

## Fluid Machinery Lab

## Mechanical Engineering Lab Equipment

### **CENTRIFUGAL PUMP TEST RIG**

#### Multi-Stage

Unit consists of a multistage (two stage) centrifugal pump. Suction side will be provided with vacuum gauge and discharge side with pressure gauges. Pump is driven with the help of a suitable D. C. Motor and with Thyristor Controller, the variable speed arrangement is provided. Performance of pump at various speeds & discharge heads can be studied. Power input to motor is measured with Energy meter.

#### **Specifications:**

- ✓ Centrifugal pump 1 Hp or 1 1/2 Hp or 2 Hp with variable speed D.C. motor, pump.
- ✓ Sump Tank 900 X 400 X 400 mm.
- ✓ Measuring Tank 400 X 300 X 400 mm.
- ✓ Energy meter.
- ✓ Pressure & vacuum gauge.
- ✓ Stop clock.
- ✓ Pump Assembly & Control, Tank mounted.

#### **Service Required:**

- ✓ Floor space of 3 m X 3 m.
- ✓ Tachometer for speed measurement can be supplied at extra cost.
- ✓ 230 V. 15 A. C. Supply or/3 pH. 440 VC supply with earthing connection.

#### **Range Of Experiments:**

- ✓ Discharge vs. Head.
- ✓ Discharge vs. input to pump.
- ✓ Discharge Vs. Pump efficiency



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### KAPLAN TURBINE TEST RIG

1-HP-Close-Circuit

#### Specifications:

- ✓ Horizontal shaft Kaplan turbine designed to develop 1 Hp at 1500 rpm, complete set with a flow of 2200 LPM at 10 mtr. supply head, complete with rope brake arrangement, pressure measuring device.
- ✓ Piping system consisting of pipes and fittings complete set for the kaplan turbine test rig.
- ✓ Flow measuring unit consisting of venturimeter and a double column differential manometer.
- ✓ Supply pump set for the above consisting of a pump of size 150 mm to discharge 2500 L.P.M at 10 m total head suitable for operation on 3 phase 50 cycles 440 VAC supply.
- ✓ Switch and starter for the above pump set.
- ✓ Rigid mild steel frame work, compactly fitted with all the above items as a self sufficient package
- ✓ unit, suitable for operation without any foundation.Mild steel sump to store sufficient water for independent circulation through the unit for experimentation and arranged within the floor space of the main unit.
- ✓ A technical manual accompanies the unit.



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### **RECIPROCATING PUMP TEST RIG**

The consists of reciprocating pump mounted over the sump tank, the unit is self contained, recirculating type provided with vacuum gauge at suction & pressure gauge at discharge. Input to motor & output of pump can be measured and pump performance can be estimated at different speeds by means of and at different heads.

#### **Specifications:**

- ✓ Reciprocating pump: 3/4" x 3/4" size provided with 1 H.P.D.C. Motor & speed controller.
- ✓ Sump tank: 900 x 400 x 400 mm
- ✓ Measuring tank: 400 x 300 x 400 mm
- ✓ Energy meter for motor input measurement.
- ✓ Pressure & vacuum gauge for measurement of head.
- ✓ Stop watch.
- ✓ D. C. Motor Variable Speed

#### **Range Of Experiment: Following characteristics can be studied at different speeds**

- ✓ Discharge Vs Head.
- ✓ Discharge Vs Input of pump.
- ✓ Discharge Vs Pump efficiency.

#### **Service Required:**

- ✓ Floor space of 3 m x 3 m.
- ✓ 230 V, 15 A, 1 pH A.C. electric supply with earthing connection.



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### **GEAR PUMP TEST RIG**

Gear pumps are positive displacement rotary pumps. The unit is a self contained recirculation type unit. All the measurements are provided to evaluate the performance of the gear pump.

#### **Specifications:**

- ✓ Gear pump with 1/2 Hp 3 pH motor with three speed cone pulley mounted over the sump tank. Speed 1500 rpm.
- ✓ Discharge measurement tank.
- ✓ Pressure gauge for discharge head.
- ✓ Energy meter for power input.
- ✓ Pressure relevant valve in discharge pipe.
- ✓ Needle valve to control discharge pressure.

#### **Range Of Experiments:**

- ✓ Following characteristics can be determined
- ✓ Speed Vs Discharge
- ✓ Head Vs Discharge.
- ✓ Discharge Vs Input power.
- ✓ Discharge Vs Efficiency.

#### **Services Required:**

- ✓ Floor space of about 1.5 x 1.5 m.
- ✓ 440 V., 3 pH A.C. supply.



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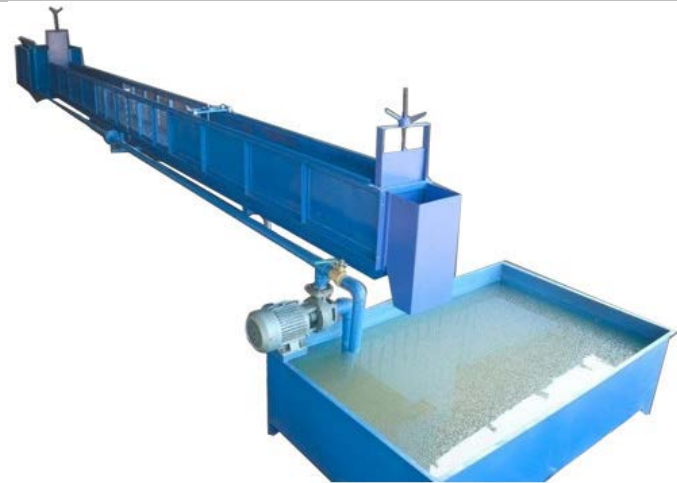
### **TILTING FLUME**

#### **Specifications:**

- ✓ A hydraulic flume of c/s 200 x 300 mm & 4000 mm length with transparent window on either sides of 1000 mm length.
- ✓ Sliding gates one at upstream and other at the downstream side.
- ✓ Screw jack for change of the slope of the flume.
- ✓ A Sump tank of sufficient capacity.
- ✓ Supply tank with waves damping arrangement.
- ✓ A1 Hp centrifugal monoblock pump.
- ✓ A Orifice meter with manometer to measure the discharge. Inlet/throat dimensions: 50/25 mm respectively.
- ✓ Trolley with point gauge for level measurement.
- ✓ Models Supplied.

#### **Weirs:**

- ✓ Sharp crested weir (crest length 200 mm)
- ✓ Broad crested weir
- ✓ Ogee weir or spillway.





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### FRANCIS TURBINE TEST RIG

Close-Circuit

#### Specifications:

- ✓ Francis turbine 75 mm size to develop 1 Kw at 1250 R.P.M. with a flow of about 1000 L.P. M. at 10 m. Supply head, complete with rope brake arrangement, pressure gauge, vacuum gauges and a set of dead weights etc. for conducting experiments in metric units.
- ✓ 5 Hp Supply pump set 75 mm size, 1000 L.P.M at 14 meters head suitable for supplying water to the above turbine and for operation on 400 V., 3 pH, 50 cycles A.C. mains.
- ✓ Switch and starter suitable for the above monoblock pump set, mounted on a panel board.
- ✓ Flow measuring unit consisting of a suitable orifice meter & pressure gauge.
- ✓ Piping system consisting of pipes, valves, fittings complete with suitable for the test rig.
- ✓ Fiber Glass Lined M.S. sump to store sufficient water for independent circulation through the unit for experimentation & arranged within the floor space of the main unit.
- ✓ Rigid mild steel frame work compactly fitted with all the above items as a self sufficient package unit, suitable for operation without any foundation.



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### **PELTON WHEEL TURBINE TEST RIG**

The unit consist of a small pelton wheel connected to rope brake dynamometer. It is high head at minimum discharge turbine. Water is given from reservoir to the turbine through penstock. A centrifugal pump is provided to supply the water to turbine. Orifice meter & pressure gauges provided to measure flow rate, water jet is directed over the bucket by a nozzle Thus, and we can determine B.H.P. & I.H.P. & various efficiencies.

#### **Specifications:**

- ✓ Pelton Wheel: Fitted with 18 buckets, nozzle for water jet, casing with one side of perspex sheet.
- ✓ Suitable pump to supply pressurised water to the turbine at the head of 30 m & 5 Hp capacity.
- ✓ Orifice meter to measure water flow rate.
- ✓ Pressure gauge to measure head.
- ✓ Rope brake arrangement with spring balances.
- ✓ Sump tank provided with sump & turbine mounting arrangement.
- ✓ Necessary piping valves gauges etc Front acrylic cover for visualisation of turbine operation.

#### **Range Of Experiment:**

- ✓ To demonstrate operation of pelton turbine.
- ✓ To study performance characteristics of pelton turbine.
- ✓ To study effect of discharge & velocity of impounding water on turbine.

#### **Service Required:**

- ✓ 440 V, 50 A. A. C. supply with earthing connection.
- ✓ Suitable floor space to mount the instrument.



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### **HYDRAULIC RAM**

#### **Hydraulic Ram**

Hydraulic Ram of size 50 x 15m to work against a delivery head up to 20m from a supply head of 2.5metres to discharge about 250LPH at 10m head.

#### **Supply Tank :**

M.S Powder Coating/M.S FRP Lining/S.S Unit tank of suitable size with over flow arrangement for supply of water at constant head of 2.5 meters.

#### **Supply & Delivery Pipings :**

Supply pipe of size 50mm & 6 meter length connecting supply tank & Hydraulic Ram and delivery pipe of ½ ” size to deliver useful water from Hydraulic Ram to measuring tank.

#### **Measuring Tank :**

M.S Powder Coating/M.S. FRP Lining/ S.S Unit of suitable size provided with standard fittings for measuring of useful water.

#### **Notch Tank :**

M.S. Unit with FRP Lining/S.S Unit with a brass Notch plate and hook gauge for measurement of waste water.

#### **Sump Tank :**

M.S. Unit with FRP Lining/S.S Unit of suitable size for independent circulation of water through the unit.

#### **Supply Pump Set :**

0.5HP, Single phase to supply water from the sump to the supply tank.

