An ISO 9001 Company

Bharat Heavy Electricals Limited
(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY **NOTICE INVITING TENDER**	Phone: +91 431 257 76 53 Fax : +91 431 252 00 31 Email : skaruna@bheltry.co.in Web : www.bhel.com

TWO PART BID	**Enquiry Number:**	**Enquiry Date:**	**Due date for submission of quotation:**
Tender to be submitted in two Parts	**2631600012**	**09.07.16**	**09.08.16**

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

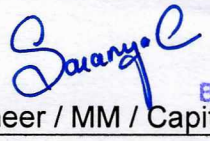
Item	Description	Quantity
10	**Vacuum Pump** as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	**01 Set**

Important points to be taken care during submission of offer

1. The Checklist for Acceptance of Commercial Terms & Conditions to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.

2. All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM/CE/GENL/001) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units > Bharat Heavy Electricals Limited page) under above Enquiry reference.

Tenders should reach us before 14:00 hours on the due date. Tenders will be opened at 14:30 hours on the due date. Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.	Yours faithfully, For **BHARAT HEAVY ELECTRICALS LIMITED**  C. SARANYA Senior Engineer MM / Capital Equipment BHEL / Tiruchirappalli - 620 014 Sr. Engineer / MM / Capital Equipment

PART - A

QUALIFYING CRITERIA FOR VACUUM PUMP

Section-I

The BIDDER/VENDOR has to compulsorily meet the following requirement to get qualified for submitting an offer for Vacuum pump

S.No	BHEL Specification	Vendor's Offer
1.0	**QUALIFYING CRITERIA**	
1.1	The BIDDER / VENDOR (OEM) shall have at least THREE Years of Experience in the Design, Manufacture & Supply of "VACUUM PUMP". Vendor to indicate the actual no. of years of experience in the field.	
1.2	Only those vendors (**OEMs**), who have manufactured ,supplied and commissioned **at least ONE VACUUM PUMP of 600 cu.m/hr [OR] ONE Vacuum Pump System containing 2 x 300 cu.m/hr Pumps operating in tandem or higher capacity** in the last TEN years [as on date of this tender opening(first date)] should quote.	
1.3	Vendor has to submit **at least one Performance Certificate** from any of their customers, for satisfactory performance of the **Vacuum PUMP/s OR systems specified in clause 1.2** supplied to them and such pump/system is working satisfactorily for a minimum period of **one year** [as on date of this tender opening(first date)]. For obtaining the Performance certificate, a suggestive format is provided at the end of part-A.	
1.4	BHEL reserves the right to verify the information provided by the vendor. In case the information provided by the vendor is found to be false/ incorrect, the offer shall be rejected.	

Section-II

2.0	**INFORMATION TO BE PROVIDED BY VENDOR**	
2.1	Vendor shall provide contact details(phone no & email id) including the address of his Agents / Service Centres in India	
2.2	Year of launch of the model quoted against this enquiry	
2.3	Number of "Vacuum pumps" supplied and commissioned till date in the quoted capacity (to quote pumps supplied during the last three years only)	
2.4	The BIDDER/VENDOR to furnish Reference List of Customers(max 10 customers) including Contact details(phone no & email id).	

SECTION III

The BIDDER to note:

S. No.	PARTICULARS	Vendor's Offer
3.1	The BIDDER shall submit the offer in **Two Parts** – 1. Technical [with PART A & PART B] & 2. Commercial and Price Bid.	
3.2	The VENDOR's RESPONSE against each clause in PART A & B of the offer should be filled by the BIDDER compulsorily with complete details.	
3.3	The BIDDER shall assure a continuous support for Spares and Service for Ten Years, from the date of commissioning of the equipment at BHEL Works.	
3.4	The Technical Offer shall be supported by Product Catalogue and Data Sheets in original and complete technical details / literature on the quoted models of pumps.	
3.5	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation.	

Suggestive Format of Performance Certificate:

The performance certificate should be produced **on Customer's Letter Head.**

PERFORMANCE CERTIFICATE

1	Supplier of the Vacuum pump/ system	
2	Make & Model of the Vacuum pump/ system	
3	Total Capacity of the Vacuum pump/ system in cu.m/hr	
3	Month & Year of Commissioning	
4	Application for which vacuum pump/ system is used	
5	Performance of the Vacuum pump/ system (Strike off whichever is not applicable)	Satisfactory / Not Satisfactory
6	After sales service (Strike off whichever is not applicable)	Satisfactory / Not Satisfactory
7	Any Other remarks	

Performance certificate issued date:

Signature & Seal of the Authority
Issuing the Performance Certificate

Contact details of issuing authority
Name & Designation:
Office No/ Mobile no:
Email ID:

TECHNICAL SPECIFICATION
for
VACUUM PUMP

Description:

The objective of using vacuum pump is to generate vacuum of 4 Torr absolute pressure (equivalent to 5.3 millibar) in order to remove the moisture/ water molecules and ensure complete dryness after Hydro-Test and draining of the steam generator vessel(schematic sketch enclosed) by pumping out the evaporated liquid water molecules and adsorbed molecules at this vacuum pressure.

The evacuation has to start from atmospheric pressure in almost completely water drained condition after hydro test. Water molecules and surface adhering water traces present in the job has to be removed and completely dried by using this vacuum pump.

The ultimate desirable vacuum is of the order of 4 Torr or better without any traces of moisture which is equivalent to relative humidity of 30% or lower at 20°C.

The Vacuum pump has to run continuously in order to achieve 4 Torr vacuum in the steam generator vessel. The vacuum pump should run for few more hours even after achieving 4 Torr vacuum in order to ensure complete dryness of the vessel. After this the pump will be isolated and then complete dryness will be ascertained if the vessel retains 4 Torr vacuum /better for minimum 30 minutes.

DETAILED SPECIFICATION :

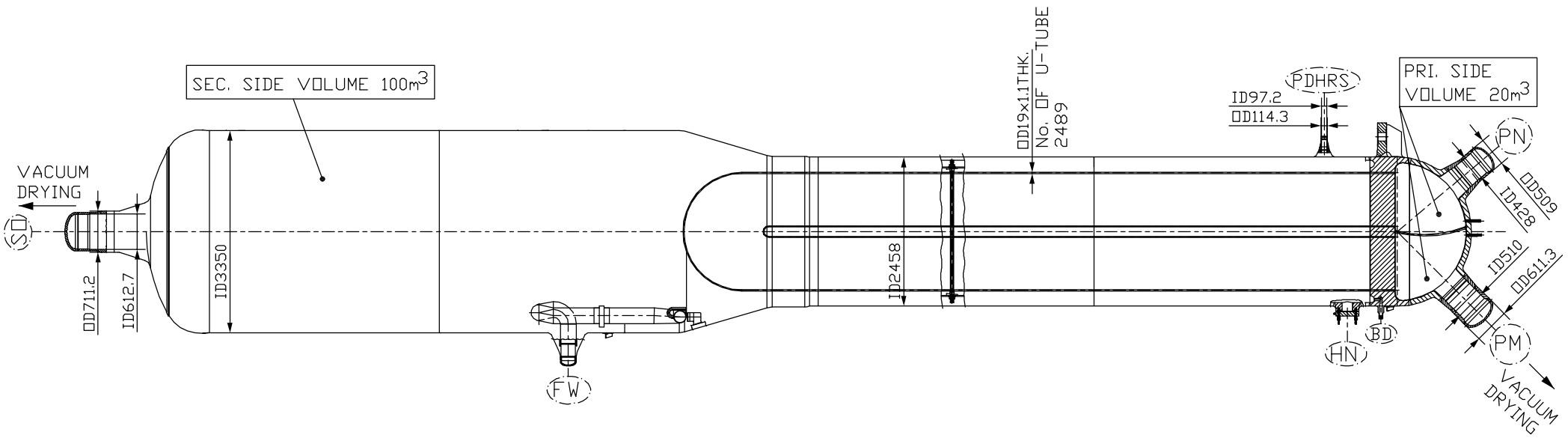
S.No.	FEATURES	BHEL SPECIFICATION	Vendors Reply
1.0	**APPLICATION:**		
1.1	Drying of Job	The proposed system is intended for drying of large volumes of primary & secondary sides of Steam Generator vessel individually by generating and retaining vacuum of 4 Torr or better without any traces of moisture (which is equivalent to relative humidity of 30% or lower at 20°C.). Vendor to confirm.	
2.0	**Job Description**		
2.1	Job Details	The total volume of the vessel for drying consists of Two sections. a) Primary side and b) Secondary side.	
2.2	Primary Section	The volume of the primary section is 20000 litres (20 m^3)	
2.3	Secondary Section	The volume of the secondary section is 100000 litres (100 m^3)	
2.4	Structure of Primary Section	The primary section(20 cub.m) consists of a thick tube sheet drilled in to which around 5000 tube ends (2500 U-Tubes) are inserted .This tube sheet is closed with a hemispherical dished end of 2.5 m diameter. The dished end will have large nozzles which can be used as inlet port for the vessel's primary side. The inner surface of these 2500 U-Tubes are to be dried by vacuum to 4 Torr.	
2.5	Inlet port	Primary section will have inlet port of ID 510mm (OD is 611.3mm) for connecting the vacuum pump with suitable adaptors/flexible bellows/fasteners/'O' rings. Vendor to provide the details of the adaptors/flexible bellow, 'O' rings, etc. BHEL will provide nominal bore of around 300mm.Vendor to confirm this size or suggest any other suitable size with the required sketch/ drawing such that the efficiency of vacuum pump is not affected.	

S.No.	FEATURES	BHEL SPECIFICATION	Vendors Reply
2.6	Structure of the Secondary Section	The secondary section (100 cub.m) is a large cylindrical shell covering the 2500 U-Tubes of primary section and welded to the thick tube sheet on one end. The other end of the cylindrical shell has a torroidal dished end with one pipe welded at the centre of the dished end. This pipe can be used as inlet port for the vessel's secondary side. The inner surface of the cylindrical shell and the outer surface of these 2500 U-Tubes are to be dried by vacuum to 4 Torr.	
2.7	Inlet port	Secondary section will have inlet port of ID 612.7mm (OD is 711.2 mm) for connecting the vacuum pump with suitable adaptors/flexible bellows/fasteners/'O' rings. Vendor to provide the details of the adaptors/flexible bellow, 'O' rings, etc. BHEL will provide nominal bore of around 300mm.Vendor to confirm this size or suggest any other suitable size with the required sketch/ drawing such that the efficiency of vacuum pump is not affected.	
2.8	Inlet Port height	The Inlet ports height is around 3 metres from floor level. The length of the connectors/adaptors/flexible bellows can be provided suitably. Vendor to confirm	
3.0	**Working procedure**		
	a) The Vacuum pump must be operated continuously to achieve vacuum of min.4 Torr. b) The vacuum pump should run for few more hours even after achieving 4 Torr vacuum in order to ensure complete dryness of the vessel (which is equivalent to relative humidity of 30% or lower at 20°C) c) After this the pump will be isolated and then complete dryness will be ascertained if the vessel retains 4 Torr vacuum /better for minimum 30 minutes. Vendor to confirm.		
4.0	**VACUUM PUMP DESCRIPTION**		
4.1	Pump Type	Rotary vane type vacuum pump OR Roto - dynamic mechanical pump(oil operated).Vendor to indicate the offered pump type	
4.2	Capacity	600 cubic meter per hour or better in order to achieve faster evacuation. Vendor to confirm and state the exact capacity and quantity of pumps offered.	
4.3	Drying Capacity of Pump	The offered Pump/s shall be able to complete drying of the Primary section (20 cub.m) in about 12 hrs and secondary section(100 cub.m) in about 24 hours(considering few water molecules and surface adhering water traces) and accordingly single pump or Two pumps in tandem operation to be provided.	
4.4	Vacuum pressure	The vacuum pump should generate pressure of 4 torr(5.3 mbar) or better in the jobs specified in clause 2.0	
4.5	Ultimate Vacuum of the pump	0.5Torr (Approx. 0.6mbar) or better in gas ballast closed condition. Vendor to specify the Ultimate Vacuum achievable by the pump with gas ballast in closed and open conditions	
4.6	Cooling Arrangement	Pumping system should have proper cooling (Air/water/other) arrangement to avoid overheating due to continuous use. Vendor to confirm and furnish the details of the cooling arrangement provided	
4.7	Filtering System	Exhaust oil filter is required to filter oil vapours entering the vacuum volume and thus the job surfaces shall be contaminant free. Vendor to confirm	

S.No.	FEATURES	BHEL SPECIFICATION	Vendors Reply
5.0	**Operator control panel**	Switch/control panel shall be provided for operating the pump system in one single movable frame for easy operation. Vendor to confirm and provide the details of the control panel.	
6.0	**Connectors/Adapters**		
6.1	Reading Gauge & reading meters	a) Vacuum recording shall be at two locations-one near the pump outlet/ within the pump and another near vessel inlet. Vendor to provide 2 nos of suitable vacuum indicating gauges. Vendor to confirm and should provide the details of the gauges b) The vacuum reading gauge heads and meters shall be calibrated ones with calibration standards traceable to International standards. c) Suitable covers for locking the ports when not in use should be provided d) A good setup for vacuum holding and retaining in power cuts by means of suitable inter-locks/valves is to be provided. Vendor to provide the details	
6.2	Flow control valve between Job and pump	Vendor to provide Flow control Valve between the job and Pump to regulate the flow to avoid condensation of water molecules	
6.3	Air Leak Tight	All inter connections, valves and vacuum gauge connecting points including vessel port connecting arrangements shall be absolutely leak tight.	
6.4	Schematic Diagram	Vendor to provide basic schematic diagram along with the offer to understand the integration and operation of the entire system	
7.0	**Carriage for Movement**	The entire equipment including operator control panel shall be easily transportable from place to place by means of a wheeled transport carriage. Suitable hooks for lifting the equipment by cranes also to be provided.	
8.0	**Power Input**	BHEL will provide power supply of 415 V with a fluctuation of ±10%, 50Hz, 3Ph (3 wire system – without neutral)	
8.1	Input Power Cable	A 10 m long sheathed power input cable is to be provided along with the equipment. Vendor to confirm	
9.0	**ACCESSORIES:**		
9.1	All the accessories required to integrate the various sub-systems shall be offered. The accessories offered shall be listed and their application shall be described. This is to cover supply of Electrical, Electronic & Mechanical Spares / panel boards – Both for operation and maintenance for 2 years including oils, clamps, quick turn couplings, 'o' rings & seals etc. Vendor to furnish a list of Standard accessories like vacuum gauges with cables, bellows, 'O' rings, etc. recommended for 2 years of trouble free operation in the technical offer with description, part number, quantity and specification etc. without price details. The same list shall be quoted in the commercial offer with price break up in a sealed cover.		

S.No.	FEATURES	BHEL SPECIFICATION	Vendors Reply
10.0	**SPARES:**		
10.1	Complete List of Spares including the following to be offered along with the machine– both Mechanical & Electrical: a) All the PCB used in the system(if any) – 1 set b) If the system is controlled through programmable microprocessor/microcontroller then the pre-programmed IC -1no to be provided c) In case the system is controlled through PLC then the licensed version of PLC software CD and backup program to be provided. d) Oils seals, filters, cables etc Vendor to furnish a list of critical spares recommended for 2 years of trouble free operation in the technical offer with description, part number, quantity and specification etc. without price details. The same list shall be quoted in the commercial offer with price break up in a sealed cover.		
11.0	**O & M MANUALS:**		
11.1	Manuals to be Supplied with Equipment	Separate Operational Instructions & Maintenance Manual for Vacuum Pump & its associated Accessories in English to be provided	
11.2	Contents of the Manual	The O & M Manual shall contain details like: a) Operation Instructions & Maintenance manual for the total system b) Description & Constructional Details c) Mechanical Assembly Drawings d) Part Drawings e) Electrical Schematic Drawings f) Bill of Materials g) Printed Circuit Board Schematics(if any) h) Technical Leaflets of Bought-Out Items I) List of Spare Parts (Both Electrical & Mechanical) with Make, Specifications/Rating j) Trouble Shooting Details k) Safety Instructions – For Erection, Testing, Operation and Maintenance. Vendor to confirm	
11.3	No of Copies	Hard Copies in Original 3 Sets Soft Copy on CD 1 No Vendor to confirm	
12.0	**GENERAL POINTS:**		
12.1	Pre-Despatch Inspection	The equipment shall be offered for inspection & functional prove out test. This shall be witnessed by BHEL at suppliers works for performance evaluation prior to despatch. The following schedule of inspection is to be carried out prior to despatch from the suppliers works: a. Factory Inspection report for ultimate Vacuum level, time to reach this vacuum and its retaining capability for 3 hours by continuous running of the pump with gas ballast in open condition. (OR) Vendor may propose any equivalent test going to be demonstrated at their works during PDI acceptable to BHEL.	

S.No.	FEATURES	BHEL SPECIFICATION	Vendors Reply
		b. Test Reports and calibration certificates for vacuum heads and meters. Final acceptance will be given by BHEL after successful Prove OUT Test at BHEL works as per clause 12.3 only	
12.2	Test and calibration certificates	Performance / functional test reports / relevant calibration certificates for vacuum heads and meters shall be provided along with the equipment	
12.3	Installation & Commissioning & Performance Prove-Out test at BHEL	Vendor should take full responsibility of Installation and commissioning at BHEL works. After the installation, the supplier has to run the equipment and demonstrate its performance at BHEL works including vacuum generation & vacuum holding.	
12.4	Training	Training on Operation and Maintenance for BHEL Staff during Installation & Commissioning of the equipment to be provided by the vendor	
12.5	Guarantee	Performance Guarantee for the entire equipment for a period of 12 months from the date of commissioning or 18 months from the date of despatch whichever is earlier shall be provided. Vendor to confirm	
13.0	**IMPORTANT NOTES:**		
13.1	The supplier shall give point-by-point confirmation by elaborating the technical feature of the offered system, with reference to the above specification. Additional literature on principle of operation shall be given. Just mentioning 'YES' or "CONFIRMED" is not acceptable.		
13.2	Deviation statement (if any) shall be given along with the offer.		
13.3	The un-priced price bid indicating clearly the offered items shall be enclosed along with the technical offer.		
13.4	Offers incomplete with respect to the above are liable for rejection.		



Schematic Sketch of a Typical Steam Generator