



**SPEED POST**

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Grams :

**SARDAR VALLABHBHAI NATIONAL  
INSTITUTE OF TECHNOLOGY, SURAT-395 007.**

No. MED/AHT Lab/4344/

/2021-22

Date:17/02/2022

To,

As per attached sheet

***SUB: - Enquiry for Experimental Setups for Heat Transfer Laboratory.***

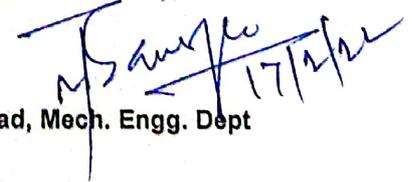
Dear Sir,

You are requested to quote your prices for supply of stores listed overleaf. The quotations may be sent to the undersigned in a sealed envelope and subscribed as: "Quotation with reference to Enquiry No. MED/ 4344/ /2021-22 dtd: 17/02/2022. Your quotation should reach the undersigned on or before 25/02/2022 at 5:00 pm.

The quotations should be furnished with the following information.

- 1) The brand or make of each item should be specifically stated and wherever necessary, Complete set of specifications and dimensions should be given.
- 2) If asked, samples are accompany the quotations
- 3) Sales tax, General tax, Central Sales tax, Custom duty, Insurance charges, Packing and Forwarding charges, if not included in the prices quoted, should be clearly specified.
- 4) The period of validity of the quotation should be at least 45 Days. Offers subject to prior sale may please be avoided.
- 5) The delivery period is to be clearly mentioned in the quotation.
- 6) The mode of delivery of the stores may be mentioned. The delivery should be F.O.R. Surat or at the Institute.
- 7) All concessions available to an educational institution should be specified and also taken into account while quoting.
- 8) This Institute is located within the limits of S.M.C. & exempted from the paying of octroi duty on incoming goods from outside limits of S.M.C.
- 9) This Institute is registered with the dept. of scientific & industrial Research (DSIR) for the purpose of availing custom duty exemption & central excise duty exemption, and hence the certificate to this effect will be issued wherever it is necessary on demand.
- 10) Payment is normally made by cheque drawn on the S.V.N.I.T. Branch Office of State Bank of India, Surat-395007 within a period of thirty days from the date of receipt of stores.
- 11) Your specifications & terms- conditions should be as per the format attached, must be on your company letterhead & signed by an authorized person.
- 12) Offered quotation may be rejected if any ambiguity is found in offered specifications, terms & conditions supplied by party in specified tabular format.
- 13) The Director reserves the right to accept stores, which are not strictly in confirming with the specifications but otherwise, found suitable.

Yours faithfully,

  
Head, Mech. Engg. Dept

SR. NO.	EXPERIMENTAL SETUP WITH SPECIFICATION
1.	<p><b>HEAT TRANSFER THROUGH COMPOSITE WALL</b></p> <p><b>Experimentation:</b></p> <ul style="list-style-type: none"> <li>To determine total thermal resistance and thermal conductivity of composite wall.</li> <li>To plot temperature gradient along composite wall</li> </ul> <p><b>Technical detail:</b></p> <ul style="list-style-type: none"> <li>Slab assembly arranged symmetrically on both sides of heater.</li> </ul> <p>Slab Material: Slab Size  Cast Iron: 250 mm dia. &amp; 20mm thick.  Bakelite: 250 mm dia. &amp; 15 mm thick.  Press Wood: 250 mm dia. &amp; 12 mm thick.</p> <ul style="list-style-type: none"> <li>Heater: Nichrome wire.</li> <li>Control panel comprising of: PID Controller: 0-199.9° C make :L Selec/Multispan Digital Temp. Indicator: 0-199.9° C, with multi-channel switch</li> <li>Temperature Sensors: RTD PT-100 type- 8Nos. make : CRZ/radix/dwyer//Dwyer/</li> <li>Energy meter: Digital type for power measurement make : selec/multispan With standard make On/off switch, Mains Indicator etc.</li> <li>Cabinet to accommodate the slab assembly with front window of glass/acrylic.</li> </ul>
2.	<p><b>STEFFAN BOLTZMAN APPARATUS</b></p> <p><b>Description</b></p> <p>The apparatus is designed to determine the Steffan Boltzmann constant.  The apparatus consists of a hemisphere fixed to a Bakelite plate, The outer surface of which forms the jacket to heat it.  Hot water to heat the hemisphere is obtained from a hot water tank, which is fixed above the hemisphere. The copper test disc is introduced at the center of hemisphere. The temperatures of hemisphere and test disc are measured with temperature sensor.</p> <p><b>Experiments</b></p> <ul style="list-style-type: none"> <li>Determination of Steffan Boltzmann constant and study the effect of hemisphere temperature on it</li> </ul> <p><b>Technical detail</b></p> <p>Hemisphere: Dia. 200mm(aprox.) made of copper  Jacket: Dia. 250mm(approx.) made of stainless steel  Test disc size: Dia. 20mm, Thickness 1.5mm made of copper  Water tank: Stainless Steel, 12 Ltr capacity  Heater: Nichrome wire immersion type  Control panel comprising of:</p> <ul style="list-style-type: none"> <li>Digital temperature controller: 0-199.9°C(for water tank) make : selec/mutispan</li> <li>Digital temperature indicator: 0-199.9° C, with multi-channel switch make : selec/mutispan</li> <li>Temperature sensors: RTD PT-100 type(2No.) make : CRZ/Radix/Dwyer With standard make on/off switch, mains indicator etc.</li> </ul>
3.	<p><b>EMISSIVITY MEASUREMENT APPARATUS</b></p> <p><b>Description</b></p> <p>The set-up is designed to measure the emissivity of test plate. The test plate comprises of a mica heater sandwiched between two plates. Black plate is identical wit test plate, but its surface is blackened. As all the physical properties, dimension and temperature are equal; heat losses from both plates will be same except radiation loss. Hence the input difference will be due to difference in emissivity. Both plates are supported on individual brackets in an enclosure with one side glass to ensure study atmospheric conditions. Temperature sensors are provided to measure the temperature of each plate and surrounding. Electric supply is given to heaters through separate variacs, so that temperature of both can be kept equal and is measured with digital volt meter and digital ammeter.</p> <p><b>Experimentation</b></p> <ul style="list-style-type: none"> <li>Determination of emissivity of test plate</li> <li>Study the variation of emissivity of test plate with absolute temperature</li> </ul> <p><b>Technical detail</b></p> <ul style="list-style-type: none"> <li>Test plate diameter: 160mm approx.; Black plate diameter: 160mm approx.; Heaters (2No.): Nicrome wire heaters(one for each plate)</li> <li>Control panel comprising of: <ul style="list-style-type: none"> <li>Digital voltmeter: 0-300 Volts Make : selec/mutispan</li> <li>Digital Ammeter: 0-2 Amps. Make : Selec/Mutispan</li> </ul> </li> </ul>

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	<ul style="list-style-type: none"> <li>▪ DPDT selector switch: For digital voltmeter and digital ammeter</li> <li>▪ Variacs(2 No.): 0-230 V, 2 Amps.(one each for test plate and black plate)</li> <li>▪ Digital temperature indicator: 0-199.9<sup>o</sup> C, with multi-channel switch</li> <li>• Temperature sensors: RTD PT-100 type(3No.) Make : CRZ/Radix/Dwyer With standard make on/off switch, mains indicator etc.</li> <li>• Cabinet to accommodate the slab assembly with front window of acrylic</li> </ul>
4	<p><b>SHELL &amp; TUBE HEAT EXCHANGER</b></p> <p><b>Description</b>  The shell and tube heat exchanger consists of seven tubes, surrounded by a transparent outer shell. The hot water flows through the tube space and the cold water through the space in the shell. Part of the thermal energy of the hot water is transferred to the cold water. Baffle plates are used to deflect the flow in the shell in such a way as to create greater turbulence and thus a more intensive transfer of heat. The media flows in a cross-flow.</p> <p>Valves on the supply unit are used to adjust the flow rates of hot and cold water. The supply hose can be reconnected using quick-release couplings, allowing the flow direction to be reversed. This allows cross parallel flow or cross counterflow operation. Temperature sensors for measuring the inlet and outlet temperature are provided.</p> <p><b>Learning objectives/ experiment</b></p> <ul style="list-style-type: none"> <li>▪ function and behaviour during operation of shell and tube heat exchanger</li> <li>▪ plotting temperature curves: in cross parallel flow operation; in cross counterflow operation</li> <li>▪ calculation of mean heat transfer coefficient</li> <li>▪ comparison with other heat exchanger types</li> </ul> <p><b>Specification</b></p> <ol style="list-style-type: none"> <li>4. cross parallel flow and cross counterflow operation possible</li> <li>5. transparent shell, visible tube bundle</li> <li>6. tube bundle consisting of 7 tubes and 4 baffle plates</li> </ol> <p><b>Technical data</b>  Heat transfer surface: 200cm<sup>2</sup>  Tube bundle, stainless steel</p> <ul style="list-style-type: none"> <li>▪ outer diameter: 6mm</li> <li>▪ wall thickness: 1mm</li> <li>▪ tubes, 7</li> </ul> <p>Shell, transparent (PMMA)</p> <ul style="list-style-type: none"> <li>▪ outer diameter: 50mm</li> </ul> <p>wall thickness: 3mm</p> <ul style="list-style-type: none"> <li>• An ENGLISH instruction manual consisting of experimental procedures will be provided along with the Apparatus</li> <li>• The whole set-up is well designed and arranged on a rigid structure painted with industrial PU Paint.</li> </ul>

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