



An ISO 9001  
Company

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

<b>ENQUIRY</b>	Phone: +91 431 257 75 75 Fax : +91 431 252 07 19 Email : <a href="mailto:rrmanohar@bheltry.co.in">rrmanohar@bheltry.co.in</a> Web : <a href="http://www.bhel.com">www.bhel.com</a>
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	<b>Enquiry Number:</b>  <b>2620700007</b>	<b>Enquiry Date:</b>  <b>15.03.2007</b>	<b>Due date for submission of quotation:</b>  <b>16.04.2007</b>
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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	CNC Lathe Type Cut – off Tube Parting and Edge preparation Machine as per the technical specification & commercial conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> )	1 No.	31.08.2007

<b>Note:</b> (1) Confirmation of acceptance for BHEL commercial terms & conditions and Price Bid formats have been posted in BHEL Corporate web site <a href="http://www.bhel.com">www.bhel.com</a> under Enquiry reference “2620700007”. Your offer should be based on all the above documents. (2) Also, you are requested to fill in the Supplier Registration formats available in <a href="http://www.bhel.com">www.bhel.com</a> (under Advancement – Supplier Registration) and send it along with your offer.
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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  Sr. Dy. Genl. Manager / Capital Purchase / MM / Manufacturing
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## **CNC TUBE PARTING & EDGE PREPARATION MACHINE**

### **PART A**

#### **SECTION – I: QUALIFYING CRITERIA**

The VENDOR (**OEM**) has to compulsorily meet the following requirements to get qualified for submitting an offer for CNC TUBE PARTING & EDGE PREPARATION MACHINE

<b>S. No.</b>	<b>REQUIREMENTS</b>	<b>VENDOR's CONFIRMATION</b>
<b>1.0</b>	Only those vendors (OEMs), who have supplied and commissioned at least one Lathe Type Cutoff and End Preparation Machine for Tube diameter upto 76 mm or higher in the past ten years and the same is presently working satisfactorily for at least one year from the date of commissioning (as on date of tender opening), should quote. However, if such machine (s) has / had been supplied to BHEL, then it should be presently working satisfactorily for more than six months after its commissioning and acceptance (on the date of opening of Tender) in BHEL	
	The <b>vendor should submit along with the offer</b> the following details with regard to the above reference supply	
a)	Name of the customer / company to whom the above reference machine has been supplied	
b)	Complete postal address of the customer	
b)	<b>Month and Year of commissioning</b>	
c)	Application for which the machine is supplied	
d)	Name and designation of the contact person of the customer	
e)	Phone, Fax No and e-mail address of the contact person of the customer	
f)	<b>Performance Certificate from the Customer regarding satisfactory performance of machine supplied to them</b>	

## **SECTION – II**

The Vendor (OEM) is requested to furnish the following additional information:

<b>S. No.</b>	<b>PARTICULARS</b>	<b>VENDOR's RESPONSE</b>
<b>2.0</b>	Profile of the Company bringing-out the years of Experience of the vendor in the field of machine design, manufacture and supply of CNC TUBE PARTING & EDGE PREPARATION MACHINE.	
<b>3.0</b>	Number of CNC TUBE PARTING & EDGE PREPARATION MACHINE supplied, installed and commissioned till date (with details on machine type / model, configuration, customer and quantity)	
<b>4.0</b>	YEAR of supply of latest CNC TUBE PARTING & EDGE PREPARATION MACHINE and the Technical Specifications of the Machine supplied [Details to be furnished]	
<b>5.0</b>	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.	
<b>6.0</b>	Details on the Firm's Registration and the FINANCIAL STRENGTH of the COMPANY (Balance Sheet for the last <b>3</b> years) shall be submitted with the TECHNICAL OFFER	
<b>7.0</b>	Details of Design Set-Up and Technology Back-Up [Details on Experience of Design Personnel, Technology Tie-Up, R & D Facilities, etc. have to be furnished]	
<b>8.0</b>	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).	
<b>9.0</b>	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.	
<b>10.0</b>	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

## **SECTION – III**

Vendor (OEM) may please note the following:

<b>S.No.</b>	<b>REQUIREMENTS</b>	<b>VENDOR's RESPONSE</b>
<b>11.0</b>	The BIDDER / VENDOR shall submit the offer in TWO PARTS - Technical <b>[with PART A &amp; PART B]</b> & Commercial and Price Bid.	
<b>12.0</b>	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	
<b>13.0</b>	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 / datasheets] may lead to outright disqualification of the Technical Offer.	
<b>14.0</b>	The 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.	
<b>15.0</b>	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.	
<b>16.0</b>	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.	
<b>17.0</b>	Vendor has to indicate the Country of Origin for the supply of equipment.	
<b>18.0</b>	In case of preliminary qualification of the offer, on technical grounds, the Vendor 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****PART - B**

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]																																	
1.0	APPLICATION	<p>This machine is meant for cutting to length, outside &amp; inside chamfering and preparation of 'V' &amp; 'J' style edge preparation on seamless steel tubes to form high-pressure components for Power Boilers and Industrial boilers for Process Industries. The machine shall be CNC Controlled</p> <p>End preparation of one end of tube is to be done in a single setting, while the other end is to be prepared on the same machine by loading the tube again. <b>A lathe type cut-off and end preparation machine is envisaged</b></p>																																		
2.0	TUBE SIZES:	<p><b>All are OD (outer diameter) Controlled tubes with thickness tolerance of Maximum +22 %</b></p> <table><tr><th>Sl.No</th><th>OUTER-DIAMETER in mm</th><th>WALL THICKNESS RANGE in mm (Tolerance: Max. +22 %)</th></tr><tr><td>1</td><td>31.8</td><td>3.2 / 3.6 / 4.0 / 5.0</td></tr><tr><td>2</td><td>38.1</td><td>3.2 / 4.0 / 5.0 / 6.3</td></tr><tr><td>3</td><td>44.5</td><td>4.0 / 4.5 / 5 / 6.3 / 8 / 9 / 10</td></tr><tr><td>4</td><td>47.63</td><td>5 / 6.3 / 8 / 10</td></tr><tr><td>5</td><td>51.0</td><td>3.6 / 4 / 4.5 / 5 / 6.3 / 8 / 10 / 12</td></tr><tr><td>6</td><td>54.0</td><td>3.6 / 4 / 4.5 / 5 / 6.3 / 8 / 10 / 12</td></tr><tr><td>7</td><td>57.0</td><td>4 / 5 / 6.3 / 8 / 10</td></tr><tr><td>8</td><td>60.3</td><td>4 / 5 / 6.3 / 8 / 10 / 12.5</td></tr><tr><td>9</td><td>63.5</td><td>4.8 / 5.6 / 6.3 / 10 / 12.5</td></tr><tr><td>10</td><td>76.1</td><td>7.1 / 10 / 12.5</td></tr></table>	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	
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4	47.63	5 / 6.3 / 8 / 10																																		
5	51.0	3.6 / 4 / 4.5 / 5 / 6.3 / 8 / 10 / 12																																		
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S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
3.0	<b>MATERIALS:</b>	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: 12X1Mφ / Steel 20	
4.0	<b>JOB SPECIFICATIONS:</b>		
4.1	Tube Diameter	Minimum: 31.8 mm Maximum: 76.1 mm	
4.2	Tube Wall Thickness	Minimum: 3.2mm Maximum: 15.25mm	
4.3	Reference Tube Size for establishing the machine capacity	<b>(Diameter x Thickness)</b> 76.1 x 12mm: 31.8 x 3.2mm: 63.5 x 12.5mm (Alloy Steel / SS)	
4.4	Raw Material Tube (Mother tube) lengths	Minimum: 2000mm 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 Annexure I to be maintained	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
4.9	Max. OD machining	5mm straight and Taper angle of 18° after that. (not shown in the Annexure)	
4.10	Machine production output required	Not less than 500 ends / shift (on 44.5 x 6.3 / SA 106 Gr C tubes)	
<b>5.0</b>	<b>MACHINE SPECIFICATIONS</b>		
5.1	<b>Machine configuration:</b> The machine shall be a lathe type cutoff and end preparation machine in which the tube can be fed from the rear of the headstock through the bore of the chuck Vendor to give the details of the machine with Tube Rotating, Stationary Cutting tool post with tool holders configuration. <b>A general arrangement drawing of the machine to be provided along with the offer.</b>	Vendor to furnish details	
5.2	No.of Tool Slides (Sequence of operation has to be explained in the offer)	Vendor to Specify	
5.3	Feed for Tool Slides - Servo controlled Ball Screws	Vendor to confirm	
5.4	Machining Operations	1. Parting 2. Inside boring 3. Chamfering or Profile as per EP style 4. OD machining <b>(Operations 1,2 &amp; 3 are to be done in a single setting of tools. Operations No 2 and 3 are to be carried out simultaneously)</b>	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>5.5</b>	<b>TUBE FEEDING ARRANGEMENT:</b>		
5.5.1	Inclined Tube Storage Table, Tube Conveyor, Kick-in arrangement for feeding single tube at a time from the Storage Table to the Tube Conveyor, and Tube Conveyor drive for feeding tube to the in-feed side of the machine <b>will be provided and installed by BHEL.</b>		
	a) However, machine vendor shall integrate this system with their machine by suitable logics required for proper operation of the machine.	Vendor to confirm	
	b) Details of electrical input signals required from the tube storage and feeding system for proper integration with the machine shall be mentioned in the offer	Vendor to Specify	
5.5.2	<b>Tube feeding system of the machine:</b>		
	a) Tube feeding shall be through spindle	Vendor to confirm	
	b) Suitable positive tube feeding arrangement shall be provided at the rear of the head stock of machine to feed the tube through the spindle bore	Vendor to specify	
	c) Tube feed arrangement drive type and power rating	Vendor to specify	
	d) The tube feeding should be interlocked with collet closing mechanism so that tube feeding is disengaged once collet clamps the tube	Vendor to confirm	



S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>5.6</b>	<b>TUBE CLAMPING &amp; LENGTH SETTING</b>		
5.6.1	Tube Clamping	Tube clamping shall be by means of Hydraulic actuated self-centering collet chuck.	
5.6.2	Hydraulic Clamping	Dual pressure – reduced pressure for thin wall	
5.6.4	Tube lift adjustment	Mechanism to ensure that pipe centre line coincides with the chuck centre line for various diameters of the pipes should be provided.	
5.6.5	<b>Length setting</b> (For finished lengths mentioned in clause 4.5 above)		
a)	Length setting shall be by a servo positioned tube stopper moving on a overhead beam in front of the headstock. The stopper should be rigid enough to take the impact loads. (Details of the arrangement should be furnished in the offer)	Vendor to confirm	
b)	Tube stopper position setting	By CNC control	
c)	Tube stopper Clamping at programmed position	Vendor to specify arrangement	
d)	The stopper should retract clear of the tube once the collet clamps the tube (Details of the arrangement should be furnished in the offer)	Vendor to confirm	
5.6.6	Tolerance on length setting	± 0.2 mm	

CNC Tube Parting and Edge Preparation Machine - Part B

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>5.7</b>	<b>SPINDLE</b>		
5.7.1	Spindle speed (Infinitely variable)	Vendor to Specify	
5.7.2	No.of spindle speed ranges	Vendor to Specify	
5.7.3	Spindle speed range selection through CNC	Vendor to Confirm	
5.7.4	KW rating of AC spindle drive motor (Vendor to furnish complete technical details along with offer)	Vendor to Specify	
<b>5.8</b>	<b>CONTROLS</b>		
5.8.1	CNC Control	Vendor to confirm	
5.8.2	Machine shall be operated in three modes viz., Automatic, semi-Automatic and Manual.	Vendor to confirm	
5.8.3	All feedback systems & elements shall have easy accessibility for maintenance	Vendor to confirm	
5.8.4	All control logics used in the machine to be detailed out in the manual.	Vendor to confirm	
5.8.5	Operator control shall be positioned for easy and safe operation of the machine	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>5.9</b>	<b>CNC SYSTEM &amp; FEATURES:</b>		
5.9.1	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	
5.9.2	CNC features	No. of axis controlled by CNC to be specified by the vendor.	
5.9.3	Make: Fanuc	Vendor to Confirm	
5.9.4	Model: (Suitable and Latest version, as available at the time of ordering, should be supplied).	Vendor to specify	
5.9.5	Details of Standard features	Vendor to specify	
5.9.6	Details of optional features, recommended by vendor.	Vendor to specify	
5.9.7	Details of other optional features	Vendor to specify	
5.9.8	Automatic diagnostic alarm feature with error display		
<b>5.10</b>	<b>AIR CONDITIONERS:</b>		
5.10.1	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	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>5.11</b>	<b>COOLANT SYSTEM</b>		
5.11.1	Coolant system has to be provided for machining. An integral coolant return system to be provided to avoid coolant spillage.	Vendor to Specify	
a)	Coolant tank capacity	Vendor to Specify	
b)	Coolant flow rate	Vendor to Specify	
c)	Coolant pressure	Vendor to Specify	
d)	Coolant motor rating	Vendor to Specify	
5.11.2	Coolant tank shall be easily removable	Vendor to confirm	
<b>5.12</b>	<b>HYDRAULICS</b>		
5.12.1	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)	
5.12.2	Make Rexroth / Vickers Sperry or equivalent from a reputed manufacturer. (Details to be submitted)	Vendor to specify	
5.12.3	Hydraulic hose end fittings shall be of suitable material with female swivel nut and 24 <sup>0</sup> cones.	Vendor to specify	
5.12.4	All hydraulic hoses shall be preferably of GATES make	Vendor to specify	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
5.12.5	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	
5.12.6	The control voltage for all solenoid operated valves	24 V DC	
5.12.7	Filtration System, Details should be submitted.	Vendor to specify	
5.12.8	Failure indication	Vendor to specify	
5.12.9	Automatic shut off provision, Details should be submitted.	Vendor to specify	
5.12.10	Cooling system of sufficient capacity to maintain Hydraulic Oil at a temperature not exceeding 40 deg C irrespective of the ambient conditions should be provided. Complete details should be submitted	Vendor to specify	
5.12.11	Hydraulic pump capacity (flow and pressure)	Vendor to specify	
5.12.12	Each pump should have an independent motor. Tandem pumps should not be used	Vendor to specify	
5.12.13	<b>First filling of all required Oils &amp; Grease etc.</b> 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]
<b>5.13</b>	<b>ELECTRICAL:</b>		
5.13.1	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	
5.13.2	Tropicalization: All electrical / electronic equipment shall be tropicalized.	Vendor to confirm	
5.13.3	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vendor to confirm	
5.13.4	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm	
5.13.5	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	
5.13.6	All motors shall be from reputed makers like FANUC, SIEMENS, ABB, Allen Bradley or equivalent conforming to IEC Standards.	Vendor to confirm	
5.13.7	All electrics shall be of reputed make like Siemens / SEW / ROCKWELL Allen Bradley/ Telemecanique/ Delta conforming to IEC or Indian standards.	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER'S OFFER [with Complete Technical Details]
5.13.8	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	
5.13.9	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm	
5.13.10	In-cycle hour counter with reset facility should be provided.	Vendor to confirm	
5.13.11	All Electric enclosures shall have IP 54 protection	Vendor to confirm	
<b>5.14</b>	<b>OPTIONAL FEATURES</b>		
5.14.1	<b>Chip conveyor:</b> Vendor to quote for a suitable chip conveyor.	Vendor to specify	
5.14.2	<b>Swing type Steady Rest:</b> For supporting the finished part and depositing into tube dumps	Vendor to Specify	
5.14.4	<b>Collecting dumps:</b> Wheel mounted collecting dump to collect finished tubes from the machine.	Vendor to specify	
<b>5.15</b>	<b>SAFETY ARRANGEMENTS:</b>		
5.15.1	Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to confirm	
5.15.2	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	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
5.15.3	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	
5.15.4	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.	Vendor to specify	
5.15.5	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	
5.15.6	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations and suitably guarded.	Vendor to Confirm	
5.15.7	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to Confirm	
<b>5.16</b>	<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE:</b>		
5.16.1	The Machine should confirm to following factors related to environment:	Vendor to Confirm	
5.16.2	Maximum noise level shall be 85 dB(A) at normal load condition, 1meter away from the machine with correction factor for back ground noise.	Vendor to demonstrate compliance to noise level,	



<b>S. No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATIONS</b>	<b>BIDDER's OFFER [with Complete Technical Details]</b>
5.16.3	There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to confirm	
5.16.4	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm	
5.16.5	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm	
<b>6.0</b>	<b>ULTRA ISOLATION TRANSFORMER</b>		
6.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, PLC etc. shall be supplied	Vendor to confirm	
6.2	Make NEEL / DELTA / AEI / POWER AID	Vendor to confirm	
6.3	Model and Rating	Vendor to specify and noise level also	
6.4	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer.	Vendor to submit	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>7.0</b>	<b>TOOLING:</b>		
7.1	No.of Tool Holders	Vendor to specify	
7.2	Tooling system should consist of ISO indexable carbide inserts, capable of generating all the edge preparation styles as indicated in 5.3. (Sufficient number of tools and inserts of each type should be quoted for one month operation on 3-shift basis at the output rate specified. Quantity may be indicated in the technical offer and price in the price offer) Cutting speed: Up to 150 metres per minute.	Vendor to specify	
<b>8.0</b>	<b>DIAGNOSTIC SYSTEM</b>		
<b>8.1</b>	<b>TELE-DIAGNOSTIC SERVICE:</b>		
8.1.1	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	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>8.2</b>	<b>FAULT DIAGNOSTIC SYSTEM:</b>		
8.2.1	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	
8.2.2	Help guide should be provided to use both diagnostic systems	Vendor to confirm	
<b>9.0</b>	<b>LEVELING &amp; ANCHORING SYSTEM</b>		
9.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied	Vendor to Confirm	
<b>10.0</b>	<b>TOOLS FOR ERECTION, OPERATION &amp; MAINTENANCE:</b>		
10.1	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	
10.2	Any Test mandrel required for checking & alignment of the machine components etc. should be supplied.	Vendor to confirm.	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
11.0	<b>SPARES:</b>		
11.1	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: <b>(Unit Price of each item of spare should be offered)</b>	Vendor to confirm	
11.2	<b>Mechanical &amp; Hydraulic Spares:</b> All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	Vendor to confirm	
11.3	<b>Electrical /Electronic / CNC Spares:</b> 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	
11.4	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	
11.5	Recommended set of spares for all attachments are to be offered with details.	Vendor to confirm	

<b>S. No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATIONS</b>	<b>BIDDER's OFFER [with Complete Technical Details]</b>
11.6	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	
<b>12.0</b>	<b>DOCUMENTATION:</b>		
12.1	Three sets of following documents (3 Hard copies,) in English language should be supplied along with the machine	Vendor to confirm	
12.2	Operating manuals of Machine & CNC system	Vendor to confirm	
12.3	Programming Manuals of Machine & CNC system	Vendor to confirm	
12.4	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	
12.5	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives.	Vendor to confirm	
12.6	Manufacturing drawings for all supplied tool holders, cutting tools, adapters, sleeves, fixtures etc.	Vendor to confirm	
12.7	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to confirm	
12.8	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to confirm	

<b>S. No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATIONS</b>	<b>BIDDER's OFFER [with Complete Technical Details]</b>
12.9	Operating Manuals, Maintenance Manuals & Catalogues for supplied Voltage Stabilizer, Isolation Transformer and all supplied Accessories.	Vendor to confirm	
12.10	PLC program printouts with comments in English.	Vendor to confirm	
12.11	PLC program on CD, NC data & PLC data on CD	Vendor to confirm	
12.13	The vendor shall submit complete Master List of parts used in the machine.	Vendor to confirm	
12.14	One additional set of all the above documentation on CD	Vendor to confirm	
<b>13.0</b>	<b>TRAINING:</b>		
13.1	The Vendor shall train Three BHEL's Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and CNC System) of the Machine at Vendor's works for a period of one week	Vendor to confirm	
13.2	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 6 working days	Vendor to confirm	
13.3	Airfare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor o Confirm	
13.4	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to Confirm	
13.5	Vendor to quote for training on per man per week basis for training at vendor's work	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
13.6	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	
<b>14.0</b>	<b>FOUNDATION:</b>		
14.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI). Complete Foundation details including static / 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 , Isolation Transformer, & any other accessories. BHEL shall construct complete foundation for the machine as per the Vendor's recommendation and drawing.	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>15.0</b>	<b>ERECTION &amp; COMMISSIONING</b>		
15.1	Vendor to take full responsibility for supervision of erection of the machine. 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	
15.2	Erection & Commissioning of, Isolation Transformer shall also be responsibility of the Vendor.	Vendor to confirm	
15.3	Successful proving of BHEL components by the Vendor shall be considered as part of commissioning. All tests, as mentioned in (clause 19.0) shall form part of the commissioning activity.	Vendor to confirm	
15.4	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	
15.5	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the Vendor on returnable basis.	Vendor to confirm	



S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
15.6	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	
15.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm	
15.8	Charges, duration, terms & conditions for E&C should be furnished in detail separately by Vendor along with offer.	Vendor to confirm	
<b>16.0</b>	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY:</b>		
16.1	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	
16.2	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	

S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>17.0</b>	<b>INSPECTION:</b>		
17.1	The Machine shall be offered for inspection and performance trials to test the design capabilities of the machine in the presence BHEL Engineers, at Supplier's works before Dispatch.	Vendor to confirm	
<b>18.0</b>	<b>PROVEOUT OF BHEL COMPONENTS At BHEL WORKS:</b>		
18.1	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	
<b>19.0</b>	<b>MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)</b>		
<b>19.1</b>	<b>Tests/Activities to be carried out at Vendor's works on the machine before dispatch:</b>		
19.1.1	Geometrical accuracies as per applicable standard test chart recommended by the Vendor	Vendor to confirm	
19.1.2	Positioning accuracies as per Applicable standard method recommended by the Vendor.	Vendor to confirm	
19.1.3	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to confirm	
19.1.4	Demonstration of all features of the machine, control system & accessories	Vendor to confirm	

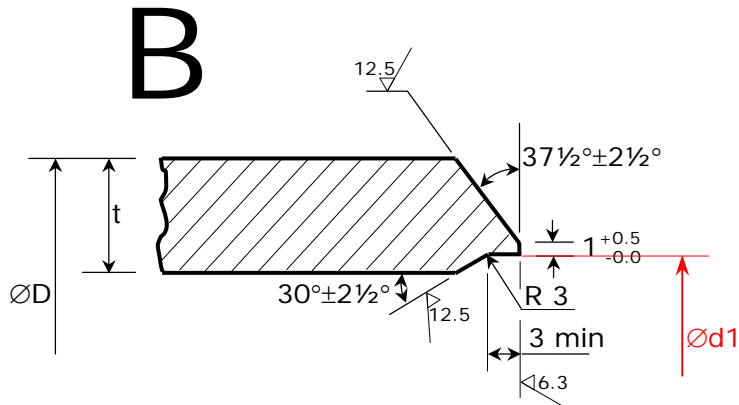
S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>19.2</b>	<b>Tests / Activities to be carried out at BHEL works while commissioning the machine:</b>	Vendor to confirm	
19.2.1	Geometrical accuracies as per. Applicable standard test chart recommended by the Vendor	Vendor to confirm	
19.2.2	Positioning accuracies as per Applicable standard method recommended by the Vendor.	Vendor to confirm	
19.2.3	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to confirm	
19.2.4	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	
19.2.5	Machining of test pieces to perform the edge preparation profiles <b>(As per Annexure I) for 3 tubes sizes and 3 material combinations.</b>	Vendor to confirm	
19.2.7	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. (Clause 4.10)		
<b>20.0</b>	<b>PACKING:</b>		
20.1	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	

CNC Tube Parting and Edge Preparation Machine - Part B

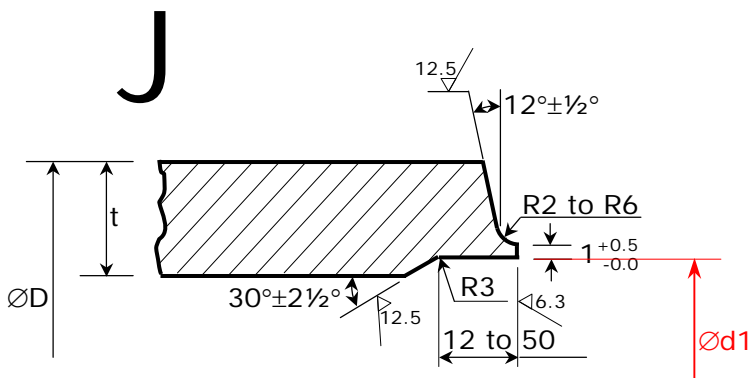
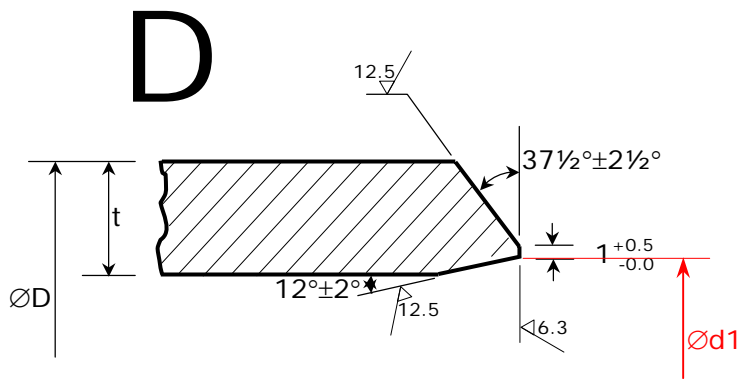
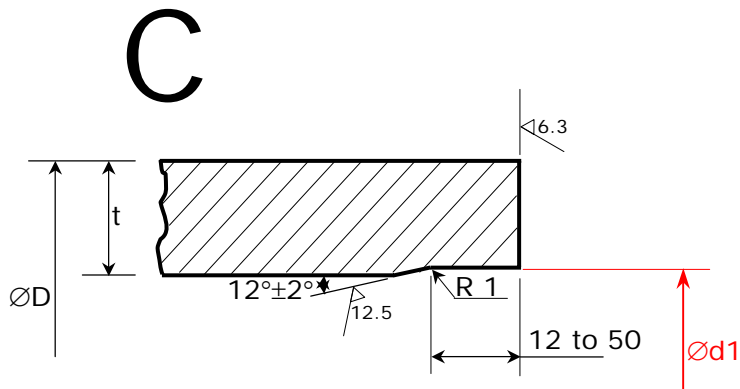
S. No.	PARTICULARS	BHEL SPECIFICATIONS	BIDDER's OFFER [with Complete Technical Details]
<b>21.0</b>	<b>GUARANTEE:</b>		
21.1	24 months from the date of acceptance of the machine.	Vendor to confirm	
<b>22.0</b>	<b>GENERAL:</b>		
22.1	Machine Model No.	Vendor to specify	
22.2	Total connected load (KVA):	Vendor to specify	
22.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to specify	
22.4	Machine lubrication	Automatic centralized lubrication system.	
22.5	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	
22.6	Painting of machine / electrical panel	RAL6011Reseda Green (Polyurethane paint)	
22.7	All gears are to be hardened and ground	Vendor to specify.	
22.8	Total weight of the machine (approx)	Vendor to specify	
22.9	Weight of heaviest part of machine (approx)	Vendor to specify	
22.10	Weight of the heaviest assembly / sub-assembly of the Machine (approx)	Vendor to specify	
22.11	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to specify	

<b>S. No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATIONS</b>	<b>BIDDER's OFFER [with Complete Technical Details]</b>
22.12	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	
22.13	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