

Specification No.	ME-7207
Item No.	ME-171/2756
Location	BAY-9
Quantity	1 no.

NOTE:-

SPECIFICATION CUM COMPLIANCE CERTIFICATE OF PORTABLE VACUUM SYSTEM

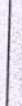
1. Vendor must submit complete information against clause no. 15.0 (Qualifying Condition). The offer meeting this clause would only be processed.
2. Vendor to furnish the offer using this standard template of the specification. While furnishing the offer, no change is to be made in the first three columns (i.e. 'S.NO.', 'DESCRIPTION FOR BHEL REQUIREMENT' & 'ACTION BY VENDOR'). Only the "Offered" column and where applicable, the "Deviations" & "Remarks" 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.

1. Vendor must submit complete information against clause no. 15.0 (Qualifying Condition). The offer meeting this clause would only be processed.
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3. The offer and all documents enclosed with offer should be in English language only.
4. Where ever "vendor to specify" or "suitable" is mentioned suitable backup data or calculation or justification is required for establishing the suitability.
5. Circuit diagram of the system offered is to be enclosed with proper writeup.

TELEPHONE NOS.:
FAX NOS.:
E-MAIL ADDRESS:

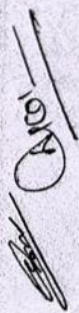
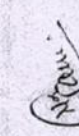
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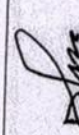
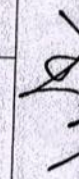
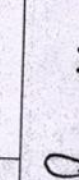
SCOPE: DESIGN, SUPPLY, ERECTION & COMMISSIONING OF PORTABLE VACUUM SYSTEM COMPLYING WITH SPECIFICATIONS AS BELOW	E-MAIL ADDRESS :
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			 25/4/19	 Shae	 Pankaj	 Ravindra

SCOPE: DESIGN, SUPPLY, ERECTION & COMMISSIONING OF PORTABLE VACUUM SYSTEM COMPLYING WITH SPECIFICATIONS AS BELOW

S. NO.	DESCRIPTION FOR BHEL REQUIREMENT	ACTION BY VENDOR	OFFERED	DEVIATION / REMARK
3.1.2.2	Plant Configuration :- Portable Vacuum Pumping system shall consist of vacuum pumps, isolation valve, airtight valve, vacuum gauges (McLeod type and Bourdon type), closed loop water cooling device, condenser, air compressor, air receiver vessel, control panel etc. The entire vacuum pumping system including control panel shall be mounted on suitable frame for easy movement of the system. Necessary inter-connection pipe line & control valves are the part of the system. It shall be consist of following main assemblies-	Vendor to Confirm		
3.1.2.2.1	Mechanical Booster pumps - 1 No. Nominal pumping speed - 2000 m ³ /hr @ 50 Hz (Min.) Make of the pump - Pfeiffer/ Shinko Seiki/ Leybold. (Offered pump shall be suitable for operation with VM-4 Vacuum Pump Oil)	Vendor to Confirm & Specify		
3.1.2.2.2	Rotary oil sealed vacuum pump - 2 Nos. Nominal pumping speed - 2X300 m ³ /hr (Min.) Ultimate Vacuum with G.B open - 0.5 Torr Make of the pump - Pfeiffer/ Shinko Seiki/ Leybold (Offered pump shall be suitable for operation with VM-4 Vacuum Pump Oil)	Vendor to Confirm & Specify		
3.1.2.2.3	An automatic bypass valve across the roots blowers shall permit operation of rotary vacuum pump alone to operate when so required. The rotary vacuum pumps are provided with gas ballast valve to prevent contamination of vacuum pump oil with moisture. The vacuum pump shall also be provided with suitable non-return valve device such that in the event of power failure the vacuum in the tank shall be maintained and the vacuum pump oil is not sucked back" into the chamber. A high vacuum safety valve (piston type) to prevent back streaming of oil and air intrusion shall be provided. Over temperature protection shall be provided with Roots pump & Rotary vacuum pump and low oil level switch with suitable interlock for rotary vacuum pump shall be provided.	Vendor to Confirm		
3.1.2.2.4	Shell and tube type condenser shall be installed between Roots pump and Rotary vacuum pump to prevent moisture contamination inside vacuum pump.	Vendor to Confirm		
3.1.2.2.5	Acceptable leak rate - 1.6 Torr Ltr/ sec	Vendor to Confirm		
3.1.2.2.6	Total capacity of Vacuum Pumping system shall be suitable to achieve the ultimate vacuum of 0.01 Torr at the suction of the Booster pump.	Vendor to Confirm		
3.1.2.2.7	Safety interlock for pump and booster over temperature protection and cooling water flow shall be provided.	Vendor to Confirm		
3.1.2.2.8	Complete vacuum pumping system shall be mounted on sturdy steel frame structure with wheels, mechanical jacks and lifting hooks.	Vendor to Confirm		
3.1.2.2.9	The vacuum pumping system shall be terminated in a suitable vacuum manifold capable of taking 2x 80 mm dia vacuum out-let for connection to transformer.	Vendor to Confirm		
3.1.2.2.10	Electro - pneumatic ball valves shall be provided at the suction of the rotary pump. The control of these valves shall be housed on the control panel. Details of valves to be submitted by vendor.	Vendor to Confirm		
3.1.2.2.11	Flexible steel corrugated hose of length 15 meter each with flange size of 80 NB for connection with transformer - 2 Nos.	Vendor to Confirm & Furnish		
3.1.2.2.12	An adequate air compressor and air receiver vessel shall be provided for the operation of the valves. Details of air compressor to be submitted.	Vendor to Confirm		
3.1.2.2.13	Vacuum Breaking- A suitable air filter, heater & silicagel breather unit shall be provided to facilitate admittance of hot air for vacuum breaking of the system.	Vendor to Confirm & Furnish		
3.1.2.2.14	Cooling System (Water Cooling Device) :- An energy efficient closed loop water cooling device with storage tank shall be provided for circulation of cooling water to the vacuum pumps & condenser.	Vendor to Confirm		
3.1.2.2.15	Interlocks & Safety Devices: The system shall be complete with necessary interlocks in respect of Electrical, Mechanical, Pneumatic and water supply etc. to give satisfactory performance of the pump. Following safety devices shall be provided:	Vendor to Confirm & Specify		
3.1.2.2.15 (a)	A vacuum switch shall be provided for the operation of booster pump in vacuum line. Booster pump shall be operated only after achieving desired vacuum by the rotary oil seal pump.	Vendor to Confirm & Specify		
3.1.2.2.15 (b)	Isolation and air admittance valves positioned above Rotary pump to isolate the rotary pump from rest of the system, thus maintaining the vacuum in the system in the event of power failure.	Vendor to Confirm		
3.1.2.2.15 (c)	Main compressed air manifold / surge tank sized to hold sufficient air to close all pneumatic valves.	Vendor to Confirm		
4.0	ELECTRICAL SYSTEM :-	Vendor to Confirm		

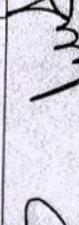
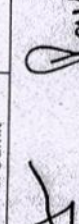




SCOPE: DESIGN, SUPPLY, ERECTION & COMMISSIONING OF PORTABLE VACUUM SYSTEM COMPLYING WITH SPECIFICATIONS AS BELOW

S. NO.	DESCRIPTION FOR BHEL REQUIREMENT	ACTION BY VENDOR	OFFERED	DAVIATION / REMARK
4.1	415V +/- 10% , 50 HZ +/- 3% 3 phase AC (3 wire system without neutral) Power Supply Source will be provided by BHEL at a single point near the Portable vacuum pumping unit as per layout recommended by VENDOR . All step down transformers, rectifiers & regulators shall also be supplied by the vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of VENDOR. Requirement of grounding/earthing with required material details is to be informed by VENDOR well in advance so that same could be incorporated during construction of foundation.	Vendor to Confirm		
4.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	Vendor to Confirm		
4.3	All electrical & electronic control cabinets & panels should be dust and vermin proof fitted with suitable panel air conditioner/s.	Vendor to Confirm		
4.4	All electrical components in the cabinets should be mounted on DIN Rail.	Vendor to Confirm		
4.5	Motors shall conform to IEC or Indian standards.	Vendor to Confirm		
4.6	VENDOR should ensure the proper earthing for the all three plant and its peripherals.	Vendor to Confirm		
4.7	All electrical equipments shall be suitably protected by HRC fuses/MCBs/ Overload relays & single phase preventives.	Vendor to Confirm		
4.8	All inputs and outputs shall be isolated by fuses and interposing relays respectively.	Vendor to Confirm		
4.9	centralized electrical panel with auxiliary step down transformer, contactors, back up protection fuses, indicating lamps etc. to be provided with audio and visual alarms for each equipment - All control circuits shall be based on 24 VDC supply. - Suitable interlock as described against each equipment shall be provided for safe and trouble free operation. - All instrument control hardware and alarms shall be mounted on a suitable control panel. A mimic diagram with indication lamps showing on off status of various equipment shall be provided on the control panel. - The plant shall be fully equipped with adequate instrumentation having provision of Auto and manual operation as mentioned. All necessary control and indicating panel shall be provided. (If PLC/HMI based control panel is offered then complete back up of PLC & HMI project / programme ladder & pdf shall be given. HMI/PLC Make: Siemens/ABB/Allen-Bradley only. Suitable communication cable with necessary adapter for communicating/ programming PLC & HMI from windows based PC shall also be provided)	Vendor to Confirm		
5.0	SAFETY ARRANGEMENTS: Following safety features in addition to other standard safety features should be provided on plant- 5.1 Plants should have adequate and reliable safety interlocks / devices to avoid damage to the workpiece and the operator due to the malfunctioning or mistakes. Plants functions should be continuously monitored and audio visual warning indication / alarm number with message (on panels) should be available. 5.2 A detailed list of all alarm / indications provided on Plants should be submitted by the supplier with the offer. 5.3 All the pipes, cables etc. on the Plants should be well supported and protected. 5.4 All the rotating parts used on Plants should be statically & dynamically balanced to avoid undue vibrations. 5.5 Emergency switches at suitable locations as per International Norms are to be provided. 5.6 Oil & water pipe lines should not run with electrical cable in the same tray.	Vendor to Confirm & Specify		
6.0	ENVIRONMENTAL PERFORMANCE : The Plants shall conform to the following factors related to environment- 6.1 Maximum noise level shall be 85 dB at normal load condition, 1mtr. away from the Plant with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Supplier to demonstrate compliance to noise level, if so required. 6.2 If any safety / environmental protection enclosure is required, it should be built in the plant by the VENDOR and certification of conformance to the pertinent act/rule shall be furnished.	Vendor to Confirm		
7.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE:	Vendor to Confirm		
7.1	Special tools and equipment required for erection of the Plant shall be brought by the VENDOR on returnable basis. However, the necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the plant should be supplied. List of such tools should be submitted with offer.	Vendor to Confirm & Sumit		

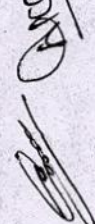


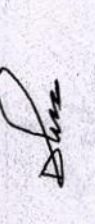


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8.0	SPARES:			
8.1	Optional Spares: (The offer for these optional spares is required to be quoted separately). Note: The prices of optional spares will not be considered while evaluating the offers of the item).	Vendor to Confirm		
8.1.1	Item wise breakup of mechanical & hydraulic and electrical & electronic spares used on the plant in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation beyond guarantee period on three shifts continuous running basis should be offered by vendor. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered)	Vendor to Confirm & Specify		
8.1.1 a)	Mechanical/ Hydraulic Spares: All types of pumps, All types of Valves, All types of pressure switches / transducers, All types of filters, All types of seals.	Vendor to Confirm & Specify		
8.1.1 b)	Electrical / Electronic Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses etc.	Vendor to Confirm & Specify		
8.2	VENDOR to confirm that complete list of spares for Plants and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the plant.	Vendor to Confirm		
9.0	DOCUMENTATION: Four sets of following documents (Soft copy in CD as well as Hard copies) in English language should be supplied along with the plant.	Vendor to Confirm		
9.1	Operating manuals of Plant with handbook for operation.	Vendor to Confirm		
9.2	Detailed Maintenance manual of Plants with all drawings of assemblies/ sub- assemblies/ parts including Electrical / Pneumatic / Coolant/ Hydraulic circuit diagrams. All the Drawings as commissioned shall be supplied with the part list also.	Vendor to Confirm		
9.3	Maintenance, Interface & commissioning manuals.	Vendor to Confirm		
9.5	Catalogues, O & M Manuals of all bought out items including drawings, wherever applicable.	Vendor to Confirm		
9.6	Detailed Specification of all rubber items and hydraulic / lube fittings.	Vendor to Confirm		
9.7	Operating manuals, Maintenance Manuals & Catalogues for supplied items & Measuring System, Voltage Stabilizer, Isolation Transformer, vacuum pump and all supplied Accessories.	Vendor to Confirm		
9.8	Soft copy of O & M Manual alongwith drawings to be provided.	Vendor to Confirm		
10.0	TRAINING:			
10.1	BHEL Persons shall be trained at BHEL Works in the field of Operation and Mechanical, Electrical & Electronics maintenance of Plants & other supplied equipment.	Vendor to Confirm		
11.0	ERECTION & COMMISSIONING			
11.1	Supplier to take full responsibility for carrying out the erection, commissioning, start up and testing of plant. Service requirement like power, air & water shall be provided by BHEL at only one point (to be indicated by supplier in their layout drawings). Other requirements like crane, trolley shall be arranged by the vendor. Details of the requirements should be informed by VENDOR in advance (one month prior to the scheduled date of start of erection/ commissioning activities).	Vendor to Confirm		
11.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 13.0 (Plant Acceptance) shall form the part of commissioning activity.	Vendor to Confirm		
11.3	Tools, Tackles, Test Material, Instruments and other necessary equipment including Laser Equipment, if any, required to carry out all above activities should be brought by the supplier on returnable basis.	Vendor to Confirm		
11.4	Commissioning spares, required for commissioning of the Plant within stipulated time, shall be brought by the supplier.	Vendor to Confirm		
11.5	All Cover Plates, Platforms (Grill Type), Railing etc. required for the Plant and its peripherals if any, shall be supplied and installed by the vendor.	Vendor to Confirm		
11.6	Portion, if any, of the Plant, accessories and other supplied items where paint has rubbed off or peeled off during transit or erection, should be repainted and merged with the original surrounding paint by the VENDOR. For this purpose, the VENDOR should supply sufficient quantity of touch-up paint of various colours of paints used.	Vendor to Confirm		
11.7	Vendor may note that the E & C charges in this case have been mandatorily fixed at 10% of the total cost. This apportioned price has to be compulsorily agreed by all vendors & no deviation shall be acceptable for this.	Vendor to Confirm		
12.0	AMBIENT CONDITIONS & THERMAL STABILITY:			

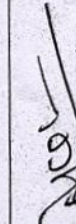
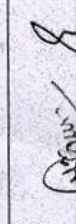
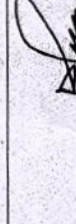


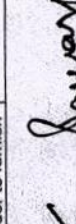




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S. NO.	DESCRIPTION FOR BHEL REQUIREMENT	ACTION BY VENDOR	OFFERED	DEVIATION / REMARK
12.1	Total Plants and all supplied items should work troublefree and efficiently under following operating conditions and should give specified accuracies. POWER SUPPLY : Voltage : 415 V -10%, +10% Frequency : 50 Hz +1.5Hz, -1.5Hz No. of phases : 3 , no neutral Ambient Conditions : Temperature = 5 to 50 degree celsius , Relative Humidity : 95 % (Vendor to confirm that Plant is suitable for above).	Vendor to Confirm		
12.2	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Plants shall be kept in the normal shop floor conditions . Max. temperature variation is up to 25 deg Celsius in 24 hours. (VENDOR to confirm that Plant is suitable for above).	Vendor to Confirm		
12.3	Thermal Stability of the complete Plant keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the Plant should be ensured by VENDOR. (VENDOR to confirm that Plant is suitable for above).	Vendor to Confirm		
13.0	PLANT ACCEPTANCE : (Tests / Activities To be Performed by VENDOR)			
13.1	Tests / Activities to be carried out at supplier's works in presence of BHEL Representative on the plant before despatch :	Vendor to Confirm		
13.1.1	Inspection of components, assemblies & sub assemblies with test certificates of OEM	Vendor to Confirm		
13.1.2	Demonstration of all features of the plants and all Accessories.	Vendor to Confirm		
13.2	Tests to be carried out at BHEL Works while commissioning the Portable Vacuum Pumping System:	Vendor to Confirm		
13.2.1	Demonstration of all features of the Vacuum Pumping Unit and all Accessories to the satisfaction of BHEL for their efficient and effective use.	Vendor to Confirm		
13.2.2	Prove-out: Minimum three power transformer vacuum drying cycles will be operated to achieve parameter mentioned in point 3.1.2.2.1 to 3.1.2.2.15.	Vendor to Confirm		
13.2.3	Two weeks supervision of independent operation of Vacuum Pumping Unit by BHEL after proveout.	Vendor to Confirm		
13.2.4	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		
14.0	GUARANTEE :			
14.1	24 months from the date of commissioning.	Vendor to Confirm		
15.0	GENERAL : The VENDOR should submit the following information for Vacuum Pumping System :			
15.1	Plant Model	Vendor to specify		
15.2	Total connected load (KVA)	Vendor to specify		
15.3	Floor area required (Length , Width , Height) for individual Plant & accessories	Vendor to specify		
15.4	Painting of Plant / Electrical Panels : Polyurethane paint (Preferably Apple Green). All the pipeline should be painted in line with IS 2379:1990- Pipelines- identification- color code.	Vendor to specify		
15.5	Total Weight of the Plant	Vendor to specify		
15.6	First fill of heating oil & hydraulic oil to be supplied by vendor.	Vendor to specify		
16.0	QUALIFYING CONDITION :			
16.1	Only Original Equipment Manufacturers (OEMs) or their Authorized Dealers/Partners meeting the following conditions are eligible to participate in the tender. (a) The vendors, submitting the quotation, should have supplied and commissioned at least 5 nos. portable vacuum pumping system in the past seven years for transformer industry can participate. Or Indian Vendors who have a running Collaboration/ Joint Working arrangement with Foreign Manufacturer [meeting above specified qualifying conditions mentioned in 16.1 (a)] can also participate. Such Indian Vendors (OEMs) shall have to submit a back to back guarantee from their foreign partner for satisfactory performance of the offered plants and collaboration certificate/ joint venture documents to be submitted alongwith offer.	Vendor to confirm & furnish		
16.2	The following information is to be submitted by the VENDOR about the companies where such plants have been supplied. This is required from all the VENDORS for qualification of their offer.	Vendor to Confirm		
16.2.1	Name of the customer / company where such Plants are installed.(unpriced copy of purchase order to be furnished in line with point no. 16.1)	Vendor to furnish		
16.2.2	Name, designation, Complete postal address, Phone no. and E-mail address of the contact person of the customer.	Vendor to furnish		
16.2.3	Year of commissioning.	Vendor to furnish		



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S. NO.	DESCRIPTION FOR BHEL REQUIREMENT	ACTION BY VENDOR	OFFERED	DAVIATION / REMARK
16.2.4	Application for which plants have been supplied.	Vendor to furnish		
16.2.5	Performance certificate from the customer/s of minimum 3 nos. Portable Vacuum Pumping System supplied in line with point no. 16.1 regarding satisfactory performance of supplied system for minimum one years after commissioning.	Vendor to furnish		
16.2.6	BHEL reserves the right to verify information or visit the place of installation of customer as indicated by VENDOR. In case the information is found to be false / incorrect, the offer shall be rejected.	Vendor to note & confirm		
17.0	TERMS & CONDITIONS			
17.1	Time of Project Completion including material supply, E&C and prove-out (within 20 Weeks from date of LOI)	Vendor to Confirm		
17.2	Schedule of Supply and Erection & Commissioning shall be submitted with the offer.	Vendor to Confirm		

[Signature]

Abhishek Gupta
Sr. Engineer/ FCX

[Signature]

Prabhat katiyar
Dy. Mgr./TRM

[Signature]

Satish Soni
Dy. Manager/WEX

[Signature]

Nitin Kumar Gaur
Manager/WEX

[Signature]

Dhirendra Kumar
Manager/TRM

[Signature]

Pawan Kumar
Sr. Manager/WEX