

Specification No.	SP/MISC./7809 Rev 02 dtd. 29.10.20
Item No.	SP/MISC/1/7/7809
Location	BAY-9
Quantity	03 Numbers

**DESIGN, SUPPLY, INSTALLATION & COMMISSIONING OF AIR COOLED WATER CHILLER, CAPACITY - 20 TR @ 15 °C FOR VAPOUR PHASE DRYING PLANT & VACUUM DRYING PLANT.**

**NOTE :**

- VENDOR must submit complete information against Clause No 11.0 (Qualifying Conditions). The offer meeting this clause will only be processed.**
  - The "offered" Column and where applicable, the "Deviations" Column of this format shall be filled in by the Vendor and submitted along with the offer. Technical details should also be submitted with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specification / requirements shall be treated as non-compliance. In general no deviation from the specification shall be acceptable. However, still in case of any Deviations the same have to be brought out separately and clearly. In case no deviation is mentioned in the compliance sheet it will be understood that the specifications have been accepted and shall be complied with in totality.
  - The offer and all documents enclosed with offer should be in English language only.
- NAME & ADDRESS OF THE SUPPLIER :  
 CONTACT PERSON'S NAME  
 TELEPHONE NOS.:  
 E-MAIL ADDRESS :

**SPECIFICATION CUM COMPLIANCE CERTIFICATE OF AIR COOLED WATER CHILLER (CAPACITY:20 TR @ 15 °C)**

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED	OFFERED	DEVIATIONS
<b>1.0</b>	<b>REQUIREMENT</b>			
	Air cooled Water Chilling Plant (CAPACITY: 20 TR @ 15 °C) is required for cooling of vapour condensers & water jacket cooling of Vacuum Pumping System of Vacuum Drying Plant & Vapour Phase Drying Plant. Qty-03 nos.	Vendor to Confirm		
<b>2.0</b>	<b>SCOPE</b>			
	Design, Supply, Installation and Commissioning of 3 nos chillers each of 20 TR @ 15 °C air cooled water chiller for vapour phase plant no. ME-1/7/2117, 2118 & Vacuum Drying Plant 2293 in bay-9.  i. Installation & commissioning of water chilling units (Commissioning shall be done either with connection of chiller unit with process line network or by independent operation of chiller unit with recirculation in case of non-availability of process line network Inlet & Outlet line connection ). ii. Initial gas charging of chillers till satisfactory commissioning of units. iii. Required pipeline , valves and other accessories for independent commissioning of individual chiller units in recirculation mode. iv. Operator's training for operation & control of air cooled water chillers.	Vendor to Confirm		
<b>3.0</b>	<b>SPECIFICATION</b>			
3.0.1	Cooling Capacity: 20TR@15°C	Vendor to Confirm		
3.0.2	Min/Max Operating Temp: +5°C/+25°C. With the facility to set/adjust the Chiller out put water temp. between + 5 °C to + 25°C by digital temperature controller/ programmable controller.	Vendor to Confirm		
3.0.3	Min/Max Ambient Temp.:+5°C/+45°C	Vendor to Confirm		
3.0.4	Media to Cool: Clean Water	Vendor to Confirm		
<b>3.1</b>	<b>Main Refrigeration Components:</b>			
3.1.1	The package type chilled water unit must have two independent circuits with individual hermetically sealed compressors with inbuilt internal thermal protector , internal pressure relief valve , evaporator,condenser & expansion valve. The crankcase heater must be operated as required by chiller PLC controller.	Vendor to Confirm		
3.1.2	The PLC should automatically switch on & off an individual compressor to work at part load to ensure energy efficiency of chilling unit and during any breakdown give fault diagnosis & alarm indication by hooter & blinking light at the top of the chiller. This PLC should also calculate & ensure equal running time for all compressors. All the local PLCs of the Chillers must be suitable for integration with the Main PLC of the VPD Plant.	Vendor to Confirm		
3.1.2.1	1. The offered PLC must support communication for sending and receiving data to and from the master PLC /HMI of VPD plant. (through Profibus/modbus/canbus etc.) 2. The acceptable makes of PLC: Siemens /ABB/Allen-bradley/Schneider only.	Vendor to Confirm		
3.1.2.2	Following signals are required from chiller PLC to operate the chillers from master PLC/HMI: 1) Run Status 2) Alarm/Trip Status 3) Start Command 4) Stop Command Run & Alarm Status will be DO for chiller plc Start & Stop command will be DI for chiller plc. So Chiller PLC need 02 DI & 0 2 DO to incorporate operation requirement.	Vendor to Confirm		
3.1.3	The chilling plant shall consist of Hermetically-sealed Compressors, Air-cooled Condensers, BPHEs, Expansion devices, Automatic Independent PLC based Control, Primary Chilled Water Pumps etc of suitable capacity.	Vendor to Confirm		
3.1.4	The condenser must be of an air-cooled type & use ambient air to condense the refrigerant. The condenser should be designed to operate at maximum ambient temperature and deliver guaranteed parameter of offered chiller. The condenser coils must be made of seamless copper tubes, internally grooved type, arranged in staggered rows & mechanically expanded into hydrophilic super slit aluminium fins to give superior heat transfer efficiency. Dynamically & statically balanced helicoids fans of GE/ EBM Nadi/ Kanbo/ Favelle/ Hi-cool make, direct drive must be installed at the top of the unit. The fan-motor for condenser must be in water-tight enclosure with protection IP-54. The fan guards & coil guards should be made of heavy gauge steel which are electro-galvanized & epoxy painted.	Vendor to Confirm		

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3.1.5	Condenser: Fan Type, Air-Cooled Condenser	Vendor to Confirm	
3.1.6	Condenser Make	Vendor to Specify	
3.1.7	Compressor Type: Hermetically Sealed Scroll Compressor	Vendor to Confirm	
3.1.8	Compressor Make: Emerson (Copeland) /Danfoss/ Tecumseh.	Vendor to Confirm	
3.1.9	Evaporator Type: BPHE (Braze Plate Heat Exchanger)	Vendor to Confirm	
3.1.10	Evaporator Make: GEA/ Swep/ Kaori/ Alfa laval/Danfoss/Kelvion. For each refrigeration circuit, separate evaporator is required.	Vendor to Confirm	
3.1.11	Expansion Device: Thermostatic expansion valve	Vendor to Confirm	
3.1.12	Expansion Valve Make: Danfoss/ Sporlon/ Alco.	Vendor to Confirm	
3.1.13	Refrigeration Circuits: 02	Vendor to Confirm	
3.1.14	Refrigerant: R134A/R407C	Vendor to Specify	
<b>3.2</b>	<b>Externally Mounted Pump: (on Tank Skid)</b>		
3.2.1	Make: Grundfos/Kirloskar/Crompton/CRI/CNP.	Vendor to Confirm	
3.2.2	Type: Multistage Centrifugal	Vendor to Confirm	
3.2.3	Construction: SS304 Impeller/CI Housing	Vendor to Confirm	
3.2.4	Process Flow Rate & Pressure: 200 L/Min @ 4Bar	Vendor to Confirm	
<b>3.3</b>	<b>Water Reservoir:</b>		
3.3.1	Chilled Water storage tank must be of SS-304 .	Vendor to Confirm	
3.3.2	The external surface of the storage tank should be adequately insulated.	Vendor to Confirm & Specify the insulation material & thickness	
3.3.3	The storage tank must have air vent ( if required), water filling hole with float valve & draining hole at the bottom level with valve to periodically drain water completely.	Vendor to Confirm	
3.3.4	Volume: Minimum 500 Liters (with water level indicator, level switch and temp. sensor)	Vendor to Confirm	
<b>3.4</b>	<b>Hydraulic Specs:</b>		
3.4.1	Piping should be Rigid & of non-corrosive material . Chilled water piping should be suitably insulated.	Vendor to Confirm	
3.4.2	Inlet/Outlet End Connections	Vendor to Specify	
3.4.3	All the valves , NRV, filter etc should be Audco/ Advance make.	Vendor to Confirm	
<b>3.5</b>	<b>Electrical:</b>		
3.5.1	The electrical control panel should be IP-54 standard. Containing overload protection, single phase preventer etc.	Vendor to Confirm	
3.5.2	MPCB for Compressor, Pump, Fan etc.: Schneider/ABB/L&T/Siemens make.	Vendor to Confirm	
3.5.3	Contactora for Compressor, Pump, Fan etc.: Schneider/ABB/L&T/Siemens make	Vendor to Confirm	
3.5.4	Main switch on/off: Schneider/ABB/L&T/Siemens make	Vendor to Confirm	
3.5.5	Single Phase Preventer: Schneider/ABB/L&T/Siemens/Minilec make	Vendor to Confirm	
3.5.6	Microprocessor/PLC based controller	Vendor to Confirm	
3.5.7	Antifreeze switch	Vendor to Confirm	
3.5.8	All wires & cables should be of reputed make with ISI mark.	Vendor to Confirm & Specify the make	
<b>3.6</b>	<b>Power Supply:</b>		
	Electric supply 3 PH, 415 V, 50Hz, AC will be provided by BHEL at one place only.	Vendor to Confirm	
<b>3.7</b>	<b>Safety Devices:</b>		
3.7.1	Hand shut off Valve: Both Suction & Discharge side of the Compressor for servicing purpose.	Vendor to Confirm	
3.7.2	Digital Temperature Controller.	Vendor to Confirm	
<b>3.8</b>	<b>Control Accessories:</b>		
3.8.1	High Pressure Trip	Vendor to Confirm	
3.8.2	Low Refrigerant Trip/ Low Pressure Trip	Vendor to Confirm	
3.8.3	Phase Reversal Trip/ Single Phase Prevention Trip	Vendor to Confirm	
3.8.4	Water Level Low Trip	Vendor to Confirm	
3.8.5	Overload Relay Trip	Vendor to Confirm	
3.8.6	High/Low Temperature Alarm	Vendor to Confirm	
3.8.7	Antifreeze Trip	Vendor to Confirm	
<b>3.9</b>	<b>Chiller Enclosure</b>		
3.9.1	Following details of chiller enclosure (heavy duty sheet metal) is requested	Vendor to Specify	
3.9.1.1	A. Sheet thickness of enclosure	Vendor to Specify	
3.9.1.2	B. Details of skid base frame (structure material & thickness)	Vendor to Specify	
3.9.1.3	C. Ground clearance	Vendor to Specify	
3.9.1.4	D. Paint type, colour & DFT	Vendor to Specify	
3.9.1.5	E. Encloser dimension details.	Vendor to Specify	
<b>4.0</b>	<b>Erection &amp; Commissioning</b>		
4.1	Erection & Commissioning shall be done by supplier at BHEL JHANSI works.	Vendor to Confirm	
4.2	Supplier to bring all the tools & tackles required for installation & commissioning.	Vendor to Confirm	
4.3	Initial charge of Refrigerant till successful commissioning of chillers shall be provided by supplier.	Vendor to Confirm	
4.4	If any special tool required for O&M it should be supplied by supplier along with chiller on Free of Cost basis.	Vendor to Confirm	
4.5	First fill up of oil, grease & gas will be in the scope of supplier till commissioning.	Vendor to Confirm	

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4.6	Successful proving of all function at site as per specification by the supplier shall be considered as part of commissioning.	Vendor to Confirm		
5.0	<b>Guarantee</b>			
5.1	Guarantee for equipment shall be for 24 months from the date of commissioning.	Vendor to Confirm		
6.0	<b>Packing:</b>			
6.1	All components shall be suitably packed so that the material reaches BHEL without any damage /loss in transit.	Vendor to Confirm		
7.0	<b>INSPECTION :</b>			
7.1	Pre-dispatch inspection will be carried out by the representative of BHEL as per specification at supplier's works.	Vendor to Confirm		
7.2	Minimum 15 days advance notice to be given by supplier for Inspection at supplier's works.	Vendor to Confirm		
8.0	<b>Miscellaneous :</b>			
8.1	Notwithstanding the details in this specification, if any thing else is required for its functioning the same shall be specifically brought out and included in the offer without extra cost .	Vendor to Confirm		
8.2	AIR COOLED WATER CHILLER, 3 Nos, (each of CAPACITY-20 TR @ 15 °C) should be in ready to use condition with all required accessories for its functioning.	Vendor to Confirm		
9.0	<b>PROVE-OUT AT BHEL :</b>			
9.1	Complete prove-out shall be done by VENDOR at BHEL works. VENDOR shall be fully responsible for prove out of components as per drawing and other requirements specified by BHEL to the full satisfaction of BHEL.	Vendor to Confirm		
9.2	Training of BHEL operators in operation of complete equipment & accessories etc by the supplier 's experts / engineers during their stay at BHEL works.	Vendor to Confirm		
10.0	<b>Documentation :</b>			
10.1	Leaflet, catalog, drawing and B.O.M. indicating quantity, make & model of component in offered chiller to be submitted along with offer.	Vendor to Submit		
10.2	Water chiller shall be supplied with 3 sets of manual. The manual shall contain the details of - a. Refrigeration circuit diagram b. Complete wiring diagram with ferrule no. c. Spare parts details and d. Operation manual with maintenance details.	Vendor to Confirm		
10.3	GA and P & ID diagram with detail for refrigeration system shall be provided by supplier.	Vendor to Submit		
10.4	Lay out diagram	Vendor to Submit		
10.5	Foot print area	Vendor to Submit		
10.6	Total electrical load	Vendor to Specify		
11.0	<b>Qualifying condition</b>			
11.1	To qualify for this tender, vendors shall submit the following detail and documents: (The documents in the name of OEM or their Authorized representatives shall be acceptable). i. The supplier should be the manufacturer (OEM) or authorized representative of the manufacturer. Authorization/OEM certificate must be submitted with offer.  ii. Only those vendors/bidders, who have supplied and commissioned at least THREE numbers of water chiller of capacity 20 TR (or) more in the last 10 years (as on date of tender opening) for industrial use should quote. Copy of unpriced POs should be furnished for above. iii. Vendor/bidder should submit following:- a) Performance Certificate from their customers for the satisfactory performance (of atleast one no.) of water chiller (capacity 20 TR or more supplied vide any of above submitted purchase order) for a minimum period of one year (as on original date of tender opening). OR b) Commissioning certificate from their customers for atleast 3 nos water chillers (capacity 20 TR or more supplied with copy of purchase orders). The date of commissioning should be atleast one year beofre from the original date of tender opening. Party to furnish addresses, contact numbers, email IDs of their above users. BHEL reserves its right and may verify Performance directly from the user of the equipment if required.  iv. The address and contact number of contact persons where such system are installed and working should be provided.	Vendor to submit		
12.0	BHEL reserves the right to verify any or all information submitted by the Vendors. In case any of the information is found to be false/ incorrect, the offer shall be rejected.	Vendor to Confirm		

*(Rajeev Chaturvedi)*  
29/10/2020

*(Vivek Kumar Gupta)*  
29/10/2020

*(RAANU VERMA)*  
29/10/20

*(Santosh Sini)*  
30/10/20  
*(Santosh Sini)*  
30/10/2020