

**KSM-038****TORSION OF BARS APPARATUS**

Torsion is primarily experienced in axles and drive shafts in motor vehicles and machines. When a torque is applied to a circular shaft, the shaft's cross-section remains flat, and no warping occurs. However, torsion causes the shaft's cross-sections to compress around the longitudinal axis. In the case of minor torsion, the length and radius of the shaft stay unchanged. The straight lines on the outer circumference of the shaft, running parallel to the axis, are transformed into helixes. For non-circular cross-sections, warping often occurs.

The **Torsion of Bars Apparatus Model KSM-038** is designed to investigate the torsion of a bar subjected to a torque. The bar is clamped into two movable bearing blocks using a chuck. Torque is applied via a circular disc, a deflection roller, and a weight. Both the clamping length and the applied torque are adjustable. The resulting torsion is measured at two random points on the bar using angle indicators.

The fundamentals of elastic torsion are demonstrated using a round bar. Additionally, three other bars are provided to explore specific cases: two thin-walled enclosed sections (a tube and a square tube) and a longitudinally slotted tube (a thin-walled open section).

All components of the experiment are clearly organized and securely stored in a system, with the complete experimental setup arranged in a frame. The well-structured instructional material outlines the key principles and offers a step-by-step guide for conducting the experiments.

**Features**

- Elastic torsion of a bar.
- Round bar, tube, longitudinally slotted tube, and square tube as test bars.
- Indication of the angle of twist at two random points on the bar.

**Specifications**

- Elastic torsion of bars.

*Note: Specifications and Photos can be altered without prior notice in our constant efforts for improvement.*



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- 2 movable bearing blocks with clamping chuck for mounting of bars, 1 fixed and 1 movable bearing.
- 2 movable angle indicators that can be clamped to the bar.
- 4 test bars:
  - Round bar with full cross-section.
  - Tube.
  - Longitudinally slotted tube.
  - Square tube.
- Application of load to the bar by a mass disc, a deflection roller, and a set of weights.
- Storage system to house the components.
- Experimental setup in the standard frame.

### Technical Specifications

- 4 Brass Bars (length = 695mm):
  - Round bar: diameter 6mm.
  - Tube: diameter 6mm, wall thickness 1mm, slot width 0.3mm.
  - Slotted tube: same as tube dimensions.
  - Square tube: WxH = 6mm, wall thickness 1mm.
- Disc to Apply the Load:
  - Effective radius: 110mm.
- Angle Indicator:
  - Measuring range: -90°...+90°, graduations: 1°.
- Weights:
  - 1x 1N (hanger).
  - 4x 1N.
  - 3x 5N.

### Experiments

- Torsion of a bar.
- Shear modulus of elasticity and 2nd polar moment of area.
- Angle of twist dependent on clamping length.
- Angle of twist dependent on torque.
- Influence of rigidity on torsion:
  - Round bar with full cross-section.
  - Tube.
  - Longitudinally slotted tube.
  - Square tube.
- Calculation of angle of twist.
- Comparison of calculated and measured angle of twist.

### Scope of Delivery

- 2 bearing blocks with clamping chuck.
- 2 angle indicators.
- 4 test bars.
- 1 deflection roller with fixture.
- 1 cable.
- 1 set of weights.
- 2 hexagon socket wrenches.
- 1 storage system with foam inlay.
- 1 set of instructional material.

