KSM-097 **TORSION TEST APPARATUS**

Torsion Test Apparatus – Model KSM-097. Torsion occurs when a moment or torque is applied to a rod or structural element, causing its transverse sections to twist around an axis normal to their plane. This results in tangential stresses similar to simple shear stresses. In industry, torsional stress is common in machine shafts that rotate and transfer motion.

The **Torsion Test Apparatus** is designed to verify the fundamentals of torsion and conduct practical experiments demonstrating:

- The elastic torsion equation for circular rods
- The modulus of rigidity for different materials

In operation, a metallic rod is secured by clamps and subjected to a gradually increasing torque, applied using a dynamometer with a lever. The resulting elastic tension and deformation are measured using a dial gauge in contact with the arm. The torsional deformation angle is calculated using a simple trigonometric identity, enhancing the unit's didactic value.

The apparatus is supplied with steel, brass, and aluminum rods for testing, and can also accommodate rods made of other materials for extended experimentation.

Specifications

- Bench-top unit with adjustable legs
- Anodized aluminum frame and panels in painted steel

Main Components

- Main frame – Supported on two aluminum blocks; consists of two stainless steel guides with other components made of aluminum
- Two guides – Allow the mobile clamp to slide for testing rods of different lengths
- Mobile clamp – Located at one end; includes a crank to adjust test rod length; made of stainless steel

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

- Fixed clamp – Includes two bearings for rotation; has an arm for force application; features a notch 60 mm from the rod's longitudinal axis for deformation measurements; made of stainless steel
- Test rods – Three rods (steel, brass, aluminum), 8 mm diameter, 350 mm length, with 50 mm markings for flexible testing lengths
- Dynamometer – Capacity up to 10 kg with 50 g accuracy for force application
- Dial gauge – Range 0–10 mm, accuracy 0.01 mm for deformation measurement
- Tools included – Allen keys for dial gauge adjustment and clamp tightening

Manuals Supplied

- Required Services
- Assembly and Installation
- Starting-up
- Safety
- Maintenance
- Practices Manuals

Experiments

- Verification of the elastic torsion equation of circular rods
- Experimental determination of the relationship between torsion moment and shaft angular deformation
- Experimental determination of the relationship between rod length and shaft turn angle for the same torsional force
- Experimental determination of the Modulus of Rigidity for steel, brass, and aluminum