(1) 2X800 MW USTPP, RAIGARH (PH-II), CHATTISGARH
(2) 2X800 MW USTPP, RAIPUR (PH-II),CHATTISGARH
(3) 2X800 MW USTPP, MIRZAPUR,UTTAR PRADESH
(4) 2X800 MW USTPP, KAWAI (PH-II),RAJASTHAN
(5) 2X800 MW USTPP, KORBA(PH-III),CHATTISGARH
(6) 2X800 MW USTPP, MAHAN(PH-III)SINGRAULI, MP

Customer: Adani Power
Consultant:TCE

TECHNICAL SPECIFICATION
FOR
MISC. PUMPS (HORIZONTAL)

SPECIFICATION No. PE-TS-513/515/516/522/523/524-100-W001

REV NO. 00

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA

INDEX

BHEL	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III	PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25

PROJECT INFORMATION

SL.NO	DESCRIPTION	RAIGARH-II	RAIPUR-II	MIRZAPUR	KAWAI-II	KORBA-III	MAHAN-III
1.0	**METEOROLOGICAL DATA**						
1.1	MAXIMUM TEMPERATURE	50 Deg C	49 Deg C	48.8 Deg C	48.5 Deg C	46 Deg C	48.8 Deg C
1.2	MINIMUM TEMPERATURE	9 Deg C	8 Deg C	12 Deg C	1.7 Deg C	13.9 Deg C	1 Deg C
1.3	MAXIMUM RELATIVE HUMIDITY	86%	82%	88%	90%	86%	85%
1.4	MINIMUM RELATIVE HUMIDITY	20%	35%	28%	18%	20%	20%
1.5	AVERAGE ANNUAL RAINFALL	1600 mm	1252 mm	1100 mm	761.4 mm	1300 mm	1132.7 mm
1.6	SEISMIC ZONE (AS PER IS 1893 - 2002)	Zone: II	Zone: II	Zone: III	Zone: II	Zone: III	Zone: IV
1.7	HEIGHT ABOVE MSL (Meter)	(+) 229.5	(+) 300	(+) 180.0	(+) 308.5	(+) 285	(+) 272.0
1.8	BASIC WIND SPEED (AS PER IS 875--Part III)	39 m/s	44 m/s	47 m/s	47 m/s	39 m/s	47 m/s
2.0	**ELECTRICAL DATA**						
2.1	AMBIENT TEMPERATURE FOR DESIGN OF ELECTRICAL EQUIPMENT	50 Deg C at relative humidity of 95%					
2.2	RATED FREQUENCY	50 Hz					
2.3	FREQUENCY VARIATION	(+)3 to (-)5 %					
2.4	AC VOLTAGE	415 V					
2.5	AC VOLTAGE VARIATION	+/-10 %					
2.6	FAULT LEVEL (KA/SEC)	50 KA for 1 second					

	GENERAL TECHNICAL REQUIREMENT
1	The design, manufacture and testing of the Pumps complete with all accessories, shall generally conform to the latest editions of the appropriate standards.
2	The bidder to choose a standard proven model from the range of pumps manufactured.
3	The equipment shall comply with all applicable safety codes and statutory regulations of India where the equipment is to be installed.
4	Latest codes and standards shall be applicable as on date of bid submission.
5	In the event of any conflict between the requirements of two clauses of this specification, documents or requirements of different codes and standards specified, stringent requirement as per the interpretation of the owner shall apply.
6	Drawing / documents to be submitted by bidder shall be as per "Documentation Requirement" given in this specification.
7	Bidder to note that drawing/document submission shall be through web based Document Management System. Bidder shall be provided access to the DMS for drg/doc approval and adequate training for the same. Bidder to ensure proper net connectivity at their end.
8	The first revision drawings/ documents submitted by vendor shall be complete in all respects. Incomplete drawing submitted shall be treated as non- submission with delays attributable to vendor’s account. For any clarification/ discussion required to complete the drawings, the bidder shall himself depute his personal to BHEL / Customer’s place as per the requirement for across the table submissions/ discussions/ finalizations of drawings.
9	The details of the Pumps with the quantity, design parameters, accessories etc. to be supplied shall be as per Data Sheet enclosed in this specification.
10	Any accessory/component which is not specifically mentioned but required for proper performance and safe operation of pumps and drives to be provided without any cost implication to BHEL.
11	The pumps shall be capable of running over the entire range of NPSH conditions required without any noise, vibration or cavitations.
12	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 stipulted in TECHNICAL DATA - PART - A.
13	The pumps shall be capable of starting with discharge valve fully open and close condition.
14	Pumps of a particular category shall be identical and shall be suitable for parallel operation with equal load division. 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.
15	Components of identical pumps shall be interchangeable.

16	The materials of construction for various components specified are the minimum requirements. Equivalent or Superior materials suitable for fluid handled is also acceptable subject to Customer/BHEL approval. Materials of construction for other components not specified shall be similarly selected by the bidder for the intended duty and subject to Customer/BHEL approval.
17	Wherever Staineless (SS) material is coming in contact with non SS material, suitable isolation (rubber etc.) shall be provided to avoid galvanic corrosion.
	CASING
18	Pump Casing shall be provided with a connection for suction and discharge pressure Gauge as standard feature.
19	Pump Suction/Discharge nozzles are capable of withstanding external reactions not less than those specified in API-610.
20	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.
	IMPELLER
21	The Impeller assembly shall be dynamically balanced and designed with critical speed substantially above the operating speed.
	WEARING RING
22	Replaceable type wearing rings (as applicable) shall be furnished to prevent damage to impeller and casing.
	SHAFT
23	Shaft size selected must take into consideration the critical speed as specified in API-610. The critical speed shall be at least 30% higher than the rated speed.
	SHAFT SLEEVE
24	Renewable type fine finished shaft sleeves shall be provided at the stuffing boxes/ mechanical seals.
25	Length of the shaft sleeves shall be extended beyond the outer 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.
26	Shaft sleeves to be properly fastened to the shaft to prevent any leakage or loosening. Shaft sleeve assembly should ensure concentric rotation.
27	In case, shaft sleeve is threaded, a water slinger to be provided on the Pump Shaft to avoid ingress of leaked water (if any due to failure of sealing arrangement for shaft sleeve) to Bearing.
	BEARING
28	Bearings to be easily accessible without disturbing the pump assembly.
29	In case of axial split casing Multistage pumps, minimum factor of safety of '2' times shall be considered for bearing capacity selection and pump design.
30	Heavy-duty ball/roller bearing to be provided to take care of the radial loads.

31	Adequate Hydraulic pressure balancing device or Thrust Bearing to be provided to take care of the axial loads.
32	A drain to be provided at the bottom of each bearing housing.
33	Provision on Bearing for mounting temperature measuring instruments to be provided.
	STUFFING BOX
34	Stuffing box to be designed for replacement of packing without removing any part other than the gland.
	MECHANICAL SEAL
35	For applicable pumps, only Cartridge Type Mechanical seals shall be provided and should be suitable for the given water quality.
36	If water handled (based upon the water quality given with Specification) by pump is dirty/ not suitable for lubrication/ cooling of Bearing/Stuffing Box/Seal, 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 BHEL/Customer approval.
	COUPLING
37	The pump and motor shafts shall be connected with adequately sized flexible coupling of proven design (pin-bush or spacer type) to facilitate dismantling of the pump without disturbing the motor. Necessary coupling guard shall be provided.
38	No. of coupling holes for joining coupling hubs shall be even in number and preferably in multiples of four.
	SUCTION STRAINER
39	Suction Strainer to be provided along with Pump as specified in TECHNICAL DATA - PART - A. Counter Flanges, Gaskets And Fasteners also be provided along with each Strainer.
40	**Instructions for HT/LT Motors supplied by BHEL as free issue (with scope mentioned in TECHNICAL DATA - PART - A):** (i) All HT /LT motors which are not in bidder's scope of supply: only bare motors, shall be supplied as free issue by 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. (ii) 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 to Bidder's Works/Shop. Bidder shall dispatch this Job Motor to Project Site along with the Pumps at their cost. All other motors shall be dispatched by BHEL directly to project sites.

41	**SITE SERVICES:** (i) 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. Loose Mechanical seal shall be dispatched along with main supply. 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. (ii) The pumps erected by BHEL/Customer shall be checked by the bidder for correctness of their installation, alignment, etc. at site prior to their commissioning. Signed Checklist for installation after completion of the activity to be submitted as per format given with specification. (iii) Performance test of Pumps at Site shall be applicable for Pumps as mentioned in TECHNICAL DATA PART-A and ANNEXURE FOR PERFORMANCE GUARANTEE AND TESTING.
42	**Instructions for Mandatory Spare:** (i) One(1) set consists of quantity required for complete replacement for one(1) Pump of each type/size.Also the 'set' would include all components/hardware required to replace the item. (ii) Wherever quantity has been specified as percentage (%), it shall mean percentage (%) of the total population of the item in the station (project), unless specified otherwise and the fraction will be rounded off to the next higher whole number. (iii) Wherever the quantities have been indicated for each type, size, thickness, material, radius, range etc. these shall cover all the items supplied and installed and the break up for these shall be furnished in the bid. (iv) In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities in line with the approach followed as above. (v) Each spare shall be clearly marked and labeled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.
43	The reputed makes of various bought out items of bidder (i.e. motor, bearings, mechanical seal etc.) shall be subject to BHEL/Customer approval in the event of order.

बी एच ई एल BHEL	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III	PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25

CHECKLIST FOR INSTALLATION CHECK OF THE HORIZONTAL PUMP AT SITE

Note:
- **To be filled in by BHEL Site Engineer and Pump Vendor Service Engineer**
- **Strike off which is not applicable**

Project Name / PO No.:	**Date of Check:**
Pump Name:	**Pump Serial No:**

S. No.	ACTIVITY DESCRIPTION	OBSERVATION	REMARKS (IF ANY)
1	Relevant Engineering data like General Arrangement Drawing & Cross Sectional Drawing is available with site engineer for reference	Yes/No	
2	All components are available as per packing list or Approved Documents	Yes/No	
3	Condition of Pump components	OK/Not OK	
4	Pump foundation dimensions as per GA drawing (List out deviations if any)	OK/Not OK	
5	Suction & discharge piping as per GA drawing and pump is free from piping strains.	Yes/No	
6	Leveling & Center line matching of base plate	OK/Not OK	
7	Grouting of base plate- Tightness of foundation bolts to be checked	OK/Not OK	
8	Is there any need of inserting shims under motor, if yes then total thickness of shims provided	Yes/No mm	
9	Is the pump shaft free to rotate	Yes/No	
10	Bearings are properly Lubricated (Re-greasing of Bearings to be checked)	Yes/No	
11	Cooling/Flushing Connections provided for Packing Box/Mech. Seal Assembly	Yes/No	
12	Radial run out between pump & motor shafts at coupling	mm	
13	Tightness of bolts between pump-base plate and motor-base plate	OK/Not OK	
14	No load test of motor performed (As per Pump/Motor Manufacturer Recommendation)	Yes/No	
	If yes then Vibration levels at Drive end of Motor	A- V- H-	

15	Fitment of coupling halves on pump & motor shafts with respective hardwares & key	Ok/Not OK	
16	Key Slot / Notch for VMS available as per GA Drawing	Yes/No	
17	Any abnormal observation at this stage. If yes, then specify, trace out the cause & correct it.	Yes/No	
18	Any abnormal observation during initial trial run of the pumping set, If yes, then specify, trace out the cause & correct it	Yes/No	
19	Vibration level at Drive end of pump	A- V- H-	
20	Vibration Level at Non Drive End of pump	A- V- H-	
21	Temperature of bearings after initial trial run of one hour (a). At drive end (b). At Non drive end	 °C °C	
22	Max Stabilized temperature of bearings (a). At drive end (b). At non drive end (c). Ambient temp	 °C °C °C	
23	Observed Noise Level at 1meter distance from the Pump	dbA	
24	Amount of leakage through Gland packing	Permissible/Not Permissible	
25	Mechanical Seal available at Site (for applicable Pumps only)	Yes/No	

ADDITIONAL REMARKS/OBSERVATION (IF ANY)

1.

2.

3.

Pump Vendor Service Engineer Name Designation Sign & Date	BHEL Site Engineer Name Designation Sign & Date	End Customer (If Required) Name Designation Sign & Date

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III	PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25

TECHNICAL DATA - PART - A

SL.NO	DESCRIPTION	UOM	DETAIL -TYPE 1	DETAIL -TYPE 2	DETAIL -TYPE 3
	Designation/Name of the Pump		DMCW PUMPS	BOILER FILL PUMPS	HOTWELL MAKE UP PUMPS
1.0	**Scope of Supply & Services**				
	The scope covers the design, manufacture, assembly, inspection and testing at manufacturer's and/or his sub-contractors works, proper packing for delivery and installation checks & supervision of replacement of gland packing with Mechanical Seal arrangement (if applicable) at site for Miscellaneous Pumps along with mandatory spares complete with all accessories as per the requirements specified in this specification, PG Test at site and any other services, etc. if called for in the succeeding sections of the specification.				
1.1	Scope of supply of Pump Accessories and Spares:				
1.1.1	LT Electric motor with cable glands and lugs at motor end.		No (HT Motor is free issue by BHEL)	Yes, along with local push button station	Yes, along with local push button station
1.1.2	Strainer at Pump Suction with Counter Flanges, Drain & Vent Valves.		Yes, Simplex Basket Type	Yes, Conical Type	Yes, Conical Type
1.1.3	Pump motor coupling (Heavy duty) along with coupling guard		Yes	Yes	Yes
1.1.4	Common base plate for pumps and motor		Yes	Yes	Yes
1.1.5	Self contained lubrication system along with all internal piping, valves, fittings, specialties etc. as required		Yes	Yes	Yes
1.1.6	Counter flanges for suction/ discharge nozzles along with fixing nuts, bolts and gaskets		Yes	Yes	Yes

1.1.7	Anchor bolts, nuts, seating steel works, shims etc. as necessary for mounting the pump-motor unit on civil foundations		Yes	Yes	Yes
1.1.8	Vent with piping, valves and Priming Connection on Pump Casing		Yes	Yes	Yes
1.1.9	Drain connections in Casing and Base Plate with piping & isolating valves/plugs		Yes	Yes	Yes
1.1.10	Lifting/ handling attachments/lugs for the pump and motor		Yes	Yes	Yes
1.1.11	First fill of lubricants with toping requirements for one year of operation after commissioning and handing over of equipment		Yes	Yes	Yes
1.1.12	Set of “Special” Tools & Tackles for Pumps and motors, if any		Yes	Yes	Yes
1.1.13	Erection and commissioning spares, “on as required” basis		Yes	Yes	Yes
1.1.14	1 No. RTD for each Pump Bearing		No	No	No
1.1.15	1 No. Reverse Rotation Indicating Switch for each Pump		No	No	No
1.1.16	Mandatory Spares (Details as per BOQ Schedule)		Yes	Yes	Yes
1.2	Scope of Services:				
1.2.1	Installation Check of Pumps at site prior to their commissioning		Yes	Yes	Yes

1.2.2	Replacement of Gland Packing with Mechanical Seal at Site after commissioning		Yes	Yes	Yes
1.2.3	Performance Testing at Site		Yes	No	No
2.0	**DESIGN CODES & STANDARDS**				
2.1	Design Standard		IS-6595/IS-5120/IS-5659/HIS		
2.2	Performance Standard		IS-9137/IS-5120/HIS/ASME PTC 8.2		
2.3	Strainer Housing/Body excluding Flange		ASME Sec VIII, DIV I		
2.4	Flange/Counter Flange		AWWA class - C-207		
2.5	Structural steel		IS 2062		
2.6	Cast Iron		IS 210		
2.7	Threaded Steel Fasteners		IS 1367		
2.8	Alloy-Steel and Stainless Steel Bolting		ASTM A193		
2.9	Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts		ASTM A194		
2.10	Carbon Steel Castings		ASTM A216		
2.11	Carbon Steel Forgings		ASTM A105		
2.12	Stainless Steel Castings		ASTM A351		
2.13	Stainless Steel Forgings		ASTM A276		
2.14	Duplex Stainless Steel Castings		ASTM A890 / ASTM A995		

2.15	Corrosion Resistance Alloy Steel Castings		ASTM A743		
3.0	**DESIGN /SYSTEM PARAMETERS**				
3.1	KKS Number (TAG NO.)/Description		PGC01AP001 PGC02AP001 PGC03AP001	00LCR21AP001 00LCR22AP001	00LCR61AP001 00LCR62AP001 00LCR63AP001 00LCR64AP001
3.2	No. of pumps (Nos.) for each 2x800 MW project		6 (six) nos. for station (3 nos per unit)	2 (two) nos. for station	4 (four) nos. for station
3.3	Total No. of pumps for SIX (06) projects		36 (THIRTYSIX) nos.	12 (Twelve) nos.	24 (Twenty four) nos.
3.4	No. of working & standby pumps for each 2x800 MW project		2 X (2 Working + 1 Standby)	1 Working + 1 Standby	2 Working + 2 Standby
3.5	Location		Indoor	Outdoor	Outdoor
3.6	Pump suitable for parallel operation		Yes	Not Applicable	Yes
3.7	Pump Duty		Continuous	Intermittent	Continuous
3.8	Rated capacity (No negative tolerance permitted) (cu.m/hr)	cu.m/hr	1775	220	75
3.9	Total Dynamic Head (TDH) at rated capacity (No negative tolerance permitted)	MWC	50	160	50
3.10	Max. limit on shut off head Corresponding to pump TDH (MWC) at 51.5 Hz	MWC	115-130% of the rated head	115-130% of the rated head	115-130% of the rated head
3.11	Required Range of Operation of the Pump (% of Rated Capacity)		40% to 120% of the rated flow	40% to 120% of the rated flow	40% to 120% of the rated flow

3.12	The pumps offered have continuously rising head capacity curves from the duty point towards shut off point.		Yes	Yes	Yes
3.13	The pumps offered have stable rising H-Q curves within the "Range of Operation"		Yes	Yes	Yes
3.14	Pump characteristics		Non Overloading type & stable	Non Overloading type & stable	Non Overloading type & stable
3.15	Maximum permissible speed of pump	RPM	1500	3000	1500
3.16	Suction Pressure (Available)	MWC	35	Flooded Suction	Flooded Suction
3.17	System Design Pressure	kg/cm2 (g)	10	20	10
3.18	Design Temperature	Deg. C	60	60	60
3.19	Specific Gravity of fluid to be handled		1	1	1
3.20	Quality of Water Handled		Passivated DM Water	DM Water	DM Water
3.21	Torque speed curve of the pump & drive motor furnished for pumps with drive motor rating of 100 KW and above.		Yes	Yes	NA
4.0	**CONSTRUCTION FEATURES**				
4.1	Type of Pump to be offered		Horizontal centrifugal type Between Bearing Pump	Horizontal centrifugal type Between Bearing Pump / Multi Stage Pump	Horizontal centrifugal type Between Bearing Pump / End Suction Pump
4.2	Type of pump casing to be offered		Axially split type	Axially/Radial split type	Axially/Radial split type
4.3	Type of Impeller to be offered		Closed	Closed	Closed
4.4	Type of Pump Lubrication allowed		Self Liquid/Grease	Self Liquid/Grease	Self Liquid/Grease

4.5	Sealing Arrangement		Gland packing initially & Mechanical seal finally after commisioning	Gland packing initially & Mechanical seal finally after commisioning	Gland packing initially & Mechanical seal finally after commisioning
4.6	Pump is designed so that pump internals can be attended without disturbing suction and discharge piping.		Yes	Yes	Yes
4.7	Motor rating selection criteria		Motor rating at ambient temperature of 50 Deg.Cel. (including voltage and frequency variations) shall be the maximum of the following requirements: a) 10% margin over the pump shaft input power at the rated duty point. b) Maximum pump shaft input power required over the entire characterstic curve of the pump. 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. *(*Note - Maximum size impellers shall not be quoted for. By installation of a new impeller a head increase of 5 % minimum shall be possible. The performance of the drive motor is to be determined according to the above mentioned technical requirements along with other specification requirements)*		
4.8	Type of coupling between pump & motor		Flexible Type	Flexible Type	Flexible Type
4.9	**Material of Construction**				
4.9.1	Casing		ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M
4.9.2	Impeller		ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M
4.9.3	Shaft		SS 316	SS 316	SS 316
4.9.4	Shaft sleeves		SS 410	SS 410	SS 410
4.9.5	Impeller Wear ring (as applicable)		SS 316	SS 316	SS 316

4.9.6	Casing Wear ring (as applicable)		SS 316	SS 316	SS 316
4.9.7	Fasteners (Wetted)		SS	SS	SS
4.9.8	Fasteners (Non-Wetted)		SS	SS	SS
4.9.9	Coupling		CI	CI	CI
4.9.10	Gland		SS 316	SS 316	SS 316
4.9.11	Stuffing Box		ASTM-A-351 CF 8M	ASTM-A-351 CF 8M	ASTM-A-351 CF 8M
4.9.12	Lantern ring		Bronze	Bronze	Bronze
4.9.13	Mechanical seals (faces)		As per Manufacturer standard	As per Manufacturer standard	As per Manufacturer standard
4.9.14	Gland packing		Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)	Teflon Impregnated (Non-Asbestos type)
4.9.15	Water seal tube		SS tube	SS tube	SS tube
4.9.16	Base plate		MS fabricated IS-2062 IS2062 E250 (min. thickness 12 mm), Painted confirming to C-4 as per ISO 12944		
4.9.17	Counter Flange		Carbon Steel	SS 304	SS 304
4.9.18	Suction Strainer Housing/Body		CS as per IS :2062	SS304	SS304
4.9.19	Suction Strainer Element / Basket including Basket Stiffeners and Handle		SS316	SS316	SS316
4.9.20	Suction Strainer Gasket		Nitrile Rubber / EPDM (Min. 3 mm thick)	Nitrile Rubber / EPDM (Min. 3 mm thick)	Nitrile Rubber / EPDM (Min. 3 mm thick)
4.10	Design Life of Bearing	Hrs	20000	20000	20000
4.11	Sealing/Cooling of Stuffing Box		By Self Water	By Self Water	By Self Water

4.12	Type of Mechanical Seal (If applicable)		Cartridge Type	Cartridge Type	Cartridge Type
4.13	Cooling/Lubrication Arrangement to be provided for Mechanical Seal		By Self Water	By Self Water	By Self Water
4.14	The bidder shall make provisions for mounting following on the pump/ pump shaft: a. Purchaser's probes in both DE/NDE bearings of pumps b. Flat surface with dimensions 60 MM x60 MM on bearing Housing for mounting vibration measuring block c. Key slots of dimensions 30MM (L) X 15 MM (W) X 3 MM (D) on each pump shaft or some other suitable location		Yes	Not Applicable	Not Applicable
4.15	**Construction Features of Suction Strainer**				
4.15.1	Type of Strainer		Simplex Basket Type	Conical type	Conical type
4.15.2	Type of Strainer Element		Wire Mesh supported with Perforated Plate	Wire Mesh supported with Perforated Plate	Wire Mesh supported with Perforated Plate
4.15.3	Perforation/Mesh size		10 Mesh (2 mm)	10 Mesh (2 mm)	10 Mesh (2 mm)
4.15.4	Maximum Permissible Pressure Drop under Clean condition	MWC	1	by Bidder	by Bidder
4.15.5	Strainer Inlet/ outlet Nozzle Size		To suit pump suction size		
4.15.6	Length of strainer (including counterflanges)	mm	by Bidder	300	200
4.15.7	Ratio of Screen Clear Flow Area vis-à-vis Pipe Inlet Area		3	-	-
4.15.8	Orientation of Inlet/Outlet Connecting Pipe		Horizontal and Co-axial	Horizontal and Co-axial	Horizontal and Co-axial

4.15.9	Type of Welding allowed for fabrication of Strainer Basket/Element		Only TIG Welding	Only TIG Welding	Only TIG Welding
4.15.10	End Conection		Flanged	Flanged	Flanged
5.0	**PERFORMANCE PARAMETERS**				
5.1	Performance Guarantee Tests at Shop/Works		Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer	Yes, To be performed by Manufacturer
5.2	Performance Guarantee Tests at Site		Yes, To be performed by Manufacturer	Not Applicable	Not Applicable
5.3	Benchmark Pump efficiency (P) for Bid evaluation	%	84	Not Applicable	70
5.4	Benchmark Motor efficiency(M) for Bid evaluation	%	95	Not Applicable	91.2
5.5	Bid Evaluation Rate (The bid evaluation shall be done at the rate as specified in Data Sheet A per one (1) KW Power consumption, per working pump (and not standby)).	Rs./kW	180000	Not Applicable	180000
5.6	Guaranteed vibration at manufacturer's works on any pump /motor bearing w.r.t. velocity (Vrms) as per ANSI/ HIS 9.6.4	Vrms	5.6	4.8	4.8
5.7	Guaranteed vibration at site on any pump /motor bearing w.r.t. velocity (Vrms) as per ANSI/ HIS 9.6.4	Vrms	4.8	3.8	3.8
5.8	Max. noise Level (Guaranteed at site)	dB	85 dB at 1 M distance	85 dB at 1 M distance	85 dB at 1 M distance

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III	PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25

TECHNICAL DATA - PART - A

SL.NO	DESCRIPTION	UOM	DETAIL
1.0	**DESIGN CODES & STANDARDS**		
1.1	Three phase induction motors :		IS15999, IEC:60034, IS: 12615, IS: 325
1.2	Single phase AC motors		IS:996, IEC:60034
1.3	Energy Efficient motors		IS 12615, IEC:60034-30
1.4	Crane duty motors		IS:3177, IS/IEC:60034
1.5	Mechanical Vibration of Rotating Electrical Machines with Shaft Heights 56 mm and Higher - Measurement, Evaluation and Limits of Vibration		IS 12075/IEC 60034-14
1.6	Designation of Methods of Cooling of Rotating Electrical Machines		IS 6362
1.7	Designation for types of construction and mounting arrangement of rotating electrical machines		IS 2253
2.0	**DESIGN /SYSTEM PARAMETERS**		
2.1	Rated voltage	V	415
2.2	Frequency	Hz	50
2.3	Permissible variations for		
a)	Voltage	%	+/-10
b)	Frequency	%	(+)3 to (-)5
c)	Combined	%	10 (absolute sum)
2.40	System fault level at rated voltage for 1 sec	kA	50
2.4	Short time rating for terminal boxes for 0.25 sec	kA	50
2.5	Type of motors		a)Squirrel cage induction motor suitable for direct-on-line starting (for non- VFD motors). b)Motor operating through VFD (if applicable) shall be suitable for inverter duty with VPI insulation.
2.6	Efficiency class		*IE3*
2.8	Rating		
a)	Motor duty		Continously rated-S1
b)	Design margin over continous max. demand of the driven equipment (min)		10%

3.0	**CONSTRUCTION FEATURES**		
3.1	Winding		Electrolytic grade Copper conductor
3.2	Enclosure Details		
a)	Degree of protection		
	i) Indoor motors		*IP55*
	ii) Outdoor motors		IP 55 with detachable metal canopy
b)	Method of ventilation		Totally enclosed fan cooled (TEFC)
3.3	Insulation		Class 'F' with temperature rise limited to class 'B'. Non-hygroscopic, oil resistant, flame resistant Insulation.
3.4	Bearings		Grease lubricated ball or roller bearings for Horizontal motors. Grease lubricated ball or roller bearings or combined thrust and guide beaing for Vertical motors.
3.5	Main terminal box		
a)	Type		-Motor terminal box shall be detachable type and located in accordance with Indian Standards clearing the motor base- plate/ foundation. -Terminals shall be stud or lead wire type, substantially constructed and thoroughly insulated from the frame. - The terminals shall be clearly identified by phase markings, with corresponding direction of rotation marked on the non-driving end of the motor.
b)	DOP		Same as motor
c)	Position when veiwed from the non driving end		Left hand side
d)	Rotation		90 Deg.
e)	Space heater		Motors rated 30KW and above shall have space heater suitable for 240V, 50 Hz single phase AC supply.
f)	Cable glands and lugs		-Motor terminal box shall be furnished with Solder less crimping type heavy duty Lugs (aluminium lugs for aluminium cables and copper lugs for copper cables) and double compression Ni-Cr plated brass glands to match with cable used.

3.6	Earthing points suitable for conenction		Motor body shall be grounded at two earthing points on opposite sides with two separate and distinct grounding pads complete with tapped holes, GI bolts and washers.
3.7	Paint shade (Corrosion proof paints of colour shade)		RAL 7032/
3.8	The spacing between gland plate & centre of bottom terminal stud		Above 7 KW - upto 13 KW 115 Above 13 KW - upto 24 KW 167 Above 90 KW - upto 125 KW 331 Above 125 KW-upto 200 KW 385/203 (For Single core cables only)
3.9	Minimum inter-phase and phase-earth air clearances with lugs installed		UP to 110 KW 10mm Above 110 KW and upto 150 KW 12.5mm Above 150 KW 19mm
3.10	Local push Button Station		The local push button stations shall be dust and vermin roof and shall have a degree of protection of IP - 55. Push buttons shall be of heavy duty spring return, push-to-actuate type. Their contacts shall be rated to make, continuously carry and break 10 A at 110V AC and 1A (inductive) at 220V DC. Push button station shall have ‘stop’ push button or ‘start & stop’ push button
4.0	**PERFORMANCE PARAMETERS**		
4.1	Starting requirement		
a)	Minimum permissible voltage as a percentage of rated voltage, at start to bring the driven equipment upto the driven equipment upto rated speed		*The motors shall be capable of operation at full load at a supply voltage of 80% of the rated voltage for 5 minutes commencing from hot condition.*
b)	Maximum locked rotor current		as per IS 12615
c)	Starting duty		No. of consecutive cold startups : 3 (with initial temperature of the motor at ambient level) No. of consecutive hot startups : 2 (with initial temperature of motor at full load operating level)

d)	The locked rotor withstand time under hot condition at highest voltage limit		a) atleast 2.5 secs. more than starting time(for motors with starting time upto 20 secs. at minimum permissible voltage during starting) b)atleast 5 secs. more than starting time(for motors with starting time more than 20 secs. and upto 45 secs. at minimum permissible voltage during starting) c) more than starting time by at least 10% of the starting time(For motors with starting time more than 45 secs.at minimum permissible voltage during starting) Speed switches mounted on the motor shaft shall be provided in cases where above requirements are not met.
e)	The ratio of locked rotor KVA at rated voltage to rated KW		(a) Below 110KW : 10.0 (b) From 110 KW & upto 200 KW : 9.0
4.2	Torque (percent of full load torque)		1] Accelerating torque at any speed with the lowest permissible starting voltage shall be at least 10% motor full load torque. 2]Pull out torque at rated voltage shall not be less than 205% of full load torque.
4.3	Noise level (max.)		85 dB(A)
4.4	Vibration shall be limited within the limits		as per IS:12075 IEC
5.0	**INSPECTION/TESTING**		
5.1	All type & Routine tests shall be as per attached quality plan		
5.3	In case the contractor is not able to submit valid report of the type test(s) or in case type test report(s) are not found to be meeting the specification requirements, or not including all specified tests the contractor shall conduct all such tests under this contract. The cost of such test shall be deemed to be included in the price. The owner shall have right to witness the type tests.		
5.4	All 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.		

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TECHNICAL DATA - PART - B FOR PUMP (SUPPLIER DATA TO BE FURNISHED AFTER AWARD OF CONTRACT)

SL.NO	DESCRIPTION	UOM	DETAIL
1.0	**GENERAL**		
1.1	Designation of the Pump		
1.2	Manufacturer		
1.3	Model No.		
1.4	No. of pumps		
1.5	System Design Pressure	Nos.	
1.6	Specific Gravity of fluid to be handled	Kg/cm^2	
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	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		
3.8	Specific speed $N = \frac{RPM \times (Flow\ in\ USGPM)^{1/2}}{(Head\ in\ Ft.)^{3/4}}$		
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 Make/Model details		
	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.		
3.15	Critical Speed of Pump Rotating Assembly	RPM	
4.0	**MATERTIAL 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^{o}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	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III	PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25

TECHNICAL DATA - PART - B (SUPPLIER DATA TO BE FURNISHED AFTER AWARD OF CONTRACT)

SL.NO		UOM	DETAIL
1.0	**GENERAL**		
i)	Manufacturer & Country of origin.		
ii)	Equipment driven by motor)		
iii)	Motor type		
iv)	Country of origin		
v)	Quantity	nos.	
2.0	**DESIGN AND PERFORMANCE DATA**		
i)	Frame size		
ii)	Type of duty		
iii)	Type of enclosure and method of cooling		
vi)	Type of mounting		
vii)	Direction of rotation as viewed from DE END		
viii)	Standard continuous rating at 40 deg.C. ambient temp. as per Indian Standard	(KW)	
ix)	(A) Derated rating for specified normal condition i.e. 50 deg. C ambient temperature	(KW)	
	(B) Rating as specified in load list	(KW)	
xi)	Rated speed at rated voltage and frequency	rpm	
xii)	At rated Voltage and frequency		
	a) Full load current	A	
	b) No load current	A	
xiii)	Power Factor at		
	a) 100% load		
	b) At duty point		
	c) 75% load		
	d) 50% load		
	e) NO load		
	f) Starting.		
xiv)	Efficiency at rated voltage and frequrecy		
	a) 100% load		
	b) At duty point		
	c) 75% load		
	d) 50% load		
xv)	Starting current*(inclusive of IS tolerance)* at		
	a. 100 % voltage	A	
	b. Minimum starting voltage	A	
xvi)	Starting time with minimum permissible voltage		
	a. Without driven equipment coupled	sec	
	b. With driven equipment coupled	sec	
xvii)	Safe stall time with 110% of rated voltage		
	a. From hot condition	sec	
	b. From cold condition	sec	
xviii)	**Torques :**		
	a. Starting torque at min. permissible voltage	(kg-mtr.)	
	b. Pull up torque at rated voltage.	(kg-mtr.)	
	c. Pull out torque	(kg-mtr.)	
	d. Min accelerating torque available	(kg-mtr.)	

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III		PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25
	e. Rated torque	(kg-mtr.)	
xix)	Stator winding resistance per phase (at 20 Deg.C.)	Ohm	
xx)	GD^2 value of motors		
xxi)	Locked rotor KVA input (at rated voltage)		
xxii)	Locked rotor KVA/KW.		
xxiii)	**Bearings**		
	a. Type		
	b. Manufacturer		
	c. Self Lubricated or forced Lubricated		
	d. Recommended Lubricants		
	e. Guaranteed Life in Hours		
	f. Whether Dial Type thermometer provided		
	g. Oil pressure Gauge/switch		
	i. Range		
	ii. Contact Nos. & ratings		
	iii. Accuracy		
xxiv)	**Vibration**		
	a) Velocity	mm/s	
	b) Displacement	microns	
xxv)	Noise level	db	
3	**CONSTRUCTIONAL FEATURES**		
i	Stator winding insulation		
	a. Class & Type		
	b. Tropicalised (Yes/No)		
	c. Temperature rise over specified max.		
	i. Cold water temperature of 38 DEG. C.		
	ii. Ambient Air 50 DEG. C.		
	d. Method of temperature measurement		
	e. Stator winding connection		
	f. Number of terminals brought out		
ii	Type of terminal box for		
	a. stator leads		
	b. space heater		
	c. Temperature detectors		
	d. Instrument switch etc.		
iii)	For main terminal box		
	a. Location		
	b. Entry of cables		
	c. Recommended cable size		
	d. Fault level	MVA	
iv)	Temperature detector for stator winding		
	a Type		
	b. Nos. provided		
	c . Location		
	d. Make		
	e. Resistance value at 0 deg. C	ohms	
vi)	Paint shade		
vii).	Weight of(approx)		
	a. Motor stator (KG)		
	b. Motor Rotor (KG)		
	c. Total weight (KG)		
4	Relevant motor curves 27		

COMPLIANCE DRAWING

1 WATER ANALYSIS
2 ELECTRICAL SCOPE SPLIT

A. DM WATER ANALYSIS:

Conductivity:	Less than 0.1 microS/cm
Total silica:	Less than 0.02 ppm
pH:	8.5 to 9.5

REV: 0 DATE: 01.04.2024

STANDARD ELECTRICAL SCOPE BETWEEN BHEL AND VENDOR (FOR EPC PROJECTS)

PACKAGE: MISC. PUMP (Electrical Package)

PROJECT: 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III

S.NO	DETAILS	SCOPE SUPPLY	SCOPE E&C	REMARKS
1	415 V MCC	CUSTOMER (APL)	CUSTOMER (APL)	240 V AC (supply feeder)/415 V AC (3 PHASE 4 WIRE) supply shall be provided by CUSTOMER (APL) 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)	Vendor	CUSTOMER (APL)	Located near the motors.
3	Power cables and control cables	CUSTOMER (APL)	CUSTOMER (APL)	Incoming cable from CUSTOMER (APL) supplied MCC will be informed by CUSTOMER (APL).
4	Screened control cables	BHEL	CUSTOMER (APL)	Screened control cable between DCS & field equipment will be informed by BHEL. Vendor shall provide lugs & glands accordingly.
4	Cable trays, accessories & cable trays supporting system	CUSTOMER (APL)	CUSTOMER (APL)	
5	Cable glands and lugs for equipments supplied by Vendor	Vendor	CUSTOMER (APL)	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	Equipment grounding (Above ground)	BHEL	CUSTOMER (APL)	
7	Lightning protection	CUSTOMER (APL)	CUSTOMER (APL)	
8	Below grade grounding	CUSTOMER (APL)	CUSTOMER (APL)	
9	LT Motors with base plate and foundation hardware	Vendor	CUSTOMER (APL)	Makes shall be subject to BHEL/CUSTOMER (APL) approval at contract stage.
10	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	CUSTOMER (APL)	

NOTES:

1. Make of all electrical equipments/items supplied shall be reputed make & shall be subject to approval of BHEL/CUSTOMER (APL) after award of contract.
2. All QPs shall be subject to approval of BHEL/CUSTOMER (APL) after award of contract without any commercial implication.
3. CUSTOMER (APL)- Customer: ADANI POWER LIMITED

PERFORMANCE GUARANTEES TO BE DEMOSTRATED AT SHOP & SITE

ANNEXURE FOR PERFORMANCE GUARANTEE AND TESTING

A. GENERAL

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

B. PG Testing at Shop

1 The guaranteed power consumption of Pumps shall be demonstrated by the successful bidder during performance testing at Vendor works/ shop. Applicabilty of Test for each type of Pump shall be as per TECHNICAL DATA - PART - A.

2 The efficiencies for pumps and motors for arriving at benchmark power consumption for Bid Evaluation shall be as indicated in TECHNICAL DATA - PART - A for various pumps.
No advantage shall be given to the bidder for quoting Power consumption (kW) at motor inlet lower than the benchmark kW value calculated with benchmark efficiencies given in Datasheet. However, in such case, quoted power consumption (kW) at motor inlet by the bidder shall be replaced with Benchmark Power consumption for both evaluation as well as LD purposes.

3 For the purpose of Bid Evaluation, Efficiencies for HT motors and LT motors which are not in bidder's scope shall be taken based on the maximum value as furnished in TECHNICAL DATA - PART - A.
During contract stage, for Pumps driven by BHEL supplied drives (HT/LT), Revised guarantee power consumption shall be calculated for M = motor efficiency as per approved datasheet of the supplied HT/LT motor. All other parameters shall remain same.

4 The bid evaluation applicable at the rate as specified below to be calculated per working pump (and not standby) as follows:

Power consumption at inlet to the motors:

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

Where,
Q = Rated capacity M^3/hr
H = Rated TDH, MWC
P = Pump Efficiency
M = Motor Efficiency.
S = Specific Gravity of fluid handled

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

C. PG Testing at Site

1 After commissioning of pumps at site, performance test for Noise, Vibration and Parallel running of pumps shall be conducted by pump vendor at project site to ensure that the pumps meet the specified requirements. PG Test shall be conducted as per approved PG Test Procedure. Applicabilty of Performance Test for each type of Pump shall be as per TECHNICAL DATA - PART - A.

2 Vendor to replace / take corrective action for any deficiency in performance parameters at site.
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 price implication.

3 All instruments required for PG testing of Noise, vibration and parallel running of pumps are to be provided by Bidder and taken back after the Test. All instruments used for PG Test shall be duly calibrated.

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		Rev. No. 00
	SCHEDULE OF PERFORMANCE GUARANTEES	Date : 20.02.25

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 terminals	Motor Rating	Motor GD^2 Value for HT motor only	Pump RPM	T/S Curve attached for HT motor
		(M3/Hr)	(MWC)	%	%	(KW)	(KW)			
	Horizontal pumps									
1	#DMCW PUMPS	1775	50		95					
2	BOILER FILL PUMPS	220	160					NA		NA
3	#HOTWELL MAKEUP PUMPS	75	50					NA		NA

Bid evaluation and LD is applicable for pumps marked with (#) only as per TECHNICAL DATA - PART - 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 BHEL as per specification.

PARTICULARS OF BIDDER/ AUTHORISED REPRESENTATIVE

NAME DESIGNATION SIGNATURE DATE COMPANY SEAL

QUALITY PLAN

Quality Assurance and Quality Plan

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

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

3 All materials used for manufacture/ fabrication of the Pump components shall be of tested quality.

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

5 During detailed engineering, the various shop test procedures for DP test, Hydro test, Peformance test, NPSH Test etc. as per Approved QAP shall be submitted by bidder along with the quality plan for BHEL/customer approval.

6 Hydraulic tested equipment shall not be packed till the inside surface becomes dry.

7 The pump casing shall be hydrostatically tested at maximum of the following:
a. Pump Suction Pressure indicated in TECHNICAL DATA PART-A (+) 2 times the TDH (Total Dynamic Head) at rated capacity (or)
b. Pump Suction Pressure indicated in TECHNICAL DATA PART-A (+) 1.5 times the shut-off pressure (or)
c. System Design pressure indicated in TECHNICAL DATA PART-A.

8 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.

9 Inspection of Mandatory spares shall be in line with approved QP for main supply.

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC NO.:PE-TS-999-100-W001		
		CUSTOMER:		QP NO.: PE-QP-999-100-W001 R00	DATE	03.01.2024
		PROJECT :		PO NO.:	DATE	
		ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)	SYSTEM: CW/ACW/DMCW/PLANT/ COMMON	SECTION:	SHEET 1 OF 4	

S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	* D	AGENCY ** M	AGENCY ** B	AGENCY ** C	REMARKS
1	2	3	4	5	6	7	8	9		10			11
					M B/C								
1	RAW MATERIALS												
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	√	P	V	V	REFER NOTE 1.
1.2	STUFFING BOX, SUCTION BELL, WEARING RINGS,NECK RINGS, SHAFT SLEEVES	MECHANICAL AND CHEMICAL PROPS	MA	MECHANICAL AND CHEM. ANALYSIS	ONE/HEAT/BATCH	APPROVED CS	RELEVANT MATERIAL SPECN.	LAB REPORT/ MTC	√	P	V	V	
		HARDNESS DIFFERENCE BETWEEN CASING / IMPELLER AND WEARING RING	MA	LAB. TEST	100%	APPROVED CS DRAWING/ DATA SHEET	50 BHN MIN.	LAB, REPORT	√	P	V	V	
1.3	BARS/FORGINGS FOR SHAFTS, LINE SHAFTS	PHYSICAL & CHEMICAL PROPS	CR	MECHANICAL & CHEMICAL ANALYSIS.	1/CAST OR 1/BARS	APPROVED CS DRAWING/DATA SHEET	RELEVANT MATERIAL SPECN.	MILL T.C, OR LAB.REPORT	√	P	V	V	CORRELATION REQUIRED, IDENTIFICATION AS PER TC
		INTERNAL DEFECTS FOR 40MM & ABOVE DIA SHAFTS.	CR	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	√	P	V	V	
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.	RELEVANT MATERIAL SPECN.	CORRELATED SR/HT.CHARTS	√	P	V	V	
		2. IGC TEST FOR SS CASTING	MA	LAB. TEST	ONE SAMPLE/ HT BATCH	ASTM A 262	ASTM A 262 Gr A	LAB, REPORT	√	P	V	V	
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	√	P	V	V	
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	√	P	V	V	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	√	P	V	V	
1.8	PUMP CASING, IMPELLER, DIFFUSER, SHAFT	PMI (MATERIAL GRADE IDENTIFICATION)	CR	RECORD	100%	MANUFACTURER'S TEST PROCEDURE	MANUFACTURER'S TEST PROCEDURE	REPORT	√	P	V	V	
1.9	a. MECHANICAL SEAL b. PUMP BEARINGS	TYPE, SIZE, MFRS, NO., MAKE	MA	VISUAL EXAM	100%	APPROVED DATASHEET / GA	APPROVED DATASHEET		√	P	V	V	COMPLIANCE TC FOR APPROVED MAKE

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name				Sign & Date	Name	Seal
Prepared by:	Prashant	PRASHANT AGARWAL	Checked by:	Gaurav Garg	GAURAV GARG	Seal		Reviewed by:			
Reviewed & Approved by:	Vishal Kumar Yadav	VISHAL KR. YADAV	Reviewed by:	Harish Kumar	HARISH KUMAR	37		Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC NO.:PE-TS-999-100-W001	DATE	
	CUSTOMER:		QP NO.: PE-QP-999-100-W001 R00	DATE	03.01.2024
	PROJECT :		PO NO.:	DATE	
	ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)	SYSTEM: CW/ACW/DMCW/PLANT/ COMMON	SECTION:	SHEET 2 OF 4	

S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY **			REMARKS
										M	B	C	
1	2	3	4	5	6	7	8	9	* D	10			11
					M B/C								
2.0	**IN PROCESS CONTROL**												
2.1	IMPELLER	DYNAMIC BALANCING	CR	DYNAMIC BALANCING	100%	ISO 1940	ISO1940 Gr 6.3	BALANCING CERTIFICATE	√	P	W	V	WTNESSING ONLY FOR SIZE GREATER THAN 10KW
2.2	IMPELLER-ALL ACCESSIBLE SURFACES, DIFFUSERS, SHAFT	DP TEST	MA	DP TEST ON M/CED AREA	100%	ASTM E 165	NO RELEVANT INDICATION ALLOWED	NDT CERTIFICATE	√	P	W	V	
2.3	WEARING RING, SHAFT SLEEVES, CASING	DP TEST	MA	DP TEST ON M/CED AREA	100%	ASTM E 165	NO RELEVANT INDICATION ALLOWED	NDT CERTIFICATE	√	P	V	V	
2.5	CASINGS/ BOWLS, STAGE BODIES, DISCHARGE HEAD (IF CAST), SUCTION HOUSING, COLUMN PIPE DISCHARGE PIPE ETC	LEAK TIGHTNESS	CR	HYDRO TEST	100%	APPROVED TECHNICAL DATA SHEET	NO LEAKAGE FOR TEST DURATION OF 30 MIN.	HT CERTIFICATE	√	P	W	V	1. HAMMERING OF CASTINGS WITH WOODEN/ RUBBER MALLET BEFORE HYDRO TEST 2. NO WELD REPAIRS PERMITTED ON CI CASTING
2.6	FABRICATED COMPONENTS												
2.6.1	a. WELDING PROCEDURE SPECIFICATION b. WELDING PROCEDURE QUALIFICATION RECORD c. WELDER PERFORMANCE QUALIFICATION	CORRECTNESS	MA	VERIFICATION	100%	ASME SEC.IX	ASME SEC.IX	ASME SEC.IX	√	P	V	V	WELDING PROCEDURE APPROVAL BY BHEL ALT. 3RD PARTY (LLYODS,BVQI OR EQ.) IS ACCEPTABLE.
2.6.2	WELD & ASSEMBLY FIT UPS	DIMENSION & ALIGNMENT	MA	MEASUREMENT, VISUAL EXAMINATION	100%	WPS/MFG DRG	WPS/MFG DRG	IR/LOG BOOK	√	P	V	V	
2.6.3	WELDMENTS	SURFACE DEFECTS	MA	PENETRANT TEST	100% | 10%	ASTM E 165	ASME-VIII,DIV I	INSPN REPORT	√	P	W	V	10%WITNESS BY BHEL & VERIFICATION BY CUSTOMER
2.6.4	BUTT WELDS	INTERNAL DEFECT	MA	UT/RT	100%	ASME SEC. V	ASME-VIII,DIV I	IR	√	P	W	V	WITNESSING OF U.T

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY					Doc No:			
	Sign & Date	Name		Sign & Date	Name	Sign & Date			Sign & Date	Name	Seal
Prepared by:	Prashant	PRASHANT AGARWAL	Checked by:	Gaurav Garg	GAURAV GARG	Seal		Reviewed by:			
Reviewed & Approved by:		VISHAL KR. YADAV	Reviewed by:	Harish Kumar	HARISH KUMAR			Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC NO.:PE-TS-999-100-W001	DATE	
		CUSTOMER:		QP NO.: PE-QP-999-100-W001 R00	DATE	03.01.2024
		PROJECT :		PO NO.:	DATE	
		ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)	SYSTEM: CW/ACW/DMCW/PLANT/ COMMON	SECTION:	SHEET 3 OF 4	

S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY **			REMARKS
										M	B	C	
1	2	3	4	5	6	7	8	9	* D	10			11
					M B/C								
3.0	SUB-ASSEMBLY CONTROL												
3.1	ROTOR ASSEMBLY	ECCENTRICITY	MA	MEASUREMENT	100%	APPROVED GA DRG/ MFR.DRAWING	APPROVED GA DRG/ MFR.DRAWING	IR/LOG BOOK	√	P	V	V	
3.2	ROTOR ASSEMBLY RESIDUAL UNBALACE	STATIC & DYNAMIC	CR	STATIC & DYNAMIC BALANCING	100%	ISO 1940	ISO1940 Gr 6.3	BALANCING CERTIFICATE	√	P	W	V	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	√	P	V	V	KEY SLOT IN SHAFT/COUPLING & VMS PAD AS PER APPROVED GA/CS DRAWING TO BE SPECIFICALLY CHECKED (AS APPLICABLE)
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 LEACKAGE - MINOR LEKAGE (DROP BY DROP) IN CASE OF GLAND PACKING ARRANGEMENT.	I.R., PERF. TEST RECORD, PLOTED CURVES	√	P	W	W	* MINIMUM 7 POINTS FROM SHUT-OFF TO MAX. OPERATING FLOW COVERING ENTIRE OPERATION RANGE OF PUMP SHALL BE TAKEN. * CUSTOMER HOLD POINT
		NPSH REQUIRED	CR	NPSH TEST	1/MODEL	APPD. PERFORMANCE TEST PROCEDURE/ APPD. DATA SHEET/APPD. CURVES		IR. NPSH TEST RECORD, PLOTED CURVES	√	P	W	W	

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY					Doc No:			
	Sign & Date	Name		Sign & Date	Name	Sign & Date			Sign & Date	Name	Seal
Prepared by:	Prashant	PRASHANT AGARWAL	Checked by:	Gaurav Garg	GAURAV GARG	Seal		Reviewed by:			
Reviewed & Approved by:		VISHAL KR. YADAV	Reviewed by:	Harish Kumar	HARISH KUMAR			Approved by:			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC NO.:PE-TS-999-100-W001	DATE	
	CUSTOMER:		QP NO.: PE-QP-999-100-W001 R00	DATE	03.01.2024
	PROJECT :		PO NO.:	DATE	
	ITEM: MISC. PUMPS (HORIZONTAL/VERTICAL)	SYSTEM: CW/ACW/DMCW/PLANT/ COMMON	SECTION:	SHEET 4 OF 4	

S. No.	COMPONENT & OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY **			REMARKS
										M	B	C	
1	2	3	4	5	6	7	8	9	* D	10			11
					M B/C								
4.2	STRIP DOWN AFTER PERFORMANCE TEST	UNDUE WEAR TEAR AND RUBBING	MA	VISUAL EXAM AFTER STRIPPING	1/MODEL	NO UNDUE WEAR TEAR & RUBBING ON IMPELLER & WEAR RING		INSP. REPORT	√	P	W	W	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 MEASURMENT	100%	APPD. G.A DRAWING	APPD. G.A DRAWING	INSP. REPORT	√	P	W	V	REFER NOTE 2 & 3.
4.4	PAINTING	SURFACE FINISH, DFT, MARKINGS ETC.	MA	VISUAL EXAM, MEASURMENT, AESTHETIC	100%	APPD.DRG.	APPD.DOCS	IR.	√	P	V	V	
4.5	PACKING, MARKING	SOUNDNESS OF PACKING	MI	VISUAL, AESTHETIC	100%	TECHNICAL SPECIFICATION/ MFG. STANDARD	TECHNICAL SPECIFICATION/ MFG. STANDARD	PHOTOGRAPHS	√	P	V	-	

NOTES:

1.AS CAST HEAT MARKS SHALL BE PROVIDED ON CI CASTING LIKE TOP & BOTTOM CASING FOR CORRELATION.

2. 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.

3. KEY NOTCH FOR VMS TO BE ENSURED FOR APPLICABLE PUMPS.

LEGEND : - * RECORDS, INDENTIFIED WITH "TICK"(√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,
** **M**: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, **B**: BHEL/ THIRD PARTY INSPECTION AGENCY, **C**: CUSTOMER
P- PERFORM, **W-** WITNESS, **V-**VERIFICATION, AS APPROPRIATE
MA: MAJOR, **MI**: MINOR, **CR**: CRITICAL, **MTC -**Mill Test Certificate, **TC-**Test Certificate, **IGC**- Inter Granular Corrosion.
GA -GENERAL ARRANGEMENT DRAWING, **CS-**CROSS-SECTIONAL DRAWING

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date		Doc No:			
	Sign & Date	Name		Sign & Date	Name				Sign & Date	Name	Seal
Prepared by:	Prashant	PRASHANT AGARWAL	Checked by:	Gaurav Garg	GAURAV GARG	Seal		Reviewed by:			
Reviewed & Approved by:		VISHAL KR. YADAV	Reviewed by:	Harish Kumar	HARISH KUMAR	40		Approved by:			

STANDARD QUALITY PLAN

ITEM : CENTRIFUGAL PUMP (HORIZONTAL) FOR OIL

SQP NO: ADANI/QA/SMQP/M/178
Rev. No.: 0
Date: 06.11.2012
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Approved By QA

SL No.	COMPONENT/ OPERATION	CHARACTERISTICS	CATE-GORY OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		INSPECTION AGENCY			REMARKS
					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
1	**RAW MATERIAL INSPECTION**													
1.1	Casing (Delivery Casing, Suction Casing & Stage Casing For Multistage Pumps)	Mech. & Chem. Properties	Critical	Verify	1/Heat/ Lot	1/Heat/ Lot	Appd. Data Sheet,Appd. C.S. Drg.	Relevant Material Specification/ As Per Appd. Drg.	MTC	√	P	V	V	No repair on Cl compone-nts permitted
1.2	a) Impeller b) Wear Ring for multistage pump only	Mech. & Chem. Properties	Critical	Verify	1/Heat/ Lot	1/Heat/ Lot	Appd. Data Sheet,Appd. C.S. Drg.	Relevant Material Specification/ As Per Appd. Drg.	MTC	√	P	V	V	
1.3	Shaft (50mm &Above)	UT	Critical	NDT	100%	100%	ASTM E 388	SEE NOTE 1	UT Report	√	P	V	V	
2	**IN PROCESS INSPECTION**													
2.1	Machined Components	Dimensional	Major	Dimension Check	Sampling	-	Mfr. Drg.	Mfr. Drg.	IR	--	P	--	--	

STANDARD QUALITY PLAN

ITEM : CENTRIFUGAL PUMP (HORIZONTAL) FOR OIL

SQP NO: ADANI/QA/SMQP/M/178
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SL No.	COMPONENT/ OPERATION	CHARACTERISTICS	CATE-GORY OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		INSPECTION AGENCY			REMARKS
					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
2.2	Impeller	Dynamic Balancing	Major	Balancing	100%	100%	ISO 1940 Gr. 6.3 & Appd.Data sheet	ISO 1940 Gr. 6.3 & Appd.Data sheet	IR	√	P	V	V	Addition during balancing is not permitted.
2.3	Casing	Leakage	Major	Hydro Test	100%	100%	1.5 times of shut off head or 2 times of head at duty point whichever is higher	No leakage	IR	√	P	H	V	
3	**ASSEMBLY AND TESTING WITH JOB MOTOR**													
3.1	Performance Test (Testing fluid is oil at working Temperature)	a)Q vs H, Q vs Eff., Q vs P b)Noise, vibration measurement	Critical	Performance Test	100%	100% 100%	Appd. Data Sheet,Appd. Drg,Tech.Spec, HIS	Tolerance at rated flow shall be as per HIS	IR	√	P	H	H	

STANDARD QUALITY PLAN

ITEM : CENTRIFUGAL PUMP (HORIZONTAL) FOR OIL

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SL No.	COMPONENT/ OPERATION	CHARACTERISTICS	CATE-GORY OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK			REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		INSPECTION AGENCY			REMARKS
					M	C/A						M	C	A	
1	2	3	4	5	6			7	8	9	*D	**10			11
3.2		Visual & overall dimensions	Major	Visual/ Measure	100%	100%	100%	Appd. Drg	Appd. Drg	IR	√	P	H	H	
3.3	Motor (Rating upto 30KW)	Make, Rating	Major	Verify	100%	100%	100%	Appd. Drg	Appd. Drg	TC	√	P	V	V	
		Rotine test report	Major	Verify	100%	100%	100%	Appd. Drg/ IS325	IS 325	TC	√	P	V	V	Refer Note.2
4	Surface Preparation & Painting	Finish, Colour, Shade, DFT	Minor	Visual & Measure	Random	Random	Random	Tech.Spec, Appd. Drg & data sheet	Tech.Spec, Appd. Drg & data sheet	IR	√	P	V	V	

Note1- For UT these are not acceptable: (1) Cracks, flaps, seams, laps (2) Defect giving indication larger than from 2 mm diameter equivalent flaw (3) Group of defect with maximum indication less than that of from 2 mm diameter equivalent flaw which can not be separated at testing sensitivity if back echo is reduced to less than 70% (4) Defect giving indication of 1 to 2 mm diameter equivalent flow separated by a distance less than 4 times the size of larger of the adjacent flaw.

Note2- For Motor rating above 30 KW, Adani Standard Quality Plan No.: ADANI/QA/SMQP/E/001 for LT Motor shall be followed

LEGEND:- D* Records identified with tick (p) shall be essentially included by supplier & manufacturer in Quality Documentation package.

** M: Manufacturer / Sub-Supplier, C: Main Supplier , A: **ADANI** or their authorized representative.

Use the following term as appropriate in columns 10. **P**: Perform, **V**: verification and **H**: Customer Hold Point to be witnessed and work shall not proceeded till it is witnessed and cleared in writing.

STANDARD QUALITY PLAN

ITEM : LT MOTOR

SQP NO: ADANI/QA/SQP/E/002
REV. NO.:02
DATE: 12.03.2016

Approved by QA

SL No.	COMPONENT/ OPERATION	CHARACTERISTICS	CATEGORY OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		INSPECTION AGENCY			REMARKS
					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
1. Boughtout Items / Raw Material														
1.1	A) C.I. Frame & End Bracket/Shield/Base Frame (If Applicable)	Visual Check for defects	Major	Visual	100%	100%	Mfg. Works Drg.	No casting defects	MTC		P	V	V	Weld Repair On Cast Frame Is Not Acceptable.
		Tensile Strength & Brinell Hardness		Mech	1 Sample/ Heat	1 Sample/ Heat	IS 210	IS 210		√	P	V	V	
		Dimension		Meas	1 Sample/ Lot	1 Sample/ Lot				√	P	V	V	
		Chemical Properties		Chemical	1 Sample/ Lot	1 Sample/ Lot				√	P	V	V	
		Pressure Testing (Applicable for flame proof motors only)		Mech	1 Sample/ Lot	1 Sample/ Lot	IEC 60079-I	IEC 60079-I		√	P	V	V	
	B) Fab.Frame & End Bracket/ Base Frame (If Applicable)	Visual Check for defects	Major	Visual	100%	100%	Mfg. Works Drg.	Smooth Finish	MTC/ITR		P	V	V	
		Dimension		Measure	1 Sample/ Lot	1 Sample/ Lot		Mfg. Works Drg.		√	P	V	V	
		Tensile Strength & % Elongation		Mech	1 Sample/ Lot	1 Sample/ Lot	IS 2062	IS 2062		√	P	V	V	
		Heat Treatment (Applicable for thickness above 18 mm)		Thermal	100%	100%	ASME SEC 8 DIV. 1 & 2	ASME SEC 8 DIV 1 & 2		√	P	V	V	
		Chemical Composition		Chemical	1 Sample /Lot	1 Sample /Lot	IS 2062	IS 2062		√	P	V	V	
1.2	Electrical Steel Stamping For Stator & Rotor	Dimensions	Major	Measure	1 Sample /Batch	1 Sample /Batch	IS 648 / IS 649	IS 648 / IS 649	MTC	√	P	V	V	
		Burr Height		Measure						√	P	V	V	
		Material		Mech						√	P	V	V	
		Core Loss		Elect						√	P	V	V	
		Stacking Factor								√	P	V	V	
		Insulation Resistance		Elect						√	P	V	V	

STANDARD QUALITY PLAN

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					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
1.2	Electrical Steel Stamping For Stator & Rotor	Bend Test	Major	Measure	1 Sample/ Batch	1 Sample/ Batch	IS 648/IS 649	IS 648/IS 649	MTC	√	P	V	V	
		Coating Thickness								√	P	V	V	
		AC Magnetization		Elect						√	P	V	V	
1.3	Forged Shaft - Normalised (If Applicable)	Dimension & Visual	Major	Measure	100%	100%	Mfg. Works Drg.	Mfg. Works Drg.	ITR	√	P	V	V	Ultra sonic test is applicable for shaft dia 50mm & above. Refer Note- 2 At Page 11
		Chem. Composition	Major	Chemical	1 Sample / Heat	1 Sample / Heat	BS 970 IS 1570-4SCB (N)	BS 970 IS 1570-4SCB (N)	MTC	√	P	V	V	
		Mech Properties	Critical	Mech						√	P	V	V	
		I) % Elongation								√	P	V	V	
		II) Ultimate Tensile Strength								√	P	V	V	
		III) Hardness (If Applicable)								√	P	V	V	
		IV) Impact Test (If Applicable)								√	P	V	V	
		V) Yield Strength								√	P	V	V	
		Ultrasonic Test	Critical	NDT	100%	100%	ASTM A 388 & NOTE 2	ASTM A 388 & NOTE 2	NDT Report	√	P	V	V	
	Steel Shaft Rolled Bar (If Applicable)	Dimension	Major	Measure	100%	100%	Mfg. Works Drg.	Mfg. Works Drg.	MTC / ITR	√	P	V	V	Ultra sonic test is applicable for shaft dia 50mm & above. Refer Note- 2
		Mechanical Properties	Critical	Mech	1 Sample / Heat	1 Sample / Heat	IS 1570-II / AISI 431	IS 1570-II / AISI 431		√	P	V	V	
		Chemical Properties	Major	Chemical						√	P	V	V	
		Ultra Sonic Test	Critical	NDT			ASTM A-388 & NOTE 2	ASTM A-388 & NOTE 2	NDT Report	√	P	V	V	
1.3.1	Shaft Rib (If Applicable)	Chemical Comp.	Major	Visual	100%	100%	BS 970	BS 970	MTC	√	P	V	V	
		Mechanical Prop. (Tensile Strength & % Elongation)	Major	Measure	100%	100%				√	P	V	V	
		UT On Plates > 40Mm Thick	Major	NDT	100%	100%	ASTM A 435	ASTM A 435, (LAMINATION IN PLATE IS NOT ACCEPTABLE)	NDT Report	√	P	V	V	

STANDARD QUALITY PLAN

ITEM : LT MOTOR

SQP NO: ADANI/QA/SQP/E/002
REV. NO.:02
DATE: 12.03.2016

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SL No.	COMPONENT/ OPERATION	CHARACTERISTICS	CATEGORY OF CHECK	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	INSPECTION AGENCY			REMARKS
					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
1.4	Aluminum Die Cast Rotor (If Applicable)	Dimension (Core Length & Inner Diameter)	Major	Mech	100%	100%	Mfg. Works Drg.	Mfg. Works Drg.	MTC	√	P	V	V	
		Casting Defects	Major	Visual	100%	100%	No blow holes & crack	No blow holes & crack		√	P	V	V	
		Mechanical Properties of (Aluminum Ignot)	Major	Mech	1 Sample/ Lot	1 Sample/ Lot	IS 4026	IS 4026		√	P	V	V	
		Conductivity (of Aluminum Ignot)	Major	Elect						√	P	V	V	
		Chemical Composition	Major	Chemical						√	P	V	V	
		Aluminum Grade	Critical	Chemical						√	P	V	V	
1.5	Slip Ring (Applicable for slip ring motor only)	Dimension	Major	Measure	100%	100%	Mfg. Works Drg.	Mfg. Works Drg.	MTC	√	P	V	V	
		HV Test		Elect	100%	100%	Mfg. Works Std.	Mfg. Works Std.		√	P	V	V	
		Heat Sock Test		Elect	1 Sample / Lot	1 Sample / Lot				√	P	V	V	
1.6	Enamelled Copper Wire (If Applicable)	Dimension (Overall Diameter, Bare Diameter, Coating Thiickness, etc.)	Major	Measure	IS 13730	IS 13730	IS 13730	IS 13730	MTC	√	P	V	V	
		Elongation		Mech						√	P	V	V	
		Heat Shock		Mech						√	P	V	V	
		Resistance to Abrasion		Elect						√	P	V	V	
		Peel Test		Visual						√	P	V	V	
		Cut Through Test		Elect						√	P	V	V	
		Break Down Voltage @ Room Temperature		Elect						√	P	V	V	
		Mandrel Winding Test		Mech						√	P	V	V	
		Continuity Test (Pin Hole Test)		Elect						√	P	V	V	

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					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
1.7	Double Glass Lapped Enamelled Copper Conductor (If Applicable)	Tensile Strength. % Elongation, Cu Purity, Oxygen Content & Flexibility, Hardness	Major	Verify	1 Sample/ Lot	1 Sample/ Lot	IS 10114	IS 10114	MTC	√	P	V	V	
		Breadk Down Voltage Test		Elec	1 Sample /Lot	1 Sample /Lot				√	P	V	V	
		Dimension		Measure						√	P	V	V	
		Resistivity		Elec						√	P	V	V	
1.8	High Conductivity Annealed Copper Strip Covered By Film Backed Mica, Paper Tape (If Applicable)	Dimension	Major	Measure	1 Sample / Lot	1 Sample / Lot	Mfr Std / Spec	Mfr Std / Spec	MTC	√	P	V	V	
		Chemical Composition		Chemical						√	P	V	V	
		Breadk Down Voltage Test		Elect						√	P	V	V	
		Tensile Strength		Mech						√	P	V	V	
		Resistivity		Elect						√	P	V	V	
		Springness		Measure						√	P	V	V	
1.9 Rotor Conductor For Sq. Cage Rotor														
1.9.1	Hard / Half Hard Drawn Copper Bar (If Applicable)	Dimension	Major	Measure	Sample	Sample	BS 1432/ BS 1433/ IS 1897	BS 1432/ BS 1433/ IS 1897	MTC	√	P	V	V	
		Conductivity		Elec						√	P	V	V	
		Mech Properties		Measure						√	P	V	V	
		Chemical Composition								√	P	V	V	
		Oxygen Content								√	P	V	V	
1.9.2	Forged Copper End Ring (If Applicable)	Dimension	Major	Measure	Sample	Sample	BS 6017	BS 6017	ITR	√	P	V	V	
		Conductivity		Elec	Sample/ Heat	Sample/ Heat			MTC	√	P	V	V	
		Chem. Composition		Chem						√	P	V	V	
		Ultrasonic Test	Major	NDT	100%	100%	ASME SEC 5	ASME SEC 5, NO DEFECT IS ALLOWED		√	P	V	V	

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					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9		**10			11
1.10	Insulating Paper	Type of Paper	Major	Visual	IEC 60626	IEC 60626	IEC 60626	IEC 60626	MTC	√	P	V	V	
		Thickness		Mech						√	P	V	V	
		Tensile Strength		Mech						√	P	V	V	
		Thermal Properties		Thermal						√	P	V	V	
		Dielectric Strength (BDV)		Elect						√	P	V	V	
1.11	Mica Paper (If Applicable)	Thickness	Major	Measure	1 Sample/ BaTCh	1 Sample/ BaTCh	IS 10192	IS 10192	MTC		P	V	V	
		BDV Test		Elec							P	V	V	
		Shelf Life		Visual	100%	100%					P	V	V	
1.12	Rotor Turning	Dimesion	Major	Visual	100%	100%	App. Drg	APP. DRG	ITR		P	V	V	
1.13	Varnish	Shelf Life	Major	Visual	1 Sample/ Batch	1 Sample/ Batch	IS 10026	IS 10026	MTC	√	P	V	V	
		Colour & Appearance		Visual						√	P	V	V	
		Curing in Thin Layer		Visual						√	P	V	V	
		Solid Content		Measure						√	P	V	V	
		Compatibility with Thinner		Visual						√	P	V	V	
		Viscosity		Mech						√	P	V	V	
1.14	Single Pack Solvent Less Epoxy Resin	Applied Viscosity	Major	Measure	1 Sample / Lot	1 Sample / Lot	Manufactuer's Standard / Spec	Manufactuer's Standard / Spec	ITR		P	V	V	
		Gel Time									P	V	V	
1.15	Tape For Over Hang	Thickness & Width	Major	Measure	1 Sample/ BaTCh	1 Sample/ BaTCh	Manufactuer's Standard / Spec	Manufactuer's Standard / Spec	MTC		P	V	V	
		Glass Fiber Content		Test							P	V	V	
		High Voltage Test		Elect							P	V	V	
1.16	Glass Fibre Sleeving (If Applicable)	Bore Dia	Major	Measure	1 Sample/ BaTCh	1 Sample/ BaTCh	IS 11654 PT 2	IS 10192	MTC		P	V	V	
		Wall Thickness									P	V	V	
		High Voltage Test		Elec							P	V	V	
1.17	Epoxy Glass Laminated Sheet (Wedges) (If Applicable)	Thickness	Major	Measure	1 Sample/ BaTCh	1 Sample/ BaTCh	IS 10192	IS 10192	MTC		P	V	V	
		High Voltage Test									P	V	V	

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					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9		**10			11
1.18	Bearing and Grease	Type & Make	Major	Visual	100%	100%	Mfg. Catalouge	As per plant standard/ drawing	ITR		P	V	V	
1.19	Space Heater (If Applicable)	High Voltage (2kV for 01 minute)	Major	Elec	100%	100%	Approved Datasheet	Withstood	ITR		P	V	V	
		Resistance						Supplier Spec			P	V	V	
		Insulation Resistance									P	V	V	
		Dimension		Measure	Sample	Sample					P	V	V	
1.20	R.T.D./B.T.D (If Applicable)	Insulation Resistance	Major	Elec	100%	100%	IS 2848	IS 2848	MTC		P	V	V	
		High Voltage (2kV for 01 minute)		Elec			Approved Datasheet	Withstood			P	V	V	
		Resistance		Elec			IS 2848	IS 2848			P	V	V	
		Pull Out Test		Mech			Mfg. Catalouge	Mfg. Catalouge			P	V	V	
1.21	B.T.D (Dial Type) (If applicable)	Check For Visual Damage	Major	Visual	100%	100%	Works Drawing	Works Drawing	MTC / ITR	√	P	V	V	
		Calibration		Verify						√	P	V	V	
1.22	Fan (M.S. / Plastic - If Applicable)	Dimension	Major	Measure	Sample	Sample	Works Drawing/ IS 2062	Works Drawing/ IS 2062	MTC		P	V	V	
		Chemical & Mechanical (For M.S.)		Test							P	V	V	
2 .In-Process Inspection														
2.1	Stator Frame	Dimension	Major	Measure	100%	100%	Mfg. Works Drg.	Mfg. Works Drg.	ITR		P	V	V	
		Appearance		Visual			Free from defects	Free from defects			P	V	V	
2.2	Stator & Rotor Core Building	Core Length & Inner diameter	Major	Measure	100%	100%	Mfg. Works Drg.	Mfg. Works Drg.	ITR		P	V	V	
		Slot Alignment		Visual							P	V	V	
		Core Rigidity									P	V	V	
		Cleanliness	Major	Visual							P	V	V	
		Stator & Rotor Dimension		Measure							P	V	V	
2.3	Wound Stator	Surge Test	Major	Elec	100%	100%	Works Std	Works Std	ITR		P	V	V	
		Insulation Resistance (Before & After HV)					IS 325	IS-325			P	V	V	
		High Voltage Test						Withstood			P	V	V	
		Winding Resistance					Works Drg.	Works Drg.			P	V	V	
2.4	Rotor Cage Assembly	Visual Test	Major	Visual	100%	100%	Works Std	Works Std	ITR		P	V	V	
		UT Of Brazed Cage Rotor		NDT							P	V	V	
		Dynamic Balancing (Residual Unbalance)		Visual			ISO 1940	ISO 1940			P	V	V	

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					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9		**10			11
2.5	Varnish Impregnation	Preheating	Major	Measure	100%	100%	Mfr Std / Spec	Mfr Std / Spec	ITR		P	V	V	
		Curing Cycle									P	V	V	
		Baking Temperature									P	V	V	
		Pressure									P	V	V	
		Gel Time									P	V	V	
		Viscosity			02 Sample/ Shift	02 Sample/ Shift					P	V	V	
		Vacuum Pressure Impregnation (If Applicable)			Daily	Daily					P	V	V	
3. Final Motor														
3.1	Complete Motor	Location Of Terminal Box etc	Major	Visual	100%	100%	App GAD	App GAD	IR	√	P	V	V	
		Marking On Rating Plates & Earthing Arrangement								√	P	V	V	
		Shaft Run Out		Measure			IS 2223			√	P	V	V	
3.2	Final Assembly & General Check	Fitting Of Sub Assembly & Components	Major	Visual / Measure	100%	100%	Works Drg & Datasheet	Works Drg & Datasheet		√	P	H	H	
		Fitting Of Accessories e.g. RTD, BTD, Heaters, etc.					BOM	Works Drg & Datasheet		√	P	H	H	
		Dimensional Check		Measure			GA DRG.			√	P	H	H	
3.3	Terminal Marking	General Check	Major	Visual	100%	100%	Works Drg.	Works Drg & Datasheet		√	P	H	H	
3.4	Acceptance Test	DC Resistance Measurement Of Stator Winding, Rotor Winding (for slip ring motor only), RTD, BTD & Space Heater at ambient Temp.	Critical	Elec	100%	100%	IS 325, IS 4029 IEC 60034	IS 325, IS 4029 IEC 60034		√	P	H	H	
		O.C. Voltage ratio of stator & rotor windings (for slip ring motor only)					IS 325, IS 4029 IEC 60034	IS 325, IS 4029 IEC 60034		√	P	H	H	

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					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
3.4	Acceptance Test	IR Measurement Of Widg. Space Heater & RTD, BTD Before & After HV Test	Critical	Elec	100%	100%	IS-4722-1992	IS-4722-1992	IR	√	P	H	H	**NOTE 1:** Type Test Certificate. not Older Than Five Years from the date of award duly reviewed & accepted by Owner'S Engg For Similar Type, Size & Rating Of Motor shall be submitted along with Inspection Call. In Case The Type Test Is Specially Required As Per The Technical Spec., Same Shall Be Witnessed.
		No-Load Test at 90% 100% & 110% of rated voltage and measure no load power, current & no load speed.					IS 325, IS 4029 IEC 60034	IS 325, IS 4029 IEC 60034		√	P	H	H	
		Reduced voltage running up test (for squirrel cage motors)								√	P	H	H	
		Locked Rotor Test at rated Current & measure Voltage , Power								√	P	H	H	
		Polarization Index								√	P	H	H	
		High Voltage Test For Winding, RTD, BTD & Space Heater						Withstood		√	P	H	H	
		Over Speed Test At 120% Of Rated speed for 02 min						IS 325 & IEC 60034		√	P	H	H	
		Phase Sequence, Direction Of Rotation & Motor RPM						App Drg		√	P	H	H	
		Vibration Measurement at Rated Speed & Voltage		Mech			IS 12075, IS 325 & IEC 60034	IS 12075, IS 325 & IEC 60034		√	P	H	H	
		Noise Measurement at Rated Speed & Voltage					IS 12065, IS 325 & IEC 60034	IS 12065, IS 325 & IEC 60034		√	P	H	H	
		Visual Check, Dimension, & Cable Entry, Location Of Main Terminal Box		Visual			App Drg	App Drg		√	P	H	H	
		Marking On Rating Plate, Earthing Arrangement								√	P	H	H	
		Degree Of Protection		Verify			IS-12063	IS-12063	T.C	√	P	V	V	Test Certificate Shall Be Reviewed.

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					M	C/A					M	C	A	
1	2	3	4	5	6		7	8	9	*D	**10			11
3.5	Painting & Finishing	Finish, Shade, DFT & Adhesion	Major	Visual	100%	100%	App Drg & Datasheet	App Drg & Datasheet	IR	√	P	H	H	

NOTE 2: ACCEPTANCE NORM FOR UT OF SHAFT:-
1) CRACKS, FLAKES, SEAMS & LAPS ARE NOT ACCEPTABLE IN THE SHAFT FORGING.
2) FOLLOWING DEFECTS IN THE OUTER REGION OF SHAFT BETWEEN 75% TO 100% OF SHAFT RADIUS ARE NOT ACCEPTABLE:-
I) ANY DEFECT GIVING INDICATION LARGER THAN THAT FROM 2MM DIAMETER EQUIVALENT FLOW.
II) GROUP OF DEFECT WITH MAX. INDICATION LESS THAN THAT FROM A 2 MM DIAMETER EQUIVALENT FLOW WHICH CANNOT BE SEPARATED AT TESTING SENSITIVITY, IF THE BACK ECHO IS REDUCED TO LESS THEN 70% OF FSH.
III)THE DEFECTS GIVING INDICATIONS OF 1 TO 2 MM DIAMETER EQUIVALENT FLOW SEPARATED BY A DISTANCE LESS THEN FOUR TIMES THE SIZE OF THE LARGER OF THE ADJACENT FLOWS.
3) FOLLOWING DEFECTS IN THE SHAFT BETWEEN CENTRE OF THE SHAFT TO 75% OF SHAFT RADIUS ARE NOT ACCEPTABLE:-
I) ANY DEFECT GIVING INDICATION LARGER THAN THAT FROM 4 MM DIAMETER EQUIVALENT FLOW.
II) GROUP OF DEFECT WITH MAX. INDICATION LESS THAN THAT FROM A 4 MM DIAMETER EQUIVALENT FLOW WHICH CANNOT BE SEPARATED AT TESTING SENSITIVITY, IF THE BACK ECHO IS REDUCED TO LESS THEN 50% OF FSH.
III)THE DEFECTS GIVING INDICATIONS OF 2 TO 4 MM DIAMETER EQUIVALENT FLOW SEPARATED BY A DISTANCE LESS THEN FOUR TIMES THE SIZE OF THE LARGER OF THE ADJACENT FLOW..

NOTE 3: THIS SQP IS APPLICABLE FOR 45 kW & ABOVE RATING MOTORS. BELOW 45 kW MOTORS, MANUFACTURER TO CARRYING OUT INTERNAL ROUTINE TEST AND TEST REPORT OF SAME TO BE SUBMITTED FOR REVIEW.

LEGEND:- D* Records identified with tick (√) shall be essentially included by supplier & manufacturer in Quality Documentation package.
** M: Manufacturer / Sub-Supplier, C: Main Supplier , A: **Adani** or their authorized representative.
Use the following term as appropriate in columns 10. **P**: Perform, **V**: verification and **H**: Customer Hold Point to be witnessed and work shall not proceeded till it is witnessed and cleared in writing.
Format of Record: MTC: Manufacturer/Sub-supplier Test Certificate, ITR: Inprocess Test Report/Record, IR: Inspection Report

GENERAL NOTE:-
- Manufacturer should have all the in house testing (Acceptance & Routine Test) facilities for LT Motor.
- Testing Instruments used during Inspection must be calibrated from NABL accredited lab only. Instruments used during testing should be within valid calibration date.

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-165-W006	
		CUSTOMER :		QP NO.: PE-QP-999-165-W006 REV-00	DATE: 03.01.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: SIMPLEX/DUPLEX STRAINER	SYSTEM: ACW/DMCW	SECTION:	SHEET 1 of 5

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6		7	8	9	D	10			11
					M	B/C								
1	RAW MATERIAL													
1.1	BODY, INTERNALS, FLANGES, COUNTER FLANGES, PERFORATED SHEET, TOP & BOTTOM BASKET PLATE, DISHED ENDS (as applicable)	PHYSICAL, CHEMICAL PROPERTIES	MA	PHYS., CHEM. TESTS	ONE/HEAT		APPROVED CS DRAWING/ DATA SHEET	APPROVED CS DRAWING/ DATA SHEET	MTC/ NABL APPD LAB REPORT	√	P	V	-	CO-RELATION REQD. FOR ALL
2.0	IN PROCESS CONTROL													
2.1	BODY MACHINING	SURFACE FINISH AND DIMENSIONS	MA	VISUAL, MEASUREMENT	100%		APPD. DRG.	APPD. DRG	IR		P	V	-	
2.2	WELDING PROCEDURE SPECIFICATION, QUALIFICATION, WELDER PERFORMANCE QUALIFICATION	CORRECTNESS, WELD SOUNDNESS	CR	PHYS. TEST, RADIOGRAPHY	100%		ASME SEC IX	ASME SEC.IX	QW 482,483,484 OF ASME SEC IX	√	P	V	-	NOTE 1

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		P. AGARWAL/ N. SHEKHAR	Checked by:		GAURAV GARG
Reviewed by:		VISHAL KR. YADAV	Reviewed by:		HARISH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-165-W006	
		CUSTOMER :		QP NO.: PE-QP-999-165-W006 REV-00	DATE: 03.01.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: SIMPLEX/DUPLEX STRAINER	SYSTEM: ACW/DMCW	SECTION:	SHEET 2 of 5

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6 M	6 B/C	7	8	9	D	10			11
	FIT-UP BUTT WELD, FIT-UP OF SHELL FLANGE AND NOZZLE ASSEMBLY TO SHELL	ORIENTATION, ALIGNMENT AND DIMENSION	MA	VISUAL	100%		APPD. WPS AND MANUFACTURING DRG.	APPD. WPS AND MANUFACTURING DRG.	MFR. LOG BOOK	√	P	V	-	
	WELD QUALITY (ALL WELDMENTS INCLUDING SCREEN ASSEMBLY)													
	ROOT RUN COMPLETED BUTT WELDS COMPLETED FILLET WELDS	**SURFACE DEFECTS, INTERNAL DEFECTS**	MA	DPT, RADIOGRAPHY TEST	100% (DPT) & 10% (RDGP)	100%	ASME SEC. VIII DIV. I	ASME SEC. VIII DIV I	RADIOGRAPHS /IR	√	P	W/V	-	10% QUANTUM FOR RADIOGRAPHY. RADIOGRAPHS TO BE REVIEWED BY BHEL
	WELD QUALITY (FABRICATED MAIN FLANGES & COUNTER FLANGES)	**SURFACE DEFECTS OF WELDMENTS**	MA	DPT	100%	100%	ASME SEC VIII DIV I	ASME SEC. VIII DIV I	IR	√	P	W	-	
		INTERNAL DEFECTS OF WELDMENTS	**CR**	RADIOGRAPHY TEST	10%		ASME SEC VIII DIV. I	ASME SEC VIII DIV. I	RADIOGRAPHS /IR	√	P	V	-	*RADIOGRAPHS TO BE VIEWED BY BHEL
		DIMENSIONS	**MA**	MEAS.	100%	100%	MFG. DRG/ APPD DRG.	MFG. DRG./APPD. DRG	STAGE INSPN. FLOW SHEET	√	P	W	-	

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:		P. AGARWAL/ N. SHEKHAR	Checked by:		GAURAV GARG		
Reviewed by:		VISHAL KR. YADAV	Reviewed by:		HARISH KUMAR		

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-165-W006	
		CUSTOMER :		QP NO.: PE-QP-999-165-W006 REV-00	DATE: 03.01.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: SIMPLEX/DUPLEX STRAINER	SYSTEM: ACW/DMCW	SECTION:	SHEET 3 of 5

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6 M	6 B/C	7	8	9	D	10			11
		STRESS RELIEVING	MA	SR	100%		ASME SEC IX	ASME SEC IX	IR	√	P	V	-	
2.3	CASING, PERFORATED SHEET, INTERNAL FITTINGS REINFORCEMENT	DIMENSIONS, ORIENTATION, PERFORATION SIZE , INCLUDING QUALITY	MA	VISUAL AND MEASUREMENT .	100%		APPD. DRAWING/ DATA SHEET .	APPD. DRAWING/ DATA SHEET	MFR. LOG BOOK/ MTC/ IR	√	P	V	-	CO-RELATION REQD. FOR ALL
4	FINAL ASSEMBLY													
4.1	FINAL INSPECTION	DIMENSIONS	MA	MEASUREMENT	100%	100%	APPROVED DRAWING	APPROVED DRAWING	IR	√	P	W	-	
		LEAK TIGHTNESS	CR	HYDRO TEST AT 1.5 DESIGN PRESSURE FOR 30 MINS.	100%	100%	TECHNICAL SPEC.	TECHNICAL SPEC.	IR	√	P	W	-	
		3)PICKLING & PASSIVATION	MA	VISUAL	100%		MFR STD PROCEDURE	APPD. PROCEDURE	TC	√	P	V	-	

BHEL						BIDDER/ SUPPLIER	
ENGINEERING			QUALITY			Sign & Date	
	Sign & Date	Name		Sign & Date	Name	Seal	
Prepared by:		P. AGARWAL/ N. SHEKHAR	Checked by:		GAURAV GARG		
Reviewed by:		VISHAL KR. YADAV	Reviewed by:		HARISH KUMAR		

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-165-W006	
		CUSTOMER :		QP NO.: PE-QP-999-165-W006 REV-00	DATE: 03.01.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: SIMPLEX/DUPLEX STRAINER	SYSTEM: ACW/DMCW	SECTION:	SHEET 4 of 5

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6 M	6 B/C	7	8	9	D	10			11
		4)CAPACITY TEST FOR WET LOAD	MA	PHYSICAL	10%	10%	REFER REMARKS	NO BREAKAGE / DAMAGE	TC	√	P	W	-	DRY SAND TO FULL VOLUME TO BE PUT IN STRAINER BASKET SHALL BE WETTED BY WATER TILL WATER STARTS SEEPING & LIFTING IT WITH REMOVABLE BAR/HANDLE FOR 5 MINUTES.
4.2	PAINTINGS & PACKING	PICKLING & PASSIVATION, UNIFORMITY, SHADE, PACKING QUALITY	MA	VISUAL	100%		APPD. DRGS/ DATASHEET/ MFR STD PROCEDURE	APPD. DRGS/ DATASHEET/ MFR STD PROCEDURE	IR/TC	√	P	V	-	

LEGEND : M-VENDOR/SUB-VENDOR, B- BHEL OR BHEL NOMINATED THIRD PARTY, C-END CUSTOMER OF BHEL.
P- PERFORM, W- WITNESS, V-VERIFICATION.
MTC -Mill Test Certificate, TC-Test Certificate, IR: Inspection Report MA-Major, MI-Minor, CR-Critical.
*Records, identified with "TICK"(√) shall be essentially included by supplier in QA Documentation.

NOTES:

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		P. AGARWAL/ N. SHEKHAR	Checked by:		GAURAV GARG
Reviewed by:		VISHAL KR. YADAV	Reviewed by:		HARISH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-165-W006	
		CUSTOMER :		QP NO.: PE-QP-999-165-W006 REV-00	DATE: 03.01.2024
		PROJECT:		PO NO.:	DATE:
		ITEM: SIMPLEX/DUPLEX STRAINER	SYSTEM: ACW/DMCW	SECTION:	SHEET 5 of 5

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6		7	8	9	D	10			11
					M	B/C								

1. Verification by BHEL/BHEL Nominated agency where WPS. WPQ & PQR are approved by BHEL/NTPC or Third party inspection agency (Lloyds, TUV, EIL, Interteck or equivalent).
   Witness by BHEL/BHEL Nominated agency where WPS. WPQ & PQR are not approved by BHEL/NTPC or Third party inspection agency (Lloyds, TUV, EIL, Interteck or equivalent)

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		P. AGARWAL/ N. SHEKHAR	Checked by:		GAURAV GARG
Reviewed by:		VISHAL KR. YADAV	Reviewed by:		HARISH KUMAR

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-100-W004	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-100-W004, REV-00	DATE: 26.12.2023
		PROJECT:		PO NO.:	DATE:
		ITEM: CONICAL STRAINER	SYSTEM: ACW/DMCW/PW	SECTION:	SHEET 1 of 3

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6		7	8	9	D	10			11
					M	B/C								
1	RAW MATERIAL													
1.1	BODY, INTERNALS, FLANGES, COUNTER FLANGES, PERFORATED SHEET	PHYSICAL, MECH. CHEMICAL PROPERTIES	MA	PHYS., MECH.. CHEM. TESTS	ONE/HEAT	ONE/HEAT	APPROVED CS DRAWING/ DATA SHEET	APPROVED CS DRAWING/ DATA SHEET	MTC/ NABL APPD LAB REPORT	√	P	V	-	CO-RELATION REQD. FOR ALL
2.0	IN PROCESS CONTROL													
2.1	BODY MACHINING	SURFACE FINISH AND DIMENSIONS	MA	MEASUREMENT	100%	100%	APPD. DRG.	APPD. DRG	IR		P	-	-	
2.2	WELDING PROCEDURE SPECIFICATION, QUALIFICATION, WELDER PERFORMANCE QUALIFICATION	CORRECTNESS, WELD SOUNDNESS	CR	PHYS. TEST, RADIOGRAPHY	100%	100%	ASME SEC IX	ASME SEC.IX	QW 482,483, 484 OF ASME SEC IX	√	P	W/V	-	NOTE 1
	FIT-UP BUTT WELD, FIT-UP OF SHELL FLANGE AND NOZZLE ASSEMBLY TO SHELL	ORIENTATION, ALIGNMENT AND DIMENSION	MA	VISUAL	100%	100%	APPD. WPS AND MANUFACTURING DRG.	APPD. WPS AND MANUFACTURING DRG.	MFR. LOG BOOK	√	P	V	-	
	WELD QUALITY (ALL WELDMENTS INCLUDING SCREEN ASSEMBLY)													

BIDDER/SUPPLIER	
Sign & Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		NITIN KUMAR	Checked by:		YUVRAJ MOHAN
Reviewed by:		VISHAL KUMAR YADAV	Reviewed by:		HARISH KUMAR

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-100-W004	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-100-W004, REV-00	DATE: 26.12.2023
		PROJECT:		PO NO.:	DATE:
		ITEM: CONICAL STRAINER	SYSTEM: ACW/DMCW/PW	SECTION:	SHEET 2 of 3

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6 M	6 B/C	7	8	9	D	10			11
	ROOT RUN COMPLETED BUTT WELDS COMPLETED FILLET WELDS	**SURFACE DEFECTS, INTERNAL DEFECTS**	MA	DPT, RADIOGRAPHY TEST	100% (DPT) & 10% (RDGP)	100%	ASME SEC. VIII DIV. I	ASME SEC. VIII DIV I	RADIOGRAPHS /IR	√	P	W/V	-	10% QUANTUM FOR RADIOGRAPHY. RADIOGRAPHS TO BE REVIEWED BY BHEL /TPIA
	WELD QUALITY (FABRICATED MAIN FLANGES & COUNTER FLANGES)	**SURFACE DEFECTS OF WELDMENTS**	MA	DPT	100%	100%	ASME SEC VIII DIV I	ASME SEC. VIII DIV I	IR	√	P	W	-	
		INTERNAL DEFECTS OF WELDMENTS	**CR**	RADIOGRAPHY TEST	10%	10%	ASME SEC VIII DIV. I	ASME SEC VIII DIV. I	RADIOGRAPHS /IR	√	P	V	-	*RADIOGRAPHS TO BE VIEWED BY BHEL/TPIA
		DIMENSIONS	**MA**	MEAS.	100%	100%	MFG. DRG/ APPD DRG.	MFG. DRG./APPD. DRG	STAGE INSPN. FLOW SHEET	√	P	W	-	
		STRESS RELIEVING	**MA**	SR	100%	100%	ASME SEC IX	ASME SEC IX	IR	√	P	V	-	
2.3	CASING, PERFORATED SHEET, INTERNAL FITTINGS REINFORCEMENT	DIMENSIONS, ORIENTATION, PERFORATION SIZE , INCLUDING QUALITY	**MA**	MEASUREMENT .	100%	100%	APPD. DRAWING/ DATA SHEET .	APPD. DRAWING/ DATA SHEET	MFR. LOG BOOK/ MTC/ IR	√	P	V	-	CO-RELATION REQD. FOR ALL
3	FINAL ASSEMBLY													

BIDDER/SUPPLIER	
Sign & Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		NITIN KUMAR	Checked by:		YUVRAJ MOHAN
Reviewed by:		VISHAL KUMAR YADAV	Reviewed by:		HARISH KUMAR

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

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	STANDARD QUALITY PLAN		SPEC. NO : PE-TS-999-100-W004	DATE:
		CUSTOMER :		QP NO.: PE-QP-999-100-W004, REV-00	DATE: 26.12.2023
		PROJECT:		PO NO.:	DATE:
		ITEM: CONICAL STRAINER	SYSTEM: ACW/DMCW/PW	SECTION:	SHEET 3 of 3

S. No.	COMPONENT / OPERATION	CHARACTERISTIC CHECKED	CLASS	TYPE OF CHECK	EXTENT OF CHECK		REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
											M	B	C	
1	2	3	4	5	6 M	6 B/C	7	8	9	D	10			11
3.1	FINAL INSPECTION	COMPLETENESS, CLEANLINESS, DIMENSIONS	MA	VISUAL AND MEASUREMENT	100%	100%	APPROVED DRAWING	APPROVED DRAWING	IR	√	P	W	-	
		LEAK TIGHTNESS	CR	HYDRO TEST	100%	100%	TECHNICAL SPEC.	TECHNICAL SPEC.	IR	√	P	W	-	HYDRO TEST AT 1.5 DESIGN PRESSURE FOR 30 MINS.
3.2	PAINTINGS & PACKING	PICKLING & PASSIVATION, UNIFORMITY, SHADE, PACKING QUALITY	MA	VISUAL	100%	100%	APPD. DRGS/ DATASHEET/ STANDARD PROCEDURE/ SPECIFICATION	APPD. DRGS/ DATASHEET/ STANDARD PROCEDURE/ SPECIFICATION	IR/TC	√	P	V	-	

LEGENDS : M-VENDOR/SUB-VENDOR, B- BHEL OR BHEL NOMINATED THIRD PARTY, C-END CUSTOMER OF BHEL.
P- PERFORM, W- WITNESS, V-VERIFICATION.
MTC -Mill Test Certificate, TC-Test Certificate, IR: Inspection Report MA-Major, MI-Minor, , CR-Critical.
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   Witness by BHEL/BHEL Nominated agency where WPS, WPQ & PQR are not approved by BHEL/NTPC or Third party inspection agency (Lloyds, TUV, EIL, Interteck or equivalent)

BIDDER/SUPPLIER	
Sign & Date	
Seal	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		NITIN KUMAR	Checked by:		YUVRAJ MOHAN
Reviewed by:	vishal	VISHAL KUMAR YADAV	Reviewed by:		HARISH KUMAR

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

SUB VENDOR LIST

SUB VENDOR LIST FOR SIMPLEX BASKET STRAINER

Sl No	Supplier Name	Supplier Communication Address	Supplier Works Address
1	ACME FLUID SYSTEMS	Mr. Rakesh Sharma 152/2, Road No. 5, GIDC Kathwada, Ahmedabad Phone- 0120-2541259 Pincode : 383430 Email : rakesh@strainersindia.com	Works-1->Mr. Rakesh Sharma Others 152/2, Road No. 5, GIDC Kathwada, -Ahmedabad-GUJARAT INDIA Phone- 01202541259 FAX : 01204313342 Pincode : 382430 Email : rakesh@strainersindia.com
2	BHATIA ENGINEERING CO.	6, DSIDC, JHILMIL INDUSTRIAL AREA, G.T.ROAD, SHAHDARA. DELHI Phone- 22583488, 55258066 Pincode : 110095 Email : sales@strainwell.com	Works-1->MR.B.S.BHATIA 6, DSIDC,JHILMIL INDUSTRIAL AREA,G.T.ROAD, SHAHDARA. -DELHI-DELHI INDIA Phone- 011-22583488 FAX : 011-22583277 Pincode : 110095 Email : sales@strainwell.com
3	FILTERATION ENGINEERS (I) PVT. LTD.	Plot No. W-62 (B) T.T.C Industrial Area MIDC , Rabale Navi Mumbai Phone-02227608501 Pincode : 400701 Email : sales@feipl.com	Works-1-> Plot no. W62 B, TTC Industrial area, Road no. 3,MIDC-Rabale -Navi Mumbai-MAHARASHTRA INDIA Phone- FAX : Pincode : 400701 Email : sales@feipl.com
4	GRAND PRIX ENGINEERING PVT. LTD.	Mr. S C Sharma, Director-Sales Plot No. 82, Sector 25, Faridabad Phone-9868021512 Pincode : 121004 Email : sales@grandprixfilters.com	Works-1->Ms. S.C. Sharma Others Plot No. 82, Sector 25, -Faridabad-HARYANA INDIA Phone- 0129-4097716 FAX : 0129-4151821 Pincode : 121004 Email : scsharma@grandprixfilters.com
5	GUJARAT OTOFILT	Mr. Mahesh I Patel Plot No. 3712 & 3714, Phase IV, GIDC Vatva B/H New Nirma, Ahmedabad Phone-079-25841164 Pincode : 382445 Email : gujfilter@gmail.com	Works-1->Mr. Mahesh I Patel Others Plot No. 3712 & 3714, Phase IV, GIDC Vatva B/H New Nirma -Ahmedabad-GUJARAT INDIA Phone-9824017311 FAX : 079-25842719 Pincode : 382445 Email : gujfilter@gmail.com

6	JAY-EESH ENGINEERING COMPANY	Mr.JAYWANT MISTRY UNIT NO.17/20,ACHARYA INDUSTRIAL ESTATE, ANDHERI KURLA ROAD MUMBAI Phone- 9819914473 Pincode : 400072 Email : jayeesh_engg@rediffmail.com	Works-1->Mr. JAYWANT MISTRY Others UNIT NO. 17 and 20,A.K.ROAD, SAKI NAKA, -MUMBAI-MAHARASHTRA INDIA Phone- 022 28502168,9819914473 FAX : Pincode : 400072 Email : jayeesh_engg@rediffmail.com
7	MICON VALVES (INDIA) PVT. LTD.	7, WADEE MANZIL, 2ND FLOOR, OPP. MEMON CO-OP. BANK, 75-77E, LADY JAMSHEDJI ROAD, MAHIM, MUMBAI Phone- 022-24460711/0712 Pincode : 400016 Email : miconvalve@vsnl.net	Works-1->Md. Ilyas Shaikh CEO Plot No R-634 Rabale TTC, MIDC Industrial Area, Navi Mumbai, -Navi Mumbai-MAHARASHTRA INDIA Phone- 9223255699 FAX : Pincode : 400701 Email : mdmiconvalves@gmail.com
8	NISAN SCIENTIFIC PROCESS EQUIPMENT PVT. LTD.	Mr. Nitin S. Nikam R-587/1, M.I.D.C. RABALE, T.T.C. INDL. AREA NAVI MUMBAI Phone- 022-27691220 Pincode : Email : sales@nisanprocess.com	Works-1->Mr. Nitin S. Nikam Dir R-587/1, M.I.D.C. RABALE, T.T.C. INDL. AREA -Navi Mumbai-MAHARASHTRA INDIA Phone- 022-27691220 FAX : 022-27693317 Pincode : Email : sales@nisanprocess.com
9	OTOKLIN GLOBAL BUSINESS LIMITED	R-02, "Remi Bizcourt", PLOT NO.09 SHAH INDUSTRIAL AREA,VEERA DESAI RAOD ANDHERI (WEST) MUMBAI Phone- 022 - 2673 2134/35 Pincode : 400053 Email : sales@otoklin.com	Works-1->Mr.Abdul Wahab W-71A,MIDC,Anand Nagar Additional,Ambernath Industrial Area -Thane-MAHARASHTRA INDIA Phone-0251-2621917 FAX : Pincode : 421 506 Email : sales@otoklin.com
10	SUNGOV ENGINEERING PVT. LTD.	MR. S PRAKASH 160 BABA NAGAR, VILLIVAKKAM CHENNAI Phone- 044 26501404 Pincode : 600049 Email : domesticsales@sungov.com	Works-1->Mr.S PRAKASH Others K-27, AMBATTUR INDUSTRIAL ESTATE, AMBATTUR -CHENNAI-TAMILNADU INDIA Phone- 044 26359940 FAX : Pincode : 600058 Email : domesticsales@sungov.com

11	VENUS VALVES & ENGINEERING WORKS	Mr. RAJESH AGARWAL Shibtolla Industrial Estate, Balitikuri Shibtalla, Howrah-Amta Road Howrah Phone-9831091232 Pincode : 711113 Email : info@venusvalves.in	Works-1->Rajesh Agarwal,Shibtolla Industrial Estate, Others Balitikuri, Shibtalla,Howrah-Amta Road - Howrah-WEST BENGAL INDIA Phone-9831091232 FAX : Pincode : 711113 Email : info@venusvalves.in

SUB VENDOR LIST -LT MOTORS

CGL	AHMEDNAGAR
MARATHON ELECTRIC	KOLKATA
Marathon Regal Beloit Wuxi Co. Ltd.	China
Siemens	China
ABB	FARIDABAD,CHINA
BHARAT BIJALI	MUMBAI
KEC	BANGALORE/HUBLI
BHEL	BHOPAL
SHANGHAI ELECTRIC COMPANY	CHINA
XIANGTAN ELECTRIC MANUFACTURING CO LTD	CHINA
SIEMENS LTD	MUMBAI, CHINA
JYOTI LTD.	BARODA
NGEF	HUBLI
SHANGHAI SHANGDIAN ELECTRIC MACHINERY	CHINA
JIANGSU DAZHONG ELECTRIC MOTORS CO. LTD	CHINA

26	HT MOTORS	DONGFANG ELECTRICAL MACHINERY CO.,LTD.	China	
		Marathon Regal Beloit Wuxi Co. Ltd.	China	
		HYOSUNG	KOREA	
		HYUNDAI	KOREA	
		SHANGHAI ELECTRIC MACHINERY CO LTD	CHINA	
		XIANGTAN ELECTRIC MACHINERY CO.LTD	CHINA	
27	LT MOTORS	CGL	AHMEDNAGAR	BOI
		MARATHON ELECTRIC	KOLKATA	
		Marathon Regal Beloit Wuxi Co. Ltd.	China	
		Siemens	China	
		ABB	FARIDABAD,CHINA	
		BHARAT BIJALI	MUMBAI	
		KEC	BANGALORE/HUBLI	
		BHEL	BHOPAL	
		SHANGHAI ELECTRIC COMPANY	CHINA	
		XIANGTAN ELECTRIC MANUFACTURING CO LTD	CHINA	
		SIEMENS LTD	MUMBAI, CHINA	
		JYOTI LTD.	BARODA	
		NGEF	HUBLI	
		SHANGHAI SHANGDIAN ELECTRIC MACHINERY	CHINA	
		JIANGSU DAZHONG ELECTRIC MOTORS CO. LTD	CHINA	
28	HT SWITCHGEAR PANELS (FOR MAIN PLANT PACKAGE OF THERMAL & AUXILIARY PACAKGE)	ABB	NASHIK	NOT IN SCOPE
		SCHNEIDER	HALOL	
		SIEMENS	MUMBAI	
		CGL	NASHIK	
		L&T	AHMEDNAGAR	
		DAQO GROUP	CHINA	
		SHANDONG TAIKAI SWITCHGEAR	CHINA	
		XD ELECTRIC CO. LTD	CHINA	
		ZHONGSHAN MINGYANG ELECTRICAL CO. LTD CHINA	CHINA	
		TIANSHUI CHANGCHENG ELECTRIC	CHINA	
		BEIJING BEIKAI SWITCHGEAR	CHINA	
29	HT PANELS(FOR AUXILIARY PACKAGES)	TECHNO CRAFT	THANE	NOT IN SCOPE
		NARKHEDE UDYOG	NASHIK	
		PRISTINE SWITCHGEAR	PUNE	
		AARTECH SOLONICS LTD	BHOPAL	
		C&S ELECTRIC MV PVT LTD INDIA	NOIDA	
		STELMAC LIMITED	AHMEDABAD	
		TRISQUARE SWITCHGEARS PVT LTD	SONIPAT	
		KIRLOSKAR ELECTRIC LTD	MYSORE, KARNATAKA	
		SHndong Taikai	CHINA	
		Xd Baoji	CHINA	
		TOSHIBA	HYDERABAD	
		DAQO GROUP	CHINA	
		ABB	NASHIK	BOI
		GE	BANGLORE	
		SIEMENS	MUMBAI/ Shanghai	
		L & T	AHMEDNAGAR	
		SCHNEIDER SWITCHGEAR	NASHIK/BANGALORE /HALOL	
		C & S	HARIDWAR	
		SHANGHAI GENERAL GUANGAN ENGG CO	CHINA	

HIMANSHU SINGHAL

PAINTING REQUIREMENT

1 Stainless Steel, Non- Ferrous and Galvanised item/portion will not be painted.

2 Painting on steel surfaces/parts shall be as per below table and all exposed External surface coating shall confirm to C-4 as per ISO 12944.

Package	Condition	Surface Preparation	Primer Coat	No. of Coats	DFT (in Microns)	Intermediate Coat (in Microns)	No. of Coats	DFT (in Microns)	Final Coat	No. of Coats	DFT (in Microns)	Total DFT
1	Indoor/ Outdoor	S.A 2.5 of Swedish Specification no. SIS-05-5900-1967	inorganic ethyl self curing zinc silicate primer (coating)	1	75	High build epoxy MIO coating cured with polyamide hardener	1	100	High Build Gloss Aliphatic Acrylic Polyurethane	1	50	225

PACKING REQUIREMENT

Sl.no	DESCRIPTION
1	**Type of Packing:**
1.1	Item shall be fully covered with multi layered cross laminated colourless polyethylene sheet of at least 100 GSM and shall be packed inside wooden box or crate or fixed on wooden pallet depending upon the size.
1.2	Item shall be firmly fixed to the bottom of the packing box/crate/pallet with the help of supports/blocks to arrest the movement from all sides. Internal threads shall be protected with metal plug sealed with Teflon tape (if applicable). External thread shall be protected with PVC sleeve. Flanged opening if any shall be covered with blank flanges sealed with blank gasket of natural rubber or equivalent.
1.3	Loose material, primary and secondary shall be packed in corrugated box and plastic bags with proper tagging.
2	**Quality of wood:**
2.1	**Quality of wood:** Wood used for packing box shall be Pinewood, Rubber wood, Mango wood, Fir wood, Silver Oak wood or other as per availability with moisture content not exceeding 30%.
3	**Moisture protection:**
3.1	External machined C.S. Surfaces shall be protected against corrosion with corrosion resisting coating or grease/ shall be coated with rust preventive primer. Equiment shall be covered with HDPE sheet/ polythene sheet inside the box to prevent from moisture ingress.
4	**Packing slip & holder:**
4.1	Packing slip kept in polyethylene bag shall be placed inside the wooden box at appropriate place.
4.2	One copy of packing slip wrapped in polyethylene bag covered in galvanized iron tin sheet/ aluminium packing slip holder shall be fixed on the external surface the packing box.

BILL OF QUANTITY

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III							PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25
	BOQ SCHEDULE							

	Project Name		**RAIGARH-II**	**RAIPUR-II**	**MIRZAPUR**	**KAWAI-II**	**KORBA-III**	**MAHAN-III**
1.0	**Supply of Pumps and Motors:**	**UOM**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**
1.1	**DMCW PUMPS**							
1.1.1	Pump	Nos.	6	6	6	6	6	6
1.1.2	Motor	Nos.	by BHEL	by BHEL	by BHEL	by BHEL	by BHEL	by BHEL
1.1.3	Suction Strainer	Nos.	6	6	6	6	6	6
1.1.4	Mandatory Spares (as per S.No. 3.0 below)	Lot	1	1	1	1	1	1
1.1	**BOILER FILL PUMPS**							
1.1.1	Pump	Nos.	2	2	2	2	2	2
1.1.2	Motor	Nos.	2	2	2	2	2	2
1.1.3	Suction Strainer	Nos.	2	2	2	2	2	2
1.1.4	Mandatory Spares (as per S.No. 3.0 below)	Lot	1	1	1	1	1	1
1.1	**HOTWELL MAKEUP PUMPS**							
1.1.1	Pump	Nos.	4	4	4	4	4	4
1.1.2	Motor	Nos.	4	4	4	4	4	4
1.1.3	Suction Strainer	Nos.	4	4	4	4	4	4
1.1.4	Mandatory Spares (as per S.No. 3.0 below)	Lot	1	1	1	1	1	1

NOTE: Commissioning & Erection spares, special Tools & tackle and other accessories applicable as per Specification but not listed above shall be included in the price of pump/motor & shall be supplied with the pump/motor.

	Project Name		**RAIGARH-II**	**RAIPUR-II**	**MIRZAPUR**	**KAWAI-II**	**KORBA-III**	**MAHAN-III**
2.0	**SITE SERVICES:**	**UOM**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**
2.1	Installation Check & Supervision for replacement of Gland packing with Mechanical Seal at Site as per Specification							
2.1.1	Site Visit Charges	Nos. of Visits	8	8	8	8	8	8

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III					PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25		
	BOQ SCHEDULE							
2.1.2	Manday Charges at Site	Nos. of Mandays	36	36	36	36	36	36
2.2	PG Test of pumps at site as per Specification	Lot	1	1	1	1	1	1
NOTE:								
1	Service charges at Sl.no 2.1.1 shall include to/fro travel expenses, medical and insurance.							
2	Service Charges at Sl.no 2.1.2 shall include boarding/lodging, local conveyance or any other applicable charge for completion of site services. No. of mandays at site defined at Sl.no. 2.1.2 above shall be calculated on the basis of presence at site (travelling time/days is excluded).							
	Project Name		**RAIGARH-II**	**RAIPUR-II**	**MIRZAPUR**	**KAWAI-II**	**KORBA-III**	**MAHAN-III**
3.0	**Mandatory Spares for**	**UOM**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**	**QUANTITY**
3.1	**DMCW PUMPS**							
3.1.1	Shaft	No	1	1	1	1	1	1
3.1.2	Shaft sleeves	Nos	1	1	1	1	1	1
3.1.3	Impeller	Nos	1	1	1	1	1	1
3.1.4	Impeller locking nuts and bolts	Nos	3	3	3	3	3	3
3.1.5	Impeller wearing rings; and casing wearing rings (each)	Nos	3	3	3	3	3	3
3.1.6	Bearings at impeller end; coupling end (each)	Nos	1	1	1	1	1	1
3.1.7	Oil seals; oil deflectors; oil rings; and lantern rings (each)	Nos	3	3	3	3	3	3
3.1.8	Stationary/carbon packing and O" ring for mechanical seal	Sets	3	3	3	3	3	3
3.1.9	Oil level gauge	Nos	2	2	2	2	2	2
3.1.10	Mechanical seal assembly	Nos	2	2	2	2	2	2

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III					PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25		
	BOQ SCHEDULE							
3.1.11	Couplings complete including rubber bushes	No	1	1	1	1	1	1
3.1.12	O" rings "	Set	2	2	2	2	2	2
3.2	**BOILER FILL PUMPS**							
3.2.1	Shaft	No	1	1	1	1	1	1
3.2.2	Shaft sleeves	Nos	1	1	1	1	1	1
3.2.3	Impeller	Nos	1	1	1	1	1	1
3.2.4	Impeller locking nuts and bolts	Nos	3	3	3	3	3	3
3.2.5	Impeller wearing rings; and casing wearing rings (each)	Nos	3	3	3	3	3	3
3.2.6	Bearings at impeller end; coupling end (each)	Nos	1	1	1	1	1	1
3.2.7	Driving and non- driving end bearing of each type of motor	Set	1	1	1	1	1	1
3.2.8	Oil seals; oil deflectors; oil rings; and lantern rings (each)	Nos	3	3	3	3	3	3
3.2.9	Stationary/carbon packing and O" ring for mechanical seal	Sets	3	3	3	3	3	3
3.2.10	Oil level gauge	Nos	2	2	2	2	2	2
3.2.11	Mechanical seal assembly	Nos	2	2	2	2	2	2
3.2.12	Couplings complete including rubber bushes	No	1	1	1	1	1	1
3.2.13	O" rings "	Set	2	2	2	2	2	2
3.2.14	Motor of each type and rating	Nos	1	1	1	1	1	1
3.3	**HOTWELL MAKEUP PUMPS**							
3.3.1	Shaft	No	1	1	1	1	1	1
3.3.2	Shaft sleeves	Nos	1	1	1	1	1	1
3.3.3	Impeller	Nos	1	1	1	1	1	1
3.3.4	Impeller locking nuts and bolts	Nos	3	3	3	3	3	3
3.3.5	Impeller wearing rings; and casing wearing rings (each)	Nos	3	3	3	3	3	3

	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III					PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00		
	BOQ SCHEDULE					Date : 20.02.25		
3.3.6	Bearings at impeller end; coupling end (each)	Nos	1	1	1	1	1	1
3.3.7	Driving and non- driving end bearing of each type of motor	Set	1	1	1	1	1	1
3.3.8	Oil seals; oil deflectors; oil rings; and lantern rings (each)	Nos	3	3	3	3	3	3
3.3.9	Stationary/carbon packing and O" ring for mechanical seal	Sets	3	3	3	3	3	3
3.3.10	Oil level gauge	Nos	2	2	2	2	2	2
3.3.11	Mechanical seal assembly	Nos	2	2	2	2	2	2
3.3.12	Couplings complete including rubber bushes	No	1	1	1	1	1	1
3.3.13	O" rings "	Set	2	2	2	2	2	2
3.3.14	Motor of each type and rating	Nos	1	1	1	1	1	1
NOTE:								
1	One(1) set consists of quantity required for complete replacement for one(1) Pump of each type/size. Also the ‘set’ would include all components/hardware required to replace the item.							
2	In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities as specified in the Technical specification.							

बी एच ई एल BHEL	TECHNICAL SPECIFICATION MISC. PUMPS (HORIZONTAL) 2X800 MW ADANI RAIGARH-II, RAIPUR-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III	PE-TS-513/515 /516/522/ 523/524-100-W001 Rev. No. 00 Date : 20.02.25

DOCUMENTATION REQUIREMENT

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID	
Sl. No.	**DOCUMENT TITLE**
1	PQR CREDENTIALS (APPLICABLE AS PER NIT)
2	COMPLIANCE CERTIFICATE (Duly Signed and Stamped)
3	GA DRAWINGS OF PUMP & MOTOR SET INDICATING PUMP OUTLINE DIMENSIONS AND CIVIL LOAD DETAILS (Only for Reference and not for Comment/Approval)
4	Data for Drive Motor which is not in bidder's scope of supply: Load torque speed curves of the pumps, selected motor rating, rpm, GD2 of driven equipment.
5	SCHEDULE OF PERFORMANCE GUARANTEES (Duly Signed & Stamped and as per the format provided with Specification)

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT ALONG WITH SUBMISSION SCHEDULE		
Sl. No.	**DOCUMENT TITLE**	**SUBMISSION SCHEDULE**
1	TDS, PERFORMACE CURVES, GENERAL ARRANGEMENT AND CROSS SECTIONAL - MISC. PUMPS (H)	Rev-00 to be submitted within 25 days of LOI/PO date.
2	TDS AND CURVES OF MOTORS FOR MISC. PUMPS (H)	
3	QP-MISC PUMPS (H) & STRAINER	
4	QP- MOTORS	
5	MOTOR TYPE TEST DOC - If Applicable	Rev-00 to be submitted within 15 days of approval of documents at S.No. 2 & 4 above.
6	O & M MANUAL - MISC PUMPS (H)	Rev-00 to be submitted within 15 days of approval of above documents.
7	PG TEST PROCEDURE - MISC PUMPS (H) - If Applicable	
BHEL/Customer comments/approval and Vendor Re-submission schedule		
BHEL comments on First Submission		Within 10 days of Vendor submission.
BHEL/Customer comments/approval on Revised Submission		Within 18 days of Vendor submission.

Vendor Re-submission	Within 7 days of BHEL / Customer comments.

Important Instructions for Drawings & Documents to be submitted after award of Contract

1	Fully dimensioned outline general arrangement drawings of the pump and motor assembly (including strainer 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.
2	Characteristic curves of pumps showing the following to be submitted: a) Flow Vs Head b) Flow Vs Power c) Flow Vs Efficiency d) Flow Vs NPSHR/ minimum submergence

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT

Sl. No.	DOCUMENT TITLE
1	APPROVED DOCUMENTS
2	O&M MANUAL
3	ALL TEST CERTIFICATES / REPORTS
4	DRAWINGS OF COMPONENTS AND DETAILS AS DEEMED NECESSARY.
5	STORAGE INSTRUCTIONS

PRE QUALIFICATION REQUIREMENT (TECHNICAL)

	PRE - QUALIFYING REQUIREMENTS (TECHNICAL)	TECHNICAL SPECIFICATION NO- PE-TS-513/515/516/522/523/524-100-N001 TECHNICAL PQR NO. REV NO. 01 DATED 23.04.25 STANDARD PQR NO: PE-PQ-STD-100-N111 REVISION NO: 04 DATE: 07.02.2020 SHEET: 1 of 2

ENQUIRY NO:

PROJECT: 2X800 MW USTPP ADANI RAIPUR-II, RAIGARH-II, MIRZAPUR, KAWAI-II, KORBA-III, MAHAN-III

PACKAGE: MISC. PUMPS (HORIZONTAL)

1. The bidder should have designed, manufactured, tested, inspected & supplied the Horizontal Centrifugal pumps for water application with minimum rated flow of 1600 CuM/Hr, 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 time duration of Satisfactory performance completion should be before 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.

PREPARED BY: NAME: DESIGNATION / DEPT.:	REVIEWED BY: NAME: DESIGNATION / DEPT.:	APPROVED BY: NAME: DESIGNATION / DEPT.:

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 time duration of Satisfactory performance completion should be before 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.

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

N4. 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.

N5. 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.

N6. 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.

N7. Attached annexure-2 to be filled by the bidders on quality and general terms. Requisite documents (e.g. factory registration certificate, R&D setup details, etc) asked in the Annexure-2, shall also be attached as annexure-F2.1 to F2.17 along with the filled response.

ANNEXURE-2

SUB-VENDOR QUESTIONNAIRE

i.	***Item/Scope of Sub-contracting***	
ii.	***Address of the registered office***	***Details of Contact Person (Name, Designation, Mobile, Email)***
iii.	***Name and Address of the proposed Sub-vendor's works where item is being manufactured***	***Details of Contact Person: (Name, Designation, Mobile, Email)***
iv.	***Annual Production Capacity for proposed item/scope of sub-contracting***	
v.	***Annual production for last 3 years for proposed item/scope of sub-contracting***	
vi.	***Details of proposed works***	
1.	***Year of establishment of present works***	
2.	***Year of commencement of manufacturing at above works***	
3.	***Details of change in Works address in past (if any)***	
4.	***Total Area***	
	Covered Area	
5.	***Factory Registration Certificate***	***Details attached at Annexure – F2.1***
6.	***Design/ Research & development set-up (No. of manpower, their qualification, machines & tools employed etc.)***	***Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design) Details attached at Annexure – F2.2 (if applicable)***
7.	***Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc)***	***Details attached at Annexure – F2.3***
8.	***After sales service set up in India, in case of foreign sub-vendor (Location, Contact Person, Contact details etc.)***	***Applicable / Not applicable Details attached at Annexure – F2.4***
9.	***Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any***	***Details attached at Annexure – F2.5***
10.	***Sources of Raw Material/Major Bought Out Item***	***Details attached at Annexure – F2.6***
11.	***Quality Control exercised during receipt of raw material/BOI, in-process , Final Testing, packing***	***Details attached at Annexure – F2.7***
12.	***Manufacturing facilities (List of machines, special process facilities, material handling etc.)***	***Details attached at Annexure – F2.8***

ANNEXURE-2

SUB-VENDOR QUESTIONNAIRE

13.	***Testing facilities (List of testing equipment)***	***Details attached at Annexure – F2.9***
14.	***If manufacturing process involves fabrication then-***	***Applicable / Not applicable***
	List of qualified Welders	***Details attached at Annexure – F2.10 (if applicable)***
	List of qualified NDT personnel with area of specialization	
15.	***List of out-sourced manufacturing processes with Sub-Vendors' names & addresses***	***Applicable / Not applicable*** ***Details attached at Annexure. –F2.11 (if applicable)***
16.	***Supply reference list including recent supplies***	***Details attached at Annexure – F2.12 (as per format given below)***

Project/ package	*Customer Name*	*Supplied Item (Type/Rating/Model /Capacity/Size etc)*	*PO ref no/date*	*Supplied Quantity*	*Date of Supply*

17.	***Product satisfactory performance feedback letter/certificates/End User Feedback***	***Attached at annexure - F2.13***
18.	***Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating) Note:- Reports need not to be submitted***	***Applicable / Not applicable*** ***Details attached at Annexure – F2.14 (if applicable)***
19.	***Statutory / mandatory certification for the proposed product***	***Applicable / Not applicable*** ***Details attached at Annexure – F2.15 (if applicable)***
20.	***Copy of ISO 9001 certificate (if available)***	***Attached at Annexure – F2.16***
21.	***Product technical catalogues for proposed item (if available)***	***Details attached at Annexure – F2.17***

Name:		***Desig:***		***Sign:***		***Date:***	

Company's Seal/Stamp:-

Annexure-1

EXPERIENCE LIST

PROJECT NAME	CUSTOMER	PUMP PARAMETERS		PUMP MODEL	NO. OF PUMPS	TYPE OF FLUID	TYPE OF PUMP	YEAR OF SUPPLY	PERFORMANE FEEDBACK CERTIFICATE ENCLOSED (Y/N)
		FLOW	TDH						
		(Cu M/Hr.)	(MWC)						

COMPLIANCE CERTIFICATE

1	It is hereby confirm that the technical specification has been read, understood. We confirm compliance to the tender specification including any pre-bid clarifications and amendments, without any deviation.
2	It is hereby declared that any technical submittals which was not specifically asked for in NIT shall be considered withdrawn.

Signature of authorised Representative

Name and Designation :

Name & Address of the Bidder

Date