



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT/ MATERIALS MANAGEMENT

ENQUIRY	Phone: +91 431 257 70 49
	Fax : +91 431 252 07 19
	Email : csguna@bheltry.co.in
NOTICE INVITING TENDER	Web : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two parts.	2620900218	05.10.2009	07.11.2009

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

Please note that under any circumstances both **delayed offer** and **late offers** will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	Tube Parting and Edge Preparation Machine as per the technical specification, general guidelines instructions & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No

Important points to be taken care during submission of offer

1. Delivery required 8 months from the date of purchase order.
2. Grace period of 3 months beyond the above delivery period will be considered.
3. Checklist to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.

BHEL's General guidelines / instructions (refer MM/CE/GT/001) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2620900218".

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.Manager / MM / Capital Equipment
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PART A
CNC TUBE PARTING & EDGE PREPARATION M/C

SECTION – I : QUALIFYING CRITERIA

The BIDDER has to compulsorily meet the following requirements to get qualified for considering the technical offer :

S. No.	REQUIREMENTS	VENDOR's RESPONSE
1	<p>Only those vendors (OEMs), who have supplied and commissioned at least ONE CNC LATHE TYPE PARTING & EDGE PREPARATION MACHINE FOR TUBE DIA. 76 MM OR HIGHER in the past ten years (from the date of opening of Tender) and such machine is presently working satisfactorily for more than one year after commissioning (from the date of opening of Tender) should quote.</p> <p>However, if such machine had already been supplied to BHEL, then that machine should be presently working satisfactorily for more than six months after its commissioning and acceptance (from the date of opening of Tender).</p>	
The vendor should submit following information where similar machine has been supplied for qualification of their offer.		
1.1	Name and postal address of the customer or company where similar machine is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no and email address of the contact person of the customer.	
1.4	Month and Year of commissioning of the machine.	
1.5	Application for which the machine is supplied	
1.6	Performance certificate from the customer regarding satisfactory performance of machine supplied to them. For obtaining the performance certificate from the customer, a suggestive format is provided in SECTION – IV	
1.7	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	
2.0	DELIVERY - The bidder shall quote the best possible delivery. However the delivery shall not exceed 8 months with an additional grace period of 3 months. The additional grace period will attract a penalty which is explained in the commercial terms of the enquiry. The delivery period shall be reckoned from date of purchase order to despatch from the vendor works.	

SECTION – I I

The BIDDER / VENDOR is requested to provide the following information:

S. No.	REQUIREMENTS	VENDOR's RESPONSE
3.0	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where CNC TUBE PARTING & EDGE PREPARATION M/Cs have been supplied in the past.	
4.0	Details of CNC TUBE PARTING & EDGE PREPARATION M/Cs supplied to other BHEL units, if any. (Year of commissioning, Spindle size of machine, Spindle motor power)	
5.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centers in South India.	
6.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III

The BIDDER to note:

S. No.	PARTICULARS	VENDOR'S RESPONSE
7.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical Offer [with PART A & PART B]& commercial offer 2. Price Bid.	
8.0	The Technical Offer shall contain a comparative statement of Technical Specifications demanded by BHEL and Offer Details submitted by the Bidder , against each clause. A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
9.0	The Technical Offer shall be supported by product Catalogues & Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.	
10.0	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.	

SECTION – IV

The performance certificate should be produced **on Customer's Letter Head.**

PERFORMANCE CERTIFICATE

1. Supplier of the machine		
2. Make & Model of the M/C		
3. Month & Year of Commissioning		
4. Application for which M/C is used		
5	a) Max. size of Tube dia. b) Spindle Power c) CNC System	
6. Performance of the Machine (Strike off whichever is not applicable)		Satisfactory / Good / Average / Not Satisfactory
7. Any Other remarks		
Date: _____ <div style="text-align: right;"> Signature & Seal of the Authority Issuing the Performance Certificate </div>		

**TECHNICAL SPECIFICATIONS for CNC TUBE PARTING & EDGE PREPARATION MACHINE
PART - B**

S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]																																	
1.0	APPLICATION	<p>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 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. A lathe type cut-off and end preparation machine is envisaged</p> <p>The machine shall have a tube storage rack and tube feeding system on the in-feed side and a finished cut tube collecting dump at the out feed side.</p>																																		
2.0	TUBE SIZES:	<p>All are OD (outer diameter) Controlled tubes with thickness tolerance of Maximum +22 %</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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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
3.0	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: 12X1Mφ / Steel 20	
4.0	JOB SPECIFICATIONS:		
4.1	Tube Diameters	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	(Diameter x Thickness) 76.1 x 12.5mm: 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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		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)	
5.0	MACHINE SPECIFICATIONS		
5.1	Machine configuration: 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. A general arrangement drawing of the machine to be provided along with the offer.	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 (Operations 1,2 & 3 are to be done in a single setting of tools. Operations No 2 and 3 are to be carried out simultaneously)	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.5	TUBE FEEDING ARRANGEMENT:		
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 The inclined tube storage table shall have a capacity to store 60 tubes of Dia. 63.5 tubes at a time	Vendor to furnish details & confirm	
5.5.2	Tube feeding system of the machine:		
	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 & furnish details of the offered system	
5.6	TUBE CLAMPING & LENGTH SETTING		
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	Vendor to confirm & furnish details.	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
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	Length setting (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	
5.7	SPINDLE		
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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.7.4	KW rating of AC spindle drive motor - around 20 KW - the Spindle motor shall be energy efficient (Vendor to furnish complete technical details along with offer)	Vendor to Specify & furnish details	
5.8	CONTROLS		
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	
5.9	CNC SYSTEM & FEATURES:		
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 / Siemens	Vendor to specify	
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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
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	Vendor to Confirm	
5.10	AIR CONDITIONERS:		
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. Make: Rittal / Warner & Finley or any other reputed make acceptable to BHEL. Detailed specifications to be submitted.	Vendor to indicate the make & submit details	
5.11	COOLANT SYSTEM		
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	
5.12	HYDRAULICS		
5.12.1	The System should be centralized, modular / stacked valve construction having minimum number of pipes / pipe joints and located on ground level with easy accessibility of components for maintenance.	Vendor to Furnish Details	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.12.2	Pumps, valves, accessories etc shall be of Rexroth / Vickers or equivalent reputed make acceptable to BHEL. (Details to be submitted). The seals used in cylinders shall be of Merkel / Parker / Bushak + Shamban / Hunger / Simrit make.	Vendor to confirm & furnish details	
5.12.3	Each pump should have an independent motor. Tandem pumps shall be avoided.	Vendor to confirm	
5.12.4	Suitable filtration system should be provided with Duplex / standby filter units. It is preferable to use re-usable type of filter elements in the system. The filter unit shall be of Hydac / Parker / Rexroth or equivalent reputed make acceptable to BHEL. (Details to be submitted).	Vendor to confirm & furnish details	
5.12.5	The flexible hoses used in the system shall be of Gates / Aeroquip / Parker or any other reputed make acceptable to BHEL.	Vendor to specify	
5.12.6	Failure indication for oil level, temperature, pressure, filter clogging should be provided	Vendor to confirm & furnish details	
5.12.7	Refrigerated type cooling system of sufficient capacity to maintain complete Hydraulic System at a temperature not exceeding 50 deg C irrespective of the ambient conditions. BHEL prefers to have direct cooling of oil in the chiller rather than indirect water cooling type. Complete details should be submitted with the offer.	Vendor to confirm & furnish details	
5.12.8	It should be possible to replace hydraulic elements like valves, manifolds etc without disturbing the associated pipelines. The positioning of hydraulic elements should allow easy maintenance	Vendor to furnish details	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.12.9	Maximum Operating Pressure of hydraulic system	Vendor to specify	
5.12.10	Main Pump flow in lpm and Motor Power in kW. It is preferable to use standard 1450 rpm motor in the hydraulic system.	Vendor to specify	
5.12.11	Reservoir capacity (in litres)	Vendor to specify	
5.12.12	All oil pipelines shall be of seamless steel and should undergo pickling process.	Vendor to confirm	
5.12.13	Pressure measuring mininess check points (preferably with ¼" BSP stud end) shall be provided for important pressure measurements from operation, trouble shooting and maintenance point of view. Two sets of hand held mininess pressure gauge of suitable range with mininess hose (1.0 to 1.5m length) also to be supplied along with the power pack.	Vendor to furnish details	
5.12.14	All cylinders used in the machine should have standard bore and rod sizes. The piston rod shall be hard chrome plated.	Vendor to furnish details	
5.12.15	Suitable stand-by pump unit, filter unit, etc shall be provided for critical areas	Vendor to furnish details	
5.12.16	The Power pack should be designed taking into account the energy efficiency (Hi-low pump system, proper unloading during idling, etc.). The motor used for pumps shall be energy efficient ones.	Vendor to furnish details	
5.12.17	All the pipe / hose end fittings shall be of standard weld nipple with O-ring seating type (DIN 3865 or equivalent) - female swivel nut with 24° cone and o-ring and no ferrule joints are to be used in the hydraulic system. All threaded connections shall be of metric sizes	Vendor to confirm	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.12.18	Suitable vibro-mounts, compensators (flexible bellows), flexible hose at the pump outlet, polypropylene clamps for pipes & hoses, etc are to be provided to minimize the vibration induced and transmitted to the hydraulic joints.	Vendor to confirm	
5.12.19	The oil to be used shall be of standard ISO Viscosity Grades – 32 / 46 / 68	Vendor to specify	
5.12.20	The maximum pressure of the system should preferably not to exceed 310 bar	Vendor to specify	
5.12.21	The control voltages for all the Solenoids of the valves shall be of 24-V DC and all solenoid operated DC valves should have manual over-ride provision and light indicating solenoids.	Vendor to specify	
5.12.22	The pipelines to be painted with standard colours as per the colour coding accepted internationally for hydraulic systems.	Vendor to furnish details	
5.12.23	All hydraulic pipelines, hoses and electrical control cables to be neatly laid out with proper clamps and flexible hose conveyors wherever required.	Vendor to confirm	
5.12.24	Suitable leakage oil collection metallic tray to be provided wherever required.	Vendor to confirm	
5.12.25	All the components in the hydraulic power pack shall be provided with identification numbers, as per the hydraulic circuit and should be pasted with metallic identification number plates.	Vendor to confirm	
5.12.26	First filling of all required Oils & Grease etc. should be supplied by vendor. Indigenous (Indian) source or Indian equivalent (Indian Oil Corporation make) and specifications of oils/ greases are also to be provided by the vendor.	Vendor to confirm & provide Indian equivalents.	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.13	Machine lubrication: Automatic centralized lubrication system with timer control and suitable metering cartridges to be supplied.	Vendor to confirm & provide 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 connections to the machine from the BHEL terminal point shall be in the scope of vendor.	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 FANUC, SIEMENS, ABB, Allen Bradley or equivalent 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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
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	
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	Chip conveyor: Vendor to quote for a suitable chip conveyor.	Vendor to confirm & furnish details	
5.16	Collecting dumps: Wheel mounted collecting dump to collect finished tubes from the machine.	Vendor to confirm	
5.17	SAFETY ARRANGEMENTS:		
5.17.1	Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to confirm	
5.17.2	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	
5.17.3	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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.17.4	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.	Vendor to specify	
5.17.5	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	
5.17.6	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations and suitably guarded.	Vendor to Confirm	
5.17.7	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to Confirm	
5.17.8	All lubricated parts like Bed, guide ways shall have provision for collecting the used Lubrication oil from machine guide ways and preventing them from spilling over on to the ground.	Vendor to Confirm	
5.18	ENVIRONMENTAL PERFORMANCE OF THE MACHINE:		
5.18.1	The Machine should conform to following factors related to environment:	Vendor to Confirm	
5.18.2	Noise level shall not exceed 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,	
5.18.3	There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to confirm	
5.18.4	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
5.18.5	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm	
6.1	ULTRA ISOLATION TRANSFORMER		
6.1.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, PLC etc. shall be supplied	Vendor to confirm	
6.1.2	Make NEEL / AEI / SERVO MAX	Vendor to confirm	
6.1.3	Model and Rating	Vendor to specify and noise level also	
6.1.4	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer.	Vendor to submit	
6.2	SERVO VOLTAGE STABILISER (SVS):		
6.2.1	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.		
6.2.2	Make NEEL / AEI / SERVO MAX	Vendor to confirm	
6.2.3	Model & Rating (Suitable for the machine load. Vendor to specify the noise level also)	Vendor to specify	
6.2.4	Spares Package for the Voltage Stabilizer for 2 years working should also be offered.	Vendor to Confirm	
6.2.5	Catalogue of the Voltage Stabilizer shall be submitted with the offer.	Vendor to Submit	
6.2.6	First fill of oil if the SVS is oil cooled	Vendor to confirm	
7.0	TOOLING:		
7.1	No.of Tool Holders	Vendor to specify	

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S. No.	PARTICULARS & BHEL SPECIFICATION	BIDDER's OFFER [with Complete Technical Details]
7.2	Tooling system should consist of ISO indexable carbide inserts, capable of generating all the edge preparation styles as indicated in annexure 1 & clause 5.4. (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
8.0	DIAGNOSTIC SYSTEM	
8.1	TELE-DIAGNOSTIC SERVICE:	
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
8.2	FAULT DIAGNOSTIC SYSTEM:	
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

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
9.0	LEVELING & ANCHORING SYSTEM		
9.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied	Vendor to Confirm	
10.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE:		
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, machine parts etc. should be supplied along with the machine.	Vendor to confirm.	
11.0	SPARES:		
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: (Unit Price of each item of spare should be offered)	Vendor to confirm	
11.2	Mechanical & Hydraulic Spares: All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	Vendor to confirm	
11.3	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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
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	
11.6	Spares listed in Annexure – II shall be supplied along with the machine	Vendor to confirm	
11.7	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	
12.0	DOCUMENTATION:		
12.1	Set of Documents to be submitted along with the Offer for technical evaluation:	Vendor to confirm	
12.1.1	General Lay-out of the machine with major and critical dimensions in line with the specification	Vendor to furnish	
12.1.2	General Arrangement drawing of the machine with bill of materials and critical dimensions	Vendor to furnish	
12.1.3	Sub-assembly drawings with bill of materials and critical dimensions for all the major sub-assemblies in the machine.	Vendor to furnish	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
12.1.4	List of bought out items with make and specification along with catalogues: Motors, Gear boxes, Controllers, Drives, Cylinders, Seals, CNC system, PLC, Hydraulics, Lubrication, Pneumatics, etc.	Vendor to furnish	
12.1.5	Hydraulic / Pneumatic Circuit with Bill of Materials giving specification and make of components used.	Vendor to furnish	
12.1.6	Lubrication / Coolant Circuit with Bill of Materials giving specification and make of components used.	Vendor to furnish	
12.1.7	Electrical Circuit with Bill of Materials giving specification and make of components used.	Vendor to furnish	
12.1.8	Video images on CD /Hard copy of literature with photographs & drawings explaining the technical features.	Vendor to furnish	
12.1.9	Sequence of operation to be explained.	Vendor to furnish	
12.1.10	Details & drawings of the Length setting and stopper arrangement.	Vendor to furnish	
12.2	Set of Documents to be submitted after placement of order for approval / verification before manufacturing:	Vendor to confirm	
12.2.1	General Lay-out of the machine with major and critical dimensions in line with the specification and Preliminary Foundation drawing.	Vendor to confirm	
12.2.2	General Assembly drawing of the machine with bill of materials and critical dimensions	Vendor to confirm	
12.2.3	Sub-assembly / Arrangement drawings with bill of materials and critical dimensions for all the sub-assemblies in the machine.	Vendor to confirm	
12.2.4	Hydraulic / Pneumatic Circuit with Bill of Materials giving specification and make of components used.	Vendor to confirm	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
12.2.5	Lubrication / Coolant Circuit with Bill of Materials giving specification and make of components used.	Vendor to confirm	
12.2.6	Electrical Circuit with Bill of Materials giving specification and make of components used.	Vendor to confirm	
12.2.7	Sequence of operation.	Vendor to furnish	
12.2.8	Details & drawings of the Length setting and stopper arrangement with bill of materials.	Vendor to furnish	
12.2.9	Quality plan	Vendor to confirm	
12.3	Set of Documents to be submitted along with machine:	Vendor to confirm	
12.3.1	Three sets of following documents as Hard copies and 1 set of all documents including bought out item catalogues – soft copy in CD in English Language should be supplied along with the machine.	Vendor to confirm	
12.3.2	One set of complete documents as Hard copy and complete documents in CD / Pen drive to be submitted during inspection at supplier's works for verification. This forms part of acceptance criteria at supplier's works.	Vendor to confirm	
12.3.3	Operating Manuals of Machine & CNC system	Vendor to confirm	
12.3.4	Programming Manuals for the machine & CNC system.	Vendor to confirm	
12.3.5	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical /PCB circuit diagrams/ Pneumatic/ Hydraulic Circuit Diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list / Bill of Materials giving complete specification and make of components.	Vendor to confirm	
12.3.6	Hydraulic / Pneumatic Circuit with Bill of Materials giving specification and make of components used. Function diagram of the Hydraulic / Pneumatic system to be provided with the circuit.	Vendor to confirm	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
12.3.7	Lubrication / Coolant Circuit with Bill of Materials giving specification and make of components used.	Vendor to confirm	
12.3.8	Details & drawings of the Length setting and stopper arrangement with bill of materials.	Vendor to furnish	
12.3.9	Electrical Circuit with Bill of Materials giving specification and make of components used.	Vendor to confirm	
12.3.10	Maintenance, Interface & Commissioning Manuals for for CNC system, spindle & feed drives.	Vendor to confirm	
12.3.11	Manufacturing drawings for all wearing components like bushes, pulleys, gears, clutch plates, etc.	Vendor to confirm	
12.3.12	Manufacturing drawings for all supplied tool holders, cutting tools, adapters, sleeves, fixtures etc.	Vendor to confirm	
12.3.13	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable highlighting the specific model used in the supplied machine.	Vendor to confirm	
12.3.14	Detailed specification of all rubber items, hoses, fittings, etc. List of bearings, belts used to be provided.	Vendor to confirm	
12.3.15	Operating Manuals, Maintenance Manuals & Catalogues for all supplied Accessories including Voltage stabilizer, Isolation transformer, etc.	Vendor to confirm	
12.3.16	Complete Master List of parts used in the equipment.	Vendor to confirm	
12.3.17	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.	Vendor to confirm	
12.3.18	PLC program printouts with comments in English.	Vendor to confirm	
12.3.19	PLC program on CD, NC data & PLC data on CD	Vendor to confirm	
12.3.20	Complete back up of hard disk on CD and clear written Instructions (3 copies) to take back up and reloading of a new hard disk.	Vendor to confirm	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
13.0	TRAINING:		
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 five working days	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	
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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
14.0	FOUNDATION:		
14.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Purchase Order. 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	
15.0	ERECTION & COMMISSIONING		
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	

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S. No.	PARTICULARS & BHEL SPECIFICATION	BIDDER's OFFER [with Complete Technical Details]
15.4	Tools, Tackles, 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	Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer	Vendor to confirm
15.6	Special equipments, like test mandrel, straight edge, dial indicators etc., should be supplied along with the machine.	Vendor to confirm
15.7	Commissioning spares, required for commissioning of the machine within stipulated time, shall be arranged by the vendor.	Vendor to confirm
15.8	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
15.9	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm
15.10	Charges, duration, terms & conditions for E&C should be furnished in detail separately by Vendor along with offer.	Vendor to confirm
16.0	AMBIENT CONDITIONS & THERMAL STABILITY:	
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

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
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	
17.0	INSPECTION:		
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	
18.0	PROVEOUT OF BHEL COMPONENTS At BHEL WORKS:		
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	
19.0	MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)		
19.1	Tests/Activities to be carried out at Vendor's works on the machine before dispatch:		
19.1.1	Geometrical accuracies as per applicable standard test chart recommended by the Vendor. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall be submitted with the offer.	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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
19.1.5	The machine production output, as specified in 4.10 shall be demonstrated at the supplier's works, for around 30 minutes continuous operation of the machine. Tube material shall be arranged by vendor	Vendor to confirm	
19.2	Tests / Activities to be carried out at BHEL works while commissioning the machine:	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 (As per Annexure I) for 3 tubes sizes and 3 material combinations.	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)		
20.0	PACKING:		
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	

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S. No.	PARTICULARS & BHEL SPECIFICATION		BIDDER's OFFER [with Complete Technical Details]
21.0	GUARANTEE:		
21.1	12 months from the date of acceptance of the machine at BHEL or 18 months from dispatch whichever is earlier.	Vendor to confirm	
22.0	GENERAL:		
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	
22.12	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to confirm	

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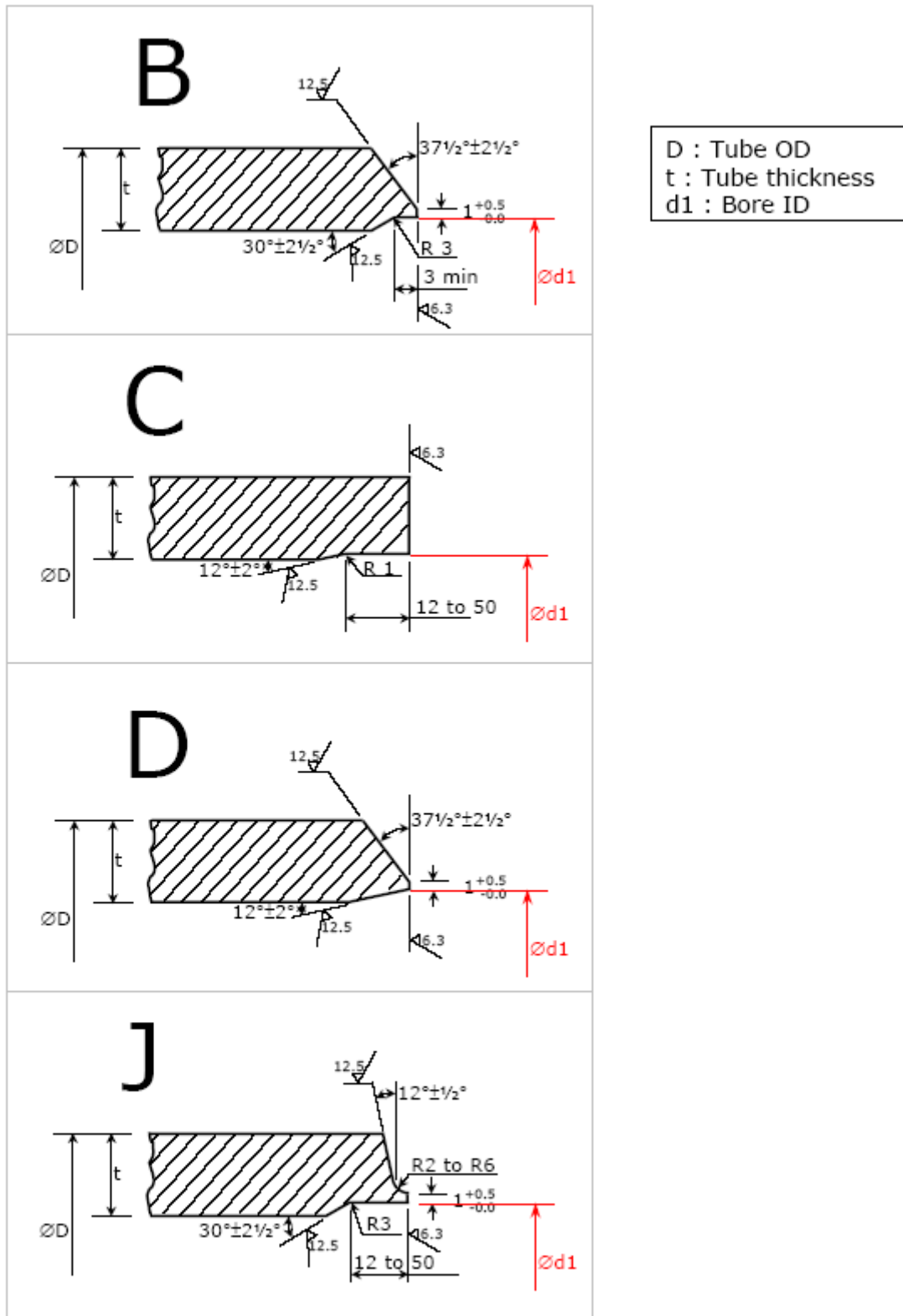
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TUBE EDGE PREPARATION DETAILS

ANNEXURE 1



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

Annexure- II

SPARES LIST for CNC TUBE PARTING & EDGE PREPARATION MACHINE

I	<u>MECHANICAL & HYDRAULIC SPARES</u>	
1	Set of gaskets, Oil seals and O rings (1 Set means – 100% quantity available in the entire machine) – list to be provided with part nos. at the time of drawing approval stage.	2 Sets
2	Friction rolls	2 Nos.
3	Feed rolls	4 Nos.
4	Drive belts, Feed belts and Toothed belts (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
5	Hydraulic pumps (1 Set means – 1 No. of each type of pump available in the hydraulic system)	1 Set
6	Set of contactors, relays and limit switches (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
7	Hydraulic Valves (1 Set means – 1 No. in each type available in the entire machine hydraulic system)	1 Set
8	Pneumatic Valves (1 Set means – 1 No. in each type available in the entire machine pneumatic system)	2 Sets.
9	Coolant Valves (1 Set means – 1 No. in each type available in the entire machine coolant system)	1 Set.
10	Pneumatic Cylinders (1 Set means – 1 No. in each type available in the entire machine)	2 Sets.
11	Hydraulic & pneumatic Pressure switches (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
12	Filter elements (1 Set means – 1 No. in each type available in the entire machine)	3 Sets
13	Hydraulic cylinder Seal kits (1 Set means – complete seal kit including O-rings for each type cylinder available in the entire machine) – list to be	2 Sets.

	provided with part nos. at the time of drawing approval stage.	
14	Hydraulic hoses (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
15	Lubrication pump	1 No.
16	Coolant pump	1 No.
17	Spindle bearings (1 Set means – complete set of bearings available in the spindle assembly)	1 Set
II	<u>ELECTRICAL, ELECTRONIC AND CNC SYSTEM SPARES</u>	
1	Proximity switches with suitable proximity switch cord (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
2	Push buttons (1 Set means – 1 No. in each type available in the entire machine)	3 Sets
3	Indicating lamps (1 Set means – 1 No. in each type available in the entire machine)	5 Sets
4	Semiconductor fuses (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
5	Special fuses (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
6	Circuit breakers (1 Set means – 1 No. in each type available in the entire machine)	2 Sets
7	Encoders (1 Set means – 1 No. in each type available in the entire machine)	1 Set.
8	CNC System spares (list to be provided by vendor along with offer)	1 Set.
9	Servo motor (Model to be provided by vendor)	1 No.