

WP 500

Torsion test, 30Nm



Description

- generate the twisting moment by means of a worm gear
- measure the twisting moment by means of a strain-gauge measuring shaft
- incremental encoder for measuring the twisting angle

The torsion test is a destructive testing method that studies the plastic behaviour of materials. In practice, components that are twisted in their application (e.g. screws, shafts, axles, wires and springs) are studied with this test method.

The WP 500 experimental unit allows torsion tests in which specimens are subjected to load until they fracture. The clean layout and simple operation mean the experimental sequence can be observed in all details and phases.

In the experiment, metallic specimens are twisted until they are destroyed by a typical shear fracture.

The twisting moment is applied manually by means of a handwheel and a worm gear. The base plate is torsionally reinforced. A transparent protective cover protects against flying fragments.

The effective twisting moment is measured by means of a moment-measuring shaft fitted with strain gauges and can be read directly on a display. The twisting angle is recorded by an incremental encoder and can also be read. The measured values are transmitted directly to a PC where they can be analysed using the software.

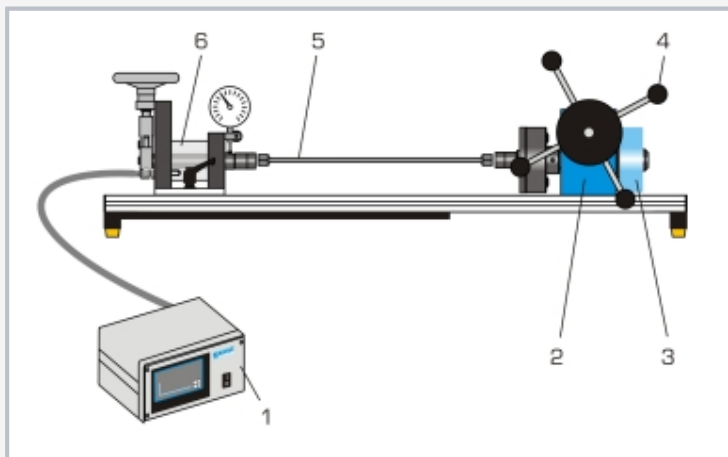
Specimens of different materials and different lengths are included in the scope of delivery. The measuring device can be moved on the rigid frame to adapt to different specimen lengths.

Learning objectives/experiments

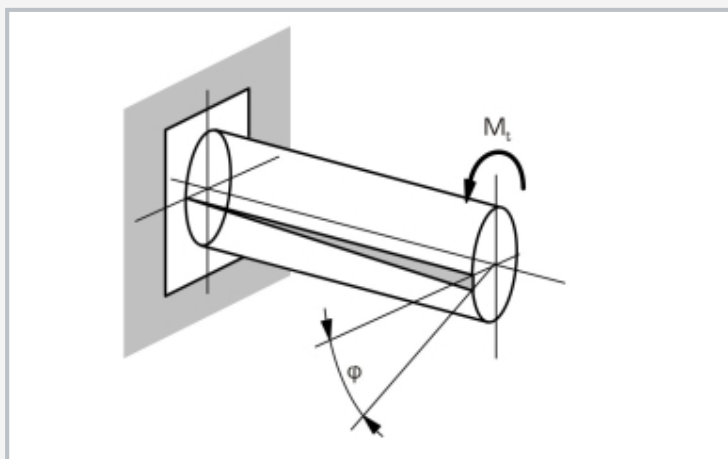
- torsion tests with different materials and load until specimen fracture
- determine the twisting strength
- plot the diagram of twisting moment over twisting angle
- influence of
 - ▶ specimen material
 - ▶ specimen cross-section
 - ▶ specimen length

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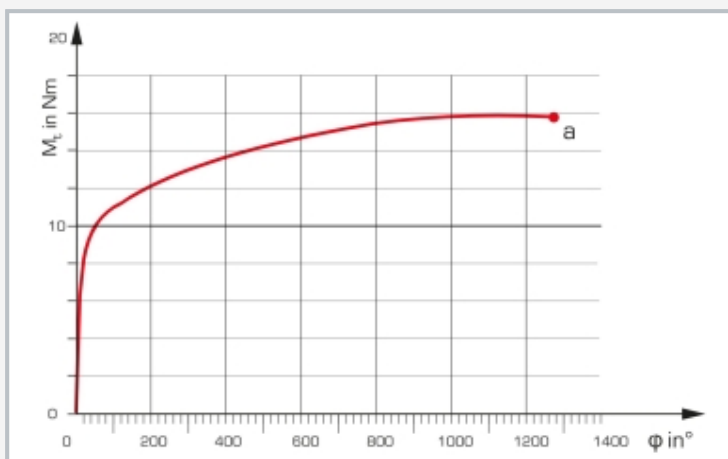
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1 measuring amplifier with display, 2 worm gear, 3 incremental encoder, 4 handwheel for twisting moment, 5 specimen, 6 movable measuring device with strain gauge measuring shaft and compensation unit



Principle of operation of torsion test: M_t twisting moment, ϕ twisting angle



Torsion test of metallic materials to fracture: M_t twisting moment, ϕ twisting angle, a specimen fracture

Specification

- [1] torsion tests with different metallic specimens to fracture
- [2] manual generation of the twisting moment by means of handwheel and worm gear
- [3] specify the input angle via handwheel
- [4] long and short specimens of steel, aluminium, brass
- [5] movable measuring device for different specimen lengths
- [6] measure the test moment by means of strain-gauge measuring shaft and measuring amplifier
- [7] strain-gauge measuring shaft with compensation for inherent deformation
- [8] twisting angle measured by incremental encoder
- [9] electronic measuring amplifier with touch panel to display twisting moment and twisting angle
- [10] GUNT software for data acquisition via USB under Windows 10

Technical data

- Max. twisting moment: 30Nm
 Loading device, worm gear
 ■ transmission ratio: 1:63
 Specimen mount: 2x 17mm, hexagonal
 Specimens
 ■ diameter: 6mm
 ■ 4x 75mm, steel
 ■ 4x 75mm, aluminium
 ■ 4x 75mm, brass
 ■ 2x 175mm, steel
 ■ 2x 350mm, steel
 ■ 2x 700mm, steel

Measuring ranges

- twisting moment: 0...30,0Nm
- angle of twist: 0...±3200°, resolution: 0,1°

230V, 50Hz, 1 phase
 230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
 UL/CSA optional
 LxWxH: 1400x700x500mm (experimental unit)
 LxWxH: 230x210x120mm (measuring amplifier)
 Weight: approx. 43kg (total)

Required for operation

PC with Windows recommended

Scope of delivery

- 1 experimental unit
- 1 measuring amplifier
- 1 set of specimens (18 pieces)
- 1 GUNT software + USB cable
- 1 set of instructional material

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Optional accessories

020.50001	WP 500.01	Set of 6 torsion specimens, St, Al, CuZn
020.50090	WP 500.90	Torsiometer
020.30009	WP 300.09	Laboratory trolley