



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 : rmanohar@bheltry.co.in Web : www.bhel.com
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	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
	2620600056	25.08.2006	05.10.2006

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	Tube Parting & Edge Preparation Machine as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com)	1 No.	20.08.2007

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 “2620600056”. 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
CNC TUBE PARTING & EDGE PREPARATION MACHINE****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 CNC TUBE PARTING & EDGE PREPARATION MACHINE.	
2.0	Number of CNC TUBE PARTING & EDGE PREPARATION MACHINE supplied, installed and commissioned till date (with details on machine type / model, configuration, customer and quantity)	
3.0	YEAR of supply of latest CNC TUBE PARTING & EDGE PREPARATION MACHINE and the Technical Specifications of the Machine supplied [Details to be furnished]	
4.0	Number of CNC TUBE PARTING & EDGE PREPARATION MACHINE supplied, installed and commissioned till date for the CUSTOMERS who are mainly the manufacturers of Power Utility Boilers (of High Pressure Ratings), with brief technical specifications of the supplied machines.	
5.0	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	
6.0	Details of Design Set-Up and Technology Back-Up assured for the PRINCIPAL Equipment Manufacturer & Supplier [Details on Experience of Design Personnel, Technology Tie-Up, R & D Facilities, etc. have to be furnished]	

S. No.	PARTICULARS	VENDOR's RESPONSE
7.0	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 Technical Offer compulsorily]	
8.0	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.	
9.0	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) .	
10.0	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.	
11.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – II

The BIDDER / VENDOR has to compulsorily meet the following requirements to get qualified for submitting an offer for CNC TUBE EDGE PREPARATION MACHINE

S. No.	REQUIREMENTS	VENDOR's COMMENTS
12.0	The BIDDER shall have a minimum of TEN Years of Continuous Experience in the field of Design, Manufacture and Supply of CNC TUBE PARTING & EDGE PREPARATION MACHINE	
13.0	The BIDDER shall have supplied at least one number of CNC TUBE PARTING & EDGE PREPARATION MACHINE (having similar CAPACITY and TECHNICAL SPECIFICATIONS given under PART B) in the recent past, say in the last five years.	

S. No.	PARTICULARS	VENDOR's COMMENTS
14.0	Reference List of Customers and Performance Certificate (for a period not less than two years) from minimum three CUSTOMERS, with full contact details of CONTACT PERSON, for whom the BIDDER had supplied similar type of CNC TUBE PARTING & EDGE PREPARATION MACHINE, are to be provided with the Technical Offer.	
15.0	BIDDER has to co-ordinate for the visit of BHEL Team (at BHEL Cost) to the Customer's Works (preferably Power Utility Boiler Manufacturer), to witness capability of an existing CNC TUBE PARTING & EDGE PREPARATION MACHINE, if warranted.	
16.0	BHEL is specific about the materials of construction, basic design/dimensional aspects of various sections, structural parts, machine base, etc., as the machine is to be installed in a rough working environment in a major and heavy fabrication shopfloor. Hence complete details of machine building have to be presented, to meet BHEL specification requirements, as this will be one of the pre-requisites for the technical qualification.	

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
17.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical [with PART A & PART B] & Commercial and Price Bid.	
18.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria are to be enclosed.	

S.No.	REQUIREMENTS	VENDOR's COMPLIANCE
19.0	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.	
20.0	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.	
21.0	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.	
22.0	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.	
23.0	BIDDER has to indicate the Country of Origin for the supply of equipment.	
24.0	The reference List of Customers shall be accompanied with (Phone Number and E-Mail ID) of the CONTACT PERSON for cross reference by BHEL	
25.0	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.	

TECHNICAL SPECIFICATIONS for CNC TUBE PARTING & EDGE PREPARATION MACHINE

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
1.	Area of Application	This machine is meant for cutting to length, outside & inside chamfering and preparation of 'V' & 'J' style edge preparation on seamless steel tubes to form high-pressure components for Power Boilers and Industrial boilers for Process Industries. The system shall be of Electro-Hydraulic type with CNC mode of operation.	

2. TUBE SIZES: All are OD (outer diameter) Controlled tubes with thickness tolerance of Maximum +22 %

Sl.No	OUTER-DIAMETER in mm	WALL THICKNESS RANGE in mm (Tolerance : Max. +22 %)
1	31.8	3.2 / 3.6 / 4.0 / 5.0
2	38.1	3.2 / 4.0 / 5.0 / 6.3
3	44.5	4.0 / 4.5 / 5 / 6.3 / 8 / 9 / 10
4	47.63	5 / 6.3 / 8 / 10
5	51.0	3.6 / 4 / 4.5 / 5 / 6.3 / 8 / 10 / 12
6	54.0	3.6 / 4 / 4.5 / 5 / 6.3 / 8 / 10 / 12
7	57.0	4 / 5 / 6.3 / 8 / 10
8	60.3	4 / 5 / 6.3 / 8 / 10 / 12.5
9	63.5	4.8 / 5.6 / 6.3 / 10 / 12.5
10	76.1	7.1 / 10 / 12.5
11	88.9	4 / 5.5 / 6.3 / 12

3. MATERIALS:

a CARBON STEEL	:	SA 192, SA 209 Gr. T1, SA 210 Gr.A1/Gr.C (ASTM)
b ALLOY STEEL	:	SA 213 Gr.T2, T11, T12, T22, T91 (ASTM)
c STAINLESS STEEL	:	SA 213 304H, 316L, 347H (ASTM)
d.GOST Standards	:	12X1M ϕ / Steel 20

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
4	JOB SPECIFICATIONS:		
4.1	Tube Diameter	Minimum: 31.8 mm Maximum: 88.9 mm	
4.2	Tube Wall Thickness	As given in the table (refer Sl.No. 2) Minimum: 3.2mm Maximum: 15.25mm	
4.3	Reference Tube Size for establishing the machine capacity	(Diameter x Thickness) 88.9 x 12mm : 31.8 x 3.2mm : 63.5 x 12.5mm (Alloy Steel / SS)	
4.4	Raw Material Tube lengths	Minimum : 1000mm Maximum: 14000mm	
4.5	Finished Tube lengths	Minimum : 50mm Maximum : 3000mm	
4.6	Edge Preparation	B, C, D styles and 'J' groove as per drawing Annexure-1	
4.7	Chamfering angles	37½° and 45° chamfering.	
4.8	Max. ID boring required	50mm + Taper angle for smooth merging. Bore ID - d1 as given in the drg. to be maintained	
4.9	Max. OD machining	5mm straight and Taper angle of 18° after that. (not shown in the Annexure)	
4.10	Machining of tube ends	Edge preparation is done on both the ends for tubes with wall thickness greater than 7.6mm	
4.11	Machine production output required	Not less than 500 ends / shift (on 44.5 x 6.3 / SA 106 Gr C tubes)	

S. No.	PARTICULARS & BHEL SPECIFICATIONS		BIDDER's OFFER [with Complete Technical Details]
5	MACHINE SPECIFICATIONS		
5.1	Machine configuration	Vendor to give the details of the machine with Tube Rotating, Stationary Cutting tool post with tool holders configuration. A general arrangement drawing of the machine to be provided.	
5.2	No.of Tool Holders	3 (minimum)	
5.3	Machining Operations	1. Parting 2. Inside boring 3. Chamfering or Profile as per EP style 4. OD machining 5. Deburring (optional)	
5.4	Both ends machining	Vendor to select suitable system/ mechanism for chamfering both the ends of the stubs. Vendor to explain the working details of the system.	
5.5	TUBE FEEDING		
5.5.1	Tube feeding requirements	Automatic tube feeding station to be provided. Vendor to specify details. Tube feeding shall be through spindle.	
5.5.2	Tube feeding system	Tube feeding system shall consist of Raw material - tube storage rack, Tube kick off, Tube feeding etc. Each tube bundle loaded on the machine will have a max. of 50 tubes	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
5.5.3	Tube feeding mechanism	Continuously running feed rolls driven by a separate motor, close on the stock when collet opens	
5.5.4	Tube rotation during operation	Bidder to give details of a suitable mechanism to ensure that the whipping action of the tube during rotation shall be arrested and does not result in deterioration of machine performance.	
5.5.5	Pads	Suitable pads to be provided on the stands to avoid noise during tube rotation / Loading & Unloading etc and for smooth operation.	
5.6	Maximum Weight	Bidder to specify the Maximum Weight that can be handled in loading / feeding magazine	
5.7	TUBE CLAMPING & LENGTH SETTING		
5.7.1	Tube Clamping	Tube clamping mechanism in the chuck shall be Hydraulic.	
5.7.2	Hydraulic Clamping	Dual pressure – reduced pressure for thin wall	
5.7.3	Tube Clamping	Automatic clamping self-centering chuck for tube clamping.	
5.7.4	Tube lift adjustment	Mechanism to ensure that pipe centre line coincides with the chuck centre line for various diameters of the pipes.	
5.7.5	Length setting	Length setting shall be of simple tube stopper arrangement, rigid enough to take the impact loads.	

S. No.	PARTICULARS & BHEL SPECIFICATIONS		BIDDER's OFFER [with Complete Technical Details]
5.7.6	Tolerance on length setting	± 0.2 mm	
5.8	SPINDLE		
5.8.1	Spindle speed (Infinitely variable)	Vendor to Specify	
5.8.2	No.of spindle speed ranges	Vendor to Specify	
5.8.3	Spindle speed range selection	Through CNC. Vendor to Confirm	
5.8.4	KW rating of AC spindle drive motor	Vendor to Specify (Vendor to furnish complete technical details along with offer)	
5.9	CONTROLS		
5.9.1	Machine shall be operated in three modes viz., Automatic, semi-Automatic and Manual.		
5.9.2	CNC System operator panel		
5.9.3	All feedback systems & elements shall have easy accessibility for maintenance		
5.9.4	All control logics used in the machine to be detailed out in the manual.		
5.10	CNC SYSTEM & FEATURES:		
5.10.1	CNC System Simple and user friendly CNC system. Storing of Pre-programmed styles of edge preparation and to be selectable with data keying of different Diameters and Thicknesses of tubes.	Vendor to specify	

S. No.	PARTICULARS & BHEL SPECIFICATIONS		BIDDER's OFFER [with Complete Technical Details]
5.10.2	CNC features	No. of axis controlled by CNC to be specified by the vendor.	
5.10.3	Make: Preferably Fanuc / Siemens.	Vendor to specify	
5.10.4	Type: PC based latest version	Vendor to specify	
5.10.5	Model: (Suitable and Latest version, as available at the time of ordering, should be supplied).	Vendor to specify	
5.10.6	Details of Standard features	Vendor to specify	
5.10.7	Details of optional features, recommended by vendor.	Vendor to specify	
5.10.8	Details of other optional features	Vendor to specify	
5.10.9	Automatic diagnostic alarm feature with error display		
5.10.10	The system should have full alphanumeric keyboard, TFT colour display (10.4" or more), additional draw-out type Qwerty Key Board and mouse in suitable enclosure, RS232C serial interfaces, parallel interface for printer, COM port for tele diagnostics, USB Ports for connectivity, compact disc drive unit for data input/output, hard disk of sufficient capacity (Largest size available at the time of order shall be supplied) , graphic simulation and preinstalled system software & other required soft wares etc	Vendor to Confirm (Details should be furnished by the Vendor in the offer)	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
5.11	Air Conditioners:		
5.11.1	Air Conditioners with Dehumidifiers of suitable / sufficient capacity 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.	Vendor to submit	
5.12	COOLANT SYSTEM		
5.12.1	Coolant system has to be provided for machining. An integral coolant return system to be provided to avoid coolant spillage.	Vendor to Specify	
5.12.2	Coolant tank capacity, Coolant flow rate, Coolant pressure and motor rating	Vendor to Specify	
5.12.3	Coolant tank shall be easily removable	Vendor to confirm	
5.13	HYDRAULICS		
5.13.1	Hydraulic system should be centralized. Hydraulic Tank shall preferably be located at floor level All hydraulic pipelines to be neatly laid out.	Vendor to Confirm (Details should be furnished in the offer)	
5.13.2	Make Rexroth / Vickers Sperry or equivalent from a reputed manufacturer. (Details to be submitted)	Vendor to specify	
5.13.3	Hydraulic hose end fittings shall be of suitable material with female swivel nut and 24° cones.	Vendor to specify	
5.13.4	All hydraulic hoses shall be preferably of GATES make	Vendor to specify	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
5.13.5	Hydraulic circuits shall be designed with minimum number of control valves and to suit oil of ISO VG 46 or 68 only. Also minimum number of check-points to be provided wherever pressure is required to be read for setting and trouble shooting. MINIMESS Pressure Gauge - 1 No with Connecting Hose to be provided.	Vendor to confirm	
5.13.6	The control voltage for all solenoid operated valves	24 V DC	
5.13.7	Filtration System, Details should be submitted.	Vendor to specify	
5.13.8	Failure indication	Vendor to specify	
5.13.9	Automatic shut off provision, Details should be submitted.	Vendor to specify	
5.13.10	Cooling system of sufficient capacity to maintain complete Hydraulic System, including lubrication oil, hydrostatic oil and gearbox oil, etc. at a temperature not exceeding 50 deg C irrespective of the ambient conditions. Complete details should be submitted	Vendor to specify	
5.13.11	Hydraulic pump capacity (flow / pressure)	Vendor to specify	
5.13.12	Each pump should have an independent motor. Tandem pumps should not be used	Vendor to specify	
5.13.13	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	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
5.14	ELECTRICAL:		
5.14.1	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. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply during construction of foundation.	Vendor to confirm	
5.14.2	Tropicalization: All electrical / electronic equipment shall be tropicalized.	Vendor to confirm	
5.14.3	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vendor to confirm	
5.14.4	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm	
5.14.5	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.	Vendor to confirm	
5.14.6	All motors shall be from reputed makers like SIEMENS, ABB, Allen Bradley conforming to IEC Standards.	Vendor to confirm	
5.14.7	All electrics shall be of reputed make like Siemens / SEW / ROCKWELL Allen Bradley/ Telemecanique/ Delta conforming to IEC or Indian standards.	Vendor to confirm	
5.14.8	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.	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
5.14.9	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm	
5.14.10	In-cycle hour counter with reset facility should be provided.	Vendor to confirm	
5.14.11	All Electric enclosures shall have IP 54 protection	Vendor to confirm	
5.15	OPTIONAL FEATURES		
5.15.1	Chip conveyor: Vendor to quote for a suitable chip conveyor.	Vendor to specify details	
5.15.2	Deburring head: Deburring of inside and outside of the machined ends.	Vendor to specify	
5.15.3	Colour coding: Logitudinal Colour coding mechanism to be provided such that the colour code (consisting of two colours) shall be sprayed on to the tube as it emerges for length setting. Quick drying paint shall be applied.	Vendor to specify	
5.15.4	Collecting dumps: Wheel mounted collecting dump for different sizes (3 different sizes) to collect finished tubes from the machine.	Vendor to specify	
5.15.5	Any Other Optional Accessories Additional Optional Accessories which enhance the productivity of the machine to be described by the supplier with the offer	Vendor to specify	
5.16	SAFETY ARRANGEMENTS:		
5.16.1	Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
5.16.2	The stopper shall be provided with safety guard interlocked, such that the machine will start only when the safety guard is closed.	Vendor to confirm	
5.16.3	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 number with messages (on CNC display and panels) should be available.	Vendor to specify	
5.16.4	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.	Vendor to specify	
5.16.5	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.	Vendor to Confirm	
5.16.6	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations and suitably guarded.	Vendor to Confirm	
5.16.7	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to Confirm	
5.17	ENVIRONMENTAL PERFORMANCE OF THE MACHINE:		
5.17.1	The Machine should confirm to following factors related to environment:	Vendor to Confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
5.17.2	Maximum noise level shall be 85 dB(A) at normal load condition, 1 meter away from the machine with correction factor for back ground noise.	Vendor to demonstrate compliance to noise level,	
5.17.3	There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to confirm	
5.17.4	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm	
5.17.5	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm	
6.0	SERVO VOLTAGE STABILIZER:		
6.1	Indian make Oil / Air Cooled servo Controlled Voltage Stabilizer suitable for complete machine, its drives, controls, PLC etc with no undesirable Harmonics in the stabilizer output.	Vendor to confirm	
6.2	Make. : NEEL / DELTA / AEI / POWER AID	Vendor to confirm	
6.3	Model & Rating (Suitable for the machine load. Vendor to specify the noise level also)	Vendor to Specify	
6.4	Spares Package for the Voltage Stabilizer for 2 years working should also be offered.	Vendor to submit	
6.5	Catalogue of the Voltage Stabilizer shall be submitted with the offer.	Vendor to submit	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
7.0	ULTRA ISOLATION TRANSFORMER		
7.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, PLC etc. shall be supplied	Vendor to confirm	
7.2	Make NEEL / DELTA / AEI / POWER AID	Vendor to confirm	
7.3	Model and Rating	Vendor to specify and noise level also	
7.4	Spares Package for the Ultra Isolation Transformer for 2 years working should also be offered.	Vendor to submit	
7.5	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer.	Vendor to submit	
8.0	TOOLING:		
8.1	No.of Tool Holders: 3 (minimum)	Vendor to specify	
8.2	Feed for Tool Slides - Hydraulic	Vendor to confirm	
8.3	Tooling system should consist of Standard ISO indexable carbide inserts, capable of generating all the edge preparation styles as indicated in 5.3. Parameters for cutting tools Cutting speed : Up to 150 metres per minute.	Vendor to specify	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
9.0	DIAGNOSTIC SYSTEM		
9.1	TELE-DIAGNOSTIC SERVICE:		
9.1.1	Tele-diagnostic service should be provided through International telephone lines along with required Hardware / Software package for the supplied CNC system for remote diagnosis and correction of the problems in both CNC System and PLC of the machine. This should be provided free of charge for the guarantee period. The Vendor should inform terms and conditions for the service after guarantee period. Subsequently, it should be possible to use other platforms, such as Internet or ISDN, subject to their availability in future. BHEL will provide the necessary telephone line near the machine.	Vendor to confirm	
9.2	FAULT DIAGNOSTIC SYSTEM:		
9.2.1	Vendor's own diagnostic system with required hardware and software should be supplied and installed on the CNC system. This should include customized auto-diagnostic system with supporting hardware and software, which shows detailed cause, and remedy for the fault on the display for faults related to mechanical and electrical maintenance.	Vendor to confirm	
9.2.2	Help guide should be provided to use both diagnostic systems	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
10.0	LEVELING & ANCHORING SYSTEM		
10.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied	Vendor to specify	
11.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE:		
11.1	The Vendor shall bring special tools and equipment required for erection of the machine. A tool kit for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to confirm	
11.2	Any Test mandrel required for checking & alignment of the machine components etc. should be supplied.	Vendor to confirm.	
12.0	SPARES:		
12.1	Itemized breakup of mechanical, hydraulic, electrical and electronic spares 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. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered)	Vendor to confirm	
12.2	Mechanical & Hydraulic Spares: All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
12.3	Electrical /Electronic / CNC Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, Encoders, , spares for CNC, Servo Motors for Feed Drives, Power Module & Control Cards for Main Drive as well as Feed Drives etc.	Vendor to confirm	
12.4	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	
12.5	Recommended set of spares for all attachments are to be offered with details.	Vendor to confirm	
12.6	Vendor to confirm that complete list of spares for machine 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	
13.0	DOCUMENTATION:		
13.1	Three sets of following documents (3 Hard copies,) in English language should be supplied along with the machine	Vendor to confirm	
13.2	Operating manuals of Machine & CNC system	Vendor to confirm	
13.3	Programming Manuals of Machine & CNC system	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
13.4	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also	Vendor to confirm	
13.5	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives.	Vendor to confirm	
13.6	Manufacturing drawings for all supplied tool holders, cutting tools, adapters, sleeves, fixtures etc.	Vendor to confirm	
13.7	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm	
13.8	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to confirm	
13.9	Operating Manuals, Maintenance Manuals & Catalogues for supplied Voltage Stabilizer, Isolation Transformer and all supplied Accessories.	Vendor to confirm	
13.10	PLC program printouts with comments in English.	Vendor to confirm	
13.11	PLC program on CD, NC data & PLC data on CD	Vendor to confirm	
13.12	Complete back up of hard disk on GHOST CD and clear written Instructions (3 copies) to take back up and reloading of a new hard disk.	Vendor to confirm	
13.13	The vendor shall submit complete Master List of parts used in the machine.	Vendor to confirm	
13.14	One additional set of all the above documentation on CD	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
14.0	TRAINING:		
14.1	The Vendor shall train Four BHEL's Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and CNC System) of the Machine at Vendor's works	Vendor to confirm	
14.2	The Vendor shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance after the commissioning of the Machine at BHEL works for not less than 8 working days	Vendor to confirm	
14.3	Airfare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor o Confirm	
14.4	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to Confirm	
14.5	Vendor to quote for training on per man per week basis for training at vendor's work	Vendor to confirm	
14.6	The training shall include specialised coaching in a) Safety b) Operation of the machine c) CNC System Operation, d) Trouble-Shooting, e) Software Application f) All special features of the machine g) Electrical / Mechanical / Electronics systems	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
15.0	FOUNDATION:		
15.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI) / P.O. whichever is earlier. Complete Foundation / dynamic load shall be submitted by the Vendor within three months after getting BHEL's approval. The layout should consist of all requirements pertaining to complete machine including space requirement for Voltage Stabilizer, Isolation Transformer, & any other accessories. BHEL shall construct complete foundation for the machine as per the Vendor's recommendation and drawing.	Vendor to submit	
15.2	Vendor should arrange equipments required for the testing of foundation, if required by the Vendor. The Vendor shall also indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine	Vendor to confirm	
16.0	ERECTION & COMMISSIONING		
16.1	Vendor to take full responsibility for supervision of the erection, vendor shall start up, test the machine, it's control & all types of other supplied equipment, carrying out machining of test pieces etc. 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. Other requirements like crane and helping personnel shall also be provided by BHEL.	Details of these requirements should be informed by Vendor in advance	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
16.2	Erection & Commissioning of Voltage stabilizer, Isolation Transformer & Air Compressor shall also be responsibility of the Vendor.	Vendor to confirm	
16.3	Successful proving of BHEL components by the Vendor shall be considered as part of commissioning. All tests, as mentioned in (clause 17.0) shall form part of the commissioning activity.	Vendor to confirm	
16.4	Tools, Tackles, Test Mandrels, instruments and other necessary equipment including any Laser equipment required to carry out all above activities should be brought by the Vendor.	Vendor to confirm	
16.5	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the Vendor on returnable basis.	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.	Vendor to confirm	
16.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm	
16.8	Charges, duration, terms & conditions for E&C should be furnished in detail separately by Vendor along with offer.	Vendor to confirm	

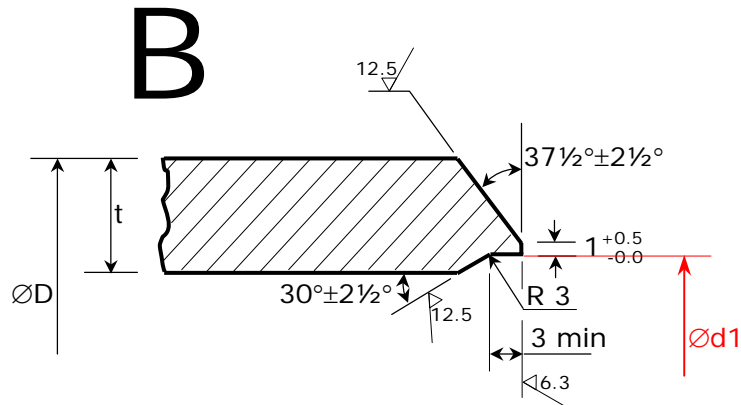
S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
17	AMBIENT CONDITIONS & THERMAL STABILITY:		
17.1	Total machine including CNC system and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Power Supply: Voltage: 415 V \pm 10% Frequency: 50 Hz \pm 3%, 3 Phase 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 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	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	
17.3	Thermal Stability of the complete machine keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and vendor should ensure trouble free operation of the machine.	Vendor to confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished by Vendor	
18	INSPECTION:		
18.1	The Machine shall be offered for inspection and performance trials to test the design capabilities of the machine, by BHEL Engineers before Dispatch at Supplier's works.	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
19.0	PROVEOUT OF BHEL COMPONENTS:		
19.1	The prove-out trials of the edge preparation shall be for the tube sizes given by BHEL during the technical discussions / at the time of releasing the Purchase Order.	Vendor to confirm	
20.0	MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)		
20.1	Tests/Activities to be carried out at Vendor's works on the machine before dispatch:		
20.1.1	Geometrical accuracies as per applicable standard test chart recommended by the Vendor	Vendor to confirm	
20.1.2	Positioning accuracies as per Applicable standard method recommended by the Vendor.	Vendor to confirm	
20.1.3	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to confirm	
20.1.4	Demonstration of all features of the machine, control system & accessories	Vendor to confirm	
20.2	Tests / Activities to be carried out at BHEL works while commissioning the machine:	Vendor to confirm	
20.2.1	Geometrical accuracies as per. Applicable standard test chart recommended by the Vendor	Vendor to confirm	
20.2.2	Positioning accuracies as per Applicable standard method recommended by the Vendor.	Vendor to confirm	
20.2.3	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to confirm	

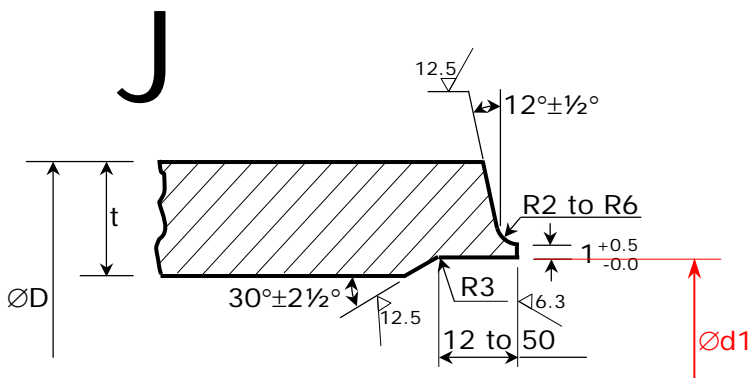
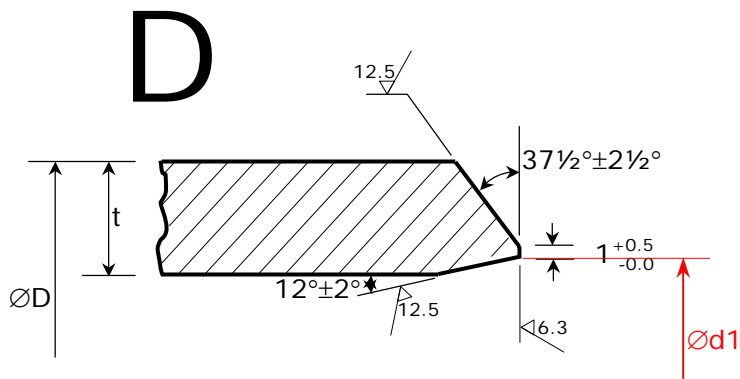
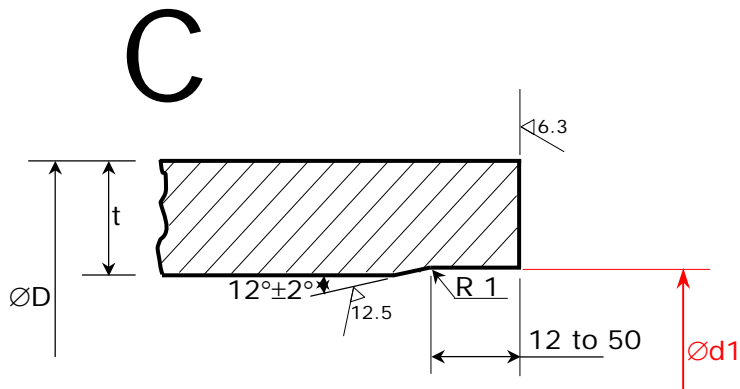
S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
20.2.4	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine	Vendor to confirm	
20.2.5	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to confirm	
20.2.6	Machining of test pieces to perform the edge preparation profiles (as per sl.no 2.0)	Vendor to confirm	
20.2.7	The prove-out trials as per Clause 16.0	Vendor to confirm	
	The production output of the machine shall be proved out by the commissioning Engineer at BHEL works for the Production rate mentioned in the specification. (Sl.No. 6.14)		
20.2.8	Supervision by vendors of independent operation of machine by BHEL after job prove out during the training period of 8 working days	Vendor to confirm	
21.0	PACKING:		
21.1	Sea worthy & rigid packing for all items of complete machine, CNC System, all accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes	Vendor to confirm	
22.0	GUARANTEE:		
22.1	24 months from the date of acceptance of the machine.	Vendor to confirm	
23.0	GENERAL:		
23.1	Machine Model No.	Vendor to specify	
23.2	Total connected load (KVA):	Vendor to specify	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
23.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to specify	
23.4	Machine lubrication	Automatic centralized lubrication system.	
23.5	Hydraulic, Pneumatic & oil piping should be preferably metallic except places where flexible piping is essential. All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to confirm	
23.6	Painting of machine / electrical panel	RAL6011 Apple Green (Polyurethane paint)	
23.7	All gears are to be hardened and ground	Vendor to specify.	
23.8	Total weight of the machine (approx)	Vendor to specify	
23.9	Weight of heaviest part of machine (approx)	Vendor to specify	
23.10	Weight of the heaviest assembly / sub-assembly of the Machine (approx)	Vendor to specify	
23.11	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to specify	
23.12	Vendor to submit, along with offer, reference list of customers where similar machines have been supplied mentioning broad specifications of the supplied machine i.e. Model, Load Carrying Capacity, Main Drive Rating, CNC System etc	Vendor to confirm	
23.13	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to confirm	

Enclosures: Annexure-1 - Tube Edge Preparation Details



D : Tube OD
t : Tube thickness
d1 : Bore ID



All dimensions are in mm
Drawing No. CABS-1-23 B-01
BHEL, TIRUCHIRAPPALLI