

Ref. Enquiry No.: PE/PG/RTC/E-6260/2019

Dated: 05.07.2019

TENDER ENQUIRY THROUGH E-PROCUREMENT

DUE DATE
16.07.2019
BY 02:00PM

SUBJECT: TENDER ENQUIRY FOR RATE CONTRACT OF MISC. PUMP (HORIZONTAL)-TYPE-1 (WITH FLOW UP TO 300 CUB M/HR.) AS PER TECHNICAL SPECIFICATION NO. PE-TS-RC-100-N002 (REV 0)

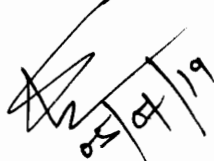
OUR REF: TENDER ENQUIRY NO: PE/PG/RTC/E-6260/2019, DTD-05.07.2019

Dear Sir/ Ma'am,

We are pleased to invite your offer for subject package in two parts strictly as per Clause-2.0 of the enclosed "Instructions to Bidders". Please upload your best quotation/ offer on <https://bhel.abcpocure.com> for the requirement strictly as per schedule of price format before above mentioned due date & time. The details of the tender enquiry are as mentioned below:

Sl. No	Description for which Rate Contract is desired	Tentative Quantity	Delivery required
1	<u>MISC. PUMP (HORIZONTAL)-TYPE-1 (With Flow Up to 300 Cub M/Hr.)</u> Refer Technical specification no PE-TS-RC-100-N002 (REV 0) for detailed description.	As per BOQ cum price schedule in Annexure-I, IA) cumulative for the Prospective Projects as per Annexure-IV	Main Supply: "Six (06) months from drawing/doc approval for respective project/requirement under the RC. Other schedules like submission of drawings/documents shall be as per cl. no. 5.0 of section IA of the Technical Specification no. PE-TS-RC-100-N002 (REV 0). In case there are delays in drawing/docs submission and resubmission, that much delay would be reduced from delivery period" For Services at Site (Installation Check, Commissioning, Trail Run and PG Testing): Vendor to depute their representative to site for carrying out above activities within two weeks of intimation by BHEL, subject to site readiness, failing which LD @ 0.5% per week or part thereof of total contract value for Services at Site. However, total LD (main supply & services) shall be limited to 10% of cumulative total contract value (main supply & services). For Mandatory Spares: Mandatory Spares to be delivered within 06 months from manufacturing clearance. Separate dispatch/ manufacturing clearance will be issued for Mandatory Spares.

Your best quotation/offer for the above requirement, in line with our terms and conditions, should be submitted online via e-procurement system. It shall be the responsibility of the bidder to ensure that the Tender is submitted on or before the due date by 02:00 p.m. Part-I bids shall be opened at 03:00 p.m. on the due date in the presence of authorized representatives of the bidders, who may like to be present.



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Note: -

1. Please note that Part Supplies offered for tender BOQ shall disqualify the bidder's offer.
2. Documents and Credential as per Technical PQR, Techno Commercial Bids and Price Bids should be uploaded on the e-procurement portal.

Please refer GCC Rev-06 which is available on www.bhelpem.com. You are requested to kindly download the same & please find enclosed here with Corrigenda to GCC Rev 06.

1. Rate contract, shall be done for 2 years from placement of Rate Contract PO with a provision for further extension after review on mutual consent.
2. Rate contract shall be done with 2 vendors in ratio of 70:30 value wise at L1 FOR site price for this package. Splitting of RC among 2 vendors may be changed during project ordering process if any vendor in RC is not approved by customer (i.e. BHEL may place order on any of the vendor in RC up to total applicable RC value in case of non-availability of customer approval for other vendor in RC). However, order for a project shall not be split.
3. Being case of RC, the project wise value is not divisible but total RC contract value is divisible & hence in line with cl. no. 3 (b) of make in India Circular ref: No. P-45021/2/2017-PP (BE-II) dtd 28/05/18 issued by Ministry of Commerce and Industry, Govt. of India, If L 1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L 1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L 1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L 1 price. In case such lowest eligible local supplier fails to match the L 1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L 1 price for remaining quantity and so on, and contract shall be awarded accordingly. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L 1 bidder.
In such case further counter-offering for 70:30 as mentioned at point no. 2 shall not be applicable. However, if L1 bid is from local supplier or local supplier is not in the range of margin of purchase preference then further counter-offering for 70:30 shall be applicable as mentioned at point no. 2.
4. As per circular ref: No. P-45021/2/2017-PP (BE-II) dtd 28/05/18, the Margin of Purchase Preference shall be 20%.
5. For Misc. Pump (Horizontal)-Type-1 package, the Local content shall be 100%.
6. Rate Contract will be finalized on total lump sum basis.
7. L1 Rates shall be counter offered to all bidders who participated in Price Bid Opening/RA for 30% value and in case acceptance of counter offer received from more than one vendor then **acceptance shall be considered as per FINAL Price Bid Opening / Reverse Auction Ranking (as applicable)**. If none accepts L1 rates, RC shall be done with L1 vendor for 100% value.

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8. The prices shall remain firm during the period of two years with a provision for further extension after review on mutual consent.
9. Bidders will be informed the following: -
- Evaluation is proposed on Ex Works + Freight basis.
 - Bidder to give single % of freight charges considering anywhere in India in the freight column. Bidders have to give same % of freight for each line item.
 - Bidders to mention applicable GST rate on (total Ex. works + freight) in the specified cells of price schedule. However, may please note that GST shall not be considered in evaluation.
 - Though evaluation is proposed on Ex Works + Freight, but there is % allocation weightage against BOQ quantity of each item which shall be used for arriving at price break up. Indigenous Bidders need to give only their total ex works price for given BOQ of Main Supply for respective groups BOQ at the specific cells that has been kept opened in the price schedule available in the e-procurement portal ('X' i.e. sl. no. A.16 column no. 8 for Annexure-I). Foreign bidders need to give only their total C&F price for given BOQ of Main Supply for respective groups BOQ at the specific cells that has been kept opened in the price schedule available in the e-procurement portal ('M' i.e. at sl. no. A.16 column no. 15 for Annexure I).
 - Rest of the prices shall be derived by BHEL in line with allocation fixed for each item. There is formula applied in price schedule form available in e-procurement portal. As soon as bidder fills the cells for Total Ex works, freight percentage and GST percentage, rest values for e.g. unit ex works – item wise, total ex works – item wise, FOR site price – item wise will filled automatically. Bidders can also validate and cross check the same by using Check Formula button.
 - For better clarity to the bidders where value is to be filled is noted as "to be quoted" and for other columns it will be noted as "derived" which denotes shall be derived by BHEL as per allocation fixed against each item.
 - HSN code for tendered item (Main supply & spares) is 8413 and HSN code for services at site is 99833.
 - For better clarity to the bidders where value is to be filled is noted as "to be quoted" and for other columns it will be noted as "derived" which denotes shall be derived by BHEL as per allocation fixed against each item.
 - Incomplete offer shall be summarily rejected.
 - Pre-Qualifying Requirements (PQR): All the bidders (registered/ non-registered) will be asked to submit documents fulfilling PQR requirements along with the bid & their further evaluation shall be done accordingly.
 - Bidders to note that their bid shall be conditional subject to qualify PQR by registered vendors & non-registered vendors have to qualify PQR & get registered with PEM for the package.
 - Additional overhead charges shall be 5% instead of 30% as mentioned in clause no 26.2 of GCC Rev 06
 - Quantity variation shall be +30%. Project list is indicative only, BHEL may ask for delivery anywhere in India for any of the project added in the prospective project/ existing projects during RC period. No minimum quantity is guaranteed by BHEL.
 - CIF allocation is not applicable for this tender. Bidder to quote accordingly.
 - Bidders to note Model Conciliation Clause under BHEL Conciliation Scheme, 2018 as per Annexure VI.



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- xvi. "For this procurement, Public Procurement (Preference to Make in India), Order 2017 dated 15.06.2017 & 28.05.2018 and subsequent Orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of the NIT but before finalization of contract/ PO/WO against the NIT. In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable" Vendors are requested to go through the above mentioned orders and confirm the following-
- The local supplier at the time of tender, bidding or solicitation shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) that the item offered meets the minimum local content as per above mentioned orders and shall give details of the location(s) at which the local value addition is made.
- xvii. MSME/ Start up vendors to submit applicable documents along with their offer for availing the benefits as per GOI guidelines.
- xviii. Further PEM is already registered with RXIL (TreDS) platform. Bidders are requested to get registered with RXIL (TreDS) platform to avail the facility as per GOI guidelines.
10. Foreign bidders will have to quote C & F (cost & freight) basis instead of FOB. For importing materials on C&F basis, bidders will be informed the following:
- In case of foreign bidders, the quoted C&F price shall be loaded by factors mentioned in GCC cl no-19.4, ITB, to arrive at total FOR Site price and evaluation will be done on FOR price in Indian currency.
 - As per Incoterms (CFR), risk transfers to buyer when the goods have been loaded on board the ship in the country of Export. Hence, shipped on board date mentioned on the clean Bill of Lading or Air way Bill, shall be treated as the date of Shipment/ Dispatch for all contractual purposes including calculation of LD.
 - Usance period (90 days) of the L/C shall start from the date of Bill of lading/Air Way Bill.
 - Bill of Lading shall be considered as equivalent document (refer clause 9.7.1 b OF GCC rev-06) for recognition of dispatch.
 - For claiming payment under clause 9.1.1 and 9.2.1 Bill of lading shall be considered instead of receipted LR (refer clause 9.7.2 b of GCC rev-06).
 - Freight is to be quoted as inclusive in basic price by vendor and is not to be quoted separately.
 - Insurance for evaluation purposes shall be @ 0.1 % of quoted C&F price.
 - There will be no change in MRC payment.

TERMS AND CONDITIONS

- Procurement of the subject package shall be done through e-procurement
- Enquiry No., due date etc. must be legibly super scribed on the offers as per clause no. 2.0 of "Instructions to Bidders".
- Offers should be uploaded in two parts online at <https://bhel.abcpocure.com> in as follows:

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- a) Part-I Bid: - Documents and Credential as per Technical PQR and Techno-Commercial offer (along with un-priced copy of un-priced bid and un-priced schedule of Technical-Commercial Deviation, Annexure I & II)
- b) Part II Bid: - Price Bid and Priced schedule of Technical-Commercial Deviation
4. Terms and conditions: -
- a) Part I bid will be opened on date & time mentioned in the NIT or subsequent corrigenda/amendments, if any.
- b) **Techno-commercial offer of only those bidders shall be evaluated who will meet the Technical pre-qualifying requirement of the tender.**
5. **Bidders shall submit their offers meeting the requirements of the following tender documents and other Terms and Conditions included in this Enquiry Letter:**
- **ANNEXURE-I of GCC Rev. 06:** Letter to be furnished by the Bidders.
 - **DEFINITION OF TERMS.**
 - **Volume-I:** Comprising i) **Part-A:** Instructions to Bidders, ii) **Part-B:** General Commercial Terms & Conditions and iii) Special Conditions of Contract, if applicable.
 - **Volume-II:** Comprising i) **Part-A:** General Technical Conditions and, ii) **Part-B:** Technical Specification.
 - **Volume-III:** Schedules and Data Sheets.
- All the above Tender Documents shall automatically become a part of the Order/Contract after its finalisation.
6. Vendors shall quote in accordance with the requirements mentioned in the tender documents. In case of deviations (Technical/ Commercial), the same shall be highlighted separately giving Clause references along with the Cost of withdrawal of Deviations as per **Annexure-II to GCC Rev 06 of "DEVIATION SHEET (COST OF WITHDRAWAL)"** along with reasons for taking such deviations
- Bidder to note all the points mentioned in "Notes" of Annexure-II to GCC Rev 06**
7. **Please note the following:**
- a. **Price format is enclosed for compliance.**
- b. **SCC enclosed for compliance.**
- GCC enclosed for compliance. GCC Rev-06 is available on www.bhelpem.com. You are requested to kindly download the same. GST related corrigenda to GCC Rev.06 is enclosed. Bidders are requested for furnishing compliance of these documents.**
8. Tenders shall be submitted strictly in accordance with the requirements of the above tender documents.
9. Standard pre-printed terms & conditions of the tenderers shall not be considered valid.
10. Validity of offer shall be as per **Clause No. 7.0, "Instructions to Bidders" of GCC Rev 06.**
11. Unsolicited fresh/revised Price Bids shall not be entertained.
12. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any/all tender(s) in part or full without assigning any reason whatsoever.
13. Late tenders will be rejected.

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14. Tenders and all correspondence thereof, shall be addressed to the undersigned by name & designation and sent at the following address:

Mr. I P SINGH, DGM, CMM
M/s Bharat Heavy Electricals Ltd.,
Project Engineering Management,
Power Project Engineering Institute,
HRD & ESI Complex,
Plot No 25, Sector-16 A, Noida-201301
Kind Attn: I P SINGH/ CMM
E-MAIL: indra.pal.singh@bhel.in
Ph. No. 0120-4218749 ,09818989654

Mr. N C SHARMA, DY MGR, CMM
M/s Bharat Heavy Electricals Ltd.,
Project Engineering Management,
Power Project Engineering Institute,
HRD & ESI Complex,
Plot No 25, Sector-16 A, Noida-201301
Kind Attn: N C SHARMA/ CMM
E-MAIL: ncsharma@bhel.in
Ph. No. 0120-4213591 ,9911170053

15. Definition of Terms is also enclosed. These definitions will apply to all the tender documents including this Enquiry Letter.
16. **PRE-QUALIFICATION REQUIREMENT: -**
Bidders is requested to fill up the details in "TECHNICAL PRE-QUALIFYING REQUIREMENT" as per the conditions mentioned in the PQR and also to submit the credentials.
Bids of only those bidders shall be evaluated who meet the Technical pre-qualifying requirements (if applicable).
17. Bidders to note that their bid shall be conditional subject to qualify Technical PQR by registered vendors & non-registered vendors have to qualify Technical PQR & get registered with PEM for the package.
For registration in PEM "Bidders needs to apply & get registered for subject package with PEM before P-2 (price bid opening) & hence you need to apply online for registration on PEM web portal & have to enclose acknowledgement with this effect with the bid documents else your bid will not be considered for evaluation"
18. Bidder has to submit "NO DEVIATION CERTIFICATE FOR COMMERCIAL TERMS AND CONDITIONS AS PER GCC (06), SCC AND NIT". In case of deviations, bidder to clearly mention the same with their techno-commercial offer.
19. All the above Tender Documents shall automatically become a part of the Order/Contract after its finalization.
20. **The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com.**
21. **"The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendors/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website**

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<http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to their notice."

BHEL Fraud prevention policy is also uploaded in vendor's section on www.bhelpem.com.

22. Bidders are requested to visit constantly our website to update them self for any technical or commercial change in the NIT.
23. All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on BHEL websites only (www.bhelpem.com, www.bhel.com & <https://bhel.abcprocure.com> under subject tender reference. Bidders are requested to visit our websites from time to time to keep themselves updated. **Bidders may go through the Sellers' manual & Help documents provided on E-Procurement Portal website & obtain required Digital Signature Certificate for participating in the subject Tender.**
24. Bidders to submit their offers strictly in line with the enclosed price format.
25. Inspection shall be done by BHEL/ END CUSTOMER/Third party Agency (finalized by BHEL).
26. Any other taxes & duties applicable on the date of bid but not quoted by the bidders shall be to bidder account.
27. Delivery terms for dispatches shall be FOR Dispatch Station.
28. This enquiry is subject to Conditions/ limits if any imposed in PMD / Vendor registration.
29. Foreign & indigenous bidders participating through open/limited tender will necessarily have to but class III DSCs issued by the certifying authorities in India. Basic procedure/ checklist is uploaded on www.bhel.com.
30. Non- registered bidder to submit the credentials required for Registration in BHEL PEM: -
"Online Registration Portal is operational in BHEL. Non-registered Vendors, who wish to apply for registration with BHEL-PEM, have to apply through Online Registration Portal available at www.bhelpem.com - vendor section - Online Supplier Registration. All credentials and/or documents duly signed and stamped related to registration has to be uploaded on the website and submit the application for registration. One set of hard copy of the filled-up SRF downloaded from Online Registration Portal duly signed and stamped has to be submitted."
31. Purchaser reserves the right to split up the scope of the tender enquiry and place the orders for different scope/ items with different bidders and also increase or decrease the quantity.
32. In case of RA, revised RA guidelines AA:SSP:RA:03 issued on 26.09.2016 (uploaded or http://www.bhel.com/vender_registration/pdf/Guidelines%20for%20Reverse%20Auction-2016.pdf) shall be applicable.
33. BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial

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evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

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

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

As a reminder to the bidders, system will flash following message (in RED Color) during the course of 'online sealed bid':

"Bidders to submit online sealed bid less than or equal to their envelope sealed bid already submitted to BHEL"

Detailed guidelines of reverse auction 2016 are available in "information section" of [www. bhelpem.com](http://www.bhelpem.com), same are applicable for subject tender.

IMPORTANT INSTRUCTION TO BIDDERS IN CASE OF REVERSE AUCTION

"The Bidders has to quote the Single Price (i.e. Total Cost to BHEL excluding GST) in Reverse Auction. Price are to be inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, Freight as applicable, including loading (if any). De-loading (if any) shall be done in line with NIT terms.

34. If any bidder has mentioned the term Not Applicable / Not required / Not Quoted in BHEL price format. The bidder needs to substantiate the same. If the same item will be required in future for the system same will be supplied free of cost.
35. Foreign Suppliers & Indian agents of foreign suppliers: Please refer our website <http://www.bhelpem.com/Tenders.aspx> for details.
36. L1 bidder will have to submit Bank Guarantee for each POs (irrespective of value) which will be placed under the Rate Contract finalised through this tender considering RC as original contract as per format mentioned in Annexure V to NIT instead of format mentioned in GCC Rev 06

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37. All other terms and conditions shall be as per GCC Rev 06 and Special Conditions of Rate Contract as per attached Annexure-III. In the event of any contradiction in the terms and conditions mentioned, the order of preference shall be NIT and Annexures/Technical Specification/ corrigenda related to GCC Rev.06/ Rate contract SCC / GCC Rev. 06

Note: Tenderer must submit UN-PRICED Price format duly filled mentioning the word "QUOTED" in place of actual price given in sealed price bid.

Thanking you,
Yours faithfully,

For and on behalf of BHEL **नरेश चन्द्र शर्मा / Naresh Chandra Sharma**
Dy. Manager (C.M.M.)
Bharat Heavy Electricals Ltd.
Power Project Engineering Management
H.R.D.I. & ESI Complex,
Plot No. 25, Sector 16, Noida - 201301

Enclosure:

1. Enquiry Terms & Conditions
2. Price Format (Prices should be quoted in this format only) – Annexure I, IA
3. Techno-Commercial Deviation Sheet (Annexure-II to GCC Rev 06) – Annexure II
4. BOQ & Technical Specifications
5. Technical PQR
6. SCC – ANNEXURE III
7. Prospective Project List – Annexure IV
8. Corrigenda to GCC Rev 06
9. Annexure V - BG Format
10. Annexure VI - Model Conciliation Clause under BHEL Conciliation Scheme, 2018

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Annexure-I														
RATE CONTRACT														
PRICE SCHEDULE FOR MISC. PUMPS (HORIZONTAL)														
NAME OF VENDOR-														
SL NO	ITEM/TYPE DESCRIPTION	UOM	QUANTITY (EXPECTED)	INDIGENOUS VENDOR					FOREIGN VENDOR					TOTAL C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY)
				UNIT EX-WORKS PRICE (DULY PACKED) IN INDIAN SEA PORT NO-A.16 OF COLUMN 8	UNIT EX-WORKS PRICE (DULY PACKED) IN INDIAN SEA PORT NO-A.16 OF COLUMN 8	TOTAL EX-WORKS PRICE (DULY PACKED) IN INDIAN SEA PORT NO-A.16 OF COLUMN 8	FREIGHT CHARGES WITHOUT GST @ % OF TOTAL EX WORKS (INR)	APPLICABLE GST RATE % ON (TOTAL EX WORKS + FREIGHT) (INR)	TOTAL F.O.R SITE PRICE (INR)	UNIT C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY)	UNIT C & F PRICE (DULY PACKED) IN INDIAN SEA PORT NO-A.16 OF COLUMN 15	TOTAL C & F PRICE (DULY PACKED) IN INDIAN SEA PORT NO-A.16 OF COLUMN 15	TOTAL C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY)	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	MISC. PUMPS - MAIN SUPPLY													
A.1	TYPE 1	NOS.	3	2.391547%	DERIVED	7.17464%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	2.391547%	DERIVED	7.17464%	DERIVED
A.2	TYPE 2	NOS.	4	0.945495%	DERIVED	3.78198%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	0.945495%	DERIVED	3.78198%	DERIVED
A.3	TYPE 3	NOS.	4	2.780868%	DERIVED	11.12347%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	2.780868%	DERIVED	11.12347%	DERIVED
A.4	TYPE 4	NOS.	5	1.557286%	DERIVED	7.78643%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	1.557286%	DERIVED	7.78643%	DERIVED
A.5	TYPE 5	NOS.	3	2.391547%	DERIVED	7.17464%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	2.391547%	DERIVED	7.17464%	DERIVED
A.6	TYPE 6	NOS.	4	1.446053%	DERIVED	5.78421%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	1.446053%	DERIVED	5.78421%	DERIVED
A.7	TYPE 7	NOS.	4	2.224695%	DERIVED	8.89878%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	2.224695%	DERIVED	8.89878%	DERIVED
A.8	TYPE 8	NOS.	4	0.723025%	DERIVED	2.89210%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	0.723025%	DERIVED	2.89210%	DERIVED
A.9	TYPE 9	NOS.	2	2.391545%	DERIVED	4.78309%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	2.391545%	DERIVED	4.78309%	DERIVED
A.10	TYPE 10	NOS.	6	2.892102%	DERIVED	17.35261%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	2.892102%	DERIVED	17.35261%	DERIVED
A.11	TYPE 11	NOS.	2	1.612903%	DERIVED	9.67742%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	1.612903%	DERIVED	9.67742%	DERIVED
A.12	TYPE 12	NOS.	2	1.835375%	DERIVED	3.67075%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	1.835375%	DERIVED	3.67075%	DERIVED
A.13	TYPE 13	NOS.	2	0.723028%	DERIVED	1.44605%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	0.723028%	DERIVED	1.44605%	DERIVED
A.14	TYPE 14	NOS.	2	2.892100%	DERIVED	5.78420%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	2.892100%	DERIVED	5.78420%	DERIVED
A.15	TYPE 15	NOS.	2	1.334815%	DERIVED	2.66963%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	1.334815%	DERIVED	2.66963%	DERIVED
A.16	TOTAL (A.1 TO A.15)					100.000000%	X (TO BE QUOTED)	DERIVED	DERIVED				100.00%	TO BE QUOTED = M
B	TOTAL EX-WORKS PRICE (DULY PACKED) OF ALL TYPE OF PUMPS (INR) (REFER ATTACHED ANNEXURE-IA FOR PRICE BREAK UP OF SPARES FOR EACH PUMP TYPE AS PER SPARE LIST INDICATED IN DATASHEET-A AT SECTION ID OF SPECIFICATION).													
Refer Annexure-IA for BOQ & % weightage type wise (ex-works value of mandatory spares component is 32.6175% of "X" at sl. No. A.16 col. 8)														
	MANDATORY SPARES													
	TOTAL EX-WORKS PRICE (DULY PACKED) OF ALL TYPE OF PUMPS (INR)													
	DESCRIPTION	UOM	QUANTITY (EXPECTED)	UNIT EX-WORKS PRICE IN INDIAN SEA PORT NO-A.16 OF COLUMN 8	UNIT EX-WORKS PRICE (INR)	TOTAL EX-WORKS PRICE IN PERCENTAGE OF TOTAL EX WORK PRICE OF ALL PUMPS QUOTED AT SL NO-A.16 OF COLUMN 8	TOTAL EX-WORKS PRICE (INR)	FREIGHT CHARGES WITHOUT GST @ % OF TOTAL EX WORKS (INR)	APPLICABLE GST RATE % ON (TOTAL EX WORKS + FREIGHT) (INR)	TOTAL F.O.R SITE PRICE (INR)	UNIT C & F PRICE (DULY PACKED) IN INDIAN SEA PORT NO-A.16 OF COLUMN 15	UNIT C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY)	TOTAL C & F PRICE (DULY PACKED) IN INDIAN SEA PORT NO-A.16 OF COLUMN 15	TOTAL C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY)
C	SERVICES AT SITE AS UNDER													
C.1	Cost of site visits for installation Checks and supervision of replacement of Gland packing with Mechanical Seal at site (Note: 1 No. or 1 Set = 1 no. site visit for 3 days = 3 MANDAYS at site)	NOS.	15	0.1390434%	DERIVED	2.085651%	DERIVED	% TO BE QUOTED	% TO BE QUOTED	DERIVED	0.1390434%	DERIVED	2.085651%	DERIVED

Signature

C.2	PG Test at site (Note: 1 No. or 1 Set = PG test of All pumps of that Type for that Project)	NOS.	15	0.278087%	DERIVED	4.171301%	DERIVED		% TO BE QUOTED	Derived	0.278087%	Derived	4.171301%	Derived
C.3	TOTAL (C.1 TO C.2)													
D	GRAND TOTAL (A.15+B+C.3)													
Note:-														
1. For details, please refer Technical Specification No-PE-TS-RC-100-N002(REV 0)														
2. Price of all accessories, Erection & commissioning spares, special Tools & tackle(if any) and other accessories not listed above shall be included in the price of PUMP/MOTOR & shall be supplied along with the PUMP/MOTOR.														
3. Bidder shall furnish signed & stamped copy of this price Schedule along with Technical bid indicating "QUOTED" wherever "TO BE QUOTED" is indicated in the price schedule and actual prices to be indicated in the Price bid. Prices of other items will be derived based on percentage break up given in the price schedule.														
4. Mandatory Spares Note : One(1) set consists of quantity required for complete replacement for one(1) Pump/Motor of each type/size														
5. Bidder to note that evaluation shall be on Grand Total Ex works price + Freight charges, however, Bidder to quote total Ex works value of the MISC. PUMPS (HORIZONTAL) at sl. No. A.16 of col. 8 ("X" in case of Indian bidder) or at sl. No. A.16 of col. 15 ("M" in case of foreign bidder) only as per the BOQ above. The item wise break up of Ex works prices (unit as well as total) for all the items in the BOQ shall be derived as per the formulae indicated above by BHEL. Indigenous bidder also need to indicate taxes percentage in the respective column and freight percentage of Ex works value considering delivery anywhere in India in the freight column.														
6. Rate contract shall be decided on the basis of grand Total Ex works price + Freight charges of Total BOQ														
7. % Freight as quoted for Main Supply items, same shall also be considered for mandatory spares items.														
8. Value is to be filled only where "to be quoted" is mentioned and for other columns where "derived" is mentioned same shall be derived by BHEL as per % allocation fixed against each item														
9. Bidder to note that total price indicated above at 'D' shall be considered for evaluation and hence should be complete in all respect for the full scope defined and considering all terms and conditions agreed.														
10. Prices shall remain firm during contract execution.														
11. Bidder to note that 1 no. site visit consists of 3 MANDAYS at site for Installation Checks and supervision of replacement of Gland packing with Mechanical Seal at site as indicated above at C.1. Further any addition/deletion per Manday shall be obtained on prorata basis as per C.1 above. The prices shall be inclusive of charges of travelling, boarding/lodging, medical, insurance etc. Site certification shall be required in calculation of "cost of service at site" mentioned whether extra stay/ less stay.														

ANNEXURE-IA												
S. No.	PUMP TYPE	SPARE ITEM DESCRIPTION	INDIGENOUS VENDOR							FOREIGN VENDOR		
			UNIT EX-WORKS PRICE (OF EACH SET OF ITEM DULY PACKED) IN PERCENTAGE OF UNIT EX WORK PRICE OF THAT TYPE OF PUMP	UNIT EX-WORKS PRICE (DULY PACKED) (INR)	EXPECTED QUANTITY OF SPARES (AS PER DATASHEET A OF SECTION ID) (UNIT OF MEASUREMENTS - SETS)	TOTAL EX-WORKS PRICE (DULY PACKED) (INR)	FREIGHT CHARGES WITHOUT GST @ % OF TOTAL EX WORKS (INR)	APPLICABLE GST RATE % ON (TOTAL EX WORKS + FREIGHT) (INR)	TOTAL F.O.R SITE PRICE (INR)	UNIT C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY) IN PERCENTAGE OF UNIT EX WORK PRICE OF THAT TYPE OF PUMP	UNIT C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY)	TOTAL C & F PRICE (DULY PACKED) IN INDIAN SEA PORT (CURRENCY)
B.1	B.1.1	TYPE-1 Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.1.2	TYPE-1 Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.1.3	TYPE-1 Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.1.4	TYPE-1 Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.1.5	TYPE-1 Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.1.6	TYPE-1 Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.1.7	TYPE-1 Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.1.8	TYPE-1 Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.1.9	TYPE-1 Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.1.10	TYPE-1 Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.1.11	TYPE-1 Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.1.12	TYPE-1 Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.1.13	TYPE-1 Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.1.14	TYPE-1 Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.1.15	TYPE-1 Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.1.16	TYPE-1 Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.1.17	TYPE-1 Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.1.18	TYPE-1 All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.1.19	TYPE-1 Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.1.20	TYPE-1 Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.1.21	TYPE-1 Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.1.22	TYPE-1 Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.1.23	TOTAL				DERIVED	Derived	Derived	Derived			Derived
B.2	B.2.1	TYPE-2 Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.2.2	TYPE-2 Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.2.3	TYPE-2 Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.2.4	TYPE-2 Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.2.5	TYPE-2 Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.2.6	TYPE-2 Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.2.7	TYPE-2 Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.2.8	TYPE-2 Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.2.9	TYPE-2 Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.2.10	TYPE-2 Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.2.11	TYPE-2 Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.2.12	TYPE-2 Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.2.13	TYPE-2 Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.2.14	TYPE-2 Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.2.15	TYPE-2 Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.2.16	TYPE-2 Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.2.17	TYPE-2 Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.2.18	TYPE-2 All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.2.19	TYPE-2 Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.2.20	TYPE-2 Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.2.21	TYPE-2 Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.2.22	TYPE-2 Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.2.23	TOTAL				DERIVED	Derived	Derived	Derived			Derived
B.3	B.3.1	TYPE-3 Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.3.2	TYPE-3 Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.3.3	TYPE-3 Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.3.4	TYPE-3 Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.3.5	TYPE-3 Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.3.6	TYPE-3 Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.3.7	TYPE-3 Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.3.8	TYPE-3 Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.3.9	TYPE-3 Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.3.10	TYPE-3 Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.3.11	TYPE-3 Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.3.12	TYPE-3 Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.3.13	TYPE-3 Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.3.14	TYPE-3 Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.3.15	TYPE-3 Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.3.16	TYPE-3 Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.3.17	TYPE-3 Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.3.18	TYPE-3 All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.3.19	TYPE-3 Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.3.20	TYPE-3 Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.3.21	TYPE-3 Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.3.22	TYPE-3 Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.3.23	TOTAL				DERIVED	Derived	Derived	Derived			Derived
B.4	B.4.1	TYPE-4 Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.4.2	TYPE-4 Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.4.3	TYPE-4 Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.4.4	TYPE-4 Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.4.5	TYPE-4 Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.4.6	TYPE-4 Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived

B.4	B.4.7	TYPE-4	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.4.8	TYPE-4	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.4.9	TYPE-4	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.4.10	TYPE-4	Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.4.11	TYPE-4	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.4.12	TYPE-4	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.4.13	TYPE-4	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.4.14	TYPE-4	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.4.15	TYPE-4	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.4.16	TYPE-4	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.4.17	TYPE-4	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.4.18	TYPE-4	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.4.19	TYPE-4	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.4.20	TYPE-4	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
B.5	B.5.1	TYPE-5	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.5.2	TYPE-5	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.5.3	TYPE-5	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.5.4	TYPE-5	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.5.5	TYPE-5	Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.5.6	TYPE-5	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.5.7	TYPE-5	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.5.8	TYPE-5	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.5.9	TYPE-5	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.5.10	TYPE-5	Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.5.11	TYPE-5	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.5.12	TYPE-5	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.5.13	TYPE-5	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.5.14	TYPE-5	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
B.6	B.6.1	TYPE-6	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.6.2	TYPE-6	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.6.3	TYPE-6	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.6.4	TYPE-6	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.6.5	TYPE-6	Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.6.6	TYPE-6	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.6.7	TYPE-6	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.6.8	TYPE-6	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.6.9	TYPE-6	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.6.10	TYPE-6	Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.6.11	TYPE-6	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.6.12	TYPE-6	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.6.13	TYPE-6	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.6.14	TYPE-6	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
B.7	B.7.1	TYPE-7	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.7.2	TYPE-7	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.7.3	TYPE-7	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.7.4	TYPE-7	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.7.5	TYPE-7	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.7.6	TYPE-7	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.7.7	TYPE-7	Bearings for Pumps (of each type)	2.00%	DERIVED	3	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.7.8	TYPE-7	Bearings for Motor (of each type)	2.00%	DERIVED	3	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.7.9	TYPE-7	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.7.10	TYPE-7	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.7.11	TYPE-7	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.7.12	TYPE-7	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.7.13	TYPE-7	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.7.14	TYPE-7	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
B.8	B.8.1	TYPE-8	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.8.2	TYPE-8	Casing Liners	6.00%	DERIVED	3	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.8.3	TYPE-8	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.8.4	TYPE-8	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.8.5	TYPE-8	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.8.6	TYPE-8	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.7	TYPE-8	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.8.8	TYPE-8	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.8.9	TYPE-8	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.10	TYPE-8	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.11	TYPE-8	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.12	TYPE-8	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.8.13	TYPE-8	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.8.14	TYPE-8	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived

B.8	B.8.4	TYPE-8	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.8.5	TYPE-8	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.8.6	TYPE-8	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.7	TYPE-8	Bearings for Pumps (of each type)	2.00%	DERIVED	3	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.8.8	TYPE-8	Bearings for Motor (of each type)	2.00%	DERIVED	3	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.8.9	TYPE-8	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.10	TYPE-8	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.11	TYPE-8	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.12	TYPE-8	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.8.13	TYPE-8	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.8.14	TYPE-8	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.8.15	TYPE-8	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.8.16	TYPE-8	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.8.17	TYPE-8	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.8.18	TYPE-8	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.8.19	TYPE-8	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.8.20	TYPE-8	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.8.21	TYPE-8	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.22	TYPE-8	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.8.23		TOTAL				DERIVED	Derived	Derived	Derived			Derived
B.9	B.9.1	TYPE-9	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.9.2	TYPE-9	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.9.3	TYPE-9	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.9.4	TYPE-9	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.9.5	TYPE-9	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.9.6	TYPE-9	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.9.7	TYPE-9	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.9.8	TYPE-9	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.9.9	TYPE-9	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.9.10	TYPE-9	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.9.11	TYPE-9	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.9.12	TYPE-9	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.9.13	TYPE-9	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.9.14	TYPE-9	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.9.15	TYPE-9	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.9.16	TYPE-9	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.9.17	TYPE-9	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.9.18	TYPE-9	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.9.19	TYPE-9	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.9.20	TYPE-9	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
B.9.21	TYPE-9	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived	
B.9.22	TYPE-9	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived	
B.9.23		TOTAL				DERIVED	Derived	Derived	Derived			Derived	
B.10	B.10.1	TYPE-10	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.10.2	TYPE-10	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.10.3	TYPE-10	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.10.4	TYPE-10	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.10.5	TYPE-10	Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.10.6	TYPE-10	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.10.7	TYPE-10	Bearings for Pumps (of each type)	2.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.10.8	TYPE-10	Bearings for Motor (of each type)	2.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.10.9	TYPE-10	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.10.10	TYPE-10	Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.10.11	TYPE-10	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.10.12	TYPE-10	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.10.13	TYPE-10	Mechanical Seal (complete with accessories)	6.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.10.14	TYPE-10	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.10.15	TYPE-10	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.10.16	TYPE-10	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.10.17	TYPE-10	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.10.18	TYPE-10	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.10.19	TYPE-10	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.10.20	TYPE-10	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
B.10.21	TYPE-10	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived	
B.10.22	TYPE-10	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived	
B.10.23		TOTAL				DERIVED	Derived	Derived	Derived			Derived	
B.11	B.11.1	TYPE-11	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.11.2	TYPE-11	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.11.3	TYPE-11	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.11.4	TYPE-11	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.11.5	TYPE-11	Shaft Sleeves	3.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.11.6	TYPE-11	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.11.7	TYPE-11	Bearings for Pumps (of each type)	2.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.11.8	TYPE-11	Bearings for Motor (of each type)	2.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.11.9	TYPE-11	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.11.10	TYPE-11	Wearing rings (Casing, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.11.11	TYPE-11	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.11.12	TYPE-11	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.11.13	TYPE-11	Mechanical Seal (complete with accessories)	6.00%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.11.14	TYPE-11	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	2	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.11.15	TYPE-11	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.11.16	TYPE-11	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.11.17	TYPE-11	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.11.18	TYPE-11	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.11.19	TYPE-11	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.11.20	TYPE-11	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
B.11.21	TYPE-11	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived	
B.11.22	TYPE-11	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived	
B.11.23		TOTAL				DERIVED	Derived	Derived	Derived			Derived	

B.12	B.12.1	TYPE-12	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.12.2	TYPE-12	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.12.3	TYPE-12	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.12.4	TYPE-12	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.12.5	TYPE-12	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.12.6	TYPE-12	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.12.7	TYPE-12	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.12.8	TYPE-12	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.12.9	TYPE-12	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.12.10	TYPE-12	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.12.11	TYPE-12	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.12.12	TYPE-12	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.12.13	TYPE-12	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.12.14	TYPE-12	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.12.15	TYPE-12	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.12.16	TYPE-12	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.12.17	TYPE-12	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.12.18	TYPE-12	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.12.19	TYPE-12	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.12.20	TYPE-12	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.12.21	TYPE-12	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.12.22	TYPE-12	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.12.23		TOTAL				DERIVED	Derived	Derived	Derived			Derived
B.13	B.13.1	TYPE-13	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.13.2	TYPE-13	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.13.3	TYPE-13	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.13.4	TYPE-13	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.13.5	TYPE-13	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.13.6	TYPE-13	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.13.7	TYPE-13	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.13.8	TYPE-13	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.13.9	TYPE-13	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.13.10	TYPE-13	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.13.11	TYPE-13	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.13.12	TYPE-13	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.13.13	TYPE-13	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.13.14	TYPE-13	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.13.15	TYPE-13	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.13.16	TYPE-13	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.13.17	TYPE-13	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.13.18	TYPE-13	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.13.19	TYPE-13	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.13.20	TYPE-13	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.13.21	TYPE-13	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.13.22	TYPE-13	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.13.23		TOTAL				DERIVED	Derived	Derived	Derived			Derived
B.14	B.14.1	TYPE-14	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.14.2	TYPE-14	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.14.3	TYPE-14	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.14.4	TYPE-14	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.14.5	TYPE-14	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.14.6	TYPE-14	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.14.7	TYPE-14	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.14.8	TYPE-14	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.14.9	TYPE-14	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.14.10	TYPE-14	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.14.11	TYPE-14	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.14.12	TYPE-14	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.14.13	TYPE-14	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.14.14	TYPE-14	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.14.15	TYPE-14	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.14.16	TYPE-14	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.14.17	TYPE-14	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.14.18	TYPE-14	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.14.19	TYPE-14	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.14.20	TYPE-14	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.14.21	TYPE-14	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.14.22	TYPE-14	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.14.23		TOTAL				DERIVED	Derived	Derived	Derived			Derived
B.15	B.15.1	TYPE-15	Casing (along with diffuser, as applicable)	20.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	20.00%	Derived	Derived
	B.15.2	TYPE-15	Casing Liners	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.15.3	TYPE-15	Shaft	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.15.4	TYPE-15	Complete Impeller Assembly (with Keys, nuts & other accessories)	12.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	12.00%	Derived	Derived
	B.15.5	TYPE-15	Shaft Sleeves	3.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	3.00%	Derived	Derived
	B.15.6	TYPE-15	Sleeve nuts & O Rings	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.15.7	TYPE-15	Bearings for Pumps (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.15.8	TYPE-15	Bearings for Motor (of each type)	2.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	2.00%	Derived	Derived
	B.15.9	TYPE-15	Wearing rings (Impeller, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.15.10	TYPE-15	Wearing rings (Casing, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.15.11	TYPE-15	Wearing rings (for shaft other than shaft sleeve, as applicable)	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.15.12	TYPE-15	Keys for Impeller, Sleeve, etc.	0.06%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.06%	Derived	Derived
	B.15.13	TYPE-15	Mechanical Seal (complete with accessories)	6.00%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	6.00%	Derived	Derived
	B.15.14	TYPE-15	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.15.15	TYPE-15	Gland	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.15.16	TYPE-15	Gland Packing	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.15.17	TYPE-15	Lantern Ring	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.15.18	TYPE-15	All Fasteners	1.20%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	1.20%	Derived	Derived
	B.15.19	TYPE-15	Gaskets	0.05%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.05%	Derived	Derived
	B.15.20	TYPE-15	Complete Motor of each Type & Rating	45%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	45%	Derived	Derived
	B.15.21	TYPE-15	Motor Terminal Block	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived
	B.15.22	TYPE-15	Motor Cooling Fan	0.60%	DERIVED	1	DERIVED	% TO BE QUOTED	% TO BE QUOTED	Derived	0.60%	Derived	Derived

8.15.23	TOTAL				DERIVED	Derived	Derived	Derived		Derived	Derived
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**ANNEXURE-II: DEVIATION SHEET (COST OF WITHDRAWAL)****PACKAGE:- MISC. PUMPS (HORIZONTAL)- RATE CONTRACT****TENDER ENQUIRY REF NO-RATE CONTRACT -PE/PG/RTC/E-6260/2019, DTD-05.07.2019****NAME OF VENDOR:-**

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

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATIONS	SIGN & DATE

NOTES:

- For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
- For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
- All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
- Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
- Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable
- Bidder shall furnish price copy of above format along with price bid.
- The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
- Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered
- For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
- Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
- All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
- Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
- In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
- In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.



BHEL / PEM / CMM
SPECIAL CONDITIONS OF RATE CONTRACT

ANNEXURE III TO NIT REF: PE/PG/RTC/E-6260/2019, DTD-05.07.2019
SPECIAL CONDITION OF RATE CONTRACT OF MISC. PUMP (HORIZONTAL)-TYPE-1 (WITH FLOW UP TO 300 CUB M/HR.)

1. BHEL/PEM intends to enter into Rate Contract for supply of the tendered items for a period of two years. The Rate Contract shall come into force from the date of issue of Purchase order for Rate Contract. Validity for ordering shall be two years from the purchase order for Rate Contract.
2. Details of consignee and project site information for dispatch of material shall be intimated at the time of placement of PO for specific project after finalization of RC
3. Transit Insurance is in BHEL scope.
4. The items will be required against respective projects. Exact quantities and Project information shall be intimated while placing order for a specific project based on the Rate Contract.
5. The prices shall remain firm during the period of two years with a provision for further extension after review on mutual consent.
6. Inspection of materials shall be carried out by BHEL/CQA and or by Customer or by an authorized agency at manufacture's works before dispatch, if required. Dispatch of material to be done, only after receipt of BHEL/Customer MDCC. It is responsibility of vendor to for obtain Material Dispatch Clearance Certificate (MDCC) from BHEL or Customer as required before dispatch of material.

Vendor shall give inspection call on BHEL-CQS web site to applicable inspection agency with a copy of inspection call to BHEL-PEM for arranging Customer participation (if applicable) in inspection / Joint inspection on the proposed date with an advance notice of 15 working days. Inspection charges shall be paid by BHEL-PEM.

Items have to be manufactured as per specification and supplied strictly in accordance with the approved BHEL / Customer's Drawings & Quality Plan. The items/ test certificate of items, which for any reason are not acceptable to BHEL / Customer, shall be required to be retested. No extra charge shall be payable on those account by BHEL.

7. Mode of dispatch shall be by road through Schedule Bank/BHEL (PEM) approved transporters.
8. Other terms and conditions shall be as per Standard Technical specification no, GCC Rev 06 & Corrigenda to GCC Rev 06, Enquiry letter.
9. This enquiry is subject to Conditions/ limits if any imposed in PMD/ Vendor registration.
10. Tentative quantity is given in enquiry.
11. Bidders to submit offer for RC of said items ONLINE via e-Procurement System only. Bidder to upload tender documents complete in all respects duly signed & stamped on each and every page by the authorized signatory of the bidder as a token of acceptance of all the terms and conditions of tender.
12. The Bidder along with its associate/ collaborators/ sub-contractors/ sub-vendor/ consultants/ service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL web site <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud as soon as it comes to their notice.

ANNX IV TO NIT REF: PE/PG/RTC/E-6260/2019, DTD-05.07.2019
LIST OF PROJECTS FOR Rate Contract of Misc. Pump (Horizontal)-Type-
1 (with flow up to 300 Cub M/hr.)

S.no	TITLE
1	MAUDA STAGE I (2X500 MW)-FGD
2	BARH - I (3X660 MW)-FGD
3	BARH - II (2X660 MW)-FGD
4	NORTH KARANPURA (3X660 MW)-FGD
5	KOTHAGUDEM (1X8000 MW)-FGD
6	BHADRADRI (4X270 MW)-FGD
7	FUTURE-FGD



BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited ¹ (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at _____ ² hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated³ valued at Rs.....⁴ (Rupees -----)/FC.....(in words.....) for⁵ (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to% (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we,, (hereinafter referred to as the Bank), having registered/Head office at and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs ----- (Rupees -----) without any demur, immediately on a demand from the Employer, .

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

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

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

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

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

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

This Guarantee shall remain in force upto and including.....⁶ and shall be extended from time to time for such period as may be desired by Employer.

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

Unless a demand or claim under this guarantee is made on us in writing on or before the⁷we shall be discharged from all liabilities under this guarantee thereafter.

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

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁸
- b) This Guarantee shall be valid up to⁹
- c) Unless the Bank is served a written claim or demand on or before¹⁰ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

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

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

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

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

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ PROJECT/SUPPLY DETAILS

⁵ BG AMOUNT IN FIGURES AND WORDS

⁶ VALIDITY DATE

⁷ DATE OF EXPIRY OF CLAIM PERIOD

⁸ BG AMOUNT IN FIGURES AND WORDS.

⁹ VALIDITY DATE

¹⁰ DATE OF EXPIRY OF CLAIM PERIOD

Note:

1. Units are advised that expiry of claim period may be kept 2/3 months after validity date.
2. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.
 - b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**
 - b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.
 - b.2 **In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank** (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.
 - b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

BRIEF PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS

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

15 days from the date of conclusion of the last hearing. The recommendations so formulated along with the reasons shall be furnished by the IEC to both the Parties at the earliest but in any case within 1 month from the date of conclusion of the last hearing.

8. Response/modifications/suggestions of the Parties on the recommendations of the IEC are to be submitted to the IEC within time limit stipulated by the IEC but not more than 15 days from the date of receipt of the recommendations from the IEC.
9. In the event, upon consideration, further review of the recommendations is considered necessary, whether by BHEL or by the other Party, then, the matter can be remitted back to the IEC with request to reconsider the same in light of the issues projected by either/both the Parties and to submit its recommendations thereon within the following 15 days from the date of remitting of the case by either of the Parties.
10. Upon the recommendations by the Parties, with or without modifications, as considered necessary, the IEC shall be called upon to draw up the Draft Settlement Agreement in terms of the recommendations.
11. When a consensus can be arrived at between the parties only in regard to any one or some of the issues referred for Conciliation the draft Settlement Agreement shall be accordingly formulated in regard to the said Issue(s), and the said Settlement Agreement, if signed, by the parties, shall be valid only for the said issues. As regards the balance issues not settled, the parties may seek to resolve them further as per terms and conditions provided in the contract.
12. In case no settlement can be reached between the parties, the IEC shall by a written declaration, pronounce that the Conciliation between the parties has failed and is accordingly terminated.
13. Unless the Conciliation proceedings are terminated in terms of para 22 (b), (c) & (d) herein below, the IEC shall forward his/its recommendations as to possible terms of settlement within one (1) month from the date of last hearing. The date of first hearing of Conciliation shall be the starting date for calculating the period of 2 months.

14. In case of 3 members IEC, 2 members of IEC present will constitute a valid quorum for IEC and meeting can take place to proceed in the matter after seeking consent from the member who is not available. If necessary, videoconferencing may be arranged for facilitating participation of the members. However, the IEC recommendations will be signed by all members. Where there is more than one (1) Conciliator, as a general rule they shall act jointly. In the event of differences between the Members of IEC, the decision/recommendations of the majority of the Members of IEC shall prevail and be construed as the recommendation of the IEC.
15. The Draft Settlement Agreement prepared by the IEC in terms of the consensus arrived at during the Conciliation proceedings between the Parties shall be given by the IEC to both the parties for putting up for approval of their respective Competent Authority.
16. Before submitting the draft settlement agreement to BHEL's Competent Authority viz. the Board Level Committee on Alternative Dispute Resolution (BLCADR) for approval, concurrence of the other party's Competent Authority to the draft settlement agreement shall be obtained by the other party and informed to BHEL within 15 days of receipt of the final draft settlement agreement by it. Upon approval by the Competent Authority, the Settlement Agreement would thereafter be signed by the authorized representatives of both the Parties and authenticated by the members of the IEC.
17. In case the Draft Settlement Agreement is rejected by the Competent Authority of BHEL or the other Party, the Conciliation proceedings would stand terminated.
18. A Settlement Agreement shall contain a statement to the effect that each of the person(s) signing thereto (i) is fully authorized by the respective Party(ies) he/she represents, (ii) has fully understood the contents of the same and (iii) is signing on the same out of complete freewill and consent, without any pressure, undue influence.
19. The Settlement Agreement shall thereafter have the same legal status and effect as an arbitration award on agreed terms on the substance of the dispute rendered by an arbitral tribunal passed under section 30 of the Arbitration and Conciliation Act, 1996.
20. Acceptance of the Draft Settlement Agreement/recommendations of the Conciliator and/or signing of the Settlement Agreement by BHEL shall

however, be subject to withdrawal/closure of any arbitral and/or judicial proceedings initiated by the concerned Party in regard to such settled issues.

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

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

Sl No	Particulars	Amount
		In cases involving claim and/or counter-claim of exceeding Rs 5 crores but less than Rs 10 crores. Rs 75,000 (per Conciliator) In cases involving claim and/or counter-claim of more than Rs 10 crores. Rs 1,00,000/- (per Conciliator) Note: The aforesaid fees for the drafting of the Settlement Agreement shall be paid on Signing of the Settlement Agreement after approval of the Competent Authority or Rejection of the proposed Settlement Agreement by the Competent Authority of BHEL.
3	Secretarial expenses	Rs 10,000/- (one time) for the whole case for Conciliation by a Sole Member IEC. Where Conciliation is by multi member Conciliators –Rs 30,000/- (one time)- to be paid to the IEC
4	Travel and transportation and stay at outstation i) Retired Senior Officials of other Public Sector Undertakings (pay scale wise equivalent to or more than E-8 level of BHEL)	As per entitlement of the equivalent officer (pay scale wise) in BHEL.
	Others	As per the extant entitlement of whole time Functional Directors in BHEL.

Sl No	Particulars	Amount
		Ordinarily, the IEC Member(s) would be entitled to travel by air Economy Class.
5	Venue for meeting	Unless otherwise agreed in the agreement, contract or the Memorandum of Understanding, as the case may be, the venue/seat of proceedings shall be the location of the concerned Unit / Division / Region / Business Group of BHEL. Without prejudice to the seat/venue of the Conciliation being at the location of concerned BHEL Unit / Division / Region / Business Group, the IEC after consulting the Parties may decide to hold the proceedings at any other place/venue to facilitate the proceedings. Unless, Parties agree to conduct Conciliation at BHEL premises, the venue is to be arranged by either Party alternately.

24. The parties will bear their own costs including cost of presenting their cases/evidence/witness(es)/expert(s) on their behalf. The parties agree to rely upon documentary evidence in support of their claims and not to bring any oral evidence in IEC proceedings.
25. If any witness(es) or expert(s) is/are, with the consent of the parties, called upon to appear at the instance of the IEC in connection with the matter, then, the costs towards such witness(es)/expert(s) shall be determined by the IEC with the consent of the Parties and the cost so determined shall be borne equally by the Parties.
26. The other expenditures/costs in connection with the Conciliation proceedings as well as the IEC's fees and expenses shall be shared by the Parties equally.
27. Out of the lump sum fees of Rs 75,000/- for Sitting Fees, 50% shall be payable after the first meeting of the IEC and the remaining 50% of the Sitting Fees shall be payable only after termination of the conciliation proceedings in terms of para 22 hereinabove.

28. The travelling, transportation and stay at outstation shall be arranged by concerned Unit as per entitlements as per Serial No. 3 of the Table at para 23 above, and in case such arrangements are not made by the BHEL Unit, the same shall be reimbursed to the IEC on actuals limited to their entitlement as per Serial No. 4 of the Table at Para 23 above against supporting documents. The IEC Member(s) shall submit necessary invoice for claiming the fees/reimbursements.
29. The Parties shall keep confidential all matters relating to the conciliation proceedings. Confidentiality shall extend also to the settlement agreement, except where its disclosure is necessary for purposes of its implementation and enforcement or as required by or under a law or as per directions of a Court/Governmental authority/regulatory body, as the case may be.
30. The Parties shall not rely upon or introduce as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the Disputes that is the subject of the Conciliation proceedings:
- a. Views expressed or suggestions made by the other party in respect of a possible settlement of the Disputes;
 - b. admissions made by the other party in the course of the Conciliator proceedings;
 - c. proposals made by the Conciliator;
 - d. The fact that the other Party had indicated his willingness to accept a proposal for settlement made by the Conciliator.
31. The Parties shall not present the Conciliator(s) as witness in any Alternative Dispute Resolution or Judicial proceedings in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
32. None of the Conciliators shall act as an arbitrator or as a representative or counsel of a Party in any arbitral or judicial proceeding in respect of a Disputes that is/was the subject of that particular Conciliation proceeding.
33. The Parties shall not initiate, during the Conciliation proceedings, any arbitral or judicial proceedings in respect of a Disputes that is the subject matter of the Conciliation proceedings except that a Party may initiate arbitral or judicial proceedings where, in his opinion, such proceedings are necessary for preserving his rights including for preventing expiry of period of limitation. Unless terminated as per the provisions of this Scheme, the Conciliation proceedings shall continue

notwithstanding the commencement of the arbitral or judicial proceedings and the arbitral or judicial proceedings shall be primarily for the purpose of preserving rights including preventing expiry of period of limitation.

34. The official language of Conciliation proceedings under this Scheme shall be English unless the Parties agree to some other language.

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

To,

M/s. (Stakeholder's name)

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

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

Sir,

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

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

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

Yours faithfully,

Representative of BHEL

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

To,

BHEL

.....

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

Ref: Contract/MoU/Agreement/LOI/LOA No & date ____

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

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

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

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

Yours faithfully,

(Signature with stamp)

Authorized Representative of Contractor

Name, with designation

Date

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

1. Chronology of the Disputes
2. Brief of the Contract/MoU/Agreement/LOI/LOA
3. Brief history of the Disputes:
4. Issues:
5. Details of Claim(s)/Counter Claim(s):

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

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

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



PRE - QUALIFYING REQUIREMENTS (TECHNICAL)

TECHNICAL SPECIFICATION NO- PE-TS-RC-100-N002. REV0
TECHNICAL PQR NO. REV NO. 00 DATED 20.06.19
PE-PQ-RC-100-N002

STANDARD PQR NO: PE-PQ-STD-100-N111

REVISION NO: 03 DATE: 19.01.2018

SHEET: 1 of 2

ENQUIRY NO:

PROJECT: RATE CONTRACT OF MISC PUMPS (HORIZONTAL)

PACKAGE: MISC. PUMPS (HORIZONTAL) - Type-I (WITH FLOW UPTO 300 CUBM/HR)

1. The bidder should have designed, manufactured, tested, inspected & supplied the Horizontal Centrifugal pumps for water application with minimum rated flow of 243 Cub M/hr. (0.9X Rated capacity of the biggest pump in the range as per datasheet-A of technical specification), which have been successfully in use for at least 1 year in two different thermal power plants or similar industry/ application and bidder is in business of Horizontal centrifugal pumps for water application on continuous basis.

2. The Bidders shall furnish following support documents for assessment of Bidder w.r.t. PQR as indicated at Sl. No. 1 above:

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

Bidder shall furnish the PO copy of at least two (2) executed Contracts as indicated in the experience list.

- B. Bidder shall furnish any one from below in support of successful performance of Horizontal centrifugal pumps for water application for one year:

- i. Satisfactory Performance feedback certificates from End Customer (Owner) (in English) for at least Two successfully executed contracts (from different End customers (Owners) which have been in use for atleast one year indicating salient features like year of commissioning of Horizontal centrifugal pumps for water application, rating of project, flow of Horizontal centrifugal pumps for water application, project name etc., date of issue of certificate and name/ designation of the certificate issuer for power plant/similar application industry. The date of Satisfactory performance feedback certificate should not be later than the date of subject Enquiry/NIT

OR

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



PRE - QUALIFYING
REQUIREMENTS
(TECHNICAL)

TECHNICAL SPECIFICATION NO- PE-TS-RC-100-N002. REV0
TECHNICAL PQR NO. REV NO. 00 DATED 20.06.19
PE-PQ-RC-100-N002

STANDARD PQR NO: PE-PQ-STD-100-N111
REVISION NO: 03 DATE: 19.01.2018

SHEET: 2 of 2

OR

- iii. Satisfactory Performance feedback certificates from End Customer (Owner) (in English) for one successfully executed contract which have been successfully in use for atleast one year indicating salient features like year of commissioning of Horizontal centrifugal pumps for water application, rating of project, flow of Horizontal centrifugal pumps for water application, project name etc., date of issue of certificate and name/ designation of the certificate issuer for power plant/similar application industry. The date of Satisfactory performance feedback certificate should not be later than the date of subject Enquiry/NIT.

AND

The bidder has been awarded repeat contracts for Horizontal centrifugal pumps for water application from minimum one End customer (owner)/Purchaser (other than the one for which the bidder has furnished the performance feedback above) for power plant/similar application industry. Repeat contract shall be considered when the second contract is given by the same purchaser/ owner after lapse of minimum 1 year from execution of first contract (viz. supply). Supporting documents for execution of the first contract like dispatch ^{N2} details or commissioning report or PG test report along with the PO Copy to be furnished, if bidder intends to submit the documents for Repeat Contracts. The date of repeat contract order should not be later than the date of subject Enquiry/NIT.

Notes:-

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

N2 - Dispatch details shall include any one of the following documents:

- a.Tax Invoice.
- b.Site receipt/Receipted LR.
- c.Customer's material dispatch clearance certificate.

Any additional document required in support of above documents to establish the correlation between the above documents and the supplied item shall be provided by the bidder.

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

[illegible]

**TECHNICAL SPECIFICATION
FOR
RATE CONTRACT
OF
MISCELLANEOUS PUMPS (HORIZONTAL)**

SPECIFICATION NO. : PE-TS-RC-100-N002 (REV. 0)



**BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI BUILDING, SECTOR 16 A
NOIDA - 201301**



TITLE:
**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPEC. NO.: **PE-TS-RC-100-N002**
SECTION:
SUB-SECTION:
REV. NO. **0** DATE **14/06/2019**
SHEET **1** OF **1**

INDEX

THIS TECHNICAL SPECIFICATION CONSISTS OF FOLLOWING SECTIONS:

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IB	Specific Technical Requirements (Electrical)
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IIA	Standard Technical Specifications (Mechanical)
IIB	Standard Technical Specifications (Electrical)
III	Documents to be submitted by Bidder
IIIA	Guarantee Schedule (To be submitted along with the Bid by all Bidders)
IIIB	Compliance Certificate (To be submitted along with the Bid by all Bidders)
IIIC	Deviation schedule (To be submitted along with the Bid by all Bidders)
IIID	Data Sheet – B and Other documents (To be submitted by successful Bidder after award of Contract)

Notes:

1) For detailed list of documents to be submitted by bidder in their technical offer, please refer cl. no. 15.00.00 of Section-IIA.

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



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION:

SUB-SECTION:

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SECTION - I

SPECIFIC TECHNICAL REQUIREMENTS

- SUB-SECTION IA** - Specific Technical Requirements (Mech.)
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- SUB-SECTION ID** – Datasheet-A



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPECIFIC TECHNICAL REQUIREMENTS

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **I**

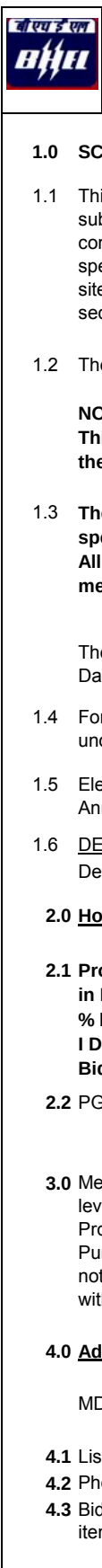
SUB-SECTION: **IA**

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SHEET **1** OF **1**

SUB-SECTION – IA

SPECIFIC TECHNICAL REQUIREMENTS (MECHANICAL)

	TECHNICAL SPECIFICATION FOR RATE CONTRACT OF MISC PUMPS (HORIZONTAL)	Specification No. : PE-TS-RC-100-N002, Rev.0			
		SECTION:		IA	
		REV. NO.	0	DATE:	14.06.19

	TECHNICAL SPECIFICATION FOR RATE CONTRACT OF MISC PUMPS		Specification No. : PE-TS-RC-100-N002, Rev.0	
			SECTION: IA	
			REV. NO. 0	DATE: 14.06.19
5.0 <u>Drawing/Document Submission Schedule:</u>				
MISC. PUMPS (HORIZONTAL)	PRIMARY DOCUMENTS			
	BHEL DRG NO	DRG TITLE	Drg Sch for Vendors	REMARKS
	PE-V7-XXX-100-N001	TDS AND PERFORMACE CURVES-MISC. PUMPS	R-0 within 20 days from LOI/PO & subsequent revisions within 10 days of comments received from BHEL.	
	PE-V7-XXX-100-N002	GENERAL ARRANGEMENT AND CROSS SECTIONAL-PUMPS		
	PE-V7-XXX-100-N003	TDS AND CURVES OF MOTORS FOR MISC. PUMPS		
	PE-V7-XXX-100-N004	QP-MISC PUMPS		
	PE-V7-XXX-100-N005	QP- MOTORS		
	SECONDARY DOCUMENTS			
	PE-V7-XXX-100-N006	MOTOR TYPE TEST DOC (if applicable)	R-0 within 20 days of Cat-I(or)II approval on motor document.	
	PE-V7-XXX-100-N007	O& M MANUAL -HORZ. PUMPS	Within 30 days from MDCC	
PE-V7-XXX-100-N008	PG TEST PROCEDURE -HOR. PUMPS (IF APPLICABLE)	R-0 within 20 days of Cat-I(or)II approval on pump document.		



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPECIFIC TECHNICAL REQUIREMENTS

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **I**

SUB-SECTION: **IB**

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SUB-SECTION – IB

SPECIFIC TECHNICAL REQUIREMENTS (ELECTRICAL)



TITLE : TECHNICAL SPECIFICATION FOR RATE CONTRACT OF MISC PUMPS(HOR.) SPECIFIC TECHNICAL REQUIREMENTS (ELECTRICAL)	SPECIFICATION NO. PE-TS-RC-100-N002
	VOLUME NO. :
	SECTION : IB
	REV NO. : 00 DATE :
	SHEET : 1 OF 2

1.0 EQUIPMENT & SERVICES TO BE PROVIDED BY BIDDER:

- a) Services and equipment as per “Electrical Scope between BHEL and Vendor”.
- b) Any item/work either supply of equipment or erection material which have not been specifically mentioned but are necessary to complete the work for trouble free and efficient operation of the plant shall be deemed to be included within the scope of this specification. The same shall be provided by the bidder without any extra charge.
- c) Supply of mandatory spares as specified in the specifications of mechanical equipments.
- d) Electrical load requirement for MISC PUMPS (all AC & DC loads at different voltage levels like 415V AC, 240 V AC, 220 V DC etc).
- e) All equipment shall be suitable for the power supply fault levels and other climatic conditions mentioned in the enclosed project information.
- f) Bidder to furnish list of makes for each equipment at contract stage, which shall be subject to customer/BHEL approval without any commercial and delivery implications to BHEL
- g) Various drawings, data sheets as per required format, Quality plans, calculations, test reports, test certificates, operation and maintenance manuals etc shall be furnished as specified at contract stage. All documents shall be subject to customer/BHEL approval without any commercial implication to BHEL.
- h) Motor shall meet minimum requirement of motor specification.
- i) Vendor to clearly indicate equipment locations and local routing lengths in their cable listing furnished to BHEL.
- j) Cable BOQ worked out based on routing of cable listing provided by the vendor for “ both end equipment in vendor’s scope”shall be binding to the vendor with +10 % margin to take care of slight variation in routing length & wastages.

2.0 EQUIPMENT & SERVICES TO BE PROVIDED BY PURCHASER FOR ELECTRICAL & TERMINAL POINTS:

Refer “Electrical Scope between BHEL and Vendor”.

3.0 DOCUMENTS TO BE SUBMITTED ALONG WITH BID

- 3.1 The electrical specification without any deviation from the technical/quality assurance requirements stipulated shall be deemed to be complied by the bidder in case bidder furnishes the overall compliance of package technical specification in the form of compliance certificate/No deviation certificate.
- 3.2 No technical submittal such as copies of data sheets, drawings, write-up, quality plans, type test certificates, technical literature, etc, is required during tender stage. Any such submission even if made, shall not be considered as part of offer.



TITLE :

**TECHNICAL SPECIFICATION FOR RATE CONTRACT
OF MISC PUMPS(HOR.)**

SPECIFIC TECHNICAL REQUIREMENTS (ELECTRICAL)

SPECIFICATION NO.
PE-TS-RC-100-N002

VOLUME NO. :

SECTION : IB

REV NO. : 00 DATE :

SHEET : 2 OF 2

4.0 List of enclosures :

- a) Electrical scope between BHEL & vendor (attached as Annexure-I of Section I B)
- b) Technical specification for motors. (attached as Annexure-II of Section I B.)
- c) Datasheets & quality plan for motors. (attached as Annexure-III of Section I B.)
- d) Electrical Load data format (attached at Section III D)
- e) BHEL cable listing format (attached at Section III D)
- f) Standard Electrical Quality Plan (attached at Section II B)
- g) Motor Datasheet-C (format) (attached at Section III D)

ANNEXURE-I OF SECTION IB

REV: 0 DATE: 25.03.2015

STANDARD ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR(FOR EPC PROJECTS)
PACKAGE: MISC. PUMP (Supply Package)

PROJECT:

S.NO	DETAILS	SCOPE SUPPLY	SCOPE E&C	REMARKS
1	415 V MCC	BHEL	BHEL	240 V AC (supply feeder)/415 V AC (3 PHASE 4 WIRE) supply shall be provided by BHEL based on load data provided by vendor at contract stage for all equipment supplied by vendor as part of contract. Any other voltage level (AC/DC) required will be derived by the vendor. OR (shall be informed by BHEL During Contract Stage) 415 V AC, 3 phase, 3 wire supply shall be provided by BHEL based on load data provided by vendor at contract stage for all equipment supplied by vendor as part of contract. Any other voltage level (AC/DC) required will be derived by the vendor.
2	Local Push Button Station (for motors)	BHEL	BHEL	Located near the motors.
3	Power cables, control cables and screened control cables	BHEL	BHEL	Incoming cable from BHEL supplied MCC will be informed by BHEL. Screened control cable between DCS & field equipment will also be informed by BHEL. Vendor shall provide lugs & glands accordingly.
4	Cable trays, accessories & cable trays supporting system	BHEL	BHEL	
5	Cable glands and lugs for equipments supplied by Vendor	Vendor	BHEL	1. Double compression Ni-Cr plated brass cable glands 2. Solder less crimping type heavy duty tinned copper lugs for power and control cables.
6	Conduit and conduit accessories for cabling between equipments supplied by vendor	BHEL	BHEL	
7	Equipment grounding & lightning protection	BHEL	BHEL	
8	Below grade grounding	BHEL	BHEL	
9	LT Motors with base plate and foundation hardware	Vendor	BHEL	Makes shall be subject to BHEL approval at contract stage.
10	Mandatory spares	Vendor	-	Vendor to quote as per specification.
11	Recommended O & M spares	Vendor	-	As per specification
12	Any other equipment/material/service required for completeness of system but not specified above (to ensure trouble free and efficient operation of the system).	Vendor	BHEL	
13	Electrical equipment GA drawing	Vendor	-	For necessary interface review.

REV: 0 DATE: 25.03.2015

STANDARD ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR(FOR EPC PROJECTS)
PACKAGE: MISC. PUMP (Supply Package)

NOTES:

1. Make of all electrical equipments/items supplied shall be reputed make & shall be subject to approval of BHEL after award of contract.
2. All QPs shall be subject to approval of BHEL after award of contract without any commercial implication.

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
	MOTORS 1.00.00GENERAL REQUIREMENTS 1.01.00 For the purpose of design of equipment/systems, an ambient temperature of 50 deg. Centigrade and relative humidity of 95% (at 40 deg C) shall be considered. The equipment shall operate in a highly polluted environment. 1.02.00 All equipment's shall be suitable for rated frequency of 50 Hz with a variation of +3% & -5%, and 10% combined variation of voltage and frequency unless specifically brought out in the specification. 1.03.00 Contactor shall provide fully compatible electrical system, equipment's, accessories and services. 1.04.00 All the equipment, material and systems shall, in general, conform to the latest edition of relevant National and international Codes & Standards, especially the Indian Statutory Regulations. 1.05.00 Paint shade shall be as per RAL 5012 (Blue) for indoor and outdoor equipment. 1.06.00 The responsibility of coordination with electrical agencies and obtaining all necessary clearances for Contactors equipment and systems shall be under the Contactor scope. 1.07.00 Degree of Protection Degree of protection for various enclosures as per IEC60034-05 shall be as follows :- i) Indoor motors - IP 54 ii) Outdoor motors - IP 55 iii) Cable box-indoor area - IP 54 iv) Cable box-Outdoor area - IP 55 2.00.00CODES AND STANDARDS 1) Three phase induction motors : IS/IEC:60034 2) Single phase AC motors : IS/ IEC:60034 3) Crane duty motors : IS:3177, IS/IEC:60034 4) DC motors/generators : IS:4722, IS/IEC:60034
PAGE 1 OF 9.	

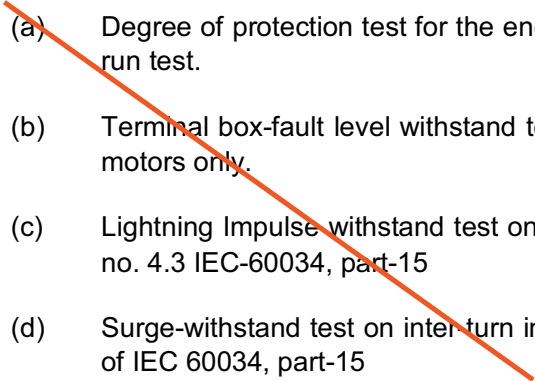
CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
3.00.00 3.01.00 3.02.00 4.00.00 5.00.00 6.00.00 6.01.00 6.01.01	5) Energy Efficient motors : IS 12615, IEC:60034-30 TYPE AC Motors: a) Squirrel cage induction motor suitable for direct-on-line starting. b) Continuous duty LT motors upto 200 KW Output rating (at 50 deg.C ambient temperature), shall be Premium Efficiency class-IE3, conforming to IS 12615, or IEC:60034-30. c) Crane duty motors shall be slip ring/ squirrel cage Induction motor as per the requirement. d) Motor operating through variable frequency drives shall be suitable for inverter duty. Also these motors shall comply the requirements stipulated in IEC: 60034-18-41 and IEC: 60034-18-42 as applicable. DC Motors Shunt wound. RATING (a) Continuously rated (S1). However, crane motors shall be rated for S4 duty, 40% cyclic duration factor. (b) Whenever the basis for motor or driven equipment ratings are not specified in the corresponding mechanical specification sub-sections, maximum continuous motor ratings shall be at least 10% above the maximum load demand of the driven equipment under entire operating range including voltage and frequency variations. TEMPERATURE RISE Air cooled motors 70 deg. C by resistance method for both thermal class 130(B) & 155(F) insulation. Water cooled 80 deg. C over inlet cooling water temperature mentioned elsewhere, by resistance method for both thermal class 130(B) & 155(F) insulation. OPERATIONAL REQUIREMENTS Starting Time For motors with starting time upto 20 secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be at least 2.5 secs. more than starting time.
PAGE 2 OF 9.	

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
6.01.02	For motors with starting time more than 20 secs. and upto 45 secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be at least 5 secs. more than starting time.
6.01.03	For motors with starting time more than 45 secs. at minimum permissible voltage during starting, the locked rotor withstand time under hot condition at highest voltage limit shall be more than starting time by at least 10% of the starting time.
6.01.04	Speed switches mounted on the motor shaft shall be provided in cases where above requirements are not met.
6.02.00	Torque Requirements
6.02.01	Accelerating torque at any speed with the lowest permissible starting voltage shall be at least 10% motor full load torque.
6.02.02	Pull out torque at rated voltage shall not be less than 205% of full load torque. It shall be 275% for crane duty motors.
6.03.00	Starting voltage requirement (a) Up to 85% of rated voltage for ratings below 110 KW (b) Up to 80% of rated voltage for ratings from 110 KW to 200 KW (c) Up to 85% of rated voltage for ratings from 201 KW to 1000 KW (d) Up to 80% of rated voltage for ratings from 1001 KW to 4000 KW (e) Up to 75 % of rated voltage for ratings above 4000KW
7.00.00	DESIGN AND CONSTRUCTIONAL FEATURES
7.01.00	Suitable single phase space heaters shall be provided on motors rated 30KW and above to maintain windings in dry condition when motor is standstill. Separate terminal box for space heaters & RTDs shall be provided. However for flame proof motors, space heater terminals inside the main terminal box may be acceptable.
7.02.00	All motors shall be either Totally enclosed fan cooled (TEFC) or totally enclosed tube ventilated (TETV) or Closed air circuit air cooled (CACA) type. However, motors rated 3000KW or above can be Closed air circuit water cooled (CACW). The method of movement of primary and secondary coolant shall be self-circulated by fan or pump directly mounted on the rotor of the main motor as per IEC 60034-6. However VFD driven motors can be offered with forced cooling type with machine mounted fan or pump driven by separate electric motor. Motors and EPB located in hazardous areas shall have flame proof enclosures conforming to IS:2148 as detailed below (a) Fuel oil area : Group – IIB
PAGE 3 OF 9.	

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
7.03.00	(b) Hydrogen generation : Group - IIC or (Group-I, Div-II as per plant area NEC) or (Class-1, Group-B, Div-II as per NEMA /IEC60034) Winding and Insulation (a) Type : Non-hygroscopic, oil resistant, flame resistant (b) Starting duty : Two hot starts in succession, with motor initially at normal running temperature. (c) 11kV & 3.3 kV AC motors : Thermal class 155 (F) insulation. The winding insulation process shall be total Vacuum Presure Impregnated i.e resin poor method. The lightning Impulse & interturn insulation surge withstand level shall be as per IEC-60034 part-15. (d) 240VAC, 415V AC & 220V DC motors : Thermal Class (B) or better
7.04.00	Motors rated above 1000KW shall have insulated bearings to prevent flow of shaft currents.
7.05.00	Motors with heat exchangers shall have dial type thermometer with adjustable alarm contacts to indicate inlet and outlet primary air temperature.
7.06.00	Noise level for all the motors shall be limited to 85 dB(A) except for BFP motor for which the maximum limit shall be 90dB(A). Vibration shall be limited within the limits prescribed in IS:12075 / IEC 60034-14 . Motors shall withstand vibrations produced by driven equipment. HT motor bearing housings shall have flat surfaces, in both X and Y directions, suitable for mounting 80mmX80mm vibration pads.
7.07.00	In HT motors, at least four numbers simplex / two numbers duplex platinum resistance type temperature detectors shall be provided in each phase stator winding. Each bearing of HT motor shall be provided with dial type thermometer with adjustable alarm contact and preferably 2 numbers duplex platinum resistance type temperature detectors.
7.08.00	Motor body shall have two earthing points on opposite sides.
7.09.00	11 KV motors shall be offered with Separable Insulated Connector (SIC) as per IEEE 386. The offered SIC terminations shall be provided with protective cover and trifurcating sleeves. SIC termination kit shall be suitable for fault level of 25 KA for 0.17 seconds.
7.10.00	3.3 KV motors shall be offered with dust tight phase separated double walled (metallic as well as insulated barrier) Terminal box. Employer shall provide termination kit for the offered Terminal box. The offered Terminal Box shall be suitable for fault level of 250 MVA for 0.12 sec. Removable gland plates of
PAGE 4 OF 9.	

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
	thickness 3 mm (hot/cold rolled sheet steel) or 4 mm (non magnetic material for single core cables) shall be provided.
7.11.00	The spacing between gland plate & centre of terminal stud shall be as per Table-I.
7.12.00	All motors shall be so designed that maximum inrush currents and locked rotor and pullout torque developed by them at extreme voltage and frequency variations do not endanger the motor and driven equipment.
7.13.00	The motors shall be suitable for bus transfer schemes provided on the 11kV, 3.3 kV /415V systems without any injurious effect on its life.
7.14.00	For motors rated 2000 KW & above, neutral current transformers of PS class shall be provided on each phase in a separate neutral terminal box.
7.15.00	The size and number of cables (for HT motors) to be intimated to the successful Contactor during detailed engineering and the Contactor shall provide terminal box suitable for the same.
8.00.00	The ratio of locked rotor KVA at rated voltage to rated KW shall not exceed the following (without any further tolerance): (a) From 50KW & upto 110KW : 11.0 (b) From 110 KW & upto 200 KW : 9.0 (c) Above 200 KW & upto 1000KW : 10.0 (d) From 1001KW & upto 4000KW : 9.0 (e) Above 4000KW : 6 to 6.5
10.00.00	TYPE TEST
10.01.00	HT MOTORS
10.01.01	The Contactor shall carry out the type tests as listed in this specification on the equipment to be supplied under this contract. The Contactor shall indicate the charges for each of these type tests separately in the relevant schedule of Section - VII- (BPS) and the same shall be considered for the evaluation of the bids. The type tests charges shall be paid only for the test(s) actually conducted successfully under this contract and upon certification by the Employer's engineer.
10.01.02	The type tests shall be carried out in presence of the Employer's representative, for which minimum 15 days notice shall be given by the Contactor. The Contactor shall obtain the Employer's approval for the type test procedure before conducting the type test. The type test procedure shall clearly specify the test set-up, instruments to be used, procedure, acceptance norms, recording of different parameters, interval of recording, precautions to be taken etc. for the type test(s) to be carried out.
PAGE 5 OF 9.	

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
10.01.03	In case the Contactor has conducted such specified type test(s) within last ten years as on the date of bid opening, he may submit during detailed engineering the type test reports to the Employer for waiver of conductance of such test(s). These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. The Employer reserves the right to waive conducting of any or all the specified type test(s) under this contract. In case type tests are waived, the type test charges shall not be payable to the Contactor.
10.01.04	Further the Contactor shall only submit the reports of the type tests as listed in "LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED" and carried out within last ten years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. However if the Contactor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the Contactor shall conduct all such tests under this contract at no additional cost to the Employer either at third party lab or in presence of client/Employers representative and submit the reports for approval.
10.01.05	LIST OF TYPE TESTS TO BE CONDUCTED The following type tests shall be conducted on each type and rating of HT motor (a) No load saturation and loss curves upto approximately 115% of rated voltage (b) Measurement of noise at no load. (c) Momentary excess torque test (subject to test bed constraint). (d) Full load test(subject to test bed constraint) (e) Temperature rise test at rated conditions. During heat run test, bearing temp., winding temp.,coolant flow and its temp. shall also be measured. In case the temperature rise test is carried at load other than rated load, specific approval for the test method and procedure is required to be obtained. Wherever ETD's are provided, the temperature shall be measured by ETD's also for the record purpose.
10.01.06	LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED The following type test reports shall be submitted for each type and rating of HT motor
PAGE 6 OF 9.	

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
	 (a) Degree of protection test for the enclosure followed by IR, HV and no load run test. (b) Terminal box-fault level withstand test for each type of terminal box of HT motors only. (c) Lightning Impulse withstand test on the sample coil shall be as per clause no. 4.3 IEC-60034, part-15 (d) Surge-withstand test on inter turn insulation shall be as per clause no. 4.2 of IEC 60034, part-15
10.02.00	LT Motors
10.02.01	LT Motors supplied shall be of type tested design. During detailed engineering, the Contactor shall submit for Employer's approval the reports of all the type tests as listed in this specification and carried out within last <i>ten</i> years from the date of bid opening. These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.
10.02.02	However if the Contactor is not able to submit report of the type test(s) conducted within last ten years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the Contactor shall conduct all such tests under this contract at no additional cost to the Employer either at third party lab or in presence of client/Employers representative and submit the reports for approval.
10.02.03	LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED The following type test reports shall be submitted for each type and rating of LT motor of above 50 KW only 1. Measurement of resistance of windings of stator and wound rotor. 2. No load test at rated voltage to determine input current power and speed 3. Open circuit voltage ratio of wound rotor motors (in case of Slip ring motors) 4. Full load test to determine efficiency power factor and slip 5. Temperature rise test 6. Momentary excess torque test. 7. High voltage test 8. Test for vibration severity of motor.
PAGE 7 OF 9.	

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.
	9. Test for noise levels of motor(Shall be limited as per clause no 7.06.00 of this section) 10. Test for degree of protection and 11. Overspeed test. 12. Type test reports for motors located in fuel oil area having flame proof enclosures as per IS 2148 / IEC 60079-1 10.03.00 All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price. 10.04.00 The type test reports once approved for any projects shall be treated as reference. For subsequent projects of NTPC, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design Change". Minor changes if any shall be highlighted on the endorsement sheet.
PAGE 8 OF 9.	

CLAUSE NO.	MOTOR SPECIFICATION APPLICABLE FOR ALL TYPE OF PUMP MOTORS EXCEPT TYPE-9 PUMP MOTORS.																												
	TABLE - I DIMENSIONS OF TERMINAL BOXES FOR LV MOTORS <table> <tr> <th>Motor MCR in KW of</th><th>Minimum distance between centre stud and gland plate in mm As per manufacturer's practice.</th></tr> <tr> <td>UP to 3 KW</td><td></td></tr> <tr> <td>Above 3 KW - upto 7 KW</td><td>85</td></tr> <tr> <td>Above 7 KW - upto 13 KW</td><td>115</td></tr> <tr> <td>Above 13 KW - upto 24 KW</td><td>167</td></tr> <tr> <td>Above 24 KW - upto 37 KW</td><td>196</td></tr> <tr> <td>Above 37 KW - upto 55 KW</td><td>249</td></tr> <tr> <td>Above 55 KW - upto 90 KW</td><td>277</td></tr> <tr> <td>Above 90 KW - upto 125 KW</td><td>331</td></tr> <tr> <td>Above 125 KW-upto 200 KW</td><td>203</td></tr> </table> For HT motors the distance between gland plate and the terminal studs shall not be less than 500 mm. PHASE TO PHASE/ PHASE TO EARTH AIR CLEARANCE: NOTE: Minimum inter-phase and phase-earth air clearances for LT motors with lugs installed shall be as follows: <table> <tr> <th>Motor MCR in KW</th><th>Clearance</th></tr> <tr> <td>UP to 110 KW</td><td>10mm</td></tr> <tr> <td>Above 110 KW and upto 150 KW</td><td>12.5mm</td></tr> <tr> <td>Above 150 KW</td><td>19mm</td></tr> </table>	Motor MCR in KW of	Minimum distance between centre stud and gland plate in mm As per manufacturer's practice.	UP to 3 KW		Above 3 KW - upto 7 KW	85	Above 7 KW - upto 13 KW	115	Above 13 KW - upto 24 KW	167	Above 24 KW - upto 37 KW	196	Above 37 KW - upto 55 KW	249	Above 55 KW - upto 90 KW	277	Above 90 KW - upto 125 KW	331	Above 125 KW-upto 200 KW	203	Motor MCR in KW	Clearance	UP to 110 KW	10mm	Above 110 KW and upto 150 KW	12.5mm	Above 150 KW	19mm
Motor MCR in KW of	Minimum distance between centre stud and gland plate in mm As per manufacturer's practice.																												
UP to 3 KW																													
Above 3 KW - upto 7 KW	85																												
Above 7 KW - upto 13 KW	115																												
Above 13 KW - upto 24 KW	167																												
Above 24 KW - upto 37 KW	196																												
Above 37 KW - upto 55 KW	249																												
Above 55 KW - upto 90 KW	277																												
Above 90 KW - upto 125 KW	331																												
Above 125 KW-upto 200 KW	203																												
Motor MCR in KW	Clearance																												
UP to 110 KW	10mm																												
Above 110 KW and upto 150 KW	12.5mm																												
Above 150 KW	19mm																												
PAGE 9 OF 9.																													

MOTOR SPECIFICATION APPLICABLE FOR TYPE-9 PUMP MOTORS.

1.00.00 **SCOPE**

1.01.00 This section covers the general requirements of the drive motors for power station auxiliary equipment.

1.02.00 Motors shall be furnished in accordance with both this general specification and the accompanying driven equipment specification.

1.03.00 In case of any discrepancy, the driven equipment specification shall govern.

2.00.00 **CODES & STANDARDS**

2.01.00 All motors shall conform to the latest applicable IS, IEC and CBIP Standards/ Publications except when otherwise stated herein or in the driven equipment specification.

2.02.00 Major standards, which shall be followed, are listed below other applicable Indian Standards for any component part even if not covered in the listed standards shall also be followed:

- i) IS-325
- ii) IS-12615
- iii) IEC-60034

3.00.00 **SERVICE CONDITIONS**

3.01.00 The motors will be installed in hot, humid and tropical atmosphere highly polluted at places with coal dust and/or fly ash.

3.02.00 Unless otherwise noted, electrical equipment/system design shall be based on the service conditions and auxiliary power supply given in the annexure to this specification.

3.03.00 For motor installed outdoor and exposed to direct sunrays, the effect of solar heat shall be considered in the determination of the design ambient temperature.

4.00.00 **TYPE AND RATING**

4.01.00 **A.C. Motors**

4.01.01 Motors shall be general purpose, constant speed, squirrel cage, three/single phase, induction type.

- 4.01.02 All motors shall be rated for continuous duty. They shall also be suitable for long period of inactivity.
- 4.01.03 LT motor & HT motor name-plate rating at 50°C shall have at least 15% margin and 10% margin respectively over the input power requirement of the driven equipment at rated duty point unless stated otherwise in driven equipment specification.
- 4.01.04 The motor characteristics shall match the requirements of the driven equipment so that adequate starting, accelerating, pull up, break down and full load torques are available for the intended service.
- 4.01.05 Motors efficiency class shall be IE1, IE2 as per latest version of IEC-60034.
- 4.02.00 **D.C. Motors**
- 4.02.01 D.C. motor provided for emergency service shall be shunt/compound wound type.
- 4.02.02 Motor shall be sized for operation with fixed resistance starter for maximum reliability.
- Starter panel complete with all accessories shall be included in the scope of supply.
- 5.00.00 **PERFORMANCE**
- 5.01.00 **Running Requirements**
- 5.01.01 Motor shall run continuously at rated output over the entire range of voltage and frequency variations as given in the annexure.
- 5.01.02 The motor shall be capable of operating satisfactorily at full load for 5 minutes without injurious heating with 75% rated voltage at motor terminals.
- 5.01.03 The motor shall be designed to withstand momentary overload of 60% of full load torque for 15 second without any damage.
- 5.02.00 **Starting Requirements**
- Motor shall be designed for direct online starting at full voltage. Breakaway starting current as percentage of full load current for various motor rating shall not exceed the given below-
- | | | |
|---------------------|---|---|
| Motors up to 1500kW | - | 600% subject to IS tolerance of plus 20%. |
| Motors above 1500kW | - | 450% not subject to any positive tolerance. |
- 5.02.01 The motor shall be capable of withstanding the stresses imposed if started at 110% rated voltage.

- 5.02.02 Motor shall start with rated load and accelerate to full speed with 80% rated voltage at motor terminals except mill motor. Mill motor shall start with rated load and accelerate to full speed at 85% of the rated voltage at the motor terminals.
- 5.02.03 a) Two hot starts in succession with motor initially at normal running temperature.
- b) Pump motor subject to reverse rotation shall be designed to withstand the stresses encountered when starting with shaft rotating at 125% rated speed in reverse direction.
- 5.02.04 The motors shall be designed to withstand 120% of rated speed for 2 minutes without any mechanical damage.
- 5.03.00 **Stress During Bus Transfer**
- 5.03.01 The motor may be subjected to sudden application of 150% rated voltage during bus transfer, due to the phase difference between the incoming voltage and motor residual voltage.
- 5.03.02 The motor shall be designed to withstand any torsional and/or high current stresses, which may result, without experiencing any deterioration in the normal life and performance characteristics.
- 5.04.00 **Locked Rotor Withstand Time**
- 5.04.01 The locked rotor withstand time under hot condition at 110% rated voltage shall be more than motor starting time by at least 3 seconds for motors up to 20 seconds starting time and by 5 seconds for motor with more than 20 seconds starting time.
- 5.04.02 Starting time mentioned above is at minimum permissible voltage of 80% rated voltage.
- 5.04.03 Hot thermal withstand curve shall have a margin of at least 10% over the full load current of the motor to permit relay setting utilising motor rated capacity.
- 6.00.00 **SPECIFIC REQUIREMENTS**
- 6.01.00 **Enclosure**
- 6.01.01 All motor enclosures for outdoor, semi-outdoor & indoor application shall conform to the degree of protection IP-55 unless otherwise specified. Motor for outdoor or semi-outdoor service shall be of weather-proof construction with canopy.
- 6.01.02 For hazardous area approved type of increased safety enclosure shall be furnished.
- 6.02.00 **Cooling**
- 6.02.01 The motor shall be self ventilated type, either totally enclosed fan cooled IC 411(TEFC), totally enclosed tube ventilated IC 511(TETV) or closed air circuit air- cooled IC 611(CACA).

- 6.02.02 For large capacity motors not available with above type of cooling may be accepted with IC 81W or IC 91W, closed air circuit water cooled (CACW) subject to the approval of the owner.
- 6.03.00 **Winding and Insulation**
- 6.03.01 All insulated winding shall be of copper.
- 6.03.02 All motors shall have class F insulation but limited to class B temperature rise.
- 6.03.03 Windings shall be impregnated to make them non-hygroscopic and oil resistant.
- 6.04.00 **Tropical Protection**
- 6.04.01 All motors shall have fungus protection involving special treatment of insulation and metal against fungus, insects and corrosion.
- 6.04.02 All fittings and hardwares shall be corrosion resistant.
- 6.05.00 **Bearings**
- 6.05.01 Motor shall be provided with antifriction bearings, unless sleeve bearings are required by the motor application. Bearings shall be rated for minimum service life of 40,000Hrs.
- 6.05.02 Vertical shaft motors shall be provided with thrust and guide bearings. Thrust bearing of tilting pad type is preferred.
- 6.05.03 Bearings shall be provided with seals to prevent leakage of lubricant or entrance of foreign matters like dirt, water etc. into the bearing area.
- 6.05.04 Sleeve bearings shall be split type, ring oiled, with permanently aligned, close running shaft sleeves.
- 6.05.05 Grease lubricated bearings shall be pre-lubricated and shall have provisions for in-service positive lubrication with drains to guard against over lubrication. LT motors 15kW and above shall be provided with external greasing arrangement.
- 6.05.06 Oiled bearing shall have an integral self cooled oil reservoir with oil ring inspection ports, oil sight glass with oil level marked for standstill and running conditions and oil fill and drain plugs.
- 6.05.07 Forced lubricated or water cooled bearing shall not be used without prior approval of Owner.
- 6.05.08 Lubricant shall not deteriorate under all service conditions. The lubricant shall be limited to normally available types with IOC equivalent.
- 6.05.09 Bearings shall be insulated as required to prevent shaft current and resultant bearing damage.
- 6.06.00 **Noise & Vibration**

- 6.06.01 All HT motors shall be provided with vibration pads for mounting of vibration detectors. Vibration monitoring devices shall be provided on DE and NDE side in x&y direction with remote DCS monitoring, alarm and tripping.
- 6.06.02 The maximum double amplitude vibrations for HT motors upto 1500 rpm shall be 25 microns and 15 microns upto 3000 rpm. For 415V motors, maximum double amplitude vibrations upto 1500 rpm shall be 40 microns and 15 microns upto 3000 rpm.
- 6.06.03 The noise level shall not exceed 85db (A) at 1.5 meters from the motor.
- 6.07.00 **Motor Terminal Box**
- 6.07.01 Motor terminal box shall be detachable type and located in accordance with Indian Standards clearing the motor base- plate/ foundation
- 6.07.02 Terminal box shall be capable of being turned 360 Deg. in steps of 180 Deg. for HT motors and 90 Deg. for LT motors unless otherwise approved.
- 6.07.03 The terminal box shall be split type with removable cover with access to connections and shall have the same degree of protection as motor.
- 6.07.04 The terminal box shall have sufficient space inside for termination/connection of XLPE insulated armoured aluminium cables.
- 6.07.05 Terminals shall be stud or lead wire type, substantially constructed and thoroughly insulated from the frame.
- 6.07.06 The terminals shall be clearly identified by phase markings, with corresponding direction of rotation marked on the non-driving end of the motor.
- 6.07.07 The terminal box shall be capable of withstanding maximum system fault current for a duration of 0.25 sec.
- 6.07.08 For 11000V and 3300V motor, the terminal box shall be phase-segregated type. The neutral leads shall be brought out in a separate terminal box (not necessarily phase segregated type) with shorting links for star connection.
- 6.07.09 Motor terminal box shall be furnished with suitable cable lugs and double compression brass glands to match with cable used.
- 6.07.10 The gland plate for single core cable shall be non-magnetic type.
- 6.07.11 Minimum clearances to be provided between phase to phase and phase to earth shall be as under-

Voltage Rating of Motor		Minimum Ph-Ph & Ph-Earth clearance
0.415 kV	:	25 mm
3.3 kV	:	65 mm
11.0 kV	:	140 mm

Note: In case it is not possible to maintain these clearances, the live parts shall be totally insulated from earth and other Phases. Adequate clearances shall be provided for cable connections.

6.08.00 **Grounding**

6.08.01 The frame of each motor shall be provided with two separate and distinct grounding pads complete with tapped hole, GI bolts and washer.

6.08.02 The grounding connection shall be suitable for accommodation of ground conductors as follows:

Rating		Conductor Size	
Above	Up to		
-----	5.5 kW	:	8 SWG GI Wires.
5.5 kW	22 kW	:	25mm X 4mm GS Flat.
23 kW	55 kW	:	40mm X 6mm GS Flat.
56kW	174kW	:	50mm X 8mm GS Flat.
175kW	ABOVE	:	75mm X 10mm GS Flat.

6.08.03 The cable terminal box shall have a separate grounding pad.

6.09.00 **Minimum Cable Size for LT & HT Motors shall as be as follows-**

a) For 415V, 3-Ph, LT Motors-

Rating		:	Cable Size
Above	Up to		
-----	5.5 kW	:	1R X 3C X 6 Sq.mm
5.5 kW	11 kW	:	1R X 3C X 10 Sq.mm
11 kW	22 kW	:	1R X 3C X 35 Sq.mm
22 kW	37.5 kW	:	1R X 3C X 70 Sq.mm.
37.5kW	55 kW	:	1R X 3C X 150 Sq.mm
55 kW	75 kW	:	1R X 3C X 300 Sq.mm
75 kW	110kW	:	2R X 3C X 150 Sq.mm
110 kW	175kW	:	2R X 3C X 300 Sq.mm

b) For 3.3kV & 11kV, 3-Ph, HT Motors-

Rating		:	Cable Size
Above	Up to		

175 kW	1000 kW	:	1R X 3C X 240 Sq.mm
1000 kW	2000 kW	:	2R X 3C X 240 Sq.mm
2000 kW	4500 kW	:	2R X 3C X 300 Sq.mm
4501 kW	10,000 kW	:	9R X 1C X 1000 Sq.mm.

Note: During detail engineering if higher cable size is required same shall be provided.

6.10.00 **Rating Plate**

In addition to the minimum information required by IS, the following information shall be shown on motor rating plate :

- a) Temperature rise in Deg.C under rated condition and method of measurement.
- b) Degree of protection.
- c) Bearing identification no. and recommended lubricant.
- d) Location of insulated bearings.

7.00.00 **ACCESSORIES**

7.01.00 **General**

Accessories shall be furnished, as listed below, or if otherwise required by driven equipment specification or application.

7.02.00 **Space Heater**

7.02.01 Motor of rating 30 kW and above shall be provided with space heaters, suitably located for easy removal or replacement.

7.02.02 The space heater shall be rated 240 V, 1 Phase, 50Hz and sized to maintain the motor internal temperature above dew point when the motor is idle.

7.02.03 Minimum Cable Size for space heater shall be as listed-

- i) For LT motors: 2.5 sq.mm, 2-Core copper cable complying with IS-1554(Part-1).
- ii) For HT motors: 6 sq.mm, 2 Core aluminium cable complying with IS-1554(Part-1).

7.03.00 **Temperature Detectors**

7.03.01 All 11000V and 3300V motors shall be provided with twelve (12) nos. simplex type winding temperature detectors, four (4) nos. per phase.

- 7.03.02 11000V and 3300V motor bearing shall be provided with duplex type temperature detectors.
- 7.03.03 The temperature detector mentioned above shall be resistance type, 3 wire, platinum wound, 100 Ohms at 0°C.
- 7.03.04 Leads of all simplex type motor winding RTDS and motor bearing RTDS shall be wired up to respective switchgear metering & protection compartment. From which one set of RTDS will be connected to numerical protection relay and another set shall be kept free for DDCMIS connectivity.
- 7.03.05 0.5 sq.mm annealed tinned copper conductor complying with IS-1554(Part-1). shall be used for RTD/BTD wiring.
- 7.04.00 **Indicator/Switch**
- 7.04.01 Dial type local indicator with alarm contacts shall be provided for the following:
- a) 11000 V and 3300V motor bearing temperature.
 - b) Hot and cold air temperature of the closed air circuit for CACA and CACW motor.
- 7.04.02 Flow switches shall be provided for monitoring cooling water flow of CACW motor and oil flow of forced lubrication bearing, if used. CACW motor shall be provided with water leakage detector with remote alarm and tripping.
- 7.04.03 Alarm switch contact rating shall be minimum 2.0 A at 220V D.C. and 10A at 240V A.C.
- 7.05.00 **Current Transformer for Differential Protection**
- 7.05.01 Motor 1000 kW and above shall be provided with three differential current transformers mounted over the neutral leads within the enclosure.
- 7.05.02 The arrangement shall be such as to permit easy access for C.T. testing and replacement. Current transformer characteristics shall match Owner's requirements to be intimated later.
- 7.06.00 **Accessory Terminal Box**
- 7.06.01 All accessory equipment such as space heater, temperature detector, current transformers etc., shall be wired to and terminated in terminal boxes, separate from and independent of motor (power) terminal box.
- 7.06.02 Accessory terminal box shall be complete with double compression brass glands and pressure type terminals to suit owner's cable connections.
- 7.07.00 **Drain Plug**
- Motor shall have drain plugs so located that they will drain the water, resulting from the condensation or other causes from all pockets of the motor casing.

7.08.00 **Lifting Provisions**

Motor weighing 25 Kg. or more shall be provided with eyebolt or other adequate provision of lifting.

7.09.00 **Dowel Pins**

The motor shall be designed to permit easy access for drilling holes through motor feet or mounting flange for installation of dowel pins after assembling the motor and driven equipment.

7.10.00 **Painting**

For paint shade finish, refer Section-X of Volume: II-A : Lead Specification.

8.00.00 **TESTS**

Routine and Type Tests are to be conducted in presence of customer's representative as per IS:325 and in addition, any special test called for in the driven equipment specification shall be performed and required copies of test certificates are to be furnished for approval. In addition, following tests shall have to be carried out on the motors in presence of OWNER's representative on 3.3kV/11kV motors.

- a. Impulse test by 1.2 / 50 micro sec. On sample coil of Stator winding insulation as type test as per IEC-60034, part -15 test voltages as under :

Voltage rating of motor	Impulse Test Voltage
3.3 kV	18 kV peak
11 kV	49 kV peak

- b. Tan delta, charging current and dielectric loss measurements on each phase of motor stator winding as routine test.
- c. Polarization Index Test as per IS: 7816 as routine test
- d. Test for suitability of IPW– 55(Weather proof) as per IS 4691 as type test. Type test certificate for first numeral shall be acceptable in lieu to test, provided the test motor is identical to motor being supplied. Second numeral test shall be carried out on one motor of each type and rating.
- e. Fault Withstand Test for main terminal box as type test. Type test certificate shall be acceptable, if the test is conducted on exactly identical terminal box.
- f. Test for noise level as routine test.
- g. Test for vibration as routine test.

- h. Tan delta measurement on coils.
- i. Surge withstand test for inter turn insulation.
- j. Test to diagnose rotor bar failure during manufacture.
- k. Over speed test as routine test.
- l. Temperature rise test.

Temperature rise under normal condition above ambient temperature shall be limited to-

Specified Design Ambient temperature	Thermometer Method	Resistance Method
50 deg.C	60 deg.C	70 deg.C
45 deg.C	65 deg.C	75 deg.C
40 deg.C	70 deg.C	80 deg.C

Tests indicated at (h), (i), (j) shall be carried out during manufacture of the coils and shall be furnished for verification.

9.00.00 **DRAWINGS, DATA & MANUALS**

9.01.00 Drawings, Data & Manuals shall be submitted in triplicate with the bid and in quantities and procedures as specified in General Conditions of Contract and/or elsewhere in the specification for approval and subsequent distribution after the issue of 'Letter of Intent'.

9.02.00 **To be Submitted with the bid**

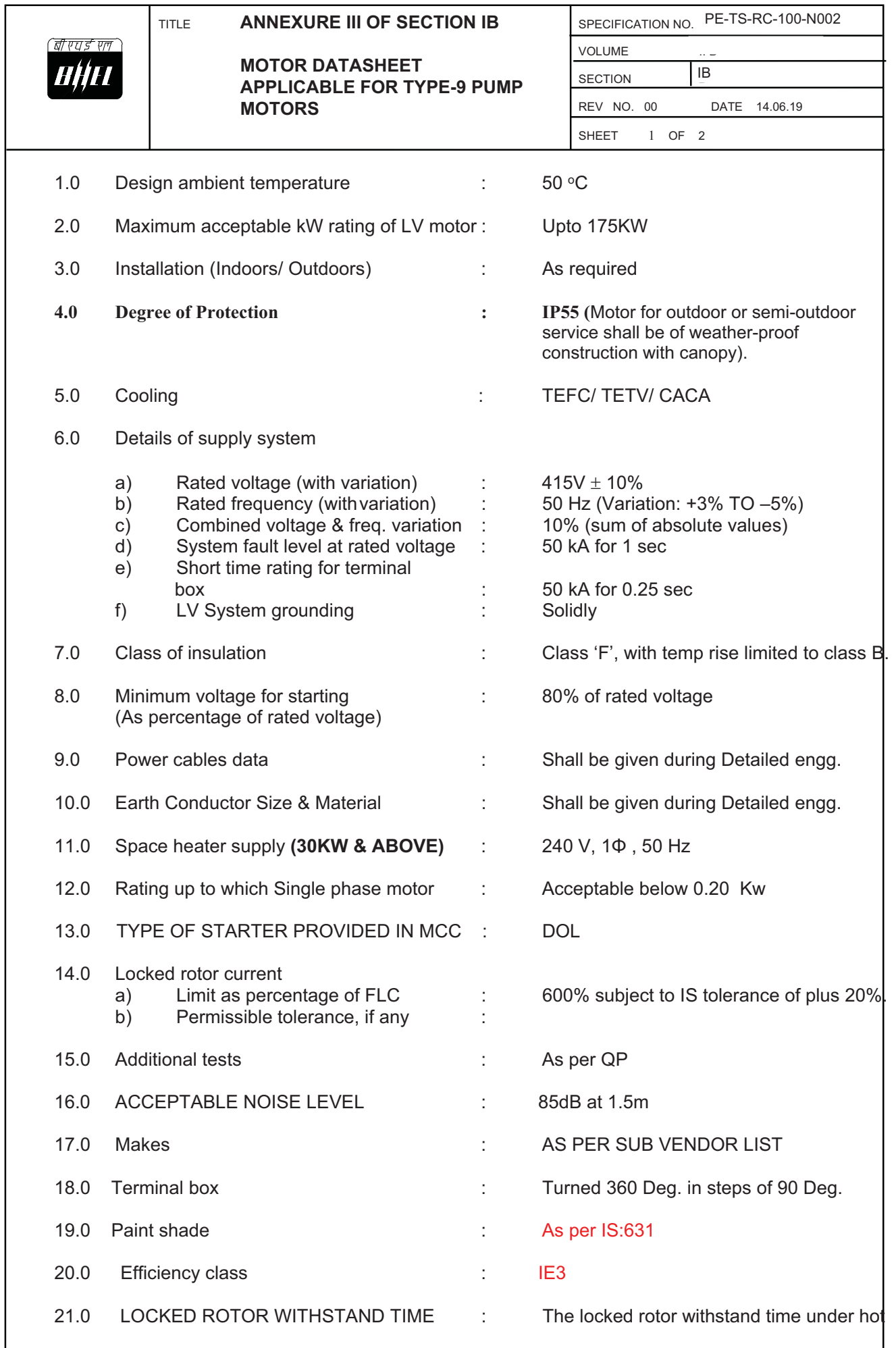
- a) List of the motors
- b) Individual motor data sheet as per format of the proposal data sheets.
- c) Scheme & write-up on forced lubrication system, if any
- d) Type test report

9.03.00 **To be submitted for Owner / Purchaser's Approval and Distribution**

All relevant drawings and data pertaining to the equipment like GTP, GA drawing, foundation plan, QAP, etc. shall be submitted by the Bidder for approval of Owner/Owner's consultant. Also refer clause no. 1.19.02(u) of Section-I of Volume – V-A: Technical Specifications for Electrical Equipment & Accessories.

	TITLE ANNEXURE III OF SECTION IB MOTOR DATASHEET APPLICABLE FOR ALL PUMP MOTOR EXCEPT TYPE-9 PUMP MOTORS	SPECIFICATION NO. PE-TS-RC-100-N002	
		VOLUME	
		SECTION	IB
		REV. NO.	DATE:
		SHEET 1	OF 2

1.0	Design ambient temperature	:	50 °C
2.0	Maximum acceptable kW rating of LV motor	:	200KW *
3.0	Installation (Indoors/ Outdoors)	:	As required
4.0	Details of supply system		
	a) Rated voltage (with variation)	:	415V ± 10%
	b) Rated frequency (with variation)	:	50 Hz + 3 % to - 5%
	c) Combined voltage & freq. variation	:	10% (sum of absolute values)
	d) System fault level at rated voltage	:	50 kA for 1 sec
	e) Short time rating for terminal boxes		
	o 110 kW and above (Breaker Controlled)	:	50 KA for 0.25 sec.
	o Below 110 kW (Contactor Controlled)	:	50 KA protected by HRC fuse
	f) LV System grounding	:	Solidly
5.0	Winding & Insulation	:	Class F with temp rise limited to class B
6.0	Minimum voltage for starting (As percentage of rated voltage)	:	85% for motor ratings below 110kW 80% for motor ratings from 110kW to 200kW.
7.0	Power cables data	:	Shall be given during detailed engg.
8.0	Earth Conductor Size & Material	:	Shall be given during detailed engg.
9.0	Space heater supply (for motors >=30kw)	:	240 V, 1ϕ, 50 Hz
10.0	Rating up to which Single phase motor	:	Acceptable below 0.2 kW
11.0	Locked rotor current		
	a) Limit as percentage of FLC	:	As per IS 12615
12.0	Makes	:	BHEL/ Customer approval (Package owner to take care)
13.0	Paint shade	:	Blue (RAL 5012) – Corrosion proof
14.0	Degree Of protection for motor/ terminal box	:	Degree of protection for various enclosures as per IEC60034-05 shall be as follows:-
	i) Indoor motors - IP 54		
	ii) Outdoor motors - IP 55		
	iii) Cable box-indoor area - IP 54		
	iv) Cable Box-Outdoor area - IP 55		
	* LT motors of continuous duty shall be energy efficient IE3 class conforming to IS-12615		
15.0	TESTING REQUIREMENTS: IN LINE WITH SPECIFICATION		





TITLE

ANNEXURE III OF SECTION IB**MOTOR DATASHEET
APPLICABLE FOR TYPE-9 PUMP
MOTORS**

SPECIFICATION NO. PE-TS-RC-100-N002

VOLUME

SECTION

IB

REV NO. 00

DATE 14.06.19

SHEET 2 OF 2

condition at 110% rated voltage shall be more than motor starting time by at least 3 seconds for motors up to 20 seconds starting time and by 5 seconds for motor with more than 20 seconds starting time.

NOTE:

1. Also detailed Customer spec. for Motors is to be referred as enclosed with technical spec.

CLAUSE NO.	QUALITY ASSURANCE																		
MOTOR																			
TESTS/CHECKS	Visual	Dimensional	Make/Type/Rating /General	Mech/Chem. Properties	NDT /DP/MP/UT	Metallography	Electrical Characteristics	Welding/Brazing(WPS/PQR)	Heat Treatment	Magnetic Characteristics	Hydraulic/Leak/Pressure Test	Thermal Characteristics	Run out	Dynamic Balancing	Routine & Acceptance tests as per IS-325/IS-4722 /IS- 9283/IS-2148/IEC60034/IEC 60079-I/ IS-12615	Vibration	Over speed	Tan delta, shaft voltage & polarization index test	Paint shade, thickness & adhesion
TEMS/COMPONENTS																			
Plates for stator frame, end shield, spider etc.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Shaft	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Magnetic Material	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rotor Copper/Aluminium	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Stator copper	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SC Ring	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Insulating Material	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Tubes, for Cooler	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sleeve Bearing	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Stator/Rotor, Exciter Coils	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Castings, stator frame, terminal box and bearing housing etc.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fabrication & machining of stator, rotor, terminal box	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

PAGE 1 OF 2

CLAUSE NO.	QUALITY ASSURANCE															
Wound stator	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Wound Exciter	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rotor complete	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Exciter, Stator, Rotor, Terminal Box assembly	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Accessories, RTD, BTD, CT, Space heater, antifriction bearing, gaskets etc.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Complete Motor	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Note: 1. This is an indicative list of tests/checks. The manufacture is to furnish a detailed Quality Plan indicating the practices & Procedure followed along with relevant supporting documents during QP finalization. However, No QP for LT motor upto 50KW. 2. Additional routine tests for Flame proof motors shall be applicable as per relevant standard 3. Makes of major bought out items for HT motors will be subject to NTPC approval. 4. Y1 = for HT Motor / Machines only.																

PAGE 2 OF 2



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPECIFIC TECHNICAL REQUIREMENTS

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **I**

SUB-SECTION: **IC**

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SUB-SECTION – IC

SPECIFIC TECHNICAL REQUIREMENTS (C&I)

BLANK



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPECIFIC TECHNICAL REQUIREMENTS

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **I**

SUB-SECTION: **ID**

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SUB-SECTION – ID

DATASHEET-A

	DATA SHEET - A			SPECIFICATION NO.:	PE-TS-RC-100-N002											
	MISCELLANEOUS PUMPS (HORIZONTAL)			REV. NO.: 00	DATE : 14.06.2019											
	RATE CONTRACT - MISC. PUMPS			VOLUME : --	SECTION : ID											
	HORIZONTAL CENTRIFUGAL PUMPS															
Sl. No.	DESCRIPTION	TYPE-1	TYPE-2	TYPE-3	TYPE-4	TYPE-5	TYPE-6	TYPE-7	TYPE-8	TYPE-9	TYPE-10	TYPE-11	TYPE-12	TYPE-13	TYPE-14	TYPE-15
1.0	SERVICE															
1.1	Total no. of pumps (Expected Qty.)	3	4	4	5	3	4	4	4	2	6	6	2	2	2	2
1.2	No. of working & standby pumps	2W+1S	2W+2S	3W+1S	3W+2S	2W+1S	2W+2S	3W+1S	3W+1S	1W+1S	4W+2S	4W+2S				
1.3	Liquid Handled	Passivated DM Cooling water	Clarified / CW Blowdown	Passivated DM Cooling water	Clarified / CW Blowdown	Passivated DM Cooling water	Clarified / CW Blowdown	Passivated DM Cooling water	Clarified / CW Blowdown	Passivated DM Cooling water	Passivated DM Cooling water	Clarified / CW Blowdown	Passivated DM Cooling water	Clarified / CW Blowdown	Passivated DM Cooling water	Clarified / CW Blowdown
1.4	Location (Indoor / Outdoor)	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor	Outdoor
1.5	Duty	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
1.6	No. of pumps working in parallel	2	2	3	3	2	2	3	3	1	4	4	1	1	1	1
1.7	Specific gravity	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1.8	System design pressure (kg/sqcm). g	12	7.5	12	7.5	12	7.5	12	7.5	12	12	7.5	12	7.5	12	7.5
2.0	DESIGN PARAMETERS															
2.1	Design capacity each, M ³ /hr	125	125	125	170	140	165	95	95	120	270	270	70	70	200	200
2.2	Total dynamic head (MWC)	60	30	65	48	55	44	71	26	60	60	30	65	30	65	30
2.3	Suction Pressure(MWC)	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction	35	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction	Flooded Suction
2.4	Design Temperature (°C)	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
2.5	Maximum permissible speed of pump (RPM)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
2.6	Max. limit on shut off head Corresponding to pump TDH (MWC) at 52.5 Hz	85	50	90	60	80	55	95	30	80	85	40	90	50	90	50
2.7	Operating range	-----40-120% of design duty point flow-----														
2.8	Motor rating	Continuous Motor rating (at 50 deg C ambient) for all pumps shall be based on following conditions(Whichever is higher including voltage & frequency variation) : (a)The motor rating shall have atleast 15% margin over the the power requirement at rated duty point. (b)The motor rating shall have 10% margin over the the maximum power requirement at any condition of the entire characteristic curve of the pump (c) Pump shaft input power required considering overloading of the pump assuming single pump operation in the event of tripping of the other pumps operating in parallel.														
2.9	Permissible tolerance in rated capacity & TDH	No negative tolerance														
2.10	Permissible tolerance in efficiency at rated capacity(%)	No negative tolerance														
2.11	Performance / Design Standard	HIS / IS 5120														
3.0	CONSTRUCTION FEATURES															
3.1	Pump type	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal	Horizontal Centrifugal
3.2	Impeller type	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
3.3	Casing type	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing	Axial Split casing
3.4	Coupling type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type	Flexible Spacer type
3.5	Sealing arrangement	Gland packing initially & Mechanical seal finally after commissioning	Gland packing	Gland packing initially & Mechanical seal finally after commissioning	Gland packing	Gland packing initially & Mechanical seal finally after commissioning	Gland packing	Gland packing initially & Mechanical seal finally after commissioning	Gland packing	Gland packing initially & Mechanical seal finally after commissioning	Gland packing initially & Mechanical seal finally after commissioning	Gland packing	Gland packing initially & Mechanical seal finally after commissioning	Gland packing	Gland packing initially & Mechanical seal finally after commissioning	Gland packing
3.6	Type of Lubrication	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease
3.7	Pump characteristics	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable
3.8	Drain Plugs, vent with valve, lifting lugs, priming connection, Coupling guard	REQUIRED														
4.0	MATERIALS OF CONSTRUCTION															
4.1	Casing	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	Cl to IS 210 FG260	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260
4.2	Impeller	ASTM-A-351 CF 8M	Bronze to IS 318 Gr. III or SS – 316 / CF8M	ASTM-A-351 CF 8M	Bronze to IS 318 Gr. III or SS – 316 / CF8M	ASTM-A-351 CF 8M	Bronze to IS 318 Gr. III or SS – 316 / CF8M	ASTM-A-351 CF 8M	Bronze to IS 318 Gr. III or SS – 316 / CF8M	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	Bronze to IS 318 Gr. III or SS – 316 / CF8M	ASTM-A-351 CF 8M	Bronze to IS 318 Gr. III or SS – 316 / CF8M
4.3	Shaft	SS 316	SS 316	SS 316	SS 316	SS 316	SS 316	SS 316	SS 316	SS 316	SS 316 / SS 410 (To be decided during detail Engineering)	SS 316 / SS 410 (To be decided during detail Engineering)	SS 316	SS 316	SS 316	SS 316
4.4	Shaft Sleeves	SS 410	SS 410	SS 410	SS 410	SS 410	SS 410	SS 410	SS 410	SS 410	SS 316 / SS 410 (To be decided during detail Engineering)	SS 316 / SS 410 (To be decided during detail Engineering)	SS 410	SS 410	SS 410	SS 410
4.5	Wearing rings (Impeller & casing, as applicable)	SS 316	High leaded bronze to IS-318 Gr.V / SS -316 in case of SS Impeller.	SS 316	High leaded bronze to IS-318 Gr.V / SS -316 in case of SS Impeller.	SS 316	High leaded bronze to IS-318 Gr.V / SS -316 in case of SS Impeller.	SS 316	High leaded bronze to IS-318 Gr.V / SS -316 in case of SS Impeller.	SS 316	SS 316	SS -316 in case of SS Impeller.	SS 316	High leaded bronze to IS-318 Gr.V / SS -316 in case of SS Impeller.	SS 316	High leaded bronze to IS-318 Gr.V / SS -316 in case of SS Impeller.
4.6	Bolts & Nuts	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
4.7	Gland/Seal Cover	SS 316	2.5% Ni Cl to IS 210 GR FG-260	SS 316	2.5% Ni Cl to IS 210 GR FG-260	SS 316	2.5% Ni Cl to IS 210 GR FG-260	SS 316	2.5% Ni Cl to IS 210 GR FG-260	SS 316	SS 316	2.5% Ni Cl to IS 210 GR FG-260	SS 316	2.5% Ni Cl to IS 210 GR FG-260	SS 316	2.5% Ni Cl to IS 210 GR FG-260
4.8	Lantern Ring	SS 316	Bronze	SS 316	Bronze	SS 316	Bronze	SS 316	Bronze	SS 316	SS 316	SS	SS 316	Bronze	SS 316	Bronze
4.9	Mechanical seal	As per manufacturer standard	Not Applicable	As per manufacturer standard	Not Applicable	As per manufacturer standard	Not Applicable	As per manufacturer standard	Not Applicable	As per manufacturer standard	As per manufacturer standard	Not Applicable	As per manufacturer standard	Not Applicable	As per manufacturer standard	Not Applicable
4.10	Gland Packing	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)
4.11	Base Plate	MS fabricated IS-2062 (min. thk.-10 mm) Epoxy Coated														
4.12	Stuffing Box	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260	ASTM-A-351 CF 8M	2.5% Ni Cl to IS 210 GR FG-260
4.13	Coupling	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS	SS
4.14	Connecting Pipe material (for deciding counterflange material)	Carbon Steel as per IS:2062, Plates rolled & welded as per IS 3589/IS 1239 Heavy grade														
5.0	MANDATORY SPARES (Mandatory Spares Note : One(1) set consists of quantity required for complete replacement for one(1) Pump/Motor of each type/size)															
5.1	Casing (along with diffuser, as applicable)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.2	Casing Liners	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	3 Sets of each type	3 Sets of each type	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.3	Shaft	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.4	Complete Impeller Assembly (with Keys, nuts & other accessories)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	2 no. of each type	2 no. of each type	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.5	Shaft Sleeves	2 Sets	2 Sets	2 Sets	2 Sets	2 Sets	2 Sets	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set	1 Set	1 Set	1 Set
5.6	Sleeve nuts & O Rings	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.7	Bearings for Pumps (of each type)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	3 Sets of each type	3 Sets of each type	1 Set	2 Sets	2 Sets	1 Set	1 Set	1 Set	1 Set
5.8	Bearings for Motor (of each type)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	3 Sets of each type	3 Sets of each type	1 Set	2 Sets	2 Sets	1 Set	1 Set	1 Set	1 Set
5.9	Wearing rings (Impeller, as applicable)	2 Sets	2 Sets	2 Sets	2 Sets	2 Sets	2 Sets	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set	1 Set	1 Set	1 Set
5.10	Wearing rings (Casing, as applicable)	2 Sets	2 Sets	2 Sets	2 Sets	2 Sets	2 Sets	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set	1 Set	1 Set	1 Set
5.11	Wearing rings (for shaft other than shaft sleeve, as applicable)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set	1 Set	1 Set	1 Set
5.12	Keys for Impeller, Sleeve etc.	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 No.	2 Nos.	2 Nos.	1 Set	1 Set	1 Set	1 Set
5.13	Mechanical Seal (complete with accessories)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	2 Sets	2 Sets	1 Set	1 Set	1 Set	1 Set
5.14	Complete Coupling for Pump & Motor (with Bushing, Keys, nuts & other accessories)	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 No.	2 Nos.	2 Nos.	1 Set	1 Set	1 Set	1 Set

	DATA SHEET - A			SPECIFICATION NO.:	PE-TS-RC-100-N002											
	MISCELLANEOUS PUMPS (HORIZONTAL)			REV. NO.:	00	DATE :	14.06.2019									
	RATE CONTRACT - MISC. PUMPS			VOLUME : --	SECTION : ID											
	HORIZONTAL CENTRIFUGAL PUMPS															
5.15	Gland	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.16	Gland Packing	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.17	Lantern Ring	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.18	All Fasteners	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.19	Gaskets	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.20	Complete Motor of each Type & Rating	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 no. of each type	1 no. of each type	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.21	Motor Terminal Block	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
5.22	Motor Cooling Fan	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set	1 Set
6.0	BID EVALUATION RATE															
6.1	Bid evaluation rate	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW	2.0 Lacs/KW
6.2	Maximum permissible efficiency for Bid evaluation															
6.2.1	Pump Efficiency (%)	60	70	60	70	70	70	65	75	60	78	82	65	75	73	83
6.2.2	Motor Efficiency (%)	93.5	92.3	94	93.5	93.5	93.2	93.2	91.3	93.5	94.5	93.2	92.8	90.5	94.5	92.8
Notes :																
1	Material of construction for other components not specified above shall be similarly selected in line with the above for the duty intended and subject to approval.															
2	For items stated as not applicable by bidder, shall have to be supplied without any cost implication to BHEL in the event they are found to be applicable during detail engineering stage.															
3	Bidder may be asked to provide flat surface with dimensions 60 MM x60 MM on bearing Housing for mounting vibration measuring block and a key slots of dimensions 30MM (L) X 15 MM (W) X 3 MM (D) on each pump shaft or some other suitable location which shall be confirmed during detail engineering by BHEL for Phase Marker.															
4	Wherever SS material is coming in contact with non SS material, suitable isolation (rubber etc.) shall be provided to avoid galvanic corrosion.															
5	Mandatory Spares : One(1) set consists of quantity required for complete replacement for one(1) Pump/Motor of each type/size															



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

STANDARD TECHNICAL REQUIREMENTS

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **II**

SUB-SECTION: **IIA**

REV. NO. **0** DATE **14/06/2019**

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SUB-SECTION - IIA

STANDARD TECHNICAL SPECIFICATION (MECHANICAL)

- **STANDARD TECHNICAL SPECIFICATION FOR MISC. PUMPS (HORIZONTAL)
INCLUDING DATASHEET-C**
- **STANDARD QUALITY PLANS**

	TITLE: STANDARD TECHNICAL SPECIFICATION HORIZONTAL PUMPS	SPECIFICATION NO. PES-179-06	
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1.00.00

GENERAL INFORMATION

1.01.0

The general guidelines as illustrated in the subsequent clauses of this section shall be applicable for horizontal centrifugal pumps to be procured under the scope of this package.

1.02.0

It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship, and shall be capable of performing the required duties in a manner acceptable to Engineer/Owner who will interpret the meaning of drawings and specifications and shall be entitled to reject any component or material, which in his judgement is not in full accordance herewith.

1.03.0

The omission of specific reference to any component/accessory necessary for the proper performance of Miscellaneous Pumps and drives shall not relieve the bidder of the responsibility of providing such facilities to complete the supply of equipment at quoted prices.

1.04.0

BHEL's / Customer's representative shall be given full access to the shop in which the equipment are being manufactured or tested and all test records shall be made available to him.

1.05.0

The equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and shipping release issued by BHEL/Customer.

2.00.00

CODES AND STANDARDS

2.01.00

In addition to the requirements spelt out elsewhere in the specification, the equipment to be provided under this section shall specifically conform to the following codes, standards, specifications and regulations, as applicable, including all the latest amendments subsequent to the year of publication as mentioned below.

2.01.01

IS-1520/1980:

Horizontal Centrifugal pumps for clear, cold and fresh water.

2.01.02

IS-5120/1977:

Technical requirements for Rotodynamic special Purpose pumps.

2.01.03

IS-5639/1970:

Pumps for handling chemicals & corrosive liquids.

2.01.04

IS-5659/1970:

Pumps for process water.

2.01.05

IS-6536/1972:

Pumps for handling volatile liquids.

2.01.06

IS-9137/1978:

Code for acceptance tests for centrifugal, mixed flow and axial flow pumps- Class 'C'.

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2.01.07	ISO 3555/1977: BS 5316/1977 Part 2	Acceptance test for centrifugal, mixed flow and axial flow pumps - Class 'B' tests.		
2.01.08	ISO 2548/1973: BS 5316/1976 Part 1	- Do - Class 'C' tests.		
2.01.09	API-610/1989:	Centrifugal pumps for general refinery services.		
2.01.10	HIS	Hydraulic Institute Standards, USA		
2.01.11	PTC 8.2/1965:	Power Test Codes - Centrifugal pumps.		
2.01.12	ASTM-1-165-55	Standard Methods for Liquid Penetration Inspection.		
2.02.00	In case of any contradiction with the above standards and annexure, the stipulations in the annexure shall prevail and shall be binding on the bidder.			
3.00.00	SCOPE OF SUPPLY & SERVICES:			
3.01.00	The miscellaneous pumps and drives scope shall be as specified in Data Sheet A /Section IA.			
3.02.00	The Capacity, Head, Materials of construction and other particulars of pumps are detailed in Data Sheet A of the specification.			
3.03.00	Accessories: All the pumps under this specification shall be complete with following standard/special accessories.			
3.03.01	Standard accessories: a) LT Electric drives/motors (as applicable) with cable gland and lugs at motor end. (The bare HT drive motors and LT motors not in bidder's scope of supply, wherever required supplied as free issue by BHEL refer Cl. 5.08.00). b) Pump motor coupling along with coupling guard. c) Common base plate for pumps and motor. d) Self contained lubrication system along with all internal piping, valves, fittings, specialties etc. as required.			

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e) Counter flanges for suction/ discharge nozzles along with fixing nuts, bolts and gaskets. f) Anchor bolts, nuts, seating steel works, shims etc. as necessary for mounting the pump-motor unit on civil foundations. g) Suitable vent (with valves)/ lifting/ handling attachments for the pump/ motor/ accessories. h) Suitable drain connections with isolating valves as applicable. i) Supply of first fill of lubricants with topping requirements for one year of operation after commissioning and handing over of equipment. j) Set of "Special" Tools & Tackles for Pumps and motors, if any. k) Erection and commissioning spares, "on as required" basis. l) Bidder shall provide various drawings, data, calculations, test reports/ certificates, operation and maintenance manuals, As-built drawings, etc. as specified and as necessary. m) Mandatory spares as specified in respective Data Sheet-A of this section. 3.04.00 Services included in Bidder's Scope: 3.04.01 The pumps shall be guaranteed to meet the performance requirements specified vide Data Sheet -A and also for trouble free operation after commissioning. Schedule of performance guarantees (Section-IIIA) duly filled and signed shall be furnished with the bid. 3.04.02 Pumps with Mechanical seal shall be supplied with gland packing arrangement initially to site and gland packing arrangement shall be replaced by vendor with mechanical seal arrangement at site after commissioning of the pumps with gland packing. However Mechanical seal shall be dispatched along with main supply for this purpose. Shaft sleeve and any other item required for satisfactory operation of Mechanical seal after replacement at site shall be provided by the pump supplier without any cost implication to BHEL. 3.04.03 The pumps erected by the purchaser shall be checked by the bidder for correctness of their installation, alignment, etc. at site prior to their commissioning. 3.04.04 After commissioning of pumps at site, site performance test for Noise, vibration and parallel running of pumps of all pumps for each unit/project shall be conducted by pump vendor at project site to ensure that the pumps meet the specified requirements. Pump vendor shall bring necessary instruments for conductance of site performance test.			



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If the site performance is found not meeting the requirements in any respect as specified, then the equipment shall be rectified or replaced by the vendor, without any commercial implication to BHEL

Note: Applicability of conducting PG test at site by vendor as per above clause shall be applicable if indicated in Section-1A.

If conductance of PG test of pumps at site for Noise, vibration and parallel running of pumps of all pumps for each unit/project is not in bidders scope and same is conducted by BHEL/ customer. In such cases also, if the site performance is found not meeting the requirements in any respect as specified, then the equipment shall be rectified or replaced by the vendor, without any commercial implication to BHEL.

3.04.05 Performance Guarantees for pumps shall stand valid till the satisfactory completion of performance testing by BHEL and its acceptance by purchaser / customer.

3.05.00 Works excluded from Bidder's Scope:

- a) All HT motors and those LT Motors which are specifically excluded.
- b) Civil foundation
- c) Suction/ discharge pipe works
- d) MCC/ Switchgear/Power supply
- e) Power and Control Cables, unless specifically specified in Electrical/ Systems portion of the specification.
- f) Erection of equipments.

4.00.00 BID EVALUATION CRITERIA & LIQUIDATED DAMAGES FOR SHORTFALL:

4.01.00 The bids received shall be evaluated for power consumption at inlet to the motors, in respect of pumps specified in Data Sheet-A (working pump only viz. not the standby), for the purpose of price comparisons as briefed below:

The bid evaluation shall be done at the rate as specified in Data Sheet A per one (1) KW Power consumption, per working pump as follows.

$$KW = \frac{Q \times H \times S}{P \times M \times 367.2}$$

Where Q = Rated capacity M³/hr
H = Rated TDH, MWC
P = Pump Efficiency
M = Motor Efficiency.
S = Specific Gravity of fluid handled

4.02.00 The efficiencies for pumps and motors for arriving at benchmark power for Bid Evaluation shall be as indicated in Data Sheet A for various pumps.



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No advantage shall be given to the bidder for Aux. Power quoted lower than the Bench mark values calculated with KW calculation formula at Cl. 4.01.00 *above, considering the bid evaluation efficiencies for pump and motor as indicated in Data Sheet-A.* However the bids shall be evaluated as above if the Aux. Power quoted are higher than Bench mark values.

NOTE:

1. Efficiencies for HT motors and LT motors not in bidder's scope, for bid evaluation purpose shall be taken based on the maximum value as furnished in Data Sheet A.
2. During contract stage the Guaranteed power consumption of Pumps with BHEL supplied drives (HT/LT) for successful bidder shall be reworked by BHEL as below:

Revised guarantee power consumption shall be as per KW calculation formula at Cl. 4.01.00 *above, where P = pump efficiency guaranteed by bidder and M = motor efficiency as per approved datasheet of the supplied HT/LT motor.*

4.03.00 Liquidated damages for shortfall in Guaranteed KW

The above guaranteed power consumption shall be demonstrated by the successful bidder during performance testing at works/ site.

For pumps with BHEL supplied drives, the power consumption shall be compared with the reworked guarantee power consumption, defined as per note no. 2 of Cl. 4.02.00 above for the purpose of shortfall.

The liquated damages @ twice the bid evaluation rate as above per KW per working pump shall be levied in the event of failure of bidder to demonstrate the guaranteed power consumption.

5.00.00 TECHNICAL REQUIREMENTS:

5.01.00 The pumps shall meet the technical requirements of Section-I as well as Section-II. In the event of any contradiction of Section-II with Section-I, the Section-I will prevail.

5.02.00 The pumps shall be Electric motor driven.

5.03.00 The Pumps shall conform to HIS. It is bare minimum requirement, however, any other equivalent or stringent standard is also acceptable, if, all the requirements of HIS are also met.

5.04.00 The horizontal pumps shall be Horizontal split casing type with speeds not exceeding 1500 RPM or as indicated in Data Sheet-A.

5.05.00 No negative tolerance shall be permitted in rated capacity & TDH.

5.06.00 No negative tolerance shall be permitted in efficiency at rated capacity.

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5.07.00	The shut off head of pumps shall be more than pump rated TDH and percentage variation may vary depending on the specific speed of the pump as under: i. 10-15% for pumps of specific speed up to 1000 US units, ii. 15-20% for pumps of specific speed in the range of 1000 to 2000 US units, iii. 20-40% for pumps of specific speed in the range of 2000 to 4000 US units, iv. Above 50% for pumps of specific speed in the range of 4000 to 7000 US units.		
5.08.00	All HT motors and those LT motors which are not in bidder's scope of supply: bare motors only, shall be supplied as free issue by BHEL through BHEL, based on ratings and TS (Torque - Speed) curve selected and furnished by the bidders along with their un-priced bid. The responsibility for satisfactory operation for combined performance of pumps & motors shall rest with the bidder only as if, the drive motors also have been supplied by the bidder. Couplings, base plate, foundation bolts, any other fittings, etc. as required shall be supplied by the bidders only. BHEL shall supply one number of each type of drive motors (where drive motor is not in bidder's scope of supply) for shop testing of pumps with job motors. All other motors shall be dispatched by BHEL directly to project sites.		
5.09.00	For all HT motor driven pumps, BHEL has envisaged vibration-monitoring system in their own scope. The bidder shall make provisions for mounting following on the pump/ pump shaft: • Purchaser's probes in both DE/NDE bearings of pumps • Key slots on pump shaft and flat surface on bearing housing for mounting vibration measuring block with dimensions as specified in Data Sheet A. • Other components as finalized during detailing. • For mounting of above on the HT motors & specifically excluded LT motors, same shall be taken care by BHEL.		
5.10.00	The pumps shall be capable of developing the required total head at rated capacity for continuous operation. The pumps shall operate satisfactorily at any point on the Q-H characteristic curve over a range of 0% to 130% capacity and shall be suitable for continuous operation between 30% to 130% capacity.		
5.11.00	Selection of the pumps shall be such that the design point shall be met even with negative manufacturing tolerance.		
5.12.00	The total head capacity curve shall be continuously rising towards the shut off, the pumps shall preferably be non-overloading type and stable.		
5.13.00	The pumps shall be capable of running over the entire range of NPSH conditions required without any noise, vibration or cavitations. The prevailing suction pressures for various pumps are indicated in Data Sheet-A for suitable mechanical design of pumps.		

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5.14.00	The pumps shall be of stiff shaft design. The minimum internal clearances should be sufficiently more than the maximum static deflection of the shaft. Shaft size selected must take into consideration the critical speed as specified in API-610.		
5.15.00	Pumps and motors shall run smooth without undue noise and vibration. The vibration shall be within vibration norms for testing as per American National Standard for 'Rotodynamics Pump' for Vibration Measurement and allowable values, Doc. ANSI/ HIS 9.6.4-2009. The applicable vibration limits for each pump, shall be indicated in the Technical Data sheet to be furnished by the successful bidder after award of LOI/ PO. The noise level shall be limited to 85 dB at distance of 1.0M.		
5.16.00	Pumps of a particular category shall be identical and shall be suitable for parallel operation with equal load division. Components of identical pumps shall be interchangeable.		
5.17.00	After installation, the guaranteed values of noise, vibration and parallel operation of pumps shall be tested and verified. If the site performance is found not meeting the requirements in any respect as specified, then the equipment shall be rectified or replaced by the vendor, at his own cost.		
5.18.00	High reliability of the pumps is an essential requirement and therefore it gets weightage over its efficiency. It is therefore essential that the bidder choose a standard proven model from the range of pumps manufactured.		
5.19.00	The offered pumps shall be of proven design meeting the experience-qualifying requirement of their operation at two sites for a minimum period of one year or as specified in technical PQR. Any deviation to this criterion shall be suitably highlighted in the deviations schedule.		
5.20.00	The bearings shall be self-water lubricated, no external water supply shall be available. The cooling/ lubrication water for bearings, etc. shall be tapped from the pump discharge and supplied thru' bidder's integral pipe work. If water handled by pump is dirty/ not suitable for lubrication/ cooling, the bidder shall provide requisite strainer/ filters, tanks, motorized valves, etc. after the tap off for the required service, the arrangement provided shall be subject to Purchaser's approval.		
6.00.00	MANDATORY SPARES:		
6.01.00	Bidder to provide the Mandatory spares listed vide Data Sheet-A. Unit price of mandatory spares shall be furnished in price Schedule.		
6.02.00	Bidder shall include the cost of Mandatory Spares, unless specified otherwise in Sec-IA of the specification or NIT.		



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7.00.00 OTHER REQUIREMENTS:

7.01.00 The quality of water handled by various pumps shall be as per Data Sheet-A.

7.02.00 The materials of construction for various components specified are the minimum requirements and materials of construction for other components not specified shall be similarly selected by the bidder for the intended duty.

7.03.00 The makes of various bought out items of bidder (i.e. motor, bearings, mechanical seal etc.) shall be subject to purchaser's approval in the event of order.

7.04.00 Painting for Pumps

- a) The surface of SS, Gun metal, brass, bronze and non-metallic component shall not be applied with any painting.
- b) The Steel surface to be applied with painting shall be thoroughly cleaned before applying painting by brushing, shop blasting etc. as per the agreed procedure.
- c) For all the steel surfaces inside the (indoor installation) building, a coat of red oxide primes of min. thickness DFT of 50 microns followed up with under coat of Synthetic Enamel paint of min. thickness DFT of 50 microns shall be applied. The top coat shall consist of two coats each of min. thickness DFT of 50 microns of synthetic enamel paint and thus total DFT shall be min. 200 microns.
- d) For all the steel surfaces exposed to (outdoor installation) atmosphere, a coat of chlorinated rubber based zinc phosphate primer of min. thickness DFT of 50 microns followed up with under coat of chlorinated rubber paint of min. thickness DFT of 50 microns shall be applied. Then, intermediate coat consisting of one coat of chlorinated rubber based paint pigmented with Titanium di-oxide with min. thickness DFT of 50 microns and top coat shall consist of two coats each of min. thickness DFT of 50 microns of chlorinated rubber paint shall be provided. Total DFT of paint system shall be min. 200 microns.

7.05.00 It is mandatory for the bidder to submit along with the bid, the deviations if any – whether major or minor in the schedule of deviations only. In the absence of deviations listed in the “Schedule of deviations, the offer shall be deemed to be full conformity with the specification, “notwithstanding” anything else stated elsewhere in bidder's offer. The implied/indirect deviations shall not be binding on the purchaser.

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8.00.00	PERFORMANCE REQUIREMENTS		
8.01.00	Performance requirements for the pumps shall be as guided in Data sheet - A enclosed with Section-I.		
8.02.00	Pump(s) shall preferably be designed to have the best efficiency at flow within ± 10% of the specified duty point flow. The pumps shall be suitable for continuous operation at any point within the “Range of Operation” as stipulated in the Data Sheet - A attached with Section-I.		
8.03.00	Pump(s) shall preferably have a continuously rising head-capacity characteristics from the specified duty point towards shut-off point, the maximum being at shut-off to enable parallel operation. Under all circumstances, the ‘range of operation’ of the pumps shall exclude any unstable operating zone of the head-capacity curve.		
8.04.00	Wherever specified in the Data Sheet - A, pumps of each category shall be suitable for parallel operation. The head vs. capacity, the BHP vs. capacity characteristics etc. shall be identical to ensure equal load sharing and trouble-free operation of any pump when the other pump(s) working in parallel with it trip.		
8.05.00	The pump set along with drive motor shall run smooth without undue noise and vibration. Acceptable vibration limits shall be guided by the HIS of USA. Refer clause 5.15.00 above for permissible limits.		
9.00.00	DESIGN AND CONSTRUCTION		
9.01.00	Pump Casing		
9.01.01	Pump casing shall be provided with adequate number of vents and priming connections with valves unless the pump is made self-venting and priming. Casing drain, as required, shall be provided complete with drain valves. It shall be provided with a connection for suction and discharge pressure gauge as standard feature.		
9.01.02	Pump design must ensure that the nozzles are capable of withstanding external reactions not less than those specified in API-610.		
9.01.03	In case where an expansion joint is located at pump discharge, the pump assembly will be subjected to an additional thrust which will be transmitted to the foundation. This additional thrust shall be taken into the consideration of pump design.		
9.02.00	Impeller		
9.02.01	The Impeller assembly shall be dynamically balanced and designed with critical speed substantially above the operating speed.		

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9.03.00	Wearing Rings		
9.03.01	Replaceable type wearing rings shall be furnished to prevent damage to impeller and casing.		
9.04.00	Shaft		
9.04.01	Shaft size shall be selected considering that the critical speed shall be away from the operating speed as recommended in applicable Code/Standard. The critical speed shall be at least 30% higher than the rated speed.		
9.05.00	Shaft Sleeves		
9.05.01	Renewable type fine finished shaft sleeves shall be provided at the stuffing boxes/mechanical seals. Length of the shaft sleeves must extend beyond the other faces of gland packing or seal end plate so as to distinguish between the leakage past Shaft and shaft sleeve and that past the seals/glands.		
9.05.02	Shaft sleeves shall be properly fastened to the shaft to prevent any leakage or loosening. Shaft sleeve assembly should ensure concentric rotation.		
9.06.00	Bearings		
9.06.01	Bearings shall be easily accessible without disturbing the pump assembly. A drain shall be provided at the bottom of each bearing housing.		
9.06.02	Heavy-duty sleeve/ball/roller type bearings shall be provided to take care of the radial loads.		
9.06.03	In case of sleeve type radial, axial thrust shall be absorbed in suitable hydraulic devices and/or thrust bearings.		
9.06.04	Bearings and hydraulic devices (if provided for balancing axial thrust) shall be of adequate design for taking the entire pump load arising from all probable conditions of continuous operation. Life of the bearings shall be guided by the design standard of the pump. Antifriction bearings of standard type, if provided, shall be selected for a minimum life 20,000 hrs. of continuous operation at maximum axial and radial loads at rated speed. Thrust bearing shall be capable of running continuously at maximum load.		
9.06.05	The bearing shall be oil/grease lubricated. Suitable lubricating arrangement for the bearings shall be furnished with the pump complete with all accessories like pump, filters, piping, fittings, valves, interlocking and supervising instruments etc. as necessary. The design shall be such that the bearing lubricant does not contaminate the liquid being pumped.		
9.06.06	Bearing housing for HT motor driven pumps shall have provision for mounting temperature measuring device.		

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9.06.07	Bearings of reputed makes are to be provided, same shall be indicated in Technical Data sheet to be furnished by the successful bidder after award of LOI/ PO, subject to acceptance of BHEL/ end customer, without any price implication to BHEL.		
9.07.00	Stuffing Boxes		
9.07.01	Stuffing box design shall permit replacement of packing without removing any part other than the gland.		
9.07.02	Stuffing boxes shall be sealed/cooled by the fluid being pumped/external clear water, as specified in the Annexure. All necessary pumps, piping, fittings, valves, instruments etc. as required for safe and trouble-free operation of the pumps and as specified in the Annexure shall be included in the scope of supply.		
9.08.00	Mechanical Seals		
9.08.01	Mechanical seals (cartridge type) shall be provided if specified in the Data Sheet-A of this section. The pump supplier shall co-ordinate with the seal maker in establishing the direct circulation rate for maintaining a stable film at the seal in the chamber. The seal piping system shall form an integral part of the pump assembly.		
9.08.02	When handling liquids near boiling point, suitable arrangement for external cooling shall be provided so as to prevent flashing at the seal faces.		
9.08.03	For the seals under vacuum service, the seal design must ensure sealing against atmospheric pressure, even when the pumps are not operating.		
9.08.04	Pumps with Mechanical seal shall be supplied with gland packing arrangement initially to site and gland packing arrangement shall be replaced by vendor with mechanical seal arrangement at site after commissioning of the pumps with gland packing. However Mechanical seal shall be dispatched along with main supply for this purpose. The special tools (if any) required for above shall be arranged by bidder.		
9.08.05	Mechanical seals of reputed makes are to be provided, same shall be indicated in Technical Data sheet to be furnished by the successful bidder after award of LOI/ PO, subject to acceptance of BHEL/ end customer, without any price implication to BHEL.		
9.09.00	Drive Unit		
9.09.01	The pumps shall be driven by electric motor directly coupled as specified in the Data Sheet-A of this section. A heavy duty coupling along with coupling guard shall be provided between the pump and drive unit.		
9.09.02	Unless otherwise specified in Data Sheet-A of this section, drive unit power rating shall be the maximum of the following requirements.		



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- a) 16% margin over the pump shaft input power at the rated duty point.
- b) 10% margin over the maximum pump shaft input power required within the 'Range of Operation'.
- c) Pump shaft input power required considering the overloading of the pump assuming single pump operation in the event of tripping of one or more of the pumps operating in parallel.

9.10.00 **Coupling for pump & Motor Shaft**

- 9.10.01 The pump and motor shafts shall be connected with adequately sized flexible coupling of proven design with spacer to facilitate dismantling of the pump without disturbing the motor. Necessary coupling guard shall be provided.
- 9.10.02 No. of coupling holes for joining coupling hubs shall be even in number and preferably in multiples of four.

10.00.00 **INSPECTION AND TESTING**

- 10.01.00 The Quality Plans enclosed in the specification are for bidder's guidance only. The bidder shall comply with these and other minimum requirements specified in the specification and shall furnish his own quality plan in the event of order based on the guidance given as above, for approval by BHEL/Customer.
- 10.02.00 The Bidder shall carry out the following specific tests inspections to ensure that the equipment furnished lies in strict conformance with the specification and also in accordance with applicable codes/standards and good engineering practice.

a) **Identification and Testing**

- i) All materials used for pump construction shall be of tested quality. Material shall be tested as per the relevant standard and test certificates shall be made available to the Owner.
- ii) 100% PMI (Process Material Identification) inspection for material grade of pump casing, shaft and impeller shall be done by vendor & certification shall be submitted for review of BHEL. Further BHEL reserves the right to conduct random & independent PMI inspection on pump casing, shaft and impeller to ascertain the grade of material during inspection at vendor works.
- iii) Tests for each pump included under this section shall include but not be limited to the following:



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- The entire surface of the impeller / casing / diffuser castings shall be subjected to Dye Penetration Test as per ASTM Specification no.:1-165-65.
- Shaft coupling & other active components shall be subjected to Dye Penetration and Ultrasonic Tests.
- Wearing rings, shaft sleeves shall be subjected to Dye Penetration Test.
- Fabricated components of pumps shall be subjected to Dye Penetration test on weld.
- Verification of material, witnessing of pouring, casting and inspection of finished fabricated/castings.
- Inspection of finished castings for impeller and verification of materials.
- Inspection of pump shaft and verification of material.
- Witnessing of NDT/review of NDT reports.
- Static balancing test for impeller and dynamic balancing of complete rotating parts as per ISO- 1940 to grade 6.3 or better.
- Complete Inspection of assembled pump.

b) Hydraulic Testing

The pump casing shall be hydrostatically tested at maximum of the following:

- i. 2 times the TDH (Total Dynamic Head) at rated capacity (or)
- ii. 1.5 times the shut-off pressure (or)
- iii. System Design pressure indicated in Data Sheet-A of Section-I.

The HT pressure shall be maintained for a period of not less than 30 minutes. During testing there should not be any pressure drop & leakage.

c) Performance Test at Shop

- i) Each pump shall have to be tested to determine the performance curves of the pumps. These tests are to be conducted in presence of Owner's representative as per the requirements of the Standards of Hydraulic Institute of USA (ASME-Power Test Code PTC 8.2/BS-599) or any other equivalent standard.
- ii) Performance tests are to be conducted to cover the entire range of operation of the pumps at rated speed. These shall be carried out to span 130% of rated capacity up to pump shut-off condition. A minimum of five combinations of



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head and capacity are to be achieved during testing to establish the performance curves, including the design capacity point, shut-off point and the two extremities of the range of operation as specified in the annexure. After completion of performance test, all pumps shall be stripped down for inspection of internals.

- iii) Tests shall be conducted with actual drive motors being furnished.
- iv) NPSH tests are to be conducted for each type at 3% head drop conditions, if specified in the pump approved QP.
- v) All rotating components of the pumps shall be subjected to static and dynamic balancing tests. The assembled rotor will be subjected to dynamic balancing tests.
- vi) Mechanical run test shall be carried out on all pumps to determine the vibration levels, noise levels etc. This test shall be conducted at site also. However, test value at site shall be used for the acceptance of the equipment.

10.03.00 Inspection of Mandatory/ Recommended spares shall be in line with approved QP for main supply.

11.00.00 DRAWINGS/ DOCUMENTS DISTRIBUTION SCHEDULE

11.01.00 After award of LOI, the successful bidder shall submit drawings/documents as per Data Sheet-C.

11.02.00 The no. of drawings/documents to be submitted shall be as per Data Sheet-C.

12.00.00 The various Sections-I's & II's along with Data Sheets attached in this specification together with the specification for Miscellaneous Pumps shall be complied with by the bidders.

13.00.00 Bidder to submit all drawing/ documents in soft as well as hard copy in the event of order as per schedule indicated in section-IA.

Within one (1) week of receipt of BHEL comments a technical representative from Bidder's works shall come for meeting with BHEL along with revised documents to resolve all issues and incorporate all comments in the soft copy here only for further submission to customer.

Further on receipt of customer's comments on the documents a technical representative from Bidder's works shall come for meeting with Customer to resolve all issues and incorporate all comments in the soft copy here only and further resubmission of same to Customer. The representative shall be available here till Category-I approval of all the drawings and documents.



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14.00.00 Guarantee for all pumps shall at least remain valid for 18 months from the Unit commissioning date or as specified in NIT.

15.00.00 The following documents only shall be furnished by the bidder with his offer:

- a) Compliance certificate duly signed and stamped (enclosed at Section-III B).
- b) GA drawings of pumps and motors with following: (shall be only for reference purpose, same shall not be reviewed/commented by purchaser at this stage and shall be subject to approval only during contract).
 - Civil static & dynamic loads.
 - Foundation details.
- c) Guarantee Schedule duly signed and stamped (enclosed at Section-III A).
- d) Technical deviation schedule (if reqd.) (enclosed at Section-III C).
- e) Data for drive Motor (HT/LT- which is not in bidder's scope of supply - as applicable):
Load torque speed curves of the pumps, selected motor rating, rpm, GD^2 of driven equipment.
- f) Unpriced copy of the price bid shall be furnished along with the technical bid.

Apart from above no other Drgs./Docs./Data sheets etc. are required to be submitted at bid stage and even if furnished shall not be taken cognizance of.

In case of any deviation from this technical specification, the same shall be indicated in the schedule of deviations as per Section-III C or NIT. In the absence of duly filled schedules it will be assumed that the bid strictly conforms to the specification.



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DATA SHEET – C

Drawings / documents distribution schedule to be followed by successful Bidder:

1.0 Drawings/documents submission schedule, shall be as per Section-IA.

The successful bidder shall submit at least following drawings/ documents:

1.1 Fully dimensioned outline general arrangement drawings of the pump and motor assembly. This drawing should include foundation base plate/sole plate details as applicable, civil foundation, anchor bolt details, loading data (Static and Dynamic), points of connections of external piping, cables and mounting of devices furnished by the supplier and details for Gap between Coupling Shafts, Float & details for axial/radial tolerance allowed etc. which are required for erecting agency during erection of pump.

1.2 Cross sectional drawing of the equipment showing the details of assembly of components and their material of construction with standard applicable codes.

1.3 Technical datasheet as per Datasheet-B (Section-IIID) including characteristic curves of pumps showing the following:

- a) Flow Vs Head
- b) Flow Vs Power
- c) Flow Vs Efficiency
- d) Flow Vs NPSHR/ minimum submergence

1.4 QAP for pump and QAP for motors (if applicable).

1.5 GA, Datasheet, Curves etc. for drive motor (as applicable).

1.6 Operation and maintenance manual.

1.7 Lubrication arrangement drawings for external lubrication (if applicable).

1.8 PG test procedure as per clause 3.04.04 (if applicable).

1.9 Motor type test document (if applicable).

2.0 Within the stipulated time period as per vendor's drawings/ documents schedule as per NIT, the O&M Manual comprising of minimum following shall be submitted:

- a) Drawings of components & details as deemed necessary.
- b) Instruction manual for erection, operation & maintenance.
- c) Storage instruction.

3.0 Before dispatch of the equipment the bidder shall furnish the following.

- a) Material test certificates.
- b) Shop test reports & certificates.
- c) Fulfilment of packing instructions as indicated in Section-IA of this specification.

4.0 Distribution of drawings / documents for all projects:

The no. of copies of drawing/ documents to be submitted by the successful bidder, after the award of the contract shall be as per Section-IA or as specified in NIT.



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT
STANDARD QUALITY PLAN

Rev-01

QUALITY PLAN FOR MISCELLANEOUS PUMPS				CUSTOMER		PROJECT TITLE						
				BIDDER/VENDOR		QUALITY PLAN NUMBER		PE-QP-999-100-N004 (For Hor. Pumps) PE-QP-999-100-N004 (For Ver. Pumps)				
SHEET 1 OF 6				SYSTEM		ITEM - CENTRIFUGAL PUMPS (HORIZONTAL / VERTICAL)						
S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CATEGORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1	MATERIALS CONTROL											
1.1	CASINGS (INCLUDING BOWLS, DIFFUSERS, STAGE BODIES, DISCH HEAD (IF CAST)), ETC. - (AS APPLICABLE) AND IMPELLER	MECHANICAL AND CHEMICAL PROPS	CR	MECHANICAL AND CHEM. ANALYSIS	ONE/HEAT/BATCH	APPROVED CS DRAWING/DATA SHEET	RELEVANT MATERIAL SPECN.	LAB REPORT/ MTC	3/2.		2,1	
1.2	STUFFING BOX, SUCTION BELL, WEARING RINGS, NECK RINGS, SHAFT SLEEVES	DO-	MA	MECHANICAL AND CHEM. ANALYSIS	ONE/HEAT/BATCH	APPROVED CS DRAWING/DATA SHEET	RELEVANT MATERIAL SPECN.	LAB REPORT/ MTC	3/2.		2,1	
		HARDNESS DIFFERENCE BETWEEN CASING / IMPELLER AND WEARING RING	MA	LAB. TEST	100%	APPROVED CS DRAWING/DATA SHEET	50 BHN MIN.	LAB. REPORT	3/2.		2,1	
1.3	BARS/FORGINGS FOR SHAFTS, LINE SHAFTS	1. PHYSICAL & CHEMICAL PROPS	CR	1. MECHANICAL & CHEMICAL ANALYSIS.	1/CAST OR 1/BARS	APPROVED CS DRAWING/DATA SHEET	RELEVANT MATERIAL SPECN.	MILL T.C. OR LAB. REPORT	3/2.		2,1	CORRELATION REQUIRED, IDENTIFICATION AS PER TC
		2. DIMENSIONS	CR	2. MEASUREMENT	100%	MFR. DRAWING	MFR. DRAWING	INSP. REPORT	3/2.		2,1	
		3. INTERNAL DEFECTS FOR 40MM & ABOVE DIA SHAFTS.	CR	3. ULTRA SONIC TEST	100%	ASTMA388 BACK WALL ECHO 100%	DEFECT ECHO MAX 20% OF B.W.E. LOSS OF BACK WALL ECHO 20% MAX	NDT CERTIFICATE	3/2.		2,1	
1.4	STRESS RELIEVING/ HEAT TREATMENT OF CASTING OF ALL ABOVE (IF APPLICABLE) / SOLUTION ANNEALING OF SS CASTING	1. VERIFICATION OF HT CHART	MA	VERIFICATION OF SR/HT CHART	ALL BATCHES	RELEVANT MATERIAL SPECN.	DO-	CORRELATED SR/HT. CHARTS	3/2.		2,1	
		2. IGC TEST FOR SS CASTING	MA	LAB. TEST	ONE SAMPLE/ HT BATCH	ASTM A 262	ASTM A 262 Gr A	LAB. REPORT	3/2.		2,1	
1.5	SHAFT ENCLOSING TUBES, COLUMN PIPES & DISCHARGE ELBOW	1. MECHANICAL & CHEMICAL PROPS. 2. DIMENSIONS. 3. SURFACE FINISH	MA	1. MECH & CHEM TEST 2. MEASUREMENT 3. VISUAL EXAM	1/BATCH 100% 100%	APPROVED GA DRG./DATA SHEET	RELEVANT MATERIAL SPECN./MAFG./ APPROVED DOCS	MFR T.C OR LAB. REPORT	3/2.		2,1	
BHEL				PARTICULARS			BIDDER / VENDOR					
				NAME								
				SIGNATURE								
				DATE						BIDDER/VENDOR SEAL		

NAME	Prepared By	Reviewed By	Approved By
SIGN.	AJAY JAIN	ASHWANI KHANNA	I. J. SINGH
DATE	23-07-2012	23-07-2012	23-07-2012



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT
STANDARD QUALITY PLAN

Rev-01

QUALITY PLAN FOR MISCELLANEOUS PUMPS				CUSTOMER		PROJECT TITLE						
				BIDDER/VENDOR		QUALITY PLAN NUMBER						
SHEET 2 OF 6				SYSTEM		ITEM - CENTRIFUGAL PUMPS (HORIZONTAL / VERTICAL)						
S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CATEGORY	TYPE/METHOD OF CHECKED	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.6	PLATE FLANGE, C/FLANGE	1. MECHANICAL & CHEMICAL PROS. 2. DIMENSIONS. 3. SURFACE FINISH	MA	1. MECH & CHEM TEST 2. MEASUREMENT 3. VISUAL EXAM	1/CAST 100% 100%	APPROVED GA DRG./DATA SHEET	RELEVANT MATERIAL SPECN./ MFR. DRG./ APPROVED DOC	MILL TC/ LAB REPORT	3/2.		2,1	CORRELATION REQ. FOR MAT OTHER THAN IS 2062
1.7	SUCTION STRAINER (IF APPLICABLE)	MECHANICAL & CHEMICAL PROS.	MI	MECH. & CHEMICAL TEST	1/HEAT	APPROVED GA DRG./DATA SHEET	RELEVANT MATERIAL SPECN./ MFR. DRG./ APPROVED DOC	MILL TC/ LAB REPORT	3/2.		2,1	
1.8	MECHANICAL SEAL (IF APPLICABLE)	TYPE, SIZE, MFRS, NO., MAKE	MA	VISUAL EXAM	100%	APPROVED DATASHEET / GA MECH. SEAL	APPROVED DATASHEET		3/2.		2,1	COMPLIANCE TC FOR APPROVED MAKE
1.9	PUMP BEARINGS	TYPE, SIZE, MFRS, NO., MAKE	MA	VISUAL EXAM	100%	APPROVED DATASHEET	APPROVED DATASHEET		3/2.		2,1	COMPLIANCE TC FOR APPROVED MAKE
2.0 IN PROCESS CONTROL												
2.1	ALL COMPONENTS UNDER 1.00 ABOVE	VISUAL DEFECTS, DIMENSIONS	MA	VISUAL EXAM, MEASUREMENT	100%	MFG. DRAWING	MFG. DRAWING	COMPLIANCE TC	3/2.		2,1	
2.2	IMPELLER	CLEANING AND DEBURRING	MA	VISUAL	100%	MFG. DRAWING	MFG. DRAWING		3/2.		2,1	
	IMPELLER	DYNAMIC BALANCING	CR	DYNAMIC BALANCING	100%	ISO 1940	ISO1940 Gr 6.3	BALANCING CERTIFICATE	3/2.	2,1		WITNESSING ONLY FOR SIZE GREATER THAN 10KW
2.3	IMPELLER-ALL ACCESSIBLE SURFACES, DIFFUSERS	DP TEST	MA	DP TEST ON M/CED AREA	100%	APPENDIX 8 OF ASME SEC. VIII DIV. 1		NDT CERTIFICATE	3/2.	2,1		WITNESS BY BHEL & VERIFICATION BY CUSTOMER
2.4	WEARING RING, SHAFT SLEEVES, CASING	DP TEST	MA	DP TEST ON M/CED AREA	100%	APPENDIX 8 OF ASME SEC. VIII DIV. 1		NDT CERTIFICATE	3/2.		2,1	
2.5	SHAFT	DP TEST	MA	DP TEST ON M/CED AREA	100%	ASTM E 165	NO RELEVANT INDICATION ALLOWED	NDT CERTIFICATE	3/2.	2,1		WITNESS BY BHEL & VERIFICATION BY CUSTOMER
2.6	CASINGS/ BOWLS, STAGE BODIES, DISCHARGE HEAD (IF CAST), SUCTION HOUSING, COLUMN PIPE DISCHARGE PIPE ETC	LEAK TIGHTNESS	CR	VISUAL	100%	TECHNICAL DATA SHEET AND NOTE 2	NO LEAKAGE FOR TEST DURATION OF 30 MIN.	HT CERTIFICATE	3/2.	2,1		HAMMERING OF CASTINGS WITH WOODEN/ RUBBER MALLET BEFORE HYDRO TEST
BHEL				PARTICULARS		BIDDER / VENDOR						
				NAME								
				SIGNATURE								
				DATE					BIDDER/VENDOR SEAL			

NAME	Prepared By	Reviewed By	Approved By
SIGN.	AJAY JAIN	ASHWANI KHANNA	I. J. SINGH
DATE	23-07-2012	23-07-2012	23-07-2012



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT
STANDARD QUALITY PLAN

Rev-01

QUALITY PLAN FOR MISCELLANEOUS PUMPS				CUSTOMER		PROJECT TITLE						
				BIDDER/VENDOR		QUALITY PLAN NUMBER						
SHEET 3 OF 6				SYSTEM		ITEM - CENTRIFUGAL PUMPS (HORIZONTAL / VERTICAL)						
S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CATEGORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
2.7	FABRICATED COMPONENTS											WELDING PROCEDURE APPROVAL BY BHEL ALT. 3RD PARTY (LLYODS, BVQI OR EQ.) IS ACCEPTABLE.
2.7.1	WELDING PROCEDURE SPECIFICATION	CORRECTNESS	MA	EXAM.	100%	ASME SEC.IX	ASME SEC.IX	QW 482 OF ASME SEC.IX	3/2.		2,1	
2.7.2	WELDING PROCEDURE QUALIFICATION	WELD SOUNDNESS	MA	VISUAL,PHYS. TESTS RT (AS APPLICABLE)	100%	ASME SEC.IX	ASME SEC.IX	QW 483 OF ASME SEC.IX	3/2.		2,1	
2.7.3	WELDER PERFORMANCE QUALIFICATION	WELD SOUNDNESS	MA	VISUAL,PHYS. TESTS RT (AS APPLICABLE)	100%	ASME SEC.IX	ASME SEC.IX	QW 484 OF ASME SEC.IX	3/2.		2,1	
2.7.4	WELD FIT-UPS	DIMENSION & ALIGNMENT	MA	MEAS.VISUAL EXAM	100%	WPS, MFG . DRAWING	WPS, MFG . DRAWING	IR/LOGBOOK	3/2.			
2.7.5	ROOT RUNS	SURFACE DEFECTS	MA	PENETRANT TEST	100%	ASTM E 165	NO SURFACE DEFECT	DO.	3/2.		2, 1	
2.7.6	WELDMENTS	SURFACE DEFECTS	MA	PENETRANT TEST	100%	ASTM E 165	ASME-VIII,DIV I	INSPN REPORT	3/2.		2,1	
BHEL				PARTICULARS		BIDDER / VENDOR						
				NAME								
				SIGNATURE								
				DATE								
BIDDER/VENDOR SEAL												

NAME	Prepared By AJAY JAIN <i>Ajay</i>	Reviewed By ASHWANI KHANNA <i>Ashwani</i>	Approved By I. J. SINGH <i>I. J. Singh</i>
SIGN.			
DATE	23-07-2012	23-07-2012	23-07-2012



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT
STANDARD QUALITY PLAN

Rev-01

QUALITY PLAN FOR MISCELLANEOUS PUMPS				CUSTOMER		PROJECT TITLE						
				BIDDER/VENDOR		QUALITY PLAN NUMBER						
SHEET 4 OF 6				SYSTEM		ITEM - CENTRIFUGAL PUMPS (HORIZONTAL / VERTICAL)						
S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CATEGORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
2.7.7	BUTT WELDS	INTERNAL DEFECT	MA	UT/RT	100%			IR	3/2.		2.1	
2.7.8	DICHARGE HEAD, COLUMN PIPE, DISCHARGE PIPE, ETC.	1. LEAK TIGHTNESS 2. DIMENSION	CR	1. HYDROTEST 2. MEASUREMENT	100%	TECHNICAL SPEC/ DATA SHEET, MFR DRAWING	1. NO LEAKAGE 2. MFR. DRAWING	IR	3/2.	2.1		
3.0	SUB-ASSEMBLY CONTROL											
3.1	ROTOR ASSEMBLY	ECCENTRICITY	MA	MEASUREMENT	100%	MFR.DRAWING	MFR.DRAWING	IR/LOG BOOK	3/2.		1	
3.2	ROTOR ASSEMBLY RESIDUAL UNBALANCE	STATIC & DYNAMIC	CR	STATIC & DYNAMIC BALANCING	100%	ISO 1940	ISO1940 Gr 6.3	BALANCING CERTIFICATE	3/2.	2.1		WTNESSING ONLY FOR SIZE GREATER THAN 10KW
3.3	COMPLETE PUMP ASSEMBLY	COMPLETENESS, CORRECTNESS, CLEANLINESS, CLEARANCES, FREENESS, ALIGNMENT	MA	VISUAL EXAM MEASUREMENT	100%	APPROVED DRG & MFG STANDARDS	APPROVED DRG & MFG STANDARDS	I.R. & CHECK LISTS	3/2.		2.1	
BHEL				PARTICULARS		BIDDER / VENDOR						
				NAME								
				SIGNATURE								
				DATE					BIDDER/VENDOR SEAL			

NAME	Prepared By	Reviewed By	Approved By
SIGN.	AJAY JAIN	ASHWANI KHANNA	I. J. SINGH
DATE	23-07-2012	23-07-2012	23-07-2012



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT
STANDARD QUALITY PLAN

Rev-01

QUALITY PLAN FOR MISCELLANEOUS PUMPS				CUSTOMER		PROJECT TITLE						
				BIDDER/VENDOR		QUALITY PLAN NUMBER						
SHEET 5 OF 6				SYSTEM		ITEM - CENTRIFUGAL PUMPS (HORIZONTAL / VERTICAL)						
S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CATEGORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
4	FINAL INSPECTION, TESTS & PACKING DESPATCH CONTROL											
4.1	PUMP WITH JOB/SHOP MOTOR ASSEMBLED ON INDIVIDUAL BASE FRAME	1. Q V/S HEAD, 2. Q V/S POWER, 3. Q V/S PUMP EFF. 4. VIBRATION 5. NOISE 6. BEARING TEMP. 7. LEAKAGES	CR	PERFORMANCE TEST	100%	APPD. PERFORMANCE TEST PROCEDURE/ APPD. DATA SHEET/APPD. CURVES FOR VIBRATIONS - AS PER ANSI/HIS 9.6.4-2009 (VALUES AS PER APPROVED DATA SHEET) FOR BEARING TEMP - BEARING HOUSING SHOULD NOT BE UNTOUCHABLY HOT. FOR LEAKAGE - MINOR LEAKAGE (DROP BY DROP) IN CASE OF GLAND PACKING ARRANGEMENT.	I.R., PERF. TEST RECORD, PLOTTED CURVES	3/2.	2,1.			* MINIMUM 7 POINTS FROM SHUT-OFF TO MAX. OPERATING FLOW COVERING ENTIRE OPERATION RANGE OF PUMP SHALL BE TAKEN.
		NPSH/ MIN. SUBMERGENCE REQUIRED	CR	NPSH TEST	1/MODEL	DO.	IR. NPSH/MIN. SUBMERGENCE TEST RECORD, PLOTTED CURVES	3/2.	2,1.			IF SPECIFIED or INSISTED BY CUSTOMER.
4.2	STRIP DOWN AFTER PERFORMANCE TEST	1. UNDUE WEAR TEAR AND RUBBING	MA	VISUAL EXAM AFTER STRIPPING	1/MODEL	NO UNDUE WEAR TEAR & RUBBING ON IMPELLER & WEAR RING	INSP. REPORT	3/2.	1			WITNESS REQUIRED ONLY WHEN ABNORMAL SOUND OBSERVED DURING PERFORMING TEST.
4.3	COMPLETE PUMP WITH UNIT MOTOR BASE FRAME, COUNTER FLANGES ETC. INCLUDING ALL ACCESSORIES AS PER SECTION C OF SPECN.	COMPLETENESS, CLEANLINESS, OVERALL DIMENSIONS ORIENTATION, WORKMANSHIP AND FINISH	MA	VISUAL EXAM MEASUREMENT	100%	APPD. G.A DRAWING	APPD. G.A DRAWING	INSP. REPORT	3/2.	1		
BHEL				PARTICULARS		BIDDER / VENDOR						
				NAME								
				SIGNATURE								
				DATE				BIDDER/VENDOR SEAL				

NAME	Prepared By AJAY JAIN	Reviewed By ASHWANI KHANNA	Approved By I. J. SINGH
SIGN.			
DATE	23-07-2012	23-07-2012	23-07-2012



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT
STANDARD QUALITY PLAN

Rev-01

QUALITY PLAN FOR MISCELLANEOUS PUMPS				CUSTOMER			PROJECT TITLE			
				BIDDER/VENDOR			QUALITY PLAN NUMBER			
SHEET 6 OF 6				SYSTEM			ITEM - CENTRIFUGAL PUMPS (HORIZONTAL / VERTICAL)			

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CATEGORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
4.4	COMPLETION OF ALL STAGES	1.COMPLETION	MA	VERIFICATION OF IR/T.C.ETC.	100%	MFG. DRG./TECHNICAL DOCS.	APPD. MFG. DRG./TECHNICAL DOCS	IR.	3/2.	2,1		WITNESSING ONLY BY BHEL, CUSTOMER VERIFICATION ONLY BUT CHP
4.5	PAINING	1.SURFACE FINISH, DFT, MARKINGS ETC.	MA	VISUAL EXAM MEASUREMENT AESTHETIC	100%	APPD.DRG.	APPD.DOCS	IR.	3/2.		2	
4.6	PACKING, MARKING	SOUNDNESS OF PACKING	MI	VISUAL AESTHETIC	100%	MFG. STANDARD	MFG. STANDARD		3/2.		2	

MTC -Mill Test Certificate, MA-Major, MI-Minor, TC-Test Certificate, CR-Critical, IGC- Inter Granular Corrosion

- 1.AS CAST HEAT MARKS SHALL BE PROVIDED ON CI CASTING LIKE TOP & BOTTOM CASING.
2. HYDRO TEST PRESSURE SHALL BE AT LEAST 2(TWO) TIMES THE DUTY POINT (OR) 1.5 TIMES OF SHUT OFF HEAD (OR) SYSTEM DESIGN PRESSURE, WHICHEVER IS HIGHER.
3. THIS QAP IS ALSO APPLICABLE FOR SPARES.
4. NO WELD REPAIRS PERMISSIBLE ON CI CASTING.
5. MATERIAL SHALL BE AS PER APPROVED CROSS SECTION DRG./ DATA SHEET.
6. STRIP TEST- INCASE OF ABNORMAL NOISE OBSERVED DURING PERF. TEST, THOSE PUMP WILL BE STRIPPED DOWN FOR VISUAL INSPECTION OF IMPELLER & WEAR SHALL BE OFFERED FOR VISUAL INSPECTION FOR WEAR /RUBBING MARKS.
7. PUMPS WITH MECHANICAL SEAL ARRANGEMENT TO BE TESTED AND SUPPLIED WITH GLAND PACKING ARRANGEMENT. HOWEVER MANUFACTURER TO ENSURE DIMENTIONAL MATCHING OF MECHANICAL SEAL WITH PUMP GA DRAWING.

LEGEND : 1- BHEL OR BHEL NOMINATED THIRD PARTY /END CUSTOMER OF BHEL,
 2- VENDOR,
 3-SUB-VENDOR

P- PERFORM, W- WITNESS, V-VERIFICATION

BHEL	PARTICULARS	BIDDER / VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER/VENDOR SEAL

NAME SIGN. DATE	Prepared By AJAY JAIN 23-07-2012	Reviewed By ASHWANI KHANNA 23-07-2012	Approved By I. J. SINGH 23-07-2012
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TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

STANDARD TECHNICAL REQUIREMENTS

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **II**

SUB-SECTION: **IIB**

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SUB-SECTION - IIB

STANDARD TECHNICAL SPECIFICATION (ELECTRICAL)



TITLE :
GENERAL TECHNICAL REQUIREMENTS

FOR

LV MOTORS

SPECIFICATION NO. PE-SS-999-506-E101
VOLUME NO. : II-B
SECTION : D
REV NO. : 00 DATE : 29/08/2005
SHEET : 1 OF 1

GENERAL TECHNICAL REQUIREMENTS

FOR

LV MOTORS

SPECIFICATION NO.: PE-SS-999-506-E101 Rev 00

	TITLE : GENERAL TECHNICAL REQUIREMENTS FOR LV MOTORS	SPECIFICATION NO. PE-SS-999-506-E101
		VOLUME NO. : II-B
		SECTION : D
		REV NO. : 00 DATE : 29/08/2005
		SHEET : 1 OF 4

1.0

INTENT OF SPECIFIATION

The specification covers the design, materials, constructional features, manufacture, inspection and testing at manufacturer’s work, and packing of Low voltage (LV) squirrel cage induction motors along with all accessories for driving auxiliaries in thermal power station.

Motors having a voltage rating of below 1000V are referred to as low voltage (LV) motors.

2.0

CODES AND STANDARDS

Motors shall fully comply with latest edition, including all amendments and revision, of following codes and standards:

IS:325	Three phase Induction motors
IS : 900	Code of practice for installation and maintenance of induction motors
IS: 996	Single phase small AC and universal motors
IS: 4722	Rotating Electrical machines
IS: 4691	Degree of Protection provided by enclosures for rotating electrical machines
IS: 4728	Terminal marking and direction of rotation rotating electrical machines
IS: 1231	Dimensions of three phase foot mounted induction motors
IS: 8789	Values of performance characteristics for three phase induction motors
IS: 13555	Guide for selection and application of 3-phase A.C. induction motors for different types of driven equipment
IS: 2148	Flame proof enclosures for electrical appliance
IS: 5571	Guide for selection of electrical equipment for hazardous areas
IS: 12824	Type of duty and classes of rating assigned
IS: 12802	Temperature rise measurement for rotating electrical machnines
IS: 12065	Permissible limits of noise level for rotating electrical machines
IS: 12075	Mechanical vibration of rotating electrical machines

In case of imported motors, motors as per IEC-34 shall also be acceptable.

3.0

DESIGN REQUIREMENTS

3.1

Motors and accessories shall be designed to operate satisfactorily under conditions specified in data sheet-A and Project Information, including voltage & frequency variation of supply system as defined in Data sheet-A

3.2

Motors shall be continuously rated at the design ambient temperature specified in Data Sheet-A and other site conditions specified under Project Information
Motor ratings shall have at least a 15% margin over the continuous maximum demand of the driven equipment, under entire operating range including voltage & frequency variation specified above.

3.3

Starting Requirements

3.3.1

Motor characteristics such as speed, starting torque, break away torque and starting time shall be properly co-ordinated with the requirements of driven equipment. The accelerating torque at any speed with the minimum starting voltage shall be at least 10% higher than that of the driven equipment.

3.3.2

Motors shall be capable of starting and accelerating the load with direct on line starting without exceeding acceptable winding temperature.

	TITLE : GENERAL TECHNICAL REQUIREMENTS FOR LV MOTORS	SPECIFICATION NO. PE-SS-999-506-E101
		VOLUME NO. : II-B
		SECTION : D
		REV NO. : 00 DATE : 29/08/2005
		SHEET : 2 OF 4
The limiting value of voltage at rated frequency under which a motor will successfully start and accelerate to rated speed with load shall be taken to be a constant value as per Data Sheet - A during the starting period of motors.		
3.3.3 The following frequency of starts shall apply i) Two starts in succession with the motor being initially at a temperature not exceeding the rated load temperature. ii) Three equally spread starts in an hour the motor being initially at a temperature not exceeding the rated load operating temperature. (not to be repeated in the second successive hour) iii) Motors for coal conveyor and coal crusher application shall be suitable for three consecutive hot starts followed by one hour interval with maximum twenty starts per day and shall be suitable for minimum 20,000 starts during the life time of the motor		
3.4 Running Requirements		
3.4.1 Motors shall run satisfactorily at a supply voltage of 75% of rated voltage for 5 minutes with full load without injurious heating to the motor.		
3.4.2 Motor shall not stall due to voltage dip in the system causing momentary drop in voltage upto 70% of the rated voltage for duration of 2 secs.		
3.5 Stress During bus Transfer		
3.5.1 Motors shall withstand the voltage, heavy inrush transient current, mechanical and torque stress developed due to the application of 150% of the rated voltage for at least 1 sec. caused due to vector difference between the motor residual voltage and the incoming supply voltage during occasional auto bus transfer.		
3.5.2 Motor and driven equipment shafts shall be adequately sized to satisfactorily withstand transient torque under above condition.		
3.6 Maximum noise level measured at distance of 1.0 metres from the outline of motor shall not exceed the values specified in IS 12065.		
3.7 The max. vibration velocity or double amplitude of motors vibration as measured at motor bearings shall be within the limits specified in IS: 12075.		
4.0 CONSTRUCTIONAL FEATURES		
4.1 Indoor motors shall conform to degree of protection IP: 54 as per IS: 4691. Outdoor or semi-indoor motors shall conform to degree of protection IP: 55 as per IS: 4691 and shall be of weather-proof construction. Outdoor motors shall be installed under a suitable canopy		
4.2 Motors upto 160KW shall have Totally Enclosed Fan Cooled (TEFC) enclosures, the method of cooling conforming to IC-0141 or IC-0151 of IS: 6362.		
Motors rated above 160 KW shall be Closed Air Circuit Air (CACA) cooled		
4.3 Motors shall be designed with cooling fans suitable for both directions of rotation.		

	TITLE : GENERAL TECHNICAL REQUIREMENTS FOR LV MOTORS	SPECIFICATION NO. PE-SS-999-506-E101
		VOLUME NO. : II-B
		SECTION : D
		REV NO. : 00 DATE : 29/08/2005
		SHEET : 3 OF 4
4.4.	Motors shall not be provided with any electric or pneumatic operated external fan for cooling the motors.	
4.5	Frames shall be designed to avoid collection of moisture and all enclosures shall be provided with facility for drainage at the lowest point.	
4.6	In case Class 'F' insulation is provided for LV motors, temperature rise shall be limited to the limits applicable to Class 'B' insulation. In case of continuous operation at extreme voltage limits the temperature limits specified in table-1 of IS:325 shall not exceed by more than 10°C.	
4.7	Terminals and Terminal Boxes	
4.7.1	Terminals, terminal leads, terminal boxes, windings tails and associated equipment shall be suitable for connection to a supply system having a short circuit level, specified in the Data Sheet-A. Unless otherwise stated in Data Sheet-A, motors of rating 110 kW and above will be controlled by circuit breaker and below 110 kW by switch fuse-contactor. The terminal box of motors shall be designed for the fault current mentioned in data sheet "A".	
4.7.2	unless otherwise specified or approved, phase terminal boxes of horizontal motors shall be positioned on the left hand side of the motor when viewed from the non-driving end.	
4.7.3	Connections shall be such that when the supply leads R, Y & B are connected to motor terminals A B & C or U, V & W respectively, motor shall rotate in an anticlockwise direction when viewed from the non-driving end. Where such motors require clockwise rotation, the supply leads R, Y, B will be connected to motor terminals A, C, B or U W & V respectively.	
4.7.4	Permanently attached diagram and instruction plate made preferably of stainless steel shall be mounted inside terminal box cover giving the connection diagram for the desired direction of rotation and reverse rotation.	
4.7.5	Motor terminals and terminal leads shall be fully insulated with no bar live parts. Adequate space shall be available inside the terminal box so that no difficulty is encountered for terminating the cable specified in Data Sheet-A.	
4.7.6	Degree of protection for terminal boxes shall be IP 55 as per IS 4691.	
4.7.7	Separate terminal boxes shall be provided for space heaters.. If this is not possible in case of LV motors, the space heater terminals shall be adequately segregated from the main terminals in the main terminal box. Detachable gland plates with double compression brass glands shall be provided in terminal boxes.	
4.7.8.	Phase terminal boxes shall be suitable for 360 degree of rotation in steps of 90 degree for LV motors.	
4.7.9	Cable glands and cable lugs as per cable sizes specified in Data Sheet-A shall be included. Cable lugs shall be of tinned Copper, crimping type.	
4.8	Two separate earthing terminals suitable for connecting G.I. or MS strip grounding conductor of size given in Data Sheet-A shall be provided on opposite sides of motor frame. Each terminal box shall have a grounding terminal.	
4.9	General	

	TITLE : GENERAL TECHNICAL REQUIREMENTS FOR LV MOTORS	SPECIFICATION NO. PE-SS-999-506-E101
		VOLUME NO. : II-B
		SECTION : D
		REV NO. : 00 DATE : 29/08/2005
		SHEET : 4 OF 4
4.9.1 Motors provided for similar drives shall be interchangeable. 4.9.2 Suitable foundation bolts are to be supplied alongwith the motors. 4.9.3 Motors shall be provided with eye bolts, or other means to facilitate safe lifting if the weight is 20Kgs. and above. 4.9.4 Necessary fitments and accessories shall be provided on motors in accordance with the latest Indian Electricity rules 1956. 4.9.5 All motors rated above 30 kW shall be provided with space heaters to maintain the motor internal air temperature above the dew point. Unless otherwise specified, space heaters shall be suitable for a supply of 240V AC, single phase, 50 Hz. 4.9.6 Name plate with all particulars as per IS: 325 shall be provided 4.9.7 Unless otherwise specified, the colour of finish shall be grey to Shade No. 631 and 632 as per IS:5 for motors installed indoor and outdoor respectively. The paint shall be epoxy based and shall be suitable for withstanding specified site conditions. 5.0 INSPECTION AND TESTING 5.1 All materials, components and equipments covered under this specification shall be procured, manufactured, as per the BHEL standard quality plan No. PED-506-00-Q-006/0 and PED-506-00-Q-007/2 enclosed with this specification and which shall be complied. 5.2 LV motors of type-tested design shall be provided. Valid type test reports not more than 5 year shall be furnished. In the absence of these, type tests shall have to be conducted by manufacturer without any commercial implication to purchaser. 5.3 All motors shall be subjected to routine tests as per IS: 325 and as per BHEL standard quality plan. 5.4 Motors shall also be subjected to additional tests, if any, as mentioned in Data Sheet A. 6.0 DRAWINGS TO BE SUBMITTED AFTER AWARD OF CONTRACT a) OGA drawing showing the position of terminal boxes, earthing connections etc. b) Arrangement drawing of terminal boxes. c) Characteristic curves: (To be given for motor above 55 kW unless otherwise specified in Data Sheet). i) Current vs. time at rated voltage and minimum starting voltage. ii) Speed vs. time at rated voltage and minimum starting voltage. iii) Torque vs. speed at rated voltage and minimum voltage. For the motors with solid coupling the above curves i), ii), iii) to be furnished for the motors coupled with driven equipment. In case motor is coupled with mechanical equipment by fluid coupling, the above curves shall be furnished with and without coupling. iv) Thermal withstand curve under hot and cold conditions at rated voltage and max. permissible voltage.		

		QUALITY PLAN		CUSTOMER :		PROJECT			SPECIFICATION :			
				BIDDER/ VENDOR		TITLE			NUMBER :			
		SHEET 1 OF 2		SYSTEM		QUALITY PLAN NUMBER PED-506-00-Q-006, REV-01			SPECIFICATION TITLE			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	SECTION VOLUME III			
									P	W	V	REMARKS
1	2	3	4	5	6	7	8	9	10			11
1.0	ASSEMBLY	1.WORKMANSHIP	MA	VISUAL	100%	MANUF'S SPEC	MANUF'S SPEC	-DO-	2	-	-	
		2.DIMENSIONS	MA	-DO-	-DO-	MFG. DRG./ MFG. SPEC.	MFG. DRG./ MFG. SPEC.	-DO-	2	-	-	
		3.CORRECTNESS COMPLETENESS TERMINATIONS/ MARKING/COLOUR CODE	MA	VISUAL	100%	MFG.SPEC./ RELEVANT IS	MFG.SPEC. RELEVANT IS	-DO-	2	-	-	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	MANUFR'S SPEC/BHEL SPEC./RELEVANT STANDARD	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-	NOTE -1 & NOTE-3
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST AS PER BHEL SPEC.	MA	-DO-	100%	IS-325/ BHEL SPEC./ DATA SHEET	SAME AS COL.7	TEST REPORT	2	1		NOTE -1 & NOTE-3
		2.OVERALL DIMENSIONS & ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET & RELEVANT IS	INSPN. REPORT	2	1	-	NOTE -1 & NOTE-3
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									

	QUALITY PLAN		CUSTOMER :			PROJECT TITLE			SPECIFICATION : NUMBER :			
			BIDDER/ : VENDOR			QUALITY PLAN NUMBER PED-506-00-Q-006, REV-01			SPECIFICATION : TITLE :			
	SHEET 2 OF 2		SYSTEM			ITEM AC ELECT. MOTORS BELOW 55KW (LV)			SECTION		VOLUME III	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTICS CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
		3.NAMEPLATE DETAILS	MA	VISUAL	100%	IS-325 & DATA SHEET	IS-325 & DATA SHEET	INSPN. REPORT	2	1	-	
NOTES: 1 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON 2 WHERE EVER CUSTOMER IS INVOLVED IN INSPECTION, (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER. 3 FOR EXHAUST/VENTILATION FAN MOTORS OF RATING UPTO 1.5KW , ONLY ROUTINE TEST CERTIFICATES SHALL BE FURNISHED FOR SCRUTINY. <u>Legends for Inspection agency</u> 1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER) P. PERFORM W. WITNESS V. VERIFY												
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN		CUSTOMER :		PROJECT TITLE			SPECIFICATION : NUMBER :			
				BIDDER/ VENDOR :		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE			
		SHEET 1 OF 9		SYSTEM		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
1.0	RAW MATERIAL & BOUGHT OUT CONTROL											
1.1	SHEET STEEL, PLATES, SECTION, EYEBOLTS	1.SURFACE CONDITION	MA	VISUAL	100%	-	FREE FROM BLINKS, CRACKS, WAVINESS ETC	LOG BOOK	3	-	-	PROPERTY CLASS MARKING SHALL BE CHECKED BY THE VENDOR
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	-DO-	3	-	-	
		3.PROOF LOAD TEST (EYE BOLT)	MA	MECH. TEST	-DO-	-DO-	-DO-	INSPEC. REPORT	3	-	2	
1.2	HARDWARES	1.SURFACE CONDITION	MA	VISUAL	100%		FREE FROM CRACKS, UN-EVENNESS ETC.	-DO-	3	-	-	
		2.PROPERTY CLASS	MA	VISUAL	SAMPLES	MANFR'S DRG./SPEC BOOK	RELEVANT IS/SPEC.	SUPPLIERS TC & LOG	3	-	2	
1.3	CASTING	1.SURFACE CONDITION	MA	VISUAL	100%		FREE FROM CRACKS, BLOW HOLES ETC.	LOG BOOK	3	-	2	
		2.CHEM. & PHY. PROP.	MA	CHEM & MECH TEST	1/HEAT NO.	MANFR'S DRG./SPEC	RELEVANT IS/	SUPPLIER'S TC	3	-	2	HEAT NO. SHALL BE VERIFIED
		3.DIMENSIONS	MA	MEASUREMENT	100%	MANUFR'S DRG.	MANUFR'S DRG.	LOG BOOK	3	-	2	
1.4	PAINT & VARNISH	1.MAKE, SHADE, SHELF LIFE & TYPE	MA	VISUAL	100% CONTINUOUS	MANFR'S DRG./SPEC	MANFR'S DRG./SPEC	LOG BOOK	3	-	2	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE									
												BIDDER'S/VENDORS COMPANY SEAL

		QUALITY PLAN		CUSTOMER :		PROJECT			SPECIFICATION :				
				BIDDER/ :		TITLE			NUMBER :				
				VENDOR		QUALITY PLAN			SPECIFICATION :				
SHEET 2 OF 9		SYSTEM		NUMBER PED-506-00-Q-007, REV-03			TITLE			SECTION			
ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)		VOLUME III											
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
									P	W	V		
1	2	3	4	5	6	7	8	9	10			11	
1.5	SHAFT (FORGED OR ROLLED)	1. SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-	VENDOR'S APPROVAL IDENTIFICATION SHALL BE MAINTAINED	
		2. CHEM. & PHYSICAL PROPERTIES	MA	CHEM. & PHYSICAL TESTS	1/HEAT NO. OR HEAT TREATMENT BATCH NO	MFG. DRG. SPEC.	RELEVANT IS	SUPPLIER'S TC	3	-	2		
		3. DIMENSIONS	MA	MEASUREMENT	100%	-DO-	MANUFR'S DRG.	LOG BOOK	3	-	2		
		4.INTERNAL FLAWS	CR	UT	-DO-	ASTM-A388	MANUFR'S SPEC. BHEL SPEC.	-DO-	3	2	1		
1.6	SPACE HEATERS, CONNEC- TORS, TERMINAL BLOCKS, CABLES, CABLE LUGS, CARBON BRUSH TEMP. DETECTORS, RTD, BTD'S	1. MAKE & RATING	MA	VISUAL	-DO-	MANUFR'S DRG. SPEC.	MANUFR'S DRG. SPEC.	-DO-	3	-	2	FOR DIA OF 55 MM & ABOVE	
		2. PHYSICAL COND.	MA	-DO-	-DO-	-	NO PHYS. DAMAGE, NO ELECTRICAL DISCONTINUITY	-DO-	3	-	2		
		3.DIMENSIONS (WHEREVER APPLICABLE)	MA	MEASUREMENT	SAMPLE	MANUFR'S DRG./ SPEC.	MANUFR'S DRG. / SPEC.	-DO-	3	-	2		
		4.PERFORMANCE/ CALIBRATION	MA	TEST	100%	-DO-	-DO-	INSP. REPORT	3	-	2		
BHEL			PARTICULARS		BIDDER/VENDOR								
			NAME										
			SIGNATURE										
			DATE					BIDDER'S/VENDORS COMPANY SEAL					

		QUALITY PLAN		CUSTOMER :			PROJECT TITLE			SPECIFICATION : NUMBER :		
				BIDDER/ VENDOR :			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE		
		SHEET 3 OF 9		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
1.7	OTHER INSULATING MATERIALS LIKE SLEEVES, BINDINGS CORDS, PAPERS, PRESS BOARDS ETC.	1. SURFACE COND. ETC.	MA	VISUAL	100%	-	NO VISUAL DEFECTS	INSPT. REPORT	3	-	2	FOR MV MOTOR INSULATION/VARNISH THICKNESS SHALL BE MORE THAN THE BURS HEIGHT
		2. OTHER CHARACTERISTICS	MA	TEST	SAMPLE	MANUF'S SPEC.	MANUF'S SPEC.	LOG BOOK AND OR SUPPLIER'S TC	3	-	2	
1.8	SHEET STAMPING (PUNCHED)	1. SURFACE COND.	MA	VISUAL	100%	-	NO VISUAL DEFECTS (FREE FROM BURS)	LOG BOOK	3	-	-	
		2.DIMENSIONS INCLUDING BURS HEIGHT	MA	MEASUREMENT	SAMPLE	MANUFR'S DRG. .	MANUFR'S DRG.	-DO-	3	-	2	
		3. ACCEPTANCE TESTS	MA	ELECT. & MECH TESTS	-DO-	MANUF'S SPEC./ RELEVANT IS	RELEVANT IS	SUPPLIER'S TC	3	-	2	
1.9	CONDUCTORS	1. SURFACE FINISH	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	LOG BOOK	3*	-	2*	
		2.ELECT. PROP, & MECH. PROP	MA	ELECT. & MECH.TEST	SAMPLES	RELEVANT IS/ BS OR OTHER STANDARDS	RELEVANT IS/ BS OR OTHER STANDARDS	SUPPLIERS TC & VENDOR'S INSPN. REPORTS	3	-	2	* MOTOR MANUFACTURER TO CONDUCT VISUAL CHECK FOR SURFACE FINISH ON RANDOM BASIS (10% SAMPLE) AT HIS WORKS AND MAINTAIN RECORD FOR VERIFICATION BY BHEL/CUSTOMER.
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN		CUSTOMER :		PROJECT TITLE			SPECIFICATION : NUMBER :			
				BIDDER/ VENDOR :		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE			
		SHEET 4 OF 9		SYSTEM		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	10			11
1.10	BEARINGS	3.DIMENSIONS	MA	MEASUREMENT	-DO-	-DO-	-DO-	Log Book	3	-	2	
		1.MAKE & TYPE	MA	VISUAL	100%	MANFR'S DRG./ APPROVED DATASHEET	MANFR'S DRG./ APPROVED DATASHEET	-DO-	3	-	2	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	BHEL DATA SHEET	BHEL DATA SHEET BEARING MANUF'S CATALOGUES	-DO-	3	-	2	
		3.SURFACE FINISH	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	2	
1.11	SLIP RING (WHEREVER APPLICABLE)	1.SURFACE COND.	MA	VISUAL	100%	-	-DO-	-DO-	3	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-	
		3.TEMP.WITH-STAND CAPACITY	MA	ELECT.TEST	-DO-	MANUF'S SPEC./ BHEL SPEC.	MANUF'S SPEC./ BHEL SPEC.	-DO-	3	-	2	
		4.HV/IR	MA	-DO-	100%	-DO-	-DO-	-DO-	3	-	2	
1.12	OIL SEALS & GASKETS	1.MATERIAL OF GASKET	MA	VISUAL	100%	MANUF'S DRG/SPECS	MANUF'S DRG./ SPECS.	-DO-	3	-	-	
		2.SURFACE COND.	MA	VISUAL	100%	-	FREE FROM VISUAL DEFECTS	-DO-	3	-	-	
		3.DIMENSIONS	MA	MEASUREMENT	SAMPLE	MANUF'S DRG	MANUF'S DRG	-DO-	3	-	-	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE						BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN		CUSTOMER :		PROJECT			SPECIFICATION :			
				BIDDER/ :		TITLE			NUMBER :			
		SHEET 5 OF 9		VENDOR		QUALITY PLAN			SPECIFICATION :			
		SYSTEM		NUMBER PED-506-00-Q-007, REV-03			TITLE					
				ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III			
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11
2.0	IN PROCESS											
2.1	STATOR FRAME WELDING (IN CASE OF FABRICATED STATOR)	1.WORKMANSHIP & CLEANNES	MA	VISUAL	100%	-DO-	GOOD FINISH	LOG BOOK	3/2	2	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-	
2.2	MACHINING	1.FINISH	MA	VISUAL	100%	-DO-	GOOD FINISH	LOG BOOK	2	-	-	
		2.DIMENSIONS	MA	MEASUREMENT	-DO-	MANUF'S DRG	MANUF'S DRG	-DO-	2	-	-	
		3.SHAFT SURFACE FLOWS	MA	PT	-DO-	RELEVANT SPEC./ ASTM-E165	MANUF'S SPEC./ BHEL SPEC./	-DO-	2	-	1	
2.3	PAINTING	1.SURFACE PREPARATION	MA	VISUAL	100%	MANFR'S SPEC/BHEL SPEC./ RELEVANT STAND	BHEL SPEC. SAME AS COL.7	LOG BOOK	2	-	-	
		2.PAINT THICKNESS (BOTH PRIMER & FINISH COAT)	MA	MEASUREMENT BY ELCOMETER	SAMPLE	-DO-	-DO-	-DO-	2	-	-	
		3.SHADE	MA	VISUAL	-DO-	-DO-	-DO-	Log Book	2	-	-	
		4.ADHESION	MA	CROSS CUTTING & TAPE TEST	-DO-	-DO-	-DO-	Log Book	2	-	-	
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE									
									BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN		CUSTOMER :		PROJECT TITLE			SPECIFICATION : NUMBER :				
				BIDDER/ : VENDOR		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE				
		SHEET 6 OF 9		SYSTEM		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	10	P	W	V	11
2.4	SHEET STACKING	1.COMPLETENESS	MA	MEASUREMENT	SAMPLE	MANUFR'S SPEC.	MANUFR'S SPEC.	Log Book	2	-	-		(FOR MOTORS OF 2MW AND ABOVE) * ON 10% RANDOM SAMPLE
		2.COMPRESSION & TIGHTENING	MA	MEASUREMENT	100%	-DO-	-DO-	Log Book	2	-	-		
		3.CORE LOSS & HOTSPOT	MA	ELECT.TEST	-DO-	-DO-	-DO-	Log Book	2	1*	1		
2.5	WINDING	1.COMPLETENESS	CR	VISUAL	100%	MANUFR'S SPEC./BHEL SPEC.	MANUFR'S SPEC./BHEL SPEC.	Log Book	2	-	-		
		2.CLEANLINESS	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-		
		3.IR-HV-IR	CR	ELECT. TEST	-DO-	-DO-	-DO-	Log Book	2	-	1		
		4.RESISTANCE	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1		
		5.INTERTURN INSULATION	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-		
		6.SURGE WITH STAND AND TAN. DELTA TEST	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1		
2.6	IMPREGNATION	1.VISCOSCITY	MA	PHY. TEST	AT STARTING	-DO-	-DO-	Log Book	2	-	-		FOR MV MOTOR
		2.TEMP. PRESSURE VACCUM	MA	PROCESS CHECK	CONTINUOUS	-DO-	-DO-	Log Book	2	-	-		
		3.NO. OF DIPS	MA	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1		
BHEL			PARTICULARS		BIDDER/VENDOR								
			NAME										
			SIGNATURE										
			DATE						BIDDER'S/VENDORS COMPANY SEAL				

		QUALITY PLAN		CUSTOMER :			PROJECT TITLE			SPECIFICATION : NUMBER :			
				BIDDER/ : VENDOR			QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE			
		SHEET 7 OF 9		SYSTEM			ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	10	P	W	V	11
2.7	COMPLETE STATOR ASSEMBLY	4.DURATION	MA	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	1	VERIFICATION FOR MV MOTOR ONLY	
2.8	BRAZING/COMPRESSION JOINT	1.COMPACTNESS & CLEANLINESS	MA	VISUAL	100%	-DO-	-DO-	Log Book	2	-	-		
2.9	COMPLETE ROTOR ASSEMBLY	1.COMPLETENESS	CR	-DO-	-DO-	-DO-	-DO-	Log Book	2	-	-		
		2.SOUNDNESS	CR	MALLET TEST & UT	-DO-	-DO-	-DO-	Log Book	2		1		
		3.HV	MA	ELECT. TEST	-DO-	-DO-	-DO-	Log Book	2		1		
2.10	ASSEMBLY	1.RESIDUAL UNBALANCE	CR	DYN. BALANCE	-DO-	MFG SPEC./ ISO 1940	MFG. DWG.	Log Book	2		1		
		2.SOUNDNESS OF DIE CASTING	CR	ELECT. (GROWLER TEST)	-DO-	MFG. SPEC.	MFG. SPEC.	Log Book	2		1		
		1.ALIGNMENT	MA	MEAS.	-DO-	-DO-	-DO-	Log Book	2	-	-		
		2.WORKMANSHIP	MA	VISUAL	-DO-	-DO-	-DO-	Log Book	2	-	-		
		3.AXIAL PLAY	MA	MEAS.	-DO-	-DO-	-DO-	Log Book	2	-	1		
		4.DIMENSIONS	MA	-DO-	-DO-	MFG.DRG./ MFG SPEC.	MFG. DRG/ RELEVANT IS	Log Book	2	-	-		
		5.CORRECTNESS, COMPLETENESS TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	MFG SPEC. RELEVANT IS	MFG SPEC. RELEVANT IS	Log Book	2	-	-		
	6. RTD, BTD & SPACE HEATER MOUNTING.	MA	VISUAL	100%	MFG SPEC. RELEVANT IS	MFG SPEC. RELEVANT IS	Log Book	2		1			
BHEL			PARTICULARS		BIDDER/VENDOR								
			NAME										
			SIGNATURE										
			DATE										
												BIDDER'S/VENDORS COMPANY SEAL	

		QUALITY PLAN		CUSTOMER :		PROJECT TITLE			SPECIFICATION : NUMBER :			
				BIDDER/ : VENDOR		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03			SPECIFICATION : TITLE			
		SHEET 8 OF 9		SYSTEM		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)			SECTION		VOLUME III	
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	10	11	12	
3.0	TESTS	1.TYPE TESTS INCLUDING SPECIAL TESTS AS PER BHEL SPEC.	MA	ELECT.TEST	1/TYPE/SIZE	IS-325/ BHEL SPEC./ DATA SHEET	IS-325/ BHEL SPEC./ DATA SHEET	TEST REPORT	2	1*	1	* NOTE - 1
		2.ROUTINE TESTS INCLUDING SPECIAL TEST AS PER BHEL SPEC.	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1\$	1	\$ NOTE - 2
		3.VIBRATION & NOISE LEVEL	MA	-DO-	100%	IS-12075 & IS-12065	IS-12075 & IS-12065	-DO-	2	1\$	1	\$ NOTE - 2
		4.OVERALL DIMENSIONS AND ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/DATA SHEET	APPROVED DRG/DATA SHEET & RELEVANT IS	INSPC. REPORT	2	1	-	
		5.DEGREE OF PROTECTION	MA	ELECT. & MECH. TEST	1/TYPE/ SIZE	RELEVANT IS	BHEL SPEC. AND DATA SHEET	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		6. MEASUREMENT OF RESISTANCE OF RTD & BTD	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1\$	1	\$ NOTE - 2
		7. MEASUREMENT OF RESISTANCE, IR OF SPACE HEATER	MA	-DO-	100%	-DO-	-DO-	-DO-	2	1\$	1	\$ NOTE - 2
		8. NAMEPLATE DETAILS	MA	VISUAL	100%	IS-325 & DATA SHEET	IS-325 & DATA SHEET	INSPC. REPORT	2	1\$	1	\$ NOTE - 2
		9.EXPLOSION FLAME PROOF NESS (IF SPECIFIED)	MA	EXPLOSION FLAME PROOF TEST	1/TYPE	IS-3682 IS-8239 IS-8240	IS-3682 IS-8239 IS-8240	TC	2	-	1	TC FROM AN INDEPENDENT LABORATORY, REFER NOTE-3
		10. PAINT SHADE, THICKNESS & FINISH	MA	VISUAL & MEASUREMENT BY ELKOMETER	SAMPLE	BHEL SPEC. & DATA SHEET	BHEL SPEC. & DATA SHEET	TC	2	1\$	1	SAMPLING PLAN TO BE DECIDED BY INSPECTION AGENCY \$ NOTE - 2
BHEL			PARTICULARS			BIDDER/VENDOR						
			NAME									
			SIGNATURE									
			DATE									
									BIDDER'S/VENDORS COMPANY SEAL			

		QUALITY PLAN		CUSTOMER :		PROJECT TITLE		SPECIFICATION : NUMBER :				
				BIDDER/ VENDOR		QUALITY PLAN NUMBER PED-506-00-Q-007, REV-03		SPECIFICATION : TITLE				
		SHEET 9 OF 9		SYSTEM		ITEM: AC ELECT. MOTORS 55 KW & ABOVE (LV & MV)		SECTION		VOLUME III		
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	P	W	V	11
NOTES: 1 DEPENDING UPON THE SIZE AND CRITICALLY, WITNESSING BY BHEL SHALL BE DECIDED. 2 ROUTINE TESTS ON 100% MOTORS SHALL BE DONE BY THE VENDOR. HOWEVER, BHEL SHALL WITNESS ROUTINE TESTS ON RANDOM SAMPLES. THE SAMPLING PLAN SHALL BE MUTUALLY AGREED UPON. 3 IN CASE TEST CERTIFICATES FOR THESE TESTS ON SIMILAR TYPE, SIZE AND DESIGN OF MOTOR FROM INDEPENDENT LABORATORY ARE AVAILABLE, THESE TEST MAY NOT BE REPEATED. 4 WHEREVER CUSTOMER IS INVOLVED IN INSPECTION, AGENCY (1) SHALL MEAN BHEL AND CUSTOMERS BOTH TOGETHER. <u>Legends for Inspection agency</u> 1. BHEL/CUSTOMER 2. VENDOR (MOTOR MANUFACTURER) 3. SUB-VENDOR (RAW MATERIAL/COMPONENTS SUPPLIER) P. PERFORM W. WITNESS V. VERIFY												
BHEL			PARTICULARS		BIDDER/VENDOR							
			NAME									
			SIGNATURE									
			DATE									
											BIDDER'S/VENDORS COMPANY SEAL	

SUB VENDOR LIST
MISC. PUMPS

S. No.	Deptt.	Package	PMD Vendor/ Sub Vendor
1	Electrical	LV MOTORS (NON FLAME PROOF)	ABB
2	Electrical	LV MOTORS (NON FLAME PROOF)	BHARAT BIJLEE LTD.
3	Electrical	LV MOTORS (NON FLAME PROOF)	CROMPTON GREAVES
4	Electrical	LV MOTORS (NON FLAME PROOF)	GE-POWER
5	Electrical	LV MOTORS (NON FLAME PROOF)	KIRLOSKAR ELECTRIC CO LTD.
6	Electrical	LV MOTORS (NON FLAME PROOF)	LAXMI HYDRAULICS PVT. LTD
7	Electrical	LV MOTORS (NON FLAME PROOF)	MARATHON
8	Electrical	LV MOTORS (NON FLAME PROOF)	NGEF
9	Electrical	LV MOTORS (NON FLAME PROOF)	RAJINDRA ELECT INDUSTRIES
10	Electrical	LV MOTORS (NON FLAME PROOF)	SIEMENS
11	Electrical	LV MOTORS (FLAME PROOF)	RAJINDRA ELECT INDUSTRIES
116	Electrical	CABLE GLANDS	ALLIED TRADERS & EXPORTERS
117	Electrical	CABLE GLANDS	ARUP ENGG & FOUNDRY WORKS
118	Electrical	CABLE GLANDS	BALIGA LIGHTING EQPT.PVT.LTD.
119	Electrical	CABLE GLANDS	COMMET BRASS PRODUCTS
120	Electrical	CABLE GLANDS	DOWELLS
121	Electrical	CABLE GLANDS	ELECTROMAC INDUSTRIES
122	Electrical	CABLE GLANDS	INCAB
123	Electrical	CABLE LUGS	DOWELLS
124	Electrical	CABLE LUGS	UNIVERSAL MACHINES LTD.

NOTE: Final list of makes/Sub-vendors are subjected to BHEL/Customer approval, during contract stage, without any commercial implications.



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **III**

SUB-SECTION:

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SECTION III

DOCUMENTS TO BE SUBMITTED BY BIDDER



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **IIIA**

SUB-SECTION:

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SECTION IIIA

**GUARANTEE SCHEDULE
(TO BE SUBMITTED ALONG WITH THE BID BY ALL BIDDERS)**



TECHNICAL SPECIFICATION FOR RATE CONTRACT OF
MISC PUMPS (HORIZONTAL)
SCHEDULE OF PERFORMANCE GUARANTEES

SPECN. NO.: PE-TS-RC-100-N002

SECTION: IIIA

REV. NO. 0 DATE: 14.06.2019

Following parameters are guaranteed for following pumps

Sl. No.	Pump Description	Guaranteed Capacity	Guaranteed TDH	Guaranteed Pump Eff.	Guaranteed Motor Eff.	Guaranteed Power consumption at inlet to motor	Pump model	Motor Rating	Pump GD ² Value for HT motor only	Pump RPM	T/S Curve attached for HT motor
		(M3/Hr)	(MWC)	%	%	(KW)		(KW)			
1	TYPE 1	125	60						NA		NA
2	TYPE 2	125	30						NA		NA
3	TYPE 3	125	65						NA		NA
4	TYPE 4	170	48						NA		NA
5	TYPE 5	140	55						NA		NA
6	TYPE 6	165	44						NA		NA
7	TYPE 7	95	71						NA		NA
8	TYPE 8	95	26						NA		NA
9	TYPE 9	120	60						NA		NA
10	TYPE 10	270	60						NA		NA
11	TYPE 11	270	30						NA		NA
12	TYPE 12	70	65						NA		NA
13	TYPE 13	70	30						NA		NA
14	TYPE 14	200	65						NA		NA
15	TYPE 15	200	30						NA		NA

Note: Bid evaluation and LD is applicable for all pumps as per clause 4.00.00 of Standard Technical specification for Pumps, Section II A.

We the undersigned hereby undertake to meet the performance guarantees as listed in the table above on the conditions as elsewhere specified. Any variation of the specified conditions during official tests will be taken in account by the customer

PARTICULARS OF BIDDER/ AUTHORISED REPRESENTATIVE

NAME

DESIGNATION

SIGNATURE

DATE

COMPANY SEAL



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **IIIB**

SUB-SECTION:

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SECTION IIIB

**COMPLIANCE CERTIFICATE
(TO BE SUBMITTED ALONG WITH THE BID BY ALL BIDDERS)**

	TECHNICAL SPECIFICATION FOR RATE CONTRACT OF MISC PUMPS (HOR.)	SPECN. NO.:	PE-TS-RC-100-N002, Rev.0		
	COMPLIANCE CERTIFICATE	VOLUME:	--	SECTION:	IIIB
		REV. NO.	0	DATE:	14/06/2019

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

- The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions/ deviations with regard to same.
- QP/ test procedures shall be submitted in the event of order based on the guidelines given in the specification & QP enclosed therein.

QP will be subject to BHEL/ CONSULTANT/ CUSTOMER approval in the event of order & customer hold points for inspection/ testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc.
- All drawings/data – sheets etc. to be submitted during contract shall be subject to BHEL/ CONSULTANT/ CUSTOMER approval.
- There are no other deviation with respect to specification other than those furnished in the 'Schedule of Deviations'.
- Bidder shall include the cost of Mandatory Spares, unless specified otherwise in Sec-IA of the specification or NIT.

Any mandatory spares stated as not applicable, shall have to be supplied without any cost implication to BHEL in the event they are found to be applicable during detail engineering stage.
- The offered materials should be either equivalent or superior to those specified. Also for components where material is not specified it shall be suitable for intended duty. All materials shall be subject to approval in the event of order.
- Prices for recommended spares (if any) for 3 years operation shall be furnished separately & not included in the base price.
- The commissioning spares (if any) are supplied on 'As Required Basis' & prices for same included in the base price (If bidders reply to this is "No commissioning spares are required" and if some spares are actually required during commissioning same shall be supplied by bidder without any cost to BHEL).
- All sub vendors shall be as per BHEL/CONSULTANT/CUSTOMER approved list.
- Tests for noise, vibration, parallel running etc. for pumps shall be conducted at site by Pump Vendor/BHEL as per cl. no. 3.04.00 of Section-IIA and if the site performance is found not meeting the requirements in any respect as specified, than the equipment shall be rectified or replaced by the vendor, at his own cost.
- Any special tools & tackles, if required, shall be in bidder's scope.
- All models offered have been supplied by bidder in the past and are meeting the experience qualifying criteria of BHEL/CONSULTANT/CUSTOMER (viz. offered model is successfully operating in two separate stations for at least one year or as specified in technical PQR). Any deviation to this criteria shall be suitably highlighted in deviation schedule.
- All selected motor ratings have minimum margins as per Datasheet A, Section ID.

We the undersigned hereby undertake to meet the compliance requirements as listed above on the conditions as elsewhere specified.

PARTICULARS OF BIDDER/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **IIIC**

SUB-SECTION:

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SECTION IIIC

**DEVIATION SCHEDULE
(TO BE SUBMITTED ALONG WITH THE BID BY ALL BIDDERS)**



TITLE

**SCHEDULE OF TECHNICAL DEVIATION FROM
TECHNICAL SPECIFICATION FOR RATE
CONTRACT OF MISC PUMPS (PE-TS-RC-100-N002)**

SPECIFICATION NUMBER
PE-TS-RC-100-N002, REV00

SECTION IIIC

SHEET OF

We the undersigned hereby certify that the above mentioned are the only deviations.

PARTICULARS OF BIDDER / AUTHORISED REPRESENTATIVE

NAME	DESIGNATION	SIGNATURE	DATE	

COMPANY SEAL



TITLE:

**TECHNICAL SPECIFICATION
FOR RATE CONTRACT
OF
MISC PUMPS**

SPEC. NO.: **PE-TS-RC-100-N002**

SECTION: **IIID**

SUB-SECTION:

REV. NO. **0** DATE **14/06/2019**

SHEET **1** OF **1**

SECTION IIID

DATA SHEET – B FOR PUMPS

ELECTRICAL LOAD DATA FORMAT

CABLE SCHEDULE

MOTOR DATASHEET-C

**(TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF
CONTRACT)**

		PROJECT: MISCELLANEOUS PUMPS DATASHEET - B		VENDOR DOC. NO.	REV NO.
				BHEL DOC. NO.	REV NO.
SL.	DESCRIPTION	UOM	PUMP DATA	PUMP DATA	PUMP DATA
1.0	GENERAL				
1.1	Designation of the Pump				
1.2	Manufacturer				
1.3	Model No.				
1.4	No. of pumps	Nos.			
1.5	System Design Pressure	Kg/cm ²			
1.6	Specific Gravity of fluid to be handled	-			
2.0	PERFORMANCE PARAMETERS				
2.1	Performance standard				
2.2	Rated capacity. (No negative tolerance)	M ³ /hr			
2.3	Total Dynamic Head (TDH) at rated capacity (No negative tolerance)	MWC			
2.4	Shut off head	MWC			
2.5	Range of Operation of the Pump				
	a) Min.Flow	M ³ /hr			
	b) Max.Flow	M ³ /hr			
2.6	The pumps offered have continuously rising head capacity curves from the duty point towards shut off point.				
2.7	The pumps offered have stable rising H-Q curves within the "Range of Operation"				
2.8	Pump rated speed	RPM			
2.9	Vibration measurements (2.9.2 is applicable in addition to 2.9.1 for Pumps with speed less than 600 RPM)				
2.9.1	Max.value of vibration on any pump /motor bearing w.r.t. velocity (Vrms) as per ANSI/ HIS 9.6.4 for speed > 600 RPM				
	a) Guaranteed at manufacturer's works	mm/s			
	b) Guaranteed at site	mm/s			
2.9.2	Max.value of vibration on any pump /motor bearing w.r.t. peak to peak amplitude as per ANSI/ HIS 9.6.4 for speed <= 600 RPM				
	a) Guaranteed at manufacturer's works	microns			
	b) Guaranteed at site	microns			
2.10	Max. noise Level (Guaranteed at site)	dB			
2.11	Guaranteed Pump efficiency at rated head & rated capacity without -ve tolerance	%			
2.12	Power consumption				
	a) Guaranteed pump input power at duty point	KW			
	b) Guaranteed max. Pump input power within range of operation.	KW			
	c) Max. pump input power at shut off	KW			
	d) Guranteed power at motor input	KW			
2.13	NPSH required at rated capacity	MWC			
3.0	DESIGN & CONSTRUCTION FEATURES				
3.1	Type of pump casing				
3.2	Pump duty				
3.3	Type of Impeller				
3.4	Location				
3.5	Pump suitable for parallel operation				
3.6	Torque speed curve of the pump & drive motor furnished for pumps with drive motor rating of 100 KW and above.				
3.7	Pump number of stages				

		PROJECT: MISCELLANEOUS PUMPS DATASHEET - B		VENDOR DOC. NO.		REV NO.	
				BHEL DOC. NO.		REV NO.	
SL.	DESCRIPTION	UOM	PUMP DATA	PUMP DATA	PUMP DATA		
3.8	Specific speed $N = \text{RPM} \times (\text{Flow in USGPM})^{1/2} / (\text{Head in Ft.})^{3/4}$						
3.9	Minimum suction head required in MLC for pump operation at maximum discharge point within the 'Range of Operation' specified (NPSHR at max. flow).						
3.10	Whether pump is suitable/ designed so that pump internals can be attended without disturbing suction and discharge piping.						
3.11	Type of coupling between pump & motor						
3.12	Bearing (DE & NDE)						
	a) Type and manufacturer						
	b) Bearing no.						
	c) Type of lubrication						
	d) Design life (Hrs.)						
3.13	Shaft Sealing arrangement						
	a) Type and manufacturer						
	b) Sealing liquid						
	c) Requirement of external water if any						
	i) Quality						
	ii) Quantity/ Pump	M ³ /hr					
3.14	In case separate oil/grease/water pump or any such equipment required for bearing lubrication/stuffing box gland sealing, furnish full technical details of these equipment and their drive.						
4.0	MATERIAL OF CONSTRUCTION (Indicate applicable code/ standard)						
4.1	Casing						
4.2	Impeller						
4.3	Shaft						
4.4	Shaft sleeves						
4.5	Wear ring						
4.6	fasteners						
4.7	Gland						
4.8	Lantern ring						
4.9	Mechanical seals (faces)/						
	Gland packing						
4.10	Base plate						
5.0	CONNECTIONS AND OTHER DIMENSIONAL DETAILS						
5.1	Impeller diameter	mm					
6.0	DRIVE DATA						
6.1	Drive unit output at 50°C ambient condition	KW/ P					
7.0	INSPECTION & TESTING						
7.1	Material test						
7.2	Hydrostatic test pressure	Kg/cm ²					
7.3	Hydrostatic test duration	Min.					
7.4	Performance test on pump at shop						
7.5	Dyanamic balance test						
8.0	WEIGHT AND LOADING DATA						
8.1	Weight of the pump & drive assembly	Kg					
8.2	Weight of the heaviest piece to be handled	Kg					
8.3	Size of base plate (length x width)	mm					

ANNEXURE III

[illegible]

	TITLE MOTORS DATA SHEET – C	SPECIFICATION NO.
		VOLUME II B
		SECTION D
		REV NO. 00 DATE
		SHEET 1 OF 2

S. No.	Description		Data to be filled by successful bidder
A.	General		
1	Manufacturer & country of origin		
2	Motor type		
3	Type of starting		
4	Name of the equipment driven by motor & Quantity		
5	Maximum Power requirement of driven equipment		
6	Rated speed of Driven Equipment		
7	Design ambient temperature		
B.	Design and Performance Data		
1	Frame size & type designation		
2	Type of duty		
3	Rated Voltage		
4	Permissible variation for		
5	a	Voltage	
6	b	Frequency	
7	c	Combined voltage & frequency	
8	Rated output at design ambient temp (by resistance method)		
9	Synchronous speed & Rated slip		
10	Minimum permissible starting voltage		
11	Starting time in sec with mechanism coupled		
12	a) At rated voltage		
13	b) At min starting voltage		
14	Locked rotor current as percentage of FLC (including IS tolerance)		
15	Torque		
	a) Starting		
	b) Maximum		
16	Permissible temp rise at rated output over ambient temp & method		
17	Noise level at 1.0 m (dB)		
18	Amplitude of vibration		
19	Efficiency & P.F. at rated voltage & frequency		
	a) At 100% load		
	c) At 75% load		

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	TITLE MOTORS DATA SHEET – C	SPECIFICATION NO.
		VOLUME II B
		SECTION D
		REV NO. 00 DATE
		SHEET 2 OF 2

S. No.	Description	Data to be filled by successful bidder
	c) At starting	
C.	Constructional Features	
1	Method of connection of motor driven equipment	
2	Applicable Standard	
3	DOP of Enclosure	
4	Method of cooling	
5	Class of insulation	
6	Main terminal box	
	a) Type	
	b) Power Cable details (Conductor, size, armour/unarmour)	
	c) Cable Gland & lugs details (Size, type & material)	
	d) Permissible Fault level (kArms & duration in sec)	
7	Space heater details (Voltage & watts)	
8	Flame proof motor details (if applicable)	
	a) Enclosure	
	b) suitability for hazardous area	
	i Zone	O / I / II
	ii Group	IIA / IIB / IIC
9	No. of Stator winding	
10	Winding connection	
11	Kind of rotor winding	
12	Kind of bearings	
13	Direction of rotation when viewed from NDE	
14	Paint Shade & type	
15	Net weight of motor	
16	Outline mounting drawing No (To be enclosed as annexure)	
D.	Characteristic curves/ drawings (To be enclosed for motors of rating $\geq 55KW$)	
	a) Torque speed characteristic	
	b) Thermal withstand characteristic	
	c) Current vs time	
	d) Speed vs time	

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NAME	SIGNATURE	DATE			

	TITLE MOTOR DATA SHEET - C	SPECIFICATION NO.	
		VOLUME	II B
		SECTION D	
		REV NO. 00 DATE 08/09/2010	
		SHEET	1 OF 7

LT MOTORS

A. GENERAL

1. Manufacturer & Country of origin.
(Shall be as per approved QA make)
2. Equipment driven by motor
3. Motor type
4. Quantity

B. DESIGN AND PERFORMANCE DATA

1. Frame size
2. Type of duty
3. Type of enclosure /Method of cooling/Degree of protection
4. Applicable standard to which motor generally conforms
5. Efficiency class as per IS 12615
6. (a) Whether motor is flame proof Yes/No
(b) If yes, the gas group to which it conforms as per IS:2148
7. Type of mounting
8. Direction of rotation as viewed from DE END__
9. Standard continuous rating at 40 deg.C. ambient temp. as per Indian Standard (KW)
10. Derated rating for specified normal condition i.e. 50 deg. C ambient temperature (KW)
11. Maximum continuous load demand of driven equipment in KW
12. Rated Voltage (volts)
13. Permissible variation of :

NAME OF VENDOR			SEAL	REV.	
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	TITLE MOTOR DATA SHEET - C	SPECIFICATION NO.		
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- a. Voltage (Volts)
 - b. Frequency (Hz)
 - c. Combined voltage and frequency
14. Rated speed at rated voltage and frequency(RPM)
15. At rated Voltage and frequency:
 - a. Full load current
 - b. No load current
16. Power Factor at
 - a. 100% load
 - b. NO load
 - c. Starting.
17. Efficiency at rated voltage and frequency,
 - a. 100% load
 - b. 75% load
 - c. 50% load
18. Starting current (amps) at
 - a. 100 % voltage
 - b. 85% voltage
 - c. 80% voltage
19. Minimum permissible starting Voltage (Volts)
20. Starting time with minimum permissible voltage
 - a. Without driven equipment coupled
 - b. With driven equipment coupled

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	TITLE MOTOR DATA SHEET - C	SPECIFICATION NO.	
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21. Safe stall time with 100% and 110% of rated voltage
 - a. From hot condition
 - b. From cold condition
22. Torques :
 - a. Starting torque at min. permissible voltage(kg-mtr.)
 - b. Pull up torque at rated voltage.
 - c. Pull out torque
 - d. Min accelerating torque (kg.m) available
 - e. Rated torque (kg.m)
23. Stator winding resistance per phase (ohms at 20 Deg.C.)
24. GD^2 value of motors
25. No of permissible successive starts when motor is in hot condition
26. Locked Rotor KVA Input
27. Locked Rotor KVA/KW
28. Vibration limit :Velocity (mm/s)
29. Noise level limit (dBA)

C. CONSTRUCTIONAL FEATURES

1. Stator winding insulation
 - a. Class & Type
 - b. Winding Insulation Process
 - c. Tropicalised (Yes/No)

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	TITLE MOTOR DATA SHEET - C	SPECIFICATION NO.	
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- d. Temperature rise over specified maximum ambient temperature of 50 deg C
 - e. Method of temperature measurement
 - f. Stator winding connection
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 envisaged by owner)
 - e. Fault level (MVA), Fault level duration (sec)
 - f. Cable glands & lugs details (shall be suitable for power cable)
3. Type of DE/NDE Bearing
4. Motor Paint shade
5. Weight of
 - a. Motor stator (KG)
 - b. Motor Rotor (KG)
 - c. Total weight (KG)

D. List of accessories.

1. Space Heaters (Applicable for 30 KW & above motor)
(Nos./Power in watts/supply voltage)
2. Terminal Box for Space Heater (Yes/No)
3. Speed switch (Yes/No)
No of contacts and contact ratings of speed switch

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NAME	SIGNATURE	DATE			

	TITLE MOTOR DATA SHEET - C	SPECIFICATION NO.	
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4. Insulation of bearing (Yes/No)

5. Noise reducer(Yes/No)

6. Grounding pads

i) No and size on motor body

ii) Nos on terminal Box

7. Vibration pads

i) Nos and size

ii) Location

8. Any other fitments

E. List of curves.

1. Torque speed characteristic of the motor

2. Thermal withstand characteristic

3. Starting. current Vs. Time

4. Starting. current Vs speed

5. P.F. and Effi. Vs Load

F. Additional Data to be filled for each rating of DC Motor

1. Rated armature voltage (Volt)

2. Rated field excitation (Amp)

3. Permissible % variation in voltage

4. Minimum Permissible Starting voltage (volt)

5. At rated voltage

i) Full load Armature current.(Amp)

ii) Full load Field current (Amp)

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	TITLE MOTOR DATA SHEET - C	SPECIFICATION NO.	
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- iii) No load Armature current (Amp)
6. Full load Field current (Amp)
7. No load Armature current (Amp)
8. Minimum permissible field current(Amp) to avoid overspeeding at
 - i) Maximum permissible voltage
 - ii) Rated voltage
 - iii) Minimum Permissible Voltage
9. Resistance (indicative Values) in ohm
 - i) Armature winding (Arm + IP + Series) at 25 deg.C
 - ii) Field Winding at 25 deg. C
10. Inductance (indicative values)
 - i) Armature winding
 - ii) Field winding
11. Value of trimmer resistance (ohm) to be connected in series with the shunt field to obtain rated speed at
 - i) 220 V DC
 - ii) 250 V DC
 - iii) 187 V DC
12. Value of the external resistance (ohm) required to be connected in series with armature during starting only
13. Technical data sheet for external resistance box
14. GA drawing of motor
15. Starting time calculation

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16. Starter resistance design calculation
17. Electrical connection diagram of motor

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

GST related Corrigendum to GCC Rev 06

Clause Ref:	Existing Clause as:	Replaced/ New Clause as:
Clause No.4 of GCTC (General commercial terms and conditions)	TAXES AND DUTIES 4.1 EXCISE DUTY 4.1.1 Seller/ Contractor is required to ensure that excise duty including cess, if any, is quoted as per the existing tariff on the date of the offer and all benefits as per existing rules have been considered. 4.1.2 Excise duty actually incurred by Seller/ Contractor on self-manufactured items alone shall be reimbursed against documentary evidence. Excise duty paid by Purchaser on inputs, bought out items, raw materials and components consigned directly to site from sources other than Seller/ Contractor's factory/ works shall be included by the bidder in the quoted basic price. 4.1.3 If excise duty is paid under protest or dispute, it shall not be reimbursed till the dispute is settled. If the Seller/ Contractor claims/ obtains any refund of the excise duty paid, the same shall be refunded to the Purchaser immediately 4.1.4 Invoice cum Excise duty gate pass (Excise Invoice) should contain the name of the ultimate consignee as per Order/ Contract/ Special Conditions of Contract. 4.1.5 If required by Purchaser, the Seller / Contractor will provide a certificate stating that CENVAT benefit has been availed of on the inputs and the same has been passed on to the Purchaser. 4.1.6 Excise duty shall be paid at actuals against documentary evidence but restricted to the amount and percentage indicated in the Order/ Contract. 4.2 SALES TAX / VALUE ADDED TAX (VAT) 4.2.1 Central Sales Tax / Value Added Tax shall be reimbursed only if the same is paid by the Seller / Contractor to the respective Govt. authorities on direct sales by the Seller/ Contractor to the Purchaser, meeting all statutory requirements and availing all exemptions/ concessions under the respective Central Sales Tax / Value Added Tax Acts. The offer should clearly indicate CST/ VAT percentage and the total	TAXES AND DUTIES 4.1 CGST/SGST/UTGST/IGST 4.1.1 Seller/ Contractor is required to ensure that CGST/SGST/UTGST/IGST (whichever is applicable) is quoted as per the existing tariff on the date of the offer and all benefits as per existing laws have been considered. 4.1.2 It is the responsibility of the seller/contractor to issue the Tax Invoice strictly as per the format prescribed under the relevant applicable GST law (CGST Act/SGST Act/UTGST Act/IGST Act). Vendor to indicate the proper GSTN Registration/ HSN code in their tax invoice. 4.1.3 The purchaser is registered in the State of Uttar Pradesh vide following GST registration number: 09AAACB4146P22C 4.1.4 Seller/contractor is required to mention the above registration number in their tax invoice unless stated otherwise in NIT/SCC. 4.1.5 CGST/SGST/UTGST/IGST shall be paid at actuals against Tax Invoice but restricted to the amount and percentage in the order/contract

GST related Corrigendum to GCC Rev 06

	amount along with concessional form(s), if any. 4.2.2 Purchaser is registered in NOIDA, U.P. vide following Registration Numbers: Central Sales Tax Registration No. : ND – 5341151 w.e.f. 01-07-2006 UP Trade Tax Registration No. : ND – 0345307 w.e.f. 01-07-2006 UP TIN No. : 09765702874 4.2.3 Central Sales Tax/ Value Added Tax shall be reimbursed, as per tariff applicable, but restricted to the percentage and amount shown in the Order/ Contract. If it is shown as included in the quoted price/ not applicable, it will not be reimbursed by the Purchaser. 4.2.4 Purchaser proposes to make sale-in-transit under section 6 (2) (b) of Central Sales Tax Act where goods movement is inter-state. Form-C shall be issued and exchanged against Form-E1/E2 based on quarterly transactions. Seller/Contractor is required to submit his request in the format enclosed at Annexure-VI within 30 days from end of the Quarter, giving State-wise invoice details. 4.2.5 VAT invoices, in format prescribed by the respective State Sales Tax Act, have to be submitted in the name of Nodal Agency specified in Special Conditions of Contract. 4.3 SERVICE TAX 4.3.1 Service Tax paid by the Service Provider /contractor to the Government authorities directly shall only be reimbursed at actuals against documentary evidence, but restricted to the rate and amount mentioned in the order/contract. The offer should clearly indicate the percentage and the total amount of service tax. 4.3.2 Service provider/Contractor to ensure their registration for “Intended Service” to be provided, before claiming Service tax under the “intended category”. Decision of BHEL shall be final w.r.t. the “Intended category” in which the service will be falling. 4.3.3 If required by the Purchaser, the Service Provider/Contractor will provide a certificate stating that “CENVAT Benefit has been availed of on the input and the	4.2 OTHER TAXES & LEVIES 4.2.1 All taxes/duties/Cess other than CGST/SGST/UTGST/IGST shall be deemed to be included in the Ex-Works prices unless specified otherwise by the bidder in the price bid. No variation in other taxes and duties shall be payable by Purchaser. 4.3 CUSTOMS DUTY
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	same has been passed on to the purchaser” or “CENVAT Benefit has not been availed of on the inputs”. 4.4 OTHER TAXES & LEVIES All taxes and duties other than Excise Duty, Sales Tax/ VAT, Service Tax shall be deemed to be included in the Ex-Works prices unless specified otherwise by the bidder in the price bid. No variation in other taxes and duties shall be payable by Purchaser. However, statutory variation in Octroi will be payable extra against documentary evidence. 4.5 CUSTOMS DUTY 4.5.1 Customs Duty element for imported items as per Special Conditions of Contract shall be included in the Ex-Works prices. No variation in customs duty and exchange rate for imported items shall be payable by Purchaser. 4.5.2 Seller/ Contractor shall arrange for his own import license, if required, since Purchaser will not provide any import license. Therefore, Seller/ Contractor alone shall be responsible for any delay in getting import license or non-availability of the same or completion of other related formalities. Purchaser shall not be responsible for any financial liability, whatsoever, on this account. 4.5.3 Essentiality Certificate or Project Authority Certificate (PAC) as per Import Policy, if required to avail concessional customs duty, shall be clearly specified in the offer. Import content (CIF value in rupees) with list of items, quantity, foreign currency, country of origin etc., shall be submitted by the bidder as part of Price bid. 4.6 DIRECT TAX 4.6.1 Purchaser shall not be liable towards income tax of whatever nature including variations thereof, arising out of this Order/ Contract, as well as tax liability of the Seller/ Contractor and his personnel.	4.3.1 Customs Duty/IGST/Goods and Services compensation cess under Goods and Services Tax (Compensation to States) Act, 2017 element for imported items as per Special Conditions of Contract shall be included in the Ex-Works prices. 4.3.2 Seller/ Contractor shall arrange for his own import license, if required, since Purchaser will not provide any import license. Therefore, Seller/ Contractor alone shall be responsible for any delay in getting import license or non-availability of the same or completion of other related formalities. Purchaser shall not be responsible for any financial liability, whatsoever, on this account. 4.3.3 Essentiality Certificate or Project Authority Certificate (PAC) as per Import Policy, if required to avail concessional customs duty, shall be clearly specified in the offer. Import content (CIF value in rupees) with list of items, quantity, foreign currency, Country of origin etc., shall be submitted by the bidder as part of Price bid. 4.4 DIRECT TAXES 4.4.1 Purchaser shall not be liable towards income tax of whatever nature including variations thereof, arising out of this Order/ Contract, as well as tax liability of the Seller/ Contractor and his personnel. 4.4.2 Deductions of Tax at source at the prevailing rates shall be effected by the Purchaser before release of payment, as a statutory obligation, if applicable. TDS certificate will be issued by the Purchaser as per statutory provisions
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	4.6.2 Deductions of Tax at source at the prevailing rates shall be effected by the Purchaser before release of payment, as a statutory obligation, if applicable. TDS certificate will be issued by the Purchaser as per statutory provisions.	
	5.0 STATUTORY VARIATION 5.1 If the rates for taxes and duties in respect of the quoted materials and/ or services assumed by the Seller/ Contractor are less than the tariff prevailing at the time of tendering, Seller/ Contractor will be responsible for such under quotations. However, if the rates assumed are higher than the correct rates prevailing at the time of tendering, the difference will be to the credit of the Purchaser. 5.2 Statutory Variations in Excise Duty, Service Tax and Central Sales Tax/ Value Added Tax only on self-manufactured items/ services rendered by vendor himself on the rates prevailing at the time of delivery/ completion in comparison to the date of offer, will be to the account of the Purchaser. No other variations such as on customs duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the Purchaser. 5.3 Notwithstanding the above, where the actual completion of the supply occurs beyond the period stipulated in the Order/ Contract or any extension thereof, variations referred to above, will be limited to the rates prevailing on the dates of such agreed completion periods only. For variations after the agreed completion periods, the Seller/ Contractor alone shall bear the impact for the upward revisions and for downward revisions; purchaser shall be given the benefit of reduction in taxes/ duties. This will be without prejudice to the levy of penalty for delay in delivery/ completion schedule. 5.4 Any new tax structure (like Goods & Services Tax) as and when implemented by the Government shall become applicable in addition to or in lieu of existing tax structure.	5.0 STATUTORY VARIATION 5.1 Statutory variation for CGST/SGST/UGST/IGST is available provided the actual completion of supply does not occur beyond the period stipulated in the order/contract or any extension (without levy of penalty). 5.2 For variation after the agreed completion periods, the seller/contractor alone shall bear the impact for the upwards revisions and adjust the price in their basic price in such a manner that total price with tax matches with the ex-works with taxes of Purchase Order/Contract. For downward revisions, purchaser shall be given the benefit of reduction in CGST/SGST/UGST/IGST. This will be without prejudice to the levy of penalty for delay in delivery/completion schedule. 5.4 No other variations such as on Custom Duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the purchaser.

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Clause 8	8.0 TRANSPORTATION & FREIGHT CHARGES 8.1 All dispatches shall be through road carriers approved by Purchaser/ Bank, on freight pre-paid basis. 8.2 Road permit/ entry permit, if required as per law of the State, shall be arranged by Purchaser. 8.3 Freight charges (including Service Tax) shall be payable after delivery of the goods at the project site, on receipt of MRC or receipted LR on pro-rata basis.	8.0 TRANSPORTATION & FREIGHT CHARGES 8.1 All dispatches shall be through road carriers approved by Purchaser/ Bank, on freight pre-paid basis. 8.2 Road Permit/E-way bill, if required, will be arranged by Supplier.
	9.0 TERMS OF PAYMENT 9.1 SUPPLY PACKAGES 9.1.1 Ninety percent (90%) of basic price of materials supplied, as per PO, along with 100% taxes and duties (as applicable), shall be paid against receipt of material at site on pro-rata basis. 9.1.2 Ten percent (10%) of basic price of materials supplied will be released on pro-rata basis after receipt of Material Receipt Certificate (MRC) from project site engineer of Owner/ Purchaser, on submission of all final documents for the packages as detailed below, duly certified by Engg. Deptt. of purchaser, and submission of Form E1/ E2 against Form-C, if applicable. List of packages with required final documents is as per Annexure-X. 9.2 SUPPLY PACKAGES WITH PERFORMANCE GUARANTEE / DEMONSTRATION TEST AT SITE IN VENDOR'S SCOPE 9.2.1 Eighty Five percent (85%) of basic price of materials supplied, as per PO / approved billing schedule, along with 100% taxes and duties (as applicable), shall be paid against receipt of material at site on pro-rata basis. 9.2.2 Ten percent (10%) of basic price of materials supplied will be released on pro-rata basis after receipt of Material Receipt Certificate (MRC) from project site engineer of Owner/ Purchaser and submission of Form E1/ E2 against Form-C, if applicable. 9.2.3 Five percent (5%) of the total basic price of materials and PG/ Demonstration test charges shall be released after submission of all final documents as per Technical	9.0 TERMS OF PAYMENT 9.1 SUPPLY PACKAGES Payment of basic price of materials supplied alongwith freight and taxes and duties (as applicable), shall be paid against receipt of material at site on pro-rata basis. 10% of basic price of materials supplied will be retained as security deposit which will be released on pro – rata basis after receipt of Material Receipt Certificate (MRC) from project site engineer of owner/purchaser on submission of all the final documents for the packages as detailed below, duly certified by engineering department of purchaser. List of packages with required final documents is as per Annexure-X. 9.2 Supply packages with performance guarantee/demonstration test at site in vendor's scope Payment of basic price of materials supplied, as per PO/ as per approved billing schedule, along with freight and taxes and duties (as applicable), shall be paid against receipt of material at site on pro-rate basis. 15% of basic price of materials supplied will be retained as security deposit which will be released on pro – rata basis as details below: a) 10% will be released after receipt of Material Receipt Certificate (MRC) from project site engineer of owner/purchaser.

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Specifications and successful completion of the Performance Guarantee (PG)/ Demonstration Test at site. Note: If the Performance Guarantee/ Demonstration Test is not conducted up to 24 months from supply completion for reasons not attributable to the vendor, then last 5% payment will be released against Bank Guarantee of an equivalent amount, valid for 12 months. This bank guarantee will be in addition to Contract Performance Bank Guarantee for 10% of the contract value (excluding taxes, duties and freight). 9.3 SUPPLY PAYMENT FOR TURNKEY PACKAGES (E&C IN VENDOR'S SCOPE) 9.3.1 Eighty Five percent (85%) of basic price of materials supplied, as per approved billing schedule, along with 100% taxes and duties (as applicable), shall be paid against receipt of material at site on pro-rata basis. OR i) Five percent (5%) lump sum payment of total basic price (excluding taxes, duties & freight) against approval of design documents and quality plan as certified by Engineering. Design documents and quality plan shall be as defined in the Technical Specifications. ii) Eighty percent (80%) of basic price of materials supplied, as per approved billing schedule, along with 100% taxes and duties (as applicable), shall be paid against receipt of material at site on pro-rata basis. 9.3.2 Five percent (5%) of basic price of materials supplied along with freight, if applicable, will be released on pro-rata basis after submission of Material Receipt Certificate (MRC) from project site engineer of Owner/ Purchaser and submission of Form E1/ E2 against Form-C, if applicable. Collection of Material Receipt Certificate from Site/ Owner and its submission for claiming the payment shall be the responsibility of the Seller/ Contractor. 9.3.3 Ten percent (10%) of the total basic price shall be released after i) submission of all final documents as per Technical Specifications and ii) successful completion of	b) 5% will be released after submission of final documents as per technical specification and successful completion of the performance guarantee (PG)/ Demonstration test at site. Note: If the Performance Guarantee/ Demonstration Test is not conducted up to 24 months from supply completion for reasons not attributable to the vendor, then 5% security deposit will be released against Bank Guarantee of an equivalent amount, valid for 12 months. This bank guarantee will be in addition to Contract Performance Bank Guarantee for 10% of the contract value (excluding taxes, duties and freight). 9.3 SUPPLY PAYMENT FOR TURNKEY PACKAGES (E&C IN VENDOR'S SCOPE) 9.3.1 Payment of basic price of materials supplied, as per approved billing schedule, along with freight, taxes and duties (as applicable), shall be paid against receipt of material at site on pro-rata basis. 15% of basic price of materials supplied will be retained as security deposit which will be released on pro – rata basis as details below: a) 5% will be released on pro-rata basis after submission of Material Receipt Certificate (MRC) from project site engineer of owner/purchaser. Collection of Material Receipt Certificate from site/owner and its submission for claiming the payment shall be the responsibility of the Seller/Contractor. b) 10% will be released after i) submission of all final documents as per Technical Specifications and ii) successful completion of Performance Guarantee (PG)/ Demonstration Test and handing over of the system/ package, if applicable, as per Order/ Contract
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	Performance Guarantee (PG)/ Demonstration Test and handing over of the system/ package, if applicable, as per Order/ Contract. 9.4 ERECTION & COMMISSIONING PAYMENT FOR TURNKEY PACKAGES 9.4.1 Eighty percent (80%) payment on pro-rata basis for the work completed, as per approved billing schedule, shall be released by Site authorities/ Region on submission of protocols, duly signed by BHEL Site/ Owner. 9.4.2 Ten percent (10%) of the total value shall be released by Site authorities/ Region on successful commissioning of the complete system/ package. 9.4.3 Ten percent (10%) of the total value shall be released by Site authorities/ Region on successful completion of PG/ Demonstration test(s) and handing over system/ package to the Owner, as applicable. 9.5 PG TEST, INSTALLATION CHECK, SUPERVISION OF ERECTION / COMMISSIONING CHARGES 100% payment shall be released after successful completion of the activity, on Site certification. 9.6 Vendors shall submit documents for payment directly to BHEL. Payment will be released within 60 days after receipt of complete documents as per order/ contract (45 days for vendors qualified and registered as Micro or Small as per MSMED Act). To be eligible for payment as Micro and Small category, vendors shall submit annual certification for validation from designated authority under MSMED Act or Chartered Accountant within first quarter of every financial year. . <u>Note:</u> 1) For indigenous suppliers, if the documents are routed through Bank, then all bank charges will be to vendor's account. 2) Foreign bidders can opt for payment (less agency commission, if applicable) through irrevocable and unconfirmed letter of credit. In that case for	9.4 ERECTION & COMMISSIONING PAYMENT FOR TURNKEY PACKAGES 9.4.1 Eighty percent (80%) payment on pro-rata basis for the work completed, as per approved billing schedule, shall be released by Site authorities/ Region on submission of protocols, duly signed by BHEL Site/ Owner. 9.4.2 Ten percent (10%) of the total value shall be released by Site authorities/ Region on successful commissioning of the complete system/ package. 9.4.3 Ten percent (10%) of the total value shall be released by Site authorities/ Region on successful completion of PG/ Demonstration test(s) and handing over system/ package to the Owner, as applicable. 9.5 PG TEST, INSTALLATION CHECK, SUPERVISION OF ERECTION / COMMISSIONING CHARGES 100% payment shall be released after successful completion of the activity, on Site certification. 9.6 Vendors shall submit documents for payment directly to BHEL. Payment will be released within 60 days after receipt of complete documents as per order/ contract (45 days for vendors qualified and registered as Micro or Small as per MSMED Act). <u>Note:</u> 1) Vendors are required to issue Tax Invoice inclusive of PVC value (if applicable) wherever indices are available. 2) For indigenous suppliers, if the documents are routed through Bank,
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	evaluation purpose, prices of foreign bidders will be loaded on account of payment through LC, equal to loading specified against 'Payment through Bank' in Annexure-VIII. No loading will be done if foreign vendors agree for 90 days usance LC or submit the documents on collection basis for payment within 90 days of submission of complete documents. 3) LC opening/ negotiation/ confirmation charges will be to vendor's account. 4) Form C/ E1/E2 are not applicable for foreign bidders. 5) In extreme case of vendors not agreeing to link 10% payment with submission of Form E1/ E2 against Form-C as above, their prices will be loaded as per Annexure-VIII. 6) Any negative PVC, if not adjusted in earlier payments, will be adjusted at the time of MRC payment. 7) Payment terms for mandatory spares shall be as per clause 9.1.	then all bank charges will be to vendor's account. 3) Foreign bidders can opt for payment (less agency commission, if applicable) through irrevocable and unconfirmed letter of credit. In that case for evaluation purpose, prices of foreign bidders will be loaded on account of payment through LC, equal to loading specified against 'Payment through Bank' in Annexure-VIII. No loading will be done if foreign vendors agree for 90 days usance LC or submit the documents on collection basis for payment within 90 days of submission of complete documents. 4) LC opening/ negotiation/ confirmation charges will be to vendor's account. 5) Payment terms for mandatory spares shall be as per clause 9.1. 9.7 The applicable TDS under CGST/SGST/UGST/IGST/ Goods and Services (Compensation to States) Act will be deducted from the payments. 9.8 Other clauses 1. Vendor/Supplier will intimate & upload the Tax invoice along with LR/RR(as applicable) on web portal & intimate BHEL immediately on removal of goods from vendor/supplier works. In case of Services, Vendor is required to upload the Tax invoice on Web Portal immediately after raising the invoice. BHEL will issue the delivery order/instruction to dispatch the material to the customer as indicated in SCC. 2. All payments against Tax Invoice to vendors/contractors shall be released only after:
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		a) Vendor/contractor declaring such invoice in GSTR-1 within the prescribed timeline as per the relevant Act. b) The tax component charged by the vendor in the invoice should be matched with the details uploaded by vendor in GSTR-1. c) Confirmation of payment of GST thereon by vendor on GSTN portal 3. In case, any GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry to timeline prescribed in the relevant Act for availing such ITC, or any other reasons not attributable to BHEL, tax amount shall be recoverable from the vendor/contractor along with interest levied/leviable on BHEL. 4. Wherein GST liability arises on BHEL under reverse charge, any interest levied/leviable due to any reasons not attributable to BHEL shall be recovered from the vendor/contractor.
Clause 9	9.7 DOCUMENTS TO BE SUBMITTED BY VENDOR 9.7.1 For Recognition of Dispatch Copy of the following documents by e-mail/ fax immediately on despatch: a. Invoice b. LR along with Delivery Order c. Packing List d. Insurance Intimation e. Dispatch Clearance 9.7.2 For Claiming Payments (under clause 9.1.1, 9.2.1, 9.3.1): a. Invoice – original+1 copy b. Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes original/ copy	9.7 All same a. to be replaced with “GST compliant invoice” in 9.7.1, 9.7.2, 9.7.3 Modification in the clause Duty drawback documents “As per applicable law” (original+1 copy.)

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	c. Delivery order- 2 copies d. Packing List - clearly showing number of packages, gross weight and net weight. - original+1 copy e. MDCC from BHEL/ Customer – as per SCC – 2 copies f. Guarantee Certificate – Original + 1 copy g. Insurance Intimation - 2 copies CQIR / Inspection Reports – Original+1 copy i. PVC Calculation and copy of all applicable indices, if PVC applicable. – 2 copies j. Duty drawback documents (original excise invoice, original disclaimer certificate, original certificate from excise authority for payment of excise duty), if applicable. – original + 1 copy 9.7.3 For Claiming Freight Payment a. Invoice – Original + 1 copy b. Receipted LR (signed & stamped)/ confirmation from site regarding receipt of packages/ Boxes original/ copy c. Transporter's document indicating the freight amount. Original money receipt to be submitted if required as per SCC. 9.7.4 For Claiming MRC Payment a. Invoice – Original + 1 copy b. Copy of MRC 9.7.5 For Claiming Payment for Services involving Service Tax a. Invoice as per rule 4A of Service Tax Act – Original + 1 copy b. Copy of Service Tax registration certificate c. Copy of challan for Service Tax payment	
Clause 3.0 Instruction to bidders	Total erection & commissioning charges including service tax should be minimum 20% (or as specified in NIT) of the total quoted package price (excluding mandatory spares but including all taxes and freight), failing which the break-up of prices shall be adjusted accordingly for ordering.	Total erection & commissioning charges including applicable tax but excluding freight along with GST should be minimum 20% (or as specified in NIT) of the total quoted package price (excluding mandatory spares but including all taxes and freight), failing which the break-up of prices shall be adjusted accordingly for ordering.

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Clause 16.0 Instruction to bidder	For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII will apply.	For deviations w.r.t. Payment terms, Liquidated damages, Firm prices before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII will apply.
Clause 16.0 of GCTC	Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half ($\frac{1}{2}$) percent of the total contract price per week or part thereof, subject to a maximum of ten (10) percent of the total contract price excluding elements of taxes, duties and freight, if the Seller/ Contractor fails to deliver any part of the ordered stores within the period stipulated in the Order/ Contract. For Turnkey packages (Supply and E&C in vendor's scope), Liquidated Damages shall be levied on the total contract value of both Supply and E&C orders (excluding taxes, duties and freight) if E&C completion of the package is delayed beyond the contractual completion date or extension thereof. Liquidated Damages will not be withheld from supply payment. LR/ GR/ RR date for indigenous supplies and AWB/ BL date for FOB contracts shall be treated as the date of dispatch for levying LD as per Clause 16. However, for indigenous supply if receipted LR date is beyond three months from the date of LR, such excess period shall also be considered for LD purpose. 2. In case of any amendment/ revision, LD shall be linked to the amended/ revised contract value and delivery date(s)	Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half ($\frac{1}{2}$) percent plus applicable GST of the total contract price per week or part thereof, subject to a maximum of ten (10) percent of the total contract price excluding elements of taxes, duties and freight, if the Seller/ Contractor fails to deliver any part of the ordered stores within the period stipulated in the Order/ Contract. For Turnkey packages (Supply and E&C in vendor's scope), Liquidated Damages shall be levied on the total contract value of both Supply and E&C orders (excluding taxes, duties and freight) if E&C completion of the package is delayed beyond the contractual completion date or extension thereof. Liquidated Damages will not be withheld from supply payment. LR/ GR/ RR/ eway bill date for indigenous supplies and AWB/ BL date for C&F contracts shall be treated as the date of dispatch for levying LD as per Clause 16. However, for indigenous supply if receipted LR/eway bill date is beyond three months from the date of LR/e-way bill, such excess period shall also be considered for LD purpose. 2. In case of any amendment/ revision, LD shall be linked to the amended/ revised contract value and delivery date(s)

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Deviation sheet- Cost of Withdrawal	Point no-9 For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.	For deviations w.r.t. Payment terms, Liquidated damages, Firm prices before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
Annexure-VI		Deleted
Annexure-VIII		Following changes in annexure-8, (remaining portion of annex-8 is same): C) LIQUIDATED DAMAGES If maximum limit asked for is 10% or 5% of Undelivered Portion – 10% value of the total quoted price including GST & freight. If maximum limit asked is less than 10 % of contract value loading shall be to the extent to which not agreed by bidder (at offered value) . E) DEVIATION TO SUBMISSION OF FORM E1/ E2 BEFORE CLAIMING 10% PAYMENT 10% of Ex-Works supply value.
New clauses:		
a) In case of discrepancy in CGST/SGST/UTGST/IGST rate corresponding to HSN ;code and quotes rates, the evaluation shall be done on quoted price and correct CGST/SGST/UTGST/IGST rate shall be considered for ordering (limited to quoted FOR Site Price) b) The bidder should have been registered with the appropriate authority under relevant GST laws. c) The bidder to specify in their offer (part 1 bid) the category of registration under GST i.e. registered dealer and composite dealer d) No CGST/SGST/UTGST/IGST will be reimbursed to composite dealer. In the event of any GST quoted by composite dealer, the same shall be considered for evaluation purpose. However, the ordering will be done without considering the tax. e) In the event of any change in the status of vendor from composite to regular dealer after the submission of the bid but before the supply, no reimbursement of CGST/SGST/UTGST/IGST will be made. However, the vendor has to raise the invoice strictly, as per the law, by adjusting their ex-works price.		