



# Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

An ISO 9001  
Company

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

<b>ENQUIRY</b>	Phone: +91 431 257 70 49 Fax : +91 431 252 07 19 Email : <a href="mailto:csguna@bheltry.co.in">csguna@bheltry.co.in</a> Web : <a href="http://www.bhel.com">www.bhel.com</a>
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	<b>Enquiry Number:</b>	<b>Enquiry Date:</b>	<b>Due date for submission of quotation:</b>
	2710800001	16.09.2008	12.11.2008

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

Item	Description	Quantity	Delivery (Item required at BHEL on)
10	Cross Piercing and Elongation Mill for Seamless Steel Tube Manufacturing as per the technical specification & commercial terms and conditions applicable (to be downloaded from web site <a href="http://www.bhel.com">www.bhel.com</a> or <a href="http://tenders.gov.in">http://tenders.gov.in</a> )	1 No.	31.07.2010

## Note:

1. This CPE Mill has to be integrated with the existing up-stream and down-stream equipments at BHEL, SSTP, Trichy. Interested vendors are requested to visit BHEL, SSTP, Trichy to see the existing facility, location and under stand all other relevant data / details etc., prior to attending pre-bid meeting.
2. A pre-bid Meeting is proposed to be conducted with prospective vendors to discuss, under stand, clarify and interact w.r.t any clause of the tender document. Modifications, if any, would be carried out to the tender document based on the pre-bid discussion and this will form the basis for inviting techno-commercial offer and price bids subsequently.
3. Pre-Bid Meeting will be held on the date, time, and venue as given below  
**DATE OF PRE-BID MEETING: 3, 4, 6 & 7th October 2008**  
**TIME: 10.00 Hrs. IST onwards**  
**VENUE: Administrative Building Conference Hall, BHEL, SSTP, Trichy - 620014**

BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats along with technical specifications 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 "2710800001".



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**NOTICE INVITING FOR PRE-BID MEETING**

**TENDER NOTICE: No 2710800001 dated 16.09.2008**

1. BHEL Tiruchirappalli has invited a Tender for supply of “**Cross Piercing and Elongation Mill for Seamless Steel Tube Manufacturing**”
2. A pre-bid Meeting is proposed to be conducted with prospective vendors to discuss, under-stand, clarify and interact w.r.t any clause of the tender document. Modifications, if any, would be carried out to the tender document based on the pre-bid discussion and this will form the basis for inviting techno-commercial offer and price bids subsequently.
3. The preliminary tender document on which pre-bid discussions will be held is displayed in our Web Site [www.bhel.com](http://www.bhel.com) under the head Tender Notices as well as in <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page under enquiry reference “2710800001”)
4. Prospective bidders are requested to study the preliminary tender documents and submit their request for clarification, if any, in the format shown below so as to reach Sr. Manager, MM ,Capital Equipment ([csguna@bheltry.co.in](mailto:csguna@bheltry.co.in)) Phone +91 431 257 7049 positively before the date of Pre-Bid Meeting viz. 3<sup>rd</sup> October 2008. Subsequently on 3, 4, 6 & 7 October interested vendors can participate in the pre bid meeting and discuss the points of the specifications.

Sl. No	PART A / PART B of Tender Document and Commercial terms and conditions	Page No	Clause No	Subject	Query / Clarification Required

5. Prospective bidders can attend the Pre-Bid Meeting on the date and venue mentioned. They are requested to come prepared for stay at Tiruchirappalli for a period of 3 to 4 days. Pre-bid Meeting will be held in the presence of all the



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### **CAPITAL EQUIPMENT / MATERIALS MANAGEMENT**

prospective bidders or their authorized representatives, in which case authorisation from the principals shall be produced prior to attending the meeting.

6. Tender documents, with modifications if any, consequent to the Pre-bid Meeting, will be posted in our web site by **22.10.2008** and the techno-commercial bid and price bid shall be submitted complying with the Tender documents hosted in the web after the Pre Bid Meeting.
7. Prospective bidders are requested to furnish the contact person's name, phone number, fax number, e-mail ID etc
8. Pre-Bid Meeting will be held on the date, time, and venue given below  
DATE OF PRE-BID MEETING: 3, 4, 6 & 7th October 2008  
TIME: 10.00 Hrs IST onwards  
VENUE: Administrative Building Conference Hall, BHEL, SSTP, Trichy – 620014.

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

**PART – A****SECTION-I****QUALIFYING CRITERIA FOR THE SUPPLY OF CPE MILL FOR TUBE MANUFACTURING**

<b>S. No.</b>	<b>PARTICULARS</b>	<b>VENDOR'S RESPONSE</b>
<b>1.0</b>	<p>a. Vendor must be an Original Equipment Manufacturer of CROSS PIERCING and ELONGATION (CPE) Mill.</p> <p>b. Above OEM Vendor must have supplied and commissioned at least :</p> <ol style="list-style-type: none"> <li>1. One New CPE Plant for manufacture of Boiler Quality Seamless Steel Tubes. (or)</li> <li>2. One Retrofitting with CPE mill (for manufacture of Boiler Quality Tubes), in line with Push Bench arrangement.</li> </ol> <p>c. Above Production Line(s) with the CPE Plants, should be presently working satisfactorily for at least Two years after commissioning (on the date of opening of Tender).</p> <p>d. Vendor shall make a visit to BHEL/SSTP to understand the present Layout and Equipments, before submission of Offer.</p> <p>e. Vendor shall submit their Offer in TOTAL, covering all the Equipments. Part-Offers shall not be taken into consideration.</p>	

CROSS PIERCING & ELONGATION MILL

S. No.	PARTICULARS	VENDOR'S RESPONSE
1.1	a. Name of the Customer / Company where similar Mill / facilities installed.	
	b. Complete Postal Address of the Customer	
	c. Month and Year of commissioning	
	d. Application for which the Mill is supplied.	
	e. Name and Designation of the contact person of the Customer.	
	f. Phone, FAX Nos. and E-Mail id of the contact person of the Customer	
	g. Performance Certificate from the Customer regarding satisfactory performance of Mill supplied/retrofitted to them.	
2.0	Offers of only those Vendors, who meet the above Qualifying Criteria (1.0 and 1.1) shall only be considered for further evaluation	
3.0	BHEL reserves the right to verify the information provided by Vendor. In case, any information provided by Vendor is found to be false/ incorrect, Offer shall be rejected.	

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## CROSS PIERCING & ELONGATION MILL

### SECTION – II

Vendors are requested to provide the following details

S. No.	PARTICULARS	VENDOR'S RESPONSE
1.0	Number of Years of Experience of the BIDDER/ VENDOR in the field of Design, Manufacture, Supply, Erection & Commissioning of Boiler Quality tube manufacturing line.	
2.0	Number of Mills supplied, installed and commissioned till date	
3.0	Number of Mills supplied, installed and commissioned till date in the QUOTED MODEL	
4.0	Number of such Mills supplied, installed and commissioned till date for the following a) New plant (CPE) b) Retrofitting with CPE Mill in line with Push Bench arrangement.	
5.0	Details of : a. SERVICE-AFTER-SALES set-up in India b. Address of Agents / Service Centre in India c. Address of Agents / Service Centre in Asian Region.	
6.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the CPE Mill for manufacture of Boiler Quality Seamless Steel Tubes..	

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## CROSS PIERCING & ELONGATION MILL

### SECTION – III

Vendor has to comply with the following:

<b>S. No.</b>	<b>REQUIREMENTS</b>	<b>VENDOR's COMPLIANCE</b>
<b>1.0</b>	BIDDER / VENDOR shall submit the offer in TWO PARTS – 1. Part-I .. Technical (Part – A & Part – B), Commercial and Un-Priced price Bid 2. Part II .. Price Bid	
<b>2.0</b>	Offer shall contain a comparative statement of Technical Specifications given by BHEL and the Offer Details submitted by the Bidder, against each clause. Where details are required, a mere 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
<b>3.0</b>	BIDDER / VENDOR shall assure continuous support for SPARES and SERVICE for TEN Years, from the date of commissioning of the equipment at BHEL Works.	
<b>4.0</b>	Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria	
<b>5.0</b>	Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	
<b>6.0</b>	BIDDER has to indicate the Country of Origin for the supply of equipment.	
<b>7.0</b>	Reference List of Customers shall be accompanied with the details (Phone Number /E-Mail ID) of the CONTACT PERSON for cross reference by BHEL if required.	

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**PART - B****TECHNICAL SPECIFICATION FOR SUPPLY OF CPE MILL FOR SEAMLESS STEEL TUBE MANUFACTURING**

<b>S. No.</b>	<b>PARTICULARS</b>	<b>BHEL SPECIFICATION</b>	<b>BIDDER's OFFER [With Complete Technical Details]</b>
<b>1.0</b>	<b>PREAMBLE</b>		
1.0.1	<b>SSTP/BHEL/TRICHY</b> Seamless Steel Tube Plant (SSTP) is manufacturing Seamless Steel Tubes and Pipes – both Hot Finished and Cold Drawn in Carbon and Low Alloy Steel grades in a wide range of sizes - catering to the need of Boiler Tubing and Piping, Petrochemical, Oil & Gas and many more industrial segments.		
1.0.2	<b>HOT MILL/SSTP</b> Hot mill uses classic Push Bench process, with Rotary Hearth Furnace, Vertical Piercing Press, Elongator and Push Bench - to make shell out of billet.  Downstream, we have Reeler & Extractor to loosen and remove Mandrel from the Shell and further closed end of the shell is cut in Hot Saw.  Further it is reheated to around 930-1000 deg.C & rolled in Stretch Reducing Mill (SRM) to make Hollows and Hot Finished tubes & pipes.		

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# CROSS PIERCING & ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
1.0.3	SSTP now proposes to :: 1. Replacing Vertical Piercing Press and Elongator with Cross Piercing & Elongation (CPE) Mill (including a Crimping Press). 2. Addition of 6 Stands of SRM and 3. Introduction of Rotary Saw after SRM		
<b>2.0</b>	<b>PURPOSE:</b>		
2.0.1	Proposed equipments shall be capable of manufacturing Hot Finished Boiler Quality Tubes, in various material specifications and sizes ranging :: 1. OD :: 31.80 mm to 133.00 mm 2. Wall Thickness :: 3.20 mm to 14.00 mm These equipments shall also be capable of getting integrated with the existing upstream and down stream equipments.		
<b>2.1</b>	<b>Product Details:</b>		
<b>2.1.1</b>	<b>Input Material:</b>	Concast / Rolled Round Blooms Dia. 200 mm.	
2.1.1.1	Max. Length of Billet	1600 mm.	
2.1.1.2	Min. Length of Billet	Vendor to specify.	
2.1.1.3	Billet OD Tolerance	Minus 2.00 mm / plus 1.00 mm.	
2.1.1.4	Max. Bend of the Billet	2.5 mm / metre	
2.1.1.5	End Surface Taper	Max. 5 mm.	
2.1.1.6	Billet Ovality.	Max. 2.5%	
2.1.1.7	Billet Temperature & soaking time in RHF	Vendor to specify	
2.1.1.8	Cycle time : Billet discharge from RHF to start of pushing in Push Bench	Vendor to specify	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]																														
2.1.2	Material Specification	<div>a. Carbon Steel Grades:<table><tr><td>SA179</td><td>SA192</td><td></td></tr><tr><td>SA106 Gr.B</td><td>SA 106 Gr.C</td><td></td></tr><tr><td>SA210 Gr.A1</td><td>SA210 Gr.C</td><td></td></tr><tr><td>API 5L Gr.A</td><td>API 5L Gr.B</td><td></td></tr><tr><td>X42</td><td>X46</td><td>X52</td></tr><tr><td>St.35</td><td>St.45</td><td>St.52</td></tr><tr><td>BS3059 Gr.320</td><td>BS3059 Gr.360</td><td>BS3059 Gr.440</td></tr><tr><td>BS3059 Gr.662</td><td>DIN2391</td><td></td></tr></table></div> <div>b. Alloy Steel Grades:<table><tr><td>SA209 T1</td><td>SA213 T11</td><td>SA213 T22</td></tr><tr><td>SA213 T91</td><td>AISI 602</td><td></td></tr></table></div> <div>c. Vendor to specify any other Grades that can be processed in these equipments over and above said Grades.</div>	SA179	SA192		SA106 Gr.B	SA 106 Gr.C		SA210 Gr.A1	SA210 Gr.C		API 5L Gr.A	API 5L Gr.B		X42	X46	X52	St.35	St.45	St.52	BS3059 Gr.320	BS3059 Gr.360	BS3059 Gr.440	BS3059 Gr.662	DIN2391		SA209 T1	SA213 T11	SA213 T22	SA213 T91	AISI 602		
SA179	SA192																																
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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
2.1.3.	Chemical Composition	Furnished in Annexure- I	
<b>2.1.4</b>	<b>Output -Final Product Range (After SRM):</b>		
2.1.4.1	Outside Diameter -- Min.	31.80 mm.	
2.1.4.2	Outside Diameter -- Max.	133.00 mm.	
2.1.4.3	Wall Thickness -- Min.	3.20 mm.	
2.1.4.4	Wall Thickness -- Max.	14.00 mm.	
2.1.4.5	Tolerance on OD:	+/- 0.5 %	
2.1.4.6	Tolerance on Wall Thickness:	Vendor to specify (Preferred range: 0-6%)	
2.1.4.7	Tolerance on Length:	+ 3.00 mm and minus 0.00 mm.	
<b>3.0</b>	<b>SCOPE OF SUPPLY OF EQUIPMENTS (for detailed tentative scope, please refer Annexure-II)</b>		
3.1	CROSS PIERCER and ELONGATOR	For Details :: Refer 4.1.	
3.2	CRIMPING PRESS	For Details :: Refer 4.2.	
3.3	EXTENSION OF EXISTING SRM BY SIX MORE STAND-POSITIONS with suitable Mounting Frame.	For Details :: Refer 4.3.	
3.4	ROTARY SAW	For Details :: Refer 4.4.	
<b>4.0</b>	<b>EQUIPMENT SPECIFICATION</b>		
<b>4.1</b>	<b>CROSS PIERCER and ELONGATOR</b>		
4.1.1	Purpose : Piercing of the Round Billet to form a Round Hollow Billet		
4.1.2	Cross Piercing Mill Configuration	Mill Stand with :: 1. Work Rolls. 2. Lateral guide assembly.	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.1.2.1	Size and Capacity of the CPE	Vendor to specify	
4.1.2.2	Model No. of CPE	Vendor to specify	
4.1.2.3	Type of Work Roll (Suitable to produce listed Material Grades under Ref: 2.1.2).	Vendor to specify	
4.1.2.4	No. of work Rolls & Arrangement (with details of working)	Vendor to specify	
4.1.2.5	Provision for adjusting feed angle	Required	
4.1.2.6	Feed angle	Vendor to specify.	
4.1.2.7	Work Roll Diameter	Vendor to specify.	
4.1.2.8	Work Roll Length	Vendor to specify.	
4.1.2.9	Work Roll Speed	Vendor to specify.	
4.1.2.10	Work Roll Drive System	Vendor to specify.	
4.1.2.11	Details of Drive Mechanism	Vendor to specify.	
4.1.2.12	Number of Motors and its Rating	Vendor to specify.	
4.1.2.13	Billet Temperature Indicator	Vendor to specify	
<b>4.1.3</b>	<b>CPE Mill Stand:</b>		
4.1.3.1	Piercing Mill Stand mainly consisting of :: 1. Work Rolls 2. Lateral guide assembly 3. Balancing and Locking Mechanism 4. Motor Drives 5. Hydraulic Cylinders 6. Grease/Oil Lubrication 7. Complete Piping 8. all other accessories required. (Vendor to furnish complete list)	Vendor to specify.	
<b>4.1.4</b>	<b>CPE Inlet:</b>		

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.1.4.1	Hydraulically Operated Entry Pusher with Push Bar.	Vendor to specify	
4.1.4.2	Inlet Trough	Vendor to specify	
<b>4.1.5</b>	<b>CPE Outlet:</b>		
4.1.5.1	Piercing Mill outlet side mainly consisting of :: 1. Guide assembly for Hollow Billet 2. Base Frame 3. Pinch Roll Arrangements 4. Steadiers 5. Hydraulic Cylinders 6. Stripper Bush 7. Conveying Rollers 8. Thrust Block with Guide bed 9. Shell Kick-out Arms 10. Mandrel Bar with Plug and its Cooling Arrangement 11. Mandrel Thrust Block Drive with Gear Box 12. Complete Piping 13. all other accessories required. (Vendor to furnish complete list)	Vendor to specify	
<b>4.1.6</b>	<b>ALIGNMENT</b>		
4.1.6.1	Mechanism for checking the alignment / centering of :: 1. Entry Die 2. Rolls 3. Guides 4. Bar Steadiers 5. Thrust Block Above parts shall be in the same rolling axis (Vendor to furnish details).	Vendor to confirm.	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
<b>4.1.7</b>	<b>ECCENTRICITY</b>		
4.1.7.1	Eccentricity of the CPE output shall be within 1%. Eccentricity % = {(Max. – Min.) / (Max. + Min.)} *100	Vendor to confirm	
<b>4.2</b>	<b>CRIMPING PRESS</b>		
4.2.1.	Purpose : To crimp leading end of the Hollow Billet after inserting the Push Bench Mandrel into Hollow Billet.		
4.2.2	Model No. of Crimping Press.	Vendor to specify	
4.2.3	Input material	Hot Hollow Billet from CPE	
4.2.4	Outside Diameter of Hollow Billet	180 mm	
4.2.5	Diameter of Mandrel to be inserted in the Hollow Billet	118 mm	
4.2.6	Wall thickness of Hollow Billet	Vendor to specify	
4.2.7	Max. Length of Hollow Billet	4000 mm	
4.2.8	Crimping Length & Diameter (max. & min.)  <u>Note :</u> 1. It shall be optimally selected so as to have sufficient grip over the Push Bench Mandrel to withstand maximum pushing force of 120 T in Push Bench.  2. Also loss of crimping end shall not be more than 1 % weight of the charged billet at RHF.	Vendor to specify	
4.2.9	Details of Transport Conveyor System from CPE to Crimping Press	Vendor to specify	
4.2.10	Details of Transport Conveyor System from Crimping Press to Push Bench	Vendor to specify	
4.2.11	Details of Transport Conveyor System for transfer of Mandrels from Mandrel Heating Skid to Crimping Press.	Vendor to specify	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.2.12	Temperature of Mandrel and hot Hollow Billet for crimping and further pushing operation in Push Bench (Maximum & Minimum temperature of Hollow Billet Maximum & Minimum temperature of Mandrel)	Vendor to specify	
4.2.13	Configuration of mandrel leading & trailing end.	Vendor to specify	
4.2.14	Crimping Press force.	Vendor to specify	
4.2.15	No. of Crimping to match CPE output	Vendor to confirm	
<b>4.3</b>	<b>SRM EXTENSION BY 6 STAND-POSITIONS.</b>		
4.3.1	<u>Purpose :</u> Present SRM output:: OD 42.4 mm to 133 mm. Proposed SRM output :: OD 31.8 mm to 133 mm (Proposed to increase number of stands from the present 22 stands to 28 stands - Rectangular type). Existing 22 stand mounting 'C' frame, gear box and other drive mechanisms including stand changing device will be retained. Present arrangement has individual drive system with electronic digital D.C drive control.		
4.3.2	Nominal Diameter of Roll Stands at inlet of SRM (1 - 8 position)	380 mm	
4.3.3	Nominal Diameter of Roll Stands at outlet of SRM ( 9 - 22 position)	300 mm	
4.3.4	Nominal Diameter of new Roll Stands - to be added (23-28 position), similar to existing stands (GA Drawing No. SSTP:TE:SKT:3.2802/Rev.00 and SSTP:TE:SKT:3.2803/Rev.00) – Ref. Annexure III).	300 mm	
4.3.5	No. of new stands (23-28 position)	6 nos.	

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S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.3.6	Required 'C' Frame for additional 6 Roll Stands (23-28 position) shall be similar to the existing one. (Vendor to visit site and get details)	Vendor to confirm	
4.3.7	Vendor to furnish Speed chart in electronic form, for all the 28 rectangular stands (22 + 6) with individual drives, for all the product-mix (detailed in Annexure-IV).	Vendor to confirm	
4.3.8	Vendor to furnish Calculation package for arriving speed for any size within the minimum & maximum OD range.	Vendor to confirm.	
4.3.9	Vendor to furnish additional Capacity of Hydraulic and Lubrication system required, in addition to the existing system.	Vendor to specify	
<b>4.4</b>	<b>ROTARY SAW</b>		
4.4.1	Purpose : For on line cutting of hot tubes coming out of SRM, to the required lengths, including leading and trailing ends.  Cutting Speed of Rotary Saw shall be matched with Output Speed (Linear) of SRM.		
4.4.2	Outside Diameter of Tube to be cut (Min. to max.)	31.80 mm to 133.00 mm.	
4.4.3	Wall Thickness of Tube to be cut (Min. to max.).	3.20 mm to 14.00 mm	
4.4.4	Inlet Speed of tube to Rotary Saw	0.3 M/Sec to 6.0 M/Sec.	
4.4.5	Minimum Length of Tube to be cut	6000 mm.	
4.4.6	Maximum Length of Tube to be cut	26000 mm.	
4.4.7	Provision for height adjustment to match the Diameter of the tube	Vendor to specify	
4.4.8	Provision for collection of leading and trailing end cut-bits	Vendor to confirm	
4.4.9	Aligning conveyors before and after Rotary Saw	Vendor to specify	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.4.10	Main Drive, Coupling, Brake, etc. to rotate the Saw Blade at the exact required speed.	Vendor to specify	
4.4.11	Minimum and Maximum length of the leading and trailing end to be cut.	Minimum 200 mm Maximum 3000 mm.	
4.4.12	Cut end to be square and burr free	Vendor to confirm	
4.4.13	Tolerance on Squareness of cut.	Vendor to specify	
4.4.14	Tolerance on Cut-Length	+ 3.00 mm and minus 0.00 mm.	
4.4.15	Dimensions, Type and Material of Blade	Vendor to specify	
<b>4.5</b>	<b>OPTIONAL EQUIPMENT</b>		
	Any other equipment which will enhance performance, productivity etc. of Mill. (Complete details to be provided by Vendor)	Vendor to specify	
<b>5.0</b>	<b>SUB SYSTEM OF EQUIPMENTS</b>		
<b>5.1</b>	<b>HYDRAULICS</b>		
5.1.1	Brand/Make of products.  Preferable makes :: 1. Bosch Rexroth 2. Vickers Sperry / 3. Denison / 4. Parker Hannfin  ( For other makes, complete details to be furnished)	Vendor to specify	
5.1.2	Hydraulic Hose end-fittings shall be of suitable material with female swivel nut and 24 deg cones.  Hoses shall preferably be of GATES make. (For other makes, complete details to be furnished).	Vendor to specify	

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CROSS PIERCING & ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
5.1.3	Hydraulic Circuits shall be designed with minimum number of control valves and to suit oil of ISO VG 68 only.  Also minimum number of check-points to be provided, wherever pressure is required to be read for setting and trouble-shooting.  MINIMESS Pressure Gauge - 1 No with Connecting Hose to be provided.	Vendor to confirm	
5.1.4	Solenoids shall be provided with indication lamp / LED. Control voltage for all solenoid operated valves.	24 V DC	
5.1.5	Filtration System.	Vendor to specify	
5.1.6	Hydraulic Failure indication	Vendor to specify	
5.1.7	Hydraulic Pump capacity (flow / pressure)	Vendor to specify	
5.1.8	Pump Motor Power in kW	Vendor to specify	
5.1.9	Hydraulic Tank Capacity	Vendor to specify	
5.1.10	Each Pump shall have an independent Motor. Tandem Pumps may be avoided.	Vendor to specify	
5.1.11	All Hydraulic Pumps for the Power Pack should be loaded only during requirement and should run unloaded during idle running.	Vendor to Confirm	
5.1.12	All Hydraulic Pumps / Motors shall have stand-by Pump / Motor.	Vendor to Confirm	
5.1.13	Possibility of using the existing Power packs in Vertical Piercer and Elongator to be explored. (Vendor to visit site and get details).	Vendor to Confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
5.2	<b>LUBRICATION:</b>		
5.2.1	Oil Lubrication and Grease Lubrication arrangement shall be provided for all rotating and moving components.	Vendor to Confirm	
5.3	<b>PNEUMATICS:</b>		
5.3.1	Pneumatic operated elements of the equipment shall work efficiently with BHEL Compressed Air supply at a pressure of <b>4 to 6 Kg / cm<sup>2</sup></b>	Vendor to confirm	
5.3.2	BHEL will provide compressed air. Vendor shall provide suitable Filter-Regulator-Lubrication (FRL) unit.	Vendor to confirm	
5.3.3	Volume (flow) of Compressed Air required for the equipment.	Vendor to Specify	
5.4	<b>ELECTRICAL:</b>		
5.4.1	BHEL shall provide power supply : 415V +/-10%, 50Hz +/- 3 Hz, 3 Phase AC (3 wire system without neutral)	Vendor to note.	
5.4.2	For high capacity motors, BHEL shall provide : 11 KV +/- 5%, 50 Hz +/- 3 Hz, 3 phase.	Vendor to note.	
5.4.3	All electrical / electronic equipment shall be tropicalized.	Vendor to confirm	
5.4.4	All electrical & electronic control cabinets & panels shall be dust and vermin proof	Vendor to confirm	
5.4.5	All electrical components in the cabinets shall be mounted on DIN Rail	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
5.4.6	All electrical and electronic panels including operator-panels shall be provided with :: 1. Fluorescent Lamps for sufficient illumination 2. Power receptacles of 220Volts, 5/15 Amp AC.  All adapters /receptacles shall have compatibility with Indian equivalents.	Vendor to confirm	
5.4.7	Motors & other electrical components shall confirm to IEC or Indian Standards	Vendor to confirm	
5.4.8	All Electric enclosures shall have IP 43 protection	Vendor to confirm	
5.4.9	Motors shall be of Siemens / ABB or such reputed makes only conforming to IS / IEC Standards (Vendor shall indicate details of make and type in the offer)	Vendor to confirm	
5.4.10	Drives shall be of Siemens / Allen Bradley / ABB or such reputed makes only conforming to IS / IEC Standards (Vendor shall indicate details of make and type in the offer)	Vendor to confirm	
<b>5.5</b>	<b>FAULT DIAGNOSTIC SYSTEM (Optional):</b>		
5.5.1	Diagnostic system with required hardware and software shall be supplied and installed on the equipments.  This shall include customized auto-diagnostic system with supporting hardware and software, which shall indicate detailed cause & remedy for the faults related to mechanical and electrical maintenance.	Vendor to confirm	
<b>6.0</b>	<b>SAFETY ARRANGEMENTS:</b> Following safety features, in addition to other standard safety features, shall be provided on the equipments:		

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
6.1	Equipments shall have adequate and reliable safety interlocks / devices to avoid damage to the equipment, work piece and the operator due to malfunctioning or mistakes.  Equipments functions should be continuously monitored and alarm / warning indications through lights/ alarm number with messages shall be made available.	Vendor to specify	
6.2	All the pipes, cables etc. on the equipment shall be well supported and protected, which shall not create any hindrance to movement of equipment operators.	Vendor to Confirm	
6.3	All the rotating parts used on equipments shall be Statically & Dynamically balanced to avoid undue vibrations and suitably guarded.	Vendor to Confirm	
6.4	Emergency Switches at suitable locations shall be provided as per International Norms.	Vendor to Confirm	
6.5	All lubricated parts shall have provision for collecting the used Lubrication Oil from equipments and preventing them from spilling over on to the ground.	Vendor to Confirm	
<b>7.0</b>	<b>ENVIRONMENTAL PERFORMANCE OF THE EQUIPMENT:</b> Equipment shall conform to following factors related to environment:		
7.1	Maximum noise level shall be 85 dB (A) at normal load condition, 1meter away from the equipment with correction factor for background noise.  This will be measured as per International Standards like DIN 45635-16. Vendor to demonstrate compliance to noise level, if required.	Vendor to Confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
7.2	If any other safety / environmental protection enclosure are required, same shall be provided in the equipment.	Vendor to confirm	
<b>8.0</b>	<b>PRODUCTION TOOLING:</b>		
8.1	Vendor shall provide complete list of Production Tools including Drawings for all the proposed equipments viz. CPE, Crimping Press, SRM and Rotary Saw for the entire SSTP product range.	Vendor to Specify	
8.2	Vendor shall furnish a List of suggested Production Tools with unit rate for all the above equipments required for normal and trouble-free operation for a period of one year – duly indicating the Expected Tool-Life for each Tool.	Vendor to Specify	
8.3	Vendor shall furnish Design for SRM Stand Calibers for all the sizes of Tubes covered in the tender.	Vendor to Specify	
<b>9.0</b>	<b>TOOLS FOR ERECTION, COMMISSIONING and OPERATION &amp; MAINTENANCE:</b>		
9.1	Vendor shall bring Special Tools and Equipments required for erection of the proposed equipments. List of such Tools to be furnished along with the Offer.	Vendor to confirm	
9.2	Vendor shall bring Any Test equipments required for checking & alignment of the equipments, components etc.	Vendor to confirm.	
9.3	Vendor shall bring Laser and optical equipments, if required, for checking, aligning and positioning.	Vendor to Specify	
9.4.	Vendor shall furnish a List of Tools required for normal Operation & Maintenance of the proposed equipments.	Vendor to Specify	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
<b>10.0</b>	<b>SPARES:</b>		
10.1	Vendor shall furnish Equipment-wise-List of Recommended & Mandatory Spares (Mechanical, Hydraulic, Electrical and Electronic items) required for 2 years of trouble free operation of proposed equipments, on three shifts basis. <b>(Unit Rate of each item of spare shall be indicated)</b>	Vendor to Specify	
10.2	<b>Items other than Recommended / Mandatory Spares.</b>  <b>Vendor to specify Technical details (along with details of Recommended Vendors) for the following:</b>  <b>a) Mechanical &amp; Hydraulic Spares:</b> All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses, etc.  <b>b) b) Electrical /Electronic Spares:</b> All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Encoders, Optical Sensors, Spares for PLC (I/O card, Digital to Analog card, CPU card, Power Supply Board, etc.), Display unit, HMI , Servo Motors for Feed Drives, Power Module & Control Cards for Main Drive as well as Feed Drives, etc.	Vendor to Specify	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
10.3	Vendor to confirm that Spares for all the proposed Equipments and Accessories shall be made available for at least ten years after commissioning of the Equipments.  If any Equipment or Control is likely to become obsolete during the above 10 year period, vendor shall inform BHEL sufficiently in advance and provide all necessary Technical Details and Drawings of parts / details of spares & Source of Vendors, to enable BHEL to procure these in advance, if required	Vendor to confirm	
10.4	Vendor to provide complete Equipment-wise List of Spares, along with Item Part No. / Detailed Specification / Type / Model, Name & Address of the Sub-Vendors.	Vendor to confirm	
11.0	<b>DOCUMENTATION:</b> Vendor to furnish Documentation, as listed below (11.1 to 11.9) ::  a. <b><u>Along with Equipments :</u></b> One set (Hard copy) in English language.  b. <b><u>After completion of Erection and Commissioning :</u></b> 1. <b>Three</b> sets of as-built-Drawings and Updated Manuals (Hard Copy) shall be supplied - including Bought-out items. 2. <b>One</b> set of above Documents in Soft-copy.	Vendor to confirm	
11.1	Operating Manuals of Equipments	Vendor to confirm	
11.2	Programming Manuals of Equipments	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
11.3	Detailed Maintenance Manual of equipments with all Drawings of equipment / Tool assemblies / sub-assemblies / parts, including Electrical / Pneumatic/ Hydraulic circuit-diagrams.  All Assembly/ Sub Assembly Drawings shall also be supplied with the part list.	Vendor to confirm	
11.4	Schedule of Maintenance for each equipment such as daily, weekly, monthly, etc.	Vendor to confirm	
11.5	PLC program printouts with comments in English (after commissioning the equipments).	Vendor to confirm	
11.6	PLC program on CD/Flash Memory card	Vendor to confirm	
11.7	Complete Master List of parts used in the equipment.	Vendor to confirm	
11.8	GA Drawing.	Vendor to confirm	
11.9	Drawings for Toolings.	Vendor to confirm	
<b>12.0</b>	<b>INSPECTION-cum-TRAINING:</b>		
12.1	BHEL shall depute eight of its Engineers for inspection and training at vendor's work. Vendor shall train BHEL's Engineers in Operation / Maintenance (Mechanical, Electrical/ Electronics system) of each equipment viz. CPE, Crimping press, SRM & Rotary Saw at Vendor's works for a period of 10 days. (Total 80 man-days).	Vendor to confirm	
12.2	Vendor shall impart training to BHEL Operators and Maintenance Crew in Operation and Maintenance (Mechanical, Electrical/ Electronics system) after commissioning of the Equipments at BHEL works - for not less than 10 working days.	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
12.3	The training shall include specialized coaching in 1. Safety 2. Operation of the Equipments 3. Assembly and Dismantling of Mill Rolls 4. Assembly and Dismantling of Guide Rolls 5. Setting and alignment of Rolls with entry Die, Guides, Bar-Steadiers and Thrust Block 6. Trouble-Shooting, 7. Software Application 8. All special features of the equipment 9. Electrical / Mechanical / Electronics systems	Vendor to Confirm	
12.4	Airfare, Boarding & Lodging for the Trainees (deputed to Vendor Works) shall be borne by BHEL.	Vendor to note	
12.5	Vendor shall arrange Competent English speaking experts, during training for satisfactory & effective training of BHEL personnel	Vendor to Confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
<b>13.0</b>	<b>FOUNDATION:</b>		
13.1	<p>Vendor shall submit the Preliminary Layout Drawing for BHEL approval, within <b>one month</b> from the date of Letter of Intent (LOI), taking into consideration of other existing Equipments / Layout at SSTP.</p> <p>Vendor shall submit Foundation details, viz. Static / Dynamic Load details, etc. and Final Layout Drawings, within <b>three months</b> after BHEL approval of Preliminary Layout Drawings.</p> <p>Layout shall consist of all requirements pertaining to complete equipments, including space requirement for any other accessories.</p> <p>BHEL shall design and construct complete Foundation for the equipments as per the recommendation of Vendor.</p> <p>Vendor shall also indicate detailed specifications of Grouting Compounds, Grouting Procedure, etc., for Foundation Bolts of the equipments.</p>	Vendor to Confirm	
13.2	List of Foundation / Anchorage material.	Vendor to specify	
<b>14.0</b>	<b>ERECTION &amp; COMMISSIONING</b>		
14.1	<p>Vendor to take full responsibility for Supervision of the Erection, Start up, Testing and Commissioning of Equipments, along with accessories.</p> <p>BHEL shall provide Service requirements, like Power, Air &amp; Water, Crane and Personnel for helping.</p>	Vendor to confirm	
14.2	Vendor to prove out the specified products both on Rate of Production and Product Quality as per the tender specification.	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
14.3	Vendor shall bring Tools, Test Mandrels, Instruments and other necessary equipment, including Laser/Optical equipments, required to carry out all above activities.	Vendor to confirm	
14.4	Vendor shall bring (on returnable basis) Spares / Tools required for commissioning of the equipment within stipulated time..	Vendor to confirm	
14.5	Vendor shall furnish a Schedule of Erection and Commissioning along with offer.	Vendor to confirm	
14.6	Vendor shall furnish Charges, Duration, Terms & Conditions for Erection & Commissioning (with break-up details), along with offer.	Vendor to confirm	
<b>15.0</b>	<b>ACCURACY TESTS</b>		
<b>15.1</b>	<b>GEOMETRICAL ACCURACY</b>		
15.1.1	Geometrical Accuracy Tests shall be carried out in accordance with applicable standards recommended by the Vendor.  Vendor shall submit Detailed Test Charts for Geometrical Accuracy Tests, clearly showing the accuracies to be achieved on the equipments, along with the offer.	Vendor to confirm	
15.2	Vendor shall demonstrate all the above accuracies to BHEL, during Erection & Commissioning.	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
<b>16.0</b>	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY:</b>		
16.1	Total equipment(s) shall work trouble-free and efficiently under following operating conditions and shall deliver specified accuracies.  <u>Power Supply:</u> Voltage: 415 V +/- 10%, Frequency: 50 Hz +/- 3%, No. of phases : 3  <u>Equipments shall be suitable for ::</u> Ambient Temperature :: 45 ° C Relative Humidity :: 90 % (However, both do not occur simultaneously).	Vendor to confirm	
16.2	Weather conditions are tropical, Atmosphere is dust laden.	Vendor to note	
16.3	Vendor to ensure trouble free operation and Thermal Stability of the equipments, keeping in view of the specified ambient conditions and accuracy requirements of BHEL.	Vendor to confirm	
16.4	Equipments, including attachments and accessories, shall be suitable for continuous operation to its full capacity for 24 x 7x 365.	Vendor to confirm	
<b>17.0</b>	<b>PROVE OUT:</b>		
17.1	<u>Out put :</u> Vendor shall establish an output of minimum 600 pushes (at Push bench) for a continuous period of eight hours	Vendor to confirm.	
17.2	<u>Cycle time :</u> Billet discharge from RHF to start of pushing in Push Bench	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
17.3	Establishing the Sizes in Carbon & Alloy steel a. 31.8 x 6.2 b. 127 x 12.5	Vendor to confirm	
18.0	<b>EQUIPMENT ACCEPTANCE: (Tests/Activities to be Performed by Vendor)</b>  A. <u>Yield of 84% shall be proved in the following sizes</u> 1. <u>Carbon steel: Input Qty. 200 Tons in each size :</u> a. 38.10 x 5.30 b. 44.50 x 4.50 c. 51.00 x 5.60 d. 63.50 x 5.60  2. <u>Alloy Steel: T11 &amp; T22- 100 Tons in each size :</u> a. 47.63 x 6.00 b. 47.63 x 6.60  B. <u>Sizes for prove out Mill capability :</u> 1. <u>Alloy steel T 11 &amp; T22 :</u> a. 38.10 x 8.80 b. 44.50 x 12.10 c. 47.63 x 9.50  C. <u>Process capability:</u> 1. Rolling of SA 213 T91	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
<b>18.1</b>	<b>Tests/Activities to be carried out on the Equipments at Vendor Works in the presence of BHEL engineers before dispatch of Equipments / Materials.</b>	Vendor to specify	
18.1.1	Demonstration of all salient features of the Equipments, Control system Accessories	Vendor to confirm	
<b>18.2</b>	<b>Tests / Activities to be carried out at BHEL works while commissioning the equipment:</b>	Vendor to specify	
18.2.1	Geometrical accuracies as per applicable standard Test Chart recommended by the Vendor	Vendor to confirm	
18.2.2	Demonstration of all salient features of the equipment, control system & accessories to the satisfaction of BHEL for efficient and effective use of the equipment	Vendor to confirm	
18.2.3	Demonstration by actual use of all supplied accessories to their full capacity.	Vendor to confirm	
18.2.4	The prove-out trials <b>as per Clause 17.0</b>	Vendor to confirm	
18.2.5	Two weeks supervision by vendor of independent operation of equipment by BHEL after job prove out (to run concurrently with training to BHEL personnel at BHEL)	Vendor to confirm	
<b>19.0</b>	<b>PACKING:</b>		
19.1	Vendor shall arrange to provide Sea worthy, rigid, pest & vermin proof and phyto-treated/certified packing for all items / complete equipments, all accessories, to avoid any damage / loss in transit.  When equipments are arranged to be dispatched in containers, all small / loose items shall be suitably packed in boxes and put inside the Containers.	Vendor to confirm	

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## CROSS PIERCING &amp; ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
<b>20.0</b>	<b>GUARANTEE:</b>		
20.1	24 months from the date of acceptance of the equipments at BHEL Works.	Vendor to confirm	
<b>21.0</b>	<b>GENERAL:</b>		
21.1	Machine Model No. (for all proposed equipments)	Vendor to specify	
21.2	Total connected load (KVA) required	Vendor to specify	
21.3	Floor area required (Length, Width, Height) for each equipment & accessories	Vendor to specify	
21.4	Painting of Equipment / Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	Vendor to confirm	
21.5	Total weight of the equipment (for each equipment and accessories)	Vendor to specify	
21.6	Weight of heaviest part of all equipments	Vendor to specify	
21.7	Weight of the heaviest assembly / sub-assembly of the Equipment (for each equipment and accessories)	Vendor to specify	
21.8	Dimensions of largest part / sub-assembly / assembly of the equipment. (for each equipment and accessories)	Vendor to specify	
21.9	Vendor to furnish Detailed catalogues, sketch / photographs of the proposed equipments and accessories / attachments, along with Offer.	Vendor to confirm	

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# CROSS PIERCING & ELONGATION MILL

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
21.10	All feedback systems & field sensors, limit switches, proximity switches, pressure switches, temperature controllers, shall be suitable 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	
21.11	Vendor to furnish clear and legible General Arrangement Drawings, showing equipments, accessories & associated systems with salient dimensions, along with Offer.	Vendor to Confirm	
21.12	Vendor shall describe in the Offer any additional/optional accessories that are likely to enhance the productivity of the proposed equipments.	Vendor to Specify	

## Enclosure :

ANNEXURE – I .. Chemical Composition of Billets  
 ANNEXURE - II .. Scope of supply  
 ANNEXURE - III .. GA Drawing for SRM stands  
 ANNEXURE - IV .. Product range / Sizes (for speed chart)  
 ANNEXURE - V .. Scope of supply - Optional items (for detail engineering)

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### Price schedule

Sl. No.	PARTICULARS	PRICE
<b>1.0</b>	<b>Manufacture and Supply :</b>	
	1. CROSS ROLL PIERCER & ELONGATOR	
	2. CRIMPING PRESS	
	3. EXTENSION OF EXISTING SRM BY SIX MORE STANDS.	
	4. ROTARY SAW	
<b>2.0</b>	Engineering Services for Basic Data / Basic Engineering, as per scope of supply (ANNEXURE – II).	
<b>3.0</b>	<b>OPTIONAL</b>	
	1. Engineering Services for detail engineering as per scope of supply ANNEXURE – V.	
	2. Any other equipments, which shall enhance Performance, Productivity of the Mill.	

# ANNEXURE I

## MATERIAL SPECIFICATION & CHEMICAL COMPOSITION FOR CARBON & ALLOY STEEL TUBES AND PIPES

### CARBON STEEL:

Standard & Grade	C	Mn	Si	S Max	P Max	Cr	Mo	V	Cu	Ni	Nb	Ti	Al	Sn
SA 179	0.06 0.18	0.27 0.63	....	0.035	0.035									
SA 192	0.06 0.18	0.27 0.63	0.25 Max	0.035	0.035	....	....							
SA 210 Gr A1	0.27 Max	0.93 Max	0.10 Min	0.035	0.035	....	....							
SA 210 Gr C	0.35 Max	0.29 1.06	0.10 Min	0.035	0.035	....	....							
SA 106 Gr B	0.25 Max	0.29 1.06	0.10 0Min	0.035	0.035	0.4 Max	0.15 Max	0.08	0.40	0.40				
SA 106 Gr C	0.25 Max	0.29 1.06	0.10 Min	0.035	0.035	0.4 Max	0.15 Max	0.08	0.40	0.40				
API 5L Gr. A	0.22	0.9	...	0.03	0.03									
API 5L Gr. B	0.28	1.2	...	0.03	0.03			c, d			c, d	D		
API 5L Gr. X42	0.28	1.30	...	0.03	0.03			d			d	D		
API 5L Gr. X46	0.28	1.40	...	0.03	0.03			d			d	D		
API 5L Gr. X52	0.28	1.40	...	0.03	0.03			d			d	D		
DIN 2391 St 35 (Quality Class B ) (S235G2T/1.0308)	0.17	0.40 Min	0.35	0.025	0.025			0.05			0.03	0.03		
DIN 2391 St 45 (S235G2T/1.0308)	0.21	0.40 Min	0.35	0.025	0.025			0.05			0.03	0.03		
DIN 2391 St 52 (S235G2T/1.0308)	0.22	1.60 Max	0.35	0.025	0.025			0.05			0.03	0.03		

c – Unless otherwise agreed, the sum of the Niobium and Vanadium contents shall be  $\leq 0.06\%$

d – The sum of the Niobium, Vanadium and Titanium concentrations shall be  $\leq 0.15\%$

DIN 2391 St.35, St 45, St 52

### CARBON STEEL :( cont)

Standard & Grade	C	Mn	Si	S Max	P Max	Cr	Mo	V	Cu	Ni	Nb	Ti	Al	Sn Max
BS3059 Gr320	0.16	0.30 0.70	0.10 0.35	0.040	0.040									
BS3059 Gr360	0.17 Max	0.40 0.80	0.10 0.35	0.035	0.035									
BS3059 Gr440	0.12 0.18	0.90 1.20	0.10 0.35	0.035	0.035									
BS3059 G622	0.08 0.15	0.40 0.70	0.50 Max	0.030	0.030	2.00 2.50	0.90 1.20		0.25	0.30			0.02	0.03

### ALLOY STEEL:

Standard & Grade	C	Mn	Si	S Max	P Max	Cr	Mo	V	Bo	Ni	Nb	Ti	Al	N	Zr	W
SA 209 Gr T1	0.10 0.20	0.30 0.80	0.10 0.50	0.025	0.025	....	0.44 0.65									
SA 213 Gr T11	0.05 0.15	0.30 0.60	0.50 1.00	0.025	0.025	1.00 1.50	0.44 0.65									
SA 213 Gr T22	0.05 0.15	0.30 0.60	0.50 Max	0.025	0.025	1.90 2.60	0.87 1.13									
SA213 Gr T91	0.072 0.14	0.30 0.60	0.20 0.50	0.01	0.020	8.0 9.5	0.85 1.05	0.18 0.25		0.40	0.06 0.10	0.01	0.02	0.03 0.07	0.01	
SA213 Gr T92	0.07 0.13	0.30 0.60	0.5	0.01	0.02	8.5 9.5	0.30 0.60	0.15 0.25	0.001 0.006	0.40	0.04 0.09	0.01	0.02	0.03 0.07	0.01	1.50 2.0
SA213 Gr T23	0.04 0.10	0.10 0.60	0.50	0.01	0.03	1.90 2.60	0.05 0.30	0.20 0.30	0.0005 0.006		0.02 0.08		0.03	0.03		1.45 1.75
AISI 602	0.2 0.32	0.45 0.65	0.55 0.75	0.025	0.025	1.00 1.50	0.40 0.60	0.20 0.30	0.001	0.2	0.03	0.03	0.02			

## SCOPE OF SUPPLY

Sl. No.	Description	Engg. services		Mfg. & Supply
		Basic Data	Basic Engg.	
1.0	<b>CPE</b>			
1.1	<b>Piercing Mill Inlet Side Facilities</b>		YES	
1.2	<b>Piercing Mill :</b>			
	Piercing Mill Stand mainly consisting of :: 1. Work Rolls 2. Guide Discs 3. Balancing and Locking Mechanism 4. Motor Drives 5. Hydraulic Cylinders 6. Grease / Oil Lubrication 7. Complete Piping 8. All accessories for 1.2.1 to 1.2.7.			YES
1.3	<b>Piercing Mill Main Drive</b>			
	Piercing Mill Main Drive mainly consisting of :: 1. Speed Reducing Gear Units 2. Gear Couplings 3. Universal Joint Shafts 4. Oil Lubrication System for gear units 5. All accessories for 1.3.1 to 1.3.5.			YES
	Base frames for the Motors and Gear units		YES	
	Main Motors for the Piercing Mill.		YES	
1.4	<b>Piercing Mill Outlet Side</b>			
1.4.1	Piercing Mill outlet-side mainly consisting of :: 1. Guide Assembly for Hollow Billet 2. Steadiers 3. Hydraulic Cylinders 4. Thrust Block with Guide Bed 5. Mandrel Bar with Plug and its cooling arrangement 6. Mandrel Thrust Block Drive with Gear box 7. Complete Piping 8. All accessories for 1.4.1 to 1.4.7..			YES
1.4.2	a. Base Frame for guide assembly b. Pinch Roll arrangements c. Stripper Bush, Conveying Rollers, d. Shell Kick-out-arm arrangements		YES	
1.4.3	Operating parts: Plug Bars with Piercer-Plugs for the shell dimensions		YES	

Sl. No.	Description	Engg. services		Mfg. & Supply
		Basic Data	Basic Engg.	
<b>2.0</b>	<b>TRANSPORT EQUIPMENTS</b>			
2.1	Transport-arrangement of Hot Billet :: from RHF to CPE including Drag Frame		YES	
2.2	Inlet skid (Billet Cross-Transfer)		YES	
2.3	Cross Transfer and Longitudinal Transfer of Hollow Billet from :: CPE Mill outlet-side into Crimping Press line		YES	
<b>3.0</b>	<b>CRIMPING PRESS :</b>			
3.1	Crimping Press consisting of :: a. Push Bench Mandrel Bar transport-arrangement b. All required accessories.			YES
3.2	a. Modifications on the existing Mandrel-Bar-positioning Roller-Conveyor-line, b. Hollow Billet receiving-table at the Crimping Press. c. Receiving Table of Mandrel with crimped-hollow- billet at Push Bench.		YES	
3.3	a. Hydraulic Power-pack. b. Valve-stands-arrangement c. All accessories for both 3.3.a and 3.3.b. (To take care of both CPE & Crimping press).		YES	
<b>4.0</b>	<b>AUXILIARY EQUIPMENT</b>			
4.1	Hydraulic Power Station with necessary Valve Station		YES	
4.2	Grease Lubrication system	YES		
<b>5.0</b>	<b>ELECTRICAL EQUIPMENT</b>			
5.1	a. Motors b. PLCs c. Converter d. Transformer e. Control Pulpit		YES	
5.2	On-stands Electrics			YES
<b>6.0</b>	<b>PUSH BENCH</b>			
6.1	New Guide Rails for Mandrel Bars		YES	
6.2	a. Second Motor b. Converter c. Transformer		YES	

Sl. No.	Description	Engg. services		Mfg. & Supply
		Basic Data	Basic Engg.	
<b>7.0</b>	<b>STRETCH REDUCING MILL</b>			
7.1	Extension of “C” frame to accommodate 6 Stands of 300 mm Roll Diameter (Position 23-28) - similar to existing design. (GA Drawing of Existing stand is enclosed – ANNEXURE V)			YES
7.2.	3 Nos. Duo-Gear-Box arrangement to suit existing layout		YES	
7.3	Modification of Roll-Stand-Changing-Equipment, including intermediate table between Mill Stands and Changing Cars		YES	
7.4.	Modification of Hydraulic and Oil Lubrication System		YES	
7.5.	Electrical Equipments such as Motor, Drive, etc. with component lists		YES	
<b>8.0</b>	<b>Tube guidance system between SRM and Rotary Saw.</b>			
8.1	Roller Conveyers Height Adjustable Equipment with V-Roller.		YES	
<b>9.0</b>	<b>ROTARY SAW</b>			
9.1.	Rotary saw consisting of :: a. Height Adjustment System b. Tube Support System with stand-by c. Drive System d. All required accessories.			YES
9.2	Noise Protection Cover		YES	
<b>10.0</b>	<b>Scrap end Removal Mechanism at Rotary Saw</b>		YES	
<b>11.0</b>	<b>Roller Conveyor to Cooling Bed</b> consisting of Support Frame Roller Drives along with required accessories.			YES
<b>12.0</b>	<b>OPTIONAL EQUIPMENTS</b> (Supplier to specify)			

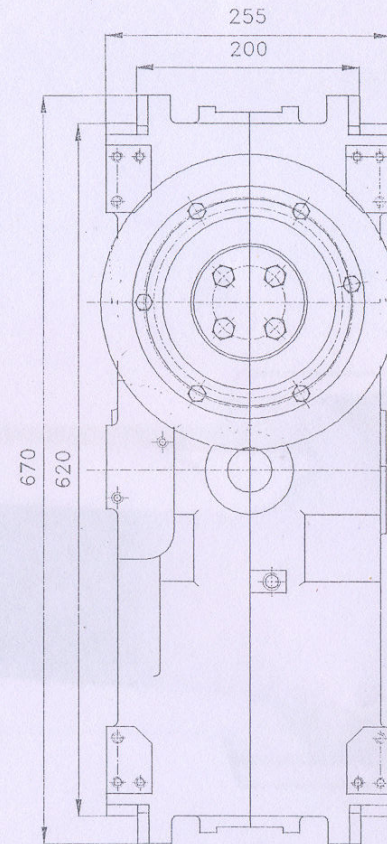
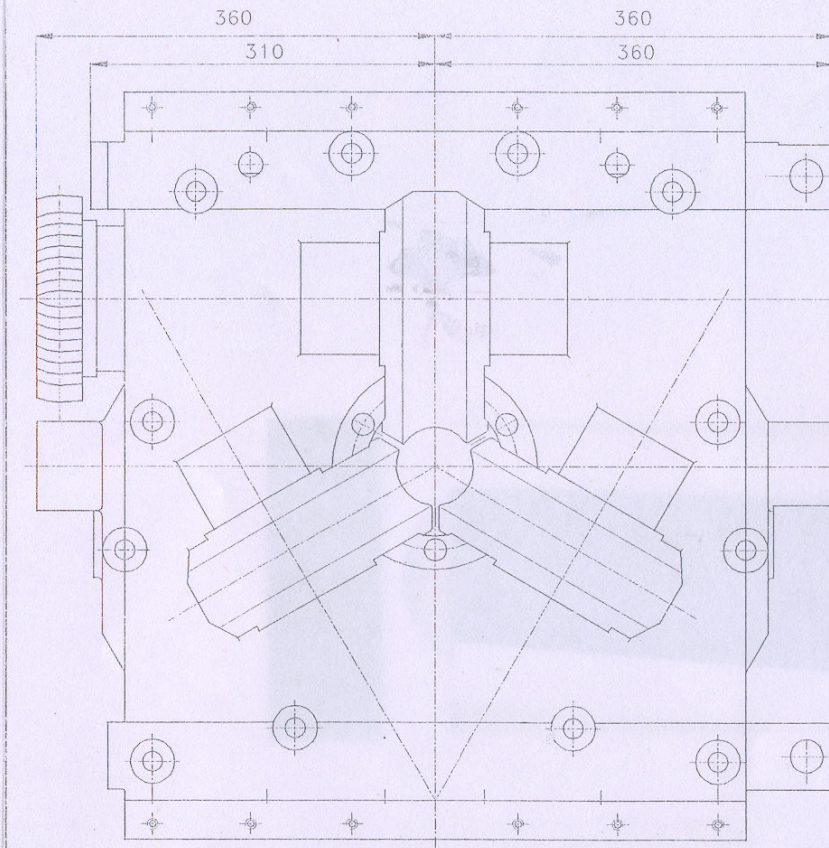
Basic Data	Detailed Technical Specification with input & output details.
Basic Engineering	Includes Assembly Drawings, Bill of Material for Sub-Assemblies, Circuit Drawings with Bill of Material & specification.
Manufacture and Supply	Includes Engineering, Manufacturing & Supply




ALL DIMENSIONS ARE IN MILLIMETERS

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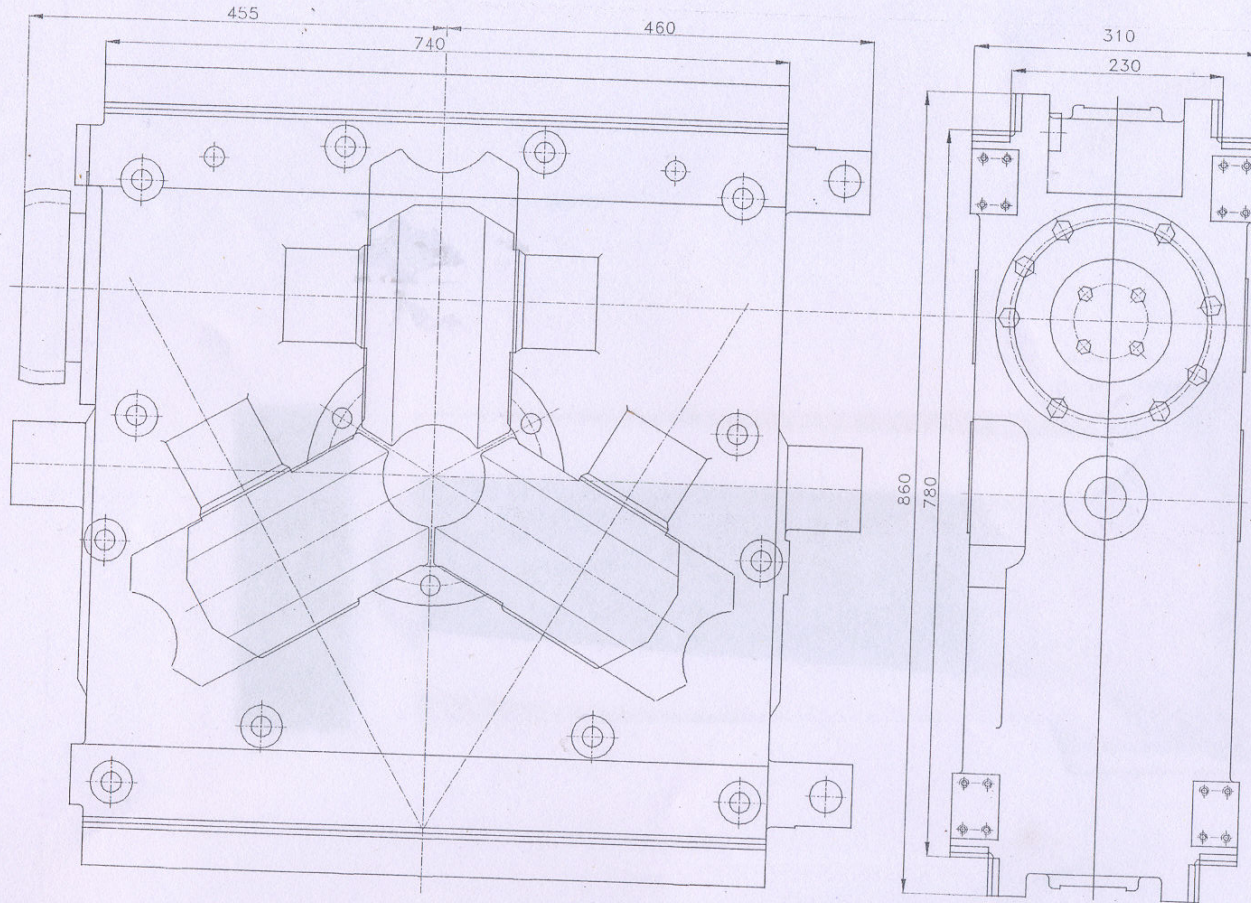
		Bharat Heavy Electricals Ltd		DRN	NAME	SIGNATURE	DATE
		SEAMLESS STEEL TUBE PLANT		CHD			
		TIRUCHIRAPALLI - 620014		APPD	S.KARUPPASAMY		
DEPT TE	GRADE OF UNTOL. DIM C/M/F	SCALE N T S	WEIGHT(kg) 498 Kg	REF TO ASSY DWG NO		ITEM NO	
CODE				REF TO OLD DWG NO			
TITLE ROLLING STAND 300 (FOR S S T P)				CARD CODE U 01	DRAWING NO : SSTP.TE.SKT.3.2803		REV 00




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		Bharat Heavy Electricals Ltd		DRN	NAME	SIGNATURE	DATE
		SEAMLESS STEEL TUBE PLANT		CHD	R.KUMAR		18.08.08
		TIRUCHIRAPALLI - 620014		APPD	S.KARUPPASAMY		
DEPT TE	GRADE OF UNTOL. DIM C/M/F	SCALE NTS	WEIGHT(kg) 900 Kg	REF TO ASSY DWG NO		ITEM NO	
CODE				REF TO OLD DWG NO			
TITLE ROLLING STAND 380 (FOR S S T P)				CARD CODE U 01	DRAWING NO : SSTP.TE.SKT.3.2802		REV 00

# Annexure-IV

OUTPUT PRODUCT SIZES (SRM)				
CARBON STEEL TUBES				
SL No	OD (mm)	Finished tube Wall Thickness (mm)	Spec	Length of Single tube (Mtr)
1	26.7	2.87, 3.91, 5.56	Gr B	6
2	31.8	3.2, 3.5, 4, 4.5, 6	A1	10, 12.15
3	33.4	3.38, 4.55, 6.35, 9.09	GrB	6
4	38.1	3, 3.2, 3.6, 4, 4.5, 5, 5.3, 6.1	A1,C	10, 11, 12.15, 12.8, 13.8
5	44.5	4, 4.5, 5, 7.1, 9, 11	A1,C	12.15
6	47.63	3.4, 3.6, 5, 8.6, 10, 11	GrC	12.15
7	48.3	3.68, 5.08, 7.14	GrB	6
8	51	11	A1,C	11.5, 12.15
9	54	4, 4.5, 5, 6, 9	A1,C	10, 11.5, 12.15
10	57	6, 6.6, 8.8	A1,C	12.15
11	60.3	3.91, 5.54, 8.70, 9.4, 11.07	GrB, C	6, 7.5, 11, 11.5, 12.15
12	63.5	3.66, 4, 4.8, 5.6, 6, 6.3, 7.1, 10.16, 13	SA192, A1, GrC	10, 11.5, 12.15
13	73	5.16, 7.01, 9.53	GrB	6,7
14	76.1	3.2, 3.6, 4, 4.5, 6.3, 7.1, 12.5	SA192, A1, GrC	11, 11.5, 12.15
15	82.5	3.6, 4, 4.5	SA192, A1	8
16	88.9	4, 5.49, 6.3, 7.62, 11.13, 12.5	GrB	6.5, 7.5, 9.5
17	108	4, 8, 12.5	A1, GrB	6, 10, 11.5
18	114.3	4, 6.02, 8.56, 11.13	GrB	7, 9, 10, 11, 11.5
19	127	4, 8, 12.5	GrB	7, 9, 10, 11, 11.5
20	133	4, 10, 13	GrB, GrC	5.5, 6.5, 8, 9

ALLOY STEEL TUBES				
SI No	OD (mm)	Finished tube Wall Thickness (mm)	Spec	Length of Single tube (Mtr)
1	28.58		T12	11, 11.50, 12.15
2	31.75	5.59	T12	11, 11.50, 12.15
3	38.1	3.6, 4.57, 8.13	T11, T12, T22	11, 11.50, 12.15
4	44.5	4.5, 5, 5.60, 6.1, 7.16, 8, 9, 10.8	T12, T91, T11, T22	11, 11.50, 12.15
5	47.63	4.5, 5, 6, 6.6, 8.6, 10, 8	T11, T22	11, 11.50, 12.15
6	51	4, 4.5, 5, 5.6, 6.3, 7.1, 6.43, 12, 9, 10, 11	T91, T11, T22	11, 11.50, 12.15
7	54	4, 4.5, 5, 6.3, 12	T1, T11	11, 11.50, 12.15
8	57	6, 8	T11,T22	11, 11.50, 12.15
9	63.5	4, 4.2, 4.5, 5, 6.3, 7.1, 12, 7.62	T11, T12, T22, T91	11, 11.50, 12.15



**Items for which Detailed Engineering is required.**

Sl. No.	Description	Detailed Engg.	Price
1.0	<b>CPE</b>		
1.1	<b>Piercing Mill Inlet Side Facilities</b>	YES	
1.2	<b>Piercing Mill :</b>		
	Base frames for the Motors and Gear units	YES	
1.3	<b>Piercing Mill Outlet Side</b>		
1.3.1	a. Base Frame for guide assembly b. Pinch Roll arrangements c. Stripper Bush, Conveying Rollers, d. Shell Kick-out-arm arrangements	YES	
1.3.2.	Operating parts: Plug Bars with Piercer-Plugs for the shell dimensions	YES	
2.0	<b>TRANSPORT EQUIPMENTS</b>		
2.1	Transport-arrangement of Hot Billet :: from RHF to CPE including Drag Frame	YES	
2.2	Inlet skid (Billet Cross-Transfer)	YES	
2.3	Cross Transfer and Longitudinal Transfer of Hollow Billet from :: CPE Mill outlet-side into Crimping Press line	YES	
3.0	<b>CRIMPING PRESS :</b>		
3.1	a. Modifications on the existing Mandrel-Bar-positioning Roller-Conveyor-line, b. Hollow Billet receiving-table at the Crimping Press. c. Receiving Table of Mandrel with crimped-hollow- billet at Push Bench.	YES	
3.2	a. Hydraulic Power-pack. b. Valve-stands-arrangement c. All accessories for both 3.3.a and 3.3.b. (To take care of both CPE & Crimping press).	YES	
4.0	<b>AUXILIARY EQUIPMENT</b>		
4.1	Hydraulic Power Station with necessary Valve Station	YES	
5.0	<b>PUSH BENCH</b>		
5.1	New Guide Rails for Mandrel Bars	YES	
6.0	<b>STRETCH REDUCING MILL</b>		
6.1.	3 Nos. Duo-Gear-Box arrangement to suit existing layout	YES	

Sl. No.	Description	Detailed Engg.	Price
6.2.	Replacement of existing “C” Frame for :: a. Nominal Diameter 380mm for Position 1-8 b. Nominal Diameter 300 mm for Position 9-22	YES	
6.3	Modification of Roll-Stand-Changing-Equipment, including intermediate table between Mill Stands and Changing Cars	YES	
6.4.	Modification of Hydraulic and Oil Lubrication System	YES	
<b>7.0</b>	<b>Tube guidance system between SRM and Rotary Saw.</b>		
7.1	Roller Conveyers Height Adjustable Equipment with V-Roller.	YES	
<b>8.0</b>	<b>ROTARY SAW</b>		
8.1	Noise Protection Cover	YES	
<b>9.0</b>	<b>Scrap end Removal Mechanism at Rotary Saw</b>	YES	
<b>10.0</b>	<b>OPTIONAL EQUIPMENTS</b> (Supplier to specify)		

Detailed Engineering	Includes Assembly Drawings, Bill of Material for Sub-assemblies, Manufacturing Drawings for components, Material Specification, Bill of Materials, source of supply, etc.
	Circuit Drawings with Bill of Material & Specification, etc.

**Note :**

1. Above request for Prices for Detailed Engineering is only **optional**. BHEL reserves the right to exercise their option either to opt for Basic Engineering (Annexure-II in full) or Detailed Engineering (Annexure-IV in full or part). It shall be considered appropriately during the process of this Tender.
2. Price for Detailed Engineering (Annexure-IV) shall exclude the Price of Basic Engineering for the respective item.
3. Price for Detailed Engineering indicated by the Vendor shall not be considered for Ranking of Vendors for Main-Plant Supply and Basic Engineering Services, as per Annexure-II).