Bharat Heavy Electricals Limited

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

An ISO 9001 Company

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

	Enquiry Number: 2711300001	Enquiry Date: 08.01.2013	Due date for submission of quotation: 08.02.2013

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

Sl. No	Description	Quantity
1	**Billet Saw** as per the technical specification, general guidelines instructions & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	02 Nos

Important points to be taken care during submission of offer

1. **Checklist to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.**
2. **In line with the mandatory requirement of Government of India, the Integrity Pact to be executed by BHEL and its suppliers s per the procedure. Hence we are enclosing the scanned copy of Integrity Pact. We request you to kindly download the attached Integrity Pact and affix your signature and seal in all the pages. In the page no. 8 of 8, in addition to your signature and seal please get the witness signature and seal. The witness signature from any one of your Organisation.**
   Duly filled Integrity Pact shall be submitted along with the tender document without fail.
3. **The tender will be monitored by IEM – Sh. Kanwarjit Singh, IRS (Retd.)**
4. **The EMD Amount for this Tender will be (INR) : 2,00,000.00**
5. **Delivery required 10 months from the date of purchase order.**
6. **All updates, amendments, corrigenda etc (if any) will be posted only on the above websites from time to time, as and when required, until tender is opened. There will be no publication of such updates, amendments corrigenda etc. through newspapers or any other media.**

BHEL commercial terms & conditions with Price Bid and Bank Guarantee formats 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 above .

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

S. KARUNANIDHY
Senior Manager
MM / Capital Equipment
BHEL, TRICHY - 620 014

1 GENERAL:

1.1 This document deals with requirements for submitting offers and executing the order on placement of Purchase Order / Contract for the subject item. The equipment under this specification is required for Hot Rolling Mill in Seamless Steel Tube Plant at BHEL, Tiruchirappalli, for cutting Blooms into Billets of required length suitable for further process. The Bloom diameter is 200 mm and length varies from 5 metre to 12 metre.

1.2 Bidders have to submit the offers as below by filling in the "Vendor's response" column with relevant information against each point in the respective sections below by providing all the information. The technical requirements shall also be confirmed for each clause.

1.3 Note: A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the "Vendor's response" column is not acceptable and may lead to disqualification of the Technical offer.

1.4 Brand and Model No. of the items offered must be indicated in the offer.

1.5 The offer shall Consist of Sections:

1.5.1 Part A:

a. General Requirements
b. Technical offer
c. Commercial terms and conditions
d. Un-priced Price bid as per Part B (i.e. Price bid as per list shown in Part B of this specification with the price value blanked)

1.5.2 Part B: Price bid for all items with split-up for major components:

Sl. No.	Particulars	Qty	Rate
01			
02			
03			
04			
05			
06			

1.6 The supplier may visit SSTP and understand the requirements before bidding.

1.7 Break up cost for Main equipment and Optional systems / items shall be indicated separately.

1.8 Portion of Supplies from Foreign countries and from Indian sources shall be separately grouped both in the Technical offer (Part A) and in the Price bid (Part B).

1.9 An approximate break up of weight of each sub-system as above shall be indicated in the offer for comparison purpose.

1.10 List of spares with part identification no. (Tools, Mechanical, Electrical & Electronics) to be maintained for ensuring continuous operation with least delay time shall be provided in the offer with price.

2 QUALIFYING CRITERIA FOR THE SUPPLY

2.1 The VENDOR has to compulsorily meet the following requirements to get qualified for submitting an offer for this equipment. Confirmation against each clause is to be indicated in the space provided.

Sl. No.	REQUIREMENTS	Vendor's confirmation and ref. to detail enclosed
1.0	The VENDOR shall have a minimum of FIVE Years of Continuous Experience in the Design, Manufacture and Supply of carbide tip bladed Billet Saws for minimum of 200 mm diameter billets for Hot Tube Mill/Rolling Mill with a sawing cycle time of maximum sixty seconds including material handling. Indicate the actual experience, Model no. and its sawing cycle time including material handling.	
2.0	The VENDOR shall have supplied at least 2 number of the offered model, within the last five years. The equipment shall be working satisfactorily at least for the past 2 years. Indicate the number of equipments (of QUOTED MODEL) sold in India & Other Countries. Reference List of Customers with full details of the customer's CONTACT PERSON for cross reference by BHEL shall be provided.	
3.0	Proof of performance of the offered equipment shall be provided in the offer based on similar systems supplied to other customers by way of CERTIFICATION OF PERFORMANCE FROM ATLEAST ONE CUSTOMER. The Certificate shall indicate the Order no., Date of installation, Model No. and the performance status for the last two years.	

2.2 The VENDOR has to necessarily provide the following details, for making an assessment of the firm's capability and competency: [The VENDOR is expected to give complete details against each clause in the table given below and wherever necessary an additional sheet may be attached (giving clear reference number) to cover the required details]

Sl. No.	PARTICULARS	Vendor's response with ref. cl. No. of detailed offer.
1.0	Number of Years of Experience of the VENDOR in the field of design, manufacture and supply of 'Billet Saw for Tube mills'.	
2.0	YEAR of LAUNCH of the Model quoted against this ENQUIRY.	
3.0	Is there any other model launched after the quoted Model? If so, Why it is not quoted? Otherwise, indicate the likely year in which the next model is likely to be launched.	

4.0	Number of Saws for Seamless Steel Tube plant/Rolling Mill supplied, installed and commissioned till date, in the QUOTED MODEL both in India and abroad. Attach list of organisations with Model no. and contact details.	
5.0	Details of Design Set-Up and Technology Back-Up if any for the PRINCIPAL Equipment Maker.	
6.0	Details on International Standards followed in Design of the Equipment.	
7.0	Confirmation to performance testing requirement of the equipment prior to dispatch from supplier's end.	
8.0	Details of Quality System followed (Kindly furnish the salient aspects of the QA system followed).	
9.0	Details on SERVICE-after-SALES Set-up in India including the addresses of Agents/Service Centers in India and Asia.	
10.0	Detail schedule and delivery period from the date of placing the Purchase Order.	
11.0	Any Additional Data to supplement the manufacturing capability of the VENDOR	

2.3 The VENDOR has to comply with the following, for accepting the Technical Offer for scrutiny by the BHEL. Confirmation against each clause is to be indicated in the space provided.

Sl. No.	REQUIREMENTS	Vendor's confirmation and ref. to detail enclosed
1.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details of 'Bought-Out-Items' with copies of Product Catalogue and Selection Criteria.	
2.0	The Commercial Offer (given with the Technical Offer – Part A) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation of Scope of Supply.	
3.0	The points confirmed by the supplier based on the clarifications sought for the original offer shall be incorporated in the revised final offer wherever applicable. Pl. confirm	
4.0	The Vendor shall provide a complete list of out sourced electrical, electronic and mechanical components with Source name, Model no., Specification and drawings.	

3 JOB DESCRIPTION:

3.1 Seamless Steel Tubes are made by heating the billets in Furnace then Piercing, Pushing and SRM rolling process. The blooms supplied in long lengths need to be cut to required length by means of an automated heavy duty cutting machine of sufficient capacity to meet the requirement of this specification. The blooms are placed in a loading table and transferred to the cutting machine conveyor one by one. After cutting the blooms to the required lengths, the billets need to move to the outlet conveyor and the scrap piece is to be rejected into the scrap piece container. The parameter of the material to be processed in the machine are tabulated below:

Bloom diameter	:	200 mm
Incoming Length	:	5000 mm to 12000mm
Finished Length	:	650 mm to 1600mm
Length deviation	:	-0 mm to +2 mm max.
End surface deviation	:	1% (max. 2 mm from the perpendicular)
Last End piece length	:	500 mm to 1600 mm
Scrap Length	:	50 mm to 500 mm
Bloom supply	:	As Cast or Rolled
Material grade	:	Carbon steel &
		Alloy steel (Cr up to 13%)

4 QUANTITY

4.1 Two nos. of billet saws are required for cutting the blooms. The two saws are to be placed such that the cut billets move to the same outlet conveyor.

5 TECHNICAL DESCRIPTION OF SAW

5.1 GENERAL:

5.1.1 The sawing machine shall be designed with the latest, state of the art technology. The machine shall be of high power sawing capability, which is designed for cutting perfect square cut without burr. The cutting should be such that no metallurgical changes and cracks on the cut surface since billets are to be cut in cold condition. The machine shall be preferably of cold circular sawing type designed for the use of carbide tipped blades and Disc millers. The saw blades designed for using in the machine shall be of standard type and available in the regular market. The sawing machines shall be specifically designed for 3 shift operation.

5.1.2 The sawing machine shall be operating with low tooling cost, very less space requirements with minimum blade changing time.

5.1.3 Necessary damping unit and guiding system shall be incorporated for reducing vibration and chatter marks on cut edges. The guide ways and moving parts shall have necessary wear reduction methodologies like ball screw arrangement.

5.1.4 The Total system shall be in compliance to permitted emission levels (e.g. CE).The noise level of the system shall be below 85 dBA

5.2 MACHINE COLUMN

5.2.1 Extremely rigid construction according to the latest knowledge of vibration technology like special steel reinforced concrete to absorb any vibration and to make it extremely resistant to distortion shall be used.

5.2.2 For the erection and adjustment of the sawing machine, height adjustment leveling elements are to be provided.

5.3 SAW HEAD

5.3.1 The casing shall be of very rigid and stress free construction. The saw shall be designed with a sturdy main spindle bearing and gears should be extremely resistant to torsion. The gears used in the machine shall be with hardened and ground toothed wheels.

5.3.2 This system must have contactless retraction of saw blade.

5.3.3 The entire inside (bearings, toothed wheels) shall run in oil.

5.3.4 The machine shall be driven by three phase motor preferably with toothed belt or any sturdier drive system like direct drive etc. A continuous speed control system (like frequency transformer) shall be provided.

5.3.5 Rotating wire brush type cleaning system shall be provided for removal of chips from tooth gap.

5.4 FEED MECHANISM

5.4.1 Hardened guide rails need to be used for sliding area.

5.4.2 The drive shall be designed as a pre-loaded backlash-free type, preferably with ball screw arrangement. The feed drive of the saw head shall be driven by an AC servomotor or equivalent constant feed rate mechanisms.

5.4.3 Electronic systems to be incorporated for faster idle feed, cutting feed and rapid return feed automatically without manual interventions to reduce the total cutting cycle time.

5.4.4 Guide ways and other accessories shall be lubricated automatically by the central lubrication system.

5.5 BRUSH EQUIPMENT

5.5.1 A rotating chip brushing equipment with high service life to ensure cleaning of each cutting tooth and does not impair the quality of the cutters shall be provided.

5.6 SAW BLADE SPRAY LUBRICATION

5.6.1 For improved saw blade life, spray lubrication with nozzle-system shall be provided. The system shall include a container that is filled with a lubricant, pump, hose and sprayer. A fine layer of oil should be deposited on the blade tip. Necessary controls need to be provided for adjusting the quantity of oil sprayed. The pneumatic system if any should function at an air pressure of 4 to 6 bar.

5.7 SAW BLADE COOLING EQUIPMENT

5.7.1 For the cooling of saw blade disc, necessary cooling systems to be provided. The pneumatic system if any should function at an air pressure of 4 to 6 bar.

5.8 **CENTRAL LUBRICATION UNIT**

5.8.1 A central lubrication unit shall be provided, intended for the lubrication of all the moving parts. The central lubrication unit shall be automated to operate at preprogrammed occasions.

5.9 **CLAMPING EQUIPMENT**

5.9.1 Rigid and wear resistant clamping arrangement at the entry and exit sides shall be provided.

5.9.2 For protection of the clamping equipments in the inlet and outlet, protection units are to be incorporated. These protection units shall be strong enough to absorb the hits of the bloom.

5.9.3 Type of clamping arrangement is to be mentioned in the offer.

5.10 **MACHINE COVER**

5.10.1 All movable parts of the sawing machine are to be covered and thereby the machine is protected against any accidents and unauthorised use.

5.11 **SAW BLADE**

5.11.1 The saw blade used shall be of Carbide tipped design. Sufficient no. of blades (Minimum 20 nos. per machine) shall be supplied for commissioning the equipment and initial trials. The details of blade including probable suppliers shall be provided, which includes:

1. Type of blade design - brazed tip or throw away insert type.
2. Suitability for cutting concast or rolled blooms for different grades of material up to 13% Cr steels.
3. Approximate blade life in terms of number of cuttings and number of regrinding that can be done.
4. Method of reconditioning and facility required for the regrinding
5. Optimum quantity of discs and inserts required per annum
6. Insert specification for both throw away / brazed type
7. Blade material specification, Chemistry, hardness value and grade of insert used.
8. Drawing for the saw blade with the above details and dimensions.
9. Sources for the procurement of disc & inserts

5.12 **CUTTING DATA OF SAWING MACHINE**

5.12.1 Cutting parameters, cutting cycle time and tool lifetime valid for offered saw blades shall be provided in the offer. These parameter's dependence on the material quality (inclusions) and alloying elements shall be provided as recommended by the saw blade supplier.

5.13 **MATERIAL HANDLING SYSTEM**

5.13.1 Design for material handling system for movement of the bloom to the machine and the cut billets to the outlet conveyor shall be provided. This shall include design for the loading table to hold blooms (min. 10 nos.), transfer system to the inlet roller table, inlet roller table and outlet table to move the cut billets for further processing. Handling system shall be manufactured by BHEL.

5.14 **MATERIAL POSITIONING DEVICE**

5.14.1 A system to be provided to cut the blooms to billets of required length. The necessary mechanical, hydraulic and electrical system need to be supplied for the operation. The positioning device shall be easy to operate and set.

5.14.2 The length tolerance for cut billets needs to be within the permissible limits (0 to +2 mm).

5.15 **SCRAP REMOVAL SYSTEM**

5.15.1 End scraps of the billets to be removed from the cutting area by a scrap removal system. It should have arrangements to remove the scrap pieces automatically from the main cutting line. System should have the necessary hydraulics and electrical systems.

5.15.2 In case of longer end pieces, handling to be addressed so that it does not come to the main outlet conveyor.

5.15.3 Design for the scrap piece container need to be provided.

5.16 **CHIP REMOVAL SYSTEM**

5.16.1 A chain type chip conveyor to transports the chips into a container outside the sawing area need to be included. Type, size, design features shall be indicated in the offer.

5.16.2 Design for the container need to be provided.

5.17 **SAW BLADE CHANGING DEVICE**

5.17.1 A saw blade changing device to lift, load and fix the blade on to the machine shall be provided.

5.17.2 The saw blade changing device shall be designed in such a way that it makes replacing of the blade faster and easier.

5.18 **HYDRAULIC EQUIPMENT**

5.18.1 The hydraulic unit for the sawing plant shall be equipped with hydraulic pump, tank, accumulator, control valves, hydraulic cylinders and temperature and oil level indication device. The system shall be designed for continuous operation in 3 shifts. The system shall be controlled centrally.

5.19 **PNEUMATIC**

5.19.1 Compressed air at 4 bar min. pressure will be provided by BHEL. Necessary filtering unit, drying unit and control system shall be part of the supply.

5.20 **ELECTRIC EQUIPMENT:**

5.20.1 GENERAL

5.20.1.1 The sawing plant shall have a set of switch cabinets, terminal boxes and an operator desk, motor protection system, necessary cooling system etc. suitably integrated with digital communication system and computerized operation using reputed make of subsystems.

5.20.1.2 Main power supply (BHEL scope of supply)

Main Voltage: 3 phase 415+/-10% VAC, 50Hz +/-5%, TN-C Network.

5.20.2 CONTROL DESK

5.20.2.1 The control desk with the operator panel and computer shall be located in the control room. The machines shall also be equipped with an operating panel for the main functions of maintenance and tool changing.

5.20.2.2 Control panel should be equipped with data input device for material data, production data, saw blade data etc. Data input can be through operator panel or computer.

5.20.2.3 The control desk should have the following indications:

- Data inputs
- Cutting speed
- Feed/ tooth
- Feed speed
- Billet length
- Signal lamps for error messages

5.20.2.4 The following modes of control must be possible:

5.20.2.4.1 Manual

Every single step of the machine can be operated separately via control elements on the control panel or commands from the computer.

The working positions of the different devices need to be controlled by sensors, in order to prevent damages.

5.20.2.4.2 Single cut

Program for one complete sawing cycle without material handling.

5.20.2.4.3 Automatic

Program for fully automatic manufacturing cycle. Automatic mode can be started by pressing the START button and can be stopped anytime by pressing the STOP button.

5.20.2.5 The entire saw system shall have self-diagnostic capability with error reporting and audio/visual display. Items covered by self-diagnosis shall be indicated in the offer. Auto shut off systems shall be provided wherever essential (including for safety requirements). Detection of failure of electronic components like AD cards etc. at card level shall be included in the diagnostic system. The system shall be functionally disabled when any one of the critical element is malfunctioning with over ride provided for Operator.

5.20.2.6 License of all the installed softwares used in the entire system shall be given along with the supply of the equipment.

5.20.2.7 All control desk visualizations should be in English language.

5.20.3 DATA COMMUNICATION

5.20.3.1 Communication with machine controls, inlet and outlet roller table etc. must be via a suitable system like Profibus DP communication.

5.20.4 REPAIR AND SERVICE CONTRACT

5.20.4.1 PLC based system for all driving components shall be from reputed supplier and a repair/service contract with a running time of 2 years shall be delivered with the machine.

5.20.4.2 Annual Maintenance Contract (AMC) scopes and conditions to be furnished in the offer rates for a period of Five years (After the completion of warrantee period)

5.20.4.3 This repair/service contract includes fault locating and changing of damaged components on the spot.

5.20.4.4 This repair/service contract comes into force at beginning of commissioning at the customer's site.

5.21 The technical data for the Saw shall be provided in a similar format as below

Machine data				
Total length	mm			
Total width	mm			
Total height	mm			
Flange diameter	mm			
Total weight	kg			
Operating parameters				
Cutting speed (min. and max.)	m/min			
Cutting Feed (min. and max.)	mm/min			
Rapid feed	mm/min			
Saw blades				
Saw blade diameter	mm			
Number of teeth/blade	nos.			
Blade changing time	Min.			
Sawing cycle time	sec.			
Rectangularity of cut				
Main drive motor with VFD				
Nominal power	kW			
Rated speed	Rpm			
Infinitely output speed range	Rpm			
Feed motor				
Nominal power	kW			
Infinitely feed speed		up to	mm/min	
Rapid return	mm/min			
Central lubrication device	kW			

Hydraulics	kW	
Control Systems		

5.22 **DOCUMENTATION**

5.22.1 The documentation shall be supplied one-fold on paper and one-fold on CD-Rom in English language consisting of the following:

- Machine erection and general notes
- Erection manual, assembly drawings and part list
- General description of function and function cycle
- Feed setting for different grades of material with respective cutting cycle time
- Saw blade specification and drawings
- Maintenance instructions
- Lubrication instructions
- Operating instructions
- Circuit diagram, cable list, etc.
- Hydraulic and switch plans
- Part list and wear part list
- Final foundation drawings, which contain all dimensions, cable channels and load indexes.

5.22.2 The documentation on CD-ROM shall be in the following format:

- Documents and lists in PDF format
- Drawings in DWG format
- Layout and foundation plan in DWG format

5.23 **TIME SCHEDULE UNTIL DATE OF SHIPPING**

5.23.1 The delivery time of supplying the equipment and the documentation at various stages of the contract as below shall be provided in the offer.

- Contract effectiveness
- Receipt of buyers workshop layout
- Preliminary Layout drawings of the sawing machine
- Confirmation of the preliminary layout by the BHEL
- Delivery of Basic Information
- Delivery of Basic Design
- Delivery of Detail Design
- Final foundation drawings, which contain all dimensions, cable channels and load indexes
- Hydraulic principle drawing

5.23.2 Electrical plan including drawing of control desk, cable list, final electricity content (power supply...), final dimension of operation desk, switch cabinet.

5.23.3 Delivery of the assembly drawings, spare and wear part list, information about the sawing machine

- Technical documentation
- Changed parts of the documentation

6 INSPECTION:

6.1 The system shall be shipped after inspection and testing at Suppliers works by BHEL. 30 days prior notice to be given for this inspection.

6.2 The system performance shall be checked for 200 mm diameter blooms, which will be provided by the supplier in hard grade material at least SA 213 T91.

7 DELIVERY:

7.1 The system need to be supplied to BHEL within 10 Months from the date of Purchase Order.

8 INSTALLATION OF THE SYSTEM:

8.1 The system shall be installed and commissioned by the supplier of the system.

8.2 Service shall be provided by the supplier during guarantee period and also later through AMC. The system supplied must be supported by way of spares, availability and service for a minimum period of 10 years.

8.3 Remote troubleshooting from Suppliers works is to be provided through ISDN-modem/ Ethernet connectivity.

9 PERFORMANCE EVALUATION & ACCEPTANCE OF THE SYSTEM:

9.1 Testing methods and acceptance norms for each subsystem for tests at Suppliers works and after installation shall be detailed out in the offer.

9.2 Production Run shall be tested for 24 hours continuously. The rated output for a reference size commensurate to the speed of cutting for that size shall be demonstrated for 8 hours shift.

10 GUARANTEE:

10.1 The equipment shall be guaranteed for a minimum period of 12 months from the commissioning date or 18 months from the date of dispatch whichever is earlier. The guarantees of the seller refer to: Acceptance Test, Sawing cycle time including billet positioning, Cutting quality, Cutting length tolerance, Noise level of <85 dBA, Rectangularity of cut surface and any other aspect agreed upon.

11 TRAINING:

11.1 Supplier shall provide operational and first level system maintenance training for two persons at supplier's works. Further training as required shall be provided at BHEL during erection commissioning for operation and maintenance.