

**BHARAT HEAVY ELECTRICAL LIMITED****UNIT'S ADDRESS:**

**CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT.)**

Proc. No.: BCM/ SA / PROCESSING / UNIT 01, Dt:-15/10/2008

Rev.: 01

**Enquiry No. :**

**Due Date :**

**Supplier Qtn. No.:**

**Date :**

**SPECIFICATION CUM COMPLIANCE CERTIFICATE OF STAND ALONE PROCESSING UNIT**

**NOTE:-**

1. Vendor must submit complete information against clause no. 22(Qualifying Condition). The offer meeting this clause would only be processed.
2. 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.
3. The offer and all documents enclosed with offer shall be in English language only.

**NAME & ADDRESS OF THE SUPPLIER :**

**TELEPHONE NOS. :**

**FAX NOS. :**

**E- MAIL ADDRESS :**

**SCOPE: Supply and commissioning of Stand alone VPI system for short processing for 10 nos Bushing**

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
<b>1</b>	<b>PURPOSE &amp; WORKPIECE MATERIAL</b>				
1.1	The processing unit is required for filling of transformer oil in bushings of various KV-Class under high Vacuum Arrangement / System is required for creating vacuum in bushings kept on stand and subsequently filling of oil in same	VENDOR TO CONFIRM			
1.2	<b>Work piece material</b> This equipment shall be used for creating vacuum in a bushing which consists of insulating paper core & copper conductor . The basic purpose is to remove moisture from the bushing / insulation item under very fine vacuum= 0.001m bar .	VENDOR TO CONFIRM			
1.3	<b>Construction</b> Appropriate stand required to keep 10 nos bushings in vertical position at a time shall be in vendors scope .Pipe work for creating vacuum & filling oil in bushings should be provided with separate valves ,vacuum points and oil filling points for all 10 nos bushings .Vacuum gauge and oil flow meters/ totalizer required for monitoring vacuum level and quantity of oil being filled in bushings	VENDOR TO SPECIFY			

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2.0.	<b>SPECIFICATION:</b>				
2.1	<b>PLANT CONFIGURATION -</b> Pumping system shall consists of vacuum pumps, intermediate & exhaust condenser, mist eliminator & water cooling system mounted on a portable frame for easy movement of the system. Necessary interconnection pipe line & control valves are part of the system. It shall consists of the following main assemblies.	VENDOR TO CONFIRM			
2.2.	<b>Oil filling system:-</b> Suitable oil filling arrangement to be provided to fill oil from processed oil filtration plant through 10 nos manifolds. Accessories like pump/ OIL flow meter cum totalizer shall be provided. To regulate oil filling speed flow meter shall be provided .It shall be possible to fill one individual or group of bushings and there shall be provision to regulate oil filling manually by rotameter in individual bushing	VENDOR TO CONFIRM			
2.3	<b>VACUUM PUMPING SYSTEM :-</b> Vacuum pumping system comprises of vacuum pump & booster pump .Pumping system should be suitable to creat vacuum in 10 no bushing of capacity(200 ltr X 10 nos =2000 ltrs . <b>Acceptable leak rate &lt; 1 torr liters/per sec</b>	VENDOR TO CONFIRM			
2.3.1	<b>Booster pump</b>				
2.3.1.1	Mechanical Booster Pumps - 1 Nos., having Pumping Speed 1000 cubic mtr / hr or suitable to achieve desired vacuum parameter given below with in 30 minutes	VENDOR TO CONFIRM			
2.3.1.2	Nominal Pumping Speed - Suitable to fulfill above requirement	VENDOR TO SPECIFY			
2.3.1.3	Ultimate Vacuum in manifold shall be 0.001mbar or less	-- do --			
2.3.1.4	Make of Vacuum Pump - Leybold / Shinko Seiki,/ Balzer / Edward / Pieffer				
2.3.2	<b>Intermediate roots pump :-</b>				
2.3.2.1	Intermediate roots pump capacity 500 cubic mtr/ hr or suitable	VENDOR TO CONFIRM			
2.3.2.2	Make of Vacuum Pump - Leybold / Shinko Seiki,/ Balzer / Edward / Pieffer	VENDOR TO SPECIFY			
2.3.3	<b>Rotary Oil Sealed Vacuum Pump –</b>				
2.3.3.1	1 Nos., having Pumping Speed . (Rotational speed of high RPM rotary pump ) capacity 250 cubic meter / hr or suitable	VENDOR TO CONFIRM			
2.3.3.2	Ultimate Vacuum - 0.001 m bar or less to achieve 0.001 m bar in manifold	--do--			
2.3.3.3	Make of Vacuum Pump - Leybold / Shinko Seiki,/ Balzer / Edward / Pieffer	VENDOR TO SPECIFY			
2.3.4	<b>McLeod Vacuum Gauge -</b> 2 No. of reputed make only suitable to measure vacuum upto 0.001 m bar	VENDOR TO CONFIRM			
2.3.5	A separate single point vacuum pirani gauge for measurement & recording of vacuum is to be provided at distribution manifold input. Make :- Edward / Peiffer	VENDOR TO CONFIRM			
2.3.6	Vacuum pumping operation to be inter locked with water cooling system.	VENDOR TO CONFIRM			

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2.3.7	Complete vacuum pumping system shall be mounted on steel frame structure. All valves in vacuum line shall be of klinger / Audco / reputed make .	VENDOR TO CONFIRM			
2.3.8	Suitable protection to be provided to avoid any spillover oil from bushing to enter the vacuum pumps. If needed a separate container to be provided to accommodate spilled oil from bushing.	VENDOR TO SPECIFY			
2.3.9	Steel pipe manifold to be provided to connect 10 bushings at a time complete with proper flanges and individual valves suitable for vacuum .	VENDOR TO CONFIRM			
<b>3.0</b>	<b>Cooling system:-</b> Cooling of vacuum pump. Self contained radiator type cooling water system for cooling of vacuum pumps.,condensor,vapour traps etc .	VENDOR TO CONFIRM			
3.1	<b>Vapor Condenser :</b> 1 No. Intermediate condenser of suitable capacity between the booster pump & rotary vacuum pump . Type, capacity and cooling water requirement to be furnished with offer.	VENDOR TO SPECIFY			
3.2	<b>Exhaust Vapor Condenser -</b> 1 No. of suitable capacity for rotary pumps to be provided. Details such as type, capacity, cooling water requirement if any to be furnished with offer. Suitable water rate measuring system to be provided. Mist eliminator of adequate capacity to absorb smokes from exhaust of vacuum pump to be provided. Emission of smoke shall be in line with permissible limit as per international standards.	--do--'			
<b>4</b>	<b>ELECTRICAL SYSTEM :</b> 415V +/-10%, 50HZ +/- 1.5 HZ, 3 Phase AC (3 wire system with out neutral) Power Supply Source will be provided by BHEL at a single point near the plant, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the plant/control cabinets, shall be the responsibility of vendor.	VENDOR TO CONFIRM			
<b>5</b>	<b>CONTROL PANEL:-</b> A frame mounted sheet metal control panel to be provided complete with MCCB for incoming Power Supply, all contactors, relays,starters, timer, single phasing preventer, MCCBS & HRC fuses, step down transformer for control voltage etc. The front side of the panel shall be provided with vacuum indicators. Indicators & Sensors shall be of WIKA GERMANY/ EDWARDS UK / PEIFFER make. A mimic diagram to be provided to indicate the position and operation of pumps and automatic valves along with indicating lamps for all motor & pumps . 6 point recorder to be provided for recording vacuum in vacuum distribution manifold	VENDOR TO CONFIRM			
5.1	Electrical schematic diagram with interlocks & protection / annunciation , power requirement for individual connected load should be furnished at the time of approval of GA drawing .	VENDOR TO CONFIRM			
5.2	Vendor shall ensure the proper earthing for the machine and its peripherals.	--do--			

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5.3	All electrical fittings shall confirm to IE rules and IS/BS standard.All switch gear shall be SIEMENS/ GE/ ABB/ TELEMCHANIQUE Make .	--do--			
5.4	All electrical equipments shall be suitably protected by HRC fuses/ MCB's / over load relay's & single phase preventives.	--do--			
5.5	The wires & cables shall be of fire retardant insulation.	--do--			
<b>6.0</b>	<b>AIR COMPRESSOR:</b>				
6.1	Independent Air Compressor (of reputed Indian make such as Elgi/ Ingersol-Rand / Atlas Copco) with refrigerated type Dryer & Filter of suitable capacity for the total compressed air requirements of the machine & accessories and to suit required air quality shall be supplied. The compressor unit shall be suitable for continuous duty operation and this shall be connected to BHEL main line with a non return valve. Refrigerated Dryer shall be of Sabro/ Denfoss/Ultrafilter/ Gem make. This shall be quoted as optional .	VENDOR TO SPECIFY			
6.2	Capacity of Compressor & Dryer	--do--			
<b>7.0</b>	<b>SAFETY ARRANGEMENTS:</b> Following safety features in addition to other standard safety features shall be provided on the plant:				
7.1	Plant shall have adequate and reliable safety interlocks in respect of electrical, Mechanical ,Pneumatic & Water Supply to avoid damage to the plant, workpiece and the operator due to the malfunctioning or mistakes. Plant functions shall be continuously monitored and alarm / warning indications through lights/ alarm . Vacuum switch for interlocking of vacuum pump & booster pump shall be provided.	VENDOR TO CONFIRM			
7.2	All the pipes, cables etc. on the plant shall be well supported and protected.	--do--			
7.3	All the rotating parts used on plant shall be statically & dynamically balanced to avoid undue vibrations.	--do--			
7.4	Emergency Switches at suitable locations as per International Norms shall be provided. Isolation (SECUVAC Valve)& Air admittance valves above rotary pump to isolate the rotary pump shall be provided to maintain the vacuum in the system in the event of power failure .	VENDOR TO CONFIRM			
<b>8.0.</b>	<b>ENVIRONMENTAL PERFORMANCE OF THE PLANT :</b>				
8.1.	The Plant shall conform to following factors related to environment :				
8.2	Maximum noise level shall be 85 dB(A) at normal load condition, 1 mtr 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.	VENDOR TO CONFIRM			
8.3	There shall not be any emissions of smokes from the plant.Suitable capacity mist eliminator shall be provided at exhaust of backing pump to arrest smokes emitting from pump.	VENDOR TO CONFIRM			
<b>9</b>	<b>TOOLS FOR ERECTION, OPERATION &amp; MAINTENANCE :</b>				
9.1	Special tools and equipment required for erection of the plant shall be brought by the vendor. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc.for operation and maintenance of the plant shall be supplied. List of such tools shall be submitted with offer	VENDOR TO CONFIRM			

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<b>10.0</b>	<b>SPARES:</b>				
10.1	Vendor to submit complete list of spares for plant and accessories, along with specification / type / model, and name & address of the spare supplier .Cost of spares to be indicated separately	VENDOR TO CONFIRM			
<b>11.0</b>	<b>DOCUMENTATION :</b>				
11.1	Five sets of following documents (Hard copies) in English language shall be supplied along with the plant				
11.2	Operating manuals of Plant	VENDOR TO CONFIRM			
11.3	Maintenance, Interface & commissioning manuals	----do----			
11.4	Manufacturing drawings for all supplied sub assemblies.	----do----			
11.5	Detailed specification of all rubber items and hydraulic/lube fittings	----do----			
<b>12.0.</b>	<b>ERECTION &amp; COMMISSIONING</b>				
12.1	Supplier to take full responsibility for carrying out the erection, start up, testing of plant, it's control system & all types of other supplied equipment, processing of bushing etc. service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings. Other requirements like crane shall also be provided by BHEL. Details of these requirements shall be informed by vendor in advance.	VENDOR TO CONFIRM			
12.2	Successful proving of stand alone processing unit by the supplier at BHEL shall be considered as part of commissioning. All tests, as mentioned at clause for (Plant Acceptance) shall also part of the commissioning activity.	VENDOR TO CONFIRM			
12.3	Tools, Tackles, instruments and other necessary equipment required to carry out all above activities shall be brought by the supplier.	VENDOR TO CONFIRM			
12.4	Commissioning spares, required for commissioning of the plant within stipulated time, shall be brought by the supplier on returnable basis.	----do----			
12.5	Portion, if any, of the plant, accessories and other supplied items where paint has rubbed off or peeled during transit or erection shall be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor shall supply sufficient quantity of touch-up paint of various colors of paint used.	VENDOR TO CONFIRM			
12.6	Schedule of Erection and Commissioning shall be submitted at time of approval of drawing	VENDOR TO CONFIRM			
12.7	Charges, duration, terms & conditions for E&C shall be furnished in detail,separately by vendor along with offer.	VENDOR TO CONFIRM			
<b>13.0</b>	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY :</b>				
13.1	Total machine including should work trouble free and efficiently under following operating conditions . Power Supply: Voltage: 415 V +/- 10% , Frequency: 50 Hz +/- 1.5 HZ, No. of phases = 3 ; 3 wire Ambient Conditions: Temperature = 5 to 50 degree Celsius Relative Humidity = 95% max.	VENDOR TO CONFIRM			
13.2	The plant, including attachments and accessories, shall be suitable for continuous operation to its full capacity for 24 hour a day and 7 days a week throughout. Vendor to ensure and confirm the same.	VENDOR TO CONFIRM			

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<b>14.0</b>	<b>INSPECTION</b>				
14.1	The machine shall be completely tested and inspected at supplier's works. The testing and inspection will be witnessed by BHEL Engineer for which an advance intimation shall be given at least 20 days before the test. Four copies of inspection and test report and guarantee certificate shall be submitted and got approved before dispatch.	VENDOR TO CONFIRM			
<b>15.0</b>	<b>PROVE OUT :-</b>				
15.1	Complete prove out of plant shall be done by Vendor at BHEL works as per BHEL specification. Bushings for the prove out of plant shall be provided by BHEL. Vendor shall be fully responsible for prove out of plant as per drawing and other requirements specified by BHEL to the full satisfaction of BHEL. Clarifications, if any required by vendor, regarding accuracy requirements of the plant, whether specified or not, shall be discussed and cleared by vendor during initial technical discussions.	VENDOR TO CONFIRM			
15.2	Vendor shall be responsible for any deviation/rejection in prove out of plant due to malfunctioning of the plant and also for the delay in process. The cost of such deviation / rejection, if any, shall be refunded by the vendor to BHEL.	VENDOR TO CONFIRM			
<b>16.0</b>	<b>PLANT ACCEPTANCE: (Tests/Activities to be Performed by Vendor)</b>				
16.1	Test of plant parameter as per technical specification shall be demonstrated at suppliers works to BHEL engineer before dispatch :	VENDOR TO CONFIRM			
16.2	Full load test to demonstrate the maximum power capacity of the plant at BHEL works	---do---			
16.3	The plant shall be tested for continuous running of 48 hrs at suppliers work at suppliers works. If any break down occurs during this test, the test shall be repeated for 48 hrs from that time.	VENDOR TO CONFIRM			
16.4	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	---do---			
16.5	Job prove out. Minimum three job trial will be taken as per BHEL specifications.	---do---			
16.6	Two weeks independent operation of plant by BHEL after job prove out under supplier supervision	---do---			
<b>17.0</b>	<b>PACKING:</b>	---do---			
17.1	Standard & rigid packing for all items of complete plant, , all Accessories and other supplied items to avoid any damage/loss in transit. When plant is dispatched in containers, all small loose items shall be suitably packed in boxes.	VENDOR TO CONFIRM			
<b>18.0</b>	<b>GUARANTEE :</b>				
18.1	The unit is to be guaranteed in respect of material, construction, operation and against any manufacturing defects for a period of 24 months from the date of commissioning. Free after sales services is to be provided during the guarantee period including free replacement of defective parts.	VENDOR TO CONFIRM			
<b>19.0</b>	<b>GENERAL : The vendor shall provide the following</b>				
19.1	Machine/Plant Model	VENDOR TO SPECIFY			
19.2	Total connected load (KVA):	VENDOR TO SPECIFY			

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19.3	Floor area required (Length, Width, Height) for complete machine & accessories	VENDOR TO SPECIFY			
19.4	Total weight of the plant/machine	VENDOR TO SPECIFY			
19.5	Detailed catalogues , sketch/ photographs of the Plant and accessories/ attachments shall be submitted with the offer.	VENDOR TO CONFIRM			
19.6	Pneumatic & oil piping shall be metallic except places where flexible piping are essential. All the pipes required for the same shall be included in the standard scope of the plant.	VENDOR TO CONFIRM			
19.7	Five copies of descriptive leaflets, technical literature, operating and service manuals, general arrangement drawing, electrical wiring diagrams and spare parts manuals etc. are to be supplied. Two copies of each of these are to be forwarded sufficiently in advance before dispatch of the machine.	VENDOR TO CONFIRM			
<b>20</b>	<b>Painting of Plant/Machine/ Electrical Panels:</b>	---do---			
20.1	All steel structure and piping work shall be suitably painted over two coats of antirust paint conforming to I.S. standards.	VENDOR TO CONFIRM			
20.2	Painting Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	VENDOR TO CONFIRM			
<b>21.0</b>	<b>TROPICALISATION</b>				
21.1	All electrical / electronic equipment shall be tropicalized	Vendor to confirm			
21.2	All electrical & electronic control cabinets & panels shall be dust and vermin proof	---do---			
21.3	Motors shall conform to IEC or Indian Standards	---do---			
21.4	Vendor shall ensure the proper earthing of the platform.	---do---			
<b>22.0</b>	<b>QUALIFYING CONDITIONS :</b>				
22.1	Only those vendors who have supplied and commissioned at least one Vacuum pumping system of around 2000 LPM capacity & vacuum of 0.01 m bar or fine vacuum level & higher capacity to any industry in past ten year & such plant is working satisfactorily for more than one year after commissioning shall quote . Following information is to be submitted by the vendor about the company were similar plant have been supply . This is required from all the vendors for qualification of there offer .	Vendor to confirm			
22.1.1	Name of the customer / company where similar machine is installed . ( copy of purchase order to be furnished)	---do---			
22.1.2	Complete postal address of the customer.	---do---			
22.1.3	Year of commissioning.	---do---			
22.1.4	Application for which the machine/plant is supplied with details of accuracies achieved on the job.	---do---			
22.1.5	Name and designation of the contact person of the customer.	---do---			
22.1.6	Phone, FAX no. and email address of the contact person of the customer.	---do---			

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22.1.7	Performance certificate from the customers regarding satisfactory performance of system supplied to them by vendor that the commissioned item is working satisfactorily along with e-mail/telephone no/address of concerned person where the item is supplied.	---do---			
22.1.8	BHEL reserves the right to verify information submitted by vendor. In case information is found to be false /incorrect , the offer shall be rejected.	---do---			