



An ISO 9001
Company

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

ENQUIRY	Phone: +91 431 257 75 75 Fax : +91 431 252 07 19 Email : rrmanohar@bheltry.co.in Web : www.bhel.com
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	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
	2620600068	30.09.2006	06.11.2006

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

Item	Description	Quantity	Delivery Schedule
10	Mechanised Drum “U” shell / Rolled shell Shot blasting station with Handling facility as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com)	1 No.	31.08.2007

Note:

- (1) The detailed Technical Specification along with technical point-by-point confirmation, Commercial Terms & Conditions applicable for this Enquiry, Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site www.bhel.com under Enquiry reference “2620600068”. Your offer should be based on all the above documents.
- (2) Also, you are requested to fill in the Supplier Registration formats available in www.bhel.com (under Advancement – Supplier Registration) and send it along with your offer.

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 Dy. Genl. Manager / Capital Purchase / MM / Manufacturing
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PART A**QUALIFYING CRITERIA FOR THE SUPPLY OF
BOILER DRUM "U" SHELL SHOT BLASTING STATION****SECTION – I**

The BIDDER is expected to give complete details against each clause in the table given below, with additional sheets those may be attached (giving clear reference number) to furnish and cover the requisite details / documents.

S. No.	PARTICULARS	VENDOR's RESPONSE
1.0	Profile of the Company bringing-out the years of Experience of the BIDDER in the field of machine design , manufacture and supply of CUSTOM BUILT SHOT BLASTING STATION constituting of blasting chamber, job handling facility, fume extraction unit, etc.	
2.0	Number of SHOT BLASTING STATIONS supplied, installed and commissioned till date (with basic details on machine type, configuration, customer and quantity)	
3.0	Details on the Firm's Registration and the FINANCIAL STRENGTH of the COMPANY (Balance Sheet for the last 3 years) shall be submitted with the TECHNICAL OFFER	
4.0	Details on International Standards / Design Process Codes followed in Design and Manufacture of the Equipment. [Copy of the English Version of relevant portion of the Standards / Codes followed, to be furnished with the Offer]	
5.0	Comprehensive Details (including Test Charts) on Performance Prove-Out Testing (which will be conducted at the time of INSPECTION by CUSTOMER ENGINEERS) - of the Equipment Offered, to be given with the Technical Offer.	
6.0	Details of Quality System followed [Furnish the salient aspects of the Quality Assurance System followed] from the stage of raw material / bought-out-item sourcing to final performance testing at BIDDER's works (coming in various stages of machine building) .	

S. No.	PARTICULARS	VENDOR's RESPONSE
7.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India. Competency & Experience of the Local Service Agency are to be elaborated.	
8.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – II

The BIDDER has to meet the following requirements, in general, to get qualified for submitting an offer for SHOT BLASTING STATION

S. No.	REQUIREMENTS	VENDOR's COMMENTS
9.0	The BIDDER shall have a minimum of TEN Years of Continuous Experience in the field of Design, Manufacture and Supply of CUSTOM BUILT SHOT BLASTING MACHINES.	
10.0	The BIDDER shall have supplied at least one number of CUSTOM BUILT SHOT BLASTING MACHINE (having similar capacity as given in PART B of the Tender Specifications, or that built for blasting large sized pressure vessels / fabricated structures) in the recent past, say in the last five years.	
11.0	Reference List of Customers and Performance Certificate (for a period not less than two years) from minimum two CUSTOMERS, with full contact details of CONTACT PERSON, for whom the BIDDER had supplied LARGE SIZE SHOT BLASTING MACHINES , are to be provided with the Technical Offer.	
12.0	BIDDER has to co-ordinate for the visit of BHEL Team (at BHEL Cost) to the Bidder's Customer Works (preferably Large Scale Fabrication / Heavy Engineering Industry, Process Plant Equipment Manufacturer), to witness capability of an existing SHOT BLASTING MACHINE, if warranted.	

S. No.	REQUIREMENTS	VENDOR's COMMENTS
13.0	BHEL is specific about the materials of construction, basic design/dimensional aspects of various sections, structural parts, machine base, etc. forming part of the proposed shot blasting station, as the equipment has work in a rough working environment in a major and heavy fabrication shopfloor. Hence complete details of machine building have to be presented, during the technical discussions at BHEL, to meet BHEL specification requirements.	

SECTION – III

The BIDDER has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser :

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
14.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid.	
15.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' preferably with the copies of Product Catalogue, are to be enclosed.	
16.0	The Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. A mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement [without any supporting technical write-ups, photos and datasheets] may lead to outright disqualification of the Technical Offer.	
17.0	The BIDDER / VENDOR shall assure a continuous support for the supply of SPARES and SERVICE for TEN Years, from the date of commissioning of the equipment at BHEL Works.	

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
18.0	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 of the inclusion of all the accessories, toolings, attachments, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements.	
19.0	Any soft copy, giving the salient features of the proposed machine or equipment with all sub-systems and auxiliaries, and /or showing live-demo of an existing and working machine of similar configuration and capacity will be highly appreciated by BHEL.	
20.0	BIDDER has to indicate the Country of Origin for the supply of equipment .	
21.0	The reference List of Customers shall be accompanied with (Phone Number and E-Mail ID) of the CONTACT PERSON for cross reference by BHEL	
22.0	In case of preliminary qualification of the offer, on technical grounds, the BIDDER may be called for a detailed technical discussion on the original technical offer at BHEL Works, with a notice period of not less than 2 weeks.	

PART B

TECHNICAL SPECIFICATIONS FOR
MECHANISED BOILER DRUM "U" SHELL SHOT BLASTING STATION

AA. JOB DESCRIPTION / APPLICATION :

Boiler Drum "U" Shells are hot formed (at temperature above 900 ° C) from thick steel plates in the shape of "U" and these "U" Shells have thick scales (metal oxides) adhering to its surfaces. The Shot Blasting Station is intended for removing (at room temperature) these scales from both inside and outside exposed surfaces of Drum "U" shells , before taking further manufacturing processes.

One job at a time shall be fed through the blast chamber by a suitable job/work feeding system. The shot blasting operation shall be carried out on inner and outer surfaces of "U"- shell automatically by centrifugal blast wheels mounted suitably inside the chamber and directed at an angle towards the job. Blasting wheels shall be adjustable to cover the job envelope.

Typical sketches of the Drum U - Shells are given in ANNEXURE – 1 & 2. The included angle for these "U" – Shells ranges from 150 degrees to 230 degrees. Suitable blasting arrangements to be designed so as to shot blast the entire surfaces including the shadow regions due to 'U opening' more than 180 deg included angle and job support member below the job. The blasting should be completed in one pass. The overall length / width of the shot blasting system shall be kept to the barest technically acceptable minimum for adequate blasting of the jobs specified.

Surface finish required is SA 2.5 as per Swedish Standards.

BB. SHOT BLASTING STATION CONFIGURATION :

The blasting station shall have the following four distinct components :-

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| a. | Job Handling Unit | It is the equipment which has to carry the work-piece from the job loading point to the blasting chamber and back after the shot blasting operation. It is preferred that this job handling unit traverses on pairs of rails embedded on the floor for easiness and safe shopfloor handling practices. |
| b. | Main Blasting Chamber | It is the equipment which has to carry out the shot blasting operation and shall be of the design & construction to suit the job description given under Clause AA. The blasting has to be totally mechanised and the accessories & attachments to form part of the blasting chamber to meet the process requirements and statutory regulations, though not specifically mentioned in the technical specifications, described under Clause CC. |
| c. | Shots Recycling Unit | The proposed system has to be self reliant to the needs of the blasting process and carry the fresh shots, keep the shots in the dried – cleaned up & de-dusted state using in-built filters, supply to the blasting wheels in appropriate quantity and finally recycle the shots, so that wastage of shots is avoided. The consumption of shots has to be made up by addition of fresh shots in suitable quantities. |
| d. | Dust Extraction Unit | The blasting chamber shall have an associated dust extraction & disposal system and other in-built safety features, so that the total installation meets the regulations of EMS and OSHAS as per ISO 14001 and ISO 18001 Standards. |
| e. | Auxiliary Blasting Chamber
[OPTIONAL ITEM] | An integrated blasting chamber with manual shot blasting equipment (run on shop supplied compressed air) connected to the main dust extraction facility and the shot recycling unit (but without job handling facility) for blasting other components whose job envelope is semi-spherical or large diameter pipes bent to "L" Shape. |

CC. DETAILED TECHNICAL SPECIFICATIONS :

S.No.	PARTICULARS AND BHEL SPECIFICATION			BIDDER'S OFFER (with Technical Details)
1.0.0	JOB / WORK PIECE DETAILS			
1.1.0	Material	Low Carbon Steel and Low Alloy Steel		
1.2.0	Geometrical Configuration	"U" Shells - As detailed out in Clause No. AA [Refer to ANNEXURE – 1 & 2]		
1.3.0	Dimensional Details			
1.3.1	Shell Length	Minimum : 4000 mm	Maximum : 15000 mm	
1.3.2	Outer Radius	Minimum : 440 mm	Maximum : 1200 mm	
1.3.3	Wall Thickness	Minimum : 40 mm	Maximum : 200 mm	
1.3.4	Job Weight/Single Piece	Minimum : 4000 kgs.	Maximum : 75000 kgs.	
1.4.0	Job Condition	Surface condition is that of a hot forged work piece with thick scales of metal oxide, sticking to the surface (both inner and outer surfaces)		
2.0.0	STATION CONFIGURATION			
2.1.0	Features	A full-fledged station to meet the process requirements and having the various constituent elements as described in the Clause No. BB (on Page 2).		
3.0.0	OUTPUT / PRODUCTIVITY			
3.1.0	Work Centre Through-put	The proposed shot blasting station shall be capable of handling, blasting and de-dusting (air cleaning) of THREE numbers of Drum 'U' Shells of the following size, in a machine operational shift of EIGHT hours : Shell Length : 12000 mm Wall Thickness : 175 mm Included Angle : 180 Degrees Outer Radius : 1100 mm Single Shell Weight : 60 Tons		

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
4.0.0	SHOT BLASTING CHAMBER		
4.1.0	Chamber Wall Material	Mild Steel with suitable structural reinforcement	
4.2.0	Chamber Wall Thickness	10 mm (minimum desired)	
4.3.0	Wall Inside Lining	The chamber walls shall be lined with 11 to 14% Austenitic Manganese Steel	
4.4.0	Wall Lining Thickness	6 mm (minimum desired)	
4.5.0	Lining Mounting Arrangement	Bidder to specify the arrangements for mounting of inside lining materials (which shall be of easily replaceable type)	
4.6.0	Replaceable Liners	Minimum 12 mm thickness – made of 11 to 14% Austenitic Manganese Steel / Nihard (in the zone of direct blast area of the blasting wheels)	
4.7.0	Chamber Dimensions	Bidder to specify, in order to suit the job profiles	
4.8.0	Service Doors	Service Doors for Inspection & Maintenance are to be provided at appropriate locations.	
4.9.0	Floor Design	Load bearing steel gratings with manganese steel plate cover to protect abrasive screw conveyor in blast chamber and also with Manganese Steel Channels / Angles for floor support	
4.10.0	Illumination	Illumination System with suitable light intensity and the Light Fittings & Protective Cover shall be provided for operation and maintenance	
5.0.0	DE – DUSTING / AIR CLEANING CHAMBER		
5.1.0	Location	Integral and Fitted to the Outlet Vestibule	
5.2.0	De-Dusting Equipment	System of air blowers & suitably positioned nozzles to blow off shots & dust from shot blasted components	
5.3.0	Blower Capacity	Bidder to specify	
5.4.0	Number & Location	Bidder to specify the Number & Location of Air Nozzles	
5.5.0	Chamber Dimensions	Bidder to specify the proposed dimensions	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
6.0.0	INLET & OUTLET VESTIBULES		
6.1.0	Material	Mild Steel with suitable reinforcement	
6.2.0	Vestibule Wall Thickness	10 mm (minimum desired)	
6.3.0	Vestibule Dimensions	Bidder to specify the Vestibule Dimensions and the size of Openings	
6.4.0	Rubber Curtains	Multiple wear resistant vulcanised rubber curtains with spring steel reinforcements are to be provided, to prevent leakage of rebounding shots to the outside while permitting easy passage of work piece	
6.5.0	Thickness of Curtains	Bidder to specify the Wall thickness of Rubber Curtains	
6.6.0	Mounting Arrangements of Rubber curtains	Bidder to specify the fixing arrangements of Rubber Curtains	
7.0.0	BLAST WHEEL UNIT		
7.1.0	Number of Blast Wheels	Bidder to specify and justify with job requirements	
7.2.0	Type	Centrifugal [Centre Fed Impeller]	
7.3.0	Shot Velocity	In the order of 80 mtrs./sec.	
7.4.0	Number of Blades	8 per Unit	
7.5.0	Blade Design	Shall be of Wear Resistant, Forward Curved, Easily Replaceable type. Bidder to mention blade material in the Offer	
7.6.0	Blast Wheel Blade Life	Bidder to specify in operating hours.	
7.7.0	Motor Power per Unit	Bidder to specify	
7.8.0	Wheel Speed	Bidder to specify	
7.9.0	Wheel Diameter	Bidder to specify	
7.10.0	Positional Adjustment	Easily adjustable arrangement on outside of Blast Unit Housing to target the blast stream in the desired direction	
7.11.0	Shot Feed Control	Clock Dial type control cage to control shot feed	
7.12.0	Shot Through-put	Bidder to specify in kgs. / minute	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
7.13.0	Wheel Housing Design	Heavy steel plate wheel housing completely lined with wear plates assembled to overlap one another and to prevent wear and abrasive leakage. Bidder has to compulsorily give technical details with the Offer.	
7.14.0	Wheel Elements	Blast wheel components shall be wear and abrasive resistant material and dynamically balanced	
7.15.0	Chamber Door Closing	Pneumatically operated door closing mechanism shall be employed. Bidder has to give technical details.	
7.16.0	Wheel Selection	Provision shall be given to selectively switch off shot blasting wheels	
7.17.0	Noise Level	Bidder to confirm that Noise Level will be controlled below 80-85 dBA at one meter distance from the Shot Blasting Wheel Unit	
8.0.0	SHOT RECOVERY & RECYCLING SYSTEM		
8.1.0	Purpose	Bidder to specify the arrangements so that the offered system works on a completely automatic mode and in conjunction with the Blast Chamber Operations.	
8.2.0	Hopper & Screw Conveyors		
8.2.1	Design Features	a. Mild steel gravity fed hopper beneath the blast chamber b. Chutes below the inlet & outlet vestibules & de-dusting chamber to collect spent & brushed-off shots & dust c. Bottom & top screw conveyors to convey steel shots to the elevator boot section	
8.2.2	Design Parameters	Bidder to specify the following : a. Arrangement of Screw Conveyors with size b. Screw Conveyor Motor Ratings d. Make & Size of Screw Conveyor Gear Boxes [shall be of reputed make & standard sizes]	

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S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
8.3.0	Belt Type Bucket Elevator		
8.3.1	Design Features	a. Easily accessible provision to compensate for belt slackness b. Back-stop arrangement to prevent the belt from slipping down during sudden stoppage c. Bucket elevator to be housed in a ventilated dust-tight fabricated steel casing provided with inspection and maintenance doors	
8.3.2	Design Parameters	Bidder to specify the following : a. Belt Material & Thickness b. Bucket Material c. Elevator Motor Rating d. Make & Size of Bucket Elevator Gear Boxes [shall be of reputed make & standard sizes]	
8.4.0	Abrasive (Shot) Separator		
8.4.1	Design Features	a. Type - Counter Flow Air Wash Separator b. Removable screen for trapping out coarse particles c. Refuse hopper for fines with non-return valves for discharge of fines d. Integral storage hopper for reclaimed abrasives e. Provided with Abrasive Level Indicator	
8.4.2	Design Parameters	Bidder to specify the following : a. Overall Arrangement Details b. Capacity	
8.5.0	Abrasive Feeding Unit		
8.5.1	Design Parameters	Bidder to specify the following : a. Overall Arrangement Details b. Type of Control Valve used	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
8.5.2	Design Features	a. Abrasive feeding by means of wear resistant feed pipes connecting storage hopper & blast wheel unit b. Abrasive control valve for controlling the flow of shots to the blast-wheel unit c. Solenoid operated, pneumatic cylinder actuated control valve for feeding shots to blast-wheel unit d. Manual shut-off valve for cutting-off shot feed to the blast-wheel unit during maintenance	
9.0.0	DUST EXTRACTION / COLLECTOR UNIT		
9.1.0	Type	Continuous automatic	
9.2.0	Filter Media	Cartridge filters	
9.3.0	Cleaning of Filters	By reverse air flow	
9.4.0	Cleaning Cycles	Timer controlled / programmable	
9.5.0	Cleaning Cycle - Sensing	Sensing to initiate cleaning cycle by Differential Pressure	
9.6.0	Particulate Emission at Chimney Outlet	Not more than 70 mg / Nm ³ for particle size greater than or equal to 10 micron	
9.7.0	Exhaust Fan	Shall be of capacity suitable to purge the entire system	
9.8.0	Scope of Supply	To include the following : a. Dust hopper with arrangement for dust removal b. Supporting structures for floor mounting c. Suction ductwork from shot blasting chamber to dust collector for a separation distance of 6 Mtrs. d. Ducting from dust collector to exhaust fan e. Suitable bellows to be provided to prevent vibration f. Chimney, Supporting Structures and its Foundation	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
9.9.0	Design Parameters	Bidder to specify the following : a. Overall Arrangement Details b. Dust Collector Model & Make c. Capacity & Filter Area d. Number of Filter Cartridges e. Capacity, Motor Rating & Speed of Exhaust Fan f. Height & other technical details of the Chimney	
10.0.0	WORK / JOB [Drum 'U' Shell] CONVEYOR		
10.1.0	Basic Design	To suit the description of jobs narrated above under Clause No. AA and Clause No. CC – 1.0.0	
10.2.0	Application	For use as described under Clause No. BB – a.	
10.3.0	Main Features	a. Movement shall be continuous but shall be stopped at Operator's discretion b. Shall be provided with variable speed drive. c. Shall be suitable for forward & reverse movements	
10.4.0	Technical Details	Bidder to specify/indicate the following : a. Job holding & handling mechanism/arrangements b. Carriage Speed c. Makes, Rating & Speed of Electric Motors used	
11.0.0	SYSTEM INTER LOCKS		
11.1.0	Inter-Lock Provisions	a. Service doors to be interlocked with blast wheel unit such that the blast wheel unit cannot be started unless service door is fully shut & blast wheel unit is shut off if service door is opened b. Blast wheel units to operate only when elevators, screw conveyors & dust collectors are in operation c. Sensor to start blasting operation only when work piece has sufficiently advanced into the chamber and to stop operation when job leaves chamber	

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S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
11.2.0	Basic Need / Features	a. All necessary interlocks to ensure safety of equipment, & personnel operating the equipment b. Bidder to specify/elaborate the list of other interlocks provided	
12.0.0	AUXILIARY BLASTING CHAMBER [Optional Construction at Extra Cost]		
12.1.0	Purpose	To suit the requirement given under Clause No. BB–e	
12.2.0	Location	On demand the Auxiliary Blasting Chamber has to be built between the entry point and the inlet vestibule (prior to Main Blasting Chamber), so that the intended work pieces are directly brought to this Auxiliary Chamber using Heavy Duty Fork Lift Trucks [i.e., the main work conveyor need not be used for this application] and are placed directly on the floor of the chamber.	
12.3.0	Blasting Machine/Mean	a. A full fledged manual shot blasting equipment (run on shop supplied compressed air) to be supplied. b. The scope of supply for the manual shot blasting machine shall be as per ANNEXURE – 3 . c. The compressed air is supplied at a pressure of 60 to 70 psi. The quantum of air supply is not a limitation.	
12.4.0	Chamber Effective Dimensions	Width : Equal to that of the Main Blasting Chamber Depth : 4000 mm (along the traverse of "U" Shell) Height : Equal to that of the Main Blasting Chamber	
12.5.0	Shots Recovery System	Spilled over and scattered/stray shots are to be recovered through the floor gratings and channelised to the main abrasive recovery and recycling system.	
12.6.0	Dust Extraction System	The dust and fume extraction from this auxiliary chamber shall be integrated with the main system.	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
12.7.0	Illumination	Since manual blasting is adopted, proper illumination system has to be provided with protective covers.	
12.8.0	Technical & Price Offer	Technical details to be given with Main Offer. The price shall be indicated as a percentage of the Main Price Bid	
13.0.0	OPERATION AND CONTROL SYSTEM - OPERATOR'S PANEL		
13.1.0	a. One Main Panel on the total equipment/station controller side (having complete machine control system with required configuration) and one Auxilliary Panel for Job/Work Handling only, with Remote Pendant along with 15 mtr. cable length, shall be provided for convenient and efficient operation. b. All switches shall be within reach of the Operator. All displays / indications shall also be conveniently located (Schematic Layout with details to be submitted with the offer)		
14.0.0	LUBRICATION SYSTEM		
14.1.0	First filling of all required Oils & Grease etc. should be supplied by vendor. Indigenous (Indian) source or Indian equivalent and specifications of oils/ greases are also to be provided by the vendor.	Vendor to specify	
15.0.0	ELECTRICAL INSTALLATION		
15.1.0	415V + 10% / -10%, 50HZ +/-3 Hz, 3 Phase AC (3 wire system without neutral) power supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor.	Vendor to confirm	
15.2.0	Tropicalization : All electrical / electronic equipment shall be tropicalized.	Vendor to confirm	
15.3.0	All electrical/electronic control cabinets & panels shall be dust & vermin proof and shall have IP 54 protection	Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
15.4.0	a. All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220 Volts, 5/15 Amp. AC. b. All adapters /receptacles should have compatibility with Indian equivalents.	Vendor to confirm	
15.5.0	Complete specification of the various drives and gear reducers shall be furnished	Vendor to confirm	
15.6.0	Control circuit voltage shall not exceed 110 V.	Vendor to confirm	
15.7.0	All motors shall be of any of the following makes : M/S Siemens / Crompton Greaves / KEC / ABB or other makes conforming to IEC standards.	Vendor to confirm	
15.8.0	Wiring: All electrical motors, limit switches etc, on the machine shall be wired using PVC sheathed cable running in conduits to common terminal block	Vendor to confirm	
15.9.0	External wiring from / to control panel, control desk, exhaust fan etc shall be by means of armoured multi-core copper cables	Vendor to confirm	
15.10.0	Vendor shall ensure the proper earthing for the machine and its peripherals.	Vendor to confirm	
16.0.0	PNEUMATIC CIRCUITS		
16.1.0	Pneumatics on machine, dust collector etc shall be connected by nylon and/or steel tube to common point on machine. Fitted at the common point would be a lubricator, regulator, filter and hand wheel valve, refrigerant system to remove moisture.	Vendor to confirm	
16.2.0	All pneumatic components including cylinders should be of FESTO / PNEUMAX / COMOZZI only	Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
16.3.0	BHEL will terminate the shop compressed air supply at the hand wheel valve to be provided by the supplier as in 4.5 above. The compressed air will be at a pressure of 60 PSI to 70 PSI. All pneumatic systems on the machine, dust collector etc shall be designed to operate efficiently at this air pressure	Vendor to confirm	
17.0.0	SPARES AND CONSUMABLES		
17.1.0	<p>a. Itemized break-up of mechanical, hydraulic, electrical & electronic spares used in the m/c. in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on two shifts running basis should be offered.</p> <p>b. The list to include following, in addition to other recommended spares: Mechanical, Pneumatic & Hydraulic Spares: All types of Transducers, Flow Switches, Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch. Spares for Motors, Drives, Power Module & Control Cards for Main Drives Filters, Seals, 'O'-Rings, Liners, Impeller Blades (Unit Price for each item shall be offered)</p>	Vendor to confirm	
17.2.0	All types of spares for total station and accessories should be available for at least ten years after supply of the equipment. If equipment / 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	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
18.0.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE		
18.1.0	<p>The Blasting Station should confirm to following factors related to environment:</p> <ul style="list-style-type: none"> a. Maximum noise level shall be 85 dB(A) at normal load condition, 1meter away from the machine with correction factor for back ground noise. b. If any safety / environmental protection is required it should be built in the machine by the vendor, to meet ISO 14001 and ISO 18001 Standards. c. Paint applied on various elements/components of the station shall be anti-corrosive & weather resistant, shall not peel off and mix up with dust or fumes emitted. d. The machine shall be suitable for an ambient temperature of +50 ° C and relative humidity of 85 % respectively, but both do not occur simultaneously 	Vendor to Confirm	
19.0.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE		
19.1.0	The Vendor shall bring special tools and equipment required for erection of the machine. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine shall be supplied. List of such tools shall be submitted with offer	Vendor to confirm	
20.0.0	DOCUMENTATION:		
20.1.0	Three sets of following documents (3 Hard copies,) in English Language should be supplied along with the machine	Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
20.2.0	Operating Manuals of Equipments forming part of the Blasting Station and Work Conveyors	Vendor to confirm	
20.3.0	Programming Manuals if any for the Station.	Vendor to confirm	
20.4.0	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Hydraulic Circuit Diagrams [with BOM – Bill of Materials]. All Assembly/ Sub Assembly Drawings shall be supplied with the Part List also.	Vendor to confirm	
20.5.0	Maintenance, Interface & Commissioning Manuals for speed drives.	Vendor to confirm	
20.6.0	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm	
20.7.0	Detailed specification of all rubber items and hydraulic / lube oil fittings	Vendor to confirm	
20.8.0	Operating Manuals, Maintenance Manuals & Catalogues for all supplied Accessories.	Vendor to confirm	
20.9.0	The vendor shall submit complete Master List of Parts used in the Blasting Station.	Vendor to confirm	
20.10.0	Vendor to confirm that complete list of spares for equipments and accessories, along with item part no / 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	
20.11.0	Component drawings with material specification for all wearing components like bushes, liners, impeller blades, etc.		
20.12.0	One additional set of all the above documentation in CD as the SOFT COPY	Vendor to confirm	
20.13.0	The supplier has to present one set of the [O & M] Manuals – DOCUMENTATION, at the time of inspection		

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
21.0.0	EQUIPMENT INSPECTION		
21.1.0	Since the Shot Blasting Station cannot be inspected in the installed condition, the supplier has to offer the complete quantum of materials, semi-finished/finished machine components, sub-assemblies, bought-out items, spares, consumables, etc. required to build the shot blasting station in total, along with one set of O&M documentation for inspection, at the supplier's works, by BHEL Engineers prior to despatch from the supplier's works.		
22.0.0	CIVIL WORKS – for Machine Foundations and Covered Roof		
22.1.0	<p>a. Complete Civil Works coming in the Shot Blasting Station (including Chimney Foundation), in addition to the Covered Industrial Shed to house the Shot Blasting Station is under the Scope of BHEL.</p> <p>b. Civil Design for Machine Foundations and Chimney Foundation shall be under the sole responsibility of the supplier.</p>	<p>Successful Bidder has to provide all the relevant details and technical inputs within 8 weeks from the date of issue of LOI [Letter of Intent]</p> <p>Bidder has to confirm.</p>	
23.0.0	ERECTION & COMMISSIONING		
23.1.0	Tools, Tackles, instruments and other necessary equipment required to carry out all above activities should be brought by the Vendor.	Vendor to confirm	
23.2.0	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the Vendor on returnable basis.	Vendor to confirm	
23.3.0	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
23.4.0	<p>a. Vendor to take full responsibility for the erection & commissioning, testing of the machine, carrying out welding of test pieces etc.</p> <p>b. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by Vendor in their foundation/layout drawings.</p> <p>c. Other requirements like crane and helping personnel shall also be provided by BHEL.</p>	Details of these requirements should be informed by Vendor in advance	
23.5.0	Portion, if any, of the equipment, 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.	Vendor to confirm	
23.6.0	Charges, duration, terms & conditions for E&C should be furnished in detail separately by Vendor along with offer.	Vendor to confirm	
24.0.0	PERFORMANCE PROVE-OUT		
24.1.0	The trouble free operation of all the sub-systems forming part of the total blasting station, at the rated operating parameters, shall be demonstrated successfully after the commissioning activity.	Vendor to confirm	
24.2.0	The supplier is also expected to carry-out the performance prove-out to meet the productivity norms expected out of the blasting station, as described under the Specification Clause No. CC – 3.0.0	Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
25.0.0	TRAINING		
25.1.0	The supplier has to impart comprehensive training to BHEL Staff - on the OPERATION, TROUBLE SHOOTING and MAINTENANCE of the Shot Blasting Station - for a minimum period of 15 Working Days after the successful completion of the commissioning and performance prove-out of the shot blasting station.	Vendor to confirm	
26.0.0	PERFORMANCE GUARANTEE		
26.1.0	Performance Guarantee for a minimum period of 24 months (for the machine in total and sub-systems or bought-out items in particular) from the date of acceptance of the machine.	Vendor to confirm	
27.0.0	GENERAL POINTS		
27.1.0	Total Connected Load (in kVA)	Vendor to Indicate	
27.2.0	All bearings to be suitably protected against dust ingress	Vendor to confirm	
27.3.0	All Gearboxes should be of reputed and standard makes like Radicon / Elecon / Shanthi Gears	Vendor to Indicate	
27.4.0	Floor area required (Length, Width, Height) for complete equipment & accessories	Vendor to Indicate	
27.5.0	Depth of any pit below floor level shall be restricted to a max. of 2m.	Vendor to confirm	
27.6.0	Maintenance platform, wherever required, shall be provided along with handrails, access ladder, etc.	Vendor to confirm	
27.7.0	Painting of Equipment / Electrical Panels using RAL 6011 Apple Green Colour (Polyurethane Paint)	Vendor to confirm	
27.8.0	Total weight of the individual systems of equipment	Vendor to specify	
27.9.0	Weight of heaviest part of machine	Vendor to specify	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with Technical Details)
27.10.0	Weight of the heaviest assembly / sub-assembly of the equipment	Vendor to specify	
27.11.0	Dimensions of largest part/ sub-assembly/ assembly of the Equipment	Vendor to specify	
27.12.0	Vendor to submit, along with offer, reference list of customers where similar equipments have been supplied mentioning broad specifications of the supplied equipment.	Vendor to confirm	
27.13.0	Detailed catalogues, sketch/ photographs of the equipment and accessories/ attachments should be submitted with the offer.	Vendor to confirm	

ENCLOSURES :

ANNEXURE –1 & 2 : Typical Sketches of the Work-Pieces

ANNEXURE – 3 : Scope of Supply for the Manual Shot Blasting Equipment & Personal Protective Gadgets

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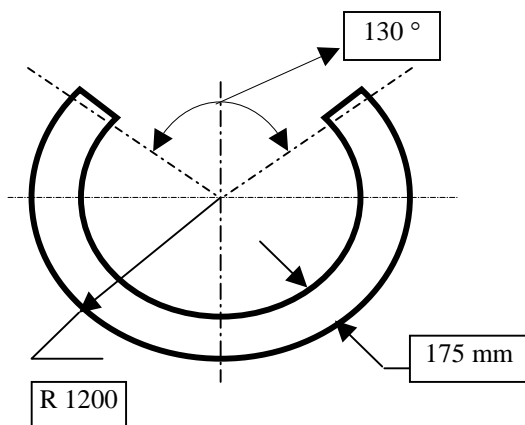
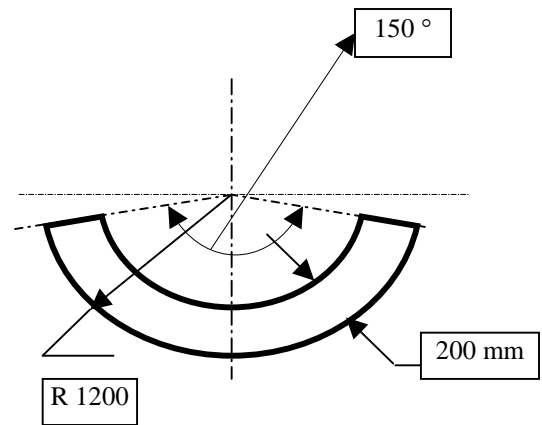
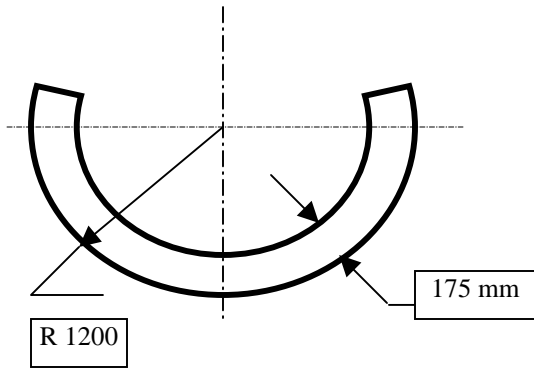
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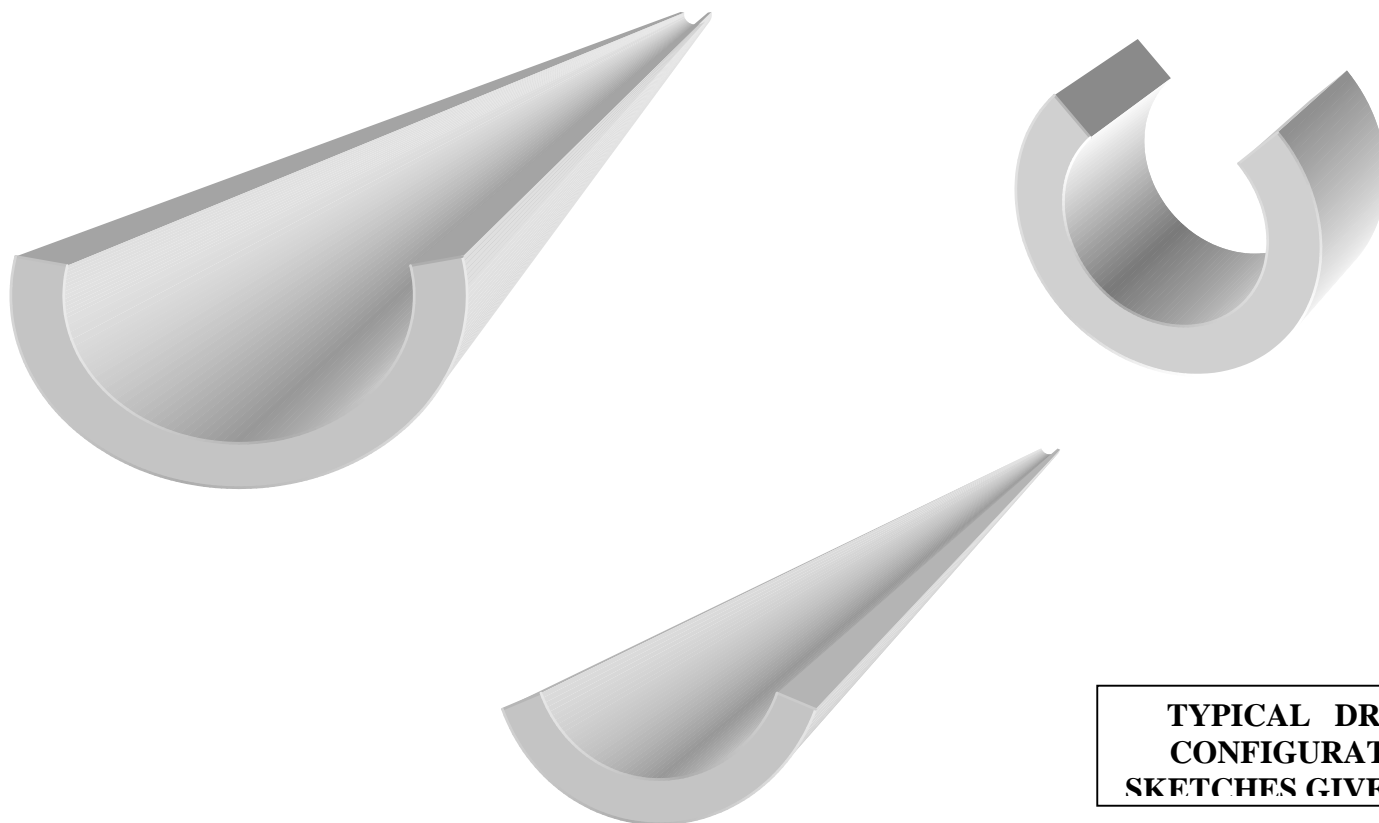
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ANNEXURE - 1



**TYPICAL DRUM “U” SHELL
LINE SKETCHES**

ANNEXURE - 2



**TYPICAL DRUM “U” SHELL
CONFIGURATIONS, FOR THE
SKETCHES GIVEN IN ANNEXURE-1**

ANNEXURE – 3

SCOPE OF SUPPLY for Manual Shot Blasting Unit & Safety Wears

S.No.	ITEM DESCRIPTION	QUANTITY
01	Pneumatically Operated Portable Abrasive Blaster with Remote Control and fitted with : a) 10 Mtr. Long Blast Hose b) Tungsten Carbide Lined Blast Nozzles – (10 mm Orifice) c) Air Filter d) Pressure Gauge e) Automatic Exhaust Valve f) Abrasive Control Pinch Valve	- 2 – Nos.
02	Air Blaster (Operator) Helmet	- 4 – Nos.
03	Helmet Hose (11 Mtrs.)	- 2 – Nos.
04	Operator Gum Boot	- 2 – Pairs
05	Operator Hand Gloves	- 4 – Pairs
06	Operator's Suit	- 2 – Nos.
07	Operator's Helmet Air-Conditioner	- 2 – Nos.
08	Air Breather	- 4 – Nos.
	SPARES :	
09	"O" Ring for Mushroom Valve	- 10 – Nos.
10	Mushroom Valve	- 1 – No.
11	Rubber Sleeve for Pinch Valve	- 5 – Nos.
12	Blast Hose (10 Mtr. Long)	- 2 – Nos.
13	Nozzle Holder	- 1 – No.
14	Rubber Bush to Nozzle Holder	- 4 – Nos.
15	Tungsten Carbide Lined Blasting Nozzle	- 4 – Nos.
16	Rubber Sleeves	- 2 – Nos.
17	"O" Rings	- 10 – Nos.
18	Outer Visor for Helmet	- 20 – Pkts.
19	Inner Visor for Helmet	- 10 – Nos.
20	Abrasive Nipple (suitable for Steel Shots)	- 2 – Nos.
21	Air Nipple	- 2 – Nos.
22	Mixing Tube Assembly	- 1 – No.
23	Exhaust Valve	- 1 – No.
24	Hose Connector	- 1 – No.
25	Other Recommended Additional Spares	- 1 - Set