An ISO 9001 Company

Bharat Heavy Electricals Limited

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

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

	Enquiry Number:	**Enquiry Date:**	**Due date for submission of quotation:**
	2710900001	**26.02.2009**	**26.03.2009**
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)**
	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 www.bhel.com or http://tenders.gov.in)	**1 No.**	**30.11.2010**

Note:

Interested vendors are requested to visit BHEL, SSTP, Trichy to see the existing facility, location and understand all other relevant data / details etc., prior to submission of quotation if felt necessary by the tenderer.

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 **"2710900001".**

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 Supply of CPE Mill for Manufacture of Boiler Quality Seamless Steel Tubes

Sl. No.	PARTICULARS	VENDOR RESPONSE
1.1	a. Vendor must be an Original Equipment Manufacturer of : a. Cross Piercing and Elongation (CPE) Mill, b. Crimping Press, c. SRM Extension and d. Rotary Saw. b. Above OEM Vendor must have supplied and commissioned at-least : 1. One New CPE Plant for manufacture of Boiler Quality Seamless Steel Tubes. (or) 2. One Retrofitting with CPE mill (for manufacture of Boiler Quality Tubes), having Push Bench arrangement. c. Above Production Line(s) with the CPE Mills, should be presently working satisfactorily at least for Two-years after commissioning - as on Tender opening Date.. d. Vendor shall submit their Offer in TOTAL, covering all the Equipments, viz., CPE Mill, Crimping Press, SRM Extension and Rotary Saw. Part-Offers shall not be taken into consideration.	

Note :

1. **Offers of only those Vendors, who meet the above Qualifying Criteria (Part-A, Section-I, 1.1), shall only be considered for further evaluation**
2. **BHEL reserves the right to verify the information provided by Vendor. In case, any information provided by Vendor is found to be false/ incorrect, their Offer shall be liable for rejection.**

PART – A

SECTION-II

Vendor is requested to provide the following details

<table>
<tr><th>Sl. No.</th><th>PARTICULARS</th><th>VENDOR RESPONSE</th></tr>
<tr><td>1.0</td><td>Total Experience of Vendor in the field of Design, Manufacture, Supply, Erection & Commissioning of Boiler Quality Tube Manufacturing Lines.</td><td></td></tr>
<tr><td>2.0</td><td>Number of Boiler Quality Tube Mills supplied, installed and commissioned till date</td><td></td></tr>
<tr><td>3.0</td><td>Number of Boiler Quality Tube Mills supplied, installed and commissioned
till date in the QUOTED MODEL</td><td></td></tr>
<tr><td>4.0</td><td>Number of such Boiler Quality Tube Mills supplied, installed and commissioned
till date for the following
a) New Plants (with CPE)
b) Retrofitting of Tube Mill with CPE + Push Bench arrangement.</td><td></td></tr>
<tr><td>5.0</td><td>Vendor shall furnish a Reference List of their CPE installations available - with the following details :
(Note : Specifically marking the Plants where the Quoted Model of CPE is installed)
<table>
<tr><th>Sl. No.</th><th>Name of Customer</th><th>Complete Postal Address</th><th>Month & Year of Commission-ing</th><th>Application for which the Mill was supplied</th><th>Name & Designation of the Contact Person</th><th>Contact Details (Phone, Fax, E-Mail)</th></tr>
</table></td><td></td></tr>
<tr><td>6.0</td><td>Details of :
a. Services-after-Sales set-up in India
b. Address of Agents / Service Centre in India
c. Address of Agents / Service Centre in Asian Region.</td><td></td></tr>
<tr><td>7.0</td><td>Any Additional Data to supplement the capability of the Vendor
for Design and Manufacture of CPE Mill for production of
Boiler Quality Seamless Steel Tubes..</td><td></td></tr>
</table>

PART – A

SECTION-III

Vendor has to comply with the following

Sl. No.	REQUIREMENTS	COMPLIANCE of VENDOR
1.0	VENDOR shall submit Offer in TWO PARTS – 1. **Part-I ..** Technical (Part – A & Part – B), Commercial and Un-Priced price Bid 2. **Part II ..** Price Bid	
2.0	BID shall contain a clause-by-clause Technical Comparative Statement of Technical Specifications furnished by BHEL Vs. Offer Details submitted by the Vendor. Wherever details are required, a mere indication of 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words in the Technical Comparative Statement, may lead to disqualification of the Technical Bid (Part-I of Two-Bid system) .	
3.0	Commercial Bid (furnished with Part-I of Two Bid System), shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation	
4.0	Vendor to indicate the Country of Origin for the supply of quoted Equipments.	

PART - B

TECHNICAL SPECIFICATION FOR SUPPLY OF CPE MILL FOR SEAMLESS STEEL TUBE MANUFACTURING

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
1.0	**PREAMBLE**		
1.0.1	**SSTP/BHEL/TRICHY** Seamless Steel Tube Plant (SSTP) is manufacturing Seamless Steel Tubes – 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, Petrochemical, Oil & Gas.		
1.0.2	**HOT MILL/SSTP** 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..		

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
1.0.3	SSTP now proposes to convert the existing push bench into CPE by: 1. Replace Vertical Piercing Press and Elongator with Cross roll Piercing Mill (including a Crimping Press). 2. Addition of 6 Stands at SRM and 3. Introduction of Rotary Saw after SRM		
2.0	**PURPOSE:**		
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.		
2.1	**Product Details:**		
2.1.1	**Input Material:**	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	Vendor to specify	

<table>
<tr><th>S. No.</th><th>PARTICULARS</th><th>BHEL SPECIFICATION</th><th>BIDDER's OFFER [With Complete Technical Details]</th></tr>
<tr><td>2.1.1.8</td><td><u>Cycle time :</u>
Billet discharge from RHF to start of pushing in Push Bench</td><td>Vendor to specify</td><td></td></tr>
<tr><td>2.1.2</td><td>Material Specification</td><td>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>
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>SAE 52100</td></tr>
</table></td><td></td></tr>
<tr><td>2.1.3.</td><td>Chemical Composition</td><td>Furnished in Annexure- I</td><td></td></tr>
<tr><td>2.1.4</td><td>Output -Final Product Range (After SRM):</td><td></td><td></td></tr>
<tr><td>2.1.4.1</td><td>Outside Diameter -- Min.</td><td>31.80 mm.</td><td></td></tr>
<tr><td>2.1.4.2</td><td>Outside Diameter -- Max.</td><td>133.00 mm.</td><td></td></tr>
<tr><td>2.1.4.3</td><td>Wall Thickness -- Min.</td><td>3.20 mm.</td><td></td></tr>
</table>

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
2.1.4.4	Wall Thickness -- Max.	14.00 mm.	
3.0	**SCOPE OF SUPPLY OF EQUIPMENTS (for detailed scope, please refer Annexure-II)**		
3.1	CROSS ROLL PIERCER	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.	
4.0	**EQUIPMENT SPECIFICATION**		
4.1	**CROSS ROLL PIERCER**		
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.	
4.1.2.1	Size and Capacity of the Piercing Mill	Vendor to specify	
4.1.2.2	Model No. of Piercing Mill	Vendor to specify	
4.1.2.3	Type of Work Roll	Vendor to specify	
4.1.2.4	Work Roll shall be suitable to process all listed Material Grades under Ref: 2.1.2	Vendor to confirm	
4.1.2.5	No. of work Rolls & Arrangement	Vendor to specify	
4.1.2.6	Feed angle	Vendor to specify.	
4.1.2.7	Provision for adjusting feed angle	Vendor to specify.	
4.1.2.8	Work Roll Diameter	Vendor to specify.	
4.1.2.9	Work Roll Length	Vendor to specify.	
4.1.2.10	Work Roll Speed	Vendor to specify.	
4.1.2.11	Work Roll Drive System	Vendor to specify.	
4.1.2.12	Number of Motors and its Rating	Vendor to specify.	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.1.3	**Piercing Mill Stand:**		
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 specify.	
4.1.4	**Piercing Mill Inlet:**		
4.1.4.1	Hydraulically Operated Entry Pusher with Push Bar.	Vendor to specify	
4.1.4.2	Inlet Trough	Vendor to specify	
4.1.5	**Piercing Mill Outlet:**		

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
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 specify	
4.1.6	**ALIGNMENT**		
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 specify	
4.1.7	**ECCENTRICITY**		
4.1.7.1	Eccentricity of Piercing Mill output (Hollow Billet Wall) Eccentricity % = {(Max. – Min.) / (Max. + Min.)} *100	Max. 3%.	
4.2	**CRIMPING PRESS**		

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
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 Piercing Mill	
4.2.4	Diameter of Mandrel to be inserted into the Hollow Billet	118 mm	
4.2.5	Crimped Length & Diameter (max. & min.) Note : 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.	Vendor to specify	
4.2.6	Crimping Loss	Vendor to specify	
4.2.7	Details of Transport Conveyor System from Piercing Mill to Crimping Press	Vendor to specify	
4.2.8	Details of Transport Conveyor System from Crimping Press to Push Bench	Vendor to specify	
4.2.9	Details of Transport Conveyor System for transfer of Mandrels from Mandrel Heating Skid to Crimping Press.	Vendor to specify	
4.2.10	Temperature of Mandrel and Hot Hollow Billet required for crimping and further pushing operation in Push Bench a, Maximum & Minimum Temperature of Hollow Billet b. Maximum & Minimum Temperature of Mandrel	Vendor to specify	
4.2.11	Configuration of Mandrel - Leading & Trailing ends.	Vendor to specify	
4.2.12	Crimping Press Capacity.	Vendor to specify	
4.2.13	No. of Crimping to match CPE output	Vendor to confirm	
4.3	**SRM EXTENSION BY 6- STAND-POSITIONS.**		

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.3.1	Purpose : 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 of Rectangular type). Following existing arrangements shall be retained : a. 22 stand mounting 'C' frame b. Gear boxes c. Drive mechanisms d. Stand changing device. 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.oo and SSTP:TE:SKT:3.2803/Rev.00) – Ref. Annexure III).	300 mm	
4.3.5	No. of new Stand Position (23-28 position)	6 nos.	
4.3.6	Required 'C' Frame for additional 6 Roll Stands (for 23-28 Position) - similar to the existing one (at 1-22 Position).	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
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 specify.	
4.4	**ROTARY SAW**		
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	0.5 M/Sec to 6.0 M/Sec.	
4.4.5	Minimum Length of Tube to be cut	Vendor to specify	
4.4.6	Maximum Length of Tube to be cut	Vendor to specify	
4.4.7	Provision for height adjustment to match the Diameter of the tube	Vendor to specify	
4.4.8	Provision of kick-out system for leading and trailing end cut bits	Vendor to specify	
4.4.9	Aligning conveyors before and after Rotary Saw	Vendor to specify	
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.	Vendor to specify	
4.4.12	Tolerance on Cut-Length	Vendor to specify	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
4.4.13	Dimensions, Type and Material of Blade	Vendor to specify	
4.5	**OPTIONAL EQUIPMENT**		
	Any other equipment which will enhance performance, productivity etc. of Mill. (Complete details to be provided by Vendor)	Vendor to specify	
5.0	**SUB SYSTEM OF EQUIPMENTS**		
5.1	**HYDRAULICS:** **a. <u>Scope of Vendor :</u>** Only equipment-mounted-hydraulic-elements. **b. <u>Scope of BHEL :</u>** Power pack, valve stand & piping upto equipments.	Vendor to note	
5.1.1	Preferred Brand/Make of Hydraulic products. 1. Bosch Rexroth 2. Vickers Sperry 3. Denison 4. Parker Hannifin	Vendor to confirm	
5.1.2	Hydraulic Circuits shall be suitable for ISO VG 68 oil only.	Vendor to confirm	
5.1.3	Hydraulic Pump capacity (flow / pressure)	Vendor to specify	
5.1.4	Pump Motor Power in kW	Vendor to specify	
5.1.5	Hydraulic Tank Capacity	Vendor to specify	
5.2	**LUBRICATION:**		
5.2.1	Oil Lubrication and Grease Lubrication arrangement shall be provided for all rotating & moving components of vendor supply.	Vendor to Confirm	
5.3	**PNEUMATICS:**		
5.3.1	Pneumatic operated elements of the equipment shall work efficiently with BHEL Compressed Air supply at a pressure of **4 to 6 Kg / cm^2**	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
5.4	**ELECTRICAL:**		
5.4.1	BHEL shall generally provide power supply : 415V +/-10%, 50Hz +/- 3 % 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 % 3 phase AC (3 wire system without neutral).	Vendor to note.	
5.4.3	All electrical / electronic equipment installed in Mill area 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 Rails, wherever possible.	Vendor to confirm	
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.	Vendor to confirm	
5.4.7	Motors & other electrical components shall conform 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	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
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	
6.0	**SAFETY ARRANGEMENTS:**		
6.1	Equipments shall have adequate and reliable safety / interlock devices to avoid damage to the equipment, work piece and the operator.	Vendor to specify	
6.2	Emergency Switches at suitable locations shall be provided as per IEC.	Vendor to Confirm	
7.0	**PRODUCTION TOOLING:**		
7.1	Vendor shall provide : 1. List of Production Tools for : a. Piercing Mill b. Crimping Press c. Rotary Saw 2. Expected Life of above Tools 3. Drawings for above Tools 4. Drawing for Push Bench mandrel 5. Sub vendor source, if any, for the above Tools	Vendor to Specify	
7.2	Vendor shall furnish Design for SRM Stand Calibers for all the product range as per Annexure- IV	Vendor to Specify	
8.0	**TOOLS FOR ERECTION, COMMISSIONING and OPERATION & MAINTENANCE:**		
8.1	Vendor shall bring Special Tools and Equipments required for Erection of the proposed equipments	Vendor to confirm	
8.2	Vendor shall bring any Test Equipments required for checking & alignment of the Equipments, Components, etc.	Vendor to confirm.	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
8.3	Vendor shall bring Laser and Optical equipments, if required, for checking, aligning and positioning of the Equipments, Components, etc..	Vendor to confirm	
9.0	**SPARES:**		
9.1	**Recommended & Mandatory Spares:** Vendor shall furnish Equipment-wise-List (Mechanical, Hydraulic, Electrical and Electronic items) - required for 2 years (on three shifts basis) of trouble free operation of the equipments under Vendor scope.	Vendor to Specify.	
9.2	**Other Spares (items not covered under 9.1):** Vendor to specify Equipment-wise-List (Mechanical, Hydraulic, Electrical and Electronic items) with Sub-Vendor details	Vendor to Specify	
9.3	Vendor to confirm that Spares for all the Equipments and Accessories supplied by Vendor, shall be made available at-least for ten years after commissioning of the Equipments. Note: 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 : a. Necessary Technical Details b. Drawings of Parts / Components c. Details of Spares d. Alternate Vendor sources to enable BHEL to procure such items in advance, if required	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
10.0	**DOCUMENTATION:** Vendor to furnish Documents for Equipments under Vendor scope, **a. <u>Along with Equipments :</u>** **<u>One set</u>** (Hard copy) - in English language. b. **<u>After completion of Erection and Commissioning</u>** : **1. <u>Three sets of Hard Copy</u>**: As-built-Drawings (including GA drawings) and updated Operation & Maintenance Manuals - including Bought-out items. **2. <u>One set of Soft-copy</u>:** All Documents listed in 10.0.b.1	Vendor to confirm	
10.1	Maintenance-Schedules for all Equipments, such as daily, weekly, monthly Schedules, etc.	Vendor to specify	
10.2	Complete Master List of Parts used in the Equipments.	Vendor to specify	
11.0	**INSPECTION-cum-TRAINING:**		
11.1	BHEL shall depute eight Engineers for Inspection and Training at Vendor works. Vendor shall train BHEL Engineers in Operation / Maintenance (Mechanical, Electrical & Electronics systems) of each equipment viz. CPE, Crimping press, SRM & Rotary Saw at Vendor works for a period of 10 days. (Total 80 man-days).	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
11.2	Vendor shall impart Training to BHEL Operators & Maintenance-Crew in Operation & Maintenance (Mechanical, Electrical & Electronics systems) - after commissioning of the Equipments at BHEL works – Duration two weeks.	Vendor to confirm	
11.3	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,	Vendor to Confirm	
11.4	Airfare, Boarding & Lodging for the Trainees (deputed to Vendor Works) shall be borne by BHEL.	Vendor to note	
11.5	Vendor shall arrange Competent English speaking experts, during training both at BHEL Works and Vendor Works, for satisfactory & effective training of BHEL personnel	Vendor to Confirm	
12.0	**FOUNDATION:**		

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
12.1	**Within THREE months from date of Letter of Intent :** Vendor shall submit Preliminary Layout Drawings for BHEL approval, taking into consideration of other existing Equipments / Layout at SSTP. **Within NINE months from date of Letter of Intent :** Vendor shall submit Foundation details, viz. Static / Dynamic Load details, etc., and Final Layout Drawings, **Note :** 1. Layout shall consist of all requirements pertaining to complete Equipments, including space requirement for any other accessories. 2. Vendor shall also indicate, if required, detailed specifications of Grouting Compounds, Grouting Procedure, etc., for fixing of Foundation Bolts of the Equipments.	Vendor to Confirm	
12.2	BHEL shall design and construct complete Foundation for the Equipments as per the recommendation of Vendor.	Vendor to note	
12.3	List of Foundation / Anchorage material.	Vendor to specify	
13.0	**ERECTION & COMMISSIONING**		
13.1	Vendor to take full responsibility for Supervision of the Erection, Start up, Testing and Commissioning of Equipments, along with accessories supplied by them **Note :** BHEL shall provide Service / Utilities requirement, like Power, Air & Water, Crane and Personnel for helping.	Vendor to confirm	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
13.2	Vendor shall bring, if required, Tools, Test Mandrels, Instruments and other necessary equipments, including Laser/Optical equipments & instruments, required to carry out all the above activities.	Vendor to specify	
13.3	Vendor shall furnish a Schedule for Erection & Commissioning along with offer.	Vendor to confirm	
13.4	Vendor shall furnish Charges, Duration, Terms & Conditions for Erection & Commissioning (with break-up details), along with Offer.	Vendor to confirm	
14.0	**TESTS**		
14.1	**No Load Test** No Load Tests shall be carried out in accordance with applicable standards recommended by the Vendor.	Vendor to specify	
15.0	**AMBIENT CONDITIONS & THERMAL STABILITY:**		
15.1	All equipments outside the control room shall work trouble-free and efficiently under following operating conditions and shall deliver specified accuracies. Power Supply: Voltage: 415 V +/- 10%, Frequency: 50 Hz +/- 3%, No. of phases : 3 Equipments shall be suitable for :: Ambient Temperature :: 45 ° C Relative Humidity :: 90 % (However, both do not occur simultaneously).	Vendor to confirm	

<table>
<tr><th>S. No.</th><th>PARTICULARS</th><th>BHEL SPECIFICATION</th><th>BIDDER's OFFER [With Complete Technical Details]</th></tr>
<tr><td>15.2</td><td>Weather conditions: Tropical & Dust-laden Atmosphere.</td><td>Vendor to note</td><td></td></tr>
<tr><td>16.0</td><td>PERFORMANCE TEST</td><td></td><td></td></tr>
<tr><td>16.1</td><td><u>CPE & Crimping Press Area</u>:
<u>Vendor shall establish</u> :
1. Output of minimum 600 pieces at CPE & Crimping Press in a period of eight hours.
2. Eccentricity of hollow billet shall be within 3 % at any cross section.
3. Processing of T 91 material.</td><td>Vendor to confirm.</td><td></td></tr>
<tr><td>16.2</td><td><u>SRM Area</u>
Following sizes shall be rolled in SRM, cut to length in Rotary saw and transferred to cooling bed
<table>
<tr><th>Sl. No.</th><th>Tube OD (mm)</th><th>Tube Wall Thickness (mm)</th><th>Material Grade</th></tr>
<tr><td>1</td><td>38.1</td><td>5.7</td><td>CS</td></tr>
<tr><td>2</td><td>63.5</td><td>6.3</td><td>CS</td></tr>
<tr><td>3</td><td>47.63</td><td>7.4</td><td>T 11</td></tr>
<tr><td>4</td><td>44.5</td><td>11</td><td>T 22</td></tr>
<tr><td>5</td><td>133</td><td>14</td><td>CS</td></tr>
</table></td><td>Vendor to confirm</td><td></td></tr>
<tr><td>17.0</td><td>PACKING:</td><td></td><td></td></tr>
</table>

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
17.1	Vendor shall arrange to provide suitable packing (Sea-worthy, Rigid, Pest & Vermin Proof and Phyto-Treated/Certified) - for all items, to avoid any damage / loss in transit. When equipments are dispatched in Containers, all small / loose items shall be suitably packed in boxes and put inside the Containers.	Vendor to confirm	
18.0	**GUARANTEE:**		
18.1	a. 12 Months from the date of acceptance of the Equipments at BHEL Works b. Optional: Vendor to indicate additional charges, if any, for 12 more months. Note : For complete details, Vendor may please refer Commercial Terms & Conditions.	Vendor to confirm	
19.0	**GENERAL:**		
19.1	Total connected Load (KVA) required	Vendor to specify	
19.2	Floor area required (Length, Width, Height) for each equipment & accessories	Vendor to specify	
19.3	Painting of Equipment / Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	Vendor to confirm	
19.4	Estimated Total weight of the Equipments (Break-up details for each Equipment and Accessories)	Vendor to specify	
19.5	Estimated Weight of the heaviest part of all equipments	Vendor to specify	
19.6	Estimated Dimensions of the largest part / sub-assembly / assembly.	Vendor to specify	

S. No.	PARTICULARS	BHEL SPECIFICATION	BIDDER's OFFER [With Complete Technical Details]
19.7	Vendor to furnish Detailed Catalogues, Sketches / Photographs of the proposed Equipments and Accessories / Attachments, along with Offer.	Vendor to confirm	

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 .. Optional items (for Detail Engineering)

Price schedule

Sl. No.	PARTICULARS	PRICE
1.0	**Manufacture and Supply :**	
	1. Cross Roll Piercer & Elongator	
	2. Crimping Press	
	3. Extension of Existing SRM by SRM – by SIX more stands.	
	4. Rotary Saw	
2.0	Engineering Services for Basic Data / Basic Engineering, as per Scope of Supply (Annexure – II).	
3.0	**Optional Items :**	
	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. (Vendor to furnish complete details).	

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 <=0.06%
d – The sum of the Niobium, Vanadium and Titanium concentrations shall be <=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			
SAE 52100	0.98 1.10	0.25 0.45	0.15 0.35	0.015	0.025	1.40 1.60				0.25						Cu 0.30

ANNEXURE - II

SCOPE OF SUPPLY

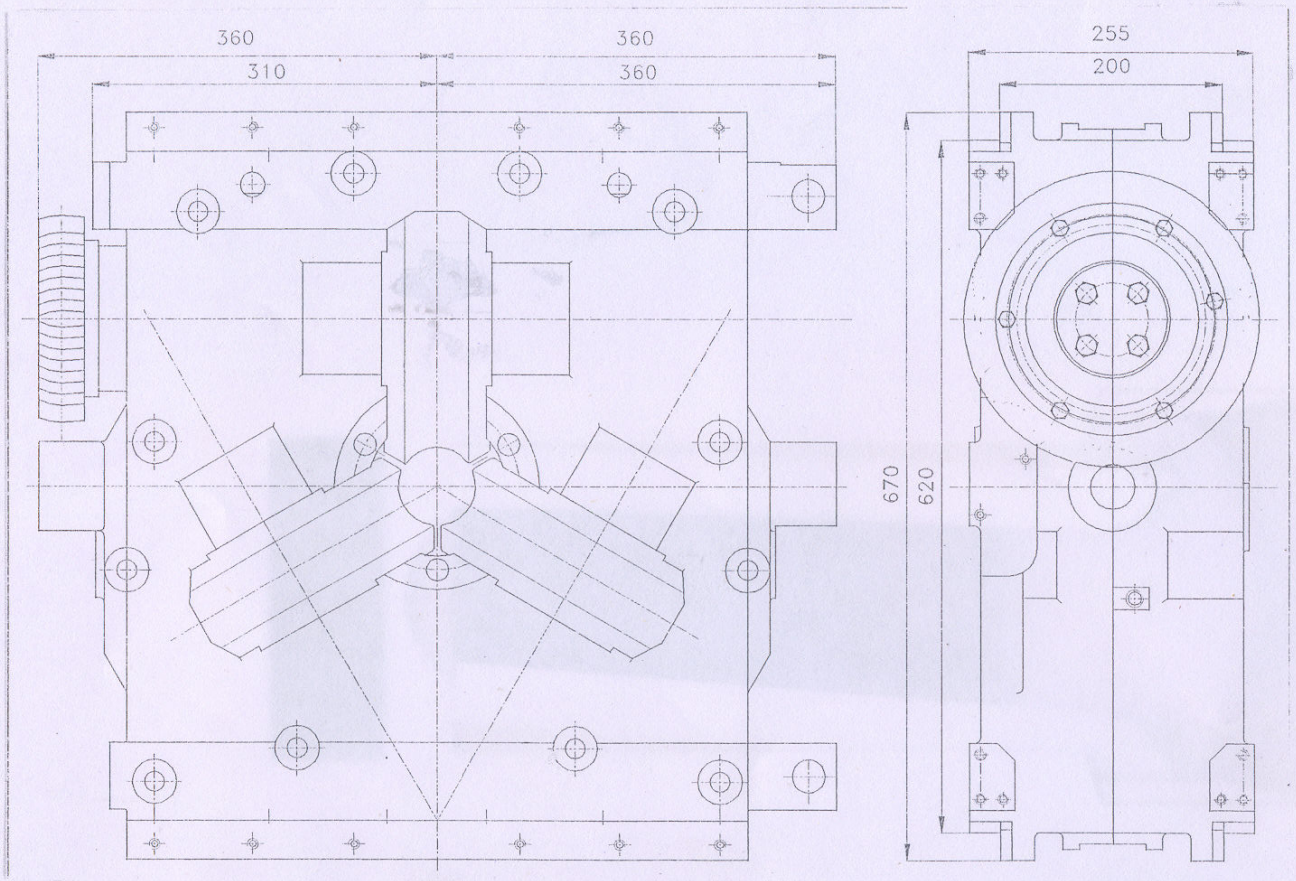
Sl. No.	Description	Engg. services		Mfg. & Supply
		Basic Data	Basic Engg.	
1.0	**CPE**			
1.1	**Piercing Mill Inlet Side Facilities**		YES	
1.2	**Piercing Mill :**			
	Piercing Mill Stand mainly consisting of :: 1. Work Rolls 2. Guide Discs 3. Balancing and Locking Mechanism 4. Motor Drives 5. Hydraulic Cylinders 6. Grease / Oil Lubrication 7. Complete Piping 8. All accessories for 1.2.1 to 1.2.7.			YES
1.3	**Piercing Mill Main Drive**			
	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	**Piercing Mill Outlet Side**			
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.	
2.0	**TRANSPORT EQUIPMENTS**			
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	**CRIMPING PRESS :**			
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	
4.0	**AUXILIARY EQUIPMENT**			
4.1	Hydraulic Power Station with necessary Valve Station		YES	
4.2	Grease Lubrication system	YES		
5.0	**ELECTRICAL EQUIPMENT**			
5.1	a. Motors b. PLCs c. Converter d. Transformer e. Control Pulpit		YES	
5.2	On-stands Electrics			YES
6.0	**PUSH BENCH**			
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.	
7.0	**STRETCH REDUCING MILL**			
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	
8.0	**Tube guidance system between SRM and Rotary Saw.**			
8.1	Roller Conveyers Height Adjustable Equipment with V-Roller.		YES	
9.0	**ROTARY SAW**			
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	
10.0	**Scrap end Removal Mechanism at Rotary Saw**		YES	
11.0	**Roller Conveyor to Cooling Bed** consisting of Support Frame Roller Drives along with required accessories.			YES
12.0	**OPTIONAL EQUIPMENTS** (Supplier to specify)			

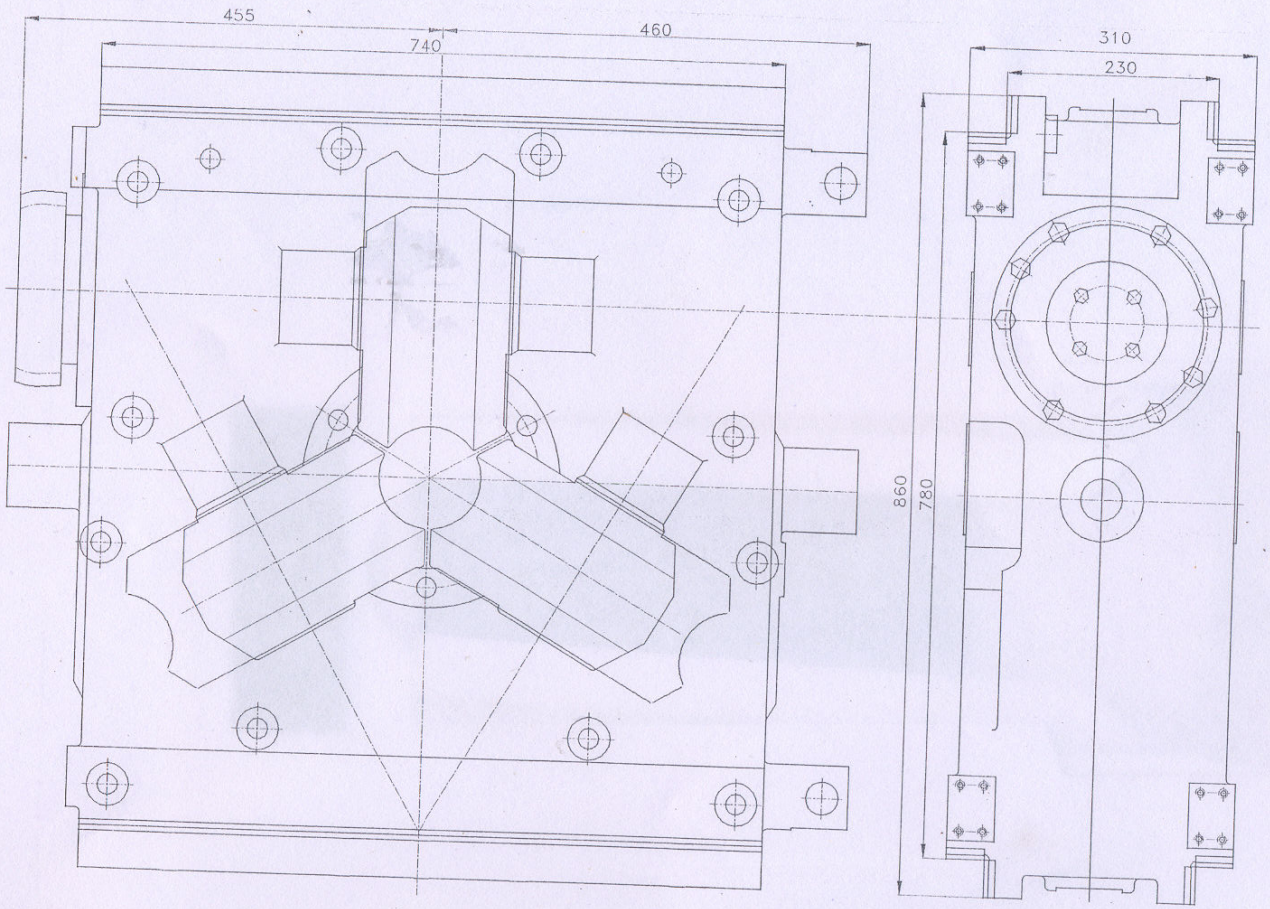
Basic Data	Detailed Technical Specification with input & output details.
Basic Engineering	Includes Assembly Drawings, Bill of Material for Sub-Assemblies, Circuit Drawings with Bill of Material & specification.
Manufacture and Supply	Includes Engineering, Manufacturing & Supply

ALL DIMENSIONS ARE IN MILLIMETERS



Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI – 620014	DRN	NAME: R.KUMAR	SIGNATURE	DATE: 18.08.08	
	CHD				
	APPD	S.KARUPPASAMY			
DEPT: TE / CODE	GRADE OF UNTOL. DIM: C/M/F	SCALE: N T S	WEIGHT(kg): 498 Kg	REF TO ASSY DWG NO	ITEM NO
				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	

ALL DIMENSIONS ARE IN MILLIMETERS



Bharat Heavy Electricals Ltd SEAMLESS STEEL TUBE PLANT TIRUCHIRAPALLI – 620014				DRN	NAME R.KUMAR	SIGNATURE	DATE 18.08.08
				CHD			
				APPD	S.KARUPPASAMY		
DEPT TE CODE	GRADE OF UNTOL. DIM C/M/F		SCALE N T S	WEIGHT(kg) 900 Kg	REF TO ASSY DWG NO		ITEM NO
					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				
Sl 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

ANNEXURE - V

Items for which Detailed Engineering is required.

Sl. No.	Description	Detailed Engg.	Price
1.0	**CPE**		
1.1	**Piercing Mill Inlet Side Facilities**	YES	
1.2	**Piercing Mill :**		
	Base frames for the Motors and Gear units	YES	
1.3	**Piercing Mill Outlet Side**		
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	**TRANSPORT EQUIPMENTS**		
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	**CRIMPING PRESS :**		
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	**AUXILIARY EQUIPMENT**		
4.1	Hydraulic Power Station with necessary Valve Station	YES	
5.0	**PUSH BENCH**		
5.1	New Guide Rails for Mandrel Bars	YES	
6.0	**STRETCH REDUCING MILL**		
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	
7.0	**Tube guidance system between SRM and Rotary Saw.**		
7.1	Roller Conveyers Height Adjustable Equipment with V-Roller.	YES	
8.0	**ROTARY SAW**		
8.1	Noise Protection Cover	YES	
9.0	**Scrap end Removal Mechanism at Rotary Saw**	YES	
10.0	**OPTIONAL EQUIPMENTS** (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).