



## Metacentric Height and Stability of Floating Bodies Apparatus (SMT-FM-02)

The metacentric height is a measurement of the initial static stability of a floating body. It is calculated as the distance between the centre of gravity of a ship and its metacentre. A larger metacentric height implies greater initial stability against overturning. The metacentric height also influences the natural period of rolling of a hull, with very large metacentric heights being associated with shorter periods of roll which are uncomfortable for passengers. Hence, a sufficiently, but not excessively, high metacentric height is considered ideal for passenger ships.

The SMT-FM-02 unit can be used to study the stability of a floating body and to determine the metacentre graphically. In addition, the buoyancy of the floating body can also be determined.

The experiment is conducted in a tank filled with water. A non-corrosion Acrylic body with a rectangular frame cross-section is used as the floating body. Clamped weights that can be moved horizontally and vertically make it possible to adjust the centre of gravity and the heel. A plumb bob, attached to the upper part of the mast, is used to measure the angle of heel of the floating base with the aid of a graduated scale.

## TECHNICAL SPECIFICATIONS

### Specifications:

- Compact size PMMA Material Transparent corrosion free body.
- Can be used with Hydraulic Bench (SMT-FM-100) or with any Water tub available in the laboratory.
- Finding the stability of a floating body and determining the metacentre.
- One horizontally and one Vertically movable clamped weight for adjusting the heel and Centre of Gravity respectively.
- Clinometer Plumb Bob with scale for displaying the heel.
- Other floating bodies with different shapes of frame are also available on customer demand.



**Technical Data:**

---

- Floating body:
  - Material: PMMA
  - LxWxH: 360x200x400mm.
  - Mass height: 400mm.
  - Horizontal scale: 200mm.
  - Vertical scale: 400mm.
  - Height scale of the floating body: 120mm.
  - Clinometer scale:  $\pm 35^\circ$ .
- Weights:
  - Floating body without clamped weights: approx. 2.7kg.
  - Vertical clamped weight: 500g.
  - Horizontal clamped weight: 200g.
  - Tank for water: 50L. (Optional)
- LxWxH: 650x450x350mm
- Weight: approx. 7kg.
- Accessories (Included)
  - Plumb Bob and Weights.
  - Instruction Manual
- Operating Conditions
  - Laboratory Temperature: 5°C to 40°C

**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:**

---

- Determination of the metacentric height.
- Study and determination of
  - buoyancy,
  - centre of buoyancy
  - centre of gravity,
  - metacentre,
  - stability
  - heel.