WP 300
Materials testing, 20kN

Learning objectives/experiments

- tensile tests
- plot stress–strain diagrams
- compression tests
- Brinell hardness test
- together with the accessories
  - compression tests for own specimens
  - bending tests
  - cupping tests
  - shear tests
  - testing of disk and coil springs

Description

- **compact, simple experimental unit for basic destructive tests**
- **tensile tests, compression tests, Brinell hardness test**

A solid understanding of the properties of materials is essential for technical and scientific professions. This knowledge helps select the suitable material, monitor production and processing and ensure the requirements in terms of a component. The materials test provides the necessary data in a reproducible and precisely quantified manner. The tensile test, bending test and hardness test are all part of classic destructive materials testing.

The range of experiments with WP 300 covers tensile tests, compression tests and Brinell hardness tests in the base unit. Bending, shear and cupping tests can be conducted using the accessories.

Disk and coil springs can also be tested. Optionally available are large compression plates for materials with a relatively low compressive strength or different geometry that require a larger contact surface (lab-own compression specimens).

The experimental unit has been developed specifically for experiments in small groups and is characterised by a clear design, simple operation and accessories that are easy to exchange.

The tensile specimens are clamped between the upper cross member and the crosshead. The compression specimens and hardness specimens are secured between the crosshead and lower cross member. The test force is generated by means of a hand-operated hydraulic system and displayed on a large force gauge with drag indicator.

A dial gauge measures the elongation of the specimens.

The experimental unit can also be equipped with electronic force and displacement measurement. Using the WP 300.20 system for data acquisition, the measured values for force and displacement can be transferred to a PC where they can be analysed with the software.

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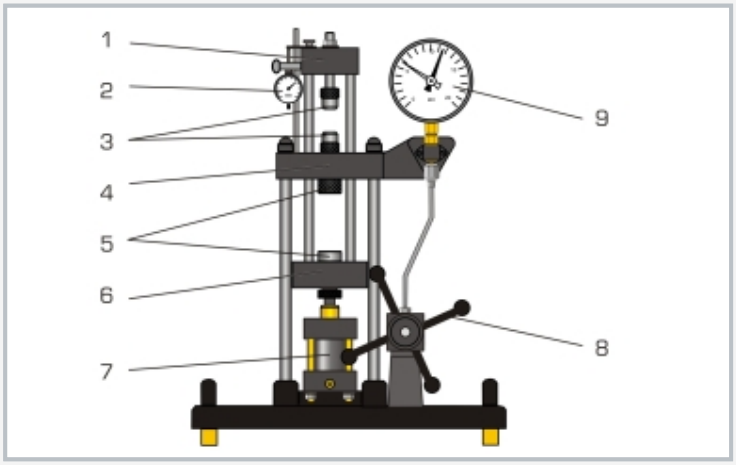
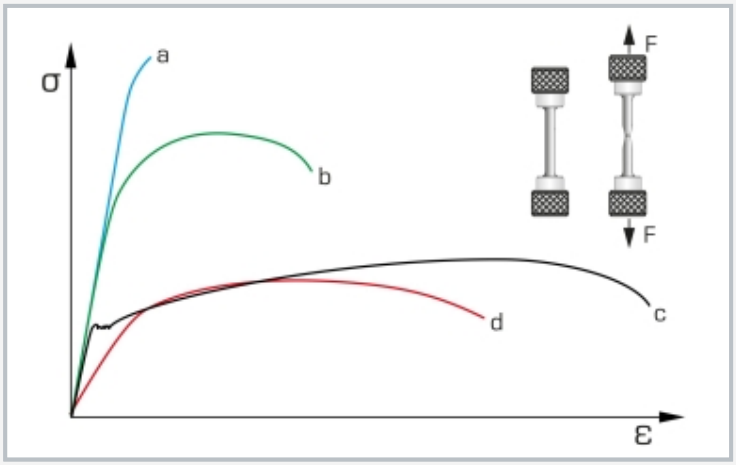
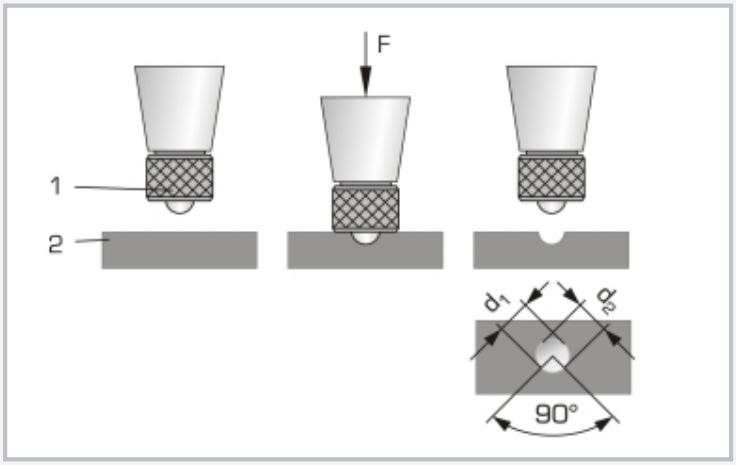


1 upper cross-member, 2 dial gauge for elongation, 3 clamp for tensile specimens, 4 crosshead, 5 compression piece and pressure plate, 6 lower cross-member, 7 hydraulic cylinder, 8 hand wheel, 9 force gauge



Stress-strain diagram for various materials: a hardened steel, b tempered steel, c annealed steel, d alloyed aluminium



Brinell hardness test: 1 hardened steel ball, 2 specimen; F test load, d_1 and d_2 dimensions of the impression surface

Specification

[1] classic experiments from destructive materials testing
[2] tensile tests, compression tests, Brinell hardness test
[3] extensive accessories available for further experiments
[4] generation of tensile and compressive forces
[5] forces generated by hand-operated hydraulic system; no power supply required
[6] force gauge, pointer instrument with drag indicator
[7] dial gauge for determining the elongation
[8] 16 hardness specimens
[9] 16 tensile specimens B6x30 according to DIN 50125
[10] compression specimens available as an option: gypsum WP 300.70, wood WP 300.71, plastic WP 300.72
[11] system for data acquisition (WP 300.20) available as an option

Technical data

Test force: max. 20kN
Stroke: max. 44mm
Free installation space for specimens: 165x65mm

16 tensile specimens
- material: 4x Al, 4x Cu, 4x St, 4x CuZn

16 hardness specimens
- LxWxH: 30x30x10mm
- material: 4x Al, 4x Cu, 4x St, 4x CuZn

Sphere for hardness testing: Ø 10mm

Measuring ranges
- force: 0...20kN, graduation: 0,5kN
- travel: 0...20mm, graduation: 0,01mm

LxWxH: 610x500x860mm
Weight: approx. 48kg

Scope of delivery

1 experimental unit
1 device for hardness test
1 force gauge
1 elongation dial gauge
4 sets of tensile specimens (4 pieces each)
4 sets of hardness specimens (4 pieces each)
1 set of instructional material

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Optional accessories

WP 300.20	System for data acquisition
Tensile test	
WP 300.02	Set of 4 tensile specimens, Al, Cu, St, CuZn
WP 300.21	Set of 4 tensile specimens, Al
WP 300.22	Set of 4 tensile specimens, Cu
WP 300.23	Set of 4 tensile specimens, St
WP 300.24	Set of 4 tensile specimens, CuZn
WP 300.14	Clamping device for flat tensile specimens
WP 300.25	Set of 4 tension specimens, flat, Al, Cu, St, CuZn
Compression test	
WP 300.70	Set of 4 compression specimens, gypsum
WP 300.71	Set of 4 compression specimens, wood
WP 300.72	Set of 4 compression specimens, plastic
for own specimens	
WP 300.05	Compression plates for compression tests, large
Brinell hardness test	
WP 300.03	Set of 4 hardness specimens, Al, Cu, St, CuZn
WP 300.31	Set of 4 hardness specimens, Al
WP 300.32	Set of 4 hardness specimens, Cu
WP 300.33	Set of 4 hardness specimens, St
WP 300.34	Set of 4 hardness specimens, CuZn
WP 300.12	Measuring magnifier for Brinell hardness test
Bending test	
WP 300.04	Bending test device
WP 300.61	Set of 3 bending specimens, Al, St, CuZn
Cupping test	
WP 300.11	Device for cupping tests
WP 300.41	Set of 5 cupping specimens, Al
WP 300.42	Set of 5 cupping specimens, Cu
WP 300.43	Set of 5 cupping specimens, St
WP 300.44	Set of 5 cupping specimens, CuZn
Shear test	
WP 300.10	Device for shear tests, double-shear
WP 300.13	Device for shear tests, single-shear
WP 300.52	Set of 5 shear specimens, Cu
Spring test	
WP 300.06	Experimental setup for spring test, helical spring, 2 sets
WP 300.07	Experimental setup for spring test, disk spring
Other accessories	
WP 300.09	Laboratory trolley