Combine Bending and Torsion of Bars Apparatus (SMT-SM-22)

As the Bending and torsion are typical loads due to which components failure occur. A number of different factors play a role in this, including the material, the cross-section of the bar, the clamping length and the method of bearing support. This Apparatus investigates the influence of these factors on the deformation of a bar under bending load or twisting moment. For direct comparison set of test bars has been assembled. The bar under investigation is fixed to two movable support blocks and loaded down by a weight.

A dial gauge records the resulting deformation. The support blocks include clamping chucks to hold the torsion bars and supports for the bars in the bend test. The supports offer a range of clamping options, enabling statically determinate or indeterminate bearing supports to be investigated.

The twisting moment is applied by a device mounted on a support block. The point of load application to generate the bending moment is adjustable.

The unit has Optional Software for computer connectivity, monitoring & display and data analysis on computer.

TECHNICAL SPECIFICATIONS

Specifications:

- Elastic deformation of bars under bending or torsion
- Bending tests with statically determinate and indeterminate systems
- Torsion tests with a statically determinate system
- Supports in the bending test may be clamped or free
- 2 adjustable blocks with clamping chuck for torsion tests and supports for bending tests
- Weights to generate the bending or twisting moment
- Dial gauge with bracket
- storage system to house the components
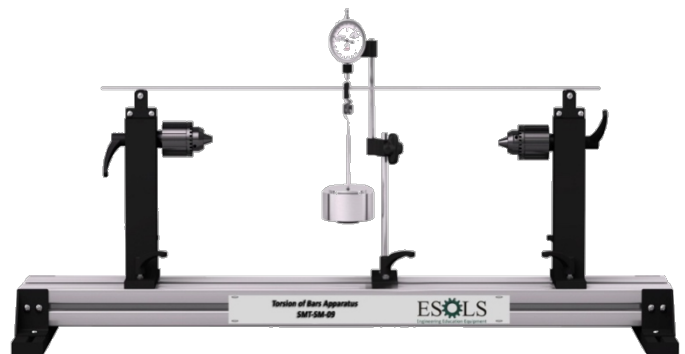
Technical Data:

- 17 bars for bending tests
    - material: aluminium, steel, brass, copper
    - height with LxW 520x20mm: h=3 to 10mm
    - width with LxH 520x5mm: w=10 to 30mm
    - length with WxH 20x4mm: l=210 to 520mm
    - LxWxH: 20x4x520mm (Al, St, brass, Cu)
    - LxWxH: 10x10x520mm (aluminium)
- 22 torsion bars
    - material: aluminium, steel, brass, copper
    - length with Ø 10mm: 50 to 650mm (aluminium)
    - ØxL: 10x50mm/10x340mm (aluminium, steel, copper, brass)
    - diameter with L=50/340mm: Ø 5 to 12mm (steel)
- Dial gauge
    - 0 to 10mm, graduation: 0.01mm
- Tape measure
    - graduation: 0,01m
- Weights
    - 1x 100g (hanger)
    - 1x 100g, 1x 400g, 1x 500g, 1x 900g
- The unit has Optional Software for computer connectivity, monitoring & display and data analysis on computer.
- LxWxH: 1000x250x200mm
  Weight: approx. 20kg
  LxWxH: 1170x480x210mm (storage system)
  Weight: approx. 12kg (storage system)

Technical Data:

- Bending tests
    - determination of the modulus of elasticity
    - statically determinate systems (beam mounted on two supports; cantilever beam)
    - statically indeterminate systems (dual-span beam)
    - deformation of a beam dependent on material, geometry (section width, height and length), type of support and length of span
    - formulation of proportional relationships for the deformation
- Torsion tests
    - determination of the shear modulus of various materials
    - angle of twist dependent on clamping length, bar diameter
    - formulation of proportional relationships for the angle of twist