



BHARAT HEAVY ELECTRICALS LIMITED
CENTRAL FOUNDRY FORGE PLANT

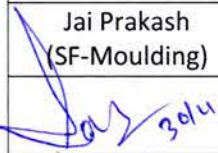
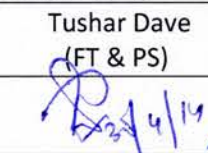

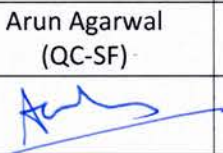
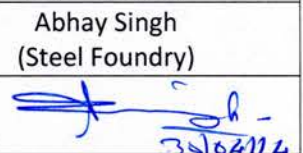
CHROMITE SAND SEPARATOR

SPECIFICATION NO. : FT/SP/61 REV 00

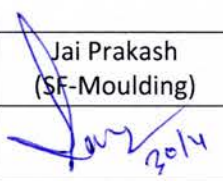
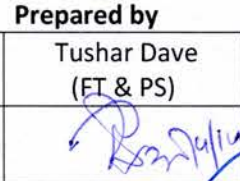


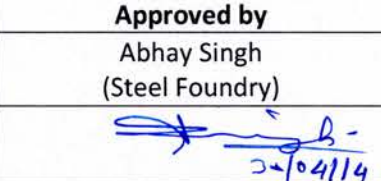
Sl. No.	Details	Remarks for/from Vendor
1.0	DESCRIPTION	
1.1	This specification governs the requirement of Chromite Sand Separator of capacity 5 T/hour along with two pneumatic conveyor system/pump for transporting Silica sand (capacity 5 T /Hr. each) & one pneumatic conveyor system/pump (capacity 5 MT / Hr.) for transporting Chromite sand	Vendor to confirm
2.0	OBJECTIVE	
2.1	The plant shall be used for separating chromite sand from reclaimed/attrited mix of used chromite and silica sand generated during knockout of steel castings from the mould. Separated Silica sand & Chromite sand shall be subsequently used for moulding activities.	Vendor to confirm
3.0	SCOPE	
3.1	Scope of supply includes design, manufacture, supply, erection and commissioning of the plant at CFFP, BHEL Haridwar. The technical and general requirements of the chromite sand separator are given below. The supplier shall give guarantee for trouble free operation of the plant for period of eighteen months from the date of commissioning of the unit.	Vendor to confirm
4.0	DESIGN	
4.1	The Chromite Separator plant shall be required to be installed adjacent to existing sand reclamation plant inside a shed the details of which are attached as annexure-A to this specification. The design of the separator plant should be made accordingly.	Vendor to confirm
4.2	Floor area required (Length, Width, Height) for complete machine & accessories is to be furnished by vendor in the technical offer.	To specify
4.3	Vendor is to submit detailed drawings of layout & design to BHEL for approval before start of manufacturing.	Vendor to confirm
5.0	TECHNICAL REQUIREMENTS	

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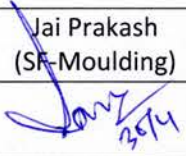
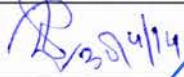

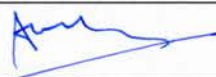
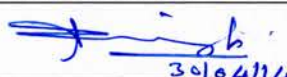
Sl. No.	Details	Remarks for/from Vendor
5.1	<p>CAPACITY</p> <p>The plant should be capable of processing, reclaimed/attrited mix of used chromite and silica sand @ 5 T/hour. The plant should be able to run round the clock (24x7).</p>	Vendor to confirm
5.2	<p>CHARACTERISTICS of INPUT SAND</p> <p>The input sand shall be fully attrited/reclaimed mix of resin (acid/alkaline based) bonded chromite and silica sand generated during knock-out of steel castings from the mould. Maximum temperature of input reclaimed sand may be Ambient + 20 °C (Ambient Temp. = 0 °C to 47 °C)</p>	Vendor to note
5.3	<p>QUALITY OF OUTPUT CHROMITE SAND AFTER PROCESSING THROUGH PLANT</p> <p>The separated chromite sand shall be free from iron pieces which are used to strengthen the mould, fins and sprayed metal resulted from pouring.</p> <p>The separated chromite sand shall be free from fine sand particles, dust, and any silica gel form.</p> <p>The plant should be capable of delivering chromite sand with a minimum purity of 95%</p>	Vendor to confirm
5.4	<p>RECLAMATION PROCESS</p> <p>The plant shall be capable of working round the clock (24x7) at the rate of 5T/hour of input sand. Accordingly all mechanical components and electrical drives and equipments shall be of continuous rating.</p> <p>The adopted principle of sand separation should be detailed out by the vendor in their offer. This should be supported by General Arrangement Drawing, Foundation Drawing of proposed plant alongwith schematic sketch of equipments, material, individual sizes and weight.</p> <p>All details of magnetic separation unit for chromite separation from silica should be provided in the offer.</p>	Vendor to confirm
5.5	<p>The separation plant shall be equipped with suction and ventilation systems to ensure dust free environment without noise and any other form of pollution. Details of dust exhaust system to be provided alongwith the offer.</p>	Vendor to confirm
5.6	<p>3 Nos. pneumatic sand conveyor systems/pumps should be provided alongwith separation plant. Sand conveyor systems/pumps shall be capable of conveying sand upto a length of 150 m & height upto 18 m.</p>	Vendor to confirm

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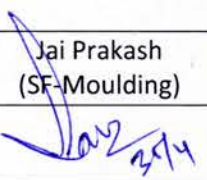
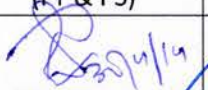



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5.7	MACHINE LIGHTS:	
5.7.1	Machine Lights for sufficient illumination of complete working area should be provided for clear visibility.	Vendor to confirm
5.7.2	Any lights required in the foundation/ pit area shall also be foreseen and supplied by the vendor.	Vendor to offer & specify details.
5.7.3	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm
5.8	AIR CONDITIONERS:	
5.8.1	It will be preferred if the electrical controls work efficiently without AC and Dehumidifiers within the specified conditions. However, if provided, then Air Conditioners with Dehumidifiers of suitable/ sufficient capacity and proper drainage pipes for condensate, are to be provided for all Electrical/ Electronic Panels/ Cabinets including operator's Panel considering specified ambient conditions. Detailed specifications of the same are to be submitted. The Air Conditioners are not to be mounted on top of the panels.	Vendor to offer and submit details.
5.9	HYDRAULIC SYSTEM (IF USED)	
5.9.1	If hydraulic system is used anywhere then it should be of reputed make centralised Hydraulic system . Details are to be submitted	To specify
5.10	LUBRICATION SYSTEM	
5.10.1	Lubrication system of all Drive Gear box/Gearing system/Bearings	Vendor to confirm & submit detail
5.11	ELECTRICAL	
5.11.1	Power consumption for running the plant at full load to be specified by the vendor	Vendor to specify
5.11.2	415V +10% / -10%, 50HZ +/- 3 HZ, 3 Phase AC (3 wire system without neutral) Power Supply Source will be provided by BHEL at a single point near the machine, 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 machine/ control cabinets, etc., shall be the responsibility of vendor. Requirement of grounding/ earthing with required material (Indian make) details is to be informed by vendor well in advance so that same could be incorporated during construction of foundation. The vendor can take earthing connection from the nearest column of the production shop.	To confirm

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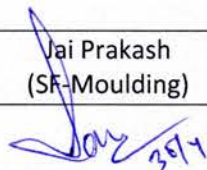
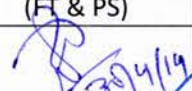
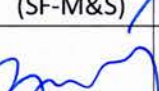
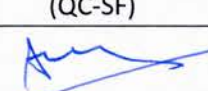

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5.11.3	Complete panels to be fuseless except Thyristor drives, where thyristor protection fuses are to be used. In all other cases MCCBs/ MPCBs etc. to be used.	To confirm
5.11.4	PLCs, Drives & basic electrical equipments like contactors, MPCBs, MCCBs ACBs etc. to be Siemens make	To confirm
5.11.5	PLCs & drives to have profibus / Ethernet communication capability. PLC programming software / application software must be supplied in soft copy.	To confirm
5.11.6	Indicating lamps to be high luminous type LED's	To confirm
5.11.7	All cables to have bottom entry into panels. Power & Control terminals to be grouped separately with 10% extra terminals in each group.	To confirm
5.11.8	One extra module of each type PLC module to be provided (Min one module each of DI, DO, AI & AO).	To confirm
5.11.9	In general the control voltage is to be single phase 220v,50Hz,AC.	To confirm
5.11.10	All panels should be provided with voltmeter, ammeter and energy meter. They should also contain phase indicating LED's in incoming supply.	To confirm
5.11.11	All electrical & electronic control cabinets & panels should be dust and vermin proof	To confirm
5.11.12	All electrical components in the cabinets should be mounted on DIN Rail	To confirm
5.11.13	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	To confirm
5.11.14	Motors shall conform to IEC or Indian Standards. Vendor to confirm that Main spindle motor will be air cooled. Vendor to provide test certificates for all the motors	To confirm
5.11.15	All cables moving with traversing axes should be installed in caterpillar / Drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	To confirm
5.11.16	Vendor should ensure the proper earthing for the machine and its peripherals.	To confirm
5.11.17	Following safety features in addition to other standard safety features should be provided on the machine:	To confirm

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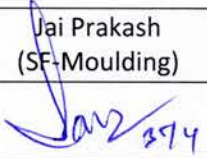
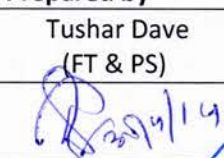

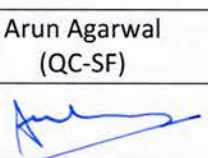
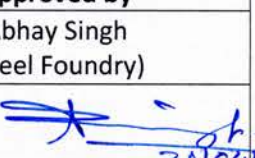
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6.0	SAFETY ARRANGEMENTS	
6.1	Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm should be available.	To confirm
6.2	A detailed list of all alarms / indications provided on machine should be submitted by the supplier.	To confirm & submit
6.3	All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine operator's movement for effective use of machine.	To confirm
6.4	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.	To confirm
6.5	Emergency Switches at suitable locations as per International Norms should be provided.	To confirm
6.6	Oil lines if any should not run with electrical cable in the same tray / trench.	To confirm
7.0	ULTRA ISOLATION TRANSFORMER	
7.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, etc. shall be supplied	To confirm
8	Make, Model and Rating	To specify
8.1	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer.	To specify
9.0	First filling of all required Oils to be supplied by vendor	To confirm
9.1	PNEUMATIC SYSTEM:	
10.0	Vendor to specify any requirement of compressed air supply for the operation of the machine. If so, then the system should be so designed to have additional provision and required accessories before Refrigerated type Air Dryer so that BHEL compressed air supply having pressure 5 Kg/sq.cm with high moisture could be used as and when required.	To specify
10.1	LEVELING & ANCHORING SYSTEM	
10.2	Complete set of anchoring materials including foundation bolts, nuts, washers, fixators, levelling shoes etc. to fix the machine to the foundation	To confirm & submit details

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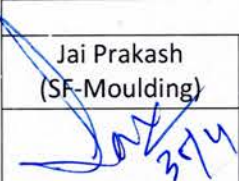
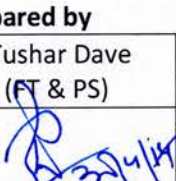

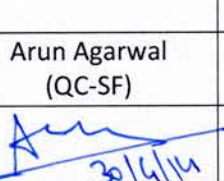
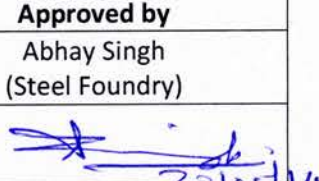
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	should be supplied.	
11.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE :	
11.1	Tools and equipment required for erection of the machine shall be brought by the vendor. Necessary tools like Torque Wrenches, Spanners, Keys, grease guns etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to offer
12.0	SPARES:	
12.1	Itemised breakup of mechanical, hydraulic, electrical and electronic spares including fast wearing consumables used on the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor. Unit Price of each item of spare should be offered separately.	Vendor to offer
12.2	All types of spares for total machine and accessories should be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required.	Vendor to confirm
12.3	Vendor to confirm that complete list of spares for machine 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 machine.	Vendor to confirm
13.0	DOCUMENTATION :	
13.1	Five sets of following documents (Hard copies) and two sets of soft copies(Pen drive) in English language should be supplied along with the machine	Vendor to confirm
13.2	Operating manuals of Machine	Vendor to confirm
13.3	Detailed Maintenance manual of machine with all drawings of machine assemblies (Including part Details)/sub-assemblies/parts including Electrical / Pneumatic/ Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings to be supplied with the part list also.	Vendor to confirm
13.4	Maintenance & commissioning manuals	Vendor to confirm
13.5	Manufacturing drawings for all supplied tool holders, adapters, sleeves, fixtures etc.	Vendor to confirm
13.6	Catalogues, O&M Manuals of all bought out items including drawings,	Vendor to confirm

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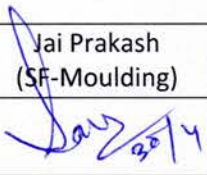




Sl. No.	Details	Remarks for/from Vendor
	wherever applicable.	
13.7	Detailed specification of all rubber items and hydraulic/lube fittings if used.	Vendor to confirm
13.8	Operating Manuals, Maintenance Manuals & Catalogues for supplied Voltage Stabilizer, Isolation Transformer, and all supplied Accessories.	Vendor to confirm
13.9	Complete Master List of parts used in the machine shall be submitted by the vendor.	Vendor to confirm
13.10	All drawings such as General Assembly & Foundation drawings etc. to be made available by Vendor at the time of PDI.	Vendor to confirm
14.0	TRAINING	
14.1	BHEL Persons should be trained as given below: (a) Electrical, Electronic maintenance for machine & other supplied equipments (b) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (c) Operation of the machine & other supplied equipments (d) Training on PLC/NC Features of the machine, if any Pre-dispatch inspection of the machine may also be carried out by the team .BHEL reserves the right to choose no. of persons, field & period of training, out of above, while deputing their engineers for training.	Vendor to confirm & offer
14.2	Travel, boarding & lodging for the trainees shall be borne by BHEL if they are being sent to vendor's place.	Vendor to confirm
14.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to confirm
14.4	Vendor should commit to organize training of BHEL Engineer for advanced features and specialised training if so required by BHEL.	Vendor to confirm
15.0	FOUNDATION	
15.1	Dynamic soil parameters are as follows: (i) $C_u = 4.937 \text{ kg/cm}^3$ (for block size of 1.5 m x 1m x1m) $C_u = 1.667 \text{ kg/cm}^3$ (for foundation size of 10 M ² or more) (ii) $C_\Phi = 9.70 \text{ kg/cm}^3$ (iii) $C_\Psi = 4.20 \text{ kg/cm}^3$ Bearing Capacity: Depth : 5 M From Shear consideration : 39 T/M ² From Settlement consideration : 9-10 T/M ²	For vendor's information.

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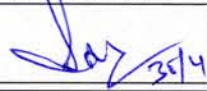
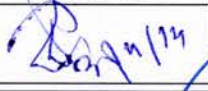


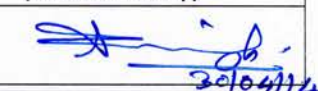
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	Recommended B. Capacity : 9 T/M ²	
15.2	Complete foundation drawing with load requirements and construction details to be submitted by vendor within one month of placement of order. Foundation shall be built by BHEL based on the drawings provided by vendor.	Vendor to confirm
16.0	ERECTION & COMMISSIONING	
16.1	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment , 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 and helping personnel shall also be provided by BHEL. Details of these requirements should be informed by vendor in advance.	To confirm
16.2	Erection & Commissioning of Voltage stabilizer, Isolation Transformer shall also be responsibility of the vendor.	To confirm
16.3	Tools, Tackles, instruments and other necessary equipment required to carry out all above activities should be brought by the supplier.	To confirm
16.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	To confirm
16.5	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor.	To confirm
16.6	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled 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 paint used.	To confirm
16.7	Schedule of Erection and Commissioning shall be submitted with the offer.	To specify
16.8	BHEL reserves the right to inspect the site and activities during erection and commissioning	Vendor to agree
17.0	AMBIENT CONDITIONS & THERMAL STABILITY :	
17.1	Total machine including all supplied items should work trouble free and efficiently under following operating conditions. Power Supply: Voltage: 415 V - 10%, +10% Frequency: 50 Hz +3%, - 3%	To confirm

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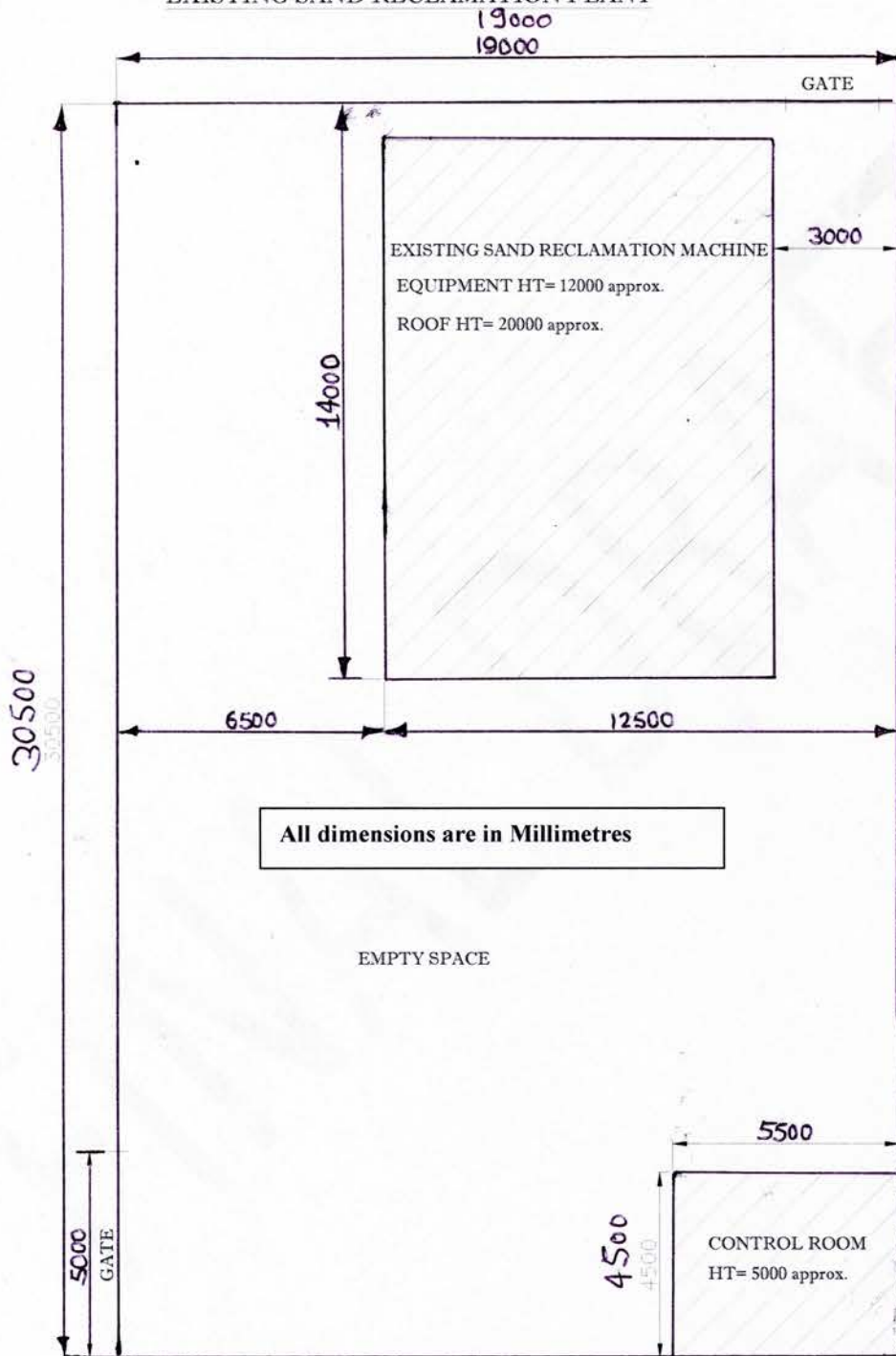
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	Ambient Conditions: Temperature = 0 to 47 degree Celsius Relative Humidity = 95% max. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	
17.2	Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. Max. Temperature variation is up to 25 deg Celsius in 24 hours. (Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	To confirm
17.3	Thermal Stability of the complete machine keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the machine should be ensured by vendor. (Confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished)	To confirm
17.4	The machine, including attachments and accessories, should be suitable for 24 hours continuous operation to its full capacity for 24 hour a day and 7 days a week throughout. Vendor to ensure and confirm the same.	To confirm
17.5	The machine will be tested for continuous running of 24 hrs (with or without load). If any break down occurs during this test, the test will be repeated for 24 hrs from that time.	To confirm
17.6	Demonstration of all features of the machine, control system, all supplied attachments & accessories to their full capacity and to the satisfaction of BHEL for efficient and effective use of the machine	To confirm
17.7	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works preferably in Hindi.	To confirm
18.0	GENERAL	
18.1	Total connected load (KVA): Operating Power Factor should be greater than 0.9 lagging. If it is less, then it should be corrected by suitable means.	To specify
18.2	Painting of Machine / Electrical Panels : (Polyurethane Paint)	To confirm
18.3	Total weight of the machine with breakup of major parts/assemblies of the machine	To specify
18.4	Weight of heaviest part of machine	To specify
18.5	Weight of the heaviest assembly / sub-assembly of the Machine	To specify

Prepared by				Approved by
Jai Prakash (SF-Moulding)	Tushar Dave (FT & PS)	Ajay Kaithal (SF-M&S)	Arun Agarwal (QC-SF)	Abhay Singh (Steel Foundry)
				

Sl. No.	Details	Remarks for/from Vendor
18.6	Dimensions of largest part/ sub-assembly/ assembly of the machine	To specify
18.7	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	To confirm
18.8	Hydraulic, Pneumatic & oil pipings should be preferably metallic except places where flexible pipings are essential. All the pipes required for the same shall be included in the standard scope of the machine.	To confirm
18.9	Ladder is to be provided to access the machine elements located at the top of the column.	To confirm
18.10	Oil & water piping if any should not be located in the tray / trench in which electrical cables are laid.	Vendor to confirm
18.11	All Cover Plates required for the machine and its peripherals shall be supplied by the vendor.	Vendor to confirm
18.12	Deviation, if any	Vendor to specify in detail
18.13	Do's & Don'ts as well as observation aspects and precautions to be specified	Vendor to inform

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EXISTING SAND RECLAMATION PLANT



 OCCUPIED AREA

Prepared by				Approved by
Jai Prakash (SF-Moulding)	Tushar Dave (FT & PS)	Ajay Kaithal (SF-M&S)	Arun Agarwal (QC-SF)	Abhay Singh (Steel Foundry)
<i>Jai Prakash</i> 30/4/14	<i>Tushar Dave</i> 30/4/14	<i>Ajay Kaithal</i>	<i>Arun Agarwal</i>	<i>Abhay Singh</i> 30/04/14