

NATURAL CONVECTION HEAT TRANSFER APPARATUS



Technical Data:

- Test Section: Diameter: 38 mm (approx).
- Length : 500 mm (approx).
- Heater: Nichrome Wire.
- **CONTROL PANEL COMPRISING OF:**
- Digital Voltmeter: 0-300 Volt.
- Digital Ammeter: 0-2 Amp.
- Variac : 0-230 V, 2 Amp.
- Digital Temp. Indicator: 0-2000C, with multi-channel switch
- Temperature Sensors: RTD PT-100 type.
- With standard make On/Off switch, Mains Indicator etc.
- Painted duct of MS to accommodate the assembly with front window of Acrylic.
- The whole set-up is well designed and arranged on a powder-coated structure.

Model : OR-PBA-019

EXPERIMENTATION :

To determine average heat transfer coefficient under natural convection.

Instruction Manual : An ENGLISH instruction manual will be provided along with the Apparatus.



FORCED CONVECTION HEAT TRANSFER APPARATUS



Model : OR-FHP-400

Technical Data:

Test section : Horizontal, externally heated

Diameter : 28 mm (approx.)

Length : 400 mm (approx.)

Blower : FHP of Standard makes.

Heater : Nichrome Wire.

Air Flow measurement: Orifice meter & U-Tube Manometer.

Control panel comprising of :

Digital Voltmeter : 0-300 Volt.

Digital Ammeter : 0-2 Amp.

Variac : 0-230 V, 2 Amps

Digital Temp. Indicator: 0-3000C, with multi-channel switch.

Temperature Sensors : RTD PT-100 type.

With standard make on off switch, Mains Indicator etc.

EXPERIMENTATION :

To determine average surface heat transfer coefficient for a pipe by forced convection. Comparison of heat transfer coefficient for different airflow rates and heat flow rates. To plot surface temperature distribution along the length of pipe

**EMISSION MEASUREMENT APPARATUS****Model : OR-EMA-156****Technical Data:**

Test plate Diameter : 160 mm (approx.)

Black Plate Dia.: 160 mm (Approx.)

Heater (2Nos.) : Nichrome Wire Heater.

(One each for test plate & black plate)

Control panel comprising of :

Digital Voltmeter : 0-300 Volt. Digital Ammeter : 0-2 Amps.

DPDT Selector switches : For Digital Voltmeter & Digital Ammeter.

Variacs : 0-230 V, 2 Amps, (2 Nos.)

(One each for test plate and black plate).

Digital Temp. Indicator : 0-2000C, with multi-channel Switch

Temperature Sensors : RTD PT-100 type.

With standard make On/Off switch, Mains Indicator etc.

EXPERIMENTATION :

Determination of the Emissivity of a test plate. Study the variation of emissivity of test plate with absolute temperature.



STEFAN BOLTZMANN'S CONSTANT APPARATUS



Model : OR-SBA-200

Technical Data:

Hemisphere : Dia.- 200 mm (approx.) made of Copper Jacket :

Dia. 250 mm (approx.) made of Stainless Steel

Test Disc Size : 20 mm Dia. x 1.5-mm thickness made of Copper

Water Tank : Stainless steel 12 Ltrs. cap.

Heater : Nichrome wire immersion heater.

Control panel comprising of :

Digital Temp. Controller : 0 to 199.90C, (for water tank)

Digital Temp. Indicator : 0 to 199.90C, with multi channel switch

Temperature sensors : RTD PT-100 type.

With standard make on/off switch, Mains Indicator etc.

EXPERIMENTATION :

Determination of Stefan Boltzmann constant and study the effect of hemisphere temperature on it.



HEAT EXCHANGER (PARALLEL FLOW AND COUNTER FLOW)



Model : OR-PCF-201

EXPERIMENTATION :

To calculate the following parameters both for parallel and counter flow arrangement: Rate of Heat Transfer. LMTD. Overall heat transfer co-efficient. To compare the performance of Parallel and Counter flow heat exchanger.

Technical Data:

System : Water to Water, concentric tube type

Length 1.6m (approx.) insulated with ceramic wool and cladded by aluminium foil.

Outer Tube: Material Stainless steel. ID 27.5mm, OD 33.8 mm (approx)

Inner Tube: Material Stainless Steel, OD 12.7mm (approx)

Water Flow Measurement: Rotameters (2Nos.) one each for cold & hot fluid.

Hot Water Tank: Made of Stainless steel. Insulated with ceramic fibre wool.

Hot Water Circulation : Magnetic Pump

Heater : Nichrome wire heater

Control panel comprising of : Digital Temp. Controller: 0-199.90C (For Hot Water Tank) Digital Temp. Indicator : 0-199.90C, with multichannel switch Temperature Sensors : RTD PT-100 type. With Standard make On/Off switch, Mains Indicator etc.



HEAT TRANSFER COEFFICIENT OF COMPOSITE WALL APPARATUS



Technical Data:

Slab assembly arranged symmetrically on both sides of heater.

Slab Material: Slab Size Cast Iron: 250 mm dia. & 20mm thick. Bakelite: 250 mm dia. & 15 mm thick.

Press Wood: 250 mm dia. & 12 mm thick. Heater :

Nichrome wire. Control panel comprising of : Digital

Voltmeter: 0-300 Volts. Digital Ammeter: 0-2 Amp. Variac: 0-230 V, 2 Amp. Digital Temp. Indicator: 0-2000C, with multi-channel switch Temp. Sensors : RTD PT-100 type. (8 Nos)

With standard make On/off switch (L & T make), Mains Indicator etc.

Model : OR-CWA-250

EXPERIMENTATION :

To determine total thermal resistance and thermal conductivity of composite wall. To plot temperature gradient along composite wall

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FREE AND FORCE VORTEX FLOW APPARATUS



Model : OR-VFA-405

Technical Data:

1. generation and investigation of vortices
2. transparent tank allows visualisation of vortex formation
3. two nozzles for radial water supply (free vortex)
4. two nozzles for tangential water supply (forced vortex)
5. different inserts for the water drain to generate free vortex
6. impeller for generating a forced vortex
7. point gauges detect the surface profile
8. flow rate determined by Hydraulic Bench
9. water supply using Hydraulic bench or via laboratory supply

Technical Details: Tank diameter: 250mm height: 190mm 4 inserts for the water drain diameter: 8, 12, 16 and 24mm Impeller with 3 blades Vertical point gauge 6 movable rods Horizontal point gauge 2 movable rods Measuring tube, movable horizontal 0...90mm, vertical 70...190mm diameter: 4mm

Experimentation:

visualisation of various vortices investigation of free and forced vortices
representation of surface profiles determination of velocity Required for
Operation: Hydraulic bench