

Torsion of Circular Sections (EDC-TCSM-306)

SPECIFICATIONS:

- Fits onto the Structures platform for ergonomic and stable use.
- Fully adjustable chuck positions for an increased range of experiments.
- Includes a Vernier caliper for precise rod diameter measurement.
- Users can apply angular deflection using a chuck with a precision potentiometer to measure angular deflection.
- The other chuck connects to a load cell to measure the resulting torque
- Includes rods of different materials to compare shear modulus (modulus of rigidity, G).
- Includes a set of rods of different metals and a tube for comparison of the elastic properties, dimensions and polar second moment of area (' J ' value);
- Includes a hollow rod to demonstrate the effect of missing material on torsional resistance.
- Allows variation of rod length to observe its effect on angular deflection.
- The potentiometer and load cell connect to the USB interface hub for computer display and data acquisition.

DESCRIPTION:

This torsion testing module is designed for analyzing the torsional behavior of rods made of different materials. The system features fully adjustable chucks, allowing users to apply angular deflection to test specimens. A precision potentiometer measures the angular twist, while a load cell records the applied torque. The unit includes three rods of different materials (solid and hollow) to compare torsional resistance, elastic shear modulus (G), and the impact of missing material on torsional stiffness. The modular design allows students to vary rod length, providing deeper insight into the relationship between length, deflection, and applied torque.

The system is fully integrated with EDAQ software, enabling real-time data acquisition, analysis, and visualization through a USB interface hub. Users can study the torsion formula, compare shear modulus values, analyze second moment of area (J), and evaluate the mass-to-torsional resistance efficiency of solid vs. hollow rods. The package includes two chuck assemblies, three rods of different materials, a Vernier caliper, two cables, hexagon tools, a storage tray, and a comprehensive user guide, making it an ideal learning tool for engineering students and researchers studying mechanical properties and structural behavior.



TECHNICAL DATA:

• Rod Specifications:

- **Rod length:** 700 mm.
- **Nominal external diameter:** 3 mm.
- **Rod materials included:**
 - Brass (solid).
 - Brass (hollow).
 - Stainless steel (solid).

• Measurement & Load Application:

- **Angular measurement range:** 0 to 25 degrees.
- **Torque measurement capacity:** Up to 1 N/m.
- **Two chuck assemblies:**
 - One with a precision potentiometer for angular measurement.
 - One with a load cell for torque measurement.

• Software & Data Acquisition:

- Compatible with EDAQ software for real-time data logging and analysis.
- USB interface hub for data collection and display.

• Learning Objectives:

- Understanding torsional stress and strain.
- Rod length and angle of twist relationship
- Rod material and angular deflection-the elastic (shear) modulus (G)
- Rod cross-sectional dimensions and torsion-the polar second moment of area (J)
- Comparison of angular deflection in similar hollow and solid rods
- Mass per unit length and torsional resistance efficiency of tubes compared to solid rods.

• Accessories Included:

- Two chuck assemblies (one with a potentiometer, one with a load cell).
- Three rods of different materials (solid and hollow).
- Two cables.
- Hexagon tools for fixings.
- Vernier caliper for cross-section measurement.
- Storage tray.
- Comprehensive user guide.