



Strut Column Buckling Apparatus (SMT-SM-06)

This Apparatus is used to find the loss of stability which is also known as buckling. The bar axis laterally deflects under the effect of compressive forces and with increasing load until it suddenly and violently fails, just before the fracture strength is reached. The stresses in the bar are often still in the elastic region. In this Apparatus, a bar is clamped or supported at both ends in the experimental unit, depending on the buckling case. A height-adjustable loading member and a hand-operated spindle are used to apply a compressive force to the bar. An axial support between the spindle and bar support prevents torsional stress on the test bar. This Apparatus demonstrate how various factors such as bar length, material and support type affect the buckling behaviour. Additional shear forces can be generated on the test bar by means of a lateral load mechanism.

The unit has Touch LCD display for visualization of process and the measurements. The Unit is also connected to Software for computer connectivity and data analysis. The Touch screen and computer software is included in the package.

TECHNICAL SPECIFICATIONS

Specifications:

- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- Investigation of all relevant buckling cases.
- Verification of Euler's theory of buckling.
- Experiments in the horizontal or vertical position.
- Test bars with different lengths made of different materials.
- Test bars pinned or fixed.
- Spindle for applying forces.
- Lateral load mechanism generates shear forces.
- Measurement of lateral deflection with a dial gauge.
- Allows safe and practical experiments into buckling of struts
- Storage system for parts.
- ESOLS DAQ Software for monitoring and control.



Technical Data:

- Test bars:
 - Quantity: 11.
 - Bar lengths: 350 to 700mm (max.).
 - Materials: aluminium, copper, brass, steel, GFRP.
 - Cross-sections: 10x4mm, 25x6mm, 25x10mm
- Load spindle.
 - Force: max. 2000N.
 - Stroke: max. 10mm.
- Lateral deflection: max. 20mm.
- Sample holder hole diameter: $\varnothing=20$ mm.
- Weight for lateral load: max. 20N.
 - 1x 5N (hanger), 3x 5N
- Measuring ranges.
 - Force: 0 to 2500N, graduation: 50N
 - Deflection: 0 to 20mm, graduation: 0.01mm.
- LxWxH: 620x450x1150mm.
- Weight: approx. 65kg.
- LxWxH: 1170x480x180mm (storage system).
- Weight: approx. 12kg (storage system).

- Touch LCD with GUI Interface for better monitoring and accurate measurement of Plant variables.
- ESOLS DAQ Software for monitoring and control.
 - Graphical visualization.
 - Security mechanism for login.
 - USB Connected
 - Compatible with Windows 7,8.1,10.
- Digital Instrumentation
- Capability to modify according to end user.
- Can be used in Research Purposes.

Experimental Data:

- Measurement of buckling under the influence of
 - Different supports and clamps
 - Different bar lengths and cross-sections
 - Different materials
 - Additional lateral load
- Testing Euler's theory: buckling on elastic bars
- Calculating the expected buckling force with Euler's formula
- Graphical analysis of the deflection and the force
- Determine elastic modulus for an unknown material (GFRP)
- Measure force and deflection