



Government Women Engineering College, Ajmer, Makhupura, Nasirabad  
Road, Ajmer -305002

## INVITATION LETTER

Package Code: TEQIP-III/2019/RJ/gwec/102

Current Date: 11-Jul-2019

Package Name: GWECA/2019/Mechanical/Heat Transfer

Method: Shopping Goods

Lab-I

To,

.....  
.....  
.....

**Sub: INVITATION LETTER FOR GWECA/2019/Mechanical/Heat Transfer Lab-I**

Dear Sir,

1. You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications given at Annexure I,

Sr. No	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	THERMAL CONDUCTIVITY OF INSULATING POWDER APPARATUS	1	ME Dept., GWEC, Ajmer	Yes
2	Thermal Conductivity of metal rod	1	ME Dept., GWEC, Ajmer	Yes
3	Heat Transfer from A Pin-Fin	1	ME Dept., GWEC, Ajmer	Yes
4	Emmissivity Measurement Apparatus	1	ME Dept., GWEC, Ajmer	Yes
5	Stefn Boltzman Apparatus	1	ME Dept., GWEC, Ajmer	Yes
6	Natural Convection Apparatus	1	ME Dept., GWEC, Ajmer	Yes
7	DROP AND FILM WISE CONDENSATION APPARATUS	1	ME Dept., GWEC, Ajmer	Yes
8	Pool Boiling Apparatus	1	ME Dept.,	Yes

			GWEC, Ajmer	
9	Parallel Flow and Counter Flow Heat Exchanger	1	ME Dept., GWEC, Ajmer	Yes
10	Forced Convection Apparatus	1	ME Dept., GWEC, Ajmer	Yes

2. Government of India has received a credit from the International Development Association (IDA) towards the cost of the **Technical Education Quality Improvement Programme [TEQIP]-Phase III** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.

3. **Quotation**

3.1 The contract shall be for the full quantity as described above.

3.2 Corrections, if any, shall be made by crossing out, initialling, dating and re writing.

3.3 All duties and other levies payable by the supplier under the contract shall be included in the unit Price.

3.4 Applicable taxes shall be quoted separately for all items.

3.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

3.6 The Prices should be quoted in Indian Rupees only.

4. Each bidder shall submit only one quotation.

5. Quotation shall remain valid for a period not less than **90**days after the last date of quotation submission.

6. Evaluation of Quotations: The Purchaser will evaluate and compare the quotations determined to be Substantially responsive i.e. which

6.1 are properly signed; and

6.2 Confirm to the terms and conditions, and specifications.

7. The Quotations would be evaluated for all items together.

8. Award of contract The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

8.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of Contract.

8.2 The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be Incorporated in the purchase order.

9. Payment shall be made in Indian Rupees as follows:

**Satisfactory Delivery & Installation - 90% of total cost**

**Satisfactory Acceptance - 10% of total cost**

10. Liquidated Damages will be applied as per the below:  
Liquidated Damages Per Day Min % :N/A  
Liquidated Damages Max % : N/A
11. All supplied items are under warranty of **36** months from the date of successful acceptance of items and AMC/Others is .
12. You are requested to provide your offer latest by **14:30** hours on **25-Jul-2019**, failing which it would be summarily rejected. GWEC Ajmer will not be responsible for postal delay or non-receipt of quotation.
13. Detailed specifications of the items are at Annexure I.
14. Training Clause (if any) **Yes**
15. Testing/Installation Clause (if any) **Yes**
16. Performance Security shall be applicable: **5%**
17. **Information brochures/ Product catalogue**, if any must be accompanied with the quotation clearly indicating the model quoted for.
18. Sealed quotation (complete in all respects) to be submitted/ delivered at the address mentioned below, **Government Women Engineering College, Ajmer,Makhupura, Nasirabad Road, Ajmer -305002**
19. You are requested to provide the company details viz. **Firm Registration Certificate, GST Registration Certificate** and any other necessary documents duly certified by **Chartered Accountant / Notary Public**.
20. The quotation would be opened on **25-Jul-2019 at 15:00 hrs** at **TEQIP-III Office, Govt. Women Engineering College Ajmer, Rajasthan – 305002, India** in the presence of bidder representatives who choose to attend the opening. The bidder representatives who are present shall sign an Attendance Sheet evidencing their attendance.
21. Notwithstanding the above, the Institute reserves the right to accept or reject any

quotation(s) and to cancel the process and reject all quotation(s) at any time.

- 22.** Dispute if any shall be subjected to the jurisdiction of Rajasthan in Ajmer/Jaipur.
- 23.** We look forward to receiving your quotation and thank you for your interest in this project.

(Authorized Signatory)

Name & Designation

## Annexure I

Sr. No	Item Name	Specifications
1	THERMAL CONDUCTIVITY OF INSULATING POWDER APPARATUS	<p>Two thin walled concentric copper spheres of different diameter i.e. Inner Sphere : Material Copper, Dia. - 100 mm. Outer Sphere : Material Copper, Dia. - 200 mm should be provided. Nichrome Wire heater should be houses in inner sphere and heat should be flow radially outwards. Temperature measurement should be done by RTD-PT100 type, Ten Temperature Sensors , tolerance IEC-60751F 0.15, Class A type Temperature Sensors. Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C, Digital Type Energy meter for power measurement and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : Determination of thermal conductivity of insulating powder. Comparison of thermal Conductivity of insulating powder at different temperatures.</p>
2	Thermal Conductivity of matel rod	<p>A Metal Bar should be made of Cooper having Length : 400 mm and Diameter : 25 mm with Insulating shell of Length : 250 mm &amp; Diameter : 200 mm. Cooling Water Jacket should be of Length : 75 mm &amp; Diameter : 50 mm. Nichrome Wire heater should be fitted at one end of metal rod. Water Flow measurement should be done by Measuring cylinder &amp; Stop watch. Eight RTD-PT100 type Temperature Sensors, tolerance IEC-60751F 0.15, Class A type Temperature Sensors for temperature measurement. Control panel should comprising of Digital Temperature Controller : PID Controller, 0-199.9° C, Digital Type Energy meter for power measurement and Digital Temperature Indicator (0-199.9°C) with multi-channel switch, With standard make on/off switch, Mains Indicator etc. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : To plot the temperature distribution along the length of Bar To determine the thermal conductivity of given bar at various temperatures.</p>

3	Heat Transfer from A Pin-Fin	<p>An air duct made of SS 304, thickness 1.5mm should be fitted with blower, Pin type fin of Dia. 20 mm, Length 170, made of aluminum and Nichrome Wire band type heater whose temperature should be controlled by PID Controller, 0 -199.9° C. Air Flow Measurement should be done by Calibrated Orifice meter and water manometer. Temperature measurement should be done by RTD-PT100 type, tolerance IEC-60751F 0.15, Class A type Temperature Sensors. Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C, digital type energy meter for power measurement and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up should be well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : To study temperature distribution along the length of fin in both Free &amp; forced convection. Comparison of theoretical temperature distribution with that of experimentally obtained distribution.</p>
4	Emmissivity Measurement Apparatus	<p>Test plate(Polished Cooper) should be of Diameter : 160 mm. Black Plate(Black cooper) should be of Dia. 160 . (Nichrome Wire Mica Insulated type Heater , 2 Nos. for test plate &amp; black plate should be provided. Three RTD-PT100 type tolerance IEC-60751F 0.15, Class A type Temperature Sensors should be provided to measure temperature. Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C, digital type energy meter for power measurement and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided Cabinet to accommodate the slab assembly with front window of acrylic. The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : Determination of the Emissivity of a test plate. Study the variation of emissivity of test plate with absolute temperature.</p>
5	Stefn Boltzman Apparatus	<p>Hemisphere of Dia.- 200 mm (approx.) should be made of Copper. Jacket of Dia. 250 mm (approx.) should be made of Stainless Steel 304 Grade, Thickness of 1.5mm. Test Disc Size of 20 mm Dia. x 1.5-mm thickness should be made of Copper. Water Tank should be made of Stainless Steel 304, thickness 1.5mm</p>

		<p>Grade of capacity 12 Ltrs, Thickness of 1.5mm. capacity. Heater : Nichrome wire immersion type heater. Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C for water tank and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. One ceramic bare sensor must be welded on test disc directly. There should be no other material in between ceramic sensor and test specimen to avoid any losses. One Standard PT-100 Sensor to be fixed on hemisphere dia 200 mm. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : Determination of Stefan Boltzmann constant and study the effect of hemisphere temperature on it.</p>
6	Natural Convection Apparatus	<p>Test section should be made of brass with Diameter : 38 mm and Length : 500 mm. Nichrome Wire heater should be fitted in rectangular duct test section. Rectangular enclosure should be open from the top and the bottom. Eight RTD-PT100 type tolerance IEC-60751F 0.15, Class A type Temperature Sensors should be provided to measure temperature. Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C, Digital Type Energy meter for power measurement and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. Powder coated duct of MS to accommodate the assembly with front window of Acrylic. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : To determine average heat transfer coefficient under natural convection.</p>
7	DROP AND FILM WISE CONDENSATION APPARATUS	<p>Two Copper tubes one with natural finish and other gold polished fitted in a glass cylinder with ID 16 mm, OD: 19 mm &amp; Length : 175 mm. Water Flow measurement should be done by Rotameter. Condensate Measurement should be done by Measuring Cylinder &amp; electronic Stopwatch. Steam Generator of capacity 8 Ltrs. (Approx.) should be made of Stainless steel 304 Grade thickness 1.5mm fitted with 1.5 kW Nichrome wire heater and Insulated with ceramic wool and cladded by aluminum foil. Control valves should be provided for Steam and Cooling water Drain. Bourdon type Pressure Gauge should be provided to measure pressure of</p>

		<p>steam. Temperature measurement should be done by RTD-PT100 type, tolerance IEC-60751F 0.15, Class A type Temperature Sensors. Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C, digital type energy meter for power measurement and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up should be well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : Visualization of condensation process in drop wise as well as film wise condition. To determine overall heat transfer co-efficient for Film wise &amp; Drop wise condensation of steam on a vertical surface.</p>
8	Pool Boiling Apparatus	<p>Test heater should be provided with holding arrangement for quick change of wire. Boiling Chamber should be made Stainless steel 304 grade, thickness 1.5mm with transparent window for observation of test heater. Nichrome wire heater should be is fitted in boiling chamber and heat input controlled by PID Controller, 0 -199.9° C. Temperature measurement should be done by Temperature Sensors of RTD PT-100 type tolerance IEC-60751F 0.15, Class A type with Digital Temperature Indicator (0-199.9 °C). Heat input to test heater measured by Voltmeter 0-200 V, Ammeter 0-2 Amp, with Peak Hold Facility and Dimmer stat 0-4 A, 230 V. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up should be well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment: To determine the critical heat flux of given wire. To study the nucleate boiling phenomenon up to Critical Heat flux point.</p>
9	Parallel Flow and Counter Flow Heat Exchanger	<p>Water to Water, concentric tube type Heat exchanger of Length 1.6 m should be insulated with ceramic wool and cladded by aluminum foil. Outer Tube of ID 27.5 mm and OD 33.8 mm and Inner Tube of ID 9.5 mm, OD 12.7mm should be made of Stainless steel 304 Grade, thickness 1.5mm. Water Flow Measurement should be done by Two calibrated Eureka make Rotameters one each for cold &amp; hot fluid. Hot Water Circulation should be done by Magnetic Pump from Hot Water Tank, 1.2 mm thick, made of Stainless steel 304 Grade, Insulated with ceramic wool and fitted with Two Nichrome wire heaters. Temperature measurement should be done by RTD-PT100 type(6 Nos), tolerance IEC-60751F 0.15, Class A type Temperature Sensor.</p>



		<p>Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C, digital type energy meter for power measurement and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up should be well designed and arranged on a rigid structure painted with industrial PU Paint. Equipment should be capable of performing following experiment : To calculate the Rate of Heat Transfer To calculate the LMTD. To calculate the Overall heat transfer co-efficient. To compare the performance of Parallel and Counter flow heat exchanger.</p>
10	Forced Convection Apparatus	<p>Test Section should be made of brass with Diameter : 38 mm and Length : 500 mm. Horizontal Test section externally heated by Nichrome wire heater should be of Diameter : 28 mm and Length : 400 mm. FHP Blower of Standard make should be fitted in test section to vary air flow rate which should be measured by orifice meter and manometer fitted on pipeline. Six RTD-PT100 type, tolerance IEC-60751F 0.15, Class A type Temperature Sensors should be provided to measure temperature. Control panel should comprising of Digital Temperature Controller i.e. PID Controller, 0-199.9°C , Digital Type Energy meter for power measurement and Digital Temperature Indicator : 0-199.9°C, with multi-channel switch, With standard make On/Off switch, Mains Indicator etc. Operating/instruction manual and sample calculations, Photographs and line diagram of the equipment must be provided along with tender documents otherwise your bid will be rejected. Equipments has to be demonstrated at college site, results should be repeatable within <math>\pm 5\%</math> of the sample calculations provided. The whole set-up is well designed and arranged on a rigid structure made of MS Square pipe 32 mm x 32 mm x 2 mm thickness and painted with industrial PU Paint. Equipment should be capable of performing following experiment : To determine average surface heat transfer coefficient for a pipe by forced convection Comparison of heat transfer coefficient for different air flow rates and heat flow rates.</p>

**FORMAT FOR QUOTATION SUBMISSION**  
(In letterhead of the supplier with seal)

Date: \_\_\_\_\_

To: \_\_\_\_\_  
\_\_\_\_\_

Sl. No.	Description of goods \ (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs. (Including Ex-Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price (A)	Sales tax and other taxes payable	
						In %	In figures (B)
<b>Total Cost</b>							

Gross Total Cost (A+B): Rs. \_\_\_\_\_

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. \_\_\_\_\_ (Amount in figures) (Rupees \_\_\_\_\_ amount in words) within the period specified in the Invitation for Quotations.

We confirm that the normal commercial warranty/ guarantee of \_\_\_\_\_ months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Contact No. \_\_\_\_\_