MT 3016 Impact Tester

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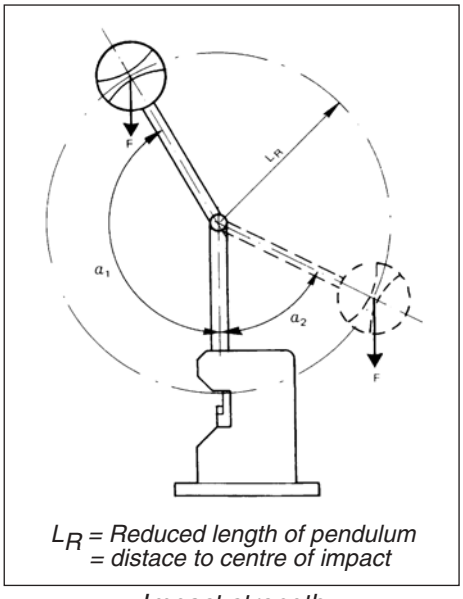
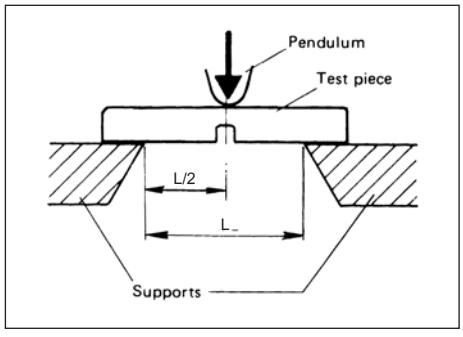


L_R = *Reduced length of pendulum*
= distace to centre of impact

Impact strength



MT 3016 is a robust, easily handled bench impact tester (Charpy) made to standard specifications.
It demonstrates in a simple and reliable manner how the impact strength characteristics of a material are affected at, for example, low temperature. This is of great importance for the choice of material in applications subjected to heavy temperature fluctuations.
It is also useful when a teacher wishes to demonstrate how the impact strength of a material is affected by different kinds of heat treatments, e.g. hardening, tempering, and normalizing.
With MT 3016 the student can do his laboratory exercises without difficulty.

Description

The machine has a heavy and stable cast iron mounting with holes for bench attachment. The stand consists of two robust steel bars.
The pendulum is mounted in ball bearings and precision balanced. The test piece supports are hardened and ground. The distance between supports can easily be adjusted. The scale is graduated in joules and shows directly the energy required to break off the test piece. The pendulum is braked with a friction brake.

Examples of experiments

- Investigate the effect of carbon content on impact strength
- Investigate the effect of temperature on impact strength
- Investigate the effect of normalization on impact strength

The equipment

- Impact Tester
- 5 sets test pieces of 3 different steel qualities (Tot 15 pieces)
- Laboratory Manual

Test pieces for MT 3016

- MT 3027-1, Impact Test Piece 1, red (construction steel)
- MT 3027-2, Impact Test Piece 2, yellow (engineering steel)
- MT 3027-3, Impact Test Piece 3, green (tooling steel)

Technical data

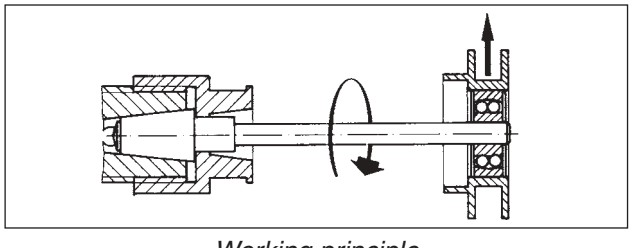
Max. impact energy	15 joule (1 J=Nm)
	1 Scale graduation = 0.1 joule
Dimensions of test pieces	6x6x44 mm
Dimensions	170x290x615 mm
Weight	30 kg

Please contact Terco for more information. Phone +46 8 506 855 12, Fax. +46 8 506 855 01, export@terco.se

MT 3012 Fatigue Testing Machine

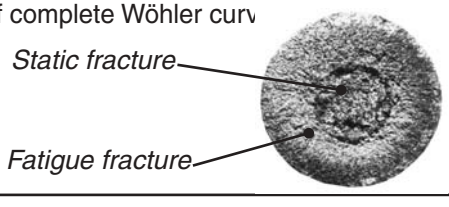
Rotary bending

With the varying load to which most machines are exposed it is not the static break point but the fatigue limit which decides when a fracture occurs. Fatigue strength is thus of very great significance in machine design.
MT 3012 provides a simple way of learning the effect of radius of fillet, surface smoothness, etc. on a material subjected to fluctuating flexural stresses.
Great emphasis has been placed on producing a simple and reliable apparatus for students laboratory exercises.



Working principle

MT 3012 is driven by a 1-ph asynchronous motor.
The number of changes of load is read directly on a 6-digit zeroing counter, counting every l0th revolution.
The tapered test piece is attached to a very stable shaft mounted in two spherical ball bearings. The force is applied to the test piece with a spring and can be infinitely varied between 0 and 300 N.
MT 3012 has a micro-switch which, on the fracture of the test piece, automatically cuts off the voltage to the motor. This ensures exact measurement and is of great advantage in experiments of a lengthy nature, such as the recording of complete Wöhler curv



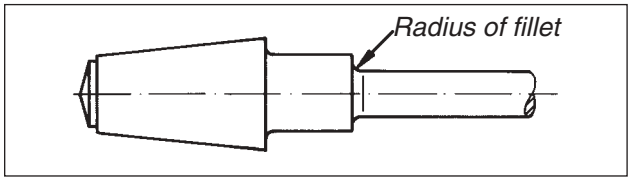
Examples of experiments

- Test the fatigue strength of a material subjected to changes in bending stress
- Investigate the effect of the radius of the fillet and suface smoothness
- Record a simple Wöhler diagram
- Determine a Wöhler diagram for different radii of fillet and for different materials

The equipment

- Fatigue Testing Machine
- Tool box containing all the necessary tools
- 5 test pieces of each (tot. 15 pcs)
- Laboratory manual

Test piece	Radius of fillet	Surface smoothness
1 (MT 3026-1)	0.5 mm	4 µ
2 (MT 3026-2)	2 mm	4 µ
3 (MT 3026-3)	2 mm	25 µ



Technical data

Test piece diameter	8 mm
Max. load	300 N
Supply voltage	230V 50/60Hz (MT 3012) 110V 60Hz (MT 3012-116)
Speed (approx)	3000 rpm resp. 3600 rpm
Dimension	980x280x460 mm
Weight	24 kg

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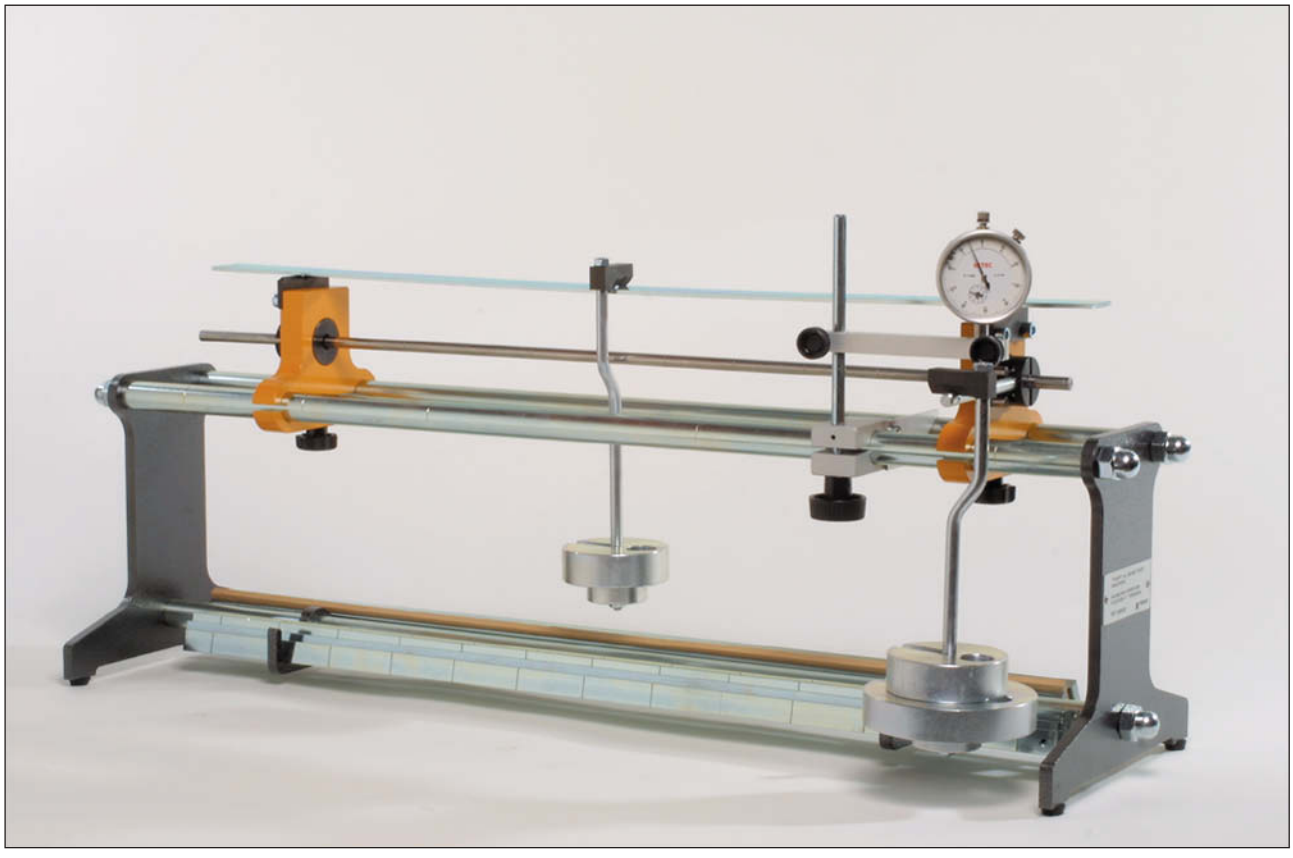
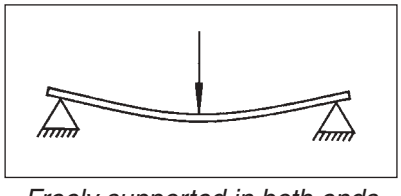
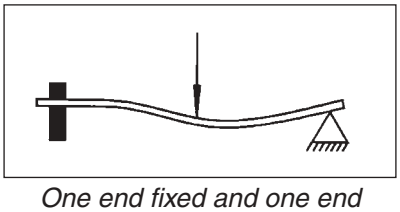
MT 3005 Twist and Bend Testing Machine



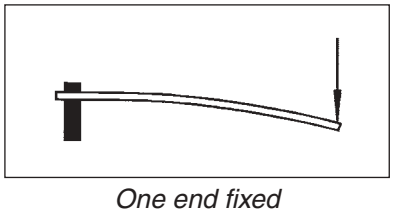
MT 3005 Twist and Bend Testing Machine



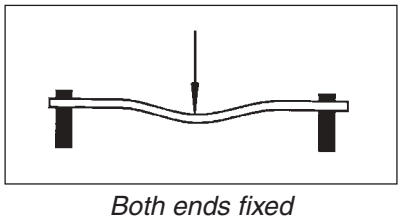
Freely supported in both ends



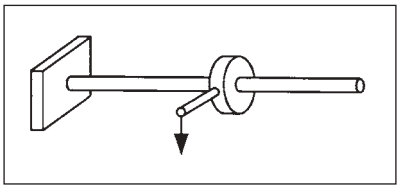
One end fixed and one end freely supported



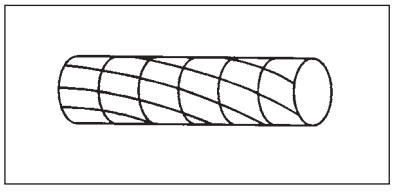
One end fixed



Both ends fixed



Twisting



Twist diagram

MT 3005 is a combined twist and bend testing machine. It can be used both in laboratory exercises, and in conjunction with theoretical work on twist and bending. Its size and weight makes it easy to carry between classrooms.

Twist

You use twist tests to determine and compare the modulus of rigidity for different materials and to demonstrate the deformation formula.

Bending

You use bending tests to determine the modulus of elasticity of different materials. You also use them to demonstrate, for example, the relation between load, moment of inertia, distance between supports, modulus of elasticity, and deflection.

The test pieces for bending tests are of different dimensions, so you can determine the relation between moment of inertia and dimension of a material.

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Exemples of experiments

- Investigate the relationship between load, span, dimensions and deflection of a beam.
- Ascertain the coefficient of elasticity for steel, brass, aluminium and wood.
- Investigate the relationship between the torsional moment, clamping length and torsional angle of a shaft.
- Determine the shear modulus of steel, brass, and aluminium.
- Investigate the difference of having one end of the test piece fixed, both ends fixed, and no end fixed.

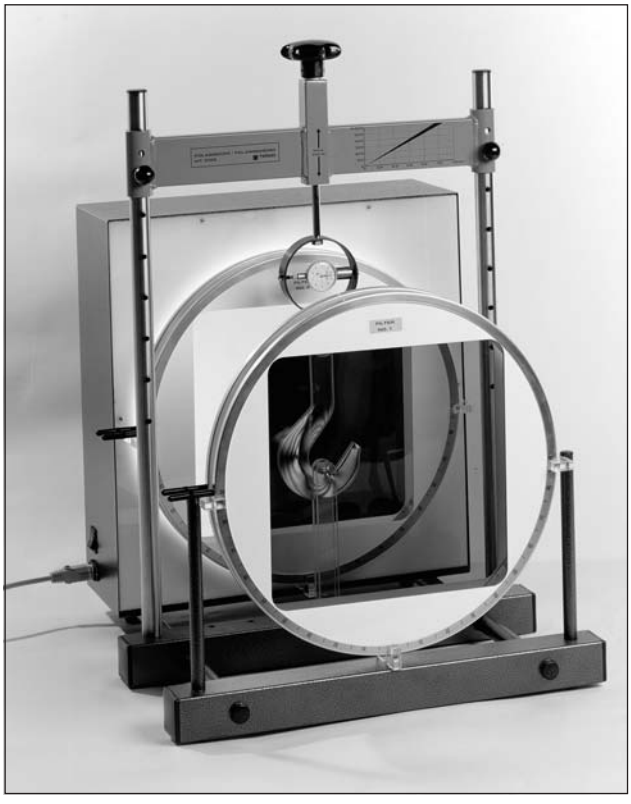
Technical data

Max distance between supports	600 mm
Accuracy of bending	0.01 mm
Accuracy of twisting	0.01 mm (degrees)
Dimensions	790x225x345 mm
Weight	13 kg

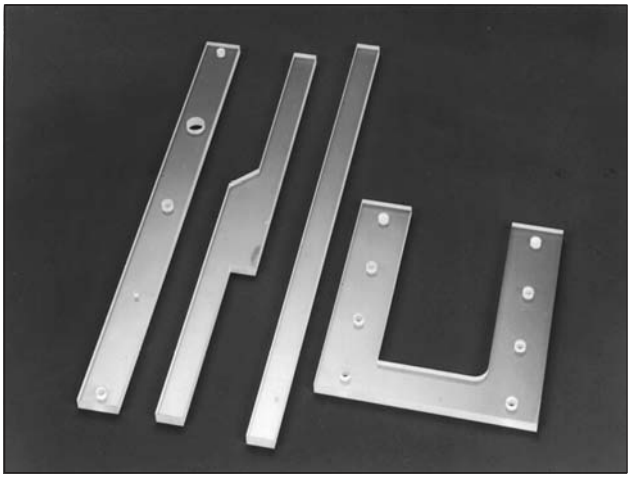
The equipment

- Twist and Bend Testing Machine
- Two loading devices (0.25 Kg)
- Two 1 kg weights
- Four 0.5 kg weights
- One dial gauge
- Seven steel test pieces of rectangular cross-section
- One wood test piece of rectangular cross-section
- Three test pieces, diameter 8 mm, of resp. steel, aluminium, and brass
- Two end fixtures
- Laboratory manual

MT 3100 Polariscope



MT 3100 Polariscope



MT 3101 Model set A

MT 3103 Model set B

For photoelastic measurements in education, industry and research environments.
The Polariscope MT 3100 is an instrument for measuring mechanical stress and studying stress patterns resulting from geometrical changes in loaded models. It was developed in collaboration with the National Aeronautical Research Institute in Sweden.
Photoelastic measurements using the polariscope are conducted by passing light through a plastic model of the actual object under test while a load is applied to the model.
Generally, photoelasticity is used to study objects stressed in two planar directions (biaxial), but it can also be used for objects stressed in three spatial directions (triaxial).
Stress patterns can be seen in the model as coloured isochromatics. Points having the same shear stress lie along these isochromatic fringes. You thus obtain an overall picture of the stress developed within the object, and stress concentrations can be ascertained and evaluated.
Using monochromatic light makes the evaluation of these isochromatics considerably easier, but white light is needed to study the directions of principal stress. The polariscope features a selector switch which operates a monochromatic lamp and a white-light fluorescent tube built into a box-type light source.

The equipment

- Polariscope MT 3100
- Quarter wave filter used with monochromatic light (2 off)
- Polarizer filter (1 off)
- Analyzer filter (1 off)
- Light source, white light (8 W) and sodium
- Load unit, steel ring with dial gauge
- Plastic model, ref.rod, plate 100x100 mm
- Laboratory Manual

Accessories

- MT 3101 Model set A, comprising: perforated beam, bar, bending element overlap
- MT 3103 Model set B, comprising: shaft, crane hook, rod, and spanner
- MT 3105 Araldit B plate to make your own test specimens. 420x310x10 mm
- MT 3106 "Polariscope measurement" slide series with captions, 25 colour slides

Technical data

Dimensions	550x500x760 mm
Weight	15 kg
Supply Voltage	230 V 50/60Hz (MT 3100)
	110 V 60 Hz (MT 3100-116)

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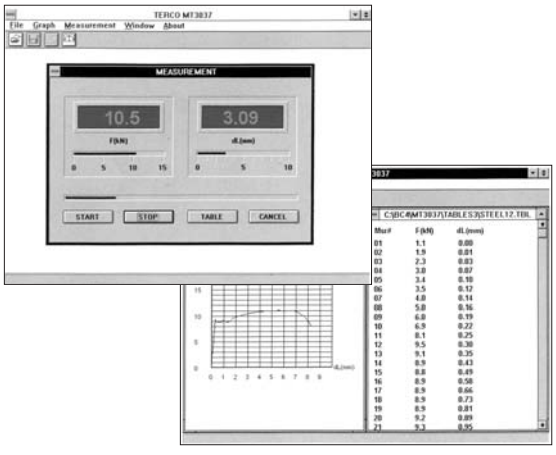
MT 3047 Computer Measuring Device

MT 3017 with MT 3047 adapted.

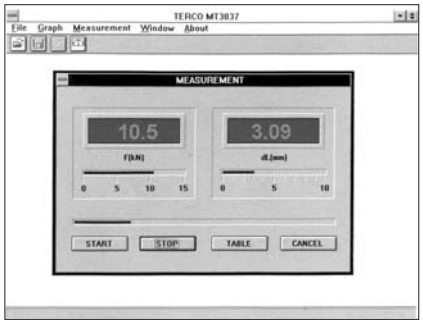


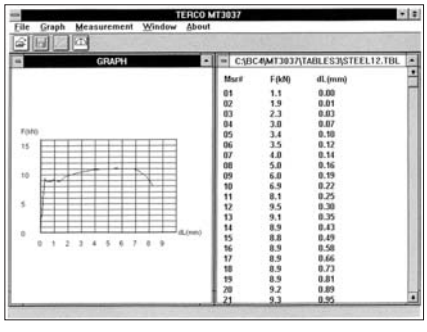
MT 3047 is a kit of components designed to be adapted on the Terco Tensile Testing Machine MT 3017. Together with a computer interface and dedicated software, (the same as for MT 3037), all tests can be recorded by the computer and displayed both as tables and as diagrams. The diagrams can be printed. The kit is very easy to install and no drilling or machining is necessary. A userfriendly installation description is included.

MT 3047 comprises:

- Pressure transducer
- Digital dial gauge
- Computer interface
- Software
- Mounting details incl. cables
- Manual
- Adapter 230 V (MT 3047)
  110V (MT 3047-116)

MT 3037 Universal Testing Machine





MT 3037 Universal Testing Machine

MT 3037 is an universal testing machine capable of a wide range of tensile and compression tests. The machine is specially designed for teaching purpose, and very easy to handle.

With the standard unit, tensile tests can be performed on various metal test pieces as well as compression tests and hardness tests according to Brinell.

Using different accessories, bending tests, folding tests, shearing tests as well as deep drawing tests can be carried out.

The machine is fully automatic and the power is generated by a motor driven hydraulic cylinder. It can be controlled both manually or by computer.

The speed of the cylinder can be manually adjusted to the requirement of the test. The power is transferred extremely smooth and with constant speed, thus giving best possible test results which is important for the tensile tests.

The power as well as the elongation is displayed on the monitor both as digital values and as bar diagrams (see figures). After the test a complete diagram, with values sampled 4 times/sec, is displayed both as tables and as diagrams. The diagrams can be printed out.

For the safety of the users the machine is equipped with a plastic cover.

The cover can be tilted to give complete access to the machine during set up.

It comprises a saftey door, which is equipped with a security lock. The machine can not operate unless this door is closed.

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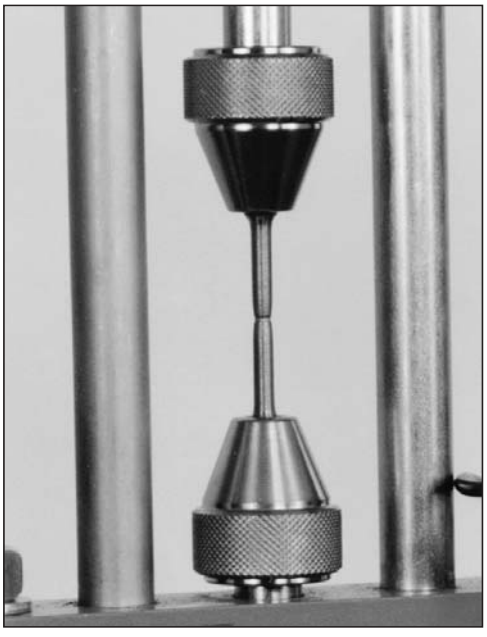
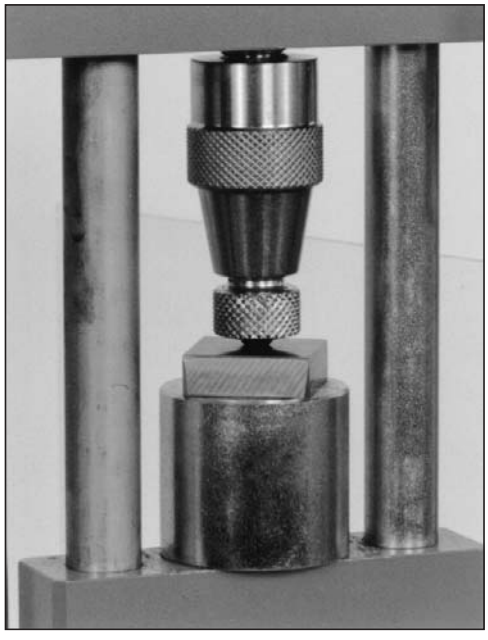
Accessories for MT 3037



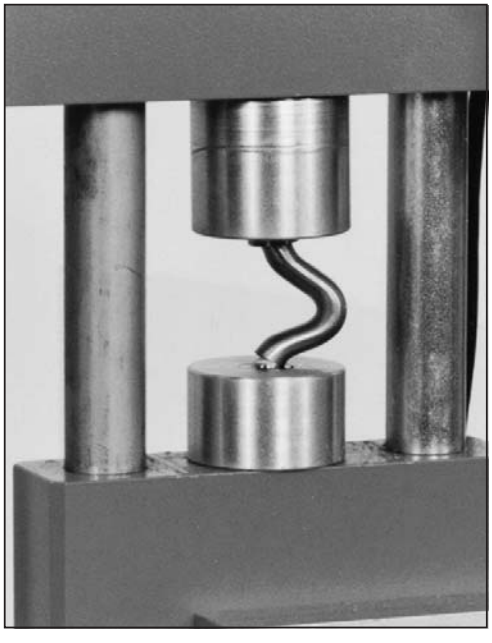
MT 3018 Tensile Test Set (standard)
Includes Tensile Test Piece Holders and 5 sets of Tensile Test Rods, each one including one of each of steel, aluminium, brass and copper.
This set is incl. in the code no. MT 3037.



MT 3019 Brinell Test Set (optional)
Includes a 10 mm steel ball indentor, magnifying glass and 5 sets of Brinell Test Pieces, each set including one of each of steel, aluminium, brass and copper.

MT 3037-2 Clamping Jaws (optional)
To be used for testing of sheet material like metal sheet and plastics. It requires special designed test pieces to avoid breaking inside the jaws.
MT 3037-2 can also be used together with MT 3017.

Technical data	
Maximum speciment thickness	2 mm
Max width of speciment	22 mm
Weight	1.45 kg



MT 3037-3 Compression Test Set (optional)
For compression tests of test rods, to compare the yield point of different materials during tensile and compression tests. The set includes upper and lower holder and 5 sets of Compression Testing Rods, each set including one of each of steel, aluminium, brass and copper.
MT 3037-3 can also be used together with MT 3017.

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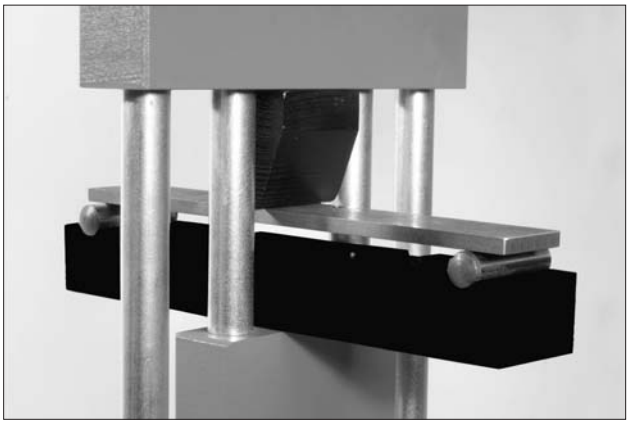


MT 3007 Bending Test Set (optional)

MT 3007 Terco Bending Test Set is an easy to use kit for bending tests, and can be used together with our Tensile Testing Machines MT 3017 and MT 3037.
The system consists of a study base profile of steel where two supports can be placed in four different fixed positions. The span width is varied between 200 and 100 mm. Tests can be carried out both manually and by use of the standard software program for MT 3037.
The test set comprises 5 test pieces of steel with the length of 250 mm. Dimensions 6x25; 6x35; 6x50; 8x25; 10x25 mm.

Equipment list for MT 3037

Standard equipment

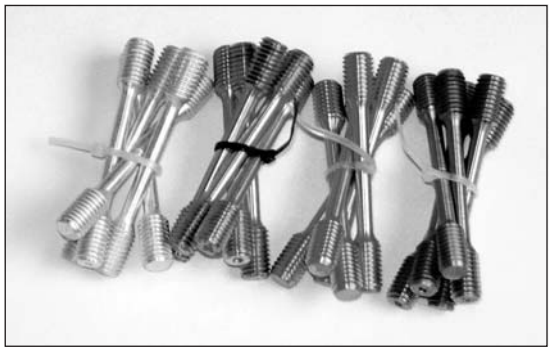
- Tool Box containing
  - Sliding Caliper
  - MT 3018 Tensile Test Set.
- MT 3037-6 Protective Safety Cover
- MT 3037-1 Computer Interface incl. cable to PC
- Software
- Manual

Optional equipment

- MT 3019 Brinell Test Set
- MT 3037-2 Clamping Jaws for test of thin metal
- MT 3037-3 Compression Test Set
- MT 3007 Bending Test Set
- Additional Test Pieces

Technical data

Max power	50 kN
Max movement	150 mm
Max speed	5 mm/sec
Min speed	0.05 mm/sec
Power supply 3-ph.	380 - 415 V 50/60 Hz (MT 3037)
Power supply 3-ph.	220 - 240 V 60 Hz (MT 3037 - 236)
Dimensions	620x450x1050 mm
Weight	80 kg



Sets of TensileTest Rods

Brinell Test Piece after Brinell Indent

Specification of test pieces

Tensile Test Rods

Diameter: 5.0 mm
MT 3018-1, Tensile Test Rods, steel - 5 pcs
MT 3018-2, Tensile Test Rods, aluminium - 5 pcs
MT 3018-3, Tensile Test Rods, brass - 5 pcs
MT 3018-4, Tensile Test Rods, copper - 5 pcs
Standard diameter is 5 mm but tensile test rods are also available with 6 mm or 7 mm.

Compression Test Rods

Diameter: 6.0 mm
MT 3037-31, Compression Test Rods, steel - 5 pcs
MT 3037-32, Compression Test Rods, aluminium - 5 pcs
MT 3037-33, Compression Test Rods, brass - 5 pcs
MT 3037-34, Compression Test Rods, copper - 5 pcs
Standard diameter is 6 mm.
5 mm, 7 mm and 8 mm is also available.

Brinell Test Piece
Dimensions: 30x30x10 mm

MT 3019-1, Brinell Test Piece, steel - 1 pc
MT 3019-2, Brinell Test Piece, aluminium - 1 pc
MT 3019-3, Brinell Test Piece, brass - 1 pc
MT 3019-4, Brinell Test Piece, copper - 1 pc

Please contact Terco for more information. Phone +46 8 506 855 12, Fax. +46 8 506 855 01, export@terco.se

MT 3024 Hardness Tester

For professional and educational hardness testing according to the ROCKWELL, BRINELL and VICKERS tests.
The ALPHA Durometer is convenient to use and requires a minimum of maintenance. The load is applied evenly and slowly by an adjustable oil dash-pot system.
The load time is set by adjusting the dash-pot.
The dial indicator has two graduations from 0 to 100, one for Rockwell tests with a diamond, the other for Rockwell tests with a steel ball.
The sturdy screw runs in a carefully centered bushing. The ball thrust bearing for the hand wheel rests against this bushing. The specimen holder has a large opening for facilitating the positioning of the indentation.

Loads

The minimum load of 10 kp is obtained by the lever alone. The 15.625 kp load is obtained by using the lever and the weight holder. In addition, weights are available for up to 187.5 kp as listed below.

The equipment

In order to have a complete set to work with, the following accessories are included:

Indentors:
- Rockwell C Diamond
- Rockwell B 1/16” ball
- Vickers Diamond
- Brinell 2.5 mm ball

Measuring magnifier:
- for Brinell tests

Laboratory manual

Test blocks:
- HRC 55-60 for Rockwell C (150 Kp load)
- HRB 70-80 for Rockwell B (100 Kp load)
- HB 200 for Brinell (30 Kp load)
- HV 720 for Vickers (187.5 Kp load)

All test blocks are delivered with certified testcertificates.

MT 3024 Hardness Tester

Technical data

Preload (by the lever alone)	10 kp
Load by lever and weight holder	15.625 kp
Loads	30, 100,150, 187.5 kp
Vertical gap	150 mm
Horizontal reach	150 mm
Height	580 mm
Width	200 mm
Depth	400 mm
Net weight, approx.	50 kg
Shipping weight, approx.	75 kg
Shipping volume, approx.	0.4 m^3

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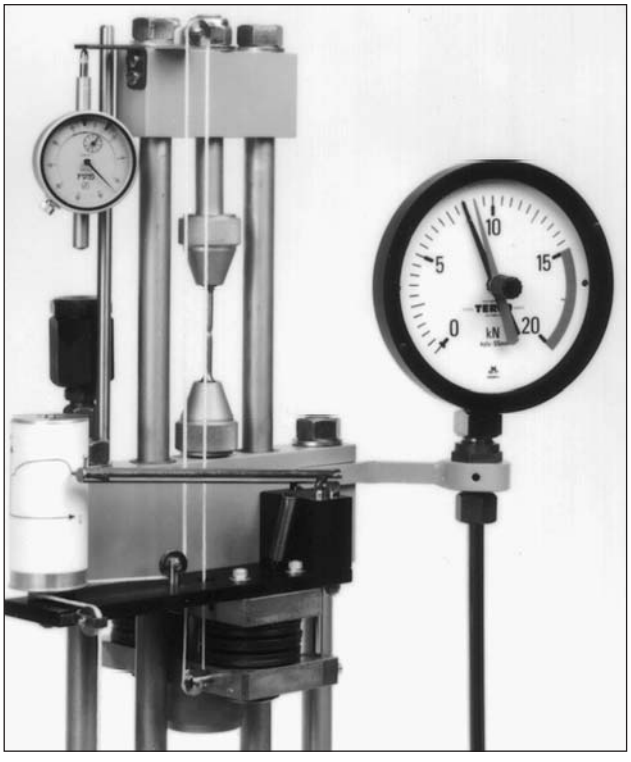
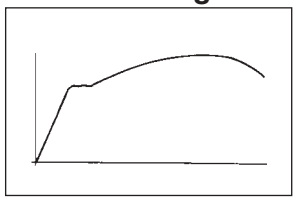
MT 3020 Recorder

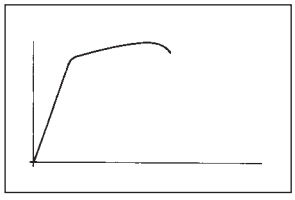


MT 3017 with Recorder MT 3020 adapted

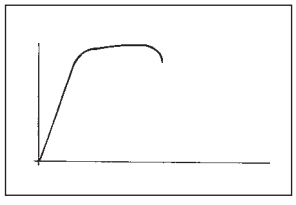
Tensile diagrams for different materials



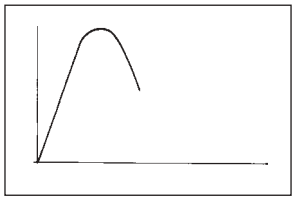
Steel



Aluminium



Brass



Copper

MT 3020 is a mechanical recorder designed to be attached to our Tensile Testing Machine MT 3017.
With this equipment you can easily study, for example, the yield point of steel.
The size of the obtained graph is approximately 50x40mm. The recorder is easily mounted on the tensile tester.

Technical data	
Accuracy	5 % (approx.)
Size	250x130x200
Weight	3 kg

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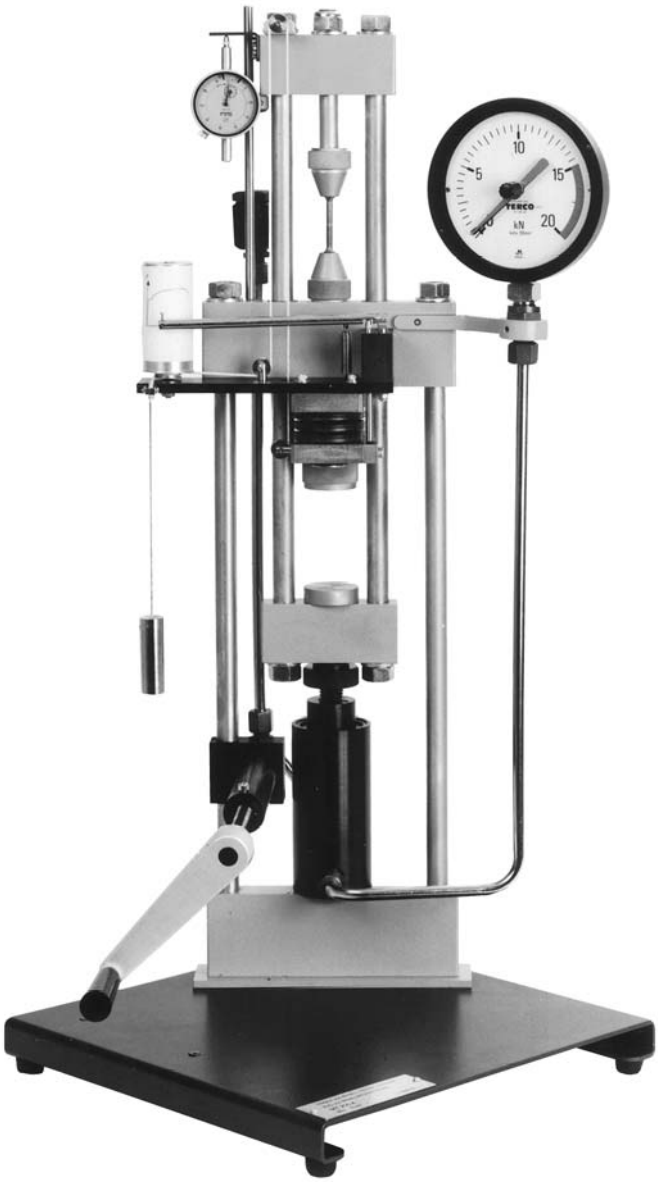
MT 3017 Tensile and Brinell Testing Machine



Tensile and Brinell Testing Machine MT 3017 with recorder MT 3020

MT 3017 is a hydraulic tensile testing machine with a screw-type operating cylinder which results in completely smooth and stepless loading.
The cylinder is operated by a crank designed so only light hand power is required to obtain maximum load.
The pedagogic design of the machine allows the student to observe what is happening throughout the entire process. Its convenient size and sturdy structure make the MT 3017 a highly reliable and safe machine.
The power is shown on a large and clearly visible indicating instrument which is graduated in kN (kilo Newton). The instrument has a maximum value indicator on the test rod which shows the power at failure.

The extension is measured by a gauge with an accuracy of 0.01 mm.
The machine provides extremely fine tensile testing charts where the elastic range, the yield range, and the plastic range are clearly indicated.
The tensile test rods for the MT 3017 are 5 mm in diameter with threaded ends. This makes them very easy to mount and also ensures reliable fastening.
The MT 3017 can also be used for Brinell testing.
A Brinell kit and measuring magnifier are included.
This machine may also be used for buckling tests.

Test pieces

- MT 3018-1, Tensile Test Rods, steel - 5 pcs
- MT 3018-2, Tensile Test Rods, aluminium - 5 pcs
- MT 3018-3, Tensile Test Rods, brass - 5 pcs
- MT 3018-4, Tensile Test Rods, copper - 5 pcs

- MT 3019-1, Brinell Test Piece, steel - 1 pc
- MT 3019-2, Brinell Test Piece, aluminium - 1 pc
- MT 3019-3, Brinell Test Piece, brass - 1 pc
- MT 3019-4, Brinell Test Piece, copper - 1 pc

Equipment list for MT 3017

MT 3018 Tensile Equipment. See page 7
- Test piece holders
- Tensile test rod set incl. 4 x 5 pieces: steel, aluminium, brass, and copper

MT 3019 Brinell Testing Set. See page 7
- Steel ball indentor
- Brinell test set incl. 4 x 5 testpieces: steel, aluminium, brass, and copper
- Measuring magnifier

Tool Box containing:
- Sliding caliper and above testpieces

Laboratory Manual

Optional equipment

MT 3037-2 Clamping Jaws. See page 7
MT 3037-3 Compressing Tool Set. See page 7
MT 3007 Bending Test Set. See page 8

Technical data	
Maximum load	20 kN
Dimensions	360x360x820 mm
Weight	24 kg

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MT 3004E Strain Gauge Bridge

MT 3004E Strain Gauge Bridge

MT 3004 is a measuring bridge for the study of deflection and load variations, suitable for use in combination with the Twist and Bend Testing Machine MT 3005 and the test pieces of steel and aluminium. The two included test pieces are provided with two strain gauges (120 W) each, connecting cables and contacts. The gauges are protected against the ingress of moisture and against mechanical damage.
The measuring bridge is controlled by a microprocessor. The strain per unit of length (micro strain) is read directly on the instrument. The instrument has very high accuracy and can be used in connection with any strain gauge measurement provided the gauge factor value K is within 1.50 - 2.50. The equipment is equipped with interface for connection to PC and the necessary software is included in the delivery.
Software includes: Save measured data, graphic presentation, and calculations.

The equipment comprises
- Strain Gauge Bridge
- 2 test pieces with strain gauges (steel and aluminium)
- Connecting cables and contacts (4 mm)
- Manual
- Software

Technical data

Selfzeroing	
Adjustable Gauge Factor value	(1.5 < K > 2.5)
Range	+/- 2000 microstrain
Linearity	0.2 %
Accuracy	1 %
Supply Voltage	230 V 50/60 Hz (MT 3004E)
	110 V 60 Hz (MT 3004E - 116)
Dimensions	250 x 150 x 300 mm
Weight	2 Kg