

	BHARAT HEAVY ELECTRICALS LIMITED, Bhopal			Enquiry No. :	
				Due Date :	
				Supplier Qtn. No.:	
				Date :	

SPECIFICATION CUM COMPLIANCE CERTIFICATE OF 80 TR (+/-2 %) CHILLER

NOTE:-

1. Vendor must submit the complete informations and documents against clause no. 8.0 (Qualifying Condition). The offer meeting this clause would only be processed.
2. Vendor to furnish the offer using this standard template of the specification. While furnishing the offer, no change is to be made in the first three columns (i.e. 'S.NO.', 'DESCRIPTION FOR BHEL REQUIREMENT' & 'ACTION BY VENDOR). Only the "Offered" column of this format 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.
3. The offer and all documents enclosed with offer should be in English language only.
4. Vendor should confirm/clarify/specify pointwise (all the points) as per specification and provide original technical leaflet, technical details, General arrangement drawing / photograph, scope of supply etc. at the first instance.

NAME & ADDRESS OF THE SUPPLIER :	NAME & ADDRESS OF THE INDIAN AGENT :
TELEPHONE NOS.:	TELEPHONE NOS.:
FAX NOS.:	FAX NOS.:
E-MAIL ADDRESS :	E-MAIL ADDRESS :
<u>SCOPE: SUPPLY & COMMISSIONING OF 80 TR (+/-2 %) CHILLER COMPLYING WITH SPECIFICATION AS BELOW :-</u>	

S. NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED/TO BE CONFIRMED BY	OFFERED	DEVIATION	REMARKS
1.0	PURPOSE & WORK PIECE MATERIAL				
1.1	Water chiller for chilling the water for VPD (Vapor Phase Drying) Plant.	Vendor to note			
2.0	SPECIFICATION :				
2.1	Technical requirement :				
2.1.1	Chiller description : Air cooled water chiller	Vendor to confirm			
2.1.2	Chiller rated capacity :	80 TR (+/-2 %)			
2.1.3	Chilled water inlet temp to evaporator :	In between 12 °C to 14 °C			
2.1.4	Chilled water outlet temp from evaporator :	In between 6 °C to 10 °C			
2.1.5	Water flow from evaporator:	40 CMH (Minimum)			
2.1.6	Ambient temp :	44 DEG C			
2.1.7	Chiller Installation Location :	BHEL Bhopal			

2.2	Chiller General Description :			
2.2.1	The water chilling machine shall be self-contained type consisting of multiple Scroll compressors, air cooled condensers, condenser fan & motor, flooded evaporator , refrigerant piping, wiring and automatic controls, microprocessor based control panel containing all necessary operating and safety controls, indicating lights, starter, internal wiring, etc. All mounted on a steel base frame forming a compact assembly. The water chilling machine shall be complete with full charge of Environmental friendly refrigerant R134a/ R410A/ R407C and oil, vibration rubber isolation pads and accessories as per chilling unit manufacturer standards, factory assembled and tested for rated capacity.	Vendor to confirm		
2.2.2	The water-chilling unit shall be air cooled with multiple scroll compressors.	Vendor to confirm		
2.2.3	It shall be compact; completely factory assembled and tested under load conditions before dispatch and shipped with full operating charge of refrigerant and oil.	Vendor to confirm		
2.2.4	Completed chiller unit shall be designed for outdoor installation.	Vendor to confirm		
3.0	SCOPE OF SUPPLY : The air cooled water chilling unit complete in all respect, self-contained type consisting of multiple hermetically sealed scroll compressors with motor, condenser fan & motor, air cooled condensers, evaporator , refrigerant piping, automatic microprocessor based control panel all mounted on a steel base frame forming a compact assembly and water circulation pumps.	Vendor to confirm		

3.1	Compressor :				
3.1.1	Compressor Type	Hermitically sealed Scroll with independent refrigeration circuit			
3.1.2	No. of Compressor units	4			
3.1.3	Lubrication	In built			
3.1.4	Capacity Control : The chiller shall have an automatic regulating capacity from 25 % to 100 %. Sequencing of compressors shall be provided to allow the compressors to start at a time lag in of 1- 5 minutes.	Vendor to confirm & Specify			
3.2	Condenser :				
3.2.1	The condenser shall be air-cooled type.	Vendor to confirm			
3.2.2	The condenser coil shall be constructed of copper tubes and die formed aluminum fins having self-spacing collars. Fins are to be mechanically bonded to the tubes.	Vendor to confirm			
3.2.3	Condenser Fan :				
3.2.3.1	The fans shall be dynamically and statically balanced, direct drive, corrosion resistant blades, providing vertical air discharge with low sound.	Vendor to confirm			
3.2.3.2	The Fan Motors shall be of efficient, direct driven, minimum 4 pole construction, 3 phase, insulation class "F". Totally, Enclosed Fan Cooled (TEFC), rigid mounted with permanently lubricated bearings.	Vendor to confirm & Specify			

3.2.3.3	Baffles shall separate each condenser fan.	Vendor to confirm			
3.3	Evaporator:				
3.3.1	The evaporator /cooler shall be shell and tube type with carbon steel/mild steel /stainless steel shell and integral copper tubes. The evaporator shall be designed for easy removal for mechanical tube cleaning and/ or tube removal.	Vendor to confirm			
3.3.2	The shell shall have baffles to provide Zigzag passage over bank of tubes for efficient heat transfer.	Vendor to confirm			
3.3.3	The flooded/DX evaporator shall have a built-in distributor for feeding refrigerant evenly under the tube bundle to produce a uniform boiling action and baffle plates shall ensure vapor separation.	Vendor to confirm			
3.3.4	The cooler shall be complete with standard accessories such as pressure relief valve &/or angle relief valve (as per manufacturer standards), purge valve and outlet and drain connection etc. as per manufacturer standards.	Vendor to confirm			
3.4	Refrigerant Piping:				
3.4.1	The unit shall consist of copper refrigerant piping, independent refrigerant circuits for multi compressor unit. Each refrigerant circuit shall include: liquid line shutoff valve with charging port, filter-drier, solenoid valve, sight glass with moisture indicator, thermostatic/electronic expansion valves, and flexible, closed-cell foam insulated suction line.	Vendor to confirm			

3.5	Frame:				
3.5.1	Complete chiller unit along with control and power panel shall be assembled on a steel frame. Frame shall be powdered quoted suitable for outdoor installation.	Vendor to confirm			
3.6	Water circulation Pumps:				
3.6.1	Centrifugal type / vertical multistage water circulation pumps of required capacity & head with motor, base plate & coupling as per system requirement for water circulation between the chiller and our existing chilled water storage tank. No. of pumps: 1 working + 1 standby (Total Pipeline length from chiller outlet to our existing chilled water tank is approx. 10- 15 feet and from Tank outlet to chiller inlet approx. 15-20 ft. Chilled water tank is located at ground.)	Vendor to confirm			
3.6.2	Pump flow: M3/hr	Vendor to specify			
3.6.3	Pump Head : Meters of WC or kg/cm2	Vendor to specify			
3.6.4	Pump Kw :	Vendor to specify			
3.7	Power and Control panel:				
3.7.1	The chiller shall be provided with a factory installed and wired microprocessor based rain tight control panel. The control panel shall be provided with necessary MCB/MCCB/isolator for termination of incoming power cable. A contactor shall be included in the control center for each compressor. Control panel should have lockable door.	Vendor to confirm			

3.7.2	The control system shall automatically control the operation of the unit from the time the unit is started, through the operating period, until the unit is stopped. The internal components shall be arranged for easy access. The panel shall incorporate necessary interlocking between equipment as required. The motor control centre should include safety devices to protect the unit from malfunctions. The protective controls shall be minimum as listed hereunder: i. High & Low refrigerant pressure cutout. ii. Low oil pressure cutout. iii. High oil temperature cutout. iv. High discharge temperature cutout. v. Compressor over current vii. Anti-freeze protection viii. Over/under voltage ix. Water flow cutout	Vendor to confirm			
3.7.3	The panel shall be capable of displaying at least the following: a) Fault shutdown conditions b) Cooler inlet and outlet water temperatures c) Suction, discharge refrigerant pressures d) Compressor motor current e) Antifreeze temperature cut-out setting f) Anti-recycle timer status for each compressor g) Compressor run status	Vendor to confirm			
3.7.4	The electrical system shall be self-sufficient and shall need only a single three-phase external power supply to be provided to the power panel.	Vendor to confirm			

3.7.5	The water-chilling unit shall be electrically interlocked with the chilled water pump. (Water pump shall be connected by our existing starter)	Vendor to confirm			
3.7.6	The electrical control panel shall be wired to permit fully automatic operation during initial start-up, normal operation, and shutdown conditions.	Vendor to confirm			
3.7.7	The microprocessor based control panel shall monitor various parameters and display them on the back lit LCD screen for easy viewing during day or night. It shall be password protected to make it totally tamperproof.	Vendor to confirm			
3.7.8	The panel shall be user friendly and display message in simple English language with operator pad offering fingertip control having function keys for viewing different screens and changing set points.	Vendor to confirm			
3.7.9	The panel shall log fault shutdowns, which shall be stored in memory along with important parameters at the time of shutdown.	Vendor to confirm			
3.7.10	The operating program shall be stored on nonvolatile memory to eliminate water chilling unit failure/ battery discharge. The programmed set points shall be retained in lithium battery backed memory.	Vendor to confirm			
3.8	INSULATION:				
3.8.1	The cooler, entire suction line and all refrigerant lines shall be insulated with adequate thickness of foam rubber or equivalent insulating material to prevent condensation.	Vendor to confirm			

3.9	INSPECTION & TESTING:				
3.9.1	Chiller shall be offered for inspection & testing. The testing shall be done in presence of BHEL representative. Location for inspection and testing shall be offered in India only. Dispatch of chiller will be done after submission of testing result documents and approval. However, final inspection & acceptance shall be done at BHEL Bhopal.	Vendor to confirm			
3.9.2	Two copies of the testing documents and inspection certificate of chiller should be furnished along with the dispatch of material.	Vendor to confirm			
3.9.3	The cost of inspection & testing shall be included in the offer, however for inspection & testing travel and stay arrangements of BHEL officials shall be in BHEL's scope.	Vendor to confirm			
4.0	PACKING:				
4.1	Complete chiller and other supplied items shall be suitably packed to avoid any damage/loss in transit.	Vendor to confirm			
5.0	ERECTION, COMMISSIONING & PROVING:				
5.1	The supplier should finalize layout plan, electrical plan etc. in consultation with BHEL and will submit the same to BHEL after issue of LOI/Purchase Order.	Vendor to confirm			
5.2	Installation of chiller and pump including pipeline between chiller, pump and our existing chilled water tank shall be in scope of BHEL.	Vendor to confirm			
5.3	Civil work (if any) shall be in scope of BHEL.	Vendor to confirm			
5.4	Laying of all the power and control cables, earthing of chiller and pump shall be done by BHEL as per plan submitted by supplier. Supply of required power supply cable shall be in scope of BHEL.	Vendor to confirm			

5.5	After the unit is properly installed, it shall be filled tested in the presence of supplier/manufacturer representative to ensure that the units meets the tender requirement.	Vendor to confirm			
5.6	Commissioning of the chiller shall be in the scope of supplier.	Vendor to confirm			
6.0	TRAINING:				
6.1	Free of charge training to BHEL's working staff and engineers should be provided at site for minimum 1 day during commissioning of chiller, in all respects of operation, maintenance (mechanical, electrical & electronics) and safety before handover.	Vendor to confirm			
7.0	GUARANTEE / WARRANTEE:				
7.1	Guarantee/warrantee for complete chiller & pump including all bought out items should be provided for a period of minimum 12 months from the date of successful commissioning & handing over to BHEL. The supplier should provide free after sales service and free replacement of defective parts during the guarantee/warrantee period.	Vendor to confirm			
8.0	QUALIFYING CONDITIONS:				
8.1	The vendor should either be an Original Equipment Manufacturer (OEM) or authorized dealer of the OEM of the offered chiller. Dealers have to submit valid Certificate of Authorization of the OEM for quoting for chiller. The Certificate of Authorization must be submitted along with the offer.	Vendor to confirm & furnish			
8.2	The vendor or their OEM must have supplied & installed at least 1 no. of the OEM make chiller of minimum 78 TR capacity during last 5 years from tender opening date and which is working satisfactorily for at least 1 year from the date of commissioning. Following information is to be submitted by the vendor about the companies where such chillers have been supplied. This is required from all the vendors for qualification of their offer.	Vendor to confirm			

8.3	Name of the customers/company where chiller as per above capacity have been supplied & installed.	Vendor to specify			
8.4	Complete postal address of the customers, Name, designation, phone no., fax no. & e-mail address of the contact person of the customers.	Vendor to specify			
8.5	Year of commissioning.	Vendor to specify			
8.6	Copy of purchase order / work order and performance certificate as per clause no. 8.2 from the customer (in the name of bidder or their OEM) shall be submitted along with offer. The Performance Certificate should be recently issued (i.e. its date of issue should not be more than 1 year old from the tender opening date). Vendor to ensure that; PO. No., PO date and commissioning / supply date should be clearly indicated on performance certificate.	Vendor to furnish			
8.7	Financial PQC: Vendor should have average turnover of Rs. 7.5 Lakhs minimum for last 3 consecutive years ending March 2020 and it should be supported as copies of I.T.C.C annual report (Profit & Loss statement and balance sheet).	Vendor to furnish			
9.0	DOCUMENTATION				
9.1	01 Set of following documents (hard copies) in English language should be supplied along with the offer.				
9.1.1	Civil foundation drawing/ details if any.	Vendor to confirm			
9.1.2	Complete bill of material of the chiller including accessories if any.	Vendor to confirm			
9.2	02 sets hard copy & one soft copy of following documents in English language should be supplied along with supply.				

9.2.1	Operation and maintenance (mechanical, electrical and electronics) manual including electrical drawing and list of spares for chiller & catalogues of bought out items like pumps etc.	Vendor to confirm			
9.2.2	Test certificates of chiller to be submitted in original along with supply.	Vendor to confirm			
9.2.3	Control panel circuit diagram with details of electrical & control circuit-wiring diagram.	Vendor to confirm			
10.0	GENERAL:				
10.1	Charges of commissioning of the chiller on turnkey basis must be mentioned separately in the offer.	Vendor to confirm			
10.2	The vendor should submit the following information along with offer:				
10.2.1	Full technical information & technical parameters, constructional / dimensional details, safety devices details must be furnished.	Vendor to confirm			
10.2.2	Details of works/equipment that is not included by the supplier and to be provided by BHEL.	Vendor to specify			
10.2.3	Service facility for chiller should be available in India (necessary document to be submitted). Location from where after sales-service will be provided.	Vendor to specify			
10.2.4	Place of inspection & testing of Chiller.	Vendor to specify			
10.2.5	Electrical: Total connected load of chiller (KW)	Vendor to specify			