PART - B : TECHNICAL SPECIFICATION				
Heavy Power Equipment Plant, **Bharat Heavy Electricals Limited,** Ramachandrapuram -502032, Andhra Pradesh, INDIA.		Enquiry No. & Dt.:		
		Supplier's Ref.:		
		Date :		
Specification cum Compliance Certificate for COOLING WATER CENTRIFUGAL PUMP AND MOTOR			Specification no:	
NOTES:			01BT/CW/Spec/1012,Rev.00	
1. The "Vendor's Offer" and deviation (if any) column shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.				
2. The offer and all documents enclosed with offer should be in English language only.				
Name & Address of the supplier:				
Telephone No.				
Fax No.				
e-mail :				

SL NO.	BHEL TECHNICAL SPECIFICATION	TO BE SPECIFIED / TO BE CONFIRMED BY	VENDOR'S OFFER	DEVIATIONS
1.0	**APPLICATION OF SYSTEM**			
	The Cooling water pump is envisaged to transfer cooled water from existing RCC Cooling Tower Sump for the cooling of different auxiliaries such as VFD,DG set, LO skid etc for 125T New Balancing Tunnel in BHEL RC Puram, Hyderabad.	vendor to conform		
2.0	**SCOPE OF SUPPLY**			
	This specification specifies the requirement of Design, Engineering, Manufacturing, Assembling, Inspection, Testing at manufacturer's works and Delivery of properly painted and packed (for transport) of **Cooling water Pumping system,** including with all necessary accessories as per the clauses below and as required for the safe and trouble-free operation of equipment to be installed at BHEL Hyderabad.	vendor to conform		
2.1	Pump & motor assembly set : 2 Nos. (1W+1S)	vendor to conform		
2.2	Coupling between pump and motor			
2.3	Suitable Y-Type Suction Strainer			
2.4	Common base frame with fixing bolts for pump and motor assembly.			
2.5	Required Inter connecting Piping & Instrumentation			
2.6	Necessary foundation bolts, nuts, shims, etc			
2.7	commissioning spares (if any)			

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3.0	**PUMP DESCRIPTION**			
3.1	**GENERAL DATA**			
3.1.1	Service	Cooling Water supply to various auxilliaries in NBT		
3.1.2	Number of Pumps	2 No.(1W+1S)		
3.1.3	Location	Indoor		
3.1.4	Duty	Continuous		
3.1.5	Drive	Motor		
3.1.6	Pumping fluid	clean Cooling Water		
3.1.7	**CONSTRUCTION FEATURES OF PUMP**			
3.1.8	Pump Type	End horizontal suction and vertical discharge.		
3.1.9	Pump Model No.	vendor to specify		
3.1.10	No. of Stages of pump	Single		
3.1.11	Rated Speed of Pump (rpm)	vendor to specify		
3.1.12	Design Standard of pump	IS 1520, HIS		
3.1.13	Standard Mechanical Seal	Gland Packing		
3.1.14	Suction specific speed at rated flow	vendor to specify		
3.1.15	Type of main bearings for pump	vendor to specify		
3.1.16	Type of thrust bearings for pump	vendor to specify		
3.1.17	Thrust bearing lubrication.	vendor to specify		
3.1.18	Direction of rotation of Pump as seen from DE	vendor to specify		
3.3.0	**MATERIAL OF CONSTRUCTION**			
3.3.1	Material of construction i. Casing: ii. Impeller: iii. Base plate: iv. Shaft: v.Shaft sleeve	 i. CS ii. SS iii. MS iv. SS/Cr steel. v. SS		

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3.4.0	**COUPLING**			
3.4.1	Flexibile coupling	As Per Manufacturing Standard		
3.4.2	Type of coupling	Metallic, non-lubricated, flexible element diaphragm type with spacer		
3.4.3	Service factor for the coupling	1.5		
3.5.0	**SUCTION STRAINER**			
3.5.1	Suction strainer type	Y-Type		
3.5.2	Suction strainer material of construction	Body: CS Internals: SS 316/SS 304		
3.5.3	Suction strainer size (same as suction pipe size(*i.s* 8") strainer with flanged ends)	Vendor to conform		
3.5.4	Free flow area of the strainer element shall be 6 times the inlet pipe size (BHEL pipe size 8").	vendor to specify		
3.5.5	Strainer pressure drop	0.2 Kg/cm2 in 50% clogged conditions		
3.6.0	**PUMP PERFORMANCE CURVE**			
3.6.1	Parallel operation	No		
3.6.2	Pump rated head	37 m		
3.6.3	Pump shut off head shall be mininum 110% of rated head.	vendor to conform.		
3.6.4	Allowable operating range, m3/hr	vendor to specify		
3.6.5	Pump End of the curve flow, m3/hr	vendor to specify		
3.6.6	Pump impeller dia., mm	vendor to specify		
3.6.7	pump suction and discharge nozzle size.	vendor to specify		
3.7.0	**DRIVE RATING**			
3.7.1	AC motor Drive	vendor to specify		
3.7.2	BKW at the rated point	vendor to specify		
3.7.3	BKW at end of curve	vendor to specify		
3.7.4	Selected drive rating, KW	should be less than 40 KW		
3.7.5	Slected drive rating / BKW at rated point	vendor to specify		
3.7.6	Selected drive rating meets BKW at end of curve	vendor to specify		

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3.8.0	**PUMP DESIGN PARAMETERS**			
3.8.1	**Rated condition**			
3.8.2	Flow (m^3/hr)	200 m^3/hr		
3.8.3	Differential Head (mlc)	37mlc		
3.8.4	Temperature of pumping fluid	40 Deg °C		
3.8.5	Sp. Gravity of pumping fluid	1		
3.8.6	Efficiency of the pump shall be more than 65%	vendor to conform/specify		
3.8.7	Available pressure on suction side	6.70 mlc		
3.8.8	NPSH(A) at pump suction nozzle(mlc)	6.60 mlc		
3.8.9	NPSH(R) (mlc)	Limited to maximum 5.60		
3.8.10	NPSH(A) - NPSH(R)	min. 1.0		
3.9.0	**PERFORMANCE TEST STANDARD**			
3.9.1	Maximum Allowed Working Pressure (MAWP) in Kg/cm2 g	vendor to specify		
3.9.2	Noise level	Less than 85 DBA at 1 m distance		
4	**INSTRUMENTATION AND PIPING**			
4.1.1	Scope of piping and instruments are (for each pump set) as per P&ID	vendor to conform/specify		
4.1.2	Required expender/Reducer & counter flanges considered at all the terminal point as per P & I D MOC shall be as below. 1. Eccentric reducer- BW,B 16.9 MAT.ASTM A234 Gr.WPB 2. concentric expender-MAT. ASTM A234 Gr.WPB 3. Class 150, SORF B16.5, MAT: ASTMA105	vendor to conform/specify		
4.1.3	Regular gate valve 8" hand operated out side screw and yoke type with flange at suction side of each pump. MOC shall be as below. 1.pressue class ANSI 150 2.Body-CS/CI. 3.valve internals-ss. 4.other parts-AS per relevent standard.	vendor to conform		
4.1.4	presure gauge with suitable range across strainer ends and discharge of each pump shall be provided by vendor.(as per P&ID)	vendor to conform/specify		

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4.1.5	one pressure switch with suitable range at discharge header shall be provided by vendor (as per P&ID)	vendor to conform/specify		
4.1.6	one tempreture gauge with suitable range at discharge header shall be provided by vendor.(as per P&ID)	vendor to conform/specify		
5.0.0	**MOTOR DESCRIPTION**			
5.1.1	Service	Drive for pump		
5.1.2	No. of Motors	2 No.		
5.1.3	Motor Standard	IS 325		
5.1.4	Location	Indoor		
5.1.5	Area classification for motor	Safe area		
5.1.6	Make	crompton greaves/kirlosker /ABB/seimens/ Bharat Bijlee/jyoti		
5.1.7	Model No.	vendor to specify		
5.1.8	Type	TEFC, AC Squirrel Cage Induction Motor		
5.1.9	Mounting	Horizontal		
5.1.10	Frame Size	vendor to specify		
5.1.11	Rated speed of drive (rpm)	vendor to specify		
5.1.12	Output rating in KW	should be less than 40 KW		
5.1.13	Type of Cooling	TEFC		
5.1.14	Protection	IP55		
5.1.15	Class of Insulation	Class F with temperature rise ltd. to class B		
5.1.16	Duty Cycle	Continuous- S1		
5.1.17	Rated Voltage &% Variation	415 V((+/-6%)		
5.1.18	Frequency	50(+/-3%)		
5.1.19	Phase	3 phase		
5.1.20	Full Load Current/No load current	vendor to specify		
5.1.21	Full load Speed	vendor to specify		
5.1.22	Ambient Temperature	40° C		
5.1.23	Allowable Temp. rise over ambient Temp.	80 Deg C by resistance method		
5.1.24	Starting Current as % of FLC	600% subject to tolerances		
5.1.25	Supply System Fault Lavel Withstand Capacity	50KA for 0.25 sec		

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5.1.26	vibration level	As per IS 12075		
5.1.27	Provision shall be given for star/delta connection in motor termial box.	vendor to conform		
5.1.28	Starter will not be in the scope of vendor. Power supply to motor will be given from Existing DOL feeder of 40KW.	vendor to conform		
5.1.29	Type & No. of Terminals	vendor to specify		
5.1.30	Method of starting	DOL		
5.1.31	P F at rated load/starting.	vendor to specify		
5.1.32	Driving End/Non Driving End bearings/Bearing life.	vendor to specify		
5.1.33	Type of Lubrication of Bearings	vendor to specify		
5.1.34	Motor Terminal Box	Phase segregated		
5.1.35	Terminal Box location	Right hand side viewed from the driving (coupling) end suitable for bottom cable entry		
5.1.36	Max Cable Size	vendor to specify		
5.1.37	Energy efficient class	vendor to specify.		
5.1.38	Noise level	85 DBA at 1 m distance		
5.1.39	Direction of rotation	Motors shall preferably be suitable for either direction of rotation		
5.1.40	Treatment against rust and corrosion.	vendor to specify		
5.1.41	Suitable Cable Glands	Suitable cable Glands complete with double compression Nickel plated brass (or Aluminium, if specifically required) cable glands		
5.1.42	All performance figures are subjected to tolerance.	IS 325		
6.0.0	**QUALITY PLAN & INSPECTION AGENCY**			
6.1.0	**QUALITY PLAN**			
6.1.1	Vendor to furnish QP for the supplied item	vendor to conform.		

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6.2.0	**INSPECTION AGENCY**			
6.2.1	Vendor to perform pre-acceptance test at their works as per standard procedure the details of the test procedure has to be submitted along with offer. Mutually agreed test shall be carried out during pre-acceptance test, BHEL representative will witness the test at vendors works.	vendor to specify		
7.0.0	**COMMISSIONING SPARES**			
7.1.0	Any commissioning spares consumed during commissioning shall be in the scope of vendor.	vendor to conform.		
8.0.0	**Special Tools and Tackles**			
8.1.0	If any special tool and tackles required for the euipment shall be part of the scope of supply.	vendor to conform.		
9.0.0	**PACKING AND FORWARDING**			
9.1.0	The equipment shall be properly packed to withstand mechnical damage and rust during transit, in general the packing is to be sea worthy.	vendor to conform.		
10.0.0	**DOCUMENTATION:**			
10.0.1	The following documents shall be submitted along with the offer 1. Compliance statement as per the BHEL specifications 2. Basic drawings, effiecieny curves, head/discharge curves for the pumps offered for the equipment offered, their interconnectivity drawings. etc. 3. Customer referance list	vendor to conform.		
10.0.2	The following documents shall be submitted for BHEL approval within 15 days after the order is placed. 1. Quality plan.- along with final drawing 2. Test procedures. - within 15 days after the order is placed. 3. Initial drawings / documents for approval. 4. Final revised drawings – within 1 week after receipt of corrected drawings	vendor to conform.		

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10.0.3	The following documents shall be submitted along with the supply of equipment. 1. Test certificate for the equipment supplied. 2. 5 sets of O & M manuals along with complete drawings 3.Floor area required (Length, Width, Height) for complete Pump & accessories. 4.Foundation details for civil.	vendor to conform.		
10.0.4	The O&M manuals shall contain the following as minimum. a) The identification details of the equipment like BHEL P.O. No., Vendor's Job Identification No., full contact address with telephone, fax, & e-mail details. b) Brief description of the system. c) System unloading, storage, erection, start up, commissioning, shut down requirements. d) System operating and maintenance requirements. e) Operational & Environmental safety instructions. f) Final data sheets and drawings. g) O&M Manuals, Catalogues of the equipment (like pump, motor, etc.) & instrumentation h) Recommended 2 years operational spares i) Test reports & certificates	vendor to conform.		