



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 7653 Fax : +91 431 252 0719 Email : skaruna@bheltry.co.in Web : www.bhel.com
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TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation :
Tender to be submitted in Two Parts	2711200013	03.09.2012	08.10.2012

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.

Item No.	Item Description	Quantity
10	Water Softening Plant as per the technical Specification, & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	01 Set

Important Points to be taken care during the submission of offer:-

1. The Technical Specification to be duly filled (as Point wise reply) and enclosed with offer.
3. Check list to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.

BHEL's General guidelines /instructions including bank guarantee formats and list of consortium banks, commercial terms checklist 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) Tender Enquiry reference "2711200013".

Tenders should reach us before 14:00 hours on the due date Tenders will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present	Yours faithfully, For BHARAT HEAVY ELECTRICALS LIMITED Sr.Manager / MM / Capital Equipment
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Water Softening Plant - SSTP

Scope:

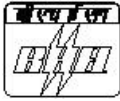
Design, manufacture, supply, erection and commissioning of below mentioned as per general technical delivery condition Ref. No: SSTP/PLS/001, DT.29.08.12

Item No.	Description	Qty
01	Water Softening Plant of 150 m ³ /hr (3 Nos x 50 m ³ /hr) capacity with accessories along with the required feed pumps, control panel, Inter connecting piping & isolation valves, suitable for outdoor installation to improve the Water Quality as per the technical specification & commercial conditions given.	1 Set

Operation:

The softener shall be designed, so as to get quality of water with the required parameter as given in Annexure-1. The total flow rate of the softener shall be 150 m³/hr consisting of 3 Nos. each of 50 m³/hr. and all the three shall be in operation during softening time. In the regeneration period the plant shall be capable of supplying treated water of minimum 100 m³/hr.

Technical Data: As per Annexure-4



Specification for Water Softening Plant – SSTP

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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 the Closed Circuit Cooling Water System in Seamless Steel Plant in BHEL, Tiruchirappalli, for softening the cooling water recycled in the in the closed circuit system.
- 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 information on model no, parameters etc. 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:

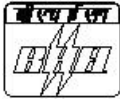
1.5.1 Part A:

- 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 of major components:

Sl. No	Particulars	Qty	Rate
01	Design, manufacture, supply, erection and commissioning of Water Softening Plant of 150 m ³ /hr (3 Nos. x 50 m ³ /hr) capacity with accessories along with the required feed pumps, control panel, Inter connecting piping & isolation valves, suitable for outdoor installation to improve the Water Quality as per the technical specification & commercial conditions given.	1 Set	

- 1.6 Necessary Documents, records, drawings, catalogues as required shall also be referenced in the response column and attached with the offer.
- 1.7 The supplier may visit SSTP and understand the requirements before bidding.
- 1.8 The requirements to be met for submitting the offer and the execution of the order are laid out below.



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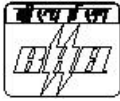
2. QUALIFYING CRITERIA FOR THE SUPPLY

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. No. of detailed offer.
1.0	Number of Years of Experience of the VENDOR in the field of design, manufacture and supply of similar equipment.	
2.0	Number of similar equipment supplied, installed and commissioned till date. Attach a reference list of customers with contact address.	
3.0	Details of Design Set-Up and Technology Back-Up if any.	
4.0	Details of International Standards followed in the Design of the Equipment.	
5.0	Details of Quality System followed (Kindly furnish the salient aspects of the QA system followed)	
6.0	Details on SERVICE-after-SALES Set-Up in India including the addresses of Agents/Service Centers in India and Asia	
7.0	Any Additional Data to supplement the manufacturing capability of the VENDOR	

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

Sl. No.	REQUIREMENTS	Vendor's confirmation and ref. to detail enclosed
8.0	The VENDOR shall have a minimum of 2 Years of Continuous Experience in the Design, Manufacture & Supply of Water Softener Plant. Indicate the actual experience.	
9.0	The VENDOR shall have supplied at least 2 number of similar capacity Water Softener Plant within the last five years. The equipment shall be working satisfactorily at least for the past 2 years. Indicate the number of equipment (of quoted model / Technology) sold in India & Other Countries.	
10.0	<u>Performance Certificate</u> : The vendor should submit one performance certificate from the customer for the satisfactory performance of the system supplied to them.	
11.0	<u>Delivery</u> – The bidder shall quote the best possible delivery. However, the delivery shall not exceed 10 weeks with an additional grace period of 2 weeks for erection and commissioning. The delivery period shall be reckoned from date of purchase order to dispatch from the vendor works.	



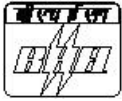
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The VENDOR has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser. Confirmation against each clause is to be indicated in the space provided.

Sl. No.	REQUIREMENTS	Vendor's confirmation & ref. to detail enclosed
12.0	The Technical Offer shall be supported by Product Catalogue and Data Sheets in ORIGINAL and complete technical details. A schematic diagram shall be provided in the offer indicating all the items to be supplied.	
13.0	The Commercial Offer (given with the Technical Offer – Part I) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation of Scope of Supply.	
14.0	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	
15.0	The Vendor shall provide a complete list of out sourced / Bought-Out-Items, with Source name, Model no., Specification, catalog and drawings. This shall be included in the offer. Pl. confirm.	
3.0	Job Details	
	In Seamless Steel Tube Plant, BHEL, Trichy Seamless Steel Tubes are manufactured by hot rolling process. For this hot process and for the equipments water is used as a cooling media. The water is circulated two ways viz.. in a closed circuit and open circuit. Water requirement for the initial filling and for the make up for the closed & open circuit cooling system is drawn from the bore well. In case of shortage of water from the bore well, water drawn from the head works situated on the banks of river Cauvery, stored in an over head tank will be used. In the closed circuit system the water is recycled continuously in a round a clock shifts. The water thus circulated in the closed circuit should meet the quality requirement as given in Annexure-1.	
3.1	Details of water quality parameters & Make up water Parameters.	
	<ol style="list-style-type: none">1. Water quality requirement - Annexure-12. Initial filling / make up water parameters – Annexure-23. Closed circuit cooling water system single line layout – Annexure-3	
3.2	<u>Water Softener - Design:</u> The softener shall be designed so as to get the quality of water with the required parameter as given in Annexure-1. The total flow rate of the softener shall be 150 m ³ /hr consisting of 3 Nos. each of 50 m ³ /hr. and all the three shall be in operation during softening time. In the regeneration period the plant shall be capable of supplying treated water of minimum 100 m ³ /hr. Regeneration shall be done once in 8 hrs. or as per the system requirement.	

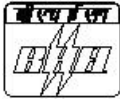


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3.3	<p><u>Quality Requirement:</u> The present level of the Total Hardness of the makeup water is 310 to 350 ppm. In the closed circuit system (Annexure-3) the water is recycled continuously for 24 hours with the flow rate of 600 m³/hr. From this 150 m³/hr (25%) of water shall be taken from the common sump of the closed circuit and processed through the pre-filter and water softener plant for water treatment. The treated water shall again be let-in to the same common sump. The resultant quality of water of the closed circuit shall have the Total Hardness of less than 320 ppm. and shall also meet the other quality parameters given in Annexure-1.</p>	
3.4	<p><u>Plant startup and operation:</u> The plant startup and operation for one month shall be under Vendor scope. Chemicals like salt, resin, etc., required shall be specified by the Vendor and same shall be under the scope of Vendor for start up and one month operation.</p> <p>Flat concrete cement flooring, making pockets for foundation, cementing the pockets shall be under BHEL scope. All other facilities like, base frames, fasteners, etc.. required for erection & commissioning shall be under Vendor scope.</p>	
3.5	<p><u>Painting</u></p> <p><u>Internal Coating:</u> Coated with two layers of epoxy powder and oven-cured.</p> <p><u>External Coating:</u> Coated with a polyester powder and oven-cured.</p>	
3.3	TECHNICAL DATA: Annexure-4	
4	Scope of supply	
4.1	The scope of work of the Vendor shall cover design, engineering, manufacture, assembly, testing, painting, packing, delivery, erection, commissioning, training & running of the water softener for one month in BHEL, Tiruchi. All interconnecting piping with accessories like valves, Flow meters, gauges, instruments, pumps, etc., shall be in Vendor scope. Each units should be equipped with a local control panel and all should be connected to a central control system. All electrical wirings shall be done by the Vendor with copper wiring. Input Power supply up to the control panel shall be under BHEL scope. Foundation and cement flooring shall be provided by BHEL for erecting / mounting the equipments & accessories.	
4.2	<p><u>List of Spares:</u> Vendor should furnish a list of commissioning spares and recommended spares for 2 year normal operation for the water softener.</p>	
4.3	The Vendor shall submit GA drawing for approval of purchaser along with offer. Provision of end connections with ANSI B 16.5 / BS / 8" NB Flgd. for a BHEL supply filtering unit between feed pump and softening plant is to be given. On completion of	



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	engineering the Vendor shall supply O&M manual as part of the contract.	
4.4	The offer should be strictly in line with the enclosed specification and any deviation in process or equipment selection from this specification shall be clearly indicated and also the objective of deviating from the specification.	
4.5	The layout and footprint area shall be described using drawings to identify space requirement. This shall be provided with the offer.	
4.6	Operating instruction / maintenance manual to be supplied along with relevant drawings at the time of equipment delivery.	
5. General requirements:		
5.1	The schematic drawing and operational features, catalogues etc. shall be provided in the offer	
5.2	Supplier shall prepare quality plan covering major items indicating critical quality characteristics, method of measurement, reference standard and acceptance norms to BHEL before starting the manufacturing activities.	
5.5	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.	
5.6	Supply of required commissioning spares for proving the performance of the m/c at SSTP is supplier's scope	
6	<u>DOCUMENTATION</u>	
6.1	<u>With the offer:</u> Preliminary design, Quality plan covering major items indicating critical quality characteristics, method of measurement, reference standard, acceptance norms. List, source and model of bought out items of Pneumatic, Mechanical, Electrical and electronics. Internationally reputed brands shall be used.	
6.2	<u>After order:</u> Activity schedule, Detailed drawings, Specification, Foundation drawings, Detailed Quality plan, Periodic status report.	

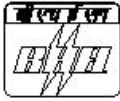


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6.3	<u>Along with the supply:</u> The documentation shall be, three-fold on paper and one-fold on CD-Rom in English language consisting of the following: installation manual, assembly drawing and part lists general description of function and function cycle maintenance instructions operating instructions circuit diagram, component list, etc. Installation drawings and final layout	
6.4	The documentation sent through e-mail or CD-ROM (in addition to the three-fold on paper) shall be in the following format: Documents and lists in PDF format Drawings in DWG format Layout and foundation plan in DWG format	
7	<u>INSTALLATION, PERFORMANCE & ACCEPTANCE OF THE SYSTEM</u>	
7.1	The system shall be shipped after inspection and testing at Suppliers works by BHEL. 20 days prior notice shall be given for this inspection.	
7.2	The system shall be installed and commissioned by the manufacturer of the system.	
7.3	The system performance shall be checked at BHEL after Installation and commissioning. Functioning of the system to be demonstrated for a period of at least 3 shifts continuously. The installations should be operated by the supplier for a period of one month with all the required chemicals like salt, resin, etc.. Testing methods and acceptance norms for each items for tests at Suppliers works and after installation shall be detailed out in the offer.	
7.4	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.	
7.5	<u>Guarantee</u> for the trouble free performance of the system shall be provided for min. 1 year for 3 shift operation. This shall be by way of performance Bank guaranty as applicable. The guarantees of the seller refer to Acceptance Test quality of operation life time performance and any other aspect agreed upon	
8	<u>Training:</u>	
8.1	Supplier shall provide operational and first level system maintenance training for 4 persons at BHEL.	



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Annexure 1

Water Quality Requirement:

	Properties / Parameters	Unit	Requirement
1	Settling materials	mg/l	20 to 30
2	Max. grain size	micron	60
3	Total hardness (1°dH = 17.8 mg/l or ppm)	°dH mg/l	18 320.4
4	Carbonate hardness (1°dH = 17.8 mg/l or ppm)	°dH mg/l	5 89.0
5	Undissolved matter	mg/l	10
6	Sulphate (H ₂ SO ₄)	mg/l	< 150
7	Chloride (Cl)	mg/l	< 150
8	Contamination with oil	mg/l	max. 5
7	Salt content	mg/l	< 1000
8	PH Value		7.5 to 8.5
9	Conductivity	μS/cm	< 700



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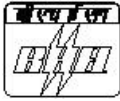
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Annexure-2

Bore Water & Drinking Water Quality – Test Sample readings:

	Properties / Parameters	Requirement	Actual		
			Bore Water (HPBP Lab Report)	Drinking Water (HPBP Lab Report)	Drinking Water (NITT Report)
1	Settling materials (mg/l)	20 to 30	----	---	1.6
2	Max. grain size (µm)	60	----	----	---
3	Total hardness (°dH) (1°dH = 17.8 mg/l) (mg/l or ppm)	18 320.4	17.4 309.7	7.3 129.94	11.5 211.82
4	Carbonate hardness (°dH) (1°dH = 17.8 mg/l) (mg/l or ppm)	5 89.0	11.8 210.04	---	11.5 211.82
5	Undissolved matter (mg/l)	10	20	----	---
6	Sulphate (H ₂ SO ₄) (mg/l)	< 150	42	23	BDL
7	Chloride (Cl) (mg/l)	< 150	42	44	55
8	Contamination with oil (mg/l)	max. 5	NIL	NIL	NIL
7	Salt content (mg/l)	< 1000	530	290	---
8	PH Value	7.5 to 8.5	8.5	7.6	8.32
9	Conductivity (µS/cm)	< 700	820	450	---



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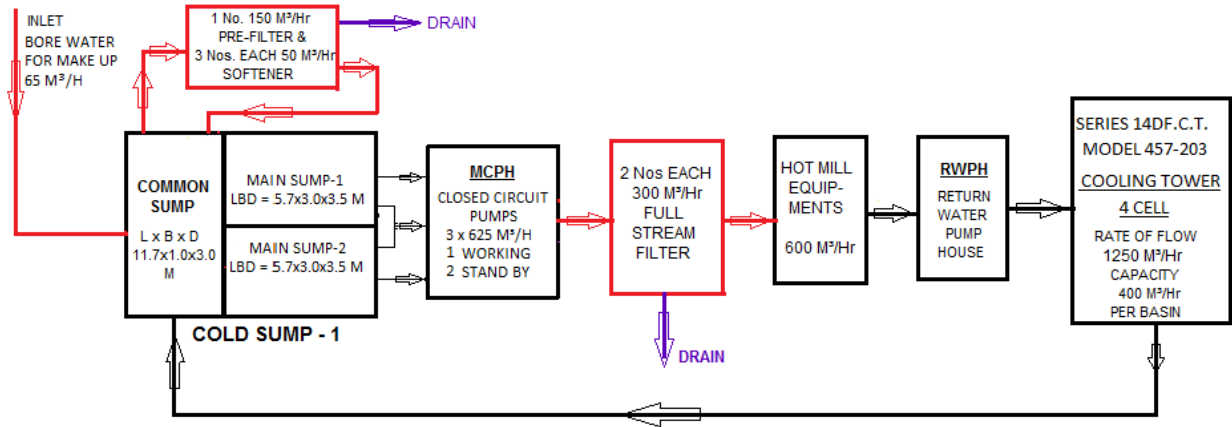
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Annexure-3

CLOSED CIRCUIT COOLING WATER SYSTEM

PLANT SERVICES / SSTP
BHEL, TRICHY-14



— PROPOSED

MCPH

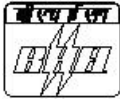
WORKING - 1 x 150 HP, H = 50 M, 625 M³/Hr, Pr: 5 Kg/cm.sq.

STAND BY - 2 x 150 HP, H = 50 M, 1250 M³/Hr,

RWWP

WORKING - 2 x 65 HP, H = 20 M, 1200 M³/Hr, Pr. 2 Kg/cm.sq.

STAND BY - 1 x 65 HP, H = 20 M, 600 M³/Hr,



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ANNEXURE-4

TECHNICAL DATA - WATER SOFTENING PLANT

1	Raw water Total Hardness. (Present level of makeup water)	17.4 to 20 °dH (310 to 350 mg/l or ppm) (1°dH = 17.8 mg/l)
2	Treated Water quality requirement.	<u>Resultant Quality of the closed circuit water</u> – Total Hardness shall be less than 320 ppm. and to meet the other quality parameters given in Annexure-2. <u>At the outlet of the softener</u> - Total Hardness as per the system requirement so as to meet 320 ppm as above – Vendor to specify.
3	Quantity, Capacity & Flow rate	3 Nos. each of 50 m ³ /hr. During regeneration time 1 unit will be under regeneration and 2 Units under softening delivering 100 m ³ /hr. Regeneration shall be done sequentially one by one.
7	Size	Dia 1400mm x 2500mm Height Of Softener per unit or as per the system requirement – Vendor to specify.
8	Material Of Construction - Vessel	MSEP (Mild Steel Epoxy Painted)
9	Operation Hours Before Regeneration	As per the system requirement
10	Resin quantity	As per the system requirement
11	Salt Required for Regeneration	As per the system requirement
12	Agitator	1.0 H.P
13	Brine Mixing Tank (BMT)	2000 Ltrs, HDPE Tank
14	Type of valves	Butterfly valves.
15	Other Accessories	Control board, Inter connecting piping & isolation valves suitable for Outdoor installation . All interconnecting piping's of MS with necessary CI Butterfly valves.
16	Electrics & Instruments	Panel with cabling, Pressure gauge, Level switch and all other sensors, switches required.
17	Feed Pump Assembly for Softener (including pump, motor, non-return valve, isolation valve)	Flow Rate : 150 m ³ /hr Quantity : 2 Nos. (1 working + 1 stand by) Head : 30 M Type : Horizontal, Centrifugal, Make - pump : Kirloskar / KSB / Beacon - Motor : Kirloskar / Crompton / Siemens