

**Product Name :**  
Buckling Behaviour of Bars

**Product Code :**  
TN499



**Description :**

Buckling Behaviour of Bars

**Technical Specification :**

The unit is perform the following experiments and investigations:

Learning Objectives / Experiments:

Investigation of buckling behaviour 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

With the included expansion set investigation of buckling behaviour under the influence of different cross-section shapes eccentric application of force

Specifications:

[1] investigation of all relevant buckling cases

[2] verification of Euler's theory of buckling

[3] experiments in the horizontal or vertical position

[4] test bars with different lengths made of different materials

[5] test bars pinned or fixed

- [6] spindle for applying forces
- [7] lateral load mechanism generates shear forces
- [8] force measurement using a hydraulic dynamometer
- [9] measurement of lateral deflection with a dial gauge
- [10] further experiments with included expansion set
- [11] storage system for parts

Technical Data:

Test bars

Quantity: 11

Bar lengths: 350...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:  $\sim 20$ mm

Weight for lateral load: max. 20N

1x 5N (hanger), 3x 5N

Measuring ranges

Force: 0...2500n, graduation: 50n

Deflection: 0...20mm, graduation: 0,01mm

Dimensions and Weight

Length x Width x Height: 620x450x1150mm

Weight: 63kg

Length x Width x Height: 1170x480x178mm (storage system)

Weight: 12kg (storage system)

Set of 10 test bars (expansion set)

Learning Objectives / Experiments:

With the Unit for investigation of buckling behaviour under the influence of

Different cross-section shapes

Eccentric application of force

Specification:

- [1] test bars for investigation of all relevant buckling problems
- [2] test bars with different lengths made of different materials
- [3] test bars pinned

Technical Data:

3 flat bars, St

Cross-section: 25x6mm

Bar length: 500mm

Eccentricity: 0mm, 1mm, 3mm

1 flat bar, Al

Cross-section: 40x6mm

Bar length: 500mm

1 flat bar, GRP

Cross-section: 25x10mm

Bar length: 700mm

1 square tube, Al

Cross-section: 20x10x2mm

Bar length: 700mm  
1 round tube, Al  
Cross-section:  $\sim 15 \times 2 \text{mm}$   
Bar length: 700mm  
2 round tubes, PVC  
Cross-Section  
 $\sim 16 \times 2 \text{mm}$   
 $\sim 20 \times 1,5 \text{mm}$   
Bar length: 700mm  
1 round bar, Al  
Cross-section:  $\sim 14 \text{mm}$   
Bar length: 700mm.

## Naugralabequipments

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