of documents by the Seller. 	
34.	<p><u>Fraud Prevention Policy</u> Bidder along with its associate /collaborators /sub-contractors /sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website http://www.bhel.com and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice.</p>	
35.	<p><u>Cartel Formation</u> All the firms should desist from forming cartel as the practice is prohibited under Section 3(3) (a) & (d) of the competition Act 2002. If any such instance is observed during this tender will attract disciplinary action as per BHEL policies. The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/guidelines.</p>	
36.	<p><u>Resolution of Disputes</u> The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the contract/tender which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof. Notes: 1. No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.</p>	

2. Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in Annexure X to this Terms and conditions.

The Annexure X together with its appendices will be treated as if the same is part and parcel hereof and shall be as effectual as if set out herein in this terms and conditions.

Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the parties, in respect of any dispute or difference; arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, then, either Party may, by a notice in writing to other Party refer such dispute or difference to sole arbitration of an arbitrator appointed as per the Arbitration and Conciliation Act, 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force.

The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties.

Subject as aforesaid, the provision of Arbitration & Conciliation Act 1996 (India) or statutory modification or re-enactment thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceeding under this clause.

The seat of arbitration shall be Trichy, Tamil Nadu, India

The cost of arbitration shall be borne as per the award of the Arbitrator.

Subject to arbitration in terms of clause above, the Courts at Trichy, Tamil Nadu, India shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.

Notwithstanding the existence or any dispute or difference and/or reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of its obligation under this Contract with due diligence and expedition in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

	<p><u>In Case of Contract with Public Sector Enterprise (PSE) or a Government Department, the following shall be applicable:</u></p> <p>In the event of any dispute or difference relating to the interpretation and application of the provisions of commercial contract(s) between Central Public Sector Enterprises (CPSEs)/Port Trusts inter se and also between CPSEs and Government Departments/Organizations (Excluding disputes concerning Railways, Income Tax, Customs & Excise Departments, such dispute or difference shall be taken up by either party for resolution through AMRCD as mentioned in DPE OM No. 4(1)/2013 –DPE (GM)/FTS-1835 dated 22-05-2018.</p>	
37.	<p><u>Force Majeure clause</u></p> <p>a. Notwithstanding the provisions contained in other clauses, the supplier shall not be liable for imposition of any such sanction so long the delay and/or failure of the supplier in fulfilling its obligations under the contract is the result of an event of Force Majeure. For purposes of this clause, Force Majeure means an event beyond the control of the supplier and not involving the supplier’s fault or negligence and which is not foreseeable and not brought about at the instance of the party claiming to be affected by such event and which has caused the non – performance or delay in performance. Such events may include, but are not restricted to, wars or revolutions, hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, quarantine restrictions, strikes excluding by its employees, lockouts excluding by its management, freight embargoes and Acts of GOD.</p> <p>b. If a Force Majeure situation arises, the supplier shall promptly notify the Purchaser/Consignee in writing of such conditions and the cause thereof within twenty-one days of occurrence of such event. Unless otherwise directed by the Purchaser/Consignee in writing, the supplier shall continue to perform its obligations under the contract as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.</p> <p>c. If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of Force Majeure for a period exceeding sixty days, either party may at its option terminate the contract without any financial repercussion on either side.</p> <p>d. In case due to a Force Majeure event the Purchaser/Consignee is unable to fulfil its contractual commitment and responsibility, the Purchaser/Consignee will notify the supplier accordingly and subsequent actions taken on similar lines described in above sub-paragraphs.</p>	
Note	<ol style="list-style-type: none"> 1. In the event of our customer order covering this tender being cancelled /placed on hold / otherwise modified, BHEL would be constrained to accordingly cancel / hold / modify the tender at any stage of execution. 2. BHEL may negotiate the L1 rate, if not meeting our budget / estimated cost. BHEL may re-float the tender opened, if L1 price is not acceptable to BHEL. Any deviation in specified commercial terms- Annexure-A, will lead to rejection of offer. 	

- | |
|--|
| <ol style="list-style-type: none">3. BHEL reserves its right to reject an offer due to unsatisfactory past performance by the respective Vendor in the execution of any contract to any BHEL project / Unit.4. Any other Techno –Commercial Terms indicated by the vendor in their offer elsewhere will be ignored. BHEL will proceed with tender evaluation as per Annexure-A only. |
|--|

Annexure-B

Project: Sagardighi1x660MW


Cust No: 1731

Qualification and proveness criteria requirement for Boiler Water circulating pump

Sl no	BHEL Requirements	Vendor Confirmation / document submission/
1.	<p>The bidder should have designed, engineered, manufactured and supplied pump rating not less than that supplied for a 500 MW or higher size super-critical boiler. Further, pump should be of Glandness pump with submerged type wet motor with external high pressure cooler as per the specification requirement and pump should have been in successful operation for a period of not less than 1 year as on the date of techno-commercial bid opening and the following condition to be met by bidder.</p> <p style="padding-left: 40px;">a) Vendor should have facility to perform HOT TYPE TEST at vendor works.</p>	Confirmed / Not confirmed
2.	<p>The supplier has to submit anyone of the following supporting documents meeting the above pre-qualifying requirement.</p> <p style="padding-left: 40px;">a) Copy of minimum one (1) performance certificate in English from end user along with copy of related PO/LOI/LOA/WO specifying that the product / equipment is running successfully for one (1) year from date of commissioning.</p> <p style="padding-left: 40px;">b) Minimum two PO/LOI/LOA/WO placed with a minimum gap of one (1) year from same purchaser.</p> <p style="padding-left: 40px;">c) Minimum three customer's/ third party's inspection reports/ test certificates/ commissioning certificates.</p>	Confirmed / Not confirmed Submitted / Not Submitted Submitted / Not Submitted Submitted / Not Submitted

Abbreviation:

(PO) - Purchase order, (LOI) –Letter of Intent, (LOA) - Letter of award, (WO) - Work order

	LIST OF ENCLOSURES TO SPECIFICATION FOR BOILER CIRCULATING WATER PUMP	SPECIFICATION NO.: BCWP_SPEC_COVER	
		SECTION : Boiler Mountings/PE(FB)	
		REV. NO. : 01	DATE: 23.03.2021
		PAGE NO : 1 OF 1	

PROJECT: SAGARDIGHI (1X660 MW)	MATERIAL CODE : L1731 1 24855 01 001 to 014
CUST. Nos. : 1731	

Sl.No.	Description	No. of Sheets
1.	Specification for BCW Pump	31
2.	Control and Instrumentation requirements of BCW Pump	3
3.	ANNEXURE-I Submerged motor pump design data of BCW Pump	3
4.	ANNEXURE-II General Technical Particulars for Motors of BCW Pump	6
5.	ANNEXURE-III Specification for Flow Rator of BCW Pump	1
6.	ANNEXURE-IV Temperature Sensing Elements of BCW Pump	1
7.	ANNEXURE-V- Document Submission Schedule for BCW PUMP	1
8.	ANNEXURE-VI- Specification for temperature & pressure gauges of BCW pump.	1
9.	TEMPERATURE GAUGE specification	4
10.	Check List for BCW Pump	3

Note: Deviations, if any on the specification will have to be brought to the notice of the purchaser along with the offer.

	PREPARED BY	CHECKED BY	APPROVED BY	VENDOR SEAL
SIGN. : NAME : DATE :	PRATEEK KUMAR JAIN 27.07.2021	GOPINATH R 27.07.2021	GUNASEKARAN. V 27.07.2021	SIGN: NAME: DATE:



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 1 OF 31

PROJECT : **SAGARDIGHI TPP, PHASE-III -1x660MW**
CUSTOMER : **M/s WBDCL**
CUSTOMER Nos. : **1731**
No. OF PUMPS / UNIT : **1**
TOTAL No. OF PUMPS : **1**
SERVICE : **FOR BOILER WATER CIRCULATING SYSTEM**
TYPE OF PUMP REQD : **GLANDLESS WET MOTOR**
No. OF PUMPS FOR
FULL LOAD WORKING : **1**

1.0 INSTRUCTIONS TO SUPPLIER

- 1.1 All documents listed in the Appendices of this specification are, by reference, to be considered part of this specification and must be complied with. If any discrepancies are there, it must be brought to our attention for a final decision.
- 1.2 Materials and equipment must be new and of proven design. Alternative designs shall be subject to BHEL's engineering approval.
- 1.3 Materials containing asbestos, RCF (refractory ceramic fibers), PCBs, mercury, lead-based paint or any other hazardous materials are not allowed.
- 1.4 All quotations and attachments submitted to BHEL shall be in the English language and in SI Metric only.
- 1.5 All quotations and inquiries to BHEL shall be routed through Purchasing.
- 1.6 Parts subject to wear, corrosion, deterioration or requiring adjustment, inspection or repair shall be accessible and capable of convenient removal, replacement, and repair.
- 1.7 **The Supplier shall complete and submit the Supplier data sheets and guarantees located in Sections 3.0 of this specification with the equipment offered in full conformance with the specification. All omissions or exceptions to the requirements of this specification must be included in the EXCEPTIONS TO THE SPECIFICATION portion of the Supplier data sheet(s). Without the completed data sheet(s) and the signed EXCEPTIONS TO THE SPECIFICATION sheet(s), the proposal will not be evaluated.**
- 1.8 The Supplier shall be governed by the following regulations, codes, and standards, including their respective addenda, amendments, and errata, as applicable. The governing documents used shall be the latest at the boiler water circulating pump PO date.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021


PAGE NO : 2 OF 31

AFBMA	Antifriction Bearing Manufacturers' Association
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ASME	American Society Mechanical Engineers
ASTM	American Society Testing and Materials
AWS	American Welding Society
HEI	Heat Exchanger Institute
HI	(American) Hydraulic Institute
IEC	International Electro technical Commission
IEEE	Institute of Electrical and Electronics Engineers
ISA	Instrumentation, Systems and Automation Society
MSS	Manufacturers Standardization Society of the Valve & Fittings Industry
NEMA	National Electrical Manufacturers' Association
NEC	National Electrical Code
NFPA	National Fire Protection Association
OSHA	Occupational Safety Health Act
PFI	Pipe Fitting Institute
SSPC	The Society for Protective Coatings
TEMA	Tubular Exchange Manufacturer's Association

2.0 EQUIPMENT FURNISHED BY SUPPLIER

Complete pump assemblies are required. Each pump shall include, but is not limited to, the following:

1. Pump Assembly
2. Lifting lugs for installing (or removal) of pump case and motor case.
3. Motor Assembly
4. Thermal barrier between high temperature pump casing and motor housing
5. ~~A terminal gland in each of 3 terminal boxes.~~ **Three terminal gland assembly in a single terminal box.**
6. High pressure inlet and outlet connections and mounting brackets to be provided on the motor housing for mounting an external motor cooler
7. Three (3) motor and Two (2) pump temperature measuring dual element (K) type thermo couples.
8. Tilting pad bearings shall be provided for the radial bearings.
9. One (1) lot of Special tools (including Stud tensioning Kit).
10. One (1) External Motor Cooler with one(1) spare set of gaskets per cooler
11. One (1) set of radiographic openings with plugs in the pump inlet and outlet nozzles.
12. Cover plate / Blind Flange for Hydro Test.
13. If heat barrier cooling is applicable, vendor to provide one temperature gauge as a loose item as per the specification requirement.
14. One Temperature indicator for motor cavity.

	SPECIFICATION FOR BOILER CIRCULATING WATER PUMP	SPECIFICATION NO.: BWCP_MAIN SPEC	
		SECTION: Boiler Mountings/PE (FB)	
		REV. NO.: 01	DATE: 23.03.2021
		PAGE NO : 3 OF 31	

3.0 PERFORMANCE DATA & TECHNICAL REQUIREMENTS - BWCP

Materials and construction of the pump pressure parts shall conform in all respects to the applicable requirements of ASME Boiler and Pressure Vessel Code, Section 1, Power Boiler, per the edition & addenda in effect on the code date specified in Section 1 (INSTRUCTIONS TO SUPPLIER) of this spec.



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 4 OF 31


DESIGN TABLE A

SGWC PUMP SELECTION DATA: SAGARIDGHI (1X660 MW)

Description	Unit	Ambient	Cold Start 80 Bar	Hot start 140 Bar	Hot start 160 Bar
No. of pumps operating	----	1	1	1	1
Separator pressure	kg/cm ² (g)	0.0	80.5	141.7	162.1
Elevation head	kg/cm ² (g)	5.29	3.94	3.39	3.19
Pump suction pressure	kg/cm ² (g)	4.33	83.18	143.59	163.69
Mixed water temp.	°C	100	295.0	337	347
Total pump head	kg/cm ² M	5.27 55	5.81 80.5	6.24 100.5	8.06 137.8
Calculated specific gravity	---	0.961	0.725	0.623	0.587
Design capacity	M ³ /hr	849	1126	1309	1390
Available NPSH	M	45.6	37.5	31.5	28.6
Minimum NPSH reqd. cold	M				
Minimum NPSH reqd. hot	M				
Pump Efficiency	%				
Power absorbed by pump-mechanical	KW				
Motor Efficiency	%				
Electrical Input to Motor	KW				
Power factor	%				
Combined efficiency	%				
Line current	Amps				
Motor cavity water flow to cooler	L /s				
Temp. Drop- HP cooling water	°C				
LP cooling water flow to cooler	L / s				
Temperature increase- LP cooling water to cooler	°C				
Losses removed by Motor cooler	KW				
LP cooling water flow to Heat Barrier	L / s				
Temperature increase- LP cooling water to Heat Barrier	°C				
Pressure drop of cooling water in Heat Barrier	kg/cm ²				

*** Must meet or exceed**

Pump offered should be suitable for all the flow conditions. Performance curves & vendor datasheets offered for pump should indicate Head developed by pump , NPSH required , shaft power input & efficiency for all the flow conditions at both hot and cold conditions . The motor performance curve & vendor datasheet should indicate Input KW , Line Amps , Speed , Power Factor and Efficiency in a single page with motor output KW on X axis. Similarly motor torque vs speed curve should have speed on X axis.

	SPECIFICATION FOR BOILER CIRCULATING WATER PUMP	SPECIFICATION NO.: BWCP_MAIN SPEC	
		SECTION: Boiler Mountings/PE (FB)	
		REV. NO.: 01	DATE: 23.03.2021
		PAGE NO : 5 OF 31	

NOTES:

1. The pump shall be capable of delivering 10% over required capacity at reduced head with the required NPSH. The pump shall also be capable of continuous operation in the above operating conditions.
2. Each piece of equipment where heat may be applied by preheating, welding or post heat treating shall be tagged by the Supplier giving all the necessary precautions to be observed to avoid damaging the component.

3.0.1 The Boiler Circulation System

The normal operation mode of a forced circulation boiler is called the once through mode. This operation mode applies to the load range from full load down to the minimum once through load, which is 35% BMCR for this project

In once through mode, the entire flow from the evaporator is directed to the super heater because the medium is slightly superheated. To assure the adequate cooling of the furnace tubes of the evaporator during start-up or in low load operation, a minimum flow rate of approximately 35% BMCR is required. At low load the water wall flow is therefore kept constant at a value corresponding to 35% BMCR. As a consequence wet conditions persist at the water separator and the saturated water is recirculated by means of the boiler circulation system.

At load 30% BMCR, for example, the evaporator will generate a saturated steam flow of 30% BMCR. Since the total evaporator flow is kept at 35% BMCR by the recirculating pump, a saturated water flow of 5% BMCR is directed into the separator and has to be recirculated by the boiler circulation system in addition to the 30% feed water flow.

3.0.2. Basic Level Control Concept

Normally the drain flow from the separator is recirculated via the boiler circulation pump (BCP) into the economizer, and control valve situated after the BCP is used for control of minimum flow requirements. The capacity of the BCP and the direct recirculation system is designed to accommodate the separator drain flow in normal low load operation. Especially during start-up larger amounts of water (swell flow) need be drained from the separator. For this purpose additional drain capacity is provided, dumping the excess water into the condenser flash tank. The respective control valves are situated near the condenser and open when the separator level exceeds a certain threshold lying above the normal set value. The boiler circulation pump is sized for boiler restart with up to 162.1Kg/ Sq.cm (g) separator pressure. The pump head has to overcome the pressure loss from economizer inlet to the water separator at a flow of 35% BMCR, which is the minimum evaporator flow.



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 6 OF 31

PERFORMANCE DESIGN CONDITIONS

Number of Pumps/boiler	1
Single Pump Outlet - degrees (if any) above Horizontal	By Supplier
Pump Outlet Type	Radial or Tangential – Supplier choice
Pump Design Pressure Kg/ Sq cm (g)	350.1
Pump Design Temperature °C	348
Pump Hydrostatic Test Pressure ⁽¹⁾ Kg/ Sq cm g	
Motor Housing Design Pressure Kg/ Sq cm g	350.1
Motor Housing Design Temperature °C	348
High Pressure Cooling Water	
Type of Connection	<input type="checkbox"/> Flange (STD) <input checked="" type="checkbox"/> Socket Weld
Design Condition Kg/ Sq cm g @ °C	350.1 Kg/ Sq cm g @ 177°C
Nozzle Connections and EP details.	
Suction Piping, mm	457 X 65, Style P ; d1=343.25 mm
Discharge Piping, mm	323.9 X 45, Style P ; d1=245.15mm

NOTES

1. Time of test will be 15 minutes for each 25 mm of minimum wall thickness, 10 minutes minimum.
2. Supplier must provide a calibration curve for measured ΔP vs. flow at radiographic taps in the pump inlet and outlet nozzles per Test A, Hydraulic Tests.
3. Supplier must provide pump head vs. capacity curves showing NPSH requirements, overall pump/motor efficiency and kilowatt input for each of the operating conditions listed.
4. Supplier must provide kilowatt input curves vs. motor efficiency, power factor, current and BHP for each of the operating conditions listed.
5. Supplier must provide current & torque curves vs. speed for the motor.
6. Supplier must provide current & thermal limits curves vs. time for the motor.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 7 OF 31

3.1 Performance Tests

The Purchaser and/or their agent shall have access to all phases of engineering, procurement, manufacturing, and testing of equipment covered by this specification. The Supplier shall provide the necessary documentation to satisfy that contract requirements have been met.

Test A : Hydraulic Tests

A complete hydraulic test with water at ambient temperature, at least 22°C, and at a low suction pressure shall be carried out on one (1) pump/motor unit to obtain complete performance characteristic curves. The required characteristics include head, NPSH, power input, and overall efficiency versus capacity. Overall efficiency shall be defined as being that of the complete pump/motor unit.

The Supplier shall include a calibration of differential pressure measured across the NB twenty five [25] mm radiographic openings in the pump inlet and outlet nozzles versus tested flow conditions. This data is required by the Purchaser for field setting of the pump differential switches.

Test B : Mechanical Tests

A mechanical run at a low pressure with water at ambient temperature, at least 22°C, shall be run on each of the remaining units of the order, if the order is for more than one pump. It is permissible to utilize the pump casing used in Test A to complete this series of tests.

Test C : Electrical Tests

The Supplier shall submit an outline of tests for Purchaser's approval.

3.2 Design Conditions and Criteria

The pump (BWCP) is used for maintenance of a minimum flow through the economizer and evaporator of a once through boiler. Above approximately 35 to 45% boiler load, the pump is shut-off. The BWCP is connected in the start-up circuit within the circulation system. In the start-up mode, during pump operation up to approximately 5% less than the finally determined shut-off point, the pump recirculates boiler water with a constant mass flow value, which is maintained by a control valve at the pump outlet. Above approximately 5% less than the shut-off point, the pump will operate in series with the boiler feed water pump. Above the shut-off point, the BWCP will be de-energized and be kept in a hot condition by means of a small bypass flow of feed water.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 8 OF 31

The pump is to be designed for the number and type of cycles shown under Table 3.3, Transient Fluid Temperature and Pressure Conditions.

The Supplier is expected, out of experience with similar plants, to advise the system designer of potential problems or possible improvements of the pump. In addition to designing the pump for the below mentioned transient pressure conditions, the Supplier shall choose only proven elements to create the design in order to assure its structural integrity. Material selections shall be made, carefully considering; local temperatures, strength, and weld ability.

3.2.1 Pump System

The pump shall be of vertical, centrifugal, inverted, wet motor type of proven design. The cooling of the motors and the bearings will be achieved by means of an internal water circulating system with an external cooler. If this becomes a contract, about the time a P.O. is issued per this spec, a guideline sketch will be made available to indicate the orientation of the pump discharge nozzle. Any other GA requirements known at that time will be included on the sketch.

The pump shall be designed to be suspended from the suction nozzle with the motor unit bolted to the underside of the pump case. If the order is for more than one pump, all pump motor units are to be interchangeable with each pump casing furnished. The pump cases are to be designed to withstand transient fluid and pressure conditions listed under the Transient Fluid Temperature and Pressure Conditions section.

The pump shall be suitable for hot stand-by conditions without impairing its performance. During hot stand-by conditions, the pump must be capable of continuously maintaining its hot stand-by condition without reaching or exceeding the Supplier's originally stated alarm temperature.

When a pump is held on stand-by, it will be kept hot by allowing water to bypass the pump valves. The pump shall be designed for this condition without damaging the pump parts in accordance with the instruction manual furnished by the Supplier. The instructions shall specify the maximum permissible temperature difference between the pump casing and boiler water for emergency starting.

The pump shall be suitable to be used to circulate a solution of inhibited acid (such as 5% solution of inhibited hydrochloric acid) approximately thirty minutes at times when the boiler is being acid cleaned, but probably not more than one (1) hour total time per year. The total exposed time to inhibited acid will probably not exceed ten (10) hours per year.

Because of the frequent temperature changes the pump housing must be of uniform and minimal wall thickness. Machining of the pump casing is recommended. High strength material is specified in order to reduce the wall thickness and so the thermal stresses.



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 9 OF 31

~~The pump casing may be from the cast body or forged and welded construction. The pump casing may be either to ASME Specification SA 216 WCB or of forged and welded construction of suitable material as per ASME Section I shall be a single piece forging. Cast body and Welded construction is not acceptable. The pump forge material shall be as per ASME section 1.~~

The pump casing including the motor housing shall be made of forged steel. When convenient for the design and fabrication single parts, i.e. line struts can be welded on the housing. The welding specification including heat treatment and test specifications have to be submitted to the Purchaser for review.

The circulating pump should be provided with an auxillary impeller to ensure circulation of cooled water to the shaft sleeves, bearings and motor parts while pumps are in service.

The pump should be free from cavitation even at the worst operating condition. The manufacturer should design the pump in such a way to have adequate margin on NPSH.

The various components of the pumps in the contract should have interchangeability of components for any emergency replacement, etc.

The rotor diameter must be minimum to avoid excess friction losses when rotating in water.

The bearing life shall be greater than 100,000 working hours.

Necessary provision shall be there in the pump design so that the wind milling effect of the pump when it is switched off and the system permits flow to pass through the pump can be avoided.

Suitable features in pump and motors to reduce the axial and radial thrust to be provided . Vendor to highlight features and submit along with offer.

Suitable design features and material of construction to reduce electrolytic action, corrosion , erosion and cavitation to be provided .

Pumps and motors shall be hermetically sealed.

10. Impellers shall be one piece casting secured to the shaft in overhung position on the extension of the motor shaft .. **The material shall be ASTM A743 CA6NM.**

Impeller mounting shall allow the hub to freely expand and contract independent of the shaft.

Deviations if any have to be brought out at Offer stage itself.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 10 OF 31

3.2.2 Drive System

The drive shall be a wet-type electric motor having a common pump/motor shaft. The motor components including the stator windings, rotor, and bearings will be immersed in high pressure water. While the motor cavity is initially filled with cool, filtered feedwater, the motor parts may eventually be in contact with boiler water. The motor shall be able to operate equally satisfactorily with cooled boiler water.

An auxiliary impeller shall be mounted on the motor shaft to insure circulation of the high pressure motor cavity fluid through the shaft radial and thrust bearings and motor parts while the pump is in service.

The motor lifting lug holes center-to-center distance shall insure there is no interference between the lifting cables/chains and the pump casing insulation. An allowance of 152.4 mm on each side should be made. A lifting lug shall also be provided at the bottom of the motor casing to be used in changing the motor orientation from vertical to horizontal. Bottom lug is not required if there are holes available & accessible there which will accept a shackle capable of supporting at least half the weight of the pump motor. Bottom lug (or holes) must be located such that a cable from the lug or shackle will pull perpendicular to a line between the two lugs at the top of the motor casing.

The required motor characteristics are : 3 phase , 50 Hz , 1470 rpm approximately , 3300 volts. The nominal rating of the motor to be selected with a continuous overload capacity based on 1.0 service factor . During boiler start up and shut down , the pump will be delivering cold water for a limited period . During this period , the motor load will be substantially higher than normal . The motor selected by pump manufacturer shall be capable of operating in this manner without impairing its life or performance . The manufacturer shall obtain the approval of the Purchaser , if the nominal rating or service factor of the motor to be furnished is other than shown above or if the cold water pump power input will exceed the HP selected at any capacity . **The Motor should have at least 10% margin over maximum load** . While the motor cavity is filled initially with cooled feed water , the motor parts may eventually be in contact with boiler water , analysis given on page 1 of these specifications . The motor shall be able to operate equally satisfactorily with boiler water. All motor windings and terminals shall be watertight.

- The minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be at least 2.5 secs. more than starting time. Speed switches mounted on the motor shaft shall be provided in case this requirement time is not met.
- Accelerating torque at any speed with the lowest permissible starting voltage (85%) shall be at least 10% motor full load torque.
- Pull out torque at rated voltage shall not be less than 205% of full load torque.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 11 OF 31

- **Winding & Insulation:**

Type: Non-hygroscopic, oil resistant, flame resistant

Starting duty: Two hot starts in succession, with motor initially at normal running temperature.

3.2.3 Motor

Motors shall conform to the requirements specified in the enclosed specification. The motor shall be submerged type. The motor winding shall be of non-hygroscopic material and shall be designed to withstand continuous water pressure and temperature variation. The coil insulation shall have sufficient dielectric strength to withstand rated phase to earth voltage in slot portion and phase to phase voltage in end windings. The insulation material shall not have any tendency to plastic deformation even under extreme operating conditions like the conductor temperatures, mechanical forces, vibrations etc. The Cooling circuit shall be provided with a reflux pressure compensation drums at the bottom of the motor to guard against any rise in pressure. Motor should have provision for socket welding of 1 ½” SCH 160 pipe to motor cooler. The flange at the motor bottom (near bottom cover) for HP cooling water line to Motor cooler (In case of flanged connection only) is in vendor scope of supply . **In case of flanged connection , the scope of supply of mating flanges, nut and bolt assembly is with the vendor.**

Power and instrumentation leads shall be taken out of the motor through water tight sealing glands and shall be run in flexible metal conduits or metal cables sheathing along the length of the pump body. The design of the seals shall allow for effects of differential expansion between insulation, conductor and pressure casing, over the entire range of operating temperatures. The motor should be suitable for continuous operation in the frequency range of 47.5Hz to 51.5Hz.

Motor for circulating pump shall be a wet motor, specially designed for the pump manufacturers for this application and shall be as per the standard adopted by the pump manufacturer subject to Owner's approval. A copy of the standard followed for Wet motor shall be sent along with the offer .

All motor windings, terminals and casing shall be suitable for the system water pressure.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 12 OF 31

NOTE : ~~Vendor to provide 3 separate Terminal Boxes ,one for each phase for Motor power supply termination , with gland plates and cable glands . The gland plates shall be made of non-magnetic material.~~

The vendor may provide single terminal box for three phase power supply termination with gland plates and cable glands. The gland plates shall be made of non-magnetic material. Only phase segregated terminal boxes will be accepted.

.2.4 Bearings

Common shaft of the pump and motor shall be guided and supported on spherically seated journal guide bearings and spherically seated tilting pad type double action thrust bearings respectively. The design of the bearing shall be such that the bearing life is assured. A separate write up on the salient construction feature of bearing adopted with drawings is to be furnished. Manufacturer may highlight their bearing design. All bearings shall be lubricated by the liquid in the motor cavity. Bearing material shall be Asbestos free.

Tilting pad bearings shall be provided for the radial bearings. A Kingsbury type bearing shall be used for the thrust bearing. Alternative bearings designs shall be subject to the Purchaser's engineering approval. The Supplier's standard radial sleeve bearing is accepted.

Bearings shall have a minimum design life (equivalent to L-10) of 100,000 hours.

3.2.5 Terminal Gland Assembly

The terminal gland assemblies are components of the pressure boundary of the motor housing, which has a specified design temperature of 348°C at the pump design pressure.

The materials and construction of the terminal gland assembly shall be capable of withstanding an internal motor fluid temperature transient after an electrical trip, increasing from 66°C to 348°C) in possibly, five (5) minutes, and sustained for at least five (5) minutes at the pump design pressure. Thereafter, the motor fluid temperature and pressure may be reduced during any time interval from five (5) minutes to five (5) hours to 93°C or lower at a pressure less than 7.036 kg/sq.cm, depending on whether the pump and motor can be effectively isolated from the boiler static pressure.

The minimum acceptance criteria for withstanding the temperature transient cycle is limited fluid leakage through all three (3) terminal gland assemblies at a combined rate not exceeding that which can be relieved through drain and blow-out openings in the terminal box without hazard to personnel in the immediate vicinity.

A mechanical restraint shall be provided to prevent ejection of a terminal conductor rod from the assembly by internal fluid pressure.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 13 OF 31

All potential leakage paths between components of the terminal gland, as well as between the assembly and the motor housing, shall be provided with O-rings that are resistant to failure by short-term exposure to the temperature transient. A telltale drain hole to atmosphere shall be provided as a visual indicator of O-ring leakage.

The series arrangement of terminal gland O-ring seals is to be designed so that at least one (1) O-ring can be replaced from the terminal box end without access to the interior of the motor.

3.2.6 Cover Plate / (Blank-off Plate)

The cover plate will be used as a bolted cover in the boiler circulation system of an ASME power boiler in accordance with the rules of PG-31 of the applicable edition of ASME Boiler and Pressure Vessel Code, Section I. The cover plate will be used when the wet motor pump unit is not installed for any of the following conditions:

- When performing a cold water hydrostatic test of the boiler in accordance with ASME Section I.
- Possibly during an extended boiler outage when the pump motor unit has been removed from the boiler circulation system for inspection or repair.
- The cover plate will only be installed after the boiler has been cooled and partially drained to permit pump motor unit removal. The boiler may then be returned to service with the cover plate installed, using special start-up procedures. In this case the cover plate will be heated using bypassed feed water flow as the boiler temperature increases.
- During boiler fluid temperature and pressure transients, the cover plate may be exposed to the conditions described in 3.3, but for less than one-tenth of the estimated cycle frequency.

3.2.6 Cover Plate Design and Construction

Two swivel hoist rings, 180 degrees apart, shall be provided on the circumference of the cover plate and arranged for horizontal lift with the flange face up. The swivel hoist rings shall be bolted into drilled & tapped holes in the edge of the cover plate. The tapped holes shall be centrally located between stud holes at the midpoint of the flange edge thickness. Bolts for the swivel hoist rings are NOT to be tack welded to the cover plate.

The following materials are acceptable for the construction of the pump case cover plate:

Pump design temperature 371 °C or less;

SA-515 Gr. 70 plate

SA-299 plate


SA-105 forging

SA-266 Gr. 2 forging

Pump design temperature greater than 371 °C;

SA-387 Gr. 11 plate

SA-182 F 11 forging

	SPECIFICATION FOR BOILER CIRCULATING WATER PUMP	SPECIFICATION NO.: BWCP_MAIN SPEC	
		SECTION: Boiler Mountings/PE (FB)	
		REV. NO.: 01	DATE: 23.03.2021
		PAGE NO : 14 OF 31	

The cover plates are to be stamped with the pump design pressure and temperature. The plates are also to be stamped with the Supplier's name or symbol and applicable model numbers to indicate which pump types the plates will fit.

3.2.7 RADIOGRAPHIC HOLES :

1" Socket welded hole shall be provided in the discharge ends / suction ends This will be used for field radiography and subsequently for differential pressure transmitter connections. (The DP. transmitter is in purchaser scope .)

3.2.8 FIELD HYDRAULIC TEST :

For conducting field hydraulic test of pump casing , the manufacturer shall furnish detailed drawings for blanking plates (Cover plates) , gaskets . For tightening these plates with pump casing, necessary technical details and tools shall be quoted separately. However studs, nuts & gaskets required for Hydro testing has to be supplied by vendor with the main equipment. Voltage and wattage of heating rods if applicable to be furnished along with Offer. Preferred voltage of heating rods is 220/ 230V AC. **Vendor has to supply blind flanges needed for their pump along with bolts ,nuts and spacer tubes** .~~Vendor has to submit drawing of blind flange needed for their pump showing dimensions , materials & no. of bolts , spacer tubes etc.~~

3.2.9 LIFTING LUGS / LUGS FOR SERVICING :

Suitable lugs to handle the motor assembly during erection and shut down is to be provided . To suit the lift hoist arrangement , two additional lugs may have to be provided which will be indicated in the drawings to be sent for approval (in the event of an order) .

Vendor may be required to support us in designing suitable lifting arrangement for motor assembly after pump hydro test & subsequent raising / lowering for maintenance purpose for radial discharge nozzles design .



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 15 OF 31

3.3 Transient Fluid Temperature and Pressure Conditions

Cycle Number	Type of Cycle	Cycle Temp. Variation, °C	Start-up & Shutdown Rate (°C/min)	Required No. of Load Changes
1a	Shock	20 → 105	----	150
1b/2b	Start-up	105 → 220	5.75	1,950
1c/2c	Shock	220 → 265	----	1,950
1d/2d	Decrease	214 ← 265	5.1	1,950
2a	Shock	50 → 105	----	1,800
3a	Shock	220 → 280	----	$\sum_a^d = 6,750$
3b	Decrease	220 ← 280	6	$\sum_a^d = 6,750$
3c	Shock	220 → 265	----	$\sum_a^d = 6,750$
3d	Decrease	214 ← 265	5.1	$\sum_a^d = 6,750$
4a	Shock	250 → 335	----	$\sum_a^d = 300$
4b	Decrease	220 ← 335	16.4	$\sum_a^d = 300$
4c	Shock	220 → 265	----	$\sum_a^d = 300$
4d	Decrease	214 ← 265	5.1	$\sum_a^d = 300$
5a	Decrease	214 ← 280	8 (φ)	$\sum_a^c = 6,750$
5b	Decrease	120 ← 214	8 (φ)	$\sum_a^c = 6,750$
5c	Start-up	120 → 290	9.5	$\sum_a^c = 6,750$

3.3.1 Circulating Water Characteristics:

Alkalinity corresponding to 9.0 to 11.0 pH

Dissolved solids, approximately 1,000 ppm maximum

Suspended matter, primarily Fe₃O₄: 1 to 20 ppm normal range
1000 ppm maximum

3.4 Pump Construction:

Pump will be installed in the circulating system of a steam boiler and therefore the materials and construction of the pump pressure parts shall conform in all respects to applicable requirements of the latest edition and addenda of the ASME Boiler and Pressure Vessel Code , Section I, Power Boilers, which have become mandatory as of the date of the order for the pump. References to specific paragraphs of this code are for special emphasis and do not limit applicability of other paragraphs.

- (a) **MATERIALS :** When selecting the pump materials , consideration should be given to materials which will be exposed to chemical cleaning solution , viz. impeller wear ring, shaft, casing and diffuser, etc.



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 16 OF 31

The material of construction of pump and motor shall be suitable for continuous operation with chemically conditioned Boiler Quality Water normally encountered in such service. **The pump and motor enclosure shall be of forged construction suitable for Boiler Pressure and temperature** . ~~The pump motor enclosure shall be of forged construction suitable for Boiler Pressure and temperature~~ . In general, parts wetted by the Boiler water shall not contain copper and its alloys so as to avoid pick up and depositions in the Boiler heat transfer surface . The material of individual component shall be proven and shall ensure long service life .

The stator windings in the motor shall be provided with suitable insulation impervious to water such as cross linked polyethylene .

(b) WELDING:

If welding is used in the fabrication of pressure retaining parts of the pump , all such welding shall be performed using :

- 1) Welding procedures which have been qualified according to the rules of ASME Code Section IX .
- 2) Welders/welding operator's qualifications shall be as per IBR 1950 (Indian Boiler Regulations) Chapter XIII regulations.

It is mandated that all Indian projects employ IBR-certified welders to be engaged in the manufacturing of the BCW pumps thus it is mandatory that the IBR welders are employed in all pump relevant activities and their IBR certification is furnished mandatorily along with the other documentation.

In addition all welding shall comply with part PW of ASME Code Section I to the extent allowed by para PW.42 .

c) MARKING:

The pump manufacturer shall mark each pump with at least the following informations , either by stamping in an accessible part of the pump body or by a name plate permanently attached to the pump .

1. Manufacturer's name or trademark .
2. Manufacturer's serial numbers (unique for that pump) for pump casing and motor housing .
3. Material identification as required by the ASME material Specification for pump casing.
4. Maximum allowable working pressure (design pressure kg/cm² & bar)



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 17 OF 31

If separate motor housings are used , which are capable of being interchanged among different pump bodies , serial number shall be used also to identify motor housings by marking or nameplate attached to the motor housing .

For each pump the manufacturer shall furnish two copies of a certification sheet containing the following informations :

- 1.) Manufacturer's name.
- 2.) Manufacturer's serial number (same as marked on pump):

Pump casing: _____

Motor housing: _____

- 3.) ASME material specifications used for pump pressure parts including :
Pump Casing: _____

Nozzles :

Other pressure retaining parts:

- 4.) Maximum allowable pressure (design pressure): _____ kg/cm² (g)
- 5.) Hydrostatic test pressure: _____ kg/cm² (g)
- 6.) Welding Certification:

All welding on this pump has been performed using procedures and welders qualified in accordance with ASME Code Section I . All welding complete with applicable requirements of Part PW in all respects , including heat treatment and non destructive examination .

Welders/welding operator's qualifications shall be as per IBR 1950 (Indian Boiler Regulations) Chapter XIII regulations.

It is mandated that all Indian projects employ IBR-certified welders to be engaged in the manufacturing of the BCW pumps thus it is mandatory that the IBR welders are employed in all pump relevant activities and their IBR certification is furnished mandatorily along with the other documentation.

- 7.) RADIOGRAPHS:

Radiographic examination has been performed as required by :

Material specification and Purchaser's Specification (for castings) and Part PW of ASME Section I (for welded joints). One set of the completed radiographs , properly identified with the respective parts , will be retained and available for inspection for a period of five (5) years .



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: BWCP_MAIN SPEC

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 18 OF 31

- 8.) Surface examination of all castings has been performed by magnetic particle or liquid penetrant methods to the technique and acceptance standards of Paragraph PG-25.2.1.2 or PG-25.2.2.1 of ASME Code Section I .
- 9.) Ultrasonic examination of all sections of each ferritin steel casting has been performed .
- 10.) Attached is one copy of each material manufacturer's certification .

The foregoing information is certified to be complete and correct .

(Date)

(Signed)

(Title or Official capacity)

(d) **SURVEILLANCE:**

Only authorized representatives of the Purchaser , the ultimate user , and / or their agents shall have reasonable access to all information , material and operations during all phases of engineering , procurement , manufacturing and testing of equipment covered by the Purchase order for this equipment .The manufacturer shall afford the authorized representatives the necessary facilities to satisfy them that contract requirements have been met .

(e) **Non-Destructive Examination of Forgings or Tubular Products**

When forgings or tubular products are used for the pump casing or other pressure parts, the non-destructive examination requirements of the ASME material specifications shall be met.

3.5 TESTING & INSPECTION :

Unless otherwise approved by the Purchaser , the Pump Manufacturer shall make the following tests before pump shipment .

- 1.) Manufacture, testing and inspection of pump , motor and its accessories shall be as per the quality plan approved by BHEL including all instruments .

Detailed documents for the volute material and pressure retaining parts as per IBR form should be furnished .

- 2.) Quality Plan in NTPC format indicating various checks in raw material, in process and final inspection stages of manufacture along with copies of all reference documents and acceptance norms mentioned therein shall be submitted immediately after placement of order for review and approval by BHEL , prior to start of



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: BWCP_MAIN SPEC

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 19 OF 31

manufacture . All testing procedures and acceptance norms for non-destructive testing shall be approved by BHEL / NTPC.

- 3.) The NDT checks shall be as per ASME Section I for pressure retaining items and structural items and shall include the following :
- All pressure retaining and structural welds should be ultrasonic tested .
 - Weld surface shall be 100% MP or LP tested to check sub surface / surface defects

- 4.) For Pressure retaining castings :

All castings shall be 100% radiographed and 100% MP /LP tested , 100% area of each casting shall be radiographed for pump casing . Repair of welds on castings shall be done after prior intimation to BHEL and using qualified procedure reviewed & accepted by BHEL and Manufacturer shall indicate repair welding of castings in Quality Plan .

- 5.) All forgings for motor cover , motor casing and shaft shall be 100% ultrasonic tested to check internal defects . Also 100% MPI be carried out to ensure that the forgings are free from surface defects .

- 6.) **Impeller shall be subjected to 100% liquid penetrate examination**

- 7.) High temperature tests on raw materials shall be done for casings , shaft and impellers to enable the chemical analysis and physical properties of the material to be determined at ambient and high temperatures .

- 8.) Manufacture, testing and inspection of the pump shall be as per Quality Plan approved by Customer but not limited to the requirement of the specification . Also, the following Type and Routine tests should be performed .

A. Ref. Standards.:

- CEGB Std. : Electrical and mechanical design requirements of
620106 water circulating pump/motor unit.
(GDCD192)
- BS EN ISO 9906:2012 : Hydraulic performance acceptance test for Roto dynamic
pumps.
- IEC – 60051 Recommendation for indicating electrical measuring
instrument.
- BS 4999 General requirements for rotating electrical measuring
instrument.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: **Boiler Mountings/PE (FB)**

REV. NO.: **01**

DATE: **23.03.2021**

PAGE NO : **20 OF 31**

- Part : 32 : Temp. rise
Part : 51 : Noise level
Part : 60 : Tests
- e) CEGB standard : Glandless pump/motor unit inspection and testing requirement.
620102
issue 2(GDCD143)

B. TESTING OF INSULATED CONDUCTORS, WINDING JOINTS AND TERMINAL SEALING GLANDS FOR WET WINDING MOTORS (GDCD:192)

ROUTINE TESTS

- i. High Voltage Test (A.4.1)
ii. Insulation Resistance Measurement (A.4.2)
iii Material check (A.4.3)

C. TYPE TESTS

(To be conducted on the first unit of each order in the presence of BHEL/their customer)

- a. Test to establish unit functioning of pump at temp and pressure.
b. Hot stand still and start up test.

The type tests shall be carried out in presence of the Employer's representative. Vendor shall inform the Employer about his readiness for conducting the type test and issue such notice to the Employer 30 days in advance, along with schedule of the type tests. The vendor shall obtain the Employer's approval for the type test procedure before notifying the Employer about his readiness for conducting the type test. The type test procedure shall clearly specify the test set-up, instruments to be used, procedure, acceptance norms, recording of different parameters, interval of recording, precautions to be taken etc. for the type test(s) to be carried out.

Irrespective of the requirement of conducting the type tests under this contract, the vendor shall submit (during initial submission) the reports of the type tests listed and carried out within last five years from the date of bid opening. These reports should be for the tests conducted on the equipment similar (model / type / size / rating) to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. The Employer reserves the right to waive conducting of any or all of the specified type tests under this contract, in which case the type test charges shall not be payable for the type tests waived by the Employer.

NOTE: 1) For brief details of test, refer Sec. '2' of CEGB Standard 620102(GDCD143).

D. ROUTINE TEST: (to be conducted on all the units in the presence of BHEL/their customer)

- a. NPSH test
b. Temperature rise test



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: BWCP_MAIN SPEC

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 21 OF 31

- c. Under voltage test
- d. Quality assurance proof test.
- e. Hydrostatic test on pump motor and casing
- f. Over speed test
- g. Test to determine unit characteristics.
- h. Pump Performance test
- i. Unit run at rated voltage.
- j. Starting current at rated voltage
- k. Cold start up test
- l. Endurance test of motor windings, joints and terminal seals.
- m. Noise level.
- n. Visual inspection of dismantled unit after (a) to (g) above are conducted.
- o. High voltage test
- p. Vibration test as per VDI 2056.

NOTE: For brief details of test, refer Sec. '3' of CEGB Standard 620102(GDCD143).

E. DOCUMENTS

- a. 6 sets of Test certificates detailing the test results and observations made during the type and routine tests listed above.
- b. 6 sets of test certificate for the motor detailing the test results for the type and routine tests, as provided by the motor supplier in accordance with BS 4999 part 60.

F. GENERAL

- a. The vendor shall submit the quality plan along with the offer in the prescribed NTPC format, with all the details.
- b. The vendor shall submit with the offer the detailed test procedure followed by them for carrying out the above tests.
- c. The vendor shall follow the quality plan approved by BHEL/Customer during manufacture.
- d. For other Tests regarding Material checks & Non destructive Testing refer our Specification for Boiler Circulating Water Pump (List of enclosures to specification for BCW PUMP) .

G. . NOISE LEVEL

Noise level should not exceed 85dBA at 1m distance from the equipment.

- 9) Each pump and motor shall be subjected to performance test at the manufacturer's works under a near actual site condition as possible.
- 10) Balancing test for Rotating parts (Static and dynamic) to be done. Vendor to furnish the rated speed at which dynamic balancing will be done.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: BWCP_MAIN SPEC

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 22 OF 31

- 11) For design requirements of electrical motor and mechanical design requirements, standard GDCD 192 may be used for reference for tests under - B. Insulated conductors (cables), winding joints and terminal sealing glands used for the stator windings shall be subjected to the following routine Quality control tests. These are the minimum requirements and any additional tests considered necessary by the contractor shall also be applied.
- 12.)a) A complete hydraulic test on water and at low suction pressure to obtain complete performance characteristic curves . The required characteristics include Head , NPSH , Power input and Overall efficiency . The Pump Manufacturer shall include a calibration of differential pressure , measured across the 1” radiographic openings in the inlet and outlet nozzles , versus measured total development head . This data is required by the Purchaser for field setting of the pump differential pressure switches .
 - b.) Mechanical run at low pressure with water on the remaining units .
 - c.) Electrical tests (Manufacturer to submit outline of routine tests) Six (6) copies of the pump performance curves shall be furnished to the Purchaser .

3.6 EXPECTED PUMP AND MOTOR PERFORMANCE DATA:

- a) The attached submerged motor pump design data sheets are to be filled in by the manufacturer to show predicted performance and submitted to the Purchaser for approval prior to release for manufacture .
- b) Revised Design Data sheets are to be filled in to reflect actual expected pump and motor performance based on manufacturer’s shop tests described .

3.6.1 PACKING AND DESPATCH:

The manufacturer shall give clear instructions for packing and detailed arrangement drawing for the packing method adopted to be furnished to BHEL in advance . Detailed instructions for preservation at site shall be furnished .

3.6.2 O & M Manuals :

Detailed O & M manuals shall be furnished. Three soft copies of O&M manuals in (CD ROM) Compact disc to be submitted. This is in addition to the regular printed 3 O&M manuals . The submitted O&M instruction manuals should include Instrumentation manuals in addition to Pump and Motor. One hard copy and one CD out of 3 sets should be sent along with transit assembly to site directly.

3.6.3 MANDATORY SPARES:

~~Mandatory spares will be dealt by the spares group.~~

3.6.4 TRAINING REQUIREMENTS:

Vendor should submit an Optional price for providing training to NTPC & BHEL personnel at the works of BCWP pump manufacturer for 5 man month period .



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 23 OF 31

The BHEL / NTPC personnel will make their own Travel / Lodging / Boarding arrangements . Depending upon the actual duration of training man months availed, the payment will be proportionately reduced on the vendor quoted amount (if period is lesser than 5 man months). Vendor to confirm this clause while quoting for training.

3.6.5 DOCUMENTS REQUIRED ALONG WITH OFFER :

(a) Drawing : Manufacturer shall furnish detailed cross sectional drawing for the circulating pump assembly showing overall dimensions , provision of lifting lugs , location of thermal gland and other instrument tags . Detailed cross sectional drawing for pump and motor with identification of all parts and material specification shall be furnished . Detailed cross section of the electrical system and other instruments quoted will also be furnished .

(b) Pump capacity vs. Head, Pump efficiency, Shaft power and NPSH curves .

(c) Commissioning Spares : The offer shall include certain essential spares which are required during the commissioning of the pump . This is to be decided by the manufacturer based on their experience .All gaskets forming part of pump , motor & flanges for heat barrier are specifically included.

(d) Mandatory Spares: The manufacturer shall quote for the list of spares indicated under Mandatory Spares. Interchangeability of various components of pumps different units shall be maintained. BHEL reserves the right to take into account mandatory spares price also for economic buying. Hence, vendors to take note of this also in their pricing. Additionally, three years operating spares as recommended by BCWP vendor may also be submitted.

(e) Cooling water requirements

(f) Precautions during power blackout .

(g) Alarm and trip values

(h) Filled in data sheets

(i) Quality Plan

(j) Instrumentation Schedule along with catalogs of Instruments .

(k) P & I drawings

(l) O & M manual

(m) List of deviations , if any

(n) Blind flange drawing for pump hydro test with Bill of Materials & dimensions.

(o) Complete list of special tools along with sizes . Vendor should not assume that certain tools are available locally . In case of problems arising during hydro test / assembly / maintenance at a later date due to non availability of certain tools , it will be vendor's responsibility to solve it at no extra cost to BHEL . (The list of special tools is not specified by us as it varies from vendor to vendor depending on the BCWP)



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: **Boiler Mountings/PE (FB)**

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 24 OF 31

- (p) Filled up Annexure – III for Flow Rator .
- (q) Vendor should submit the completely filled up check list sent along with enquiry.

3.6.6 DOCUMENTS REQUIRED AFTER PLACEMENT OF PURCHASE ORDER

Details given in annexure 5.

3.6.7 ERECTION & COMMISSIONING SUPPORT

Optional price to be quoted by the seller in terms of price per man-day for erection and commissioning support.

If commissioning engineer is deputed from Indian office, then the payment will be released in INR only.

This service will be utilized by BHEL-site through power sector regions. Separate PO will be released by BHEL-Site through power sector regions to avail the vendor's supervision service.

During this period, vendor should also ensure that motor cavity is filled as per correct vendor procedure of flushing fill and drain line and ensure that motor internal filter is not clogged before boiler operation.

All the expenses like to & fro charges, incidentals, boarding & lodging at site are to be borne by BCWP vendor.

Depending upon the actual duration of erection and commissioning support availed, the payment will be paid by BHEL- power sector regions based on the vendor quoted amount (price per man-day).

The price calculated for 14 days of erection and commissioning per pump will be considered for price comparison.

3.6.8 PAINT & FINISH

Two coats of primer Red Oxide / Zinc chrome (Alkyl base) to IS 2074:1992 (Reaffirmed 2002) Standard (min. DFT = 60µm) and two coats of Finish paint of Synthetic enamel (Alkyl base) to IS 2932:2003 Standard . The Shade should be Blue as per RAL 5012. Finish paint DFT = 40 µm and min. Total DFT =100µm .

3.7 COOLING SYSTEM:

01. The circulating pump which has got hot motor cavity water can be cooled by provision of a separate cooler . In addition to this , the pump design should permit natural cooling so that the excess heat due to conduction to the motor cavity water is minimized .The temperature of high Pressure cooling water leaving the motor cavity to the cooler shall not exceed 60deg C. The cooler shall be adequately designed to reduce the temperature of the motor cavity to 50° C.
02. In the high pressure cooler (motor cooler) the heat transfer shall be effective to reduce the motor cavity water temperature to the allowable limit back to the motor



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 25 OF 31

- .A high temperature motor cavity alarm / trip shall be provided to operate the alarm at 63° C and trip the motor at 66° C while the pump is in operation .
03. The connections between the cooler and the motor for the hot cavity water shall be through adequate pipe sizes which has got welded connections for the pump motor . This should be welded with the cooler at site. Suitable sockets shall be provided in the motor connecting nipple and the cooler connecting nipple so that a spool piece can be welded conveniently .
04. The motor bearing shall be lubricated with the motor cavity liquid. The selection of the type of bearing , and the material of the bearing shall be giving long service life irrespective of the working conditions . In the bottom of the motor the combination of thrust cooler and the auxiliary impeller shall be located at the bottom of the motor assembly. This will ensure circulation of cooling fluid through the motor assembly and the high pressure cooler . The design shall be such that during hot standby service of the pumping unit , sufficient cooling effect is provided by natural circulation of the coolant so as to prevent the overheating of the motor .
05. The cooling water for the heat exchanger will be demineralized water . This should be used for the design of motor cooler .
06. The pump vendor shall clearly recommend the suggested filling and draining method for pump operation .
07. The pump vendor shall inform the precautions to be adopted during total power black out (recommendations for provision of cooling water system, quantity of water recommended and duration of supply of cooling water to pump motor cooler. This is to avoid increase in temperature of water in pump motor cavity when there is total black out.)
08. For circulating pump motor cavity temperature , the pump vendor based on the selection of insulating material shall clearly recommend the alarm and trip values for pump motor cavity water for pump motor . Also , the max. operating temp. water recommended for cavity water should be specified if it is other than the values furnished by BHEL .
09. ~~The vendor to provide a tap off point in motor casing with suitable pressure gauges for measuring the motor cavity pressure.~~
10. The design shall be such that during not standby service of the pumping unit , sufficient cooling effect is provided by natural circulation of the coolant so as to prevent over heating of the motor.

3.7.1 PUMP COOLING SYSTEM , BEARINGS AND OPERATION :

This type of pump does not require a shaft seal since it is totally enclosed in the pump casing . An auxillary impeller should be provided to ensure circulation of cooled water through the shaft sleeves , bearings and motor parts while the pump is in service . An external cooler shall be provided by vendor , as required. The low



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 26 OF 31

pressure cooling water inlet temperature is 39° C maximum . The overall pressure drop through the low pressure cooling system , the required flow in gpm and the coolant water temperature rise is to be specified by Pump vendor. The pump must be suitable for hot standby conditions without impairing its reliability or performance . During hot standby with the pump idle , but subjected to normal operating suction pressure and temperature , the required low pressure cooling water quantity will be supplied to the thermal barrier or the external cooler . A limited quantity of high pressure , filtered purge water , not exceeding the maximum allowable motor inlet temperature , will be normally available to offset possible leakage from the motor .

No suction valves will be installed in the initial period . Consequently , cold standby conditions will not exist except when the boiler is cold . When a pump is held on standby , it will be kept hot by allowing water to bypass the pump discharge valves . It may not be fully preheated before starting . Pump shall be designed to start under this condition without damage to pump parts when operated in accordance with Instruction manual to be furnished by manufacturer. Instructions should specify maximum permissible temperature difference between pump casing and boiler water for emergency starting .

The manufacturer shall provide the necessary temperature measuring instrument with alarm and trip contacts to close on rising motor fluid temperature . The manufacturer shall stipulate the normal motor temperature and the alarm and trip settings .

3.7.2 Operating Conditions

3.7.2.1 Recirculated High Pressure Water Conditions

When the wet motor pump is operating to provide boiler circulation, the water contained in the motor enclosure is recirculated through the heat exchanger by the rotation of the secondary impeller (on the motor shaft) to maintain the specified flow of high pressure, cooled water for bearing lubrication and motor cooling. The pressure in the motor enclosure is maintained in equilibrium with the pressure in the boiler by the shaft clearance between the motor and the pump casing. The system pressure ranges from 3.4 bar g to 207 bar g, depending on boiler operation.

When the wet motor pump is shut down on hot-standby, the heat exchanger will remain in service to remove a small quantity of heat conducted from the hot pump casing to the motor enclosure. Adequate recirculation through the motor and heat exchanger is maintained by the difference in density of the cooled water in the heat exchanger and the heated water in the motor enclosure. The cooling system pressure will be whatever the boiler circulating pressure is.

3.7.2.2 Recirculated High Pressure Water Constituents

Total Solids: Maximum 100 ppm

PO₄ 5 - 20 ppm

SiO₂ 0.2 - 2.0 ppm

Fe₃O₄ 0.25 - 10 ppm



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 27 OF 31

O² 5 - 10 ppb

Alkalinity corresponding to pH of 8.5 to 11.0.

The minimum values are representative of the normal constituents of the treated feedwater used to initially fill the motor enclosure and heat exchanger.

The maximum values reflect the eventual chemical equilibrium that may be attained between the recirculated water in the motor enclosure and the more concentrated constituents in the boiler water by dispersion through the shaft clearance. The possible effects of corrosion or deposit formation should be considered in the selection of heat exchanger materials and determination of the service heat transfer rate. The materials are to be selected to avoid electrolytic corrosion by dissimilar metals.

3.7.2.3 Low Pressure Cooling Water

A primary supply of low pressure cooling water for normal continuous operation and an alternate supply for back-up will be provided by the ultimate user. BHEL will obtain a chemical analysis of the water to be supplied by both sources to verify that it is acceptable with respect to corrosion and fouling of the heat exchanger. Marginal water conditions will be referred to the Supplier for review and comment prior to release for manufacture of the heat exchanger.

3.7.3 Component Design

3.7.3.1 Criteria

The heat exchanger shall be a vertical, counter flow, shell and tube design with the high pressure fluid on the tube side.

Fluid connections shall be located for down flow on the high pressure side and up flow on the low pressure side.

Heat exchanger threaded flanged vent and drain connections with plugs, shall be provided on the low pressure side. If needed, a threaded connection with plug must also be provided for a high pressure drain.

Bolted channel covers with gaskets shall be provided for tube side inspection and cleaning. Gaskets are to be spiral wound, stainless steel and fiber filled.

Welded attachments are to be provided on the shell for vertical mounting of the exchanger to brackets supplied on the motor enclosure of the wet motor pump.

The heat exchanger shall be designed for the specified fluid pressure and temperature on each side with the other side empty at zero gage pressure.



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 28 OF 31

3.7.3.2 Construction

Stainless steel tube sheets are to be used where permissible by the designated Code Section or shell thickness and applicable welding procedure. If, in the judgment of the Supplier stainless steel should not be used, the tube sheets may be made of carbon steel and a stainless steel weld overlay applied to the entire tube side of the tube sheet after stress relieving. The cross-baffles and tubes are to be stainless steel and the tubes are to be strength welded to the tube sheet.

Carbon steel may be used for the shell, channels, channel covers and fluid connections.

The inside of the shell shall be sandblasted to remove all mill scale and rust. Interior surfaces shall be free of oil, dirt, and foreign material before the tube bundle is assembled and strength welded to the tube sheets.

3.7.3.3 Connections to Pump

The bracket connecting hardware and HP piping to connect the cooler to the pump must be supplied, but doesn't need to be attached during shipping. Each section of HP piping going between the cooler and the pump is to be shop welded out from flange-to-flange. Before shipping, the cooler and pump must be shop assembled to check the fit of HP piping and mounting brackets.

3.8 PERFORMANCE DATA & TECHNICAL REQUIREMENTS - COOLER

(table to be completed by pump supplier)

Performance data is required for the following operating conditions on a per cooler basis.

PERFORMANCE REQUIREMENTS				
Required Heat Exchanger Rate, kw	Mfg. Design Q cold or 1.5 x Q hot (Whichever is larger)			
Offered Heat Exchanger Rate, kw				
	SHELL SIDE (LP)		TUBE SIDE (HP)	
Fluid Circulated	Cooling water		Motor cavity water	
Flow Rate, m3/hr				
Temperature Entering, °C	39			
Allowable Pressure Drop, bar				
Fouling Factor, m ² -°K/w (note 2)				
Number of Passes				
Design Pressures and Temperatures				
Design Temperature, °C				
Design Pressure, bar g				
Hydrostatic Test Press, bar g				
Connections	Inlet	Outlet	Inlet	Outlet
Nominal Pipe Size, mm by Supplier				
Type of Connection	Socket	Socket	Socket	Socket
Fitting Pressure Class				



SPECIFICATION FOR BOILER CIRCULATING WATER PUMP

SPECIFICATION NO.: **BWCP_MAIN SPEC**

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 29 OF 31

NOTES

1. Materials and construction of the pressure parts shall conform in all respects to the applicable requirements of ASME Boiler and Pressure Vessel Code, Section VIII, Power Boiler, Edition and Addenda to be those in effect on date specified in section 1 (INSTRUCTIONS TO SUPPLIER) of this spec.
2. If no fouling factor is specified, the service transfer rate is to be 85% of the clean transfer rate, (cleanliness factor = 0.85)
3. Q cold & Q hot above are based on the table in section 3.0. Q cold is the “Ambient” column and Q hot is the “Design Point” column.
- * Maximum cooling water flow: $m^3/hr = \text{rated kw} / 40.9$. With the proposed spiral tube cooler, this value is exceeded and accepted, as shown in the table.

3.9 Tests and Certification:

3.9.1 Shop Tests

Each side of the heat exchanger shall be hydrostatically tested at the pressure specified by the applicable Code for fifteen (15) minutes for each 25.4 mm of design minimum wall, with a minimum hold time of ten (10) minutes. The water used on both sides shall be clean and pH adjusted (to between 8.5 and 11) with ammonia.

The heat exchanger shall be completely drained and thoroughly air dried immediately after hydrostatic testing.

3.9.2 Field Test


After equipment is put in service, Purchaser may run a check test on the equipment to ascertain that it is performing properly in every respect. The Supplier shall, if requested, arrange to have an authorized representative present to witness and assist in the test.

3.9.3 Certification

The Supplier shall furnish the Purchaser with a certificate that requirements of the applicable ASME Boiler & Pressure Vessel Code have been met. A nameplate shall be provided on the heat exchanger, stating the low pressure cooling water quantity and inlet temperature, the thermal rating, the Supplier's exchanger identification number, and the ASME Code Section used for construction. The heat exchanger does not need to have a U Stamp.

3.10 The following performance guarantees apply to the BWCP & Cooler:

- Pump Rated Capacity, 1390 m^3/hr , for the Hot start 160 bar Design condition as shown in Section 3.0.
- Pump Head, 137.8 m, for for the Hot start 160 bar Design condition as shown in Section 3.0.

	SPECIFICATION FOR BOILER CIRCULATING WATER PUMP	SPECIFICATION NO.: BWCP_MAIN SPEC	
		SECTION: Boiler Mountings/PE (FB)	
		REV. NO.: 01	DATE: 23.03.2021
		PAGE NO : 30 OF 31	

Guarantees shall be subject to testing per mutually agreed upon procedures and analysis. All guarantees shall be met with the pumps field installed and operating

3.10.1 GUARANTEE FOR CAVITY WATER TEMPERATURE RAISE

Pump should be designed such that the cavity water temperature should be less than 50 deg C as per clause 3.7 point no 1 page 24 of 30 of pump specification and also guarantee for the performance. In case if BCWP recommended alarm temperature is only 60 deg C then cavity water temperature should be less than 60 deg C as per above clause.

3.10.2 Pump, motor and heat exchanger should be shipped with glycol and water mixture filled to site. Dry preservation during transit is not acceptable. Vendor also to provide wet preservation procedure for short/ long time storage at site.

3.10.3 GUARANTEE FOR NOISE LEVEL

The Noise level shall be less than 85 dBA . Sound pressure level will be measured all around the pump and motor set at a distance of 1 m from the nearest surface of the machine and at a height of 1 m from the floor level. A minimum of six points should be covered for measurement. The average of the A – weighted sound pressure level measured expressed in decibels to a reference of 0.0002 microbar shall not exceed the specified value. The tests shall be carried out with the machine operating at rated speeds and throughout the operating range. Correction for background noise and correction on account of test environment will be considered in line with HIS. For this purpose all the additional data required as per HIS should necessary be collected during the test.

The test in the manufacturer's workshop is to be carried out to ensure that the recirculation pump will only be delivered if the following sound level guarantee is achieved.

In case that this maximum allowable sound level is exceeded, corrective measures are to be taken, free of charge for purchaser, until the guaranteed value is met.



**SPECIFICATION FOR BOILER CIRCULATING
WATER PUMP**

SPECIFICATION NO.: BWCP_MAIN SPEC

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 23.03.2021

PAGE NO : 31 OF 31

3.10.4 VERIFICATION OF GUARANTEE

The tolerances for the acceptance criteria for the test results shall be as per the following table for the guaranteed values (duty point) notwithstanding the values mentioned in the clause 4.4 of the standard BS EN ISO 9906:2012.

Quantity	Tolerance
Flow Rate	± 4%
Pump Total Head	± 2%
Overall Efficiency	-2.5

CONTROLS & INSTRUMENTATION REQUIREMENTS OF BCW PUMP	SPECIFICATION NO: BCWP_C&I_REQ	
	SECTION: Boiler Mountings/PE (FB)	
	REV. NO.: 00	DATE: 06.03.19
	PAGE NO : 1 OF 3	

1.0 DIFF. PRESS. TRANSMITTER

Suitable provision shall be made in Suction and Discharge sides **for three** DP. transmitters to match **1" SCH** pipe which is in purchaser's scope of supply .

2.0 **INSTRUMENTATION FOR CONTROLLED CIRCULATION PUMPS:**

~~The instruments provided shall include the following:~~

~~2.1a. Temperature gauge (1 No.), Duplex thermocouple (3-2 Nos.) and pressure gauge (1 No.) on each pump motor cavity.~~

~~2.1b. Flow Rator in the DM cooling water return line.~~

~~2.1c. Two Duplex Thermocouples. One to be installed in pump casing and the other in Suction manifold for measuring Suction manifold to pump casing differential temp.~~

2.1d If heat barrier cooling is applicable, vendor to provide one temperature gauge as a loose item as per the specification requirement.

2.2 The following instrument ~~sation is to~~ shall be provided for each pump for indicating, interlocking and recording purposes.

2.2 MOTOR CAVITY THERMOCOUPLES

Three numbers of Duplex thermocouples shall be provided for this purpose. 16 AWG wire of Chromel- Alumel (Type K) or 24 AWG wire Pt -Rhodium - Pt(Type R) ungrounded type, depending on operating temperature shall be used . This thermocouple shall comply with the specification given in Annexure –IV. The motor cavity thermocouples will be used to actuate an **alarm**, if motor cavity temperature **exceeds 63°C** and to **trip** the motor, if the motor cavity temperature **exceeds 66°C**.

2.2.1 PUMP CASING THERMOCOUPLES

Two numbers of Duplex thermocouples shall be provided for this purpose. 16 AWG wire of Chromel- Alumel (Type K) or 24 AWG wire Pt -Rhodium - Pt(Type R) ungrounded type, depending on operating temperature shall be used . This thermocouple shall comply with the specification given in Annexure –IV.

CONTROLS & INSTRUMENTATION REQUIREMENTS OF BCW PUMP	SPECIFICATION NO: BCWP_C&I_REQ	
	SECTION: Boiler Mountings/PE (FB)	
	REV. NO.: 00	DATE: 06.03.19
	PAGE NO : 2 OF 3	

2.4 FLOW RATOR set

Flow Rator type with alarm contact flow rator shall be provided in the cooling water line from each pump cooler. This instrument shall give local flow indication and the contact for low flow set point to be set based on the Recommended flow rate to meet the Operating temperature requirement . The contact rating shall be min. 5 A. at 240V AC , 2 NO + 2 NC contacts are to be provided. If BCWP vendor design requires LP cooling water for Heat Barrier, then 1 number per pump shall be supplied in this set. The rotameter shall comply with the specification given in Annexure-III.

3.0 INSTRUMENTATION-GENERAL

Vendor shall furnish a write up on their recommended protection and interlock requirements for the pump and motor along with their offer.. Apart from the instruments specified in serial no. 2.0, if any other instruments are required for vendor's recommended protection/interlocks/ and annunciation for the system offered, the same shall be provided with set point recommendations.

- 3.1 Permanently fastened stainless steel name plate stamped with the owner's tag no. and other necessary details shall be furnished on all gauges, flow devices, temp. elements, and all other devices.
- 3.2 All press. and temp. instruments shall have metric scales. Press. and temp. shall be in kg. per sq.cm and °C respectively.
- 3.3 All aux. contacts of flow and temp. elements provided for the purpose of interlock, control annunciation etc. shall have minimum rating of 5 amp. at 240V AC. Each initiating device shall have 2 NO + 2 NC contacts. These NO and NC contacts shall be independent and potentially free
- 3.4 Instruments shall be designed to withstand ambient temp. from 0°C to 60°C and relative humidity from 10 to 95%.

4.0 SPECIFICATION ENCLOSED

The following specifications are enclosed as Annexure for compliance.

- i. Pump / motor data sheet (Annexure-I & ANNEXURE-II).
- ii. Specification for Flow rator (Annexure-III).
- iii. Specification for Temperature Sensing Elements (Annexure-IV).
- iv. Specification for Temperature and Pressure gauges (Annexure-V).

CONTROLS & INSTRUMENTATION REQUIREMENTS OF BCW PUMP	SPECIFICATION NO: BCWP_C&I_REQ	
	SECTION: Boiler Mountings/PE (FB)	
	REV. NO.: 00	DATE: 06.03.19
	PAGE NO : 3 OF 3	

v. Vendor quality plan format for instrumentation items to be filled and submitted by the vendor along with the offer (Annexure-VI)

5.0 The makes of the items shall be preferably as follows :

- 5.1. Temperature gauges. Aschroft, Dresser Industries/U.S.A., Budenberg/UK., KDG/UK
- 5.2. Temp. switches : KDG/UK, Dresser/USA, Delta Control/USA, SOR/USA, ITT Barton/USA
- 5.3. Thermocouple : Thermoelectric/Netherland, BICC/UK, Degussa/Germany, ISA Controls/UK
- 5.4. Flow Rator(Rotameter) : ITT Barton/ USA , Auxitrol/ UK , Dressor/USA Magnetrol/ Belgium , Mercoid/USA , Merium/ USA , Universal Flow Meter /USA

The vendor has to indicate Make, Model No. & Weight of each of the Instruments proposed during Offer submission.

6.0 DOCUMENTS

Supplier shall furnish the documents in 18 sets each, as per the document submission schedule enclosed.

7.0 SPARES

i. Commissioning Spares

The offer shall include certain essential spares which are required during commissioning of the system. This is to be decided by the manufacturer based on their experience.

ii. ~~Mandatory Spares (Not Applicable)~~

~~The manufacturer shall quote for three year trouble free operation spares for the system.~~



ANNEXURE - I
SUBMERGED MOTOR PUMP DESIGN
DATA OF BCW PUMP

SPECIFICATION NO.: SAGARDIGHI _ANNX-1

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 00

DATE: 06.03.19

PAGE NO : 1 OF 3

(TO BE FILLED IN BY PUMP MANUFACTURER)

Model No. of Pump _____ Model No. of Motor _____

Type of Pump : Glandless BCWP

Rated Capacity _____ m³ / hr. Head : _____ m : Sp.gr _____.

Pump and Motor Data required : Date of completion : _____.

1. Type of motor _____
Motor Rating : _____ KW. 3300 **Volts 3 Phase 50 Cycle**

2. Rated Full Load Speed _____ rpm Service Factor _____

3. Locked Rotor Current _____ amps.
Starting (in rush) current _____ amps.

4. Rated Full Load Current : _____ amps.

5. Rated Full Load Power Factor : _____

6. Operating Current : Hot Duty _____ amps.
Cold Duty _____ amps.

7. Operating Power Factor : Hot Duty _____
Cold Duty _____

8. Motor Efficiency : Hot Duty _____ %
Cold Duty _____ %

9. Pump Efficiency : Hot Duty _____ %
Cold Duty _____ %

10. Shaft Power : Hot Duty _____ KW
Cold Duty _____ KW

11. Motor Power Input : Hot Duty : _____ KW
Cold Duty : _____ KW

12. Power Consumption at shut off condition _____ KW

13. Type of casing _____



ANNEXURE - I
SUBMERGED MOTOR PUMP DESIGN
DATA OF BCW PUMP

SPECIFICATION NO.: SAGARDIGHI _ANNX-1

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 00

DATE: 06.03.19

PAGE NO : 2 OF 3

14. Type of impeller _____
15. Type of shaft _____
16. Type of drive _____
17. Type of seal : Glandless
18. Type of coupling _____
19. Type of mounting : Suspended
20. Nozzle orientation
a) Suction _____
b) Discharge _____
21. Materials of construction
a) Pump casing _____
b) Casing ring _____
c) Impeller _____
d) Shaft _____
e) Journal bearing _____
f) Motor housing cover _____
g) Thrust disc _____
h) Thrust bearing pads _____
i) Bearing sleeves _____
j) Motor housing _____
k) Stator _____
l) Rotor _____
m) Heat barrier _____
n) Bolt _____
o) nuts _____
22. Motor Cavity Fluid (High Pressure side) to Cooler :
- a. Temperature : Hot Duty _____ °C ; Cold Duty _____ °C
- b. Quantity : Hot Duty _____ litres/ sec , Cold Duty _____ litres/sec
- c. Allow.pr.drop : Hot Duty _____ bar , Cold Duty _____ bar
- d. Heat transfer Hot Duty _____ KW hr , Cold Duty _____ KW hr

	ANNEXURE - I SUBMERGED MOTOR PUMP DESIGN DATA OF BCW PUMP	SPECIFICATION NO.: SAGARDIGHI _ANNX-1	
		SECTION: Boiler Mountings/PE (FB)	
		REV. NO.: 00	DATE: 06.03.19
		PAGE NO : 3 OF 3	

e. Maximum recommended operating temperature (alarm) _____ ° C

f. Maximum allowable operating temperature (trip) _____ °C

Additional Motor Data required Date of completion _____

23. Full load torque _____ Kg-m

24. Locked Rotor torque _____ Kg-m

25. Pull Up torque _____ Kg-m

26. Breakdown torque _____ Kg-m

27. WK² Valve (including impeller) _____ Kg-m²

28. Acceleration Time _____ sec

29. Maximum Rotor Temperature _____ ° C

30. Maximum Stator Temperature _____ ° C

31. Type of Insulation _____

32. Minimum time interval between starts _____ sec

33. Minimum starting voltage : Hot duty _____ % of rated voltage
Cold duty _____ % of rated voltage

Predicted performance curves required

1. Pump head vz. Capacity curve showing NPSH requirements , Efficiency and Brake horse power for SP.GR= 1.0 (and hot duty) SP.GR.

2. Motor efficiency , power factor , current and kilowatt input viz. brake horse power.



**ANNEXURE - II
GENERAL TECHNICAL PARTICULARS
FOR HT & LT MOTORS OF BCW PUMP**

SPECIFICATION NO.: SAGARIDGHI __ANNX-2

SECTION: Boiler Mountings/PE(FB)

REV. NO. : 00

DATE: 06.03.19

PAGE NO : 1 OF 6

TECHNICAL DATA SHEET : : PROFORMA

A. AC. MOTORS:

1. Vendor Name : Model No. : Motor Rating: _____ KW
2. Type and frame size and design :
Code No.
3. Nos. required :
4. Application : BOILER CIRCULATION WATER PUMP
5. Specification & Codes :
6. Capacity at 50°C ambient : Continuously rated
temperature
7. Location for installations :
8. Type of enclosure and :
ventilation
9. Degree of protection : Terminal box IP55
10. Type of duty :
11. No. of phases, frequency and : **3 / 50 / 3300**
voltage.
12. Permissible variations in
 - a. Voltage : $\pm 10 \%$
 - b. Frequency : $+ 3 \%$, -5%
 - c. Combined : 10 % absolute
13. At rated voltage & Frequency
 - a. Full load current : (amperes)
 - b. Full load speed : (rpm)
 - c. No load current : (amperes)
14. a. Minimum starting voltage : (volts)
b. Minimum permissible
running voltage
15. Maximum permissible time at
minimum permissible voltage :
during running at full load.



ANNEXURE - II
GENERAL TECHNICAL PARTICULARS
FOR HT & LT MOTORS OF BCW PUMP

SPECIFICATION NO.: SAGARIDGHI __ANNX-2

SECTION: Boiler Mountings/PE(FB)

REV. NO. : 00

DATE: 06.03.19

PAGE NO : 2 OF 6

16. Maximum permissible time at
85% of rated voltage during :
running at full load.
17. Whether motor stalls at 70% of :
rated voltage
18. Efficiency and Power Factor :
Load
(% of full load)
100
50
25
0
At start
19. Stator Winding:
i. Connection :
ii. Type & Nos. of terminals :
brought out
iii. Resistance between :
terminals at 20°C
iv. Resistance per phase at :
20°C
20. Starting current as % of full load
current:
i. With IS tolerance :
ii. Without IS tolerance :
21. Torque at full load in Kg. m. :
22. Break down torque in % full load :
torque.
- 23a. Pull up torque in % of full load :
torque.
- 23b. Starting torque in % of full load
torque
24. Pull out torque in % of full load :
torque



ANNEXURE - II
GENERAL TECHNICAL PARTICULARS
FOR HT & LT MOTORS OF BCW PUMP

SPECIFICATION NO.: SAGARIDGHI __ANNX-2

SECTION: Boiler Mountings/PE(FB)

REV. NO. : 00

DATE: 06.03.19

PAGE NO : 3 OF 6

25. Starting time in sec. :
- i. With rated voltage :
 - ii. With 80% of rated voltage :
 - iii. With 110% of rated voltage :
 - iv. With min. permissible voltage (%) :
26. Safe stall time (Hot motor)
- i. At rated voltage :
 - ii. At 80% of rated voltage :
 - iii. At 110% of rated voltage :
 - iv. At min. permissible voltage (%) :
27. Safe stall time (Cold motor)
- i. At rated voltage :
 - ii. At 80% of rated voltage :
 - iii. At 110% of rated voltage :
 - iv. At minimum permissible voltage (%) :
28. Whether speed switch is provided, if required. :
29. Limiting rotor temperature to determine safe stall time. :
30. Permissible maximum accelerating time (hot motor): :
- i. At rated voltage :
 - ii. At 80% of rated voltage :
 - iii. At 110% of rated voltage :
 - iv. At min. permissible voltage (%) :
31. Permissible maximum accelerating time (Cold Motor)
- i. At rated voltage :
 - ii. At 80% of rated voltage :
 - iii. At 110% of rated voltage :
 - iv. At min. permissible voltage (%) :
32. Insulation:
- i. Class of insulation :
 - ii. Material & treatment of insulation. :



ANNEXURE - II
GENERAL TECHNICAL PARTICULARS
FOR HT & LT MOTORS OF BCW PUMP

SPECIFICATION NO.: SAGARIDGHI __ANNX-2

SECTION: Boiler Mountings/PE(FB)

REV. NO. : 00

DATE: 06.03.19

PAGE NO : 4 OF 6

33. Whether insulation is suitable for 3.3 KV :
ungrounded system.
34. Maximum temperature rise over cooling water
inlet temperature of **39°C** (ambient temperature
45°C).
35. Method of starting :
36. Permissible starting duty cycles : Two hot starts in succession with
motor cavity at normal running
temperature.
37. Stator thermal time constant :
38. Maximum permissible voltage during high speed :
bus transfer and special design feature.
39. Time required for voltage to decay down to :
when driving voltage is removed.
50% RV 40% RV 25% RV Zero %
40. Method of cooling
41. Details of water cooling system
- i. No. of coolers
- ii. Water requirement per cooler : One / Motor
- iii. Losses removed by cooler :
- iv. Max. permissible temperature of
cooling water at inlet.
- v. Maximum permissible temperature
of cooling water at outlet.
- vi. Maximum permissible pressure at
water outlet.
- vii. Water pressure drop through the cooler
- viii. Temp. rise of water through cooler
- ix. Arrangement to ensure the water flow
42. Bearing :
- i. Number :
- ii. Type :
- iii. Lubrication system :



ANNEXURE - II
GENERAL TECHNICAL PARTICULARS
FOR HT & LT MOTORS OF BCW PUMP

SPECIFICATION NO.: SAGARIDGHI __ANNX-2

SECTION: Boiler Mountings/PE(FB)

REV. NO. : 00

DATE: 06.03.19

PAGE NO : 5 OF 6

- iv. Quantity of lubricant required for both the bearings. :
- v. Life in hours at rated speed. : > 30,000 hours
- vi. Bearing end play :
- vii. Max. permissible temp. of bearing :
43. Terminal designation correspond to direction of rotation (Facing Driving end) :
44. Terminal boxes with accessories- Separate terminal boxes provided. :
45. Main Terminal Box details
- i. Type and Nos. :
- ii. Fault level permissible for 0.25 sec. :
- iii. Location :
- iv. Cable gland size & No. : Will be intimated later
- v. Direction of cable entry :
46. Type of mounting :
47. Shaft orientation :
48. Grounding pads size Nos. & Location
49. Motor GD² : kg.m²
50. Lifting Device (Motor) :
51. Weight
- i. Weight of stator (wound) Kg. :
- ii. Weight of rotor (wound) Kg. :
- iii. Weight of base plate :
- iv. Weight of copper :
- v. Net weight of motor :
52. Shipping dimensions & weight :
53. Characteristic curves attached



ANNEXURE - II
GENERAL TECHNICAL PARTICULARS
FOR HT & LT MOTORS OF BCW PUMP

SPECIFICATION NO.: SAGARIDGHI __ANNX-2

SECTION: Boiler Mountings/PE(FB)

REV. NO. : 00

DATE: 06.03.19

PAGE NO : 6 OF 6

- i. Speed Vs current at rated voltage :
 - ii. Speed Vs Torque at 110%, 100%, 90% and 80% of rated voltage, superimposed thereon speed torque curve of driven equipment. :
 - iii. Thermal withstand curve for hot and cold conditions. :
 - iv. Efficiency Vs load :
 - v. pf Vs load :
 - vi. Current Vs time :
 - vii. Negative phase sequence curve :
54. Drawing attached:
- i. General Arrangement of motor :
 - ii. Main terminal box showing the method of terminating the Board's incoming cables. :
 - iii. Instruction manuals :
55. Paint Shade : RAL BLUE 5012
56. **Alarm Temperature Value :**
57. **Trip Temperature Value: :**
58. **Alarm Values:**
- a) Heat Exchanger cooling water flow (alarm only) :
 - b) Heat Barrier Cooling water flow :
 - c) Differential Temperature between pump casing and suction tank (Trip) :
 - d) Vibration :
59. **Vibration Limit :2.8mm/s rms**



ANNEXURE - III
SPECIFICATION FOR FLOW RATOR
OF BCW PUMP

SPECIFICATION NO.: SAGARDIGHI _ANNX-3

SECTION : Boiler Mountings / PE(FB)

REV. NO. : 00

DATE : 06.03.19

PAGE NO: 01 of 01

(TO BE FILLED/COMPLIED UP AND SUBMITTED BY BCWP VENDOR)

<u>SL.NO.</u>	<u>FEATURES</u>	<u>ESSENTIAL/MINIMUM REQUIREMENTS</u>
01.	Type of Flow Rator	Variable area linear scale
02.	Fluid media	Water at 22 Kg/cm ² (g) pressure
03.	Accuracy	± 2% of full-scale range.
04.	Material of body	Transparent toughened glass (If alternate material is used Vendor to specify alternate material and justification for using alternate material).
05.	Output	Dial type indicator and electrical contact output
06.	Sensor Mechanism	Magnetic float
07.	Material of float	316 SS
08.	Housing protection class	IP-55
09.	No. of Contacts	2 NO+ 2 NC, SPDT snap action dry contact
10.	Adjustment of Indicator	Yes
11.	Rating of contact	5A, 240 V AC or 0.25A, 220V DC
12.	Relay Amplifier	Required for getting the No. of contacts and its rating indicated in SI.Nos. 9 & 11.
13.	Power supply for Relay Amplifier	The power supply for Relay Amplifier shall be 240V AC. Vendor to take note of the above and supply of power pack to suit the power requirement of the relay amplifier and sensor.
14.	Enclosure for Relay Amplifier	The Relay Amplifier shall be housed in a suitable enclosure with IP-55 protection class.
15.	Accessories for Relay Amplifier enclosure	The enclosure shall have a gland plate for cable entry. Cable glands suitable for entry of input, output signal cable and the power cable shall be supplied as accessories.
16.	Inlet / Outlet Line size	Motor Cooler - 2" ANSI 300 CLASS Heat Barrier – 1 " ANSI 300 CLASS
17.	Inlet / Outlet Flange connection details	
	a) Size :	Motor Cooler-2"
	b) ANSI Rating :	ANSI 300 CLASS
18.	Design Pressure	27 bar
19.	Design temperature	50 deg c
20.	Flow requirement	Vendor to Decide.



**ANNEXURE - IV
TEMPERATURE SENSING ELEMENTS
OF BCW PUMP**

SPECIFICATION NO.: SAGARDIGHI_ANNX-4

SECTION : Boiler Mountings / PE(FB)

REV. NO. : 00

DATE : 02.03.19

PAGE NO: 01 of 01

<u>SL.NO.</u>	<u>FEATURES</u>	<u>ESSENTIAL/MINIMUM REQUIREMENTS</u>
01.	(a) Type of Thermocouple	16 AWG wire of Chromel-Alumel (Type K) or 24 AWG wire Pt-Rhodium Pt (Type R), Ungrounded type depending on operating temperature range.
	(b) Type of RTD	4 wire-pt RTD 100 ohm (as per DIN-43760)
02.	No. of element	Duplex
03.	Housing/Head	IP-55/Diecast aluminum (Where applicable)
04.	(a) Sheathing of Thermocouple	Swaged type magnesium Oxide insulation.
	(b) Sheathing of RTD	Metal sheathed, ceramic packed.
05.	Calibration and accuracy	As per IEC-751/ANSI-C-96, 1 0.5% of range for RTD.
06.	Characteristic	Linear with respect to temp, within $\pm 1/2$ percent of top range value.
07.	Accessories	Thermo well of 316 SS tapered, solid bore.
08.	Standard	ANSI C 96.1 for Thermocouple and ASME PTC-19.3 for Thermo well.
09.	Thermo well	One piece 316 SS, tapered drilled from Bar stock (As per ASME PTC 19.3-1974).



**ANNEXURE –V
DOCUMENT SUBMISSION SCHEDULE
FOR BCW PUMP**

SPECIFICATION NO.: **SAGARDIGHI _ANNX-5**

SECTION : Boiler Mountings/ PE(FB)

REV. NO. : 00

DATE : 02.03.19

PAGE NO: 01 of 01

1. G.A / dimensional drawings - 4 weeks from Purchase Order placement - For Approval.
2. Catalogs for Instrumentation - 4 weeks from Purchase Order placement - For information.
3. Instrument schedule covering type, range, make, accuracy etc. in BHEL STD.
Proforma - 6 weeks from Purchase Order placement - For Approval.
4. Final Motor Technical data sheet and characteristic curve 8 weeks from Purchase Order placement -
For Approval.
5. Motor terminal Box G.A. and dimensional drawing Final - 8 weeks from Purchase Order
placement - For Approval .
6. Mounting arrangement details of Blank plate with pump casing - 4 weeks from Purchase Order
placement - for information.
7. Routine / Type test procedure and report and Manufacturing quality plan – For approval.
8. O&M manual for loose instruments - 20 weeks from Purchase Order placement.
9. Final combined O&M manual including O&M instructions - 2 months before delivery.



**ANNEXURE - VI
SPECIFICATION FOR TEMPERATURE &
PRESSURE GAUGES OF BCW PUMP**

SPECIFICATION NO.: SAGARDIGHI: BCWP_ANX-VI

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 01

DATE: 08.01.2021

PAGE NO : 1 OF 1

SL.NO.	FEATURES	ESSENTIAL/MINIMUM REQUIREMENTS	
		Pressure gauge	Temperature gauge
01.	Sensing Element and material.	Bourdon for high pressure, Diaphragm/Bellow for low pressure of 316 SS	Mercury in steel below 450°C and actuated for above 450°C of SS bulb capillary.
02.	Body material	Die-cast aluminium	Die-cast aluminium
03.	Dial size	150 mm	150 mm
04.	End connection	1/2 inch NPT (F)	3/4" NPT (F)
05.	Accuracy	± 1% of span	± 1% of span
06.	Scale	Linear, 270° arc graduated in metric units.	Linear, 270° arc graduated in ° C.
07.	Range selection	Cover 125% of max. of scale	Cover 125% of max. of scale.
08.	Over range test	Yes	Yes
09.	Housing	Weather and dust proof as per NEMA-4	Weather and dust proof as per NEMA-4.
10.	Zero/Span adjustment	To be provided	To be provided.
11.	Identification	Engraved with service legend or engraved phenolic laminated tag plate.	Engraved with service legend or laminated phenolic name plate.
12.	Accessories	Blow out disc, syphon, snubber, pulsation, dampener, chemical seal (if required by process) and gauge isolation valve.	SS Thermo well.
13.	Material of Bourdon movement	316 SS/304 SS	316 SS/304SS
14.	Capillary length	6.1 mtrs. (20 feet)	6.1 mtrs. (20 feet)

Bharat Heavy Electricals Limited

HIGH PRESSURE BOILER PLANT , TIRUCHIRAPPALLI 620 014.

TECHNICAL DELIVERY CONDITIONS


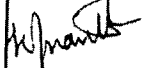
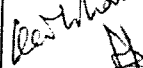
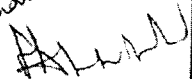
FOR SUB - DELIVERY COMPONENTS OF CONTROLS AND INSTRUMENTATION

TDC : TCI : 105 / REV 07

PAGE 01 OF 04

TEMPERATURE GAUGE

WITH THERMOWELL ✓

Rev. No.	DATE	DESCRIPTION	PREPARED	REVIEWED	APPROVED	
					ENGG	QAC
01,02 03,04	----	General Revisions	Sd/-	Sd/-	Sd/-	Sd/-
05	09.07.93	Page Number added	Sd/-	Sd/-	Sd/-	Sd/-
06	16-06-97	General Revisions	S/d	S/d	S/d	s/d
07	29-03-04	Revised based on revisiting of the specification				

CL NO.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note:2)
1.0	<u>SITE CONDITIONS</u>		
1.1	Altitude above mean sea level	550 m.	
1.2	Ambient temperature condition	50°C.	
1.3	Relative humidity	100 %	
1.4	Atmosphere	Tropical ,Dusty, salty, corrosive and highly polluted.	
2.0	<u>GENERAL</u>		
2.1	Reference standard	BS 5235 / EN 837- 1,2,3	
2.2	Type	Direct - rigid stem type, Remote capillary type	
2.3	Scale	Industrial concentric 270 Deg linear.	
2.4	Sensing Element	Mercury / Liquid / Gas filled.	
2.5	Nominal Dial size	As specified in Data sheet	
2.6	Accuracy	± 1 % of FSD	
2.7	Over range protection	125% of max range.	
2.8	Dial Graduation	Graduated in degree C.	
2.9	Zero Adjustment	Micrometer adjustable from the front, after opening the bezel.	
2.10	Enclosure protection	Weather proof, water tight & dust tight IP 65 of IS 12063 / IS 13947 PART-I-1993 / IEC 529 / NEMA Equivalent	
2.11	Painting	Stoved, Enameled & anti - corrosive black painting or epoxy powder coated. (Not applicable for SS 304 casing)	
2.12	Identification	Separate SS tag. plate with tag. no. and service legend.	
3.0	<u>PROCESS CONDITION</u>		
3.1	Tag number	HAG27CT502	
3.2	Medium	Water Refer to Data Sheet	
3.3	Application	Cooling water return line temperature	
3.4	Operating Parameter	Pmax - 22 Kg/cm ² , Tmax - 60 deg C, Velocity max - 3 m/s	

CL NO.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note:2)
3.5	Range	0-100deg C	
3.6	Mounting & Entry	Remote mounting, Capillary type	
3.7	Process Connection	Threaded type, RC 1" <temperature stub drg attached>	
3.8	Thermowell immersion length	To be calculated by vendor	
3.9	Special Requirement		
4.0	<u>MATERIAL</u>		
4.1	Case	Die cast Aluminium / SS 304	
4.2	Bourdon	Chrome moly steel or AISI 316 SS	
4.3	Bezel	Die cast aluminium with screwed ring type / SS 304 with Snap Action Bayonet type..	
4.4	Movement assembly	AISI 304 SS	
4.5	Bulb and stem	AISI 316 SS	
4.6	Capillary	AISI 316 SS	
4.7	Flexible Armouring	AISI 304 SS	
4.8	Thermowell	AISI 316 SS	
4.9	Window	Shatter proof glass .	
5.0	<u>DIMENSIONS</u>		
5.1.0	Bulb		
5.1.1	OD	12 mm	
5.1.2	Bulb to thermowell	Manufacturer's Standard	
5.1.3	Capillary length	5 metres	
5.2.0	Thermowell		
5.2.1	Specification	As per ASME performance test code (PTC-19.3)	
5.2.2	Thermowell bore dia	Suitable to accommodate sensing bulb	
5.2.3	Type	Bar stock / tapered	
5.2.4	Test pressure	200 Kg / sqcm	
6.0	Response time (without thermowell)	Refer QP	

CL NO.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note:2)
7.0	<u>INSPECTION & TESTING</u>	As per quality plan QA:CI:STD:QP:02 (Latest revision)	
8.0	<u>DOCUMENTS</u>		
8.1	6 sets of the following;	<ol style="list-style-type: none"> 1. T.C. for routine test for each gauge 2. T.C. for type test 3. Material certificate for bourdon, bulb and capillary 4. Guarantee certificate 5. Calibration certificate 6. IBR form ILLC or Equivalent for thermowell. 	
8.2	CD & 2 sets of Original;	<ol style="list-style-type: none"> 1. Catalogues. 2. O & M manuals 	
9.0	<u>PACKING</u>	As per Packing Procedure QA:CI:STD:PR: 04 (Latest revision)	

NOTE:

1. Refer current valid list for revision status of Quality Plan, Drawing No & Packing Procedure.
2. In 'Vendor Compliance' column, vendor shall indicate 'YES', 'NO' or 'NOT APPLICABLE'.
3. Vendor to submit GA Drawing of Gauge & thermowell in AutoCAD and data sheet. In MS WORD for BHEL's approval.



**CHECKLIST FOR BOILER
CIRCULATING WATER PUMP**

SPECIFICATION NO: SAGARDIGHI_ BCWP_CHKLIST

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 00

DATE: 06.03.19

PAGE NO : 1 OF 3

Vendor should submit this Filled up Check List signed and Company seal affixed on each page along with Technical and Unpriced Offer / Quotation during initial submission and with each revised submission. Wherever it is not applicable, vendor should not leave blank or indicate "NO" but should indicate. "NOT APPLICABLE" only. Offer will not be evaluated without receipt of filled up check list signed and company seal affixed.

Sl.No.	ENCLOSURES AS SPECIFIED	ENCLOSURE/CONFIRMATION
01.	Vendor's offer (Unpriced Bid) showing the entire Item / Part Sl. Nos. and quantities item-wise (Original equipment, Commissioning Spares, Special Tools & Mandatory Spares) matching with Enquiry Sl. Nos. and Quantities.	Initial Submission 'YES / NO' Revised Submission 'YES / NOT APPLICABLE'
02.	Vendor has to indicate Optional Price for <ol style="list-style-type: none">1) Hot type tests (if applicable).2) Vendor supervision for Erection & Commissioning.3) Training at vendor's works.	
03.	Completely filled up BHEL Datasheets for <ol style="list-style-type: none">1) Annexure-I.2) Annexure-II.3) Annexure-III (Flow Rator).4) Filled up BHEL Table-A.	
04.	Vendor to confirm the following: <ol style="list-style-type: none">1) IBR Form-III C compliance.2) List of special tools adequate for dismantling and assembling of Motor Assembly.3) Number of Low Pressure cooling water flow rator quoted adequate for motor heat exchanger and <u>Heat Barrier</u> (if applicable for model offered).4) Lifting lugs quantity for motor assembly sufficient for all three pumps in a boiler.5) Voltage of electric heating rods (for stud tensioning) is 230 Volts A.C.6) Studs and Nuts offered for pump & motor joints during normal operation can be used for pump case and blind flange during Boiler Hydro Test.7) BHEL manufactured Motor cooler supplied for previous projects is suitable for this project also.8) Pump case with single suction vertical nozzle and single discharge Nozzles.	YES / Not applicable

VENDOR NAME :



**CHECKLIST FOR BOILER
CIRCULATING WATER PUMP**

SPECIFICATION NO: SAGARDIGHI_ BCWP_ CHKLIST

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 00

DATE: 06.03.19

PAGE NO : 2 OF 3

Sl.No.	ENCLOSURES AS SPECIFIED	ENCLOSURE/CONFIRMATION
04. (contd)	<ol style="list-style-type: none">9) Sockets provided on Motor for high-pressure connection to Motor Cooler and suitable for Socket welding of 1½” SCH 160 BHEL pipe.10) Socket provided on motor for Fill and Drain connection and suitable for socket welding to 1” SCH 160 pipe.11) 3 Separate Terminal boxes, one for each phase for motor power supply with gland plate and cable glands. The gland plate is of non-magnetic material.12) Suction & discharge nozzles edge preparation dimension and style confirmed as indicated in BHEL specification.13) 1” socket welded hole provided in the suction and Discharge Nozzles as indicated in BHEL specification.14) Drawing of Blanking Plate required for Pump Hydro Test showing all dimensions, materials, number of bolts, Lifting lugs , spacer tubes (if applicable) etc.15) General Assembly Drawing showing all major dimensions, pump & motor lifting lugs, correct orientation, edge preparation details and instrumentation enclosed.16) Vendor’s P&ID showing scope of supply, instrumentation and their set points enclosed.17) Cross sectional drawing showing Bill of Materials.18) Terminal box drawing showing Bill of Materials.19) Pump performance curves for specific gravity = 1.0 showing flow in m³/hr on ‘X’ axis and (i) Head, (ii) Pump Efficiency, (iii) Shaft power, (iv) NPSH all on ‘Y’ axis.20) Motor performance curves showing output KW on ‘X’ axis and (i) Current, (ii) Motor Input Power KW, (iii) Speed rpm, (iv) Power factor and (v) Motor efficiency all on ‘Y’ axis.21) Motor starting characteristic curve – Current vs Time curves for different voltages.22) Current vs Speed curves for different voltages.23) Thermal Limit vs Time curves at both hot and cold condition.24) Torque vs Speed curves for different voltages.	



**CHECKLIST FOR BOILER
CIRCULATING WATER PUMP**

SPECIFICATION NO: SAGARDIGHI_ BCWP_ CHKLIST

SECTION: Boiler Mountings/PE (FB)

REV. NO.: 00

DATE: 06.03.19

PAGE NO : 3 OF 3

Sl.No.	ENCLOSURES AS SPECIFIED	ENCLOSURE/CONFIRMATION
04. (contd)	<p>25) Heat Barrier Inlet and Outlet Flange size (if applicable for offered model) – Size 1”, ANSI 300 RF, Line Size 1” and Flexible Hose Size 1”.</p> <p>26) Cold water pump efficiency is considered to obtain electrical input to motor for operating points in BHEL Table-A. (i.e. Karassik correction factor not used).</p> <p>27) Technical deviation or comments to specification (only if particular specification is not applicable to offered model) enclosed. (Not bringing out comments / deviations will be treated as complying with specification.)</p> <p>28) No contradiction between values / figures , models etc indicated in unpriced bid, datasheets , Performance curves and drawings enclosed.</p> <p>29) The tolerances for the acceptance criteria for the test results shall be as per the specification for the guaranteed values (duty point).</p>	



BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI - 620 014, INDIA.
QUALITY ASSURANCE DEPARTMENT

STANDARD QUALITY PLAN FOR BOILER WATER CIRCULATION/
START-UP SYSTEM RE-CIRCULATION PUMPS (BWCP/BRCP)

SQP:SD:08 Rev 00

Page: 1 of 8

Prepared By
Quality Assurance

VENKANNA RUPANI

R. Venkanna
11/12/2018


Reviewed by	Signature
Quality Assurance (G. PANNEER SELVAM)	 11/12/18
Engineering / FB (K. SRIDHARAN)	 11/12/2018
Materials Management / BOI (PRATEEK KUMAR JAIN)	 11/12/2018
Quality Control (R. DHARMA)	 11/12/18

Rev No	Date	Approved by	Signature
00	11/12/2018	AGM / QA & BE	 11/12/18

Record of Revisions

Rev No	Details of Revision	Remarks
00	Fresh Issue	

Proprietary Data - For Internal Use Only


	MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS	STANDARD QUALITY PLAN							QWI NO: SQP:SD:08 REV.NO.00 DATE: 11/12/2018 PAGE: 2 OF 8				
		PRODUCT: BOILER WATER CIRCULATION/START-UP SYSTEM RE-CIRCULATION PUMPS (BWCP/BRCP)											
		SUB-SYSTEM :Steam Generator Package											
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N				M	C	N	
1	2	3	4	5	M	C/N	7	8	9	D*	**	10	11

1.0	RAW MATERIALS:													
1.1	Pump/Spherical Casing; Operating cover for pump casing, if applicable.	Chemical & Mechanical Properties, Hardness, High temp. tensile testing	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	IBR Form III-G shall be submitted.
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V	
		Internal Soundness (UT) after rough machining	B		100%	100%	ASME Sec. V	Refer Note 2 (b).		√	V	V	V	
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V	
1.2	Discharge Nozzles; Suction Nozzles, if applicable	Chemical & Mechanical Properties, Hardness, High temp. tensile testing	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	IBR Form III-G shall be submitted.
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V	
		Internal Soundness (UT) after rough machining	B		100%	100%	ASME Sec. V	Refer Note 2 (b).		√	V	V	V	
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V	
1.3	Flanges	Chemical & Mechanical Properties, Hardness	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V	
		Internal Soundness (UT)	B		100%	100%	ASME Sec. V	Refer Note 2 (b).		√	V	V	V	
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V	
		Surface condition & dimensions	B	Visual & Measurement	100%	100%	Manufacturer's procedure & drawing	No harmful defects & Mfg's drawing	IR	√	P	V	-	
1.4	Pipes	Chemical & Mechanical Properties,	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	IBR Form III-A shall be submitted.
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V	
		Internal Soundness (UT)	B		100%	100%	ASME Sec. V	ASME E213		√	V	V	V	
		Bend test	B		100%	100%	IBR	IBR		√	V	V	V	
1.5	Thermometer sleeve	Chemical & Mechanical Properties	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V	
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V	


LEGEND: D* - RECORDS IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY THE SUPPLIER IN QA DOCUMENTATION;
**** M:** MANUFACTURER, **C:** BHEL QC/BHEL AIA, **N:** CUSTOMER; **P:** PERFORM. **W:** WITNESS, **V:** VERIFICATION; **CLASS:** A - CRITICAL; B - MAJOR; C - MINOR;
MTC- Manufacturer's Test Certificate; TC: Test Certificate; IR- Inspection/Test Report; (R): Routine test; (I)/(I's): Type test, COC: Certificate of Compliance

		MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS		STANDARD QUALITY PLAN					PRODUCT: BOILER WATER CIRCULATION/START-UP SYSTEM RE-CIRCULATION PUMPS (BWCP/BRCP)					QWI NO: SQP:SD:08 REV.NO.00 DATE: 11/12/2018 PAGE: 3 OF 8	
		SUB-SYSTEM :Steam Generator Package													
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	M	C/N	7	8	9	D*	M	C	N	11	
1.6	Studs (Pump casing to motor casing, motor casing/cover to thrust bearing case/housing)	Chemical & Mechanical Properties, Hardness	B	TC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	TC	√	V	V	-		
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	-		
		Internal Soundness (UT)	B		100%	100%	ASME Sec. V	Refer Note 2 (b).		√	V	V	-		
		Marking check	C		100%	100%	Manufacturer's procedure			-	P	-	-		
1.7	Nuts (Pump casing to motor casing, motor casing/cover to thrust bearing case/housing)	Chemical Properties, Hardness	B	TC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	TC	√	V	V	-		
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	-		
		Surface Soundness (MT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c).		√	V	V	-		
		Proof load test on specimen nuts	B		Specimen Nuts		Matl Spec & Grade	Matl Spec & Grade		√	V	V	-		
1.8	Heat Barrier & Thrust Bearing Case/Housing, as applicable	Chemical & Mechanical Properties, Hardness, High temp. tensile testing	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	IBR Form III-G shall be submitted.	
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V		
		Internal Soundness (UT) after rough machining	B		100%	100%	ASME Sec. V	Refer Note 2 (b).		√	V	V	V		
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V		
1.9	Motor Casing & Cover	Chemical & Mechanical Properties, Hardness, High temp. tensile testing	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	IBR Form III-G shall be submitted.	
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V		
		Internal Soundness (UT)	B		100%	100%	ASME Sec. V	Refer Note 2 (b).		√	V	V	V		
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V		
1.10	Welding Lug Plates	Chemical & Mechanical Properties	B	TC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	TC	√	V	V	-		
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	-		
		Internal Soundness (UT)	B		100%	100%	ASME Sec. V	SA578 Level B		√	V	V	-		


LEGEND: D* - RECORDS IDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY THE SUPPLIER IN QA DOCUMENTATION;
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		STANDARD QUALITY PLAN						QWI NO: SQP:SD:08 REV.NO.00 DATE: 11/12/2018 PAGE: 4 OF 8							
MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS		PRODUCT: BOILER WATER CIRCULATION/START-UP SYSTEM RE-CIRCULATION PUMPS (BWCP/BRCP)													
		SUB-SYSTEM :Steam Generator Package													
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS	
					M	C/N			9	D*	M	C	N		
1	2	3	4	5	M	C/N	7	8	9	D*	**	10	11		
1.11	Impeller	Chemical & Mechanical Properties, Hardness, High temp. tensile testing	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V	IBR Form III-F shall be submitted.	
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V		
		Internal & Surface Soundness (NDE#)	B		100%	100%	ASME Sec. V	Refer Note 2.		√	V	V	V		#Shall be as per BHEL Engineering/ Purchase Specification.
		Surface condition & dimensions	B		Visual & Measurement	100%	100%	Manufacturer's procedure & drawing		No harmful defects & Mfg's drawing	IR	√	P		
1.12	Shaft	Chemical & Mechanical Properties, Hardness, High temp. tensile testing	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V		
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V		
		Internal Soundness (UT)	B		100%	100%	ASME Sec. V	Refer Note 2 (b).		√	V	V	V		
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V		
		Surface condition & dimensions	B	Visual & Measurement	100%	100%	Manufacturer's procedure & drawing	No harmful defects & Mfg's drawing	IR	√	P	V	-		
1.13	Winding Cables	Insulation resistance	B	Electrical measurement & TC Review	100%	100%	Mfr. Standard	≥5000MΩ (DC 1000V-1 min)	TC	√	P	V	V		
		High Voltage Test (Dielectric Test)	B		100%	100%	Mfr. Standard	No Abnormality (2E+1000 V-1min)		√	P	V	V		
		Specific resistance measurement	B		100%	100%	Mfr. Standard	≤0.01786Ωmm ² /m (at 20°C)		√	P	V	V		
1.14	Socket	Chemical & Mechanical Properties	B	MTC Review	1/ Heat	1/ Heat	BHEL approved datasheet	BHEL approved datasheet	MTC	√	V	V	V		
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V		
		Surface Soundness (MT/PT)	B		100%	100%	ASME Sec. V	Refer Note 2 (c) / 2 (d).		√	V	V	V		

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MTC- Manufacturer's Test Certificate; TC: Test Certificate; IR- Inspection/Test Report; (R): Routine test; (I)/(Ts): Type test, COC: Certificate of Compliance


		MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS		STANDARD QUALITY PLAN					PRODUCT: BOILER WATER CIRCULATION/START-UP SYSTEM RE-CIRCULATION PUMPS (BWCP/BRCP)					QWI NO: SQP:SD:08 REV.NO.00 DATE: 11/12/2018 PAGE: 5 OF 8		
		SUB-SYSTEM :Steam Generator Package														
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS			
					M	C/N				M	C	N				
1	2	3	4	5	M	C/N	7	8	9	D*	** 10	11				
1.15	All Valves including non-return & isolation valves, if included in scope of supply.	Chemical & Mechanical Properties	B	TC Review	1/ Heat	1/ Heat	ASME B16.34	ASME B16.34	MTC	√	V	V	V	IBR Form III-C shall be submitted.		
		Heat Treatment	B		100%	100%	ASME B16.34	ASME B16.34		√	V	V	V			
		Internal Soundness (RT/UT)	B		100%	100%	ASME B16.34	ASME B16.34		√	V	V	V			
		Surface Soundness (MT/PT)	B		100%	100%	ASME B16.34	ASME B16.34		√	V	V	V			
		Hydrostatic Test	A		Pressure Test	100%	100%	ASME B16.34		No leak	√	V	V		V	
		Surface condition & dimensions	B		Visual & Measurement	100%	100%	ASME B16.34		ASME B16.34	IR	√	P		V	-
1.16	Heat Exchanger/ Motor Cooler	Chemical & Mechanical Properties	B	TC Review	100%	100%	BHEL approved datasheet	BHEL approved datasheet	TC	√	V	V	V	IBR Form III-C shall be submitted.		
		Heat Treatment	B		100%	100%	Matl Spec	Matl Spec		√	V	V	V			
		Hydrostatic test	A	Pressure Test	100%	100%	ASME Sec VIII Div 1	No leakage	MTC	√	P	V	V			
		Surface condition & dimensions	B	Visual & Measurement	100%	100%	Manufacturer's procedure & drawing	No harmful defects & Mfg's drawing	IR	√	P	V	-			
2.0	INPROCESS CONTROLS															
2.1	Welding Qualifications	Procedure	B	Review	100%	100%	ASME Sec IX	ASME Sec IX	WPS & PQR	√	P	V	V			
		Personnel /Operators	B	Review	100%	100%	IBR@	IBR@	WPQ	√	P	V	V		@Refer Note 3.	
2.2	Machining of Casings, Shafts	Workmanship, Finish & Dimensions	B	Visual & Measurement	100%	100%	Manufacturer's Drawing	Manufacturer's Drawing	IR	√	P	V	V			
2.3	Fit-up Inspection	Location, height, Orientation	B	Measurement	100%	100%	Manufacturer's Drawing	Manufacturer's Drawing	IR	√	P	V	-			
2.4	Butt Joints- Critical welds	Weld Quality	B	NDE-RT/UT	100%	100%	ASME Sec V	Refer Note 2 (a) / 2 (b).	IR	√	P	V	V	\$Refer Note 4.		
2.5	Other butt joints	Weld Quality	B	NDE-RT/UT	10%#	10%#	ASME Sec V	Refer Note 2 (a) / 2 (b).	IR	√	P	V	V	# of total butt welds		
2.6	All Fillet Welds	Weld Quality	B	NDE-MT/PT	100%	100%	ASME Sec V	Refer Note 2 (c) / 2 (d).	IR	√	P	V	V			
2.7	Post Weld Heat Treatment (PWHT)	Time vs Temp, Soaking Time	A	Review	100%	100%	WPS & IBR@	WPS & IBR@	HT Chart	√	P	V	V	@Refer Note 3.		

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		MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS					STANDARD QUALITY PLAN				QWI NO: SQP:SD:08 REV.NO.00 DATE: 11/12/2018 PAGE: 6 OF 8			
PRODUCT: BOILER WATER CIRCULATION/START-UP SYSTEM RE-CIRCULATION PUMPS (BWCP/BRCP)														
SUB-SYSTEM :Steam Generator Package														
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
					M	C/N			9	D*	M	C	N	
1	2	3	4	5	M	C/N	7	8	9	D*	**	10	11	
2.8	Hydrostatic test	Leak tightness of pump casing, motor casing	A	Visual	100%	100%	@1.5x design pressure & GDCD Standard: 143	No leakage	IR	√	P	W	V	IBR Form III-C shall be submitted.
2.9	Rotor Assembly (Impeller & Shaft) Test	Dimensions & True running test, dynamic balancing	A	Measurement & Visual	100%	100%	GDCD Standards (192 & 143) & Manufacturer's Standard	BHEL Specification & BHEL approved datasheet	IR	√	P	V	V	
2.10	Terminal Glands	Dimensions	C	Visual	100%	100%			IR	√	P	V	-	
		Partial discharge test/ Insulation Resistance test	B	Measurement	100%	100%			IR	√	P	V	-	
3.0 Routine Tests (R) on Assembled Motor – Refer Note 1.														
3.1	Inspection of winding	Inspection of winding – Stator Assy & Rotor Assy	A	Visual	100%	100%	GDCD Standards (192 & 143) & Manufacturer's Standard	BHEL Specification & BHEL approved datasheet	IR	√	P	W	V	
3.2	Direction of rotation check	Direction of rotation	A	Visual	100%	100%			IR	√	P	W	V	
3.3	High voltage (Dielectric) test	High voltage (Dielectric) test	A	Measurement	100%	100%			IR	√	P	W	V	
3.4	Insulation resistance test	Insulation resistance	A		100%	100%			IR	√	P	W	V	
3.5	Insulation resistance during hydrostatic test	Insulation resistance during hydrostatic test	A	Measurement	100%	100%	GDCD Standards (192 & 143) & Manufacturer's Standard	BHEL Specification & BHEL approved datasheet	IR	√	P	W	V	
3.6	Winding resistance test	Winding resistance	A		100%	100%			IR	√	P	W	V	
3.7	No load test	No load characteristics	A		100%	100%			IR	√	P	W	V	
3.8	Locked-rotor	Locked-rotor	A		100%	100%			IR	√	P	W	V	
3.9	Single-Phase measurement test	Single-Phase measurement	A		100%	100%		IR	√	P	W	V		
4.0 Routine Tests (R) on Pump & Motor Assembly – Refer Note 1.														
4.1	Performance	Performance	A	Visual & Measurement	100%	100%	GDCD Standards (192 & 143) & Manufacturer's Standard	BHEL Specification & BHEL approved datasheet	IR	√	P	W	V	
4.2	Unit run at rated	Unit run at rated duty	A		100%	100%			IR	√	P	W	V	
4.3	Starting current at rated voltage	Starting current at rated voltage	A		100%	100%			IR	√	P	W	V	
4.4	Cold Start-up	Cold Start-up characteristics	A		100%	100%			IR	√	P	W	V	
4.5	Over speed test	Over speed characteristics	A		100%	100%			IR	√	P	W	V	
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SUB-SYSTEM :Steam Generator Package															
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	M	C/N	7	8	9	D*	M	C	N	11	
4.6	Noise level test	Noise level	A	Visual & Measurement	100%	100%	GDGD Standards (192 & 143) & Manufacturer's Standard	BHEL Specification & BHEL approved datasheet /drawing	IR	√	P	W	V		
4.7	Vibration test	Vibration level	A		100%	100%			IR	√	P	W	V		
4.8	NPSH measurement	NPSH	A		100%	100%			IR	√	P	W	V		
4.9	Temperature rise test	Temperature rise	A		100%	100%			IR	√	P	W	V		
4.10	Under voltage test	Under voltage characteristics	A		100%	100%			IR	√	P	W	V		
4.11	Quality Assurance proof test	Quality Assurance proof	A		100%	100%			IR	√	P	W	V		
4.12	Endurance test of motor windings, joints & terminal seals/glands	Endurance of motor windings, joints & terminal seals/glands	A		100%	100%			IR	√	P	W	V		
4.13	Visual & overall dimensional check	Surface conditions and Overall dimensions	A		100%	100%			IR	√	P	W	V		
4.14	Inspection of dismantled unit	Inspection of dismantled unit	A	100%	100%	IR	√	P	W	V					
5.0	Type Tests (Ts) on Pump & Motor Assembly – Refer Note 1 & 5.														
5.1	Test to establish unit functioning at rated temperature and pressure	Test to establish unit functioning at rated temperature and pressure	A	Visual & Measurement	One/ Project	One/ Project	GDGD Standards (192 & 143) & Manufacturer's Standard	BHEL Specification & BHEL approved datasheet	IR	√	P	W	V		
5.2	Hot standstill test	Hot standstill test	A		IR	√			P	W	V				
5.3	Hot start-up test	Hot start-up test	A		IR	√			P	W	V				
6.0	PAINTING & PACKING														
6.1	Painting	Surface Preparation, Color Shade & DFT	B	Visual & Measurement	100%	100%	BHEL Specification & PO	BHEL Specification & PO	IR	√	P	V	-		
6.2	Marking/ Identification	W.O/DU No; SI Nos on Name plates, direction of rotation of pump & motor	B	Visual	100%	100%	BHEL Specification & PO	BHEL Specification & PO	IR	√	P	V	-		
6.3	Verification of completeness	Pump, Motor & piping	B	Visual	100%	100%	BHEL Specification & PO	BHEL Specification & PO	IR	√	P	V	-		
6.4		Accessories	B	Visual	100%	100%			IR	√	P	V	-		
6.5	Packing & Preservation	Tightness & Stability#, Preservation	B	Visual	100%	100%	As per Manufacturer's Standard procedure		IR	√	P	V	-	#All openings shall be closed.	

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		STANDARD QUALITY PLAN						QWI NO: SQP:SD:08 REV.NO.00 DATE: 11/12/2018 PAGE: 8 OF 8					
MANUFACTURER'S NAME & ADDRESS: BHEL TIRUCHIRAPPALLI APPROVED SUPPLIERS		PRODUCT: BOILER WATER CIRCULATION/START-UP SYSTEM RE-CIRCULATION PUMPS (BWCP/BRCP)											
		SUB-SYSTEM :Steam Generator Package											
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N				M	C	N	
1	2	3	4	5	M	C/N	7	8	9	D*	**	10	11

Notes:

- Customer inspection stages specified above, under column "N", shall be followed. Additional Customer witness/verification stages, if required, shall be as specified in BHEL PO.
- NDE Acceptance Norms:**
 - RT: For Raw Material Castings:** ASME Sec VIII Div 1 Appd 7 or DIN 1690-Part2-V 3.
For Welds: ASME Sec I PW-51.
For Valves only: ASME B16.34.
 - UT: For Raw Material Forgings:** ASME Sec VIII Div 2 Cl 3.3.4 or DIN EN 10228-3 Table 3 and 4 with 100% Examination, Table 5 and 6 for longitudinal defects, Quality class 3.
For Raw Material Pipes/Tubes: UT method & acceptance shall be as per ASTM E213.
For Plates: UT method shall be as per SA578 with acceptance as per ASTM 578 Level B.
For Welds: ASME Sec I PW-52.
For Valves only: ASME B16.34.
 - MT: For Raw Materials and Welds:** ASME Sec VIII Div 1 Appendix 6 or DIN EN 10228-1 / DIN EN 10228-2; Quality Class 3.
For Valves only: ASME B16.34.
 - PT: For Raw Materials and Welds:** ASME Sec VIII Div 1 Appendix 8 or DIN EN 10228-1 / DIN EN 10228-2; Quality Class 3.
For Valves only: ASME B16.34.
- If the Code of Design & manufacturing is other than IBR, then the welders/welding operators' qualification and PWHT shall be according to the provisions of this code. For Example, if the code of design & manufacturing is ASME BPVC, then, the welders/welding operators shall be qualified as per ASME Sec IX and PWHT shall be as per ASME Sec I.
- Critical Butt joints:** Nozzles to pump casing, any circumferential butt joints on the pumps/motor casings (when casing is made of two parts/halves), etc.
- Type tests on Pump & Motor Assembly** shall be carried out if indicated in the BHEL Purchase Order. Else, a report of previous type test, conducted not older than 5 years, for the pump of similar rating & parameters shall be submitted to BHEL Engineering for review and acceptance.
- The latest editions/ revisions of the above mentioned /referred standards / procedures /specifications shall be used.**

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PART-I (No Deviation Certificate)

Note: The following Declaration to be submitted on the bidder's Letter Head, duly signed & stamped and to be attached along with your Technical bid of the tender.

===== **Boiler Circulating Water Pump along with its Commissioning Spares, Special Tools, Mandatory Spares and Erection & Commissioning Support.** =====

Enquiry No.: **1802100225 dated 10.12.2021**

I/We M/s.
have read and clearly understood all the Terms and conditions in Tender Schedule of and accordingly accept the same without any deviation what so ever.

- *I/ We unconditionally agree to all the tender conditions and no new conditions are imposed by us in the technical / price bid. I understand in the event of imposing any condition in the technical / price bid, such condition would be ignored by BHEL and only the prices will be considered for the purpose of evaluation". In case of any deviation (Technical or commercial) the same is mentioned below.*

SPECIFICATION	a) Specification for BCW Pump: BWCP_MAIN SPEC Rev: 01. b) Controls and Instrumentation Requirements of BCW Pump: BCWP_C&I_REQ Rev: 00. c) ANNEXURE-I Submerged motor pump design data of BCW Pump. d) ANNEXURE-II General Technical Particulars for Motors of BCW Pump e) ANNEXURE-III Specification for Flow Rator of BCW Pump. f) ANNEXURE-IV Temperature Sensing Elements of BCW Pump. g) ANNEXURE-V- Document Submission Schedule for BCW Pump. h) ANNEXURE-VI- Specification for temperature & pressure gauges of BCW pump. i) Temperature Gauge specification TDC: TCI:105 Rev. 07. j) Annexure-A; Terms and Conditions	
DOC. REFERENCE	BHEL ENQ. CALLED FOR	FIRM'S ALTERNATE OFFER
-Nil-	-Nil-	-Nil-

- *I/ We confirm that none of our group concern or affiliates etc., appears on the list of banned firms / companies by BHEL (list available on www.bhel.com) nor any of the Director / Partner / proprietor of bidder / such group concern or affiliate etc. are involved with such company.*
- *I/ We also declare that, we have not been suspended or black listed or issued with Show Cause Notice by BHEL- Trichy or any other BHEL Unit or any PSU/ Government organization.*
- *I/ We confirm that other than us, none of our group concerns or affiliates etc. are participating in the tender either directly or indirectly through any other agency under same proprietor / common director(s) / common partner(s).*
- *I/ We confirm that if any of the above statement / information furnished by us in this tender is found to be false/ fake at any stage of tender evaluation or during execution of contract, BHEL will have the right to initiate appropriate action including legal proceeds / termination of contract, recovery of damages, penalties etc. as deemed fit.*

(Contractor Signature with Seal)

Contractor Signature

Contractor Seal

Integrity Pact (IP)

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

SL	IEM	Email
1.	Shri Arun Chandra Verma, IPS (Retd.)	acverma1@gmail.com
2.	Shri Virendra Bahadur Singh, IPS (Retd.)	vbsinghips@gmail.com

(b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

(c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

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

Details of contact person(s): -

(1)

Name: Rajesh Kumar SB

Deptt: MM/BOI

Address: 24 Building, BHEL, Trichy

Phone: 0431-2574166

Email: sbrajesh@bhel.in

(2)

Name: Jiby MJ

Deptt: MM/BOI

Address: 24 Building, BHEL, Trichy

Phone: 0431-2574363

Email: mjjiby@bhel.in

INTEGRITY PACT

Between

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

and

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

Preamble

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

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

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

Section 1- Commitments of the Principal

- 1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-
 - 1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - 1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - 1.1.3 The Principal will exclude from the process all known prejudiced persons.
- 1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions:

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

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

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

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

Section 4 - Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 - Equal treatment of all Bidders/ Contractors / Sub-contractors

- 6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.
- 6.2 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

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

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

Section 8 - Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

- 8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.
- 8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.12 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.
- 9.2 If any claim is made/ lodged during currency of IP, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

_____ *SBRajeshK* _____

For & On behalf of the Principal

S.B. RAJESH KUMMAR
Senior Engineer
(Office Seal) Purchase / BOI
BHEL, TRICHY - 620 014.

For & On behalf of the Bidder/

Contractor

(Office Seal)

Place- Trichy

Date- 10.12.2021

Witness: *[Signature]* _____

(Name & Address) _____

JIBY. M.J.
Assistant Engineer - I
Materials Management / BOI
BHEL, TRICHY - 620 014.

Witness: _____

(Name & Address) _____

BANK GUARANTEE FOR PERFORMANCE SECURITY

(Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s))

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

IFSC AND MICR CODE

Dear Sirs,

1. In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____¹ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) (VENDOR CODE) with its registered office at _____² hereinafter referred to as the 'Vendor / Contractor / Supplier ', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated³ valued at Rs.....⁴ (Rupees -----)/FC.....(in words.....) for⁵ (hereinafter called the 'Contract') and the Vendor / Contractor / Supplier having agreed to provide a Contract Performance Bank Guarantee, equivalent to% (... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

2. we,, (hereinafter referred to as the Bank), having registered/Head office at and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs -----⁶ (Rupees -----) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

3. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

4. We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor / Contractor / Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

5. The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the Vendor / Contractor / Supplier shall have no claim against us for making such payment.

6. We thebank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance guarantee period as per the terms of the Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

7. We.....BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Vendor / Contractor / Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Vendor / Contractor / Supplier and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Vendor / Contractor / Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Vendor / Contractor / Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

8. The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Vendor / Contractor / Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the Vendor / Contractor / Supplier's liabilities.

9. This Guarantee shall remain in force upto and including.....⁷ and shall be extended from time to time for such period as may be desired by Employer.

10. This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Vendor / Contractor / Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

11. Unless a demand or claim under this guarantee is made on us in writing on or before the⁸we shall be discharged from all liabilities under this guarantee thereafter.

12. Any claim or dispute arising under the terms of this document shall only be enforced or settled in the Courts at Tiruchirappalli.

13. We..... BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁶

- b) This Guarantee shall be valid up to⁷
- c) Unless the Bank is served a written claim or demand on or before (minimum 3 to 6 months from the expiry date ⁸ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

14. We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

BANK EMAIL ID:

BANK PHONE NO:

AUTHORISED SIGNATORIES CELL PHONE NO:

BANK FAX NO:

¹ NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/SUPPLY DETAILS

⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE

⁸ DATE OF EXPIRY OF CLAIM PERIOD

List of Consortium Banks	
Sl. No.	Name of the bank
1.	State Bank of India
2.	Canara Bank
3.	Axis Bank
4.	Bank of Baroda
5.	Central bank
6.	Citi Bank N.A.
7.	Deutsche Bank
8.	Exim Bank
9.	Federal Bank Limited
10.	HDFC Bank Limited
11.	Hongkong and Shanghai Banking Corporation Limited
12.	Indian Bank
13.	ICICI Bank Limited
14.	IDBI Bank Limited
15.	IndusInd Bank Limited
16.	Indian Overseas Bank
17.	Kotak Mahindra Bank Limited
18.	Punjab National Bank
19.	RBL Bank Ltd.
20.	Standard Chartered Bank
21.	Union Bank of India
22.	Yes Bank Limited

/ On Bidder's office letter pad /

Self-Declaration

Enquiry No.	
Enquiry Date	

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt. 28.05.2018 and 04.06.2020.

I / We hereby declare that I / We are a "Local Supplier" meeting the requirement of minimum local content (.....%) defined in the above government notification for the goods against above mentioned enquiry Number.

Details of location at which local value addition will be made is as follows:

Door No.	
Street / Address 1	
Street / Address 2	
District	
State	
Country	
PIN Code	

We also understand that the false declarations will be considered as breach of Integrity and liable for action.

For Company Name:

Seal:

Signature:

Date:

Place:

(Please fill all the yellow color field)

THIRD PARTY NON-DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, Trichy on contract is confidential and that the nature of the business of the BHEL, Trichy is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, Trichy Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.
- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, Trichy all documents and property of BHEL, Trichy, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, Trichy's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, Trichy and are reasonable given the nature of the business carried on by the BHEL, Trichy I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Place:- _____

Date:- _____

Name

Company

Signature

BRIEF PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

1. The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided herein:
2. The party desirous of resorting to Conciliation shall send an invitation/notice in writing to the other party to conciliate specifying all points of Disputes with details of the amount claimed. The party concerned shall not raise any new issue thereafter. Parties shall also not claim any interest on claims/counter-claims from the date of notice invoking Conciliation till the conclusion of the Conciliation proceedings.
3. The party receiving the invitation/notice for Conciliation shall within 30 days of receipt of the notice of Conciliation intimate its consent for Conciliation along with its counter-claims, if any.
4. The Conciliation in a matter involving claim or counter-claim (whichever is higher) up to Rs 5 crores shall be carried out by sole Conciliator nominated by BHEL while in a matter involving claim or counter-claim (whichever is higher) of more than Rs 5 crores
Conciliation shall be carried out by 3 Conciliators nominated by BHEL.
5. The Parties shall be represented by only their duly authorized in-house executives/officers and neither Party shall be represented by a Lawyer.
6. The first meeting of the IEC shall be convened by the IEC by sending appropriate communication/notice to both the parties as soon as possible but not later than 30 days from the date of his/their appointment. The hearings in the Conciliation proceeding shall ordinarily be concluded within two (2) months and, in exceptional cases where parties have expressed willingness to settle the matter or there exists possibility of settlement in the matter, the proceedings may be extended by the IEC by a maximum of further 2 months with the consent of the Parties subject to cogent reasons being recorded in writing.

7. The IEC shall thereafter formulate recommendations for settlement of the Disputes supported by reasons at the earliest but in any case within 15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.
8. Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.
9. In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.
10. Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.
11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.
12. In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.
13. Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing

of Conciliation shall be the starting date for calculating the period of 2 months.

14. In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.
15. The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.
16. Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.
17. In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.
18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.
19. The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the

substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.

20. Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.
21. Unless otherwise provided for in the agreement, contract or the Memorandum of Understanding, as the case may be, in the event of likelihood of prolonged absence of the Conciliator or any member of IEC, for any reason/incapacity, the Competent Authority/Head of Unit/Division/Region/Business Group of BHEL may substitute the Conciliator or such member at any stage of the proceedings. Upon appointment of the substitute Conciliator(s), such reconstituted IEC may, with the consent of the Parties, proceed with further Conciliation into the matter either de-novo or from the stage already reached by the previous IEC before the substitution.
22. The proceedings of Conciliation under this Scheme may be terminated as follows:
 - a. On the date of signing of the Settlement agreement by the Parties; or,
 - b. By a written declaration of the IEC, after consultation with the parties, to the effect that further efforts at conciliation are no longer justified, on the date of the declaration; or,
 - c. By a written declaration of the Parties addressed to the IEC to the effect that the Conciliation proceedings are terminated, on the date of the declaration; or,
 - d. By a written declaration of a Party to the other Party and the IEC, if appointed, to the effect that the Conciliation proceedings are terminated, on the date of the declaration.
 - e. On rejection of the Draft Settlement Agreement by the Competent Authority of BHEL or the other Party.
23. The Conciliator(s) shall be entitled to following fees and facilities:

Sl No	Particulars	Amount
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1	Sitting fees	Each Member shall be paid a Lump Sum fee of Rs 75,000/- for the whole case payable in terms of paragraph No. 27 herein below.
2	Towards drafting of settlement agreement	In cases involving claim and/or counter-claim of up to Rs 5crores. Rs 50,000/- (Sole Conciliator)

Sl No	Particulars	Amount
		<p>In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator) In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.</p>
3	Secretarial expenses	<p>Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC.</p> <p>Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC</p>

4	Travel and transportation and stay at outstation i) Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL.
Sl No	Particulars	Amount
		Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region / Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of

their claims and not to bring any oral evidence in IEC proceedings.

25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.
26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.
27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.
28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 3 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.
29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement, except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/ regulatory body, as the case may be.
30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
 - a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
 - b. admissions made by the other party in the course of the Conciliator proceedings;
 - c. proposals made by the Conciliator;

- d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.
31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.
34. The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

Appendix I

FORMAT FOR SEEKING CONSENT FOR REFERRING THE DISPUTES TO CONCILIATION THROUGH IEC

To,

M/s. (Stakeholder's name)

Sub: Resolution of the Disputes through conciliation by Independent Expert Committee (IEC).

Ref: Contract No/MoU/Agreement/LOI/LOA& date _____.

Sir,

With reference to above referred Contract/MoU/Agreement/LOI/LOA, you have raised certain Disputes/claims. Vide your letter dated____ you have requested BHEL to refer the Disputes/claims to IEC for Conciliation.

We are enclosing herewith Format (3) for giving consent and the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. You are requested to give your unconditional consent to the said terms and conditions of the Scheme by returning the same duly sealed and signed on each page. On receipt of your consent, matter will be put to the Competent Authority for consideration and decision.

Please note that BHEL has also certain claims against you (if applicable). BHEL reserves its right to agree or not to agree conciliation of the said disputes through BHEL and this letter is being issued without prejudice to BHEL's rights and contentions available under the contract and law.

Yours faithfully,

Representative of BHEL

Appendix II

**FORMAT FOR GIVING CONSENT BY
CONTRACTOR/VENDOR/CUSTOMER/COLLABORATOR/CONSORTIUM PARTNERSFOR REFERRING THE DISPUTES TO CONCILIATION
THROUGH IEC**

To,

BHEL

.....

Sub: Resolution of Disputes through Conciliation by Independent Expert Committee (IEC).

Ref: Contract/MoU/Agreement/LOI/LOA No _____ & date_____

With reference to above referred contract, our following bills/invoices/claims submitted to BHEL are still unpaid giving rise to Disputes:

SL. no.	Claim Description	Bill submitted to BHEL (no. and date)	Amount of the bill/claim	Amount received from BHEL	Outstanding Amount

Accordingly we request you to kindly refer the Disputes in respect of above claims to IEC for Conciliation.

We hereby agree and give our unconditional consent to the terms and conditions of BHEL Conciliation Scheme, 2018 governing conciliation through IEC. We have signed the same on each page and enclosed it for your consideration.

Yours faithfully,

(Signature with stamp)

**Authorized Representative of Contractor
Name, with designation**

Date

Appendix III

STATEMENT OF CLAIMS/COUNTER CLAIMS TO BE SUBMITTED TO THE IEC BY BOTH THE PARTIES

1. Chronology of the Disputes
2. Brief of the Contract/MoU/Agreement/LOI/LOA

3. Brief history of the Disputes:

4. Issues:

5. Details of Claim(s)/Counter Claim(s):

SI. No.	Description of claim(s)/Counter Claim	Amount (in INR)Or currency applicable in the contract	Relevant contract clause

6. Basis/Ground of claim(s)/counter claim(s) (along with relevant clause of contract)

Note– *The Statement of Claims/Counter Claims may ideally be restricted to maximum limit of 20 pages. Relevant documents may be compiled and submitted along with the statement of Claims/Counter Claims. The statement of Claims/Counter Claims is to be submitted to all IEC members and to the other party by post as well as by email.*