An ISO 9001 Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant**)**
Tiruchirappalli – 620014, TAMIL NADU, INDIA
CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY **NOTICE INVITING TENDER**	Phone: +91 431 257 76 53 Fax : +91 431 252 00 31 Email : skaruna@bheltry.co.in Web : www.bhel.com

TWO PART BID Tender to be submitted in two Parts	**Enquiry Number:** **2851300022**	**Enquiry Date:** **26.10.2013**	**Due date for submission of quotation:** **28.11.2013**

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	Delivery Required	Delivery Terms Required
10	**Tube Cutting and Edge Preparation Machine (ATCEP)**	**01 No.**	**10 Months from PO date**	**F.O.R, BHEL Stores, POWER EQUIPMENT FABRICATION PLANT, BHARAT HEAVY ELECTRICALS LIMITED, Mundipar- 441804, Sakoli Taluk, Bhandara District, Maharashtra State.**

The above items as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)

Important points to be taken care during submission of offer:-

1. **Checklist No. IND 01A / IMP 01 and Annexure-II (Details of Company Performance) as applicable to the vendor to be filled in and enclosed along with the offer failing which, their offer will not be considered for evaluation.**
2. **EMD for this Tender will be Rs. 2,00,000/-**
3. **All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.**
4. **The Period required for completion of Erection & Commissioning of the above items shall be 45 days from the date of intimation from BHEL requesting supplier to depute Service Engineers about site readiness**

BHEL's General guidelines / instructions (refer MM / CE / GENL / 001 - EMD) 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 "2851300022".

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** Engineer / Capital Equipment / MM

PART A– QUALIFYING CRITERIA

AUTOMATIC TUBE CUTTING AND EDGE PREPARATION MACHINE (ATCEP)

SECTION – I

The BIDDER is expected to give complete details against each clause in the table given below

S. NO	REQUIREMENTS	VENDOR'S RESPONSE
1.0	**QUALIFYING CRITERIA**	
1.1	The BIDDER / VENDOR (OEM) shall have a minimum of TEN Years of Continuous Experience in the Design, Manufacture & Supply of "**AUTOMATIC TUBE CUTTING AND EDGE PREPARATION MACHINE (ATCEP)**". Vendor may indicate the actual no. of years of experience in the field.	
1.2	Only those vendors (**OEMs**), who have manufactured, supplied and commissioned at least one**"AUTOMATICTUBE CUTTING AND EDGE PREPARATION MACHINE (ATCEP)"**having all the following features**:** 1. Tube measuring & Cutting station, 2. Tube end preparation stations with tube stationary 3. Automatic tube conveying and transfer system 4. Machine capable of handling and end preparation of tubesuptoOD-76mm and length of minimum 12 metres in the past ten years are only eligible to quote. Such supplied machine should at present be working satisfactorily for at least one year after its commissioning (as on the date of opening of this Tender). The name and contact addresses of the customers to whom the machine has been supplied has to be furnished with details.	
1.3	Vendor has to submit at least one Performance Certificate, for satisfactory performance of "AUTOMATIC TUBE CUTTING AND EDGE PREPARATION MACHINE (ATCEP) " **as given in under clause 1.2 above**, for a minimum period of one year from the date of commissioning (as on date of opening tender). For obtaining the Performance certificate, a suggestive format is provided. **Overseas vendors should provide a performance certificate from their customers,located either in India or any other country outside the country of origin**.	
1.4	BHEL reserves the right to verify the above information provided by vendor. In case the information provided is found to be false/ incorrect, the offer shall be rejected.	

SECTION – II

The BIDDER is expected to give complete details against each clause in the table given below:

S. NO	REQUIREMENTS	VENDOR'S RESPONSE
2.0	**INFORMATION TO BE PROVIDED BY VENDOR**	
2.1	The BIDDER / VENDOR to furnish Reference List of Customers, with complete address, details of contact person, where **AUTOMATIC TUBE CUTTING AND EDGE PREPARATION MACHINE (ATCEP)**have been supplied in the past.	
2.2	Specify details of **AUTOMATIC TUBE CUTTING AND EDGE PREPARATION MACHINE (ATCEP)**supplied to other units of BHEL, if any (Year of commissioning, type of station, tube sizes handled, tube material typeetc.)	
2.3	Details on SERVICE-AFTER-SALES Set-up in India including the Address of Agents / Service Centres in India.	
2.4	Any Additional data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

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

Suggestive Format of Performance Certificate

(*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. Machine Details
   a) Length of tubes (m) :
   b) Tube material :
   c) Tube Diameter(Min & max.) :
   d) Tube thickness (max) :
5. Performance of the Machine : Satisfactory / Good / Average / Not Satisfactory
   (Strike off whichever is not applicable)
6. After sales service : Satisfactory / Good / Average / Not Satisfactory
   (Strike off whichever is not applicable)
7. Any Other remarks :

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

AUTOMATIC TUBE CUTTING & EDGE PREPARATION MACHINE

PART B – TECHNICAL SPECIFICATION

Note:-

1.0 The Column **"Vendor's offer with Technical details & Remarks"** of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.

2.0 The offer and all documents enclosed with offer should be in **English language** only.

Name & Address of the Vendor:	Name & Address of the Indian agent:
Telephone no.:	Telephone no.:
Fax no.:	Fax no.:
e-mail:	e-mail:

3.0 Scope: - Design, Manufacture, Supply, Erection & Commissioning of **AUTOMATIC TUBE CUTTING AND EDGE PREPARATION MACHINE (ATCEP)**for BHEL complying with the specification as below.

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
1.0	**PURPOSE & APPLICATION**		
	a. The machine is to be designed and constructed for measuring, cutting and edge preparation of tubes automatically from tube in-feed to discharge**.** The edge preparation involves cutting, facing, chamfering, and finallyboring operationto correct size of ID, to meet thejob requirement. b. The edge preparation profile (normally to form "V" Groove and "J" Groove style Weld Joint preparation when the tubes butt against each other– Refer to **ANNEXURE – 1**)is to be obtained. c. The Basic Machine with all the Sub-Systems and Accessories are to be designed for working in three shifts (8 hour shift) a day and on all days in a year. **BIDDER is expected to give technical write up on machine design, construction and operational features to bring out the capability of the proposed equipment, to meet the BHEL specification requirements**		
2.0	**WORK PIECE / JOB DETAILS**		
2.1	**TUBE DIMENSIONS**		
2.1.1	Range of Diameter (O.D.)	28mm to 76.1 mm	
2.1.2	Range of Wall Thickness	2.4 mm to 16.51 mm	
2.1.3	Minimum Tube Length	2000 mm (2 meters)	
2.1.4	Maximum Tube Length	15000mm (15metres)	
2.2	**Bend in tubes:** Due to handling of tubes during loading and unloadingin shop floor, some of the tubes get bent. Machine should be designed to accommodate bend in tubes to an extent of 10mm from the axis of the tube. Vendor to confirm.		

<table>
<tr><th>S.No.</th><th>PARTICULARS AND BHEL SPECIFICATION</th><th>BIDDER'S OFFER
(with complete Technical Details)</th></tr>
<tr><td>2.3</td><td>TUBE SIZES:
NOTE: All are OD (Outer Diameter) controlled tubes with a tolerance of maximum 15%on tube wall thickness.
<table>
<tr><th>S.No.</th><th>OD
(in mm)</th><th>THICKNESS(in mm)</th><th>Max/Min ID
(in mm)</th></tr>
<tr><td>1</td><td>28.0</td><td>5.6 / Rifle Tubes</td><td>21.60/16.80</td></tr>
<tr><td>2</td><td>31.8</td><td>4.0/4.57</td><td>25.40/22.60</td></tr>
<tr><td>3</td><td>33.4</td><td>5.59/ 7.11</td><td>22.22/19.18</td></tr>
<tr><td>4</td><td>38.1</td><td>4.57/5.59/7.11/ 9.65/ 10.67 / 11.0</td><td>28.96/16.10</td></tr>
<tr><td>5</td><td>41.3</td><td>7.4/ 8.2</td><td>26.50/24.90</td></tr>
<tr><td>6</td><td>42.4</td><td>4.57/ 5.59/ 6.6/ 7.11/ 7.62/ 8.6/ 9.1</td><td>33.26/24.20</td></tr>
<tr><td>7</td><td>44.5</td><td>4.19/ 5.59/ 6.1/ 7.11/ 8.1/ 8.7/ 10.92</td><td>36.12/22.66</td></tr>
<tr><td>8</td><td>48.3</td><td>6.6/ 8.1</td><td>35.10/32.10</td></tr>
<tr><td>9</td><td>51.0</td><td>4.19/ 5.59/ 6.6/ 7.62/ 8.64/ 9.6/ 10.0/ Rifle Tubes</td><td>42.62/31.00</td></tr>
<tr><td>10</td><td>54.0</td><td>9.14/ 13.49</td><td>35.72/27.02</td></tr>
<tr><td>11</td><td>57.0</td><td>4.19/ 7.62/ 8.64/ 9.4/ 12.7/ 14.3/ 15.09</td><td>48.62/26.82</td></tr>
<tr><td>12</td><td>63.5</td><td>3.81/ 4.19/ 4.57/ 5.59/ 8.64/ 12.7 / Rifle Tubes</td><td>55.88/38.10</td></tr>
<tr><td>13</td><td>69.85</td><td>4.57/ 15.09/16.51</td><td>60.71/39.67</td></tr>
<tr><td>14</td><td>76.1</td><td>4.57/ 5.08/ 5.5</td><td>67.06/65.20</td></tr>
</table></td><td></td></tr>
<tr><td>2.4</td><td>MATERIAL SPECIFICATION [ASTM]
a) CARBON STEEL: SA 192, SA 210A1, SA 210C
b) ALLOY STEEL: SA 209T1, SA 213T11, SA 213T22, T23, SA 213T91, T92, T93
c) STAINLESS STEEL:SA 213 TP304H, SA 213 TP321H,SA 213 TP347H, SUPER 304H</td><td></td></tr>
</table>

<table>
<tr><th>S.No.</th><th>PARTICULARS AND BHEL SPECIFICATION</th><th>BIDDER'S OFFER
(with complete Technical Details)</th></tr>
<tr><td>3.0</td><td>MACHINE OUTPUT / PRODUCTIVITY:BIDDER has to guarantee a minimum output of around 1000 endpreparations (one thousand end preparations in 500 tubes with the following dimensions / details, in a single shift of 8 hrs.
<table>
<tr><td>Raw Tube Length:</td><td>≈15000 mm</td></tr>
<tr><td>Finished Tube Length after machining both ends:</td><td>14950 mm</td></tr>
<tr><td>EP Style on both ends:</td><td>'G' style as given in ANNEXURE-1</td></tr>
<tr><td>Tube Size:</td><td>38.1 mm (OD) x 8.00 mm (thickness)</td></tr>
<tr><td>Tube Material:</td><td>Carbon Steel – SA 210 Gr. A1</td></tr>
<tr><td>I.D. Bore length:</td><td>12 mm in Tube Wall Thickness</td></tr>
</table></td><td></td></tr>
<tr><td>4.0</td><td colspan="2">OPERATIONS INVOLVED:</td></tr>
<tr><td>4.1</td><td>Loading of single tubes from tube bundle placed on tube stock table onto the in-feed conveyor by suitable kick-in device.</td><td></td></tr>
<tr><td>4.2</td><td>Movement of tube, by suitable tube conveying device, to programmed tube length for cut-off</td><td></td></tr>
<tr><td>4.3</td><td>Clamping of tube and tube cut off.</td><td></td></tr>
<tr><td>4.4</td><td>Kick-off of remnant length (2000mm to 7000mm), if any, by suitable kick-off arrangement in the tube in-feed line</td><td></td></tr>
<tr><td>4.5</td><td>Tube transfer to subsequent stations for End preparation of tube ends.</td><td></td></tr>
<tr><td>4.6</td><td>After completion of final operation, the Tube is moved to the tube discharge stock table by means of a kick-off arrangement. The tubes to stack against a stopper.</td><td></td></tr>
<tr><td>4.7</td><td>The tubes are to be rolled into the tube dump by releasing a stopper.</td><td></td></tr>
<tr><td>4.8</td><td>Once the tube is transferred out of the line, a new tube comes to the line and the same process is repeated.</td><td></td></tr>
<tr><td>4.9</td><td>Remnant lengths of 1000mm and below should fall in a bin placed in the gap between tube in-feed conveyor and the tube cutting unit</td><td></td></tr>
</table>

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
4.10	Small bit pieces (100 mm to 300 mm) to be collected in a bin box of suitable size provided below the cutting wheel.		
4.11	[NOTE: Wherever possible parallel activities are to be contemplated to improve efficiency of the machine performance and productivity.]		
5.0	**MACHINE CONFIGURATION:** Each machine shall consist of following components &equipment:		
5.1	Tube Stock Table and In feed Conveyor	1 set	
5.2	Tube Length Measuring Unit	1 set	
5.3	Cutting Unit	1 set	
5.4	Tube End Preparation Unit	2 sets	
5.5	Conveyor and Transfer Conveyor between Cutting Line and End Preparation Lines	1 set	
5.6	Out Feed (Discharge) Unit	1 set	
5.7	Tube dump on the out feed side	1 set	
5.8	Chip Conveyor with Chip bin	2 sets	
5.9	Air Compressor with tank (if necessary), FRL Unit and Moisture Separator	1 set	
5.10	Electrical, Electronics, AC Drives & CNC/PLC Controls with Panels and Local Operator Consoles	1 set	
5.11	Hydraulic system	1 set	
5.12	Additional kick-off unit on the tube in-feed side for balance useful length of 2m to 7m	1 set	
6.0	**TUBE STOCK TABLE, IN-FEED & OUT-FEED (DISCHARGE) UNIT, KICK-OFF UNIT FOR REMAINING LENGTH:**		
6.1	**TUBE STOCK TABLE:**		
6.1.1	The tube stock table shall have a flat portion and a sloping rack. Vendor to Confirm		
6.1.2	The flat portion shall be suitable for placing 2 tube bundles, each having 40 tubes of OD 51mm x 10mm thick of 15 metre length. Max. weight of the tube bundles around 13 Tons. The width of the flat portion shall be around 1200mm.Vendor to Confirm		

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
6.1.3	One tube bundle from above is opened so that tubes spread out on the sloping rack. The width of the sloping rack shall be suitable for 40 tubes of OD 51mm x 10mm thick. Max. weight of the tube bundles around 13 Tons.Length of the slanted portion of sloping rack shall be around 2000mm. Vendor to Confirm		
6.2	**TUBE INFEED:**		
6.2.1	Number of Tube Pickup arms	Minimum 10	
6.2.2	Tube conveyor type	Pinch-Roll Type / Roller Type	
6.2.3	Max Tube conveyor speed suitable for achieving 1000 ends / shift as per Clause 3.0	Vendor to specify in m/min	
6.2.4	Tube Conveyor Drive Type	Vendor to Specify	
6.2.5	Number and power rating of each drive unit of tube conveyor	Vendor to Specify	
6.3	**OUT-FEED (DISCHARGE) UNIT:**		
6.3.1	Discharge unit to unload tube from final station	Should be suitable for 2000mm to 15000mmlong tubes	
6.3.2	Number of Tube Kick-Off arms	Minimum 10	
6.3.3	Out feed Discharge table shall have a sloping rack to accommodate 20 tubes of OD 51mm as buffer storage with a stopper to hold the tubes. On activating the stopper, which is either pneumatic or electrical, the tubes shall roll down in to the tubes dump.	Vendor to Specify	
6.3.4	Tube dump shall be provide to hold 200 tubes of OD 51mm tubes.	Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
6.4	**KICK-OFF UNIT FOR REMAINING LENGTH:**		
6.4.1	Useful Length of remaining tube after cut-off	2000mm to 7000mm	
6.4.2	Kick-off arrangement should be located on the in feed conveyor side	Vendor to confirm	
6.4.3	Number of Tube Kick-off arms	Vendor to Specify	
6.5	Complete technical description of stock loading table, single-tube kick-in device, tube conveyor, tube discharge arrangement and kick-off unit for remaining length should be furnished along with offer. A layout drawing to be furnished.		
7.0	**MEASURING UNIT:**		
7.1	Technical Features – Vendor to confirm and provide details wherever necessary		
7.1.1	To set and measure for cutting		
7.1.2	To travel to its programmed position by the AC servomotor through rack and pinion mechanism.		
7.1.3	Movement of measuring unit on LM guide ways is preferable.		
7.1.4	The measuring unit shall not travel to its reference position for subsequent tubes of the same cut length		
7.1.5	The unit shall have sensors to signal for creeping speed, to avoid hammering and breakage of components by tube hitting.**The speed reduction shall be automatically detected by the PLC/CNC system based on the tube length and size entered by the operator.**		
7.1.6	There shall be no rubbing / collision of tube with length measuring unit during tube transfer to next station		
7.2	Measuring Range	2000 mm to 15000 mm	
7.3	Max Traveling Speed – suitable to achieve the required productivity as per Claude 3.0	Vendor to Specify.	
7.4	Rating of AC Servo Motor	Vendor to Specify	
7.5	Accuracy on length required	± 0.5mm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
8.0	**TUBE CUTTING/ SIZING UNIT**		
8.1	**Basic Features**		
8.1.1	The cutting unit is for cutting the tube at the programmed length by a metal circular saw		
8.1.2	Tube has to be stationary while cutting		
8.1.3	During cutting, the cutting blade has to be guided and clamped for rigidity, to ensure vibration free, smooth and sharp cut		
8.1.4	Movement of cutting unit (circular saw) shall be horizontal or downward for cutting operation		
8.1.5	Mist Coolant system for circular saw blade shall be provided for Cutting Operation		
8.2	Tube Cut-Off (sized) Length	Any length in the range of 2000 to 15000 mm	
8.3	Tube diameters	28mm to 76.1mm	
8.4	Circular saw Drive	Inverter Controlled. Vendor to confirm	
8.5	Circular Saw Speed	Vendor to Specify	
8.6	Circular Saw Drive Rating	Minimum 7.5 KW. Vendor to specify the rating	
8.7	Cutting Feed	Hydraulic. Vendor to confirm	
8.8	Cutting Feed Range	Vendor to Specify	
8.9	Cutting Stroke	Vendor to Specify	
8.10	Tube Clamping	Hydraulic. Vendor to confirm	
8.11	Tube Clamping Force	Vendor to Specify	
8.12	Circular Saw Dimensions. The saw cutting unit shall be suitable for the mentioned blade specification only. Vendor to confirm		
8.12.1	Diameter	400 mm	
8.12.2	Mounting Bore	50 mm-H7	
8.12.3	Carrier Bolt Holes	4 Nos.[Diameter 15 mm at PCD of 80 mm]	
8.12.4	Blade thickness	3mm	
8.12.5	No of teeth	Around 100	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
8.13	Tube Bit Collection Bin: A gap of about 1000mm has to be provided between Tube Cutting Unit and In-feed Conveyor for a bin to be located in such a position that remnant lengths fall into the bin once clamp is opened.	Vendor to Confirm	
8.14	Collecting Bin should be supplied to suit for remnant length of tubes up to 1000 mm for one shift.		
8.15	Small bit pieces (100 mm to 300 mm) to be collected in a bin box of suitable size provided below the cutting wheel.		
9.0	**TUBE END MACHINING / EDGE PREPARATION UNIT:**		
9.1	Type of End Preparation: Different Edge preparation styles as per sketch given in **ANNEXURE-1**		
9.2	**Technical Features:**		
9.2.1	Two ends of the tube have to be edge prepared in either separate lines or simultaneous operation with Tube being Stationary. Vendor to provide the details of the configuration.		
9.2.2	Operations - edge chamfering, boring and facing to the specified dimensions as shown in the Annexure - 1		
9.2.3	There shall be a rigid stopper to position the tube end at a particular location for tube end preparation		
9.2.4	Suitable sliding chip guard shall be provided to protect the surroundings and personnel from flying metal chips. Viewing port with toughened glass shall be provided for viewing the machining in progress		
9.3	Drive Motor for End Preparation Unit	Inverter Controlled	
9.4	Drive motor rating **(Continuous)**	Minimum: **20 kW** Vendor to confirm and provide details	
9.5	Gear Reduction Ratio	Vendor to Specify	
9.6	Spindle RPM range	Vendor to Specify	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
9.7	Max. Boring Depth in tube - 100mm	Vendor to Confirm	
9.8	Spindle Stroke based on boring depth under clause 9.7	Vendor to Specify	
9.9	Spindle Feed Range (Preferred)	Rapid - 4 m/min. Cutting feed-0.05 mm/rev to 0.5mm/rev Vendor to specify	
9.10	Feed drive	Hydraulic / Electric	
9.11	Cutting Speed	Vendor to Specify	
9.12	Max. Cutting Feed	Vendor to Specify	
9.13	Type of self-centering tube clamping arrangement (Collet / Chuck)	Vendor to Specify	
9.14	Clamping system	Hydraulic / Electric/ Pneumatic Vendor to provide details	
9.15	Clamping Force	Vendor to specify	
10.0	**TUBE CONVEYOR & TRANSFER UNITS**		
10.1	**Purpose:**		
10.1.1	For moving the tubes to end preparation lines		
10.1.2	Transfer the tube from each line, starting with cutting line, to the next, right up to discharge table		
10.2	Drive Mechanism for tube movement within each line.	Vendor to Specify	
10.3	Number of drives and rating of each drive in each line for tube movement	Vendor to Specify	
10.4	Speed of movement of tube in each line suitable to match the productivity as per Clause 3.0	Vendor to Specify	
10.5	Tube Transfer Mechanism from one line to the next	Vendor to Specify	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
10.6	Tube Transfer Speed suitable to match the productivity as per Clause 3.0	Vendor to Specify	
11.0	**CHIP COLLECTION SYSTEM:**		
11.1	**Application:** Metal chips from each end preparation unit should be collected in respective suitable chip bins to be supplied foreach unit to ensure a clean working environment.		
11.2	Chip conveyors to be provided for each end preparation unit to transfer the metal chips to the chip collecting bins	Vendor to furnish details of chip conveyor system	
11.3	Chip Collecting bins with rollers - 4 Nos. to be supplied. The size of each bin shall be suitable to collect metal chips for two shifts consecutively.	Vendor to confirm	
12.0	**TOOLING**		
12.1	A universal tool holder for all tube sizes mentioned under clause 2.3 with Standard ISO cutting tools with indexable high productivity carbide inserts capable of generating all edge preparation styles indicated in ANNEXURE-1. An indicative design of the universal tool holder is given in ANNEXURE-2. Supplier may provide their own design "universal tool holder", suitable to match the productivity as per clause 3.0.		
12.2	Vendor to specify if any special tooling is required for RIFLE tubes as mentioned under 2.3		
12.3	Tool Holder Clamping: ISO 50 draw type clamping is preferable. Vendor to provide details of the clamping arrangement.		
12.4	Vendor to supply the following Tool Holders, Cutting Tools, Adapters etc. in all types~~,~~ to meet machine performance prove out:		

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical Details)
12.4.1	Universal Tool Holders: Suitable for OD range of 38.1mm to 76.1mm and Min. bore ID of 27mm Bore Length of 12mm Quantity - 3 Nos	
12.4.3	Special Tool Holder for OD 51mm x Th. 7.1mm - Rifle tube Edge preparation style: 'C' style as per Annexure-1 Bore ID: 39.8mm Bore length : 100mm Quantity – 2 Nos	
12.4.4	Special Tool Holder for OD 63.5mm x Th. 6.3mm - Rifle tube Edge preparation style: 'C' style as per Annexure-1 Bore ID: 50.9mm Bore length : 100mm Quantity – 2 Nos	
12.4.5	Special Tool Holders: Suitable for OD range of 28.0 mm to 44.5mm Edge preparation style: 'C' style as per Annexure-1 Min. bore ID of 19mm Bore Length of 80mm Quantity - 4Nos	
12.4.6	Carbide Inserts : 100 Nos in each variety	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
13.0	**OPERATION AND CONTROL SYSTEM**		
13.1	**OPERATOR'S CONTROL PANEL:**		
13.1.1	Control shall be **PC based PLC or CNC based.**	Vendor to Specify	
13.1.2	Operator's Panel having complete machine control system with suitable display unit of required configuration shall be provided for convenient and efficient operation. All switches should be within reach of operator. All displays/indications should also be conveniently placed (Layout showing complete details should be submitted with the offer)	Vendor to Confirm	
13.2	**PC based PLC or CNC SYSTEM & FEATURES**		
13.2.1	Make: Preferred Make – FANUC / SIEMENS / Any other reputed makes acceptable to BHEL	Vendor to provide details	
13.2.2	Model (suitable and latest version, as available at the time of purchase order placement, shall be supplied).	Vendor to specify	
13.2.3	Details of Standard features	Vendor to specify	
13.2.4	Details of optional features, recommended by vendor.	Vendor to specify	
13.2.5	The system should have full alphanumeric keyboard, display of suitable size, RS232C serial interfaces, parallel interface for printer,**USB**, COM port for tele diagnostics, compact disc drive unit for data input/output, hard disk of sufficient capacity, pre-installed system software and other associated / required soft wares, etc.(Details shall be furnished by the Vendor in the TECHNICAL OFFER)	Vendor to Confirm	
13.2.6	Display type and size	Vendor to Specify	
13.2.7	Latest version Laptop with pre-loaded software for PLC/ CNC for maintenance to be supplied with the machine.	Vendor to Specify	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
14.0	**DIAGNOSTIC SYSTEMS**		
14.1	**FAULT DIAGNOSTIC SYSTEM:**		
14.1.1	Fault diagnostic system should be provided to display the faults and the detailed cause and remedy for thefaults related to mechanical and electrical maintenance.	Vendor to confirm	
14.1.2	Help guide should be provided to use both diagnostic systems	Vendor to confirm	
14.2	**TELE-DIAGNOSTIC SERVICE – Optional**		
14.2.1	Tele-diagnostic service should be provided through International telephone lines / **modems**along with required Hardware / Software package for the supplied PC based PLC or CNC system for remote diagnosis and correction of the problems inCNC / PC based PLC System of the machine. The tele-diagnostic service shall be provided free of charge for**atleast five years.** BHEL will provide the necessary communication line near the machine. GSM connection not acceptable.	Vendor to confirm	
14.2.2	The Vendor shall inform terms and conditions for the service after theperiodmentioned in clause 14.2.1. Subsequently, it should be possible to use other platforms, such as Internet or ISDN, subject to their availability in future.	Vendor to confirm	
15.0	**HYDRAULICS**		
15.1	The System should be centralized, modular / stacked valve construction having minimum number of pipes / pipe joints and located at suitable location with easy accessibility of components for maintenance.	Vendor to Furnish Details	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
15.2	Pumps, valves, accessories etc. shall be OF BOSCH-REXROTH / VICKERS only (Details to be submitted). The seals used in cylinders shall be of MERKEL / PARKER / BUSHAK + SHAMBAN / HUNGER / SIMRIT make.	Vendor to confirm & furnish details	
15.3	Each pump should have an independent motor. Tandem pumps shall be avoided.	Vendor to confirm	
15.4	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 only (Details to be submitted).	Vendor to confirm & furnish details	
15.5	The flexible hoses used in the system shall be of GATES / AEROQUIP / PARKER only	Vendor to specify	
15.6	Failure indication for oil level, temperature, pressure, filter clogging should be provided	Vendor to confirm & furnish details	
15.7	Automatic shut off provision during failure of hose/ chiller unit, low oil level etc. Pump unloading feature during idle running to be provided for energy conservation. Details should be submitted.	Vendor to specify	
15.8	Cooling system of sufficient capacity to maintain complete Hydraulic System at a temperature not exceeding 50°C irrespective of the ambient conditions.	Vendor to confirm & furnish details	
15.9	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	
15.10	Maximum Operating Pressure of hydraulic system	Vendor to specify	
15.11	Main Pump flow in LPM and Motor Power in kW	Vendor to specify	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
15.12	Reservoir capacity (in litres)	Vendor to specify	
15.13	All oil pipelines shall be of seamless steel and should undergo pickling process.	Vendor to confirm	
15.14	One hand held minimess pressure gauge of suitable range with minimess hose (1.0 to 1.5m length) to be supplied along with the power pack. Check points to be provided in the system.		
15.15	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	
15.16	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	
15.17	All the pipe / hose end fittings shall be of standard weld nipple with O-ring seating type (DIN 3865 or equivalent). No ferrule joints are to be used in the hydraulic system. All threaded connections shall be of metric sizes	Vendor to confirm	
15.18	The oil to be used shall be of standard ISO Viscosity Grades – 32 / 46 / 68	Vendor to specify	
15.19	The maximum pressure of the system should preferably not to exceed 310 bar	Vendor to specify	
15.20	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	
15.21	The pipelines to be painted with standard colours as per the colour coding accepted internationally for hydraulic systems.	Vendor to furnish details	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
15.22	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	
15.23	Suitable metallic tray for collection of oil (in case of leakage) to be provided wherever required.	Vendor to confirm	
15.24	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	
15.25	Hydraulic oil will be supplied by vendor during pre-dispatch inspection at supplier's works and commissioning at BHEL works.	Vendor to confirm	
16.0	**LUBRICATION :**		
16.1	Machine lubrication: Automatic centralized lubrication system with timer control and suitable metering cartridges to be supplied.	Vendor to confirm	
16.2	First filling of Lubrication Oil to be supplied by the supplier. Indian equivalent shall be mentioned.	Vendor to specify	
16.3	First filling of Grease should be supplied by vendor. Indian equivalent shall be mentioned.	Vendor to specify	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
17.0	**PNEUMATIC SYSTEM:**		
17.1	The pneumatic operated elements of the machine shall work efficiently with BHEL compressed air supply at a pressure of 5 kg/cm^2. If higher air pressure is required for efficient operation of the machine, vendor shall furnish the information for Air Compressor of suitable capacity.	Vendor to confirm	
17.2	BHEL will provide compressed air at only one point near / on the machine. Vendor shall provide suitable filter-regulator-lubrication (FRL) unit at this point.	Vendor to confirm	
17.3	Hydraulic, Pneumatic & Lubricating 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	
17.4	Pneumatic components shall be of FESTO / SMC / NORGRENmakeonly	Vendor to Specify	
18.0	**ELECTRICAL & ELECTRONICS SYSTEMS**		
18.1	415V with a voltage fluctuation of +/- 10%, 50HZ with a fluctuation of +/-3%, 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 cables, connections, circuit breakers etc. required for connecting BHEL's power supply to the machine shall be in the scope of vendor.	Vendor to confirm	
18.2	Tropicalization**:** All electrical / electronic equipment shall be tropicalized.	Vendor to confirm	
18.3	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
18.4	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	
18.5	Motors & other electrical components shall conform to IEC or Indian Standards	Vendor to confirm	
18.6	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	
18.7	Vendor should ensure the proper earthing for the machine and its peripherals. Separate Earthing for CNC/PLC will not be provided. Earth electrode for CNC/PLC with suitable earth resistance value (preferably less than 1.5 ohm) is in the scope of supplier. The location for earth pit shall be indicated in the machine foundation drawing. Earth Electrode maintenance shall be mentioned in the O&M manual.	Vendor to confirm	
18.8	Cables shall be routed through totally enclosed cable trays. There shall not be cable trenches.	Vendor to Confirm	
18.9	In-cycle hour counter with reset facility should be provided.	Vendor to confirm	
18.10	**ULTRA ISOLATION TRANSFORMER**		
18.10.1	Vendor to provide the technical / capacity details of Ultra-Isolation Transformersuitable for the machine.	Vendor to confirm	
18.10.2	Procurement of Ultra Isolation Transformer is in BHEL Scope.	Vendor to Note	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
18.11	**SERVO VOLTAGE STABILISER (SVS):**		
18.11.1	Vendor to provide the technical / capacity details of Servo Voltage stabilisersuitable for the machine.	Vendor to Confirm	
18.11.2	Procurement of Servo Voltage Stabiliser is in BHEL Scope.	Vendor to note	
18.12	All electrical & electronic control cabinets & panels should be vermin and dust proof. All Electric enclosures shall have IP 54 protection. Vendor to confirm		
18.13	Motors and drives shall be of FANUC / SIEMENS / ALLEN BRADLEY / MITSUBISHI / TOSHIBA/ GE / INDRAMAT / SEW or any other reputed makes acceptable to BHEL conforming to IS / IEC Standards. Vendor to confirm and indicate make and type in the offer)		
18.14	All feedback systems & field sensors, limit switches, proximity switches, pressure switches, temperature controllers, should be for heavy duty application and wired up with flexible PVC insulated screened cables. All field elements shall have easy accessibility for maintenance.Vendor to confirm		
18.15	Air Conditioners with Dehumidifiers of suitable 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 Specify		
18.16	**MACHINE LIGHTS**		
18.16.1	Machine Spot Lights for sufficient illumination at End preparation and Tube cutting areas to be provided for clear visibility.Vendor to Confirm		
18.16.2	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents. Vendor to Confirm		

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical Details)
19.0	**MACHINE SPARES:**	
19.1	Itemized break-up of mechanical, hydraulic, electrical and electronic spares used in the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis shall be furnished by vendor along with offer. The list is to include following, in addition to other recommended spares: **(Unit Price for each item of spare shall be offered).** Vendor to confirm	
19.2	**Mechanical & Hydraulic Spares:** All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc. Vendor to confirm	
19.3	**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 PLC / CNC System, Servo Motors for Feed Drives, Power Module & Control Cards for Main Drive as well as Feed Drives etc.Vendor to confirm	
19.4	All types of spares for total machine and accessories shall 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	
19.5	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	
20.0	**DOCUMENTATION:**	
20.1	GA drawings, Machine detailed constructional drawings with dimensions, Civil Foundation layout drawings, Hydraulic / Pneumatic / Electrical / Electronic circuits with BOM, are to be submitted within 45 days from the date of ordering (in case of an order) for approval by BHEL. Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical Details)
20.2	Tooling drawings for the ordered tooling are to be submitted within 60 days from the date of placing order, for BHEL approval before manufacturing, in case of an order. Vendor to Confirm	
20.3	The following documents in English language should be supplied along with the machine: **Hard Copies - 3 Sets** **Vendor to confirm** **In CD form - 1 Set** a) Operating manuals of Machine & its PLC/CNC System b) Programming manuals of Machine & its PLC/CNC System c) Maintenance manuals with all drawings of machine assemblies / sub-assemblies with parts list. d) Electrical circuit diagrams with bill of materials. e) Hydraulic circuit diagrams with bill of materials. f) Pneumatic circuit diagrams with bill of materials. g) Maintenance & Interface manuals for Machine Control System. h) Preventive Maintenance check list for Electrical and Mechanical System. i) Manufacturing drawings for all toolings, ordered along with the machine, including Tool Holders, Spindle Mounting details, Adapters etc. j) Catalogues, O&M manuals for all bought out items used in the machine. k) Operating Manuals, Maintenance Manuals & Catalogues for all supplied Accessories. l) Detailed specification of all rubber items / hydraulic / lubrication fittings m) PLC program print-outs with comments in English n) PLC program and data on CD, Flash Memory Card. o) 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. p) Complete list of Alarm log, Error code, error messages & remedies and on line fault diagnostics to be provided by the vendor. q) Complete list of spares for machine, along with item part no / specification / type / model and make & address of the sub-vendor.	

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical Details)
21.0	**MACHINE INSPECTION & ACCEPTANCE:**	
21.1	**AT VENDOR'S WORKS:**	
21.1.1	Machine shall be offered for inspection by BHEL engineers at vendor's works. Vendor to confirm	
21.1.2	Trials to demonstrate satisfactory operation of the machine including cutting, end preparation on a few tubes shall be performed. Required tubes for the same shall be supplied by BHEL. Vendor to confirm	
21.2	**AT BHEL WORKS:**	
21.2.1	To determine the quality of the edge preparation, several sizes of tubes will be tested for different edge preparation styles. The edge preparation shall be as per the EP styles provided in ANNEXURE-1	
21.2.2	The production rate mentioned in Clause 3.0 shall be proved out by vendor for the tube sizes mentioned therein for one shift in each machine separately.Vendor to confirm	
22.0	**TRAINING:**	
22.1	The supplier shall train TWO BHEL Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and Programming) of the Machine for FIVE working days at supplier's works after the pre-dispatch inspection.Vendor to confirm	
22.2	Vendor to clearly mention whether the training is offered free of cost or chargeable. If chargeable, the vendor has to quote on man-day basis.Vendor to Specify	
22.3	Airfare, board & lodging for the BHEL Engineers who will be visiting supplier's works for pre-dispatch inspection and training, shall be borne by BHEL.Vendor to note	
22.4	The Supplier shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance (Mechanical, Electrical/ Electronics and PC based control System) during commissioning of the Machine at BHEL works for 10 working days.Vendor to confirm	

S.No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
22.5	The training shall include specialized coaching in a) Safety b) Operation of the machine c) PC based System & Operation, d) Trouble-Shooting, e) Software Application f) All special features of the machine g) Electrical / Mechanical / Electronics systems	Vendor to Confirm	
22.6	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to Confirm	
23.0	**MACHINE FOUNDATION:**		
23.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI). Complete details like static and dynamic loads etc required for foundation design shall be submitted by the Vendor within three months after getting BHEL's approval. Vendor to confirm		
23.2	BHEL shall design and construct complete foundation for the machine as per the Vendor's recommendation. Vendor to confirm		
23.3	**MACHINE LEVELLING & ANCHORING SYSTEM:** Complete anchoring system including foundation bolts, anchoring materials, fixators, levelling shoes etc. should be supplied. Vendor to specify		
24.0	**ERECTION & COMMISSIONING**		
24.1	Supplier to take full responsibility for the erection and for start-up, testing and commissioning of machine, its controls and accessories. Supplier shall send suitable qualified Engineers for Erection and Commissioning of the machine at BHEL works.Vendor to Confirm		

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical Details)
24.2	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. Arranging requirements like material handlingand helpers shall in the supplier's scope.Vendor to Confirm	
24.3	Successful proving of BHEL components by the Vendor shall be considered as part of commissioning. All tests, as mentioned (Machine Acceptance) shall form part of the commissioning activity.Vendor to Confirm	
24.4	Commissioning spares, required for commissioning of the machine shall be supplied free of cost. Vendor to Confirm	
24.5	Test Mandrels, Instruments and other necessary equipment including Laser equipment, if required, to carry out all above activities should be brought by the Vendor. Vendor to confirm	
24.6	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	
24.7	The Vendor shall bring special tools and equipment required for erection of the machine. Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer. Vendor to confirm	
25.0	**IN-BUILT SAFETY ARRANGEMENTS:** Following safety features in addition to other standard safety features should be provided on the machine	
25.1	A detailed list of all alarms / indications provided on machine should be submitted by the Vendor.Vendor to specify	
25.2	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	

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical Details)
25.3	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. Vendor to specify	
25.4	Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm number with messages (on the display and operator panels) should be available.Vendor to Confirm	
25.5	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations and suitably guarded.Vendor to Confirm	
25.6	Emergency Switches should be provided at suitable locations as per International Norms.Vendor to Confirm	
25.7	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	
26.0	**THERMAL STABILITY FOR AMBIENT CONDITIONS & ENVIRONMENTAL PERFORMANCE OF THE MACHINE:**	
26.1	The machine shall be suitable for an ambient temperature of +49 °C and relative humidity of 90 % respectively, but both do not occur simultaneously. Vendor to confirm	
26.2	The vendor should ensure trouble free operation of the machine with Thermal Stability of the complete machine and accuracy requirements of BHEL components, keeping in view of ambient conditions as mentioned above. Vendor to confirm	
26.3	The machine, including attachments and accessories, should be suitable for 24 hrs. Continuous operation to its full capacity for 24 hour a day and 7 days a week throughout the year.Vendor to Confirm	
26.4	If any safety / environmental protection enclosure is required it shall be built in the machine by the vendor.Vendor to confirm	
26.5	Paint of the machine should be oil / coolant resistant and should not peel off. Vendor to confirm	

S.No.	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER (with complete Technical Details)
26.6	The Machine should conform to following factors related to environment: Maximum noise level shall be 85 dB (A) at normal load condition, 1meter away from the machine with correction factor for back ground noise. This will be measured as per international standards like DIN 45635-16. Supplier to demonstrate compliance to noise level, if asked for.Vendor to Confirm		
27.0	**PAINTING:**Painting of Machine / Electrical Panels: **RAL 6011 Apple Green** (Polyurethane Paint). Vendor to Confirm		
28.0	**GUARANTEE:**Performance Guarantee to be given for 12 months from the date of commissioning.Vendor to confirm.		
29.0	**MACHINE PACKING:** Sea worthy & rigid packing for all items of complete machine, PC based PLC / 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.		
30.0	**GENERAL:**		
30.1	Machine Model No.	Vendor to specify	
30.2	Total connected load (KVA):	Vendor to specify	
30.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to specify	
30.4	Total weight of the machine	Vendor to specify	
30.5	Weight of heaviest part of machine	Vendor to specify	
30.6	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to specify	
30.7	The general arrangement drawing showing the machine & associated systems with salient dimensions shall be submitted along with the offer. The drawing should be clear and legible	Vendor to provide compulsorily	

S.No.	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER (with complete Technical Details)
31.0	**SCOPE OF SUPPLY**	
31.1	**Supplier Scope** 1. Design, Manufacture, Supply, Erection, Commissioning and prove out of ATCEP Station 2. Universal Tool Holders, Special Tool Holders & 100 Nos. of carbide inserts in each variety. 3. All anchoring & foundation bolts, levelling plates for the complete machine 4. Levelling Instruments, Power Tools / Hand Tools for erection. 5. Welding machines and consumables required for erection 6. Commissioning Engineer with erection crew 7. Job Quality and Productivity Prove-out	
31.2	**BHEL Scope** 1. Drawings approval 2. Civil foundation work as per manufacturer's drawing 3. Tube materials for trials and prove out 4. EOT Crane inside shop 5. Single Compressed air point at the location indicated in the drawing 6. Single Electrical Supply point at the location indicated in the drawing 7. ULTRA ISOLATION TRANSFORMER &SERVO VOLTAGE STABILISER (SVS):	

Enclosures:

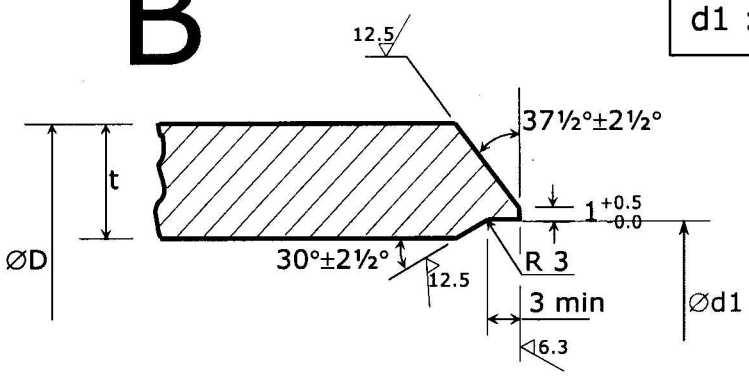
ANNEXURE - 1: CABS-3-03N-01 and CABS-3-03N-02: Tube Edge Preparation Styles

ANNEXURE – 2: CABS-3-03N-03 Universal Tool Holder Drawing

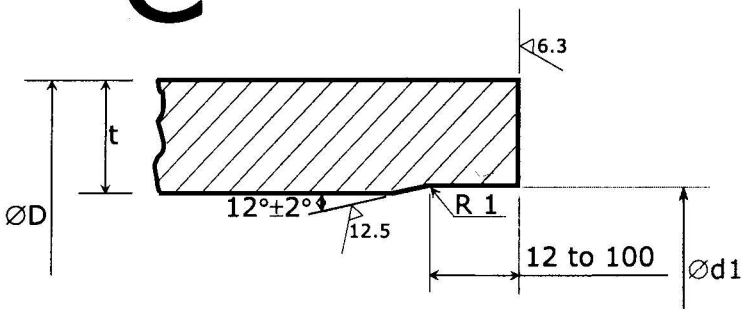
TUBE EDGE PREPARATION DETAILS

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

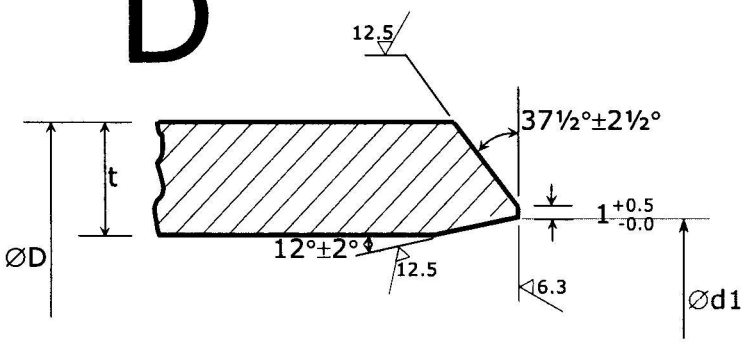
B



C



D

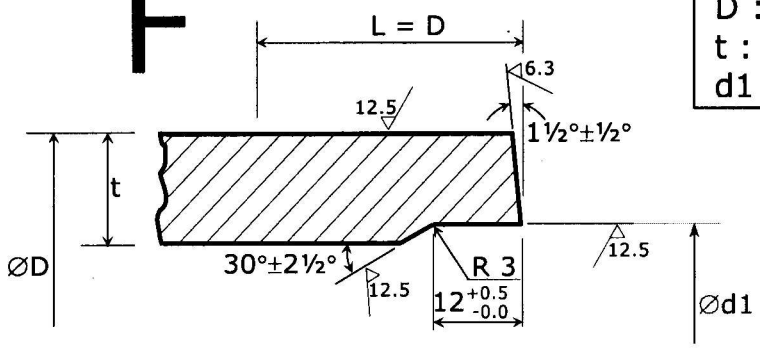


All dimensions are in mm
Drawing No. CABS-3-03N-01
BHEL, TIRUCHIRAPPALLI

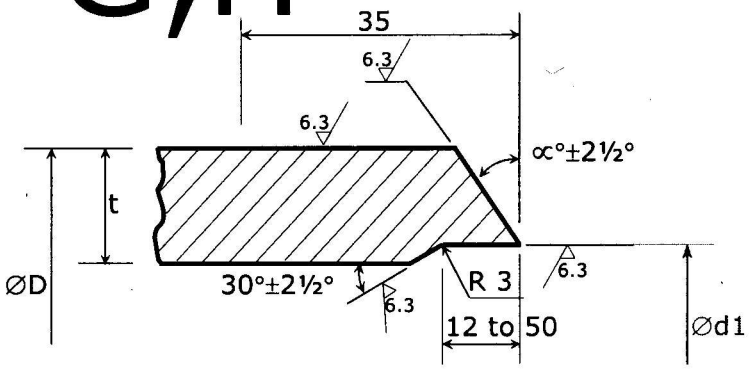
ANNEXURE - 1

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

F

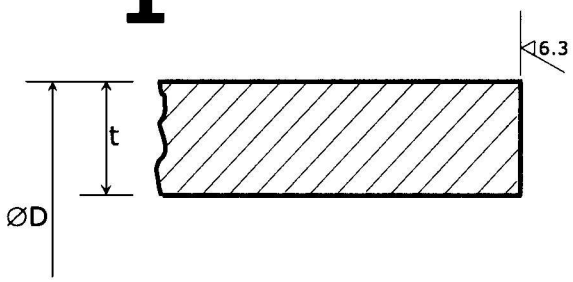


G,H

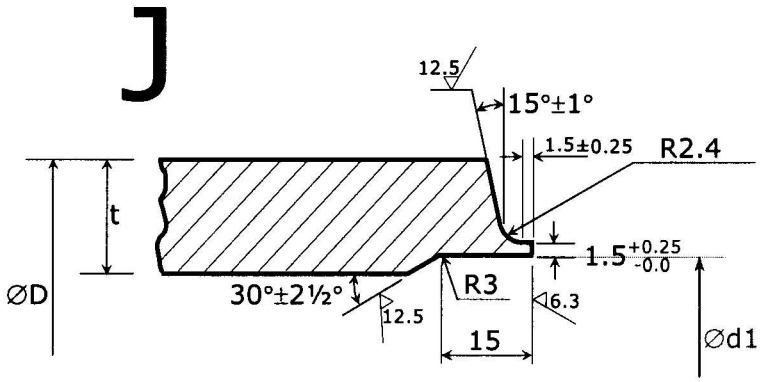


∝ = 45° for t≤ 5.6mm – G Style
∝ = 37½° for t>5.6mm – H Style

I



J

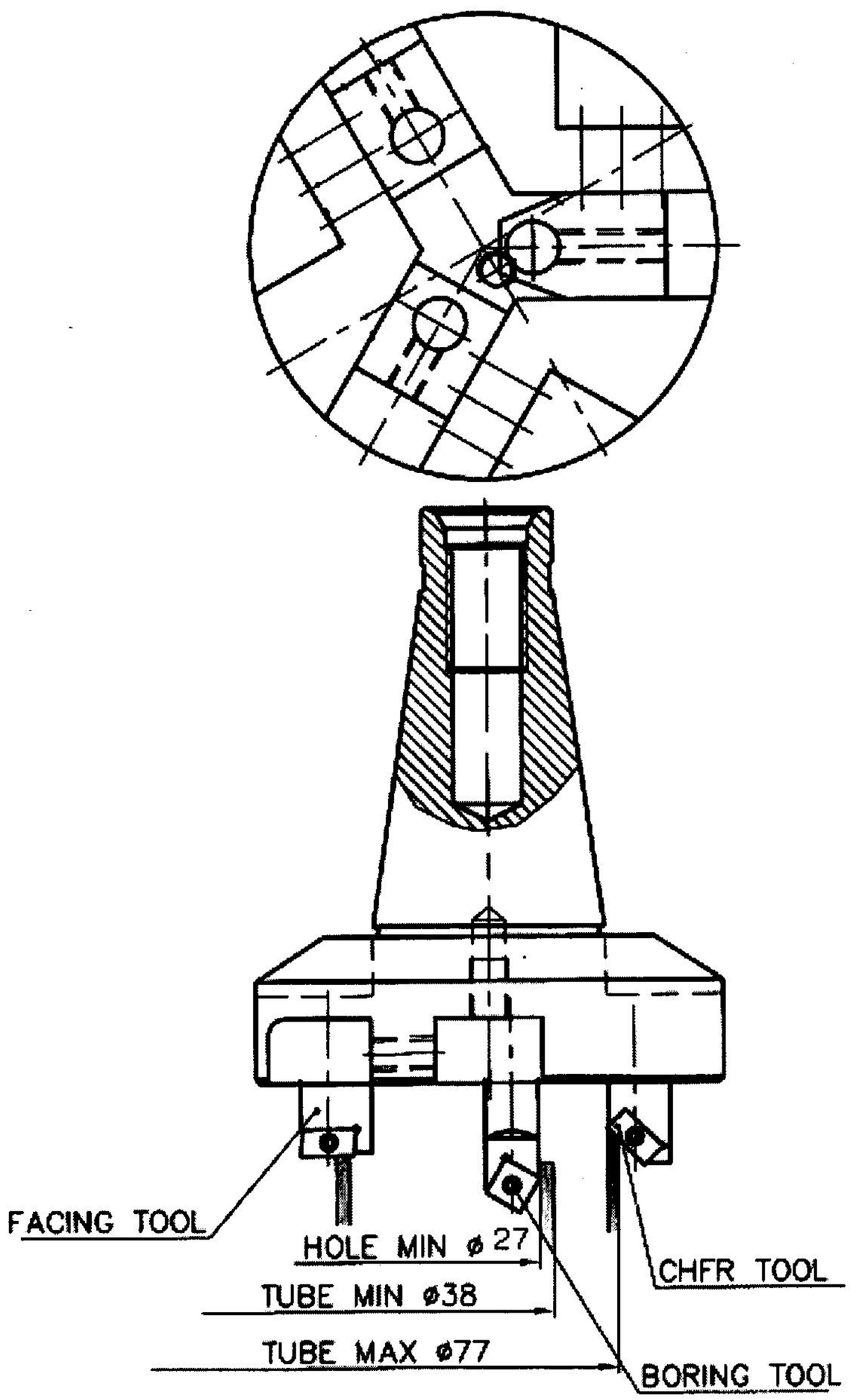


All dimensions are in mm

Drawing No. CABS-3-03N-02
BHEL, TIRUCHIRAPPALLI

ANNEXURE - 2

UNIVERSAL TOOL HOLDER



All dimensions are in mm

Drawing No. CABS-3-03N-03

BHEL, TIRUCHIRAPPALLI