Hydrostatic Pressure & Centre of Pressure Apparatus (SMT-FM-04B)

Hydrostatic pressure refers to the pressure that any fluid in a confined space exerts. If fluid is in a container, there will be some pressure on the wall of that container. The effect of hydrostatic pressure is highly important in many fields of engineering: in shipbuilding, in hydraulic engineering when designing locks and weirs, in sanitation and building services. The SMT-FM-04B experimental unit offers typical experiments to study hydrostatic pressure in liquids at rest.

This Apparatus consists of a quadrant assembled to the arm of a scale that swings around an axis. When the quadrant is immersed in the water tank, the force that acts on the flat rectangular front surface exerts a momentum with respect to the supporting axis. The swinging arm is fitted with a tray and an adjustable counter balance. The tank has adjustable supporting legs for levelling. It has a drainage valve. The level reached by the water inside the tank is indicated by a graduated scale.

The equipment includes non-toxic water dye colour to help students see the water levels more clearly and a syringe for accurate addition or removal of small amounts of water.

TECHNICAL SPECIFICATIONS

Specifications:

- Simple construction.
- Easy to operate and understand.
- Clear Transparent PMMA Construction.
- Stand-alone apparatus just needs clean water.
- Investigation of the hydrostatic pressure in fluids at rest.
- Lever arm with different weights.
- Anti-corrasion structure.
- Have built-in bubble level.
- Have adjustable levelling feet.
- Can be used with Base Water supply ESOLS Hydraulic Bench (SMT-FM-100)

Fluid Mechanics
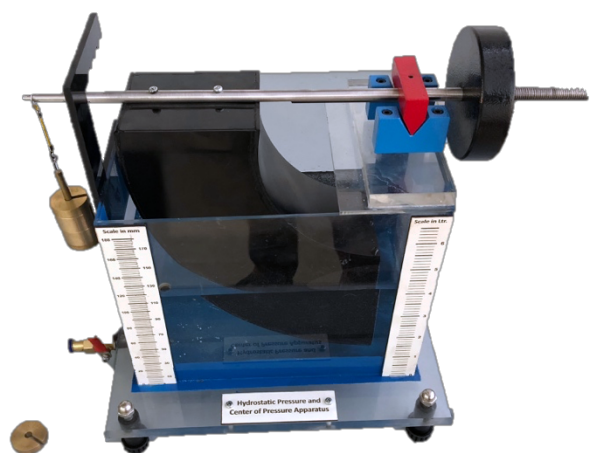
Technical Data:

- Water tank:
  - Transparent PMMA.
  - 6.0 L
- Distance between the suspended masses and support point: 300mm

- Area of the section: 0.008m^2

- Total Depth of submerged quadrant: 165mm

- Height of the support point on the quadrant: 100mm

- Weights:
  - 2x 0.5N.
  - 4x 1N.
  - 2x 2N.
  - 1x 2.5N.
- LxWxH: 500x4350x400 mm.
- Weight: approx. 6kg.

  ### Accessories (Included)
  - Water Colouring
  - Syringes
  - Instruction Manual

  ### Operating Conditions
  Laboratory Temperature: 5ºC to 40ºC

  ### Note:
  This product may produce small splashes of water in use, so you must use it at a safe distance from electrical supplies. ESOLS recommends approximately 2.0 m.

Experimental Data:

- Study of the relationship between hydrostatic force and head of water for a fully and partially submerged vertical and inclined plane body.

- Pressure distribution along an effective area in a liquid at rest.

- Determination of the centre of pressure and centre of area.

- Comparison of actual and theoretical hydrostatic force on a fully or partially submerged plane for any given head of water.

- Determination of the center of pressures with an angle of 90°, partially submerged.

- Determination of the resultant force with an angle of 90°, partially submerged.

- Determination of the center of pressures, angle <> 90° partially submerged.

- Determination of the equivalent force with an angle <>90° partially submerged.

- Determination of the center of pressures with an angle of 90° totally submerged.

- Determination of the resultant force with an angle of 90° totally submerged.
- Determination of the center of pressures, angle <>90° totally submerged.
- Determination of the resultant force, angle <>90° totally submerged.
- Balance of momentum.