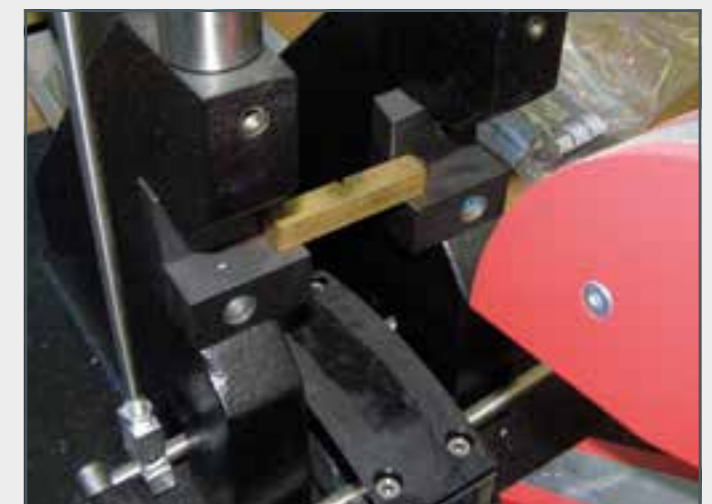
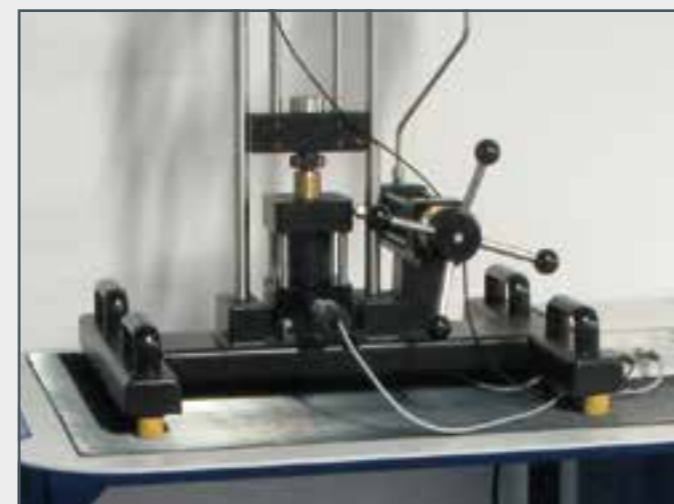
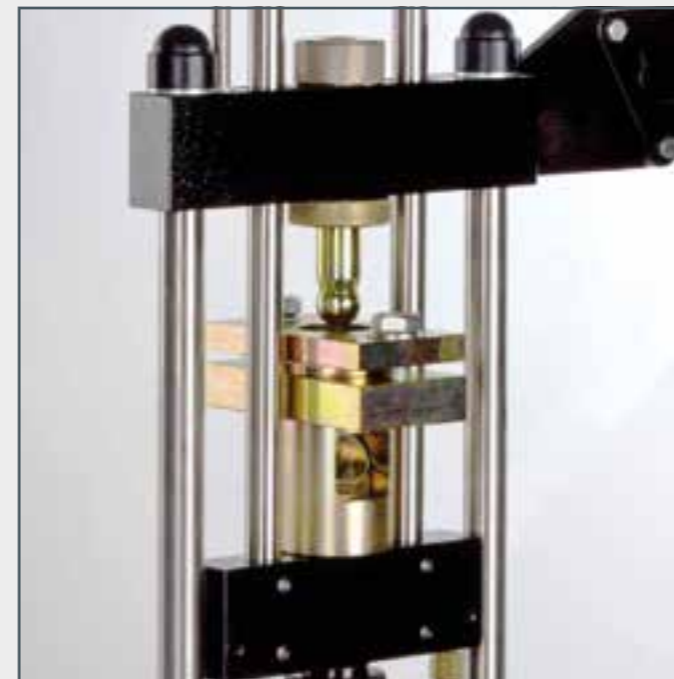


Course  
Fundamentals of materials testing

Series WP

A complete course  
in the fundamentals  
of materials testing



# Course

## Fundamentals of materials testing

Using experimental units, students learn how to analyse materials by learning about different test methods for determining material properties and for assessing and classifying "unknown" materials.

The complete course includes topics such as:

- elastic and plastic deformation
- tensile strength, stress, strain, force-extension diagram, stress-strain diagram
- elongation at fracture, necking, fracture behaviour
- Brinell hardness test
- compression test, compression strength, compression yield stress, stress-compression diagram
- bending test
- cupping test, cold formability
- shear test, shear strength
- torsion test, torsion, shear stress, torsional stiffness, impact behaviour
- Charpy notched-bar impact test, toughness property, notched-bar-impact work-temperature diagram
- fatigue strength test, Wöhler diagram, analysis of the fracture surface
- creep rupture test, creep, strain-time diagram (creep curve)



**The compact WP 300 experimental unit generates a 20kN test load**

- classic experiments from destructive materials testing
- observation of the experiment in all details and phases
- clear demonstration of relationships between rising forces and change in various materials
- mobile use thanks to compact and lightweight design
- preparation display and storage of data with the WP 300.20 system for data acquisition



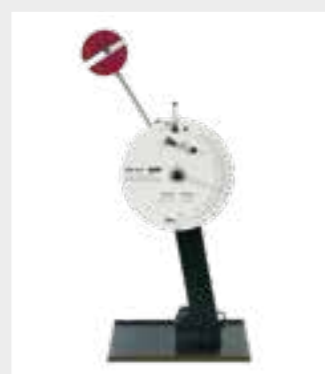
**The WP 310 experimental unit generates a 50kN test load**

- classic experiments from destructive materials testing with measuring results based on industrial standards
- trainer for experiments based on industrial standards
- acoustic overload signal for test loads
- the scope of delivery includes GUNT software for analysing the experimental data



**The compact WP 400 experimental unit generates a 25Nm work capacity**

- Charpy notched-bar impact test for quality control and analysis of the fracture behaviour in metallic materials
- pendulum impact tester based on DIN EN ISO 148-1
- various safety devices for conducting experiments safely and optional protective cover for the WP 400.50 operating area
- preparation display and storage with the WP 400.20 system for data acquisition



**The WP 410 experimental unit generates a 300Nm work capacity**

- Charpy notched-bar impact test with increased work capacity
- pendulum impact tester based on industrial standards / DIN EN ISO 148-1
- safe experiments thanks to two-hand release of the hammer and optional protective cage for pendulum impact tester WP 410.50
- preparation display and storage with the WP 410.20 system for data acquisition



**The compact WP 500 experimental unit generates reference moments of 30Nm**

- generates the twisting moment by means of a worm gear
- measure the twisting moment with strain-gauge measuring shaft and encoder for measuring the twisting angle
- the scope of delivery includes GUNT software for analysing the measured values



**The WP 510 experimental unit generates reference moments of 200Nm**

- torsion test based on industrial standards; experiments conducted with the aid of a motor
- different torsional velocities, clockwise and anticlockwise
- microprocessor-based measuring technology
- the scope of delivery includes GUNT software for analysing the experimental data



**The compact WP 140 experimental unit is used to conduct fatigue strength tests**

- fatigue strength of bars under reverse bending stress
- digital counter displays load cycles
- automatically shuts down when the test bar fractures
- preparation display and storage with the WP 140.20 system for data acquisition



**The compact WP 600 experimental unit is used to conduct creep rupture tests**

- simple creep rupture tests with lead and plastic specimens
- experiments can be conducted at room temperature
- cooling elements allow experiments to be conducted below room temperature
- experiments last from a few minutes to an hour

# Course

## Fundamentals of materials testing

### Accessories for various materials tests

#### WP 300, 20 kN test load

##### Tensile tests

<b>WP 300.02</b>	Set of 4 tensile specimens, Al, Cu, St, CuZn
<b>WP 300.21</b>	Set of 4 tensile specimens, Al
<b>WP 300.22</b>	Set of 4 tensile specimens, Cu
<b>WP 300.23</b>	Set of 4 tensile specimens, St
<b>WP 300.24</b>	Set of 4 tensile specimens, CuZn
<b>WP 300.14</b>	Clamping device for flat tensile specimens
<b>WP 300.25</b>	Set of 4 tensile specimens, flat, Al, Cu, St, CuZn

##### Compression tests

<b>WP 300.05</b>	Compression plates for compression tests, large
<b>WP 300.70</b>	Set of 4 compression specimens, gypsum
<b>WP 300.71</b>	Set of 4 compression specimens, wood
<b>WP 300.72</b>	Set of 4 compression specimens, plastic

##### Brinell hardness tests

<b>WP 300.03</b>	Set of 4 hardness specimens, Al, Cu, St, CuZn
<b>WP 300.31</b>	Set of 4 hardness specimens, Al
<b>WP 300.32</b>	Set of 4 hardness specimens, Cu
<b>WP 300.33</b>	Set of 4 hardness specimens, St
<b>WP 300.34</b>	Set of 4 hardness specimens, CuZn
<b>WP 300.12</b>	Measuring magnifier for Brinell hardness test

##### Bending tests

<b>WP 300.04</b>	Bending test device
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##### Cupping tests

<b>WP 300.11</b>	Device for cupping tests
<b>WP 300.41</b>	Set of 5 cupping specimens, Al
<b>WP 300.42</b>	Set of 5 cupping specimens, Cu
<b>WP 300.43</b>	Set of 5 cupping specimens, St
<b>WP 300.44</b>	Set of 5 cupping specimens, CuZn

##### Shear tests

<b>WP 300.10</b>	Device for shear tests, double-shear
<b>WP 300.13</b>	Device for shear test, single-shear
<b>WP 300.52</b>	Set of 5 shear specimens, Cu

##### Spring tests

<b>WP 300.06</b>	Experimental setup for spring test, helical spring, 2 sets
<b>WP 300.07</b>	Experimental setup for spring test, disk spring

#### WP 310, 50 kN test load

##### Tensile tests

<b>WP 310.05</b>	Clamping device for tensile specimens, round and flat
<b>WP 310.12</b>	Set of 10 tensile specimens F10x50 DIN 50125, St (S235JRC+C)
<b>WP 310.06</b>	Clamping device for tensile specimens, threaded end
<b>WP 310.11</b>	Set of 10 tensile specimens B10x50 DIN 50125 M16, St (S235JRC+C)
<b>WP 310.07</b>	Clamping device for tensile specimens, dumbbell-shaped
<b>WP 310.13</b>	Set of 10 tensile specimens, dumbbell-shaped, St (S235JRC+C)

##### Compression tests

<b>WP 310.04</b>	Compression plates for compression tests
<b>WP 310.15</b>	Set of compression specimens, 4x plastic, 1x wood

##### Brinell hardness tests

<b>WP 310.01</b>	Experimental setup for Brinell hardness test
<b>WP 300.03</b>	Set of 4 hardness specimens, Al, Cu, St, CuZn
<b>WP 300.31</b>	Set of 4 hardness specimens, Al
<b>WP 300.32</b>	Set of 4 hardness specimens, Cu
<b>WP 300.33</b>	Set of 4 hardness specimens, St
<b>WP 300.34</b>	Set of 4 hardness specimens, CuZn
<b>WP 300.12</b>	Measuring magnifier for Brinell hardness test

##### Bending tests

<b>WP 310.03</b>	Bending test device
<b>WP 310.81</b>	Set of 25 bending specimens, St

##### Cupping tests

<b>WP 310.10</b>	Device for cupping tests
<b>WP 300.41</b>	Set of 5 cupping specimens, Al
<b>WP 300.42</b>	Set of 5 cupping specimens, Cu
<b>WP 300.43</b>	Set of 5 cupping specimens, St
<b>WP 300.44</b>	Set of 5 cupping specimens, CuZn

##### Shear tests

<b>WP 310.02</b>	Device for shear tests, double-shear
<b>WP 300.52</b>	Set of 5 shear specimens, Cu

##### Spring tests

<b>WP 310.08</b>	Experimental setup for spring test, helical spring
<b>WP 310.09</b>	Experimental setup for spring test, disk spring

#### WP 400, 25 Nm test load

##### Impact test

<b>WP 400.01</b>	Set of 10 V specimens 10x5, construction steel
<b>WP 400.02</b>	Set of 10 V specimens 10x5, CuZn
<b>WP 400.03</b>	Set of 10 V specimens 10x10, CuZn
<b>WP 400.04</b>	Set of 10 U specimens 10x5, free cutting steel
<b>WP 400.05</b>	Set of 10 R7 specimens, free cutting steel
<b>WP 400.06</b>	Set of 10 R5 specimens, free cutting steel
<b>WP 400.07</b>	Set of 10 R7 specimens, heat treatable steel
<b>WP 400.08</b>	Set of 10 R7 specimens, construction steel
<b>WP 400.09</b>	Set of 10 V specimens, construction steel
<b>WP 400.50</b>	Safety cage for pendulum impact tester

#### WP 500, 30 Nm test load

##### Torsion test

<b>WP 500.01</b>	Set of 6 torsion specimens, St, Al, CuZn
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#### Material fatigue with WP 140

##### Fatigue strength test

<b>WP 140.01</b>	Set of 3 specimens, various fillet radii, St
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#### WP 410, 300 Nm test load

##### Impact test

<b>WP 410.01</b>	Set of 10 ISO-V specimens 10x10, St 37k
<b>WP 410.02</b>	Set of 10 ISO-V specimens 10x10, Cu
<b>WP 410.03</b>	Set of 10 ISO-V specimens 10x10, CuZn
<b>WP 410.50</b>	Safety cage for pendulum impact tester

#### WP 510, 200 Nm test load

##### Torsion test

<b>WP 510.01</b>	Set of 5 torsion specimens, St
<b>WP 510.02</b>	Set of 5 torsion specimens, CuZn
<b>WP 510.03</b>	Set of 5 torsion specimens, Al

#### Material fatigue with WP 600

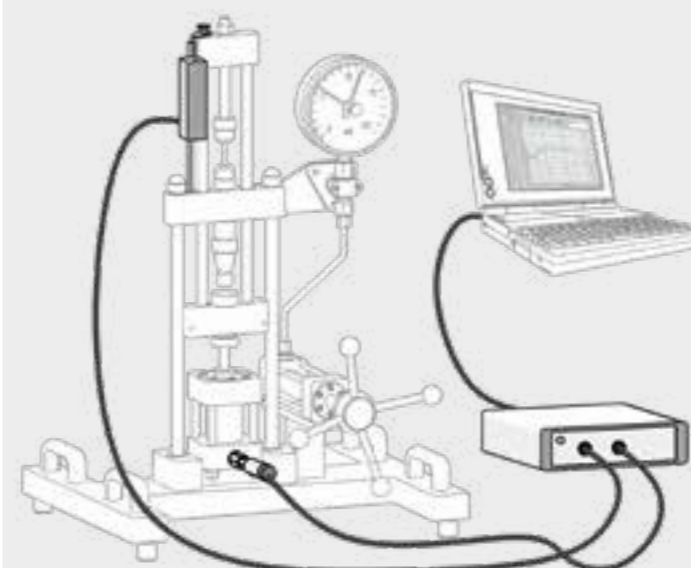
##### Creep rupture test

<b>WP 600.01</b>	Set of 10 specimens, PE
<b>WP 600.02</b>	Set of 10 specimens, Pb

##### Accessories

<b>WP 300.09</b>	Laboratory trolley
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### Systems for data acquisition



#### GUNT software

- supports various materials tests
- record typical diagrams, e.g. stress-strain diagram, notched bar impact work-temperature diagram
- complete test record according to DIN (tensile and compression test)
- prepare, display and store data
- in WP 140, WP 300, WP 400, WP 410 optionally available
- in WP 310, WP 500, WP 510 included in scope of delivery