



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 7421
NOTICE INVITING TENDER	Email : vkaruna@bhel.in
	Web : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2601900010	28.03.2019	22.04.2019

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

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

Item	Description	Quantity	(Indigenous Vendors) Matl. will be Delivered to
10	DESIGN,MANUFACTURE,SUPPLY,E&C OF TEMPERATURE CONTROLLED HEATING SYSTEM WITH PLC BASED FEEDBACKCONTROLLER FOR CORROSION TESTING as per the technical specification & commercial conditions applicable (to be downloaded from web site (http://www.bhel.com) http://www.bhel.com/tender/tender_home.php or https://eprocure.gov.in/epublish/app)	1 No.	FOR, BHEL Stores, High Pressure Boiler Plant, Tiruchirappalli - 620014

Important points to be taken care during submission of offer

1. Material shall be delivered to: Indigenous Vendors: As stated above.
2. Delivery required 7 week including PDI from the date of purchase order.
3. Erection & Commissioning period required 3 Weeks from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
4. EMD for this Tender will be (not less than): NIL
5. Compliance Form Nos.: TRY/IND/08 to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
6. All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / 001 – NO EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site (<http://www.bhel.com>) http://www.bhel.com/tender/tender_home.php or from the Government tender website <https://eprocure.gov.in/epublish/app> under above Enquiry reference.

(This is not an E-tender, please submit your offer in hard copies)

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

V. Karuna
DGM / Capital Equipment / MM

V. KARUNAKARAN
Dy. General Manager
Capital Equipment / MM
BHEL / Tiruchirappalli - 620 014

**Part A : Qualification criteria for design,manufacture,supply,erection & commissioning of Temperature controlled Heating System
with PLC based feedback controller for Corrosion testing. Qty-1 No.**

S.No	BHEL Specification	Vendor's Offer
1.0	QUALIFYING CRITERIA	
1.1	The BIDDER / VENDOR (OEM) shall have a minimum of three Years of Continuous Experience in the Design, Manufacture & Supply of “ <i>Special devices / Developmental works with PLC based feedback controller systems</i> ”. Vendor may indicate the actual no. of years of experience in the field	Vendor to provide details
1.2	Only those vendors (OEMs), who have supplied and commissioned at least one number of “ <i>Special devices / Developmental works with PLC based feedback controller systems</i> ” in the last five years (as on first date of tender opening) are eligible to quote.	Vendor to provide details
1.3	Vendor has to submit at least one Performance Certificate from their customers, for satisfactory performance of such system indicated in clause 1.2 for a minimum period of one year (as on first date of tender opening). For obtaining the Performance certificate, a suggestive format is provided at the end of this Part A document.	Vendor to provide performance certificate

Part A : Qualification criteria for design,manufacture,supply,erection & commissioning of Temperature controlled Heating System with PLC based feedback controller for Corrosion testing.

Qty-1 No.

S.No	BHEL Specification	Vendor's Offer
2.0	INFORMATION TO BE PROVIDED BY VENDOR	
2.1	Number of “ <i>Special devices / Developmental works with PLC based feedback controller systems</i> ” supplied and commissioned till date.	Vendor to provide the list.
2.2	The BIDDER/VENDOR to furnish Reference List of Customers	Vendor to provide the list.
2.3	Contact details(phone no & email id) including the Address of Agents / Service Centres in India to be provided	Vendor to provide details
2.4	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	Vendor to Note & confirm
2.5	The bidding FIRM should have 'in-house' or 'self-owned' facility for FABRICATION and requisite TESTING.	Vendor to confirm

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

PERFORMANCE CERTIFICATE

1. Supplier of the Device / System with PLC based feedback :
2. Make & Model of the PLC based Device / System :
3. Intended function of the Device / System :
4. Month & Year of Commissioning :
6. Performance of the Device / System : Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
7. After sales service : Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
8. Any Other remarks

Date:

Signature & Seal of the Authority
Issuing the Performance Certificate

<u>Part B: Technical Specifications:</u> <i>Temperature controlled Heating System with PLC based feedback controller for Corrosion testing-QTY : 01 No.</i>			
SL.NO.	DESCRIPTION	BIDDER'S OFFER	DEVIATION REMARKS
1.0	<i>PURPOSE:</i> <i>Please refer the Annexure-I, having a sketch showing the general arrangement of the proposed system. It is used to test materials or components in hot acidic solution. In the sketch, the component is an “U-Tube”. The acidic solution either Sulphuric Acid or Magnesium Chloride. The solution shall be heated gradually up to 250 Deg. C in a controlled manner. Vapors of the acidic solution due to heating shall be condensed and sent back to the heating flask. For cooling the vapors in condenser, a separate water circuit shall be used. Following Items shown in the sketch are <u>“Not in the Scope of Supply”</u>:</i> <i>Borosilicate Flask</i> <i>U - Tube (Component)</i> <i>U-Tube support Stand</i> <i>Bulb Type Condenser</i> <i>Flask + Trap assembly at the top of the Condenser.</i> <i>Acidic solution (Sulphuric Acid or Magnesium Chloride)</i>	Vendor to note.	
2.0	<i>SCOPE OF SUPPLY:</i> <i>The Scope of Supply includes:</i> <i>Hot plate-with Non-Corrosive top plate(10”x10”-Heating surface)</i> <i>Voltage stabiliser, Programmable Logic Controller unit, a feedback system</i> <i>Temperature sensors (contact type - separately for Sulphuric acid and Magnesium chloride),with Non Corrosive/Non-Affected by hot vapours- Rubber Corks to hold the temperature sensors in vertical position within the borosilicate Flask.</i> <i>Closed water circuit assembly consisting of a synthetic water tank (20-litres capacity), DC Motor-Pump assembly, flow control valve, Flow meter, water circulating PVC hoses, (PVC-Hoses to connect synthetic water tank and the condenser set-up and vise versa.</i> <i>All electrical wiring from electrical input supply point to stabiliser, PLC and interlock wiring</i> <i>Erection, commissioning and performance prove out at BHEL, Trichy.</i> <i>Spares as mentioned in Cl. 4.0</i>	Vendor to confirm.	

<u>Part B: Technical Specifications:</u> Temperature controlled Heating System with PLC based feedback controller for Corrosion testing-QTY : 01 No.			
SL.NO.	DESCRIPTION	BIDDER'S OFFER	DEVIATION REMARKS
2.0	HOT PLATE: Hot plate is a device used to provide heat energy in a controlled manner to the Borosil Flask having the Acidic solution. It should able to withstand the load of the Flask with Solution – Minimum 25_ Kg.	Vendor to confirm.	
2.1.0	Top plate (Heating Surface) of the Hot plate:		
2.1.1	Size of the Tot Plate shall be of Dia 250 mm or 250 mm x 250 mm (Minimum).	Vendor to confirm.	
2.1.2	Top plate shall be of Non – Corrosive type material which transmits the heat energy supplied to it without any loss to the water contained in a borosilicate flask (capacity – 10 liters of water).	Vendor to confirm.	
2.1.3	Shall withstand the thermal shock.	Vendor to confirm.	
2.1.4	It should able to withstand the load of the Flask with Solution – Minimum _25_ Kg.	Vendor to confirm.	
2.2.0	HEATING ELEMENTS:		
2.2.1	Heating Elements shall be selected from an experienced and standard manufacturer and of good quality and of latest design. Vendor to specify the material.	Vendor to Specify.	
2.2.2	Heating elements shall be available in the market in case of replacement at a later time.	Vendor to confirm.	
2.2.3	Heating elements shall be able to withstand the thermal shock.	Vendor to confirm.	
2.2.4	The maximum temperature of aqueous solution to be heated is 250°C. Tolerance: +/- 1.5 Deg C	Vendor to confirm.	
2.2.5	The heat energy released by the heating elements in such a way that the temperature raise shall be in increments(0.5°C) and controllable.	Vendor to confirm.	
2.2.6	System interlock shall be provided to trip the power supply in case of sudden release of high heat energy. In case of such sudden release of heat energy and trip, resumption of heating shall be spelt out.	Vendor to confirm and provide details	

<i>Part B: Technical Specifications:</i> <i>Temperature controlled Heating System with PLC based feedback controller for Corrosion testing-QTY : 01 No.</i>			
SL.NO.	DESCRIPTION	BIDDER'S OFFER	DEVIATION REMARKS
2.3.0	<i>PROGRAMMABLE LOGIC CONTROLLER:</i>		
2.3.1	The programmable logic controller unit and the stabilizer unit shall be housed in a separate unit without getting affected by the heat in the hot plate and should function automatically varying the heat energy supplied to the system based on the feedback from the temperature sensing unit accordingly.	Vendor to confirm and provide details	
2.3.2	System interlocks shall be in-built and a constant monitor of temperature and heat energy shall be in such a way that the variation in temperature of the bath solution shall be within +/- 1.5°C w.r.to the Set value.(Variation of more than 1°C will affect the corrosion rate and may lead to bad results.)	Vendor to confirm and provide details	
2.3.3	The rate of heating should be set manually and it should be displayed for the operator's convenience. Desired rate of heating should be controllable.	Vendor to confirm	
2.4.0	<i>TEMPERATURE SENSING UNITS: (CONTACT TYPE, NON-CORROSIVE,CONTINUOUS MONITORING)</i>	Vendor to confirm	
2.4.1	Temperature sensor units shall be supplied separately for acid (sulphuric acid) solution and alkali(Magnesium chloride) solution	Vendor to confirm	
2.4.2	Diameter of the Temperature sensing element shall not be more than _12 mm and length should not be less than 400_ mm. Immersion depth shall be _30_ mm.		
2.4.3	The temperature sensed shall be indicated in the PLC Unit / hot plate base unit illuminated with bright LED (red) lights and feedback to be provided to PLC unit.	Vendor to confirm	
2.4.4	Provision shall be in the made to set the temperature required and shall be indicated with bright LED(red) lights. Both SV-Set value and PV-Process value shall be displayed with bright LED lights.	Vendor to confirm	
2.4.5	One operation cycle needs Continuous temperature measurement for 120 Hrs in Sulphuric acid and 500 Hrs in Magnesium Chloride. Life of temperature sensing units shall be for a minimum of 40 such cycles of operation.	Vendor to confirm	
2.4.6	Maintaining a constant, uniform temperature of both the solutions are to be demonstrated during the test run/pre-commissioning.	Vendor to confirm	
2.4.7	Continuous temperature measurements and feed back to PLC to be established and demonstrated during Pre-Commissioning for a minimum of _600_ Hrs for each solution.	Vendor to confirm	

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SL.NO.	DESCRIPTION	BIDDER'S OFFER	DEVIATION REMARKS
2.4.8	Calibration certificates are to be provided for the bought-out items like PLC, Stabilizer, Temperature sensing instruments, voltmeter, ammeter etc. Calibration shall be traceable to National/International standards.	Vendor to confirm	
2.5.0	VOLTAGE STABILISER.		
2.5.1	A Voltage Stabilizer of repute shall be provided in a separate housing along with PLC unit. The voltage stabilizer shall be of good quality and shall be easily available in the market in case of replacement.	Vendor to confirm	
2.5.2	The constant output voltage from the stabilizer shall be demonstrated during commissioning. The heat energy supplied to the heating coils, shall be constant after initial setting and should be ensured throughout the corrosion cycle, unless altered manually or automatically by the PLC unit.	Vendor to confirm	
2.5.3	The input current and voltages to the system shall be indicated with LED lights.	Vendor to confirm	
2.6.0	WIRING		
2.6.1	All electrical wiring from electrical input supply point to stabilizer, PLC and interlock wiring are in the scope of the bidder.	Vendor to confirm	
2.6.2	All wiring shall be of good quality and should able to withstand without getting heated up during continuous operations.	Vendor to confirm	
2.6.3	Identification of connections with numbers shall be done using ferrules.	Vendor to confirm	
2.6.4	All wires are to be dressed up neatly.	Vendor to confirm	
2.6.5	Suitable protective arrangements shall be ensured to avoid damages due to rat menace.	Vendor to confirm	
3.0	CLOSED LOOP CIRCULATING WATER SYSTEM:		
3.1.1	A Synthetic PVC tank of 20 Litres capacity shall be supplied and erected permanently along with water level indicator in the location shown by BHEL	Vendor to Confirm	
3.1.2	A Pump-Motor set up shall be supplied and to be erected at the location indicated by BHEL. This motor-pump set-up is required for pumping the tank water for circulation in the condenser set up provided by BHEL. The Motor-Pump set up is to be erected with necessary angles and bolts in place by the vendor. Volume of water flow to the	Vendor to Confirm	

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SL.NO.	DESCRIPTION	BIDDER'S OFFER	DEVIATION REMARKS
	condenser is 1 Litre/minute. A flow control valve&flow meter are to be supplied and erected at the synthetic tank outlet pipe line.		
3.1.3	Necessary air tight PVC hoses to connect the water supply from the existing tap to water tank and from water tank to condenser set up available (provided by BHEL) and from condenser to water tank are to be connected with PVC hoses are to be supplied by the vendor. (latest, leak-proof type connector-(plug-in type)- shall be provided.	Vendor to Confirm	
3.1.4	PVC hoses to be selected to suit synthetic tank's outlet pipe and the condenser inlet/outlet).	Vendor to Confirm	
4.0	SPARES: The following spares shall be supplied along with this order with calibration certificates. 1. 1 No. Voltage Stabilizer (of make and model supplied) 2. Each 2 Nos. of temperature sensing instrument – for Sulphuric acid and Magnesium Chloride (alkali). 3. 1 No.PLC. (of make and model supplied.) 4. Other O&M Spares for two years of trouble free Operation and Maintenance.		
5.0	DOCUMENTATION: Following are to be supplied along with the equipment. 1. Three sets of GA Drawing & Wiring Drawings. Electrical /electronic circuit diagrams for individual components shall be given for trouble shooting purpose. 2. Three set of Catalogs for Hot plate, stabilizer, PLC, Heating element and Temperature sensing instruments. 3. Calibration certificates for the instruments are required and traceable to national/international standards. 4. Guarantee certificates of the bought out items as applicable.		
6.0	PRE DISPATCH INSPECTION: Working and performance of the heating system as whole- Hot Plate and its related units such as Voltage stabilizer, Temperature Controller, PLC system etc. are to be demonstrated to BHEL Representatives. Boarding and lodging Charges of BHEL Representatives shall be borne by BHEL.		
7.0	COMMISSIONING/PROVE OUT: The Entire set-up (Hot plate with stabilizer and PLC and temperature sensing instruments and Synthetic water tank, pump-motor with circulating water hoses are to be erected by the Vendor at the indicated location of BHEL by the Vendor and to be demonstrated and Commissioned successfully to the complete satisfaction of BHEL		

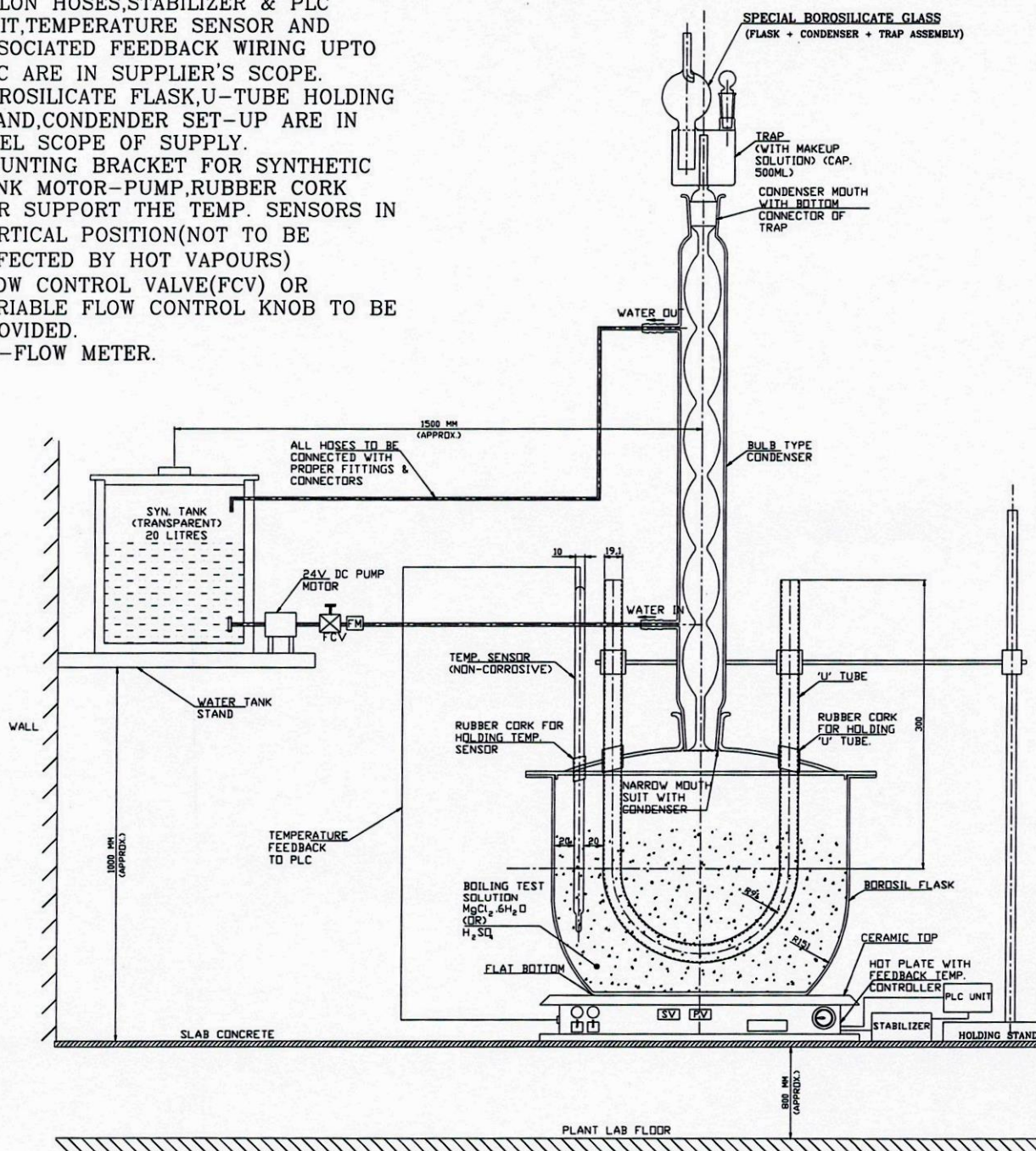
<i>Part B: Technical Specifications:</i> <i>Temperature controlled Heating System with PLC based feedback controller for Corrosion testing-QTY : 01 No.</i>			
SL.NO.	DESCRIPTION	BIDDER'S OFFER	DEVIATION REMARKS
	Engineers and prove that the entire system works satisfactorily. Any faulty instruments during commissioning should be replaced free of cost by the vendor till performance prove out is successful.		
8.0	<i>PERFORMANCE GUARANTEE:</i> A Performance Guarantee for satisfactory working of the equipment's supplied and in case any fault in the instrument shall be replaced free of cost. The Guarantee period shall be 24 months minimum from the date of commissioning.		
9.0	<i>ANNUAL MAINTENANCE CONTRACT:</i> A separately sealed quote is to be provided for the AMC of the system beyond the Guarantee period of 24 months.		

ANNEXURE-1

TEMPERATURE CONTROLLED HEATING SYSTEM WITH PLC BASED FEEDBACK CONTROLLER CORROSION TESTING (PLANT LABORATORY)

***NOTE:**

1. TEMPERATURE CONTROLABLE HEATING SYSTEM WITH PLC BASED FEEDBACK CONTROLLER, SYNTHETIC TANK, 24 V DC MOTOR-PUMP UNITS, ASSOCIATED NYLON HOSES, STABILIZER & PLC UNIT, TEMPERATURE SENSOR AND ASSOCIATED FEEDBACK WIRING UPTO PLC ARE IN SUPPLIER'S SCOPE.
2. BOROSILICATE FLASK, U-TUBE HOLDING STAND, CONDENSER SET-UP ARE IN BHEL SCOPE OF SUPPLY.
3. MOUNTING BRACKET FOR SYNTHETIC TANK MOTOR-PUMP, RUBBER CORK FOR SUPPORT THE TEMP. SENSORS IN VERTICAL POSITION (NOT TO BE AFFECTED BY HOT VAPOURS)
4. FLOW CONTROL VALVE (FCV) OR VARIABLE FLOW CONTROL KNOB TO BE PROVIDED.
5. FM-FLOW METER.



PLANT LABORATORY