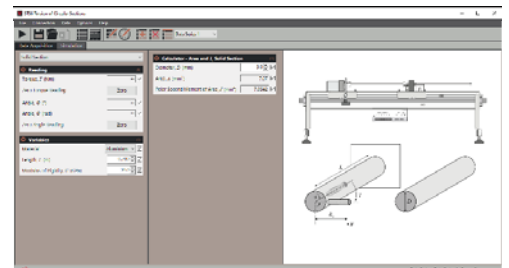
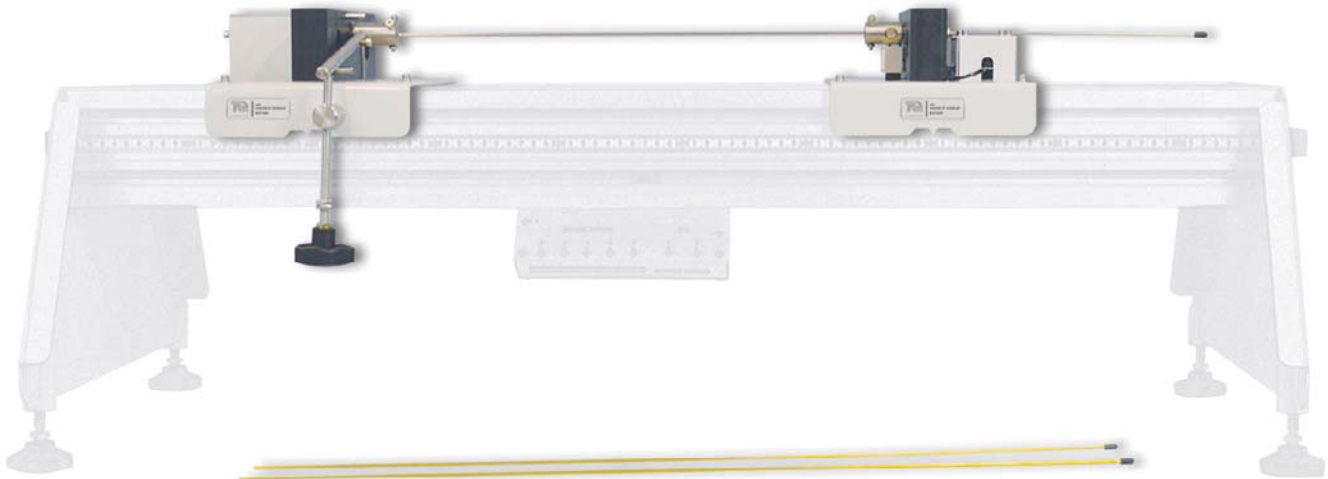




≡ TORSION OF CIRCULAR SECTIONS



Experiment for the study of torque and deflection in different materials with circular section. Mounts on the Structures platform and connects to the Structures automatic data acquisition unit and software (VDAS® Onboard).



SCREENSHOT OF THE VDAS® SOFTWARE

KEY FEATURES

- One of a range of experiment modules that teach structures principles
- Fits to the Structures platform for ergonomic use and space-saving storage
- Fully adjustable chuck positions for increased experiment range
- Includes rods of different material for comparison of shear modulus (modulus of rigidity)
- Includes a tubular (hollow) rod to show the effect of 'missing' material, compared to a similar solid rod
- Includes Vernier caliper for rod diameter measurement
- Supplied with a storage tray to keep smaller items safe
- Works with user-friendly software (VDAS®)



TORSION OF CIRCULAR SECTIONS



DESCRIPTION

One of a range of experiment modules that fit to the Structures platform (STS1, available separately), this product helps students to understand the torsional elastic properties of circular sections (tubes and solid rods). Students choose from a selection of test rods and fit them between two collet 'chucks'. They may adjust the distance between the chucks for tests on varying rod length. Each chuck includes pointers that work with the scale on the platform for accurate positioning.

Students apply angular deflection to the specimen using a chuck which includes a precision potentiometer to measure the angular deflection. The other chuck connects to a load cell to measure the resulting torque. Students use textbook beam equations to predict the deflection and torque relationship and compare the calculated results with the measured results. This helps confirm the reliability of the textbook equations and the accuracy of the experiment results.

This product 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). It also allows the student to vary the effective length of the rods to see how this affects the magnitude of deflection for a given torque.

The potentiometer and load cell connect to the USB interface hub of the Structures platform for computer display and data acquisition (VDAS® Onboard).

STANDARD FEATURES

- Supplied with comprehensive user guide
- Five-year warranty
- Made in accordance with the latest European Union directives
- ISO9001 certified manufacturer

LEARNING OUTCOMES

- Torsion formula
- 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

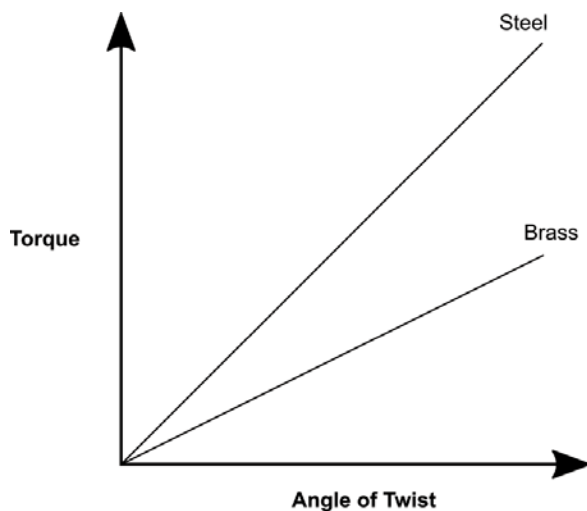
ESSENTIAL ANCILLARY

- Structures Platform (STS1)

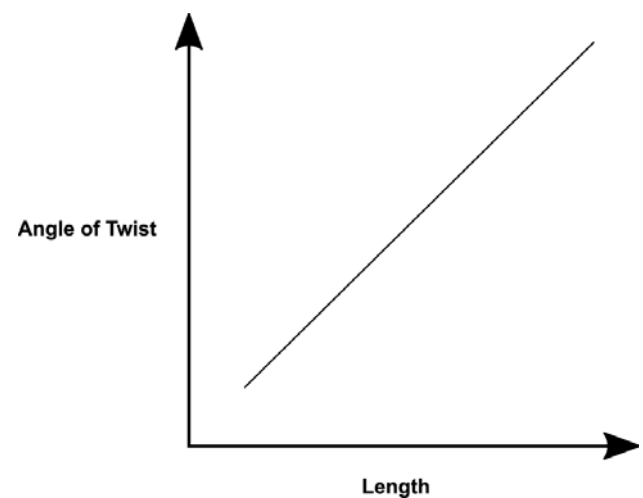
SOFTWARE

TecEquipment has created data acquisition applications (VDAS® Onboard) for each experiment module, with additional simulated experiments.

The simulated experiments allow students to simulate the hands-on laboratory experiments, verifying their results. They also allow simulation of alternative set-ups, such as rods of different cross-sectional shape and material, extending the learning experience beyond the practical laboratory session.



TYPICAL EXPERIMENT RESULTS COMPARING THE ANGLE OF TWIST OF RODS OF DIFFERENT METALS



TYPICAL EXPERIMENT RESULTS COMPARING ANGLE OF TWIST AGAINST LENGTH

≡ TORSION OF CIRCULAR SECTIONS



OPERATING CONDITIONS

OPERATING ENVIRONMENT:

Laboratory

STORAGE TEMPERATURE RANGE:

-25°C to +55°C (when packed for transport)

OPERATING TEMPERATURE RANGE:

+5°C to +40°C

OPERATING RELATIVE HUMIDITY RANGE:

80% at temperatures < 31°C decreasing linearly to 50% at 40°C

DETAILED SPECIFICATIONS

TecEquipment is committed to a programme of continuous improvement; hence we reserve the right to alter the design and product specification without prior notice.

DIMENSIONS AND WEIGHT:

- Nett (assembled): 850 mm long x 130 mm front to back and 500 mm high and 14 kg
- Approximate primary packed (with storage tray): 0.08 m³ and 16 kg

SPACE NEEDED:

- 1500 mm x 600 mm, level bench or desk

ITEMS INCLUDED:

- Two chuck assemblies: one with a precision potentiometer for angular measurement, the other with a load cell for torque measurement
- Angular measurement from 0 to 25 degrees
- Torque measurement up to 1 Nm
- Three different rods of length 700 mm and nominal 3 mm external diameter:
 - 1 x brass (solid)
 - 1 x brass (hollow)
 - 1 x stainless steel (solid)
- Two cables
- Hexagon tools for fixings
- Vernier caliper
- Storage tray
- Comprehensive user guide