



## HEAT TRANSFER LAB EQUIPMENTS

S. No	Name of the Equipment	specifications	Photograph
1.	<b>COMPOSITE WALL APPARATUS</b>	<p>Slab assembly arranged symmetrically on both sides of the Heater.</p> <p>Heater coil type of 250-Watt capacity.</p> <p>Dimmer stat open type, 230v, 0-2 amp, single phase.</p> <p>Volt meter range 0-300V</p> <p>Ammeter range 0-20A</p> <p>Digital temperature indicator range 0-800<sup>o</sup> c</p> <p>Thermocouple used: Teflon coated, Chromal-Alumal</p> <p>Slab diameter of each =150 mm.</p> <p>Thickness of mild steel = 10 mm.</p> <p>Thickness of Asbestos = 6 mm.</p> <p>Thickness of wood= 10 mm.</p>	

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<p style="text-align: center;">2.</p>	<p style="text-align: center;"><b>CRITICAL HEAT FLUX APPARATUS</b></p>	<p>Length of Nichrome wire, <math>L = 52 \text{ mm}</math></p> <p>Diameter of Nichrome wire, <math>D = 0.25 \text{ mm}</math> (33 gauge)</p> <p>Distilled water quantity = 4 liters</p> <p>Thermometer range : <math>0 - 100 \text{ }^\circ\text{C}</math></p> <p>Heating coil capacity (bulk water heater ) : 2 kW</p> <p>Dimmer stat open type, 230v, 0-2 amp, single phase.</p> <p>Ammeter range 0-20A</p> <p>Voltmeter range 0-300V</p>	 <p>The image shows a 'CRITICAL HEAT FLUX APPARATUS' mounted on a red metal table. It consists of a control panel on the left with a digital display, a red emergency stop button, and a power switch. To the right is a cylindrical glass chamber containing a heating coil and a thermometer, connected to the control panel by wires.</p>
<p style="text-align: center;">3.</p>	<p style="text-align: center;"><b>EMISSIVITY APPARATUS</b></p>	<p>Specimen material : Brass</p> <p>Specimen Size : <math>\phi 150 \text{ mm}</math>, 6 mm thickness (gray &amp; black body)</p> <p>Voltmeter : <i>Digital type, 0-300v</i></p> <p>Ammeter : <i>Digital type, 0-3 amps</i></p> <p>Dimmerstat : 0-240 V, 2 amps</p> <p>Temperature Indicator : Digital type, <math>0-300^\circ\text{C}</math>, K type</p> <p>Thermocouple Used : 7 nos.</p> <p>Heater : Sand witted type Nichrome heater, 400 W</p>	 <p>The image shows an 'EMISSIVITY MEASUREMENT APPARATUS' in a blue metal cabinet. The front panel features a digital display, three analog meters, and two large circular openings labeled 'TEST BODY' and 'BLACK BODY'. The brand name 'datacone' is visible at the bottom right of the panel.</p>

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4.

### FORCED CONVECTION APPARATUS

Specimen : Copper Tube  
Size of the Specimen : I.D. 25mm x  
300mm long  
Heater : Externally heated, Nichrome wire Band  
Heater  
Ammeter : Digital type, 0- 20amps, AC  
Voltmeter : Digital type, 0-300volts, AC  
Dimmerstat for heating Coil : 0-230v, 2amps  
Thermocouple Used : 7 nos.  
Centrifugal Blower : Single Phase 230v, 50 hz,  
3000rpm  
Manometer : U-tube with mercury as working  
fluid  
Orifice diameter, ' $d_o$ ' : 20 mm  
G. I pipe diameter, ' $d_p$ ' : 40 mm





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<p>5.</p>	<p><b>THERMAL CONDUCTIVITY OF INSULATING POWDER APPARATUS</b></p>	<p>Radius of inner sphere = 50mm                  Radius of outer sphere = 100 mm                  Voltmeter 0-300V &amp; Ammeter 0-5amps.                  Variac – 2 amps.                  Temperature indicator 0-300<sup>o</sup>c</p>	
<p>6.</p>	<p><b>NATURAL CONVECTION APPARATUS</b></p>	<p>Specimen : Stainless Steel tube,                  Size of the Specimen : I.D 38mm / O.D 44mm,                  500mm length                  Heater : Nichrome wire type heater along its length                  Thermocouples used : 8nos.                  Ammeter : Digital type, 0-2amps, AC                  Voltmeter : Digital type, 0-300volts, AC                  Dimmerstat for heating coil : 0-230 V, 2 amps, AC power                  Enclosure with acrylic door : For visual display of test section (fixed)</p>	

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7.	<b>PARALLEL FLOW/COUNTER FLOW HEAT EXCHANGER APPARATUS</b>	<p>Length of heat exchanger = 2440 mm                  Inner copper tube ID = 12 mm                  OD = 15 mm                  Outer GI tube ID = 40 mm                  Geyser capacity = 1 ltr, 3 kW</p>	
8.	<b>PIN-FIN APPARATUS</b>	<p>Length of the fin, 'L' = 150mm                  Diameter of the fin, 'd<sub>f</sub>' = 12mm                  Thermal conductivity of fin material (brass) = 110.7 W/m<sup>2</sup>-K                  Diameter of the orifice, 'd<sub>o</sub>' = 20 mm                  Width of the duct, 'W' = 150 mm                  Breadth of the duct, 'B' = 100 mm                  Coefficient of discharge of the orifice, 'C<sub>d</sub>' = 0.62                  Density of manometric fluid (mercury) = 13.6 x 1000 kg/m<sup>3</sup></p>	

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9	<b>STEFAN BOLTZMAN APPARATUS</b>	<p>Specimen material : Copper                  Size of the disc : <math>\phi</math> 20mm x 0.5mm thickness                  Base Plate : <math>\phi</math> 250mm x 12mm thickness (hynam)                  Heater : 1.5 kW capacity, immersion type                  Copper Bowl : <math>\phi</math> 200mm                  Digital temperature indicator : 0 -199.9° C                  Thermocouples used : 3 nos. on hemisphere                  Stop Watch : Digital type                  Overhead Tank : SS, approx. 12 liter capacity                  Water Jacket : <math>\phi</math> 230 mm, SS                  Mass of specimen, 'm' : 5 gm</p>	 <p>The image shows the Stefan Boltzmann apparatus. It consists of a white control panel with a digital display and a red power switch. A copper bowl is mounted on a blue stand, and a specimen disc is positioned above it. A heater is visible in the background, and various wires are connected to the setup.</p>
10	<b>THERMAL CONDUCTIVIT Y OF METAL ROD APPARATUS</b>	<p>Specimen material : Brass rod                  Size of the Specimen : <math>\phi</math>20 mm, 450mm long                  Cylindrical shell : 300mm long                  Voltmeter : Digital type, 0-300volt, AC                  Ammeter : Digital type, 0-20amp, AC                  Dimmer for heating Coil : 0-230v, 12amps                  Heater : Band type Nichrome heater, 250 W                  Thermocouple used : 11 nos.                  Temperature indicator : Digital type, 0-200°c,                  Cr-Al</p>	 <p>The image shows the thermal conductivity of metal rod apparatus. It features a white control panel with a digital display and a red power switch. A blue cylindrical shell is mounted on a blue stand, and a brass rod is positioned inside it. A heater is visible in the background, and various wires are connected to the setup.</p>

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11	<b>LAGGED PIPE APPARATUS</b>	<p>Diameter of heater rod <math>d_1 = 20 \text{ mm}</math></p> <p>Diameter of heater rod with asbestos lagging <math>d_2 = 40 \text{ mm}</math></p> <p>Diameter of heater rod with asbestos and saw dust lagging <math>d_3 = 80 \text{ mm}</math></p> <p>Effective length of the cylinder <math>l = 500 \text{ mm}</math>.</p>	
12	<b>CONDENSATION IN DROP WISE AND FILM WISE APPARATUS</b>	<p>Heater : Immersion type, capacity 2kW</p> <p>Voltmeter : Digital type, Range 0-300v</p> <p>Ammeter : Digital type, Range 0-20 amps</p> <p>Dimmerstat : 0-240 V, 2 amps</p> <p>Temperature Indicator: Digital type, 0-800°C</p> <p>Thermocouple Used : Teflon coated, Chromal-Alumal (Ch-Al)</p> <p>Diameter of copper tube <math>d = 16 \text{ mm}</math></p> <p>Length of copper tube <math>l = 300 \text{ mm}</math></p> <p>Capacity of boiler max <math>2 \text{ kg/cm}^2</math></p> <p>Glass tube diameter 150 mm, length 300 mm, thickness 5 mm</p>	

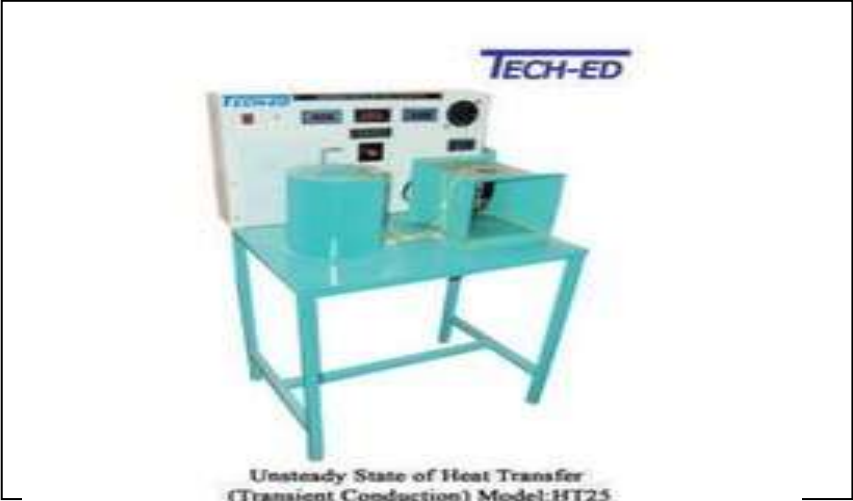


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13	<b>HEAT PIPE DEMONSTRATION APPARATUS</b>	Inside Diameter of the pipe= 24 mm Outside Diameter of the pipe= 28 mm Length of pipes = 300 mm.	 A photograph showing three heat pipe demonstration apparatus units arranged horizontally on a white panel. Each unit consists of a black cylindrical pipe with a copper bowl at the bottom, connected to a black control box. Yellow wires are connected to the top of each pipe. The panel has three circular indicators at the top.
14	<b>TWO PHASE HEAT TRANSFER APPARATUS</b>	Diameter of copper bowl : 100 mm Quantity of liquid in sump : 200 ml	  A photograph of a two phase heat transfer apparatus. The top part shows a control panel with a pressure gauge, a digital display, and a glass vessel with a copper bowl inside. The bottom part shows the same apparatus mounted on a red metal stand.



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15	<b>UNSTEADY STATE HEAT TRANSFER APPARATUS</b>	D.C buzzer :10-30 V Oil heater : 1 kW Digital temperature Indicator 1200 <sup>o</sup> c Thermocouple : Al-Cr type Specimen material : copper Fuse : 4 amps	 <p>Unsteady State of Heat Transfer (Transient Conduction) Model:HT25</p>
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