BUYERS SPECIFIC ADDITIONAL TERMS & CONDITIONS
ITEM NAME: OIL PURIFICATION UNIT ALONG WITH SPARES

PROJECTS- 1X800MW YAMUNA NAGAR HPGCL

1. SCOPE OF ENQUIRY:

Sl. No.	Material Code & Item Description	Total Qty.	LOT Quantity & Delivery schedule
1.	W90311928803 DRG: 411928J3100 REV:00 UNIT OIL PURIFICATION SYSTEM SPEC: ST39013 REV: 08	1 No.	1X800MW YAMUNA NAGAR HPGCL: 1 No. -30/04/2027
2.	W90311928811 DRG: 411928J3100 REV:00 OIL PURIFICATION SYSTEM (CENTRAL) SPEC: ST39013 REV: 08	1 No.	1X800MW YAMUNA NAGAR HPGCL: 1 No. -30/04/2027
3.	W90318103150 PRESSURE SWITCH FOR OIL PURIFICATION UNIT:1 NO. EACH TYPE AND RANGE SPEC: ST39013 REV: 08	2 No.	1X800MW YAMUNA NAGAR HPGCL: 2 No. -28/07/2027
4.	W90318103265 MANDATORY SPARE FOR DPS ACROSS POLISHING FILTER OF OIL PURIFIER UNIT, ST39013 SPEC: ST39013 REV: 08	2 No.	1X800MW YAMUNA NAGAR HPGCL: 2 No. -28/07/2027
5.	W90318103192 LEVEL SWITCH FOR OIL PURIFICATION UNIT: 1 NO. OF EACH TYPE AND RANGE SPEC: ST39013 REV: 08	2 No.	1X800MW YAMUNA NAGAR HPGCL: 2 No. -28/07/2027
6.	W90318103290 MANDATORY SPARES FOR FLOW SWITCH OF OIL PURIFIER UNIT, ST-39013 SPEC: ST39013 REV: 08	2 No.	1X800MW YAMUNA NAGAR HPGCL: 2 No. -28/07/2027
7.	W90318103168 RTDS FOR OIL PURIFICATION UNIT:1 NO. EACH TYPE AND RANGE SPEC: ST39013 REV: 08	3 No.	1X800MW YAMUNA NAGAR HPGCL: 3 No. -28/07/2027
8.	W90318103176 PRESSURE INDICATORS FOR OIL PURIFICATION UNIT:1 NO. EACH TYPE AND RANGE SPEC: ST39013 REV: 08	2 No.	1X800MW YAMUNA NAGAR HPGCL: 2 No. -28/07/2027
9.	W90318103184 TEMP INDICATOR FOR OIL PURIFICATION UNIT: 1 NO OF EACH TYPE AND RANGE SPEC: ST39013 REV: 08	2 No.	1X800MW YAMUNA NAGAR HPGCL: 2 No. -28/07/2027
10.	W90318103427 SEPERATOR MOTOR FOR LUB OIL PURIFIER AS PER ST39013 SPEC: ST39013 REV: 08	1 No.	1X800MW YAMUNA NAGAR HPGCL: 1 No. -28/07/2027
11.	W90318103435 BEARING FOR SEPERATOR MOTOR 1 SET ND AND DE SPEC: ST39013 REV: 08	4 No.	1X800MW YAMUNA NAGAR HPGCL: 4 No. -28/07/2027
12.	WS9818103645 DRG: 41810H11002 REV:00 LT SWITCH GEAR ITEM FOR OPU AS PER DOCUMENT NO. 41810H1002 AND SPEC NO. ST39013	1 Set	1X800MW YAMUNA NAGAR HPGCL: 1 Set -28/07/2027
13.	Supervision of Erection & Commissioning Lump sum per man day charges at site, including every expense at our site i.e. boarding & lodging, local travel etc. (Considering 02 working days per OPU)	04 Days	On Intimation
14.	Supervision of Erection & Commissioning Lump sum per visit charges (to & fro) including travelling time & all expenses up to our project site. (Considering to & fro one visit for each unit)	02 Visit	On Intimation
15.	PERFORMANCE TEST OF PARTICLE SIZE & MOISTURE IMPURITIES FOR LUBE OIL (ISO VG-46) AS MENTIONED IN SL.NO.5(a) OF SPEC- ST39013 TO BE CARRIED OUT ON ONE NO. OF MACHINE OF THE PROJECT. BOTH THE TEST SHALL BE TESTED/VERIFIED FROM CMTI/NABL ACCREDITED LAB.	1 No.	1X800MW YAMUNA NAGAR HPGCL: 1 No. -28/02/2027

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2. Project Details with consignee address:

Project Name	1X800MW YAMUNA NAGAR HPGCL
Consignee Address	OFFICE OF CHIEF ENGINEER/DCRTPP, HARYANA POWER GENERATION CORPORATION LIMITED (HPGCL), 1X800 MW ULTRA SUPERCRITICAL EXPANSION UNIT, DEEN BANDHU CHHOTU RAM THERMAL POWER PLANT (DCRTPP), VPO- PANSARA, YAMUNA NAGAR, HARYANA-135001, INDIA

3.BUYERS SPECIFIC ADDITIONAL TERMS & CONDITIONS IN ADDITION TO GTC

Sl. No.	**Terms**	**Description**	**Supplier confirmation**
1.	**Documents Checklist:**	Please submit signed and stamped copy of your offer on each page along with following documents; • Buyer Specific T&C. • Technical PQR & its supportive document. • Technical drawing & purchase specification. • Certificate/self-certification for minimum local content as per PPP-MII order. • Replica of price bid schedule without prices with part-I offer.	
2.	**Special Instruction of Technical requirement**	a) SPECIFICATION ST39013(Rev. no.-08), CHECK LISTS, PQR, DRG. NO 41810H11002 , CUSTOM BID FOR GEM AND ADDENDUM 411928J8100 ARE ENCLOSED.	
		b) OIL PURIFIER SHALL BE 7500LPH, DCS BASED, MANUAL CLEANING TYPE AND HEATER RATING 90 kW.	
		c) VENDOR HAS TO CONDUCT PERFORMANCE TEST OF PARTICLE SIZE & MOISTURE IMPURITIES FOR LUBE OIL (ISO VG-46) AS MENTIONED IN SL.NO.5(a) OF SPEC- ST39013 TO BE CARRIED OUT ON ONE NO. OF MACHINE OF THE PROJECT. BOTH THE TEST SHALL BE TESTED/VERIFIED FROM CMTI/NABL ACCREDITED LAB.	
		d) TWO DAYS OF VENDOR ENGINEER IS REQUIRED FOR SUPERVISION DURING ERECTION & COMMISSIONING OF ONE OIL PURIFICATION SYSTEM AT SITE.	
		e) PIPING, VALVE BODY & ITS INTERNAL AND ALL OTHER COMPONENT OF OIL PURIFICATION SYSTEM COMING IN CONTACT WITH OIL SHALL BE IN STAINLESS STEEL CONSTRUCTION.	
		f) CONTROL PANEL COLOR SHALL BE – EXTERNAL (FRONT & REAR)-GREY 9002 EXTERNAL (SIDE)-BLUE 5012 INTERNAL-BRILLIANTWHITE GLOSSY.	
		g) SEVEN(7) NUMBER HARD COPIES AND TWO (2) NUMBER CDs OF O&M MANUAL TO BE SUPPLIED BY VENDOR AT BHEL HARIDWAR .	
		h) EFFICIENCY OF MOTOR- IE3	
3.	**Supervision of erection & commissioning.**	Kindly note that the vendor shall carry out supervision work during Erection & Commissioning at site.	
		Kindly Confirm that following charges have been quoted separately in your offer: 1. Per Visit Charges for Supervision during Erection & Commissioning (lumpsum & inclusive of everything). 2. Per day charges inclusive of all i.e. lodging, fooding, boarding, taxes & duties etc.).	
		Payment shall be done for the actual no. of days worked at site which should be certified by BHEL site.	
		Kindly ensure Supervision charges should be quoted including GST in your offer.	
4.	**Compliance of GTC on GeM**	General Terms and Conditions on GeM 4.0 (Version 1.26) Dtd -06/11/2025 or it's latest revision of GeM portal shall be applicable against this enquiry. Kindly confirm to compliance the same for this tender.	
5.	**Pre-Qualification Requirements**	The Pre-Qualification Requirements have been compiled. All the bidders should ensure submission of complete details and documents as called for in these requirements. The Offers submitted by the bidders would be scrutinized with respect to Pre-Qualification Requirements first. Techno-Commercial offer of only those bidders shall be evaluated who meet the Pre-Qualification Requirements.	
6.	**Customer approval requirement**	Bidders are requested to submit their credentials along with offer (Credentials should include BHEL P.O.s on vendor for the same rating or higher rating turbines, Experience of vendor with state utilities and major PSU like NTPC, End User Certificate wherever available), in order to take up with	

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		end customer for approval Supplier to submit following credentials for arranging Customer approval: - • Company Profile • List of Order Executed/ on hand for Power Sector/Gov. organization of same /similar items • Copy of Major Supply Orders • Performance Certificates for Satisfactory working of System/ Equipment from end users Item. **The offer of only those bidders, who meet Pre-qualification requirement (PQR), Technical requirement and approved by the End Customer, will be considered for price-bid opening & RA for the requirement against this enquiry.**	
7.	**Make in India Clause**	"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 19.07.2024 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT". As per Make in India Order, only Class-1 and Class-2 local supplies are eligible to bid in this tender enquiry. For this eligibility criteria, bidders are required to submit certificate of Minimum local content as specified in attached Make In India Declaration format.	
8.	**Compliance of Rule 144 (xi) of GFR 2017**	Compliance of Restrictions under Rule 144 (xi) of GFR 2017 shall be as per GeM.	
9.	**Bid validity/ Validity of offer**	Please note that validity of the offer shall be 180 days from the date opening of Techno-Commercial bid (Part-I bid) on GeM portal. Offer of bidder's having validity less than 180 days shall liable to reject. Please confirm.	
		The required validity is considering that offer is complete & clear w.r.t. PQR and all techno-commercial conditions. Vendors need to extend their offer validity for the time taken by them in responding BHEL's comments/clarification sought during techno-commercial scrutiny of the offer. In case regret by any bidder for such validity extension, their offer shall liable to be reject. Please confirm.	
10.	**Loading and unloading**	Vendor's scope will not cover Loading & Unloading at Final destination of delivery. Unloading at final destination (i.e. BHEL site) is in BHEL 'scope. Loading and unloading at other intermediate places due to any permitted transhipment will be the responsibility of the vendor. Kindly note	
11.	**Prices/Basis of Quotation**	The offered prices of the items shall remain firm and fixed till the execution of the contract, kindly confirm.	
		Kindly confirm that your quote prices are inclusive of P&F, Freight & GST for Total quantity on GeM portal.	
		Transit Insurance would be arranged by BHEL. Please quote your prices accordingly.	
		The prices are to be quoted on Ex-Works with freight Pre-paid up to project destination basis & inclusive of all taxes & duties, GST (i.e. Inclusive all). Bidders can dispatch goods through any Indian Bank Association approved transporters having their branch at HARIDWAR / destination. If material is dispatched through other than Indian Bank Association approved transporter, material to be delivered on door delivery basis. In case of dispatch of material through any other unapproved transporter, payment shall be made only after receipt of material and any additional charges payable to the transporter shall be to the bidder's account. Any demurrage / godown rent payable to the transporter /or to godown's owner due to any delay attributed by the supplier shall be recovered from supplier's account.	
12.	**Special Instructions:**	• Original (Invoice, GR/LR, Bill of Lading (if applicable), Air Way Bill • (if applicable), Pkg. List, Certificate of origin (if applicable), • E-Way bill are required for billing. • Material is to be despatched on Door Delivery basis to site. • Commissioning spares need to be packed in separate boxes. Commissioning spares to be written in Bold Letters on all sides of packing boxes. • Mandatory spares need to be packed in separate boxes. Mandatory spares to be written in Bold Letters on all sides of packing boxes. Mandatory spares are to be supplied along with Main Equipment but mandatorily in separate box. • The packing list item description are in accordance with the approved BBU or Correlation Certificate approved by Engineering is required for MDCC and billing.	

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<table>
<tr><td></td><td></td><td>Please inform 8 Digit HSN code for Oil Purification along with spares.
08 DIGIT GST HSN CODE to be provided & mentioned in your invoice & packing list.
Vendor to ensure submission billing documents in the same month of material despatch. If vendor fail to provide the despatch documents in the same month GST Penalty shall be applicable and bear by vendor as per GST rule.</td><td></td></tr>
<tr><td rowspan="2">13.</td><td rowspan="2">Evaluation criteria</td><td>Evaluation would be done on the basis of total landed cost for the complete scope/requirement covered in the enquiry Considering total material value, supervision charges, type test charges (if applicable), Packing charges, Forwarding Charges, taxes & duties, Freight & Insurance).</td><td></td></tr>
<tr><td>Prices of only those bidders who are approved by the End User will be considered for evaluation against this tendered requirement.</td><td></td></tr>
<tr><td>14.</td><td>Evaluation Currency</td><td>The evaluation currency for this tender shall be INR.</td><td></td></tr>
<tr><td>15.</td><td>Payment terms:</td><td>For Material portion:
The payment shall be done after receipt of Material at BHEL respective project site, within no. of days as defined in the below table from the date of receipt of Material at site i.e. MRC date).

<table><tr><td>Type of Bidder</td><td>Payment Terms (Number of Days)</td></tr><tr><td>Micro & Small Enterprises (MSEs)</td><td>45 days</td></tr><tr><td>Medium Enterprises</td><td>60 days</td></tr><tr><td>Non MSME</td><td>90 days</td></tr></table>
The Payment terms are subject to receipt of non-discrepant document from supplier.</td><td></td></tr>
<tr><td></td><td></td><td><u>Payment terms for Supervision charges during Erection & Commissioning:</u>
100% payment against submission of successful Erection & Commissioning certificate from Project Site or MOM.</td><td></td></tr>
<tr><td>16.</td><td>GeM charges</td><td>GeM charges if any shall be either side only i.e. buyer’s GeM charges shall be in buyer’s account and seller’s GeM charges shall be on seller’s account. Please confirm.</td><td></td></tr>
<tr><td>17.</td><td>Contract execution</td><td>Bidder’s are advised to read GeM related query & clarification carefully on GeM portal. Order shall be executed through GeM.</td><td></td></tr>
<tr><td>18.</td><td>Reverse Auction (E-bidding)</td><td>BHEL shall be resorting to Reverse Auction (RA) on GEM portal as per GEM functionalities for this tender. RA shall be conducted among the techno-commercially qualified bidders.</td><td></td></tr>
<tr><td>19.</td><td>Quantity Variation</td><td>BHEL reserves the right to cancel tender or reject any or all the quotations without assigning any reasons thereof.
BHEL also reserves the right to Increase or decrease the tendered quantities or quantity of individual material code may be dropped as a whole also.
Vendors should be prepared to accept order for reduced Quantity without any extra charges. Vendor should also be prepared for giving discount in case of Increase in Quantity.
Vendor has to take manufacturing clearance from BHEL before starting manufacturing of material. In case ordered quantity is reduced at the time of manufacturing clearance, then payment shall be made accordingly as per decreased quantity. Kindly confirm.</td><td></td></tr>
<tr><td>20.</td><td>Delivery Period</td><td>Please note that BHEL’s Delivery requirements are mentioned in point no 1 of above.
Early delivery w.r.t. above lot delivery will be accepted only after written confirmation from BHEL. BHEL reserve right to reject early delivery request of bidders / suppliers.
Delivery period indicated in GeM bid is only indicative and final delivery of tender shall be taken as mentioned above.
Accordingly bidders to confirm the above deliveries or quote their best possible delivery in no of months / weeks from the date of placement of Purchase order, including all activities like document approval, inspection by TPI time etc.</td><td></td></tr>
<tr><td>21.</td><td>Technical Document/ Drawing approval conditions</td><td>Drawings/Data sheets/documents/QAP etc. as called for in the specifications shall be submitted by Vendor for BHEL/ Customer approval within 30 days of purchase order. BHEL shall approve these drawings/data sheets/ documents / QAP etc. within 30 days of receipt.
Any comments on the documents shall be given by BHEL within 7 days of submission and vendor shall submit revised document / reply to comments, within 7 days of BHEL comments. However, total time for Document submission and approval shall not exceed 30 days for respective party.

Delivery is from the date of PO, accordingly, delay in submission / revision of the documents by the</td><td></td></tr>
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		vendor will automatically account for to vendor. In case of delay on account of BHEL in comments / approval of the documents, the delivery shall be re-scheduled by the no of days taken by BHEL in excess to 30 days. For delay analysis cumulative no of days (including time taken in comments), shall be considered for delivery extension.	
22.	**Liquidated Damages (LD) for late delivery**	Liquidated Damages shall be lot wise as per clause no. 15 (iii) of General terms and conditions on GeM 4.0 (Version 1.26) as under: kindly confirm. "If the Seller/Service Provider fails to deliver any or all of the Goods/Services within the original/re-fixed delivery period(s) specified in the contract, the Buyer will be entitled to deduct/recover the Liquidated Damages for the delay, unless covered under Force Majeure conditions aforesaid, @ 0.5% of the contract value of delayed quantity per week or part of the week of delayed period as pre-estimated damages not exceeding 10% of the contract value of delayed quantity without any controversy/dispute of any sort whatsoever".	
		The date of LR would be treated as the date of delivery for penalty purposes.	
23.	**MDCC clause**	Please note that, material shall be dispatched only after issue of Material dispatch clearance certificate (MDCC) from end customer. For issue of MDCC, vendors are required to submit all test certificates (TC) and inspection report of third party (IR) to BHEL. After review & acceptance of the quality document, BHEL will forward the same to end customer for issuance of MDCC. MDCC shall be issued within 7 days of receipt of complete quality documents / TCs,. In case of delay in issuance of MDCC, only delivery shall be extended by no of days taken by BHEL in excess to 7 days and all other terms and conditions of PO shall remains same & binding. In case any material is dispatched without MDCC and any loss is incurred by Supplier/Vendor for any reason whatsoever, BHEL shall not be responsible in any manner to compensate the supplier in this regard. Kindly confirm.	
24.	**BREACH OF CONTRACT, REMEDIES AND TERMINATION:**	**The following shall amount to breach of contract:** I. Non-supply of material/ non-completion of work by the Supplier/Vendor within scheduled delivery/ completion period as per contract or as extended from time to time. II. The Supplier/Vendor fails to perform as per the activity schedule and there are sufficient reasons even before expiry of the delivery/ completion period to justify that supplies shall be inordinately delayed beyond contractual delivery/ completion period. III. The Supplier/Vendor delivers equipment/ material not of the contracted quality. IV. The Supplier/Vendor fails to replace the defective equipment/ material/ component as per guarantee clause. V. Withdrawal from or abandonment of the work by the Supplier/Vendor before completion as per contract. VI. Assignment, transfer, subletting of Contract by the Supplier/Vendor without BHEL's written permission resulting in termination of Contract or part thereof by BHEL. VII. Non-compliance to any contractual condition or any other default attributable to Supplier/Vendor. VIII. Any other reason(s) attributable to Vendor towards failure of performance of contract. In case of breach of contract, BHEL shall have the right to terminate the Purchase Order/ Contract either in whole or in part thereof without any compensation to the Supplier/Vendor. IX. Any of the declarations furnished by the contractor at the time of bidding and/ or entering into the contract for supply are found untruthful and such declarations were of a nature that could have resulted in non-award of contract to the contractor or could expose BHEL and/ or Owner to adverse consequences, financial or otherwise. X. Supplier/Vendor is convicted of any offence involving corrupt business practices, antinational activities or any such offence that compromises the business ethics of BHEL, in violation of the Integrity Pact entered into with BHEL has the potential to harm the overall business of BHEL/ Owner. Note-Once BHEL considers that a breach of contract has occurred on the part of Supplier/Vendor, BHEL shall notify the Supplier/Vendor by way of notice in this regard. Contractor shall be given an opportunity to rectify the reasons causing the breach of contract within a period of 14 days. In case the contractor fails to remedy the breach, as mentioned in the notice, to the satisfaction of BHEL, BHEL shall have the right to take recourse to any of the remedial actions available to it under the relevant provisions of contract. **Remedies in case of Breach of Contract**. i) Wherein the period as stipulated in the notice issued under above clause has expired and Supplier/Vendor has failed to remedy the breach, BHEL will have the right to terminate the contract on the ground of "Breach of Contract" without any further notice to contractor. ii) Upon termination of contract, BHEL shall be entitled to recover an amount equivalent to 10% of the Contract Value for the damages on account of breach of contract committed by the Supplier/Vendor. This amount shall be recovered by way of encashing the security instruments like performance bank	

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		guarantee etc available with BHEL against the said contract. In case the value of the security instruments available is less than 10% of the contract value, the balance amount shall be recovered from other financial remedies (i.e. available bills of the Supplier/Vendor, retention amount, from the money due to the Supplier/Vendor etc. with BHEL) or the other legal remedies shall be pursued. iii) wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is 10% of the contract value or more, such security instruments to the extent of 10% contract value will be encashed. In case no security instruments are available or the value of the security instruments available is less than 10% of the contract value, the 10% of the contract value or the balance amount, as the case may be, will be recovered in all or any of the following manners: iv) In case the amount recovered under sub clause (a) above is not sufficient to fulfil the amount recoverable then; a demand notice to deposit the balance amount within 30 days shall be issued to Supplier/Vendor. v) If Supplier/Vendor fails to deposit the balance amount within the period as prescribed in demand notice, following action shall be taken for recovery of the balance amount: a) from dues available in the form of Bills payable to defaulted Supplier/Vendor against the same contract. b) If it is not possible to recover the dues available from the same contract or dues are insufficient to meet the recoverable amount, balance amount shall be recovered from any money(s) payable to Supplier/Vendor under any contract with other Units of BHEL including recovery from security deposits or any other deposit available in the form of security instruments of any kind against Security deposit or EMD. vi) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against defaulted supplier/Vendor. vii) It is an agreed term of contract that this amount shall be a genuine pre-estimate of damages that BHEL would incur in completion of balance contractual obligation of the contract through any other agency and BHEL will not be required to furnish any other evidence to the Supplier/Vendor for the purpose of estimation of damages. viii) In addition to the above, imposition of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract. Note: 1) The defaulting Supplier/Vendor shall not be eligible for participation in any of the future enquiries floated by BHEL to complete the balance work. The defaulting contractor shall mean and include: (a) In case defaulted Supplier/Vendor is the Sole Proprietorship Firm, any Sole Proprietorship Firm owned by same Sole Proprietor. (b) In case defaulted Supplier/Vendor is The Partnership Firm, any firm comprising of same partners/ some of the same partners ; or sole proprietorship firm owned by any partner(s) as a sole proprietor.	
25.	**Suspension of Business Dealings with Suppliers / Contractors:**	The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms / principal / agents, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com. If any bidder / supplier / contractor during pre-tendering / tendering / post tendering / award / execution / post-execution stage indulges in any act, including but not limited to, 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 tampers the tendering process or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860(Bhartiya Nyaya Samhita 2023) 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: http://www.bhel.com/vender_registration/vender.php.	
26.	**Settlement of Dispute, CONCILIATION & ARBITRATION: :**	**Settlement of Dispute** If any dispute or difference of any kind whatsoever shall arise between BHEL and the Supplier/Vendor, arising out of the contract for the performance of the work whether during the progress of contract termination, abandonment or breach of the contract, it shall in the first place referred to Designated Officer / IEM for amicable resolution by the parties. Designated Officer / IEM who within 60 days after being requested shall give written notice of his decision to the contractor. Save as hereinafter provided, such decision in respect of every matter so referred shall forthwith be given effect to by the Supplier/Vendor who shall proceed with the work with all due diligence, whether he or BHEL desires to resolve the dispute as hereinafter provided or not. If after the Designated Engineer has given written notice of this decision to the party and no intention to pursue the dispute has been communicated to him by the affected party within 30 days from the receipt of such notice, the said decision shall become final and binding on the parties. In the event the Supplier/Vendor being dissatisfied with any such decision or if amicable settlement cannot be reached then all such disputed issues shall be resolved through conciliation in terms of the BHEL Conciliation Scheme 2018 as per 'CONCILIATION' Clause.	

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		CONCILIATION: Any dispute, difference or controversy of whatever nature howsoever arising under or out of or in relation to this Agreement (including its interpretation) between the Parties, and so notified in writing by either Party to the other Party (the "Dispute") shall, in the first instance, be attempted to be resolved amicably in accordance with the conciliation procedure as per BHEL Conciliation Scheme 2018. 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 - "Procedure for conduct of conciliation proceedings" (as available in www.bhel.com). **ARBITRATION:** Except as provided elsewhere in this Contract, in case Parties are unable to reach amicable settlement (whether by Conciliation to be conducted as provided herein above or otherwise) 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 (hereinafter referred to as the 'Dispute'), then, either Party may, refer the disputes to Arbitral Institution and such dispute to be adjudicated by Sole Arbitrator appointed in accordance with the Rules of said Arbitral Institution. A party willing to commence arbitration proceeding shall invoke Arbitration Clause by giving notice to the other party in terms of section 21 of the Arbitration & Conciliation Act, 1996 (hereinafter referred to as the 'Notice') before referring the matter to arbitral institution. The Notice shall be addressed to the Head of the Region, Power Sector/ Unit, BHEL, executing the Contract and shall contain the particulars of all claims to be referred to arbitration with sufficient detail and shall also indicate the monetary amount of such claim including interest, if any. After expiry of 30 days from the date of receipt of aforesaid notice, the party invoking the Arbitration shall submit that dispute to the Arbitral Institutions (shall be identified by the contract issuing agency) and that dispute shall be adjudicated in accordance with their respective Arbitration Rules. The matter shall be adjudicated by a Sole Arbitrator who shall necessarily be a Retd Judge having considerable experience in commercial matters to be appointed/nominated by the respective institution. The cost/expenses pertaining to the said Arbitration shall also be governed in accordance with the Rules of the respective Arbitral Institution. The decision of the party invoking the Arbitration for reference of dispute to a specific Arbitral institution for adjudication of that dispute shall be final and binding on both the parties and shall not be subject to any change thereafter. The institution once selected at the time of invocation of dispute shall remain unchanged. The fee and expenses shall be borne by the parties as per the Arbitral Institutional rules. The Arbitration proceedings shall be in English language and the seat and venue of Arbitration shall be at the court(s) of Haridwar. Subject to the above, the provisions of Arbitration & Conciliation Act 1996 and any amendment thereof shall be applicable. All matters relating to this Contract and arising out of invocation of Arbitration clause are subject to the exclusive jurisdiction of the Court(s) situated at Haridwar , shall have exclusive jurisdiction. Notwithstanding any reference to the Designated Engineer or Conciliation or Arbitration herein, a. the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree. Settlement of Dispute clause cannot be invoked by the Contractor, if the Contract has been mutually closed or 'No Demand Certificate' has been furnished by the Contractor or any Settlement Agreement has been signed between the Employer and the Contractor. It is agreed that Mechanism of resolution of disputes through arbitration shall be available only in the cases where the value of the dispute is less than Rs. 10 Crores. In case the disputed amount Claim, Counter claim including interest is Rs. 10 crores and above, the parties shall be within their rights to take recourse to remedies other than Arbitration, as may be available to them under the applicable laws after prior intimation to the other party. Subject to the aforesaid conditions, provisions of the Arbitration and Conciliation Act, 1996 and any statutory modifications or re-enactment thereof as amended from time to time, shall apply to the arbitration proceedings under this clause. In case, multiple arbitrations are invoked (whether sub-judice or arbitral award passed) by any party to under this contract, then the cumulative value of claims (including interest claimed or awarded) in all such arbitrations shall be taken in account while arriving at the total claim in dispute for the subject contract for the purpose of clause mentioned above. Disputes having cumulative value of less than 10 crores shall be resolved through arbitration and any additional dispute shall be adjudicated by the court of competent jurisdiction.	
27.	**Action against Bidders / vendor /**	In order to protect the commercial interests of BHEL, BHEL shall take action against supplies / contractors by way of suspension of business dealings, who either fail to perform or are in default without any reasonable cause, cause loss of business/ money/ reputation, indulge in malpractices,	

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	supplier / contractor in case of default:	cheating, bribery, fraud or any other misconduct or formation of cartels so as to influence the bidding process or influence the price etc. Suspension of Business Dealings could be in the form of "Hold" or "Banning" a supplier/ contractor or a bidder and shall be as per "Guidelines for Suspension of Business Dealings with Suppliers/ Contractors" available at BHEL's website **"https://www.bhel.com/guidelines-suspension-business-dealings-supplierscontractors"**	
28.	**MICRO AND SMALL ENTERPRISES (MSE):**	Any Bidder falling under MSE category shall furnish the following details & submit documentary evidence/ Govt. Certificate etc. in support of the same along with their techno-commercial offer. Type under MSE / SC/ST owned / Women owned / Others (excluding SC/ ST & Women Owned) Micro Small **Note:** If the bidder does not furnish the above, offer shall be processed construing that the bidder is not falling under MSE category. a) MSE suppliers can avail the intended benefits in respect of the procurements related to the Goods and Services only (Definition of Goods and Services as enumerated by Govt. of India vide Office Memorandum F. No. 21(8)/2011-MA dtd. 09/11/2016 office of AS & DC, MSME) only if they submit along with the offer, attested copies of either Udyam Registration. Date to be reckoned for determining the deemed validity will be the last date of Technical Bid submission. Non-submission of supporting document in GeM portal will lead to consideration of their bids at par with other bidders. No benefits shall be applicable for this enquiry if the above required documents are not uploaded at the time of bid submission. Documents submitted by the bidder shall be verified by BHEL for rendering the applicable benefits.	
29.	**JURISDICTION:**	This contract shall be governed by the Law for the time being in force in the Republic of India. Subject to clause(s) mentioned above of this contract, the Civil Court having original Civil Jurisdiction at Haridwar shall alone have exclusive jurisdiction in regard to all matters in respect of the Contract.	
30.	**Force Majeure**	"Force Majeure" shall mean circumstance which is: a) beyond control of either of the parties to contract, b) either of the parties could not reasonably have provided against the event before entering into the contract, c) having arisen, either of the parties could not reasonably have avoided or overcome, and d) is not substantially attributable to either of the parties And Prevents the performance of the contract, Such circumstances include but shall not be limited to: i) War, hostilities , invasion, act of foreign enemies. ii) Rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war. iii) Riot, commotion or disorder by persons other than the contractor's personnel and other employees of the contractor and sub-contractors. iv) Strike or lockout not solely involving the contractor's personnel and other employees of the contractor and sub-contractors. v) Encountering munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the contractor's use of such munitions, explosives, radiation or radio- activity. vi) Natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon, flood, fire, cyclones etc. vii) Epidemic, pandemic etc. The following events are explicitly excluded from Force Majeure and are solely the responsibilities of the non-performing party: a) any strike, work-to-rule action, goslow or similar labour difficulty (b) late delivery of equipment or material (unless caused by Force Majeure event) and (c) economic hardship. If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within 15 (fifteen) days after the occurrence of such event. The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended by a period of time equal to period of delay caused due to such Force Majeure event. Delay or non-performance by either party hereto caused by the occurrence of any event of Force Majeure shall not i) Constitute a default or breach of the Contract. ii) Give rise to any claim for damages or additional cost expense occasioned thereby, if and to the extent that such delay or non-performance is caused by the occurrence of an event of Force Majeure. BHEL at its discretion may consider short closure of contract after 1 year of imposition of Force Majeure in line with extant guidelines. In any case, Supplier/Vendor cannot consider deemed short-closure after 1 year of imposition of Force Majeure	

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31.	**Cartel Formation**	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.	
32.	**Order of Precedence:**	In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below: a. Amendments/Clarifications/Corrigenda/Errata etc. issued in respect of the tender documents by BHEL. b. Buyer Added Bid Specific ATC c. GeM Bid Technical Conditions of Contract (TCC) d. GeM GTC	
33.	**Conflict of interest:**	The bidder notes that a conflict of interest would said to have occurred in the tender process and execution of the resultant contract, in case of any of the following situations: a) If its personnel have a close personal, financial, or business relationship with any personnel of BHEL who are directly or indirectly related to the procurement or execution process of the contract, which can affect the decision of BHEL directly or indirectly; b) The bidder (or his allied firm) provided services for the need assessment/ procurement planning of the Tender process in which it is participating; c) Procurement of goods directly from the manufacturers/suppliers shall be preferred. However, if the OEM/Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. In case bids are received from both the manufacturer/ supplier and the agent, bid received from the agent shall be ignored. However, this shall not debar more than one Authorized distributor (with/ or without the OEM) from quoting equipment manufactured by an Original Equipment Manufacturer (OEM) in procurements under a Proprietary Article Certificate. d) A bidder participates in more than one bid in this tender process. Participation in any capacity by a Bidder (including the participation of a Bidder as a partner/ JV member or sub-contractor in another bid or vice-versa) in more than one bid shall result in the disqualification of all bids in which he is a party. However, this does not limit the participation of an entity as a sub-contractor in more than one bid if he is not bidding independently in his own name or as a member of a JV. The Bidder declares that they have read and understood the above aspects, and the bidder confirms that such conflict of interest does not exist and undertakes that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder{s), in this regard. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or nonsubmission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the Bidder is found having indulged in above activities, the same will be considered as a violation of the tender conditions, and suitable action shall be taken by BHEL as per extant policies/ guidelines.	
34.	**Guarantee**	Kindly confirm that Guarantee shall be provided for a period of "**36 months from the date of dispatch or 18 months from the date of commissioning, whichever is earlier".** In case of any failure or trouble reported from site, the supplier should depute their representative immediately to attend the problem and replace the defective component/part if required, without any additional cost to BHEL.	
		Supplier shall be responsible for free replacement of defective equipment / material at our site	
		Please note that offers with guarantee period lesser than above mentioned guarantee period may result in rejection of the offer.	
35.	**Order Acceptance:**	Ink signed order acceptance shall be furnished within 15 days of order placement. In case, order acceptance do not received within 15 days of order placement, PO deemed to be accepted by you.	
36.	**Beneficiary of PO**	Kindly confirm on whom the PO will be placed in the event of ordering.	
37.	**Dispatch documents**	Following dispatch documents to be provided immediately after directly dispatch to BHEL Project site for billing purpose: • Guarantee/Warrantee Certificates • E- Invoice and commercial invoice • GeM invoice • Original consignee copies of GR/LR/RR (Material shall be dispatched on door delivery basis without consignee copy) • Packing list • Original GST compliance certificate • E-way bill	

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		• MRC/POD/Receipted LR/RR/GR copy (as per proof of delivery of material at BHEL Project site)	
38.	**IP Address**	The bids received from same IP address shall be outrightly rejected and shall not be considered for further evaluation.	
39.	**Additional Conditions for Assessment**	BHEL also reserves the right to have on-site assessment of the facilities at supplier's works during the bid evaluation.	
40.	**O&M Manuals**	**Kindly confirm that in the event of ordering,** 7 Sets hard copies (Paper based) and 2 Set (in CD ROM) of O & M manual shall be furnished containing all drawings and datasheet, catalogues of all instruments and instructions for storage, erection & commissioning, operation and maintenance after approval. Please submit same to BHEL Haridwar after despatch of material.	
		Kindly confirm that in the event of ordering, 02 Sets of O&M Manuals would be kept inside the dispatch box of Oil Purification Unit & the same shall also be mentioned in your Shipping/Packing List.	
41.	**Quality Requirement**	VENDOR TO SUBMIT ENDOSRED COPY OF SQP FOR BHEL & CUSTOMER APPROVAL. FINAL APPROVAL BY CUSTOMER WILL BE DONE AFTER POST AWARD.	
		JOINT INSPECTION SHALL BE DONE BY BHEL NOMINATED INSPECTION AGENCY QUEST AND CUSTOMER AS PER FINALLY CUSTOMER APPROVED QP.	
		FOR SPARES: INSPECTION SHALL BE DONE AS PER CUSTOMER APPROVED QP. FOR ITEM NOT APPEARING IN CUSTOMER APPROVED QP, TC/COC SHALL BE SUBMITTED.	
		VENDOR TO FOLLOW CUSTOMER APPROVED QP.	
		The Charges for Pre-Inspection would be borne by BHEL. However at least 15 days' notice is to be provided for arranging Pre-Inspection.	
	Bidder Contact details	Please provide Contact details of your representative for techno-commercial clarifications: Mobile no. & Email id (minimum 2 person)	

SPECIAL NOTE FOR BIDDERS:

a. 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.
b. 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 even after negotiation.
c. Any change in applicable rates of Tax or any other statutory levies (Direct / Indirect) or any new introduction of any levy by means of statute and its corresponding liability for the deliveries beyond the agreed delivery date for reasons not attributable to BHEL will be to vendors account. BHEL will not reimburse the same and any subsequent claim in this respect will be summarily rejected.
d. 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.
e. The offers of the bidders who are under suspension and also the offers of the bidders, who engage the services of the banned firms /principal/agents, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.
f. Recovery / deduction as applicable as per Direct and Indirect taxes as notified by Govt. Of India from time to time will be made and information/certificate for such deduction/recoveries shall be provided by BHEL to the vendor.
g. If the delivery of supply as detailed above gets delayed beyond the delivery period, the Supplier/Vendor shall request for a delivery extension and BHEL at its discretion may extend the Contract. However, if any 'Delivery extension' is granted to the Supplier/Vendor for completion of supply, due to backlog attributable to the Supplier/Vendor, then it shall be without prejudice to the rights of BHEL to impose LD for the delays attributable to the Supplier/Vendor.
h. In case BHEL increase the quantity during currency of the contract in line with quantity variation clause of GeM bid, delivery extension on pro-rata basis shall be given for supply of these additional quantity.

Following documents are an integral part of this Tender Enquiry and endorsed copies of these documents (duly signed and stamped on each page, as a token of acceptance) are to be submitted/uploaded along with offer on GeM portal against this bid.

1. Please submit replica of Price schedule (without prices) showing ''quoted" in place of price along with techno-commercial bid (Part-I).
2. Please submit signed & Stamped copy (each page) of duly filled of confirmation column of "Buyers Specific Additional Terms & Conditions (ATC)" and its clause wise supporting documents where required.
3. Please submit signed & stamped copy (each page) for qualifying PQR with proper filled information and related supporting documents as mentioned in PQR.
4. Please submit certificate of Minimum local content as specified in the Make In India Certificate of the tender

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DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017- REVISION DATED 19TH JULY, 2024 AND SUBSEQUENT ORDER(S)

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

To,
(Write Name & Address of Officer of BHEL inviting the Tender)
Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 19th July, 2024 and subsequent order(s).

Ref: 1) Tender Enquiry No: ……
2) All other pertinent issues till date

We hereby certify that the items offered by (specify the name of the organization here) has a local content of _____ % and this meets the local content requirement for **'Class**-I local **supplier' / 'Class II local supplier'** ** as defined in Public Procurement (Preference to Make in India), Order 2017Revision dated 19.07.2024 issued by DPIIT and subsequent order(s).

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

1. _____ 2. _____

3. _____ 4. _____

...

Thanking you,
Yours faithfully,

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

** - Strike out whichever is not applicable.

Note:

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

Annexure-3

Declaration for treatment of cases regarding conflict of interest

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

a) If its personnel have a close personal, financial, or business relationship with any personnel of BHEL who are directly or indirectly related to the procurement or execution process of the contract, which can affect the decision of BHEL directly or indirectly;
b) The bidder (or his allied firm) provided services for the need assessment/ procurement planning of the Tender process in which it is participating;
c) Procurement of goods directly from the manufacturers/suppliers shall be preferred. However, if the OEM/Principal insists on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. In case bids are received from both the manufacturer/ supplier and the agent, bid received from the agent shall be ignored. However, this shall not debar more than one Authorized distributor (with/ or without the OEM) from quoting equipment manufactured by an Original Equipment Manufacturer (OEM) in procurements under a Proprietary Article Certificate.
d) A bidder participates in more than one bid in this tender process. Participation in any capacity by a Bidder (including the participation of a Bidder as a partner/ JV member or sub-contractor in another bid or vice-versa) in more than one bid shall result in the disqualification of all bids in which he is a party. However, this does not limit the participation of an entity as a sub-contractor in more than one bid if he is not bidding independently in his own name or as a member of a JV.

The Bidder declares that they have read and understood the above aspects, and the bidder confirms that such conflict of interest does not exist and undertakes that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder{s), in this regard. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

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

(Signature of the authorized signatory of the bidder)

Description

The oil purification system (OPS) is complete skid of purifier in which separator is main component used for removing particle impurities and moisture contents from turbine lube oil system. It is centrifuge type with manual cleaning system. The control panel is DCS/PLC based type.

The OPS should be very reliable and proven in design. The OPS inlet and outlet connection are connected to main lube oil tank. The OPS should be designed for achieving purities of oil in a single pass. It should work both as purifier and clarifier.

Scope of the document:

This document states the pre-qualification requirements (PQR) of Oil purification system (OPS). Vendors desirous of supplying the OPS equipment to BHEL are advised to read this document carefully and furnish required documentation.

Mandatory requirement for Pre-Qualification

1.0 Experience Requirement –

i) Vendor/ its principle should have successfully designed, manufactured, tested & supplied Oil purification system (OPS) for turbine oil applications. Vendor should have supplied at least one (1) no. of OPS in one power plant in last seven (7) years (from the date of issuance of enquiry) satisfying the criteria mentioned in table-1

Table-1

Sl. no.	Product features	Details
1.	Type of Separator	Centrifuge type
2.	Oil grade	Lube oil (ISO VG-46) or equivalent higher grade
3.	Flow Capacity (single machine)	4000LPH or higher
4.	Particle Purity Level	Equal to or better than class -/15/12 as per ISO 4406 at the outlet of OPS
5.	Moisture content	Equal to or less than 500 ppm at the outlet of OPS
6.	Control Panel type	DCS/PLC based

ii) In case the vendor is a non-manufacturer/trader, valid authorization certificate from principal to be submitted for our reference

2.0 Submission of documents conforming to Clause no. 1 along with offer

Vendor shall furnish the following documents for minimum one oil purification system:

a) Vendor to furnish copy of Un-Priced Purchase Orders executed for supply of at least one no. of OPS in one project in last seven (7) years (from the date of issuance of enquiry).

b) Vendor to furnish the performance test certificate of particle size of impurities and moisture contents for lube oil satisfying in clause-1.0.

c) Against supply at sl. no 1.0 above, controls for supplied OPS shall have been realised in a DCS/PLC based control panel. PLC shall be kept in a JB along with associated control gear on skid. Vendor to submit control panel scheme for information.

d) Vendor to provide make/ model/ data sheet of centrifuge motor for information.

e) Vendor to furnish P&ID, GA drg. and data sheet of OPS.

f) Vendor to furnish dispatch docs of OPS i.e. tax invoice/ inspection report /Lorry way bill for our information.

TABLE-2: To be submitted filled by Vendor along with offer

Sl. no.	Description	Acceptance Criteria	Vendors response for Project Vendor to Tick applicable box.	Does Vendor meet PQR (Vendor to tick Yes or No)
1	Project name and project rating			
2	Purchase Order No. and PO Date			
3	Whether design, manufacturing, testing, supply was done by Vendor/its principle.	Yes	Yes □ No □	Yes □ No □
4	Whether Type of purifier is centrifuge	Yes	Yes □ No □	Yes □ No □
5	Whether oil grade is Lube oil (ISO VG-46) or equivalent higher grade	Yes	Oil Grade = ... (Vendor to fill)	Yes □ No □
6	Whether flow capacity of OPS >= 4000LPH	Yes	Flow capacity = ...LPH (Vendor to fill)	Yes □ No □
7	Whether particle purity of oil as per sl. no. 4 of table-1	Yes	particle purity = ... (Vendor to fill)	Yes □ No □
8	Whether moisture purity of oil as per sl. no. 5 of table-1	Yes	moisture purity = ... (Vendor to fill)	Yes □ No □
9	Whether Control Panel type is DCS/PLC based	Yes	Yes □ No □	Yes □ No □
10	Contact details, Telephone no's & Email id of End user		Vendor to fill	

Note: -

a) BHEL reserves the right to verify the information submitted by Vendor. BHEL may visit the factory premises of the Vendor for verification and other purposes submission of false/ incorrect information shall lead to rejection of offer.

b) BHEL reserves the right to ask for more pertinent information /documents / clarifications.

c) Vendor shall provide this information to BHEL in a timely manner so that project schedule does not hamper.

Worked by	ANIL KUMAR/DM-STE(TL) Anil Kumar 5/3/25	S.K. GAUTAM/DM -CIE Anil 05/3/25
Checked	---	DEEPAK GOEL/SM-CIE Deepak Goel 05/3/25
Approved	ANUJ JAIN/SDGM-STE(TL) 5/3/25	SURESH CHANDRA/SDGM-CIE 05/03/25
	STE-TL	CIE

	VENDOR'S NAME & ADDRESS: HPGCL approved vendor	STANDARD QUALITY PLAN		
		PROJECT: 1 X 800 MW YAMUNANAGAR TPS **CONTRACTOR:** BHEL-Haridwar **PACKAGE**: Main Plant Package	**PRODUCT**: Oil Purification Unit **BHEL SPEC.:** ST 39013	QAP NO.: 4.02.01 REV. NO: 01 DATE: 23.10.2025 PAGE 1 OF 5

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY M	AGENCY C	AGENCY N	REMARKS
1.0	**RAW MATERIALS & BOUGHT OUT ITEMS**												
A.	***Centrifuge***												
1	Centrifuge with Motor	Throughput / RPM	MA	Bench Test	Each Machine	DIN 55350-18-4.2.2	WS Data Sheet	T.C.	√	P	V	V	
2	Material of Construction	Bowl Bottom : SS Bowl Top : SS Bowl Spindle : SS Distributor : SS Impeller (Centripetal Pump): SS Gun Metal Centrifuge Frame : Cast Iron Centrifuge Hood : Seluminium	MA	TC	100%	Std. as per approved Data Sheet	COC	T.C.	√	P	V	V	
3	Bowl Balancing	Balancing Test	MA	----	10 %	ASME E 165	COC	COC	√	P	V	V	
4	UT Test for Bowl Spindle	NDT	MA	----	----	ASME E 165, ASTM A388	No Surface defect	COC	√	P	V	V	
B.	***Control Panel***												
1		Dimension	MI	Measurement	100%	BHEL Appd Drawing	BHEL Appd Drawing	Mfg. T.C.	√	P	V	V	IP 54 enclosure
2		Interlock & sequential operation	MA	Simulation	100%	BHEL Appd Drawing	BHEL Appd Drawing	Mfg. T.C.	√	P	V	V	
3		Insulation resistance	MA	Mugger Test	100%	500V DC	More than 1 M Ohm	Mfg. T.C.	√	P	V	V	
4		HV Test & IR before & after HV	MI	HV Test	100%	2 KV for 1 min.	No failure	Mfg. T.C.	√	P	V	V	

MANUFACTURER / SUB-CONTRACTOR		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY CONTACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUB-CONTRACTOR, C: BHEL / NOMINATED INSPECTION AGENCY, N: CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION.	
SIGNATURE		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER.	FOR CUSTOMER USE APPROVED BY

VENDOR'S NAME & ADDRESS: HPGCL approved vendor	STANDARD QUALITY PLAN		
	PROJECT: 1 X 800 MW YAMUNANAGAR TPS **CONTRACTOR:** BHEL-Haridwar **PACKAGE**: Main Plant Package	**PRODUCT**: Oil Purification Unit **BHEL SPEC.:** ST 39013	QAP NO.: 4.02.01 REV. NO: 01 DATE: 23.10.2025 PAGE 2 OF 5

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY M	AGENCY C	AGENCY N	REMARKS
5		Voltage variation test	MA	-	100%	10% Variance	No failure	Mfg. T.C.	√	P	V	V	
6		Bill of Material	MA	Visual	100%	As per Drg.	As per Drg.	Mfg. T.C.	√	P	V	V	
C.	***Motor***												
1	Feed Pump Motor	Routine Test	MA	Elec. Test	100%	IEC 60034	IEC 60034	T.C.	√	P	V	V	
2		Type Test	MA	Elec. Test	Sample	IEC 60034	IEC 60034	T.C.	√	P	V	V	
3	Separator Motor	Routine Test	MA	Elec. Test	100%	IEC 60034	IEC 60034	T.C.	√	P	V	V	
4		Type Test	MA	Elec. Test	Sample	IEC 60034	IEC 60034	T.C.	√	P	V	V	
D.	***Pump***												
1	Feed Pump	Routine Test	MA	Capacity & Pr.	100%	Mfg. Spec.	Mfg. Spec.	Mfg. T.C./ Conformity Crt.	√	P	V	V	
E.	***Instruments***												
1	Pressure Gauge	Performance & accuracy	MA	Measurement	100%	Mfg. Spec.	Mfg. Spec.	Mfg. T.C.	√	P	V	V	
2	Pressure Switches	Performance & accuracy	MA	Measurement	100%	Mfg. Spec.	Mfg. Spec.	Mfg. T.C.	√	P	V	V	
3	Temperature Gauge	Performance & accuracy	MA	Measurement	100%	Mfg. Spec.	Mfg. Spec.	Mfg. T.C.	√	P	V	V	
4	RTD	Performance & accuracy	MA	Measurement	100%	Mfg. Spec.	Mfg. Spec.	Mfg. T.C.	√	P	V	V	
F.	***Pipe***												
1	Pipelines	Leakage	MA	Hyd. Test	100%	Approved Drgs	No Leakage	I.R.	√	P	V	V	
2	Pipe Fittings	Leakage	MA	Hyd. Test	100%	Approved Drgs	No Leakage	I.R.	√	P	V	V	

MANUFACTURER / SUB-CONTRACTOR	LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY CONTACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUB-CONTRACTOR, C: BHEL / NOMINATED INSPECTION AGENCY, N: CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION.	
SIGNATURE	ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER.	FOR CUSTOMER USE / APPROVED BY

	VENDOR'S NAME & ADDRESS: HPGCL approved vendor	STANDARD QUALITY PLAN		
		PROJECT: 1 X 800 MW YAMUNANAGAR TPS **CONTRACTOR:** BHEL-Haridwar **PACKAGE**: Main Plant Package	**PRODUCT**: Oil Purification Unit **BHEL SPEC.:** ST 39013	QAP NO.: 4.02.01 REV. NO: 01 DATE: 23.10.2025 PAGE 3 OF 5

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY M	AGENCY C	AGENCY N	REMARKS
G.	***Valves***												
1	Valves (Ball Valve, Globe Valve & Relief Valve)	Leak test for body & seat	MA	Hyd. Test	100%	Mfg. Spec.	No Leakage	I.R.	√	P	V	V	
2	Strainer Y - Type	Leak test for body	MA	Hyd. Test	100%	Mfg. Spec.	No Leakage	I.R.	√	P	V	V	
H.	***Polishing Filter***												
1	Polishing Filter	Routine Test including Hydro Test	MA	Conformity Test	100%	Mfg. Spec.	BHEL approved Doc	TC	√	P	V	V	
J.	***HEATER***												
1	Plates	Mech / Chem	MA	Visual & Dimensional	100%	Std. as per Approved Drg	SS304	Mfg. T.C.	√	P	V	V	
2	Nozzle Pipes	Mech / Chem	MA	Visual & Dimensional	100%	Std. as per Approved Drg	SS304	Mfg. T.C.	√	P	V	V	
3	Flanges	Mech / Chem	MA	Visual & Dimensional	100%	Std. as per Approved Drg	SS304	Mfg. T.C.	√	P	V	V	
4	MOC Tubes	Mech / Chem	MA	Mech/Chem	100%	Std. as per Approved Drg	SS304	Mfg. T.C.	√	P	V	V	
2.0	**MANUFACTURING**												
1	Fabrication / Assembly	Overall Dimension	MA	Dimensional	100%	BHEL Approved Drg.	BHEL Approved Drg.	IIR	√	P	V	-	
2	Welding	DP Test	MA	Visual	100%	BHEL Approved Drg.	BHEL Approved Drg.	IIR	√	P	V	-	
3	Leakage test	Leakage	CR	Visual	100%	BHEL Approved Drg.	BHEL Approved Drg.	IIR	√	P	V	V	

MANUFACTURER / SUB-CONTRACTOR		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY CONTACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUB-CONTRACTOR, C: BHEL / NOMINATED INSPECTION AGENCY, N: CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION.		
SIGNATURE		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER.	FOR CUSTOMER USE	APPROVED BY

	VENDOR'S NAME & ADDRESS: HPGCL approved vendor	STANDARD QUALITY PLAN			
		PROJECT: 1 X 800 MW YAMUNANAGAR TPS **CONTRACTOR:** BHEL-Haridwar **PACKAGE**: Main Plant Package	**PRODUCT**: Oil Purification Unit **BHEL SPEC.:** ST 39013	QAP NO.: 4.02.01	
				REV. NO: 01	DATE: 23.10.2025
				PAGE 4 OF 5	

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY M	AGENCY C	AGENCY N	REMARKS
4	Element Elect. Test	Resistance, insulation, capacity, voltage, HV test	CR	Resistance test, megger test, HV test	100%	BHEL Approved Drg.	BHEL Approved Drg.	Mfg. T.C.	√	P	V	V	
3.0	**INPROCESS, FINAL INSPECTION & TESTING**												
1	Dimension and general layout of system	Dimensions & layouts	MI	Measurement & visual check	100%	Approved drg.	Approved drg.	I.R.	√	P	W	W	
2	Complete Skid	Bill of Material	MI	Visual	100%	Approved drg.	Approved drg.	I.R.	√	P	W	W	
3	System interlocks, alarms & DOL starter function	Functioning of instruments	MA	Simulation	100%	Approved drg.	Approved drg.	I.R	√	P	W	W	
4	Mechanical run Test	Capacity / Vibration, Noise level	MA	Measurement	100%	Approved drg.	Approved drg.	I.R.	√	P	W	W	
4.0	**PERFORMANCE TEST**												
1	Performance	Moisture content in oil before & after separation	MA	Lab test	Sample Report	approved procedure	Free Moisture in Clean oil < 0.05% from initial > 1.5%	TC	√	P	W	W	
2	Oil Purity	Particle size Inlet and Outlet	MA	Visual	Sample Report	approved procedure	Particle size at outlet is 15/12 from initial 21/18	Type Test report will be provided	√	P	V	V	
5.0	**PRESERVATION & PACKING**												
1	Painting, Cleaning, packing & marking		MA	Visual	100%	BHEL Specs	BHEL Specs	Quality Record	√	P	V	V	

MANUFACTURER / SUB-CONTRACTOR		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY CONTACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUB-CONTRACTOR, C: BHEL / NOMINATED INSPECTION AGENCY, N: CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION.		
SIGNATURE		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER.	FOR CUSTOMER USE	APPROVED BY

	VENDOR'S NAME & ADDRESS: HPGCL approved vendor	STANDARD QUALITY PLAN		
		PROJECT: 1 X 800 MW YAMUNANAGAR TPS **CONTRACTOR:** BHEL-Haridwar **PACKAGE**: Main Plant Package	**PRODUCT**: Oil Purification Unit **BHEL SPEC.:** ST 39013	QAP NO.: 4.02.01 REV. NO: 01 DATE: 23.10.2025 PAGE 5 OF 5

SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*	AGENCY			REMARKS
									D	M	C	N	

Note:

1. All material of construction shall be as per BHEL approved datasheet. Bought out items shall be purchased from BHEL approved sources/ approved data sheet.
2. Accuracy /class of instruments shall be as per BHEL contract specification.
3. UT shall be carried out for bowl spindle dia ≥ 50 mm. 2 MHz frequency, 20 mm /10 mm normal beam probe shall be used. The back wall echo shall be set to 100 % at sound area. Any defect echo exceeding 20 % is not acceptable. Also, at any area, loss back wall echo up to 20 % (back wall echo height = 80% of FSH or less) is not acceptable.
4. Bowl balancing is carried out to reduce vibrations (which are measured in final inspection).

MANUFACTURER / SUB-CONTRACTOR		LEGEND: * RECORDS IDENTIFIED WITH (✓) SHALL BE ESSENTIALLY INCLUDED BY CONTACTOR IN QA DOCUMENTATION. M: MANUFACTURER / SUB-CONTRACTOR, C: BHEL / NOMINATED INSPECTION AGENCY, N: CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION.		
SIGNATURE		ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER.	FOR CUSTOMER USE	APPROVED BY

ADDENDUM- 411928J8100(Rev. no.-00)

MANUAL CLEANING TYPE OIL PURIFIER (DCS BASED)

ADDITIONAL SPECIFICATION FOR ST39013 (Rev.no. -08):

Requirements mentioned in this addendum shall supersede the corresponding requirements/clause of spec ST39013.

1. Capacity (By single machine) of oil purification system (OPS) shall be **7500 LPH.**
2. Heater rating shall be 90 kW.
3. The optional offer to be furnished by vendor for performance test of particle size & moisture impurities for lube oil (ISO VG- 46) as mentioned in sl.no.5(a) of spec-ST39013. Both the tests shall be carried out from CMTI/NABL accredited lab.
4. Type test report for capacity, particle size & moisture impurities for lube oil (ISO VG-46) as mentioned in sl.no.5(a) of spec-ST39013 conducted within 5 years carried out from CMTI lab/NABL accredited shall be furnished by vendor.
5. Clause 5 a (ii) at page no.: 10 of Spec-ST39013 read as: - Moisture contents at the outlet of OPS shall be maximum 500 ppm from inlet of greater than or equal to 15000 ppm.
6. The material for the rotating parts of the centrifuge shall be high grade stainless steel AISI 316 or equivalent.
7. Piping, valve body & its internal and all other component of oil purification system coming in contact with oil shall be of stainless-steel construction.
8. The oil purification system (OPS) is complete skid of purifier in which centrifuge type separator is main component used for removing particle impurities and moisture contents from turbine lube oil system. Only following make separator are acceptable to BHEL: -

Sl. No.	Item Name	Make of Separator
1	Centrifuge type Separator	i. Alfa Laval ii. GEA Westfallia iii. Alternate make separator is acceptable provided OPS in which it is used meets the particle & moisture criteria mentioned in sl. no.4 above of this doc. and flow 7500LPH.Vendor to furnish customer approved type test report of such OPS for any earlier executed project. In case, vendor fails to furnish customer approved type test report doc. Vendor's offer shall not be considered.

9. Var. nos. 7,8,10 &11 of Table A of clause no 3.17 at sheet no. 06 of 40 of specification ST 39013 shall not be applicable.
10. Clause no. 3.13 at page no. 5 of 40 of Spec-ST39013 shall be ignored and shall be considered one centrifuge separator in place of multiple centrifuge to meet the flow requirement.

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ADDENDUM- 411928J8100(Rev. no.-00)

MANUAL CLEANING TYPE OIL PURIFIER (DCS BASED)

11. Clause 20 A (14) & 20 A (16) at page no.36 & 37 of Spec-ST39013 shall be ignored.
12. Since unit oil purifier and central oil purifier are same, the drawings/documents to be furnished to BHEL for approval shall be common for both.
13. For paint Scheme

    Clause 11 at page no.: 15&16 of Spec-ST39013 read as following:

Paint (Coat)	Paint Type	No. of coat DFT*	
Primer Paint	Epoxy base Zinc rich primer paint	1 Coat	50
Intermediate Paint	Epoxy MiO Polyamide Cured Paint	1 Coat	100
Finish (Final) Paint	Aliphatic Acrylic Polyurethane Finish paint	1 Coat	75

Total DFT = 225 (microns)

Note: Touch-up paint shall be 5% of total finish coat paint qty.

14. The sizes of inlet and outlet pipe connections of oil purification system shall be NB 50mm in place of NB 40mm mentioned in P&ID of Spec-ST39013. Also, the sizes of inlet and outlet pipe connections of vented sight overflow fitting shall be NB 50mm.
15. Supervision by vendor during erection & commissioning at site shall be required.
16. List of recommended spares and commissioning spares along with price breakup of individual spares are required.
17. Vendor to provide lube oil recirculation piping/ piping connection in its scope. Vendor to note that unit oil purifier recirculation line shall be connected to outlet of purifier. For central oil purifier, oil recirculation line shall be connected to inlet of purifier.
18. Clause 5(b) at page no.: 10 and Clause 20 A (9) at page no.: 36 of Spec-ST39013 read as $\beta 5 \geq 1000$ in place of $\beta 3 = 1000$ or better.
19. Clause 3.6 at page no.: 4 of Spec-ST39013 read as: -The OPS preferably shall be completely vapor tight to prevent fumes & vapor tight to prevent fumes & vapours from entering.
20. Clause 7.5(2c) at page no.: 12 of Spec-ST39013 read as: -Ignore the clause and consider vibration of machine in use is max vibration 9.0 mm/s.
21. Clause 8.1(f) at page no.: 13 of Spec-ST39013 read as: -Characteristic curve of all pumps preferably required.
22. Clause 8.1(i) at page no.: 4 of Spec-ST39013 read as: -Documents preferably required with offer-cross sectional drawings of all equipment including horizontal & vertical section of the separator.
23. Clause 8.3(b) at page no.:14 read as nine (9) sets paper based in place of twenty (20) sets of O&M Manual.
24. Refer sheet no 10 of specification ST 39013, clause no 4.2.g- alternatively vendor to ensure that separator cover is locked before starting the purifier.

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ADDENDUM- 411928J8100(Rev. no.-00)

MANUAL CLEANING TYPE OIL PURIFIER (DCS BASED)

25. Clause j (i) at page no.: 12 of Spec-ST39013 read as – Degree of protection test as per IS: 2147 (type test) and HV test at 2.0 KV for one minute
26. For supply of VAF meter 3 phase 3 wire supply is preferred.
27. Refer sheet no 08 of 40 of specification ST 39013, clause no 4.1.u – cable glands suitable for 3 wire 400 mm2 incoming cable shall be provided.
28. Refer Sheet no 8 of 40 of clause no 4.1.y., and sheet no 38 of 40 point no 2 of specification ST 39013 may be read as wherever possible Plug and socket type connection should be provided for pressure and level switch.
29. Refer sheet no 09 of 40 of specification ST 39013, clause no 4.2 – Alternatively switching of control unit shall be possible from DCS.
30. Refer sheet no 12 of 40 of specification ST 39013, clause no 7.h- Alternatively manufacturers test certificate shall be provided for BHEL review.
31. Refer sheet no 12 of 40 of specification ST 39013, clause no k.i – may be ignored.
32. Refer sheet no 12 of 40 of specification ST 39013, clause no k.ii – Pick up and drop-down test may be ignored. Alternatively, voltage variation range for all major items shall be indicated with items details in data sheet.
33. Refer sheet no 30 of 40 of specification ST 39013, clause no 16.1.8- starting current. This clause should be read as starting current shall be as per IEC 60034-12 or equivalent.
34. Refer sheet no 30 of 40 of specification ST 39013, clause no 17.1.g should be read as the pressure gauge should have micrometer adjustable facility on front or any other suitable place.
35. Refer sheet no 30 of 40 of specification ST 39013, clause no 17.1.i -This clause may be ignored.
36. Refer sheet no 30 of 40 of specification ST 39013, clause no 16.1.3-ambient temp may be read as 50 degree centigrade instead of 500.
37. Refer sheet no 31 of 40 of specification ST 39013, clause no 3.2 – should be read as motor should essentially have manual or online greasing facility.
38. Refer sheet no 33 of 40 of specification ST 39013, clause no 17.3- process connection of magnetic level switch shall be as per BHEL specification or vendors standard practice.
39. Motor starting current shall be for Direct Online (DOL) shall be as per IS: 12615 - 2011/IEC 60034.
40. For DCS based manual cleaning type oil purification system ON/OFF control, indication and alarm functions shall be provided on the LCP as well as on HMI system DCS.
41. Clause 4.1.e at page no.: 7 of Spec-ST39013 Requirement of flame proof motor as per IS2148 is not essential.
42. Clause 4.1.w at page no.: 8 of Spec-ST39013: - should be read as polishing filter, chock alarm shall be provided through DPS.
43. Motor efficiency: - IE3.
44. Spec. no. ST39013 Clause no. 17 (Page no. 33 of 40) Sl. No. 2: Temperature Indicator

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Type – Inert gas type instead of Bi-Metallic to be provided.

45. Incoming Supply: 415V AC, 3Phase, 4Wire.
46. MCCB Incomer: shall be 250Amps Incomer 4 pole ,3D,50kA, THERMAL MAGNETIC TM-D, SC PROTECTION MCCB
47. The MCCB shall be quick-make, quick-break heavy duty type min. 1NO + 1 NC auxiliary contacts. For Motor Protection, contactor, O/L relay and MCCB combination shall be tested to ensure type-2 co-ordination at 50KA rating.
48. MCB shall be rated for 10kA short circuit rating. It shall be quick make, quick break, independent manual type with trip free feature. MCB shall have the following:
    a. Over current protection
    b. ON/OFF Trip position indicators
    c. Auxiliary contact block (Wherever required)
49. Contactors shall be of air break, electromagnetic type rated for uninterrupted duty Contactors shall be double-break, non-gravity type and their main contacts shall be silver faced copper. Direct-on-line contactors shall be of utilization category AC3. Full Voltage Reversing starters shall comprise of Forward and Reverse contactors mechanically and electrically interlocked with each other. These contactors shall be of utilization category AC4.
50. The contactor shall operate satisfactorily between 85% to 110% of the rated voltage. The contactor shall not drop out at 70% of the rated voltage but shall definitely drop out at 20% of the rated voltage.
51. MCCBs shall be of four pole construction for panel mounting, operating mechanism shall be trip free, quick make quick break type. MCCB should be current limiting type only. The MCCBs shall be provided with front operating handles & mechanical ON/OFF indicators. MCCBs shall be provided with overload thermal releases setting range of 80% to 100% of rated current and adjustable short circuit magnetic releases from 5-10 times rated current.
52. **Current Transformer:** Metering CT Accuracy class shall be 0.5. The accuracy limit factor shall be less than 5.0.
53. The voltage transformers shall have an accuracy class 0.5 for metering & 3P for protection.
54. The local push button stations shall be dust and vermin roof and shall have a degree of protection of IP - 55. Push buttons shall be of heavy-duty spring return, push-to-actuate type. Their contacts shall be rated to make, continuously carry and break 10 A at 110V AC and 1A (inductive) at 220V DC.
55. **For Local Indicator (PG, TG etc.):**
    i. Dial size shall be 150mm.
    ii. Case Material: Stainless Steel
    iii. Enclosure Class: IP-65
56. **For Duplex RTD:**
    a) Head type: IP-65 universal screwed type.
    b) Protecting Tube: -
        i. O.D.: 8 mm
        ii. Material: SS-316, Seamless

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iii. Filling: Magnesium oxide (Purity above 99.4%).
iv. Calibration: DIN 43760
v. Accuracy: 0.5%

57. **For Level Switch:**
    i. Switch housing: Epoxy coated die cast aluminium alloy with neoprene gasket conforming to IP-65.
    ii. Type of switch Configuration: 2 SPDT (two nos.)
    iii. Contact rating: 5A, 240V/AC, 0.25A, 220V DC
58. **For Pressure Switch:**
    i. Sensing element material: AISI SS-316. All other wetted part SS316.
    ii. Case Material: Die cast aluminium alloy with neoprene gasket.
    iii. Switch configuration: Two SPDT
    iv. Switch Rating: 240V, 5A AC/220V, 0.5A DC
    v. Enclosure Class: IP-65
59. **Air Filter Regulator:**
    i. Filter Element: Sintered Bronze
    ii. Filter Size: 5 microns
    iii. Input Air: 10.0 Kg/Sq. cm (maximum)
    iv. Output: Adjustable from 0-2.0 Kg / Sq. cm or 0-7.0 Kg / Sq. cm (continuous) as applicable.
    v. Effect of Supply: Maximum 0.02 Kg/Sq. cm for a change pressure variation in supply pressure of 4 Kg/Sq. cm
    vi. Bowl Material: Metallic.
    vii. Accessories: 2" dial size output pressure gauge
    viii. Feature: No perceptible drop of pressure on opening the drain port.

60. **For Solenoid value:**
    i. Body: SS Bar Stock
    ii. Trim: AISI SS-316
    iii. Manual Operator: In built
    iv. Coil Enclosure: Stainless Steel
    v. Insulation: Class - H
    vi. Coil Casing: IP-65
61. Panels / enclosure shall be provided with 20% spare terminals. In addition, the spare hot on rail mounted input output channels /modules shall be in fully wired & terminated condition for system cabinets.
62. Vendor to provide additional packing list for Material code: W90318103613 as per Doc. no. 418101H3008

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APPLICABLE MANDATORY SPARE LIST FOR LT SWITCH GEAR ITEMS OF LUB OIL PURIFICATION UNIT

DRAWING NO-41810H11002 REV 00

PROJECT- 1x800MW Yamunanagar

Mat code- WS9818103645: 1 SET OF MATERIAL CODE CONTAINS FOLLOWING ITEMS

SNO	ITEM DESC	QTY	UOM	Remarks
1	AUX CONTACT SET	6	SET	1 Set=1 No. Aux Contact of each type and rating
2	CURRENT TRANSFORMER (METERING)	3	NO	
3	CONTROL SUPPLY TRANSFORMER	1	NO	
4	AMMETER	1	NO	
5	RELAY	1	SET	1 Set=1 No. Relay of each type and rating
6	POWER CONTACTORS	5	SET	1 Set=1 No. Power Contactor of each rating
7	CONTROL AND SELECTOR SWITCHES	1	NO	
8	POWER FUSE	1	NO	
9	INDICATING LAMP HOLDERS COMPLETE	1	NO	
10	DOOR LIMIT SWITCHES	6	NO	

NOTE-DRAWING SHOULD BE READ ALONGIWTH THE SPECIAL INSTRUCTIONS MENTIONED IN THE INDENT.

(Sunil Kumar Gautam) (Deepak Goyal) (Suresh Chandra)

Dy. Manager Sr. Manager Sr. DGM

CHECK LIST FOR MECHANICAL ITEMS OF OIL PURIFICATION SYSTEM (OPS)

Ignore check list at annexure-VII(A) at sheet no. 36 & 37 of 40 of spec. ST39013 and refer this check list: -

Sl. No.	Technical Requirements	Vendor's confirmation (Yes/No)	Remarks (if any)
1.	Is capacity of oil purification system (OPS) **(i.e. 7500 LPH)** and heater rating 90 Kw as per BHEL specifications		
2.	For lube oil (ISO VG-46) at 65 deg. C or at lower temp, purity of oil of oil purifier as following: - a) Is particle content equal to or better than class 15/12 as per ISO 4406 at the outlet of OPS from inlet of class 21/18 or inferior in single pass? b) Is moisture content equal to or less than 500 ppm at the outlet of OPS from inlet of greater than or equal to 15000 ppm in single pass?		
3.	Is the test certificate for particle size of impurities & moisture content provided as per BHEL specifications?		
4.	Is mode of operation (i.e. purifier/clarifier) as per BHEL specifications & enquiry?		
5.	Is noise level as per BHEL specifications?		
6.	Is overflow sight fitting provided as per BHEL specifications?		
7.	Is capacity of oil feed & discharge Pump (i.e. **at least 10% higher** than capacity of the purifier) as per BHEL specifications?		
8.	a) Are copies of O&M manual (2 nos. CD based & 9 nos. hard paper based) provided as per BHEL specifications? b) Are 2 copies (hard paper based) of O & M manuals kept inside the dispatch box as per BHEL specifications & enquiry?		
9.	Is polishing filter **(β5= 1000 or better)** provided as per BHEL specifications?		
10.	Is supervision during erection & commissioning at site by vendor offered as per BHEL specifications & enquiry?		
11.	Is lube oil recirculation piping/ piping connection provided as per BHEL specifications & enquiry?		
12.	Is pipe size (NB 50) of inlet and outlet of Oil purification system?		
13.	Are sufficient spares for satisfactory commissioning and for 3 years satisfactory operation of the purifier provided as per BHEL specifications?		
14.	Are detailed lists of recommended spares and commissioning spares along with price break up provided as per BHEL specifications & enquiry?		
15.	Is particle size impurities test and moisture test as detailed out in sl.no.5(a) of Spec- ST39013 technical specification to be carried out on one oil purification system of project? Procedure of test shall be as per annexure-X of this doc.		
16.	Is the painting scheme as per BHEL specifications/enquiry?		
17.	Are piping, valve body & its internal and all other component of oil purification system coming in contact with oil shall be in stainless steel construction?		

CHECK LIST FOR MECHANICAL ITEMS OF OIL PURIFICATION SYSTEM (OPS)

18.	**Deviations taken (Please specify clearly, if any):** a) b) c)		

Notes: Vendors are supposed to fill relevant columns with Yes/ No/ Value offered.

Date: **Signature**
&
Place: **Seal of manufacturer**

ANNEXURE-X

Procedure and Set-Up of oil purity test for Centrifuge type purifier:

a) Assemble the centrifuge bowl in purifier mode and set up the module as per the schematic flow diagram.

b) Start the feed and set the purifier for desired capacity and temperature to maintain during test i.e. desired flow (As per data sheet) and 65 deg C. Check the calibration certificate of all the equipment used in test.

c) Start the module and wait till it reaches full speed. The module is started initially in recirculation mode (fresh oil is circulated back to dirty oil tank).

d) Add particulate matter (contamination) in dirty oil tank to achieve contamination level of 21/18 as per ISO 4406 by ensuring proper mixing of the particulate matter (contamination).

e) Now the module is ready for the Type test. Run the centrifuge.

f) The oil flow (capacity) is checked using measuring flask/flow meter. In case of measuring flask desired capacity is measured by collecting the oil in a jar of 5 ltrs. And time taken to fill this jar. At least three readings are taken to adjust the capacity. The capacity is adjusted by flow adjusting inlet valve.

g) Collect samples from centrifuge inlet sampling point after one minute of mixing dirt and collect sample at outlet after two minute of mixing dirt.

h) In case of purifier where polishing filter is also applicable in such cases first sample will be collected by bypassing the filter and then by passing through polishing filter sample will be collected at the outlet of the polishing filter.

i) The samples should be checked for its contamination using CMTI instruments which are made available at the type test venue. All the sample readings are recorded as per the Log Sheet.

j) Multiple samples will be collected. Stop the centrifuge after collection of Sample.

ANNEXURE-X

Procedure and Set-Up of oil purity test for Centrifuge type purifier:

ACCEPTANCE CRITERIA

- Removal of 15,000ppm water down to 500 ppm water or less in one pass.
- Removal of particulate at Code 21/18 on the inlet to Code 15/12 as per ISO 4406 or less on the outlet in one pass

Log Sheet

Sl.NO.	Oil Temp. (deg C)	Flow (L/Min)	Solids (ISO 4406)	Water (L/Min)	No. of Sample	Time elapsed since FAT Starts

Check list for C&I items- OPU (DCS Based)

Indent No.:

Project Name:

S.No.	Description	Check
1.	OPU is DCS Based with provision of operating from local controls panel as well as control room	Yes / No
2.	Plug and socket type connection for all pressure switch and level switch	Yes / No
3.	DCS/Local selector switch is provided on the Local control panel	Yes / No
4.	Relays shall be of 24 v dc and of vendor scope of supply	Yes / No
5.	List of drives to be operated through DCS is furnished along with list of instruments and alarms	Yes / No
6.	All field instruments shall be wired to a JB which shall be in vendor scope	Yes / No
7.	A pressure switch at outlet of centrifuge and a level switch in anti-flood tank shall be provided for detection of liquid seal breakage	Yes / No
8.	Arrangement for Liquid seal breakage alarm is provided	Yes / No
9.	Air requirement of pneumatic valves is mentioned	Yes / No
10.	Motor efficiency meeting as per special instruction/project requirement	Yes / No
11.	Control panel is designed for 3 phase (415 v Ac) 3 wire power supply system	Yes / No
12.	Control panel is provided with anti-vibration pads to withstand vibrations	Yes / No
13.	Motor data sheet shall be subject to customer/ BHEL approval	Yes / No
14.	Cable glands for 415 V AC incomer is provided	Yes / No
15.	On/Off control, indication and alarms is provided in local panel as well as HMI	Yes / No
16.	Painting treatment as per addendum or special instruction mentioned in indent	Yes / No
17.	Construction of panel as per specification/addendum	Yes / No
18.	Price breakup of spare item/spare of LT switchgear given along with offer	Yes / No
19.	20% spare terminals have been provided at panel	Yes / No
20.	All instrument as well as motor data sheet, wiring diagram write up is subject to BHEL/customer approval	Yes / No
21.	Panel to be designed for 110 V AC control voltage	Yes / No
22.	Panel color as per specification/addendum	Yes / No
23.	LT motors shall be energy efficient type with efficiency class-3	Yes / No

Date: Signature

Place: Seal of manufacturer

दिनांक एवं हस्ताक्षर SIGN & DATE

SUPERSEDES INVENTORY NO

BASED ON ST22002

Bid Specification
For
Turbine Oil Purification System

(Centrifuge type)

				नाम NAME	दिनांक एवं हस्ताक्षर SIGNATURE & DATE
CIE	B. S. Rana	18/3/16	अनुवादक TRANSLATED BY	-------	
QAX	S. K. Chauhan	18/3/16	निर्मातकर्ता WORKED BY	Anil Kumar	Anil Kumar 18.03.16
TSX	DEEPAK	18/3/16	जाचकर्ता CHECKED BY	A. S. Rajput	18.03.16
सहमत विभाग AGREED DEPTT.	नाम NAME	दिनांक एवं हस्ताक्षर DATE & SIGNATURE	पर्यवेक्षणकर्ता SUPERVISED BY	R. Panja	18-03-16

दिनांक एवं हस्ताक्षर SIGN & DATE 8/4/16

मालसी सूची संख्या INVENTORY NO. P.55 38

SUPERSEDES

स्वीकृति APPROVED : S. K. Baveja 18.3.16

Gr. NO. 8.20

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LIST OF CONTENTS:

1 INTENT OF SPECIFICATION

This specification is intended to cover design, manufacturing, testing, delivery supervision of system & commissioning of turbine oil purification system and putting the system into satisfactory operation.

RESPONSIBILITY OF BIDDER: The bidder shall be responsible for providing all material, equipment and services, specified or otherwise which are required to complete the project and fulfill the intent of ensuring operability, maintainability and the reliability of the complete work covered under this specification. It is not the intent to specify completely here in, all aspects of design and construction of equipment. Nevertheless, the equipment shall conform in all respects to high standards of engineering, design & workmanship & shall be capable of performing in continuous commercial operation, in a manner acceptable to Purchaser/Owner. Bidder is requested to carefully examine and understand the specification & seek clarification, if required, to ensure that they have understood the specifications prior to submit the bid.

2 SCOPE OF SUPPLY

2.1 One oil purification system (OPS) shall comprise of:

a. One centrifuge along with its drive & accessories.

b. Indirect type oil heater and accessories

c. One dirty oil feed pump complete with its drive & accessories.

d. One clean oil discharge pump complete with its drive & accessories (if applicable).

e. Polishing filter with suitable bypass arrangement.

f. Adequately sized booster pump (if required).

g. One overflow sight fitting (loose supply).

h. The OPS shall be such that it can be used both as purifier as well as clarifier.

i. An arrangement to detect and raise alarm in case of liquid seal breakage.

j. All relevant valves, Y-type strainer, fittings and inter-connecting piping.

k. All flanged end valves and flanged terminal points of piping along with counter flanges, nuts, bolts and gaskets.

l. All relevant controls, interlocks and instrumentation.

m. Foundation plates, anchor bolts, sleeves, inserts etc. required for installation of the complete system on foundation.

n. Necessary lugs and eye bolts of all equipments for lifting the complete system during erection and maintenance.

o. A set of required special tools and tackles for erection & commissioning and operation & maintenance of the system.

2.2 **Spare Parts: -** Spares for satisfactory commissioning of the OPS are to be supplied (apart from mandatory spares). Also, a list of recommended spare parts with price break-up for 3 year satisfactory operation of the system shall also be supplied by vendor. Purchase order on the same shall be placed later by BHEL as per customer's requirement. Validity shall be kept suitable to meet our customer's requirement.

3 GENERAL TECHNICAL REQUIREMENTS

3.1 The OPS shall operate on a bypass system and the capacity of the unit shall as per the Table-A of this specification. The oil in system conforms to Servoprime-46 / ISO VG 46 / Turbinol-47 / BHEL standard practice (refer Annexure -I). The system will be located inside the turbine hall in oil room near oil tank.

3.2 The OPS should be as compact as possible so that it may be installed in the minimum required space and easy to handle.

3.3 The OPS should be suitably designed to operate in tropical climatic conditions. Equipment shall be designed for ambient temperature of 55°C and relative humidity of 95%.

3.4 Base area/ foundation of purifier shall be designed to be as compact as possible without any vibration problem as per IS: 10816-2.Norms as per approved datasheet.

3.5 All valves and instruments should be readily accessible to facilitate maintenance and operation.

3.6 The OPS should be completely vapour tight to prevent fumes and vapours from entering.

3.7 The equipment shall be suitable for continuous operation round the clock.

3.8 On load automatic cleaning of bowl assembly is preferable.

3.9 The OPS shall be equipped with sight glasses both for the purified oil and the separated water from the collecting pan.

3.10 Each purifier system shall be furnished with a positive displacement feed pump & a similar type discharge pump, if needed. Each pump shall be of the helical, herringbone, Spur gear or screw type with a normal capacity of at least 10% greater than that of the purifier system when operating under the maximum suction lift against the pressure required to feed the centrifuge. Each pump shall be fitted with adequate relief bypass valve to prevent damage from excess pressure.

3.11 Although oil temperature at the inlet to heater during normal operation of Turbine Generator set shall be 65°C but system should be designed to operate with oil at 20°C during cold starting of TG-set. During such operation, even if guaranteed purification cannot be achieved, the system shall be accepted.

3.12 Arrangement of oil recirculation piping/piping connection should be provided with recirculation line connecting to clean oil line at oil purifier outlet (with applicable NRVs) such that there are only two interfaces of oil inlet & outlet connection to oil purifier.

3.13 For two or more centrifuges running in parallel, a common skid housing for both or multiple centrifuges shall be supplied with inlet & outlet manifold. Connection interface with BHEL shall be inlet & outlet only, not multiple connections.

3.14 Pressure at the outlet of oil purification system shall be 1.5 to 2.0 bar (gauge).

3.15 The inlet, outlet & overflow connections to overflow sight fitting shall be NB80 (ø88.9X3.96)/NB40 (ø48.3X3.96)/NB15 (ø21.3X2.6) respectively. Also, it is to be noted that overflow sight fitting is to be supplied loose and the same shall be fitted in BHEL's Main Oil Tank at site.

3.16 A common drive system for separator, dirty oil feed pump and clean oil discharge pump (if required) shall also be considered. Details of such drive should be clearly submitted by the vendor in his offer.

3.17 Different variants for combination of Flow capacity of Oil Purification System, Control Panel Type and Heater Rating are given below in **Table- A.**

TABLE- A

Var. No.	Flow capacity of purification system (Litre Per Hour)	Control Panel Type	Heater Rating (kW)
1.	7500	DCS	90 kW
2.	6000	DCS	72 kW
3.	2 x 4500	DCS	120 kW
4.	7500	Relay	90 kW
5.	6000	Relay	72 kW
6.	2 x 4500	Relay	120 kW
7.	7500	DCS	55 kW
8.	6000	DCS	45 kW
9.	2 x 4500	DCS	80 kW
10.	7500	Relay	55 kW
11.	6000	Relay	45 kW
12.	2 x 4500	Relay	80 kW

4 CONTROL AND INSTRUMENTATION

4.1 Offer should include all necessary interlocks & instruments along with remote indication facility in the control panel (protection type). Purchaser will review same & necessary addition / subtraction in interlocks & instruments, considered essential for smooth operation of the unit, will be asked to include. Some of the important interlocks/controls, required, are given below.

(a) Separator shall be provided with interlocks to prevent the operation of the unit unless the feed pump & the discharge pump are operating.

(b) A system of annunciating the flooding of the separator due to loss of water seal shall be provided.

(c) All instruments i.e. pressure gauges, RTDs etc. should be reliable & of proven design. Purchaser has full right to ask them changed from one supply source to another according to operational experience. All instruments should be calibrated at minimum 5 points throughout the range and accuracy, hysteresis, repeatability etc. shall be within the specified limits i.e. ± 1%.

(d) Auxiliary electric supply available at site comprises of 415V, 3ø, 3 wires, 50 Hz (± 10% V,± 5% frequency,± 10% combined). If supplier requires any other supply for his devices, instruments and drives etc. he shall arrange \ to convert 415V, 3ø supply to the required value for further distribution. Isolating switches, over current protection, fuses, junction boxes with terminal strips etc. as required for sub-distribution shall be deemed to be in bidder's scope.

(e) Motor shall be flame proof as per IS: 2148 and make shall be of BHEL approved vendor make. Motor shall be preferably of class 2 or better in efficiency rating. If motor of any other efficiency is required, the same will be intimated to vendor during enquiry. Technical requirement for motor is given in Annexure-III.

(f) The temperature of the oil leaving the heater shall be automatically controlled by RTD in not less than 3 steps. RTD shall function to open the heater circuits when the desired temperature is exceeded & to close the heater circuits before the temperature drops below that necessary for proper purification of the oil. The heater circuits shall be interlocked with the pump motor circuits to shut off the heaters when the pumps are not being operated. Heater rating should be as given in Table-A. Heaters shall be designed to operate in minimum of three steps & shall be of indirect type.

(g) In case of polishing filter, it shall be equipped with a differential pressure switch with adjustable contracts to indicate high pressure drop across the filter along with alarm & annunciation system.

(h) Local instruments for pressure temp. & flow indication shall be provided in accordance with clause 8.0 of Annexure-I.

(i) The unit should be provided with suitable alarm & annunciation system for easy operation & identification of fault conditions. It should have spare outputs in the form of potential free contact to be hooked-up with central annunciation system in the room.

(j) All control switches, indicating lamps & sound alarm devices shall be mounted on the front face plate of a cubicle (panel) to be supplied with purification unit.

(k) Remote operating facility for all electrically operated components should be provided on control panel.

(l) All motors, heaters included in the offer, should be supplied along with its starter which will be mounted in the same panel.

(m) An arrangement to detect and raise alarm in case of liquid seal breakage shall be provided. It may be adequately sized anti-flood tank with necessary drain valves along with level gauge or any other equivalent arrangement as per standard practice of the vendor. Drain and vent connections for level switch specified in Annexure-III to ST39013 shall be NB15 (ø21.3X2.6).

(n) Control switches & Indicating lamps shall be as per vendor's standard practice or owner approved vendor/ make (project dependent).

(o) If a common control panel is provided by vendor for two or more oil purifiers running in parallel, then control panel should be designed in such a way that it allows control of both the separators on the same panel. Control panel & controls shall also be able to work a purifier satisfactorily while one purifier is in shutdown/ breakdown.

(p) Local Panel (LCP)construction:
Type: Fabricated from cold rolled sheet steel
Frame thickness: 2.0 mm
Enclosure thickness: 1.6 mm
Gland plate thickness: 3.0 mm

(q) ON/OFF control, indication, and alarm functions shall be provided on the LCP as well as on HMI system (DCS).

(r) Adequately sized copper ground bus shall be provided for each panel.

(s) Control voltage shall be 110 V AC/220 VAC.This will be informed at the time of detail Engineering.

(t) Cables for Motors and heaters shall be adequately sized keeping sufficient margin. Sizes shall be subject to BHEL/Customer approval.

(u) Cable glands suitable for incoming 415 V feeder cables shall be provided. Cable Sizes will be intimated later.

(v) LCP shall have 20% spare terminals.

(w) Polishing filter (if applicable), chock alarm shall be provided through DPS.

(x) All instruments/ Devices shall have IP55 degree of protection.

(y) For level switches and other instruments, plug and socket type connectors shall be provided. For level switch over range proof pressure shall be 150% of max design pressure.

(z) For Pressure gauge, Temperature gauge and level gauge over range test pressure shall be 1.5 times the maximum design pressure at 38 C. Range selection should cover 125% of max of scale. For Rotameter, the housing shall be IP55 protection class.

(aa) Reports of type tests shall be those conducted within last five years.

(bb) The local control panel shall have main switch fuse unit, power contactors, control transformer, space heater, alarm lamps, terminals, switchgear, OLR for separator motors and heaters and other contactors.

(cc) Interconnection diagram shall be provided along with offer.

(dd) Anti vibration pads shall be provided. Control panel should also be designed in such a way that it is able to withstand the site vibtations.

(ee) Instruments/ equipments used in parallel system of 2x4500LPH system shall be of same make & type for both the purifiers in a single project.

4.2 For DCS control panel, additional requirements

The purification system shall be operated from control room as well as local panel having the logic built in BHEL control system instead of relay based control system.

It shall also have Local/remote switch, separator start/stop selector Switch, heater on/off sel. Switch Test/Accept/Reset push buttons and 24 V DC interfacing relays with DCS.

Control Philosophy

(a) The purification system shall be operated from control room, as well as local control panel "DCS/Local" selector switch shall be provided on the LCP.

(b) All field instruments shall be wired to a JB, which shall be in vendor scope. From JB these shall be wired to DCS by BHEL.

(c) Operating sequence and interlocks for various drives shall be programmed in BHEL's DCS. Vendor shall furnish Logic diagram and write-up for operation of the system. All interlocks shall be clearly brought out in the logic diagram and write-up.

(d) 24V Interfacing relay are to be supplied by vendor mounted in the LCP for operation of drives. 24V commands shall be given from DCS to these relays for operation of various drives.

(e) Alarms shall be generated in DCS and output shall be given for driving the alarm windows in LCP.

(f) Control of individual heaters stages shall be from DCS for maintaining required oil temp using 2 nos. duplex RTDs.

(g) Limit switch or any other alternate arrangement with BHEL approval shall be provided for separator cover for remote monitoring when operating in DCS.

(h) Flow switch shall be provided at centrifuge inlet.

(i) List of drives to be operated from DCS, list of instruments and list of alarms shall be furnished along with the offer.

(j) Air requirement for 3-way valve shall be furnished with the offer.

(k) Functional testing of system shall be done with local control panel and by simulating DCS outputs.

5 PERFORMANCE REQUIREMENTS

a. The quality of purified oil at outlet of OPS at 65°C shall be as follows.

(i) Particle size of impurities at the outlet of OPS shall be equal to or better than class 15/12 as per ISO 4406 from class 21/18 at the inlet of the oil purification system in single pass without removing any additives/ inhibitors present in the oil and maintaining the lubricating value of the oil.

(ii) Moisture contents at the outlet of OPS shall be maximum 300 to 500 ppm from inlet of maximum 15000 ppm.

b. Polishing filter shall be capable of handling the quantity of clean oil, coming out of the centrifuge & filtering it down to $\beta 3=1000$ or better including colloidal carbon but shall not remove any rust inhibitor or oxidation inhibitor.

c. Noise level shall not exceed 85 decibel measured at a distance of 1 meter from the equipment and at height of 1.5 meter from the ground level.

d. Facility of indirect heater for heating oil from 50°C to the temperature which is required to make separation of water and oil most effective shall be provided. But to take care of situation while temperature is much below than 50°C, an arrangement of utilizing the heater to elevate the temperature of oil in the main oil tank to 50°C shall be provided. Heater shall be provided with suitable bypass arrangement.

6 GUARANTEES

6.1 The unit should be guaranteed for trouble free operation for a minimum period of 18 months after commissioning or 36 months after dispatch whichever is earlier.

6.2 The purification level as indicated in clause 5.2 shall be guaranteed by the supplier.

6.3 The supplier shall guarantee the power consumption of the motor at normal duty point.

6.4 If during erection, commissioning and operation at site any deficiency in a part is detected with in guarantee period, BHEL site representative shall prepare the assessment report and a copy of the same shall be forwarded to the supplier. The supplier shall replace/ rectify the concerned items free of charge. The supplier if, he so desires may depute his representative at site at his own cost, otherwise the finding of BHEL/ Owner representative shall be final and binding on the supplier.

6.5 Care should be taken during packing of electrical/electronic items to insure that there is no damage to these items during handling/transportation.

7 QUALITY ASSURANCE, INSPECTION AND TESTING

7.1 The manufacture shall conduct all tests required to ensure all the component parts of the oil purification unit offered conform to the requirements of the specification & in compliance with requirements of applicable codes & standards.

7.2 The bidder shall submit along with his offer quality plan in the prescribed BHEL's format as per Annexure-VI.

7.3 The particulars of the proposed shop tests & procedures for the tests shall be submitted to the BHEL / owner for approval along with quality plan.

7.4 The equipments shall be dispatched only after inspection & clearance of material by BHEL/ Owner & approval of tests certificates by BHEL /Owner.

7.5 The minimum tests / checks to be carried out on the unit as envisaged by purchaser are given below. This is however , not intended to form a comprehensive testing programme as it is supplier's responsibility to prepare the detailed quality plan, which should also include tests checks carried out by supplier as a part of their normal practice. This quality plan is subjected to the approval of BHEL & owner. BHEL/ Owner reserves the right to ask any more checks at the time of quality plan finalization.

(1) TESTING OF MATERIALS: The material of each component that is bowl, bowl cover, disc, heater tubes, pump casing Shafts, gear/screw, valve body etc. shall be tested as per relevant specification for its composition & mechanical properties, viz. YS, UTS, impact strength, % elongation, % RA etc. suitable NDT on the above components to ensure freedom from surface & subsurface defects shall be carried out.

(2) Following tests shall be carried out during various stages of manufacture at manufacture's works.

(a) Check for dimensions of all the component parts including surface finish, radial run out of shaft

(b) NDT:- Bowls shall be subjected to DP after final machining to ensure freedom from surface defects. Shaft shall be subjected to UT & DP to ensure freedom from internal & surface defects. All butt welds on oil piping shall be subjected to 10% RT & fillet welds to 100% MP/DP. Norms for acceptance to be informed in the offer for BHEL approval.

(c) Static & dynamic balancing test on all rotating elements of the centrifuge. Acceptance Norms for vibration is 5.6 mm/s.

(d) Hydraulic testing of all pressure parts including polishing filter if offered and vessel body etc. for 1.5 times of working pressure for 30 minutes & seat leakage test of valves at 1.0 times of working pressure for 30 minutes. No leakage to be ensured.

(e) Performance test on feed & discharge oil pump, purifier motor, heaters, control system & other accessories. Reference & Acceptance norms for vibration to be informed in the offer for BHEL approval.

(f) Type-test reports detailing the results for motors of similar ratings shall be furnished as called annexure III.

(g) Routine test reports of motors to be furnished as per annexure III.

(h) Control panel RTD, level switch & solenoid valve shall be subjected to the following final testing as applicable as routine test (unless otherwise stated) in addition to the stage inspection carried out by the vendor.

(i) Dimensional checks as per approved drawing including proper cut outs, mounting of all instruments/ accessories etc. as per approved general arrangement drawing.

(j) Functional/ operational checks of all wiring schematics, operational/ sequential interlocks etc. are applicable as per approved drawing.
i) Degree of protection test as per IS: 2147 (Type test) at 2.0 KV.

(k) High voltage test & IR measurement not less than 30 mega ohm (MΩ) before and after test.
ii) Pick up and drop down test & performance with ±10% voltage variation.

(l) Capacity test of complete oil purification system. During capacity test, the complete purifier shall be tested at manufacture's works for mechanical running, vibration & noise level, sequential operation & interlocks, test for vapour tightness (if applicable), maximum particle size & moisture

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content at the outlet of oil purification system. Acceptance norms for vibration to be informed in the offer for BHEL approval

(m) Verification/ BHEL approved type-test report for max. particle size & moisture content.

7.6 Party to furnish certificate of compliance for the instruments which are being installed in the system after P.O. placement.

7.7 STORAGE:- Bidder shall inform to purchaser along with the offer regarding storage facility which they require at the site for their equipment if the unit is to be stored at site for their equipment. If the unit is to be stored at site for next 12 to 18 months after dispatch from manufacturer's works.

8 DOCUMENTS, DATA AND DRAWINGS TO BE FURNISHED BY SUPPLIER

8.1 DRAWINGS/ DOCUMENTS REQUIRED WITH THE OFFER

a. GA drawing of the equipment offered, arrangement and layout drawing showing various equipments with all fittings, accessories and connection as well as clearance necessary for other equipment or structural members for operation and maintenance, loading data and foundation details of oil purification system.

b. Data sheets of all instruments including RTDs, motor, solenoid valves, instruments and 3-way pneumatic/solenoid valve for oil purification system shall be furnished as per Annexure-II of this specification for BHEL's review.

c. P&ID including bill of material indicating piping, valves, all instruments and devices of the system as per BHEL format annexure-VII.

d. Drawings / Documents of all equipments such as heater, y-strainer, dirty & clean oil pump etc. shall also be included in the offer.

e. Detailed technical literature on various equipments/ instruments and GA drawing of control panel.

f. Characteristic curves of all pumps.

g. Manufacturer's descriptive and illustrative literature showing details of equipments and method of operation of the complete system.

h. Electrical single line diagram, control wiring diagram, interlocks schematic, protection scheme, details of motor and starter etc.

i. Cross-sectional drawings of all equipments including horizontal and vertical section of separator indicating the recommended and mandatory spare parts. Also, list of recommended and mandatory spares with their part no. / model no. and quantity required.

j. Details of standards /codes used for designing of the various equipments and selecting the material of various components.

k. Name of the manufacturer and illustrative literature all components which have been out-sourced for purchaser's review.

l. All other relevant data and drawings which supplier considers necessary for better understanding of the system.

m. Type test Reports for capacity, moisture content, particle size of impurities and motor efficiency conducted within last 5 years.

n. Interconnecting diagram of DCS control panel (if required).

o. Acceptance norms for (i) in process NDT of bowl, shaft, butt welds of piping. (ii) Static & dynamic balancing of shaft. (iii) Performance test on pumps & motors. (iv)Vibration norms for pumps, motor and unit.

p. Also, Bidder to shall furnish the filled up check list of BHEL format as per annexure –VII.

8.2 **DRAWINGS / DOCUMENTS REQUIRED WITHIN 30 DAYS AFTER PLACEMENT OF ORDER**

a. Five sets (paper based) of each of GA drawing, P&ID, filled in data sheet, control panel schematic & write-up etc. shall be furnished for review/ approval by BHEL/CUSTOMER after placement of order.

b. Motor datasheet, curves/ graphs, type- test reports, efficiency rating etc. for review/ approval by BHEL/CUSTOMER after placement of order.

c. O & M manual (soft/ paper based) shall be furnished for BHEL review/ approval.

8.3 **DRAWINGS/ DOCUMENTS REQUIRED ALONGWITH SUPPLY**

a. All relevant test certificates & full details of the tests carried out as per the requirement of this specification before dispatch.

b. Twenty sets (paper based) and 2 set (in CDROM) of O&M manual shall be furnished containing all drawings and datasheets, catalogues of all instruments and instructions for storage, erection &

commissioning, operation and maintenance after approval. Vendor shall keep 2 copies of O&M manual in the dispatch box & shall also mention the same in its shipping list.

c. Before bidder finalises these manuals, the same will be reviewed by purchaser. After getting approval of purchaser, final manual in required quality shall be dispatched. Manual shall clearly indicate all inspections & tests to be carried out at site and if any check list/ log sheets etc. are required to carry-out specified inspection & test that shall be made part of manual.

d. Data sheets of all instruments, thermostats and motor .The same shall be included in O&M manual of oil purification system along with the catalogues of all instruments.

9 MATERIALS OF CONSTRUCTION

9.1 The material of all rotating parts / components i.e. "bowl, bowl cover, disc, Shaft/spindle, gear/screw shall be of high grade stainless steel (e.g. austenitic) considering the purpose and the extent of contact with oil. Other parts coming in direct contact with water shall be of stainless steel or other corrosion resistant material conforming to applicable standard (IS / BS) or equivalent standard. All those parts that are coming in contact with oil & are not of Stainless steel / other corrosion resistant shall be mentioned in their offer. This should be submitted as a separate document indicating material/ make of all parts.

9.2 All piping, fittings & valves should be suitably selected as per applicable IS, BS or equivalent standard.

9.3 Strainers, wherever provided, should be designed to enable them to be cleaned during operation.

9.4 All other parts/ components shall be of compatible material to suit the applications.

10 CODES AND STANDARDS

In addition to the codes and standards specifically mentioned in the relevant technical specification for the equipment/ plant/ system, all equipment parts, systems and works covered under this specification shall comply with all currently applicable statutory regulations and safety codes (National/International).

11 CLEANING, PROTECTION AND PAINTING

Painting scheme shall be according to BHEL approved/ previously approved scheme. Painting scheme for oil purification system shall be as below.

Paint (Coat)	Paint Type	No. of coat	DFT*
Primer Paint:	Epoxy base Zinc rich primer paint	2	70
Intermediate Paint:	Epoxy TiO2 Pigmented Polyamide Cured Paint	1	70
Finish (Final) Paint:	Aliphatic Acrylic 2 Pack Polyurethane Finish paint	2	60

Total Minimum DFT= 180
*DFT– Dry Film Thickness (Final) in micron.

Paint Shade shall be as below:-

- For Oil purifier- Light Blue (RAL 5012)
- For Control Panel generally it is - External-Light Grey (shade 631 of IS-5), Internal- Brilliant White or paint shade will be informed during later stage of engineering.

11.1 All surfaces shall be thoroughly cleaned of all mill scales, oxides and other coating and prepared in the shops. The protective coating should be such as to prevent the deterioration of coating itself by him for internal and external surface protection which shall be checked and approved by BHEL / Owner. All surfaces which will not be easily accessible after the shop assembly, shall before hand be treated and protected for life of the equipment.

11.2 The pre-treatment/ painting of the control panel shall be done by 7 tank process/ shot blasting/ sand blasting, by 2 coats of primer and 2 coats of paint of shade no. 692 as per IS: 6005. The total thickness of paint shall be a minimum of 180 micron and maximum of 250 micron.

11.3 After testing of unit, its internals shall be thoroughly cleaned, dried and conserved before packing. Conservation shall be suitable for storing in saline atmosphere & for a period of 2 years before use. Unit shall be suitably packed for transportation. Supplier shall be responsible for all loss or damage during transportation, handling and storage due to improper packing.

11.4 Painting treatment for LCP shall be as per IS: 6005. Two coats of lead oxide primer followed by powder painting. External shade for front and Rear shall be RAL9002 and for panel sides shall be RAL5012. Internal color shall be same as external color indicated above.

12 DESIGN CO-ORDINATION MEETING

Supplier shall attend the meeting on his own cost, whenever felt necessary, called by purchaser / owner to clarify the subject matter to them during engineering, erection, commissioning, and any stage prior to handing over.

13 LIST OF CROSS-REFERRED STANDARDS

13.1 IS: 10816-2
13.2 IS: 325,
13.3 IS: 4029,
13.4 IS: 2147,
13.5 IS: 2148,
13.6 IS: 6005,

13.7 IS: 5,
13.8 IS: 4722,
13.9 IS: 2253,
13.10 IS: 2254,
13.11 IS: 3202,
13.12 IS: 4722-1992,
13.13 ISO: 4406,
13.14 IS: 12075,
13.15 IS: 12615:2011,
13.16 IS: 10816-2.

14 ANNEXURE-I (PROPERTIES OF TURBINE OIL)

S. No.	Properties	Value	Test Method
1. a.	Kinematic viscosity at 37.8°C	47.5 c.s. to 49.5 c.s.	IS : 1448-P25
b.	Kinematic viscosity at 50.0°C	28 c.s.	IS : 1448-P25
2.	Viscosity index	Min 97	IS : 1448-P56
3. a.	Inorganic acidity	Nil	IS : 1448-P2
b.	Organic acidity	Max. 0.14 mg of KOH	IS : 1448-P2
c.	Neutralisation No.	Max. 0.2 mg of KOH per gm of oil	IS : 1012
4.	Colour	Max. 2	IS : 1448-P12
5.	Specific gravity at 50 °C	0.852	IS : 1448-P32
6.	Flash point Cleveland Open cup	Min. 200°C	
7.	Copper strip corrosion test At 100°C for 3 hours	Not worse than No.1	IS : 1448-P15
8.	Pour point	-6 °C max.	IS : 1448-P10
9.	Rust preventing characteristics	negative test passed	ASTM : D665
10.	Emulsion characteristics	40-40-0(20 minutes)	ASTMD : 1401-67
11	Total acidity after 1000 hrs. oxidation	Max. 2.0 mg of KOH per gm of the oil.	ASTMD : 943-54/ IP 157/64
12.	Foaming characteristics Max.		
	(a) At 24ºC	Nil	Volume in ml of foam after 10 minutes.
	(b) At 93.5ºC	Nil	

S. No.	Properties	Value	Test Method
	(c) At 24ºC after testing at 93.5ºC	Nil	
13.	De-aeration capacity at 50ºC	6 Minute Max.	DIN 51381
14.	Ash (by weight)	Max. 0.01	IS : 1448- P4
15.	Water content by weight	% gm below the limit of quantitative detectability.	DIN 51592
16.	Mechanical solid impurities.	Below the limit of quantitative detectability.	DIN 51592
17.	Water separation capacity After steam treatment.	Max. 300 seconds	DIN 51589

15 ANNEXURE-II (DATA SHEET OF TURBINE OIL PURIFICATION SYSTEM)

1.0 NUMBER OF UNITS OFFERED:

2.0 SCOPE OF SUPPLY:

2.1	Centrifuge	Yes/No
2.2	Centrifuge feed pump	Yes/No
2.3	Centrifuge discharge pump	Yes/No
2.4	Speed indicator	Yes/No
2.5	Thermostatically controlled electric heater with control and trip thermostat (indirect)	Yes/No
2.6	Flow meter	Yes/No
2.7	Pressure gauges	Yes/No
2.8	Temp. indicators	Yes/No
2.9	Anti-flood device	Yes/No
2.10	Y-Strainer at suction of feed pump	Yes/No
2.11	Electric control panel	Yes/No
2.12	Common base plate for complete equipment	Yes/No
2.13	Necessary spares for three (3) years of normal operation & maintenance.	Yes/No
2.14	Special tools	Yes/No
2.15	Heater (With Valves) connections	
2.15.1	Oil inlet	Yes/No
2.15.2	Oil outlet	Yes/No
2.15.3	Oil drain	Yes/No
2.15.4	Water drain	Yes/No
2.15.5	Make-up water	Yes/No
2.15.6	Open vent connection from drum	Yes/No
2.15.7	Globe valve by pass connection to heater (Oil side)	Yes/No
2.16	Centrifuge feed pump relief valve	Yes/No
2.17	Centrifuge discharge pump relief valve	Yes/No
2.18	Isolating & bypass valves for flow meter.	Yes/No

3.0 DESIGN FEATURES OF CENTRIFUGE

3.1	**Location**	Indoor
3.2	Type of operation	
3.3	Max. hydraulic capacity with turbine oil (110% of design capacity)	Lit/Hr.
3.4	Recommended through put for best performance (for turbine oil)	Lit/Hr.

3.5	Speed	RPM
3.6	Particle size distribution of impurities in purified oil at outlet of centrifuge in single pass as per ISO 4406	
3.7	Particle size distribution of impurities in purified oil at outlet of oil purification system (i.e. polishing filter) in single pass as per ISO 4406	
3.8	Moisture/Water content in purified oil at outlet of oil purification system / polishing filter	ppm
3.9	OIL TEMPERATURES	
3.9.1	Inlet to electric heater	^{0}C (Max), ^{0}C (Min)
3.9.2	Outlet from electric heater	^{0}C (Not to exceed 90^{0}C)
3.10	Water temperature in the heater tank	
3.11	Bearings :	
3.11.1	Nos.	
3.11.2	Type	
3.11.3	Manufacturer	
3.12	Dirt holding capacity of the bowl	

4.0 CONSTRUCTION FEATURES OF CENTRIFUGE

4.1	Automatic tripping of all electric motors on actuation of anti-flood device	Not provided /provided
4.2	Cleaning of centrifuge bowl	Self-cleaning/manual
4.3	Type of centrifuge drive	Worm & Gear /Belt
4.4	If centrifuge is belt driven automatic tripping of all electric motors on belt failure.	Not Provided/Provided
4.5	Hand brake	Not Provided/Provided

5.0 MATERIALS OF CONSTRUCTION OF CENTRIFUGE (INDICATE STANDARDS)

5.1	Bowl body	
5.2	bowl cover	
5.3	Separating discs	
5.4	Drive shaft	
5.5	Bowl nut	
5.6	Worm & Gear /Belt	

5.7	Oil injection nozzle	
5.8	Other inlet and outlet parts	
5.9	Other wetted bowl parts	
5.10	Valve Body	

6.0 DESIGN/CONSTRUCTION FEATURES OF ELECTRIC HEATER

6.1	**Heater details**	
6.1.1	Quantity	Nos.
6.1.2	Kilowatts	kW
6.1.3	Rating of steps (kW)	
6.1.4	Voltage	Volts (AC)
6.1.5	Frequency	C/s
6.1.6	Phase	
6.1.7	Number of thermostat	3 (2Nos. for oil temp. and one for water temp.)
6.1.8	Range	
6.1.9	Model	
6.1.10	Manufacturer	
6.2	**Heater control thermostat setting**	Cut in at ^{0}C/ Cut out at ^{0}C
6.2.1	Rating of thermostat contacts	5 amps 240V A. C 0.25 amps 240V D.C
6.2.2	No. of contacts	2 No + 2 N C
6.3	**Heater tubes**	
6.3.1	Material	
6.3.2	Number	
6.3.3	Length	mm
6.3.4	Outside diameter	mm
6.3.5	Tube wall thickness	mm
6.3.6	Surface area of heater tubes.	mm^2
6.4	**Tube Sheets**	
6.4.1	Material	
6.4.2	Number	
6.4.3	Thickness	mm
6.5	Tube bundle type	Removable/non-removable
6.6	Capacity of heater tank	M3

7.0 CENTRIFUGE FEED PUMP & DISCHARGE PUMP

	FEED PUMP	DISCHARGE PUMP

7.1	Quantity	Nos.		
7.2	Type	Positive displacement (Rotary i.e. Helical, Herring bone , spur gear or screw type)		
7.3	Capacity	Lit/hr.		
7.4	Speed	RPM		
7.5	Discharge pressure	Kg/cm2 (g)		
7.6	Relief valve setting	Kg/cm2 (g)		
7.7	Max. allowable pump working pressure	Kg/cm2 (g)		
7.8	Connections			
7.8.1	Inlet	mm		
7.8.2	outlet	mm		
7.9	Material			
7.9.1	Casing			
7.9.2	Shaft			
7.9.3	Shaft sleeves			
7.9.4	Gear/screw			
7.10	Drive (AC Motor)	As per enclosed annexure-3.		
7.11	Motor rating	KW		
7.12	Bearings :			
7.12.1	Nos.			
7.12.2	Type			
7.12.3	Manufacturer			
7.13	BHP at rated capacity			

8.0 Y-STRAINER

8.1	Make & Model	
8.2	Number	
8.3	Location	
8.4	Connection sizes	
8.5	Mesh size	
8.6	Material of element	

9.0 POLISHING FILTER

9.1	Capacity	
9.2	Make & Model	
9.3	Type	
9.4	Number	
9.5	Location	
9.6	Material of filter element	
9.7	Connection sizes	
9.8	Design Pressure (body)	Kg/cm^2
9.9	Pressure differential at choking	Kg/cm^2

10.0 INTERCONNECTING PIPINGS OF THE SYSTEM

10.1	Sizes of pipes	
10.2	Material of piping	

11.0 ANTI-FLOOD TANK

11.1	Capacity	
11.2	Number	
11.3	Location	
11.4	Connection sizes	

12.0 PNEUMATIC/SOLENOID OPERATED THREE-WAY VALVE

12.1	Make & Model	
12.2	Type	
12.3	Number	
12.4	Location	
12.5	Connection sizes	

13.0 INSTRUMENTS

13.1	**PRESSURE GAUGES: (For detailed specification refer Annexure-IV)**	
13.1.1	Type	
13.1.2	Number	
13.1.3	Location	1) Inlet to pump (Compound gauge) 2) Outlet from feed pump 3) Water temperature of indirect heater Outlet from discharge Pump.(In case

		polishing Filter, outlet from polishing Filter)
13.1.4	Range	Kg/cm^2
13.1.5	Accuracy	± 1% or better
13.1.6	Manufacturer	
13.2	**TEMPERATURE INDICATORS: (For detailed specification refer Annexure-IV)**	
13.2.1	Type	
13.2.2	Number	
13.2.3	Location	1) Inlet to electric heater 2) Outlet from electric heater 3) Inlet to centrifuge 4) Oil temperature at outlet of purifier
13.2.4	Range	^{0}C
13.2.5	Accuracy	± 1% of span
13.2.6	Manufacturer	
13.3	**FLOW METER**	
13.3.1	Type	
13.3.2	Number	
13.3.3	Location	Downstream of centrifuge feed pump.
13.3.4	Range	
13.3.5	Accuracy	
13.3.6	Connections, type & size.	
13.3.7	Model No.	
13.3.8	Manufacturer	
13.4	**PRESSURE SWITCH**	
13.4.1	Type	
13.4.2	Number	
13.4.3	location	Outlet of centrifuge
13.4.4	Range	
13.4.5	Accuracy	
13.4.6	Model No.	
13.4.7	No. of contacts & contact rating	
13.4.8	Manufacturer	
13.4.9	End connection	½'' NPT(F)
13.4.10	Electrical connection	Plug in socket
13.4.11	Repeatability	
13.5	**RESISTANT TEMPERATURE DETECTOR (RTD)**	
13.5.1	Type of RTD	
13.5.2	No. of element	Duplex
13.5.3	Housing/ Head	IP-55/Die cast Al. plug-in connectors are

		to be provided for external cable connection	
13.5.4	Sheeting of RTD	Metal sheathed; ceramic packed	
13.5.5	Calibration & accuracy		
13.5.6	Thermo well		
13.5.7	Model no.		
13.5.8	Manufacturer		
13.6	**LEVEL SWITCH (For detail specification, refer annexure-IV)**		
13.6.1	Number		
13.6.2	Type		
13.6.3	Location	Indirect oil heater Anti-flood device	
13.6.4	Range		
13.6.5	Manufacturer		
13.6.6	Model no.		
13.6.7	No. of contacts & contact rating	2 NOs. SPDT contacts 5A for 240 VAC 0.25A for 220 VOC	
13.7	**LEVEL GAUGE**		
13.7.1	Number		
13.7.2	Type		
13.7.3	location		
13.7.4	Model No.		
13.7.5	Length		
13.7.6	Manufacturer		
13.8	**INDICATING TYPE DIFFERENTIAL PRESSURE SWITCH (across polishing filter)**		
13.8.1	Number		
13.8.2	Type		
13.8.3	Model No.		
13.8.4	No. of contacts & contact rating		
13.8.5	Manufacturer		
13.8.6	List of spares furnished for three (3) Years normal operation and maintenance Enclosed with bid.		Yes/No
13.8.7	List of special tools furnished enclosed with bid.		
14.0 LT MOTORS(for details refer Annex III)			
14.1	GENERAL		
14.1.1.	Manufacturer & Country of origin.		
14.1.2.	Equipment driven by motor		
14.1.3.	Motor type		

14.1.4.	Quantity	
14.2	**DESIGN AND PERFORMANCE DATA**	
14.2.1.	Frame size	
14.2.2.	Type of duty	
14.2.3.	Type of enclosure /Method of cooling/ Degree of protection	
14.2.4.	Applicable standard to which motor generally conforms	
14.2.5.	Efficiency class as per IS 12615	
14.2.6.	(a)Whether motor is flame proof	Yes/No
	(b)If yes, the gas group to which it conforms as per IS:2148	
14.2.7.	Type of mounting	
14.2.8.	Direction of rotation as viewed from DE END	
14.2.9.	Standard continuous rating at 40 deg C. ambient temp. as per Indian Standard (KW)	
14.2.10.	Derated rating for specified normal condition i.e. 50 deg. C ambient temperature (KW)	
14.2.11.	Maximum continuous load demand of driven equipment in KW	
14.2.12.	Rated Voltage (volts)	
14.2.13	Permissible variation of :	
	a. Voltage (Volts)	
	b. Frequency (Hz)	
	c. Combined voltage and frequency	
14.2.14.	Rated speed at rated voltage and frequency(RPM)	
14.2.15.	At Voltage and frequency:	
	a. Full load current	
	b. No load current	
14.2.16.	Power Factor at	
	a. 100% load	
	b. NO load	
	c. Starting.	
14.2.17.	Efficiency at rated voltage and frequency,	
	a.100% load	
	b. 75% load	
	c. 50% load	
14.2.18.	Starting current (amps) at	
	a. 100 % voltage	
	b. 85% voltage	
	c. 80% voltage	
14.2.19.	Minimum permissible starting Voltage (Volts)	

14.2.20.	Starting time with minimum permissible voltage	
	a. Without driven equipment coupled	
	b. With driven equipment coupled	
14.2.21.	Safe stall time with 100% and 110% of rated voltage	
	a. From hot condition	
	b. From cold condition	
14.2.22.	Torques :	
	a. Starting torque at min. permissible voltage(kg-m)	
	b. Pull up torque at rated voltage.	
	c. Pull out torque	
	d. Min accelerating torque (kg.m) available at lowest permissible	
	e. Rated torque (kg.m)	
14.2.23.	Stator winding resistance per phase (ohms at 20 DegC.)	
14.2.24.	GD2 value of motors	
14.2.25.	No of permissible successive starts when motor is in hot	
14.2.26.	Locked Rotor KVA Input	
14.2.27.	Locked Rotor KVA/KW	
14.2.28.	Vibration limit :Velocity (mm/s)	
14.2.29.	Noise level limit (dBA)	
14.3	**CONSTRUCTIONAL FEATURES**	
14.3.1.	Stator winding insulation	
	a. Class & Type	
	b. Winding Insulation Process	
	c. Tropicalized (Yes/No)	
	d. Temperature rise over specified maximum ambient temperature of 50 deg C	
	e. Method of temperature measurement	
	f. Stator winding connection	
14.3.2.	Main Terminal Box	
	a. Type	
	b. Location(viewed from NDE side)	
	c. Entry of cables(bottom/side)	
	d. Recommended cable size(To be matched with cable size	
	e. Fault level (MVA),Fault level duration(sec)	

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	जाँचकर्ता CHECKED BY:	A. S. Rajput / Devesh	A.S. Rajput Devesh	18.03.16

	f. Cable glands & lugs details (shall be suitable for power cable)	
14.3.3.	Type of DE/NDE Bearing	
14.3.4.	Motor Paint shade	
14.3.5.	Weight of	
	a. Motor stator (KG)	
	b. Motor Rotor (KG)	
	c. Total weight (KG)	
14.4	**List of accessories.**	
14.4. 1.	Space Heaters (Nos./Power in watts/supply voltage)	
14.4.2.	Terminal Box for Space Heater (Yes/No)	
14.4.3.	Speed switch (Yes/No)	
	No of contacts and contact ratings of speed switch	
14.4.4.	Insulation of bearing (Yes/No)	
14.4.5.	Noise reducer(Yes/No)	
14.4.6.	Grounding pads	
	i) No and size on motor body	
	ii) Nos on terminal Box	
14.4.7.	Any other fitments	
14.5	**List of curves.**	
14.5.1	Torque speed characteristic of the motor	
14.5.2	Thermal withstand characteristic	
14.5.3	Starting. current Vs. Time	
14.5.4	Starting. current Vs speed	
14.5.5	P.F. and Effie. Vs Load	

Note:- Mark N.A. in motor data sheet whichever is not applicable.

16 ANNEXURE-III (SPECIFICATION OF MOTOR)

1.0 A suitable motor conforming to the purification unit requirement shall be supplied. The motor shall also meet the following requirement broadly. The motor shall confirm to IS : 4722, IS : 325, IS : 2253, IS : 2254, IS : 4029, IS : 3202,IS12615:2011 & IS : 2148 or equipment BS : Specification. The motor shall meet all Indian statutory requirements.

1.1	Application	To drive feed pump (suction & discharge) and centrifuge
1.2	Type of Motor	Squirrel cage, induction motor
1.3	KW Rating at 500 ambient temp	It shall have at least 10-15% reserve capacity than required for drive the unit when it is discharging max. quantity at max. viscosity
1.4	KW actually required by driven equipment under specified operation/ start-up conditions.	Unit capacity
1.5	Min. Voltage required under starting conditions to bring driven equipment up to rated speed.	80% rated
1.6	Full load speed	It shall be commensurate with pump & centrifuge speed as per design
1.7	Full load current	As per design
1.8	**Starting current**	Not to exceed 600% of the rated exclusive of IS tolerance
1.9	Starting Torque	1.3 (Min) of rated torque
1.10	Break down torque	2.05 times (min) of rated valve.
1.11	Efficiency at full load	IE2 AS PER IS 12615:2011
1.12	Power factor at full load	0.85 (Min)

1.13 Motor shall be designed to with stand the voltage and torque stresses developed due to difference between the motor residual voltage and incoming supply voltage equal to 150% of the rated motor voltage during fast changeover of buses.

2.0 STARTING DATA

2.1	Starting	Suitable for DOL
2.2	Acceleration time with full load connected.	To be furnished by supplier.
2.3	Permissible starting duty cycle, No. of Starts.	3-Starts equally spread over an hour. 2-consecutive starts from hot condition without any injurious heating to the winding.

2.4	Overload (% of full load) that can be Carried by motor without impairing Overall performance and period for Which this overload is applicable.	Motor shall be capable for running at full load with 80% of rated voltage for 5 minutes and 70% of rated voltage for1 Sec. Locked rotor with stand time under hot condition at rated voltage shall be at Least 2.5 sec more than starting time
2.5	Location	Turbine oil room indoor
2.6	Class of Insulation	Class-F, fungus resistant as per IS:3202 with temp rise limited to that of class B.
2.7	Shaft disposition mountings	As per Unit's supplier requirement.
2.8	Method of connections driven equipment	As per Unit's supplier requirement.
2.9	Direction of rotation and corresponding terminal designation	To suit pumps & centrifuge
2.10	Enclosure and ventilation	Totally enclosed fan cooled and flame proof IP55.
2.11	Bearing	As per supplier's design, min life 30,000 hrs
2.12	Grounding Device	Suitable arrangement shall be provided for earthing the motor at two separate and distinct connection points. Design of earthing conductor shall be as per IS: 4722-1992.
2.13	Terminal box	Flame proof terminal box to be provided with double compression Cable gland for AI cable Fault level : 45 KA for 0.01 Sec

3.0 SPECIAL REQUIREMENTS:

3.1 The motor shall be rewound able
3.2 The motor shall have on line greasing facility.
3.3 Motor shall be suitable for working in an environment of oil fumes without any hazard.
3.4 Separate terminal box for space heater (if applicable) to be provided.
3.5 Motor bearings (DE & NDE) shall be sealed type to avoid frequent Re-greasing.
3.6 The motor construction shall be suitable for easy disassembly and reassembly.
3.7 The terminal box shall be suitable for top and bottom entry of cable and shall be suitable for PVC insulated PVC sheathed armoured aluminium cables and shall be capable of being rotated by 180^0 in steps of 90^0.
3.8 Motor vibrations shall be acceptable as per IS: 12075; motor efficiency as per IS 12615:2011& noise level as per IS: 12065. Also mechanical vibrations shall be under limits as per IS: 10816-2.

4.0 DOCUMENTS TO BE SUPPLIED WITH DELIVERY WITH EACH UNIT. THESE SHALL BE SUPPLIED IN TWO COPIES & WORKABLE SOFT COPY.

4.1 **Characteristics:** (at 80%, 100% and 110% of rated voltage)
- 4.1.1 Starting current v/s time
- 4.1.2 Torque v/s slip
- 4.1.3 Thermal with stand for HOT and Cold condition.

4.2 Type and frame size

4.3 Starting time
- 4.3.1 With 100% voltage at terminal
- 4.3.2 With 85% voltage at terminal
- 4.3.3 With 80% voltage at terminal

4.4 Safe install time at 110% rated voltage under hot condition.

4.5 Power rating requirement w.r.t. pump requirement.

4.6 Motor GD^2

4.7 Total wt. of motor.

4.8 Expected life of bearing (but not <30000 hrs.)

4.9 Type & size of cable for which gland is provided, in the terminal box.

4.10 Type & routine test certificate as per IS: 4722.

4.10.1 In addition to cl 4.10, the following tests shall also be carried out
- i) Degree of protection test as type test
- ii) 20% over speed test for 2 minutes as routine test.
- iii) Measurement of variation as routine test as per IS: 12075.

5.0 TESTS AT MANUFACTURE'S WORKS OF MOTOR:

5.1 Motor after complete assembly shall be subjected to both type and routine tests as per IS: 4722

5.2 Additional type test:-

5.2.1 Degree of protection test to conform to the specified degree of protection.

5.2.2 Measurement of noise level as per IS 12065, motor noise level shall be limited so as to achieve combined pump motor noise level as per clause no. 5(c).

5.3 Additional routine test:

5.3.1 20% over speed test for 2 minutes.

5.3.2 Measurement of vibrations per IS 12075.

6.0 CROSS REFERRED STANDARDS:

IS:325 , IS:4722, IS:2253, IS:2254, IS:3202, IS:4029, IS:12065, IS:12075, IS:12615:2011

17 ANEXURE-IV (SPECIFICATION OF INSTRUMENTS)

1) PRESSURE GAUGE

The Pressure gauge should confirm to the following technical specification:-

a) The sensing element shall be SS-316bourden tube.
b) The dial size shall be approx. 150 mm diameter.
c) The casing shall be epoxy coated die-cast aluminium with threaded bezel ring.
d) The movement shall be stainless steel rotary gear with nylon bearings.
e) The process connection shall be G1/2"
f) The over range protection should be 150% of max. range
g) The pointer shall be `micrometer adjustable with zero facility on front.
h) The accuracy shall be 1% of full scale.
i) The gauge is to be provided with pulsation dampeners.

2) TEMPERATURE INDICATOR

Type .	Bimetallic rigid system type. No use of mercury or any other hazardous/toxic material
Case	Die cast aluminium alloy moisture proof case, heavily enamelled black
Dial Size	100 mm
Range	As per design
Accuracy	1% of total range
Bulb Material	½" bulb diameter made of SS. 316
Thermo-well	SS-AISI316 (with thread size G1/2")
Ambient Temp	60^0 C max.

3) MAGNETIC LEVEL SWITCH

Process Connection: - Nb25
Material: All parts coming in contact with the liquid made of stainless steel SS316
Electrical characteristics
Switch: Single pole double throw change over switch silver contact for handling the following currents

AC 250V – 5.0A
DC 250V – 0.25A

Operating characteristics
Differential – 6 MM I. e. 3 MM on either side of centre line working pr & Temp. : As per design
Ambient Temp. : 60°C max.

उत्पाद क्रय विनिर्देश (हीप : हरिद्वार)

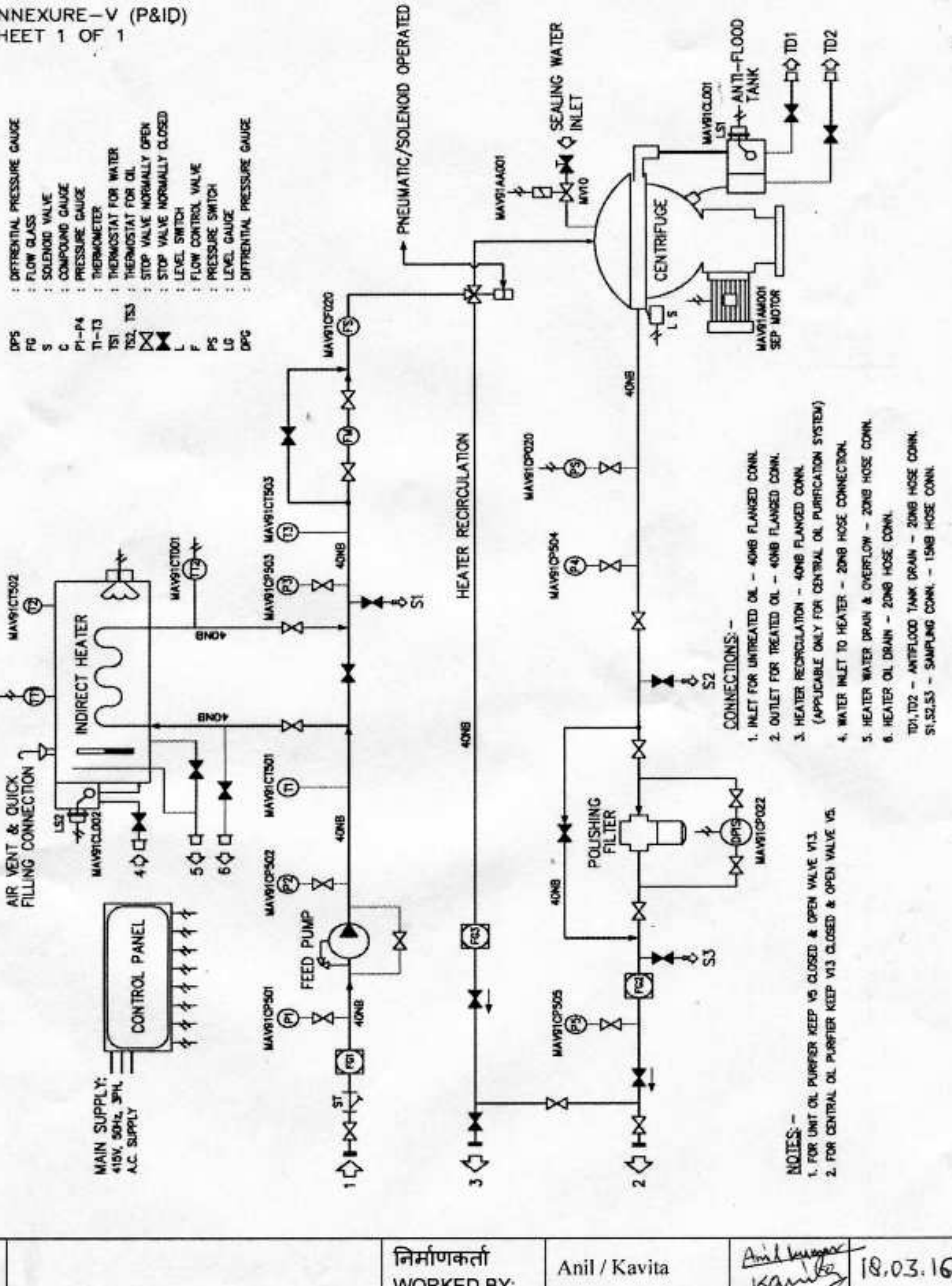
PRODUCT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)

SIGN & DATE

SUPERSEDES INVENTORY NO.

INVENTORY NO.

ANNEXURE–V (P&ID)
SHEET 1 OF 1



Rev. no.				
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	जाँचकर्ता CHECKED BY:	A. S. Rajput / Devesh		18.03.16

SUPERSEDES INVENTORY NO

सामग्री सूची संख्या को अधिक्रमित करता है

निरीक्षण एवं हस्ताक्षर SIGN & DATE

सामग्री सूची संख्या INVENTORY NO. P.55.38

19 ANNEXURE–VI (QUALITY PLAN)

MANUFACTURER'S NAME AND ADDRESS

STANDARD QUALITY PLAN

TO BE FILLED BY BHEL

TO BE FILLED BY BHEL

BHEL

VENDOR'S NAME

ITEM

DRG. NO.

SPEC.

REV

QP NO.

DATED

Page 1 of 3

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY M	AGENCY B	AGENCY N	REMARKS
1	2	3	4	5	6	7	8	9	O	10		11

LEGEND:
! RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.
M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY
N: CUSTOMER
INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION
ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER

FOR CUSTOMER USE

APPROVED BY

MANUFACTURER/SUBCONTRACTOR

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	जाँचकर्ता CHECKED BY:	A. S. Rajput / Devesh	18.03.16

18.03.16

20 ANNEXURE– VII (CHECK LIST)

A. CHECK LIST FOR MECHANICAL ITEMS

Sl. No.	Technical Requirements	Vendor's confirmation (Yes/No)	Remarks (if any)
1.	Is capacity of oil purifier as per BHEL specifications **(i.e. 7500 LPH)?**		
2.	a) Is particle size of impurities in the clean oil as per BHEL specifications in single pass (i.e. **class 15/12 or better** as per ISO4406)? b) Is moisture content in the clean oil as per BHEL specifications in single pass (i.e. **≤ 500 ppm**)?		
3.	Is the test certificate for particle size of impurities & moisture content provided as per BHEL specification?		
4.	Is mode of operation (i.e. purifier/clarifier) as per BHEL specifications & enquiry?		
5.	Is noise level as per BHEL specifications?		
6.	Is overflow sight fitting provided as per BHEL specifications?		
7.	Is capacity of oil feed & discharge Pump (i.e. at least 10% higher than capacity of the purifier) as per BHEL specifications?		
8.	a) Is copies of O&M manual (CD based & hard paper based) provided as per BHEL specifications? b) Are 2 copies (hard paper based) of O & M manuals kept inside the dispatch box as per BHEL specifications & enquiry?		
9.	Is polishing filter (β3= 1000 or better) provided as per BHEL specifications?		
10.	Is supervision during erection & commissioning at site by vendor offered as per BHEL specifications & enquiry?		
11.	Is lube oil recirculation piping/ piping connection provided as per BHEL specifications & enquiry?		
12.	Are sufficient spares for satisfactory commissioning and for 3 years satisfactory operation of the purifier provided as per BHEL specifications?		
13.	Are detailed lists of recommended spares and commissioning spares along with price break up provided as per BHEL specifications & enquiry?		
14.	Is separate offer for conducting test for particle size of impurities and		

	moisture content on one oil purification system provided as per BHEL specifications/enquiry?		
15.	Is the painting scheme as per BHEL specifications/enquiry?		
16.	Are all piping of oil purification system shall be stainless steel?		
17.	**Deviations taken (Please specify clearly, if any):** a) b) c) d)		

Notes: Vendors shall fill relevant columns with Yes/ No/ Value offered.

Date:
Place:

Signature &
Seal of manufacturer

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PRODUCT PURCHASE SPECIFICATION
(HEEP: HARIDWAR)

B. CHECK LIST FOR C&I ITEMS

Check list for OPU (DCS Based)

1. OPU is DCS Based with provision of operating from local controls panel as well control room; yes/ no
2. Plug and socket type connection for all pressure switch and level switch : yes/no
3. DCS/Local selector switch is provided on the Local control panel: yes/no
4. Relays shall be of 24 v dc and of vendor scope of supply: yes/no
5. List of drives to be operated through DCS is furnished along with list of instruments and alarms.: yes/no
6. All field instruments shall be wired to a JB which shall be in vendor scope.: yes/no
7. A pressure switch at outlet of centrifuge and a level switch in anti-flood tank shall be provided for detection of liquid seal breakage.
8. Arrangement for Liquid seal breakage alarm is provided : yes/no
9. Air requirement of pneumatic valves is mentioned: yes/no
10. Motor efficiency meeting as per special instruction/project requirement : yes ./no
11. Control panel is designed for 3 phase (415 v Ac) 3 wire power supply system: yes/no
12. Control panel is provided with anti-vibration pads to withstand vibrations: yes/no.
13. Motor data sheet shall be subject to customer/ BHEL approval: yes/no
14. Cable glands for 415 V AC incomer is provided : yes/no
15. On/Off control, indication and alarms is provided in local panel as well as HMI: yes/no
16. Painting treatment as per addendum or special instruction mentioned in indent: yes/no.
17. Construction of panel as per specification/addendum: yes/no.
18. Price break of spare item/spare of LS switchgear given along with offer: yes/no
19. 20% spare terminals have been provided at panel: yes/no.

20. All instrument as well as motor data sheet, wiring diagram write up is subject to BHEL/customer approval: yes/no
21. panel to be designed for 110 V AC control voltage : yes/no
22. For panel color exterior -Opaline green semi glossy finish, interior-glossy white and motor-smoke grey yes/no
23. All HT & LT motors shall be energy efficient type with efficiency class 1: yes/no

Date: **Signature**
Place: **Seal of manufacturer**

हस्ताक्षर एवं दिनांक SIGN & DATE

अधिक्रमित सामग्री सूची संख्या SUPERSEDES INVENTORY NO.

सामग्री सूची संख्या INVENTORY NO. P.5530

Rev. no.					
08		निर्माणकर्ता WORKED BY:	Anil / Kavita	Anil Kumar Kavita	18.03.16
		जाँचकर्ता CHECKED BY:	A. S. Rajput / Devesh	Rajput Devesh	18.03.16

Check list for OPU (Relay Based)

1. Oil Purification Unit is relay based: yes/no
2. On/Off control, indication and alarms is provided in local panel: yes/no
3. Control panel is designed for 3 phase (415 v Ac) 3 wire incomer power supply system: yes/no
4. Motor efficiency meeting as per special instruction/project requirement : yes /no
5. Air requirement of pneumatic valves is mentioned: yes/no.
6. A pressure switch at outlet of centrifuge and a level switch in anti-flood tank is provided for detection of liquid seal breakage: yes/no
7. Cable glands for 415 V AC incomer is provided : yes/no
8. Adequately sized copper ground bus is provided for each panel: yes/no
9. Painting treatment as per addendum or special instruction mentioned in indent: yes/no
10. Paint shade of control panel as per addendum/special requirement: yes/no
11. Construction of panel as per specification/addendum: yes/no
12. Control panel is provided with anti-vibration pads to withstand vibrations: yes/no.
13. Plug and socket type connection for all instruments : yes/no
14. Arrangement for Liquid seal breakage alarm is provided: yes/no
15. Price break of spare item/spare of LS switchgear given along with offer: yes/no
16. Motor data sheet shall be subject to customer/ BHEL approval: yes/no
17. 20% spare terminals have been provided at panel: yes/no
18. All instruments shall be of reputed make.

Date:
&Place:

Signature
Seal of manufacturer