TERCO

Material Testing Laboratory

MATERIAL TESTING LABORATORY

EQUIPMENT FOR TESTING STRENGTH OF MATERIALS

The equipment is of a conveniently small size which reduces costs. This makes it possible for schools and colleges to buy complete sets of equipment instead of only being able to afford one or two items. Large number of students can thus follow courses which were previously only available to a privileged few.

Ref.No. Contents

MT3005 Twist and Bend Testing Machine.....3

MT3004-E Strain Gauge Bridge.....4

MT3012-E Fatigue Testing Machine.....5

MT3016 Impact Tester.....6

MT3017 Tensile and Brinell Testing Machine.....7

MT3047 Computer Measuring Device.....8

MT3007 Bending Test Set.....8

MT3018 Tensile Test Rods.....9

MT3019 Brinell Test Peices.....9

MT3037-2 Clamping Jaws for test of thim mateial.....9

MT3017 Compression Set and test peices.....9

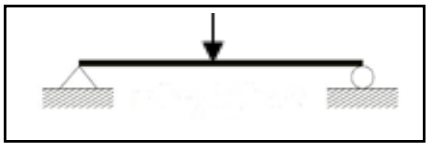
MTH600 Brinell Hardness Tester.....10

Guarantee & Terms

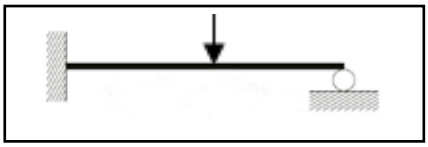
All overseas deliveries are dispatched in special, made to order wooden crates, extremely sturdy and damage resistant.
The guarantee is valid for 24 months from delivery and covers repair or exchange of parts, defective due to faulty design or workmanship at our factory. Detailed conditions of guarantee are specified in our Terms of Guarantee.
Spare parts for 2-5 years of normal operation can be offered on request.
Regular after-sales service is performed by the worldwide network of Terco representatives, along with the advice and support of our engineers.
Commissioning and training is normally offered separately. Special training can be arranged on request either in Sweden or on site.
Terco is ISO 9001 certified

Terco reserves the right to make changes in the design and modifications or improvements of the products at any time without incurring any obligations

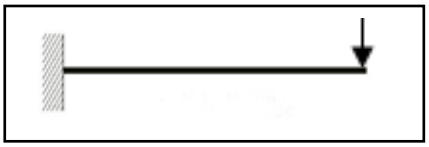
MT3005 Twist and Bend Testing Machine



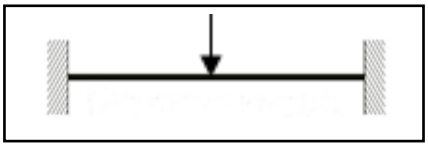
Freely supported in both ends



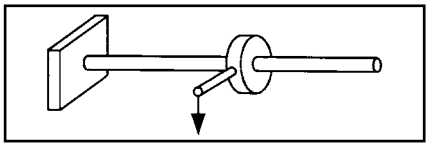
One end fixed and one end freely supported



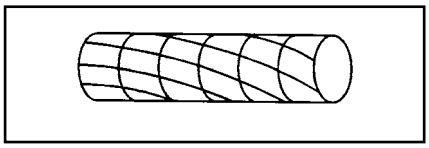
Freely supported in both ends



Both ends fixed



Twisting



Twist diagram

MT3005 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.

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.

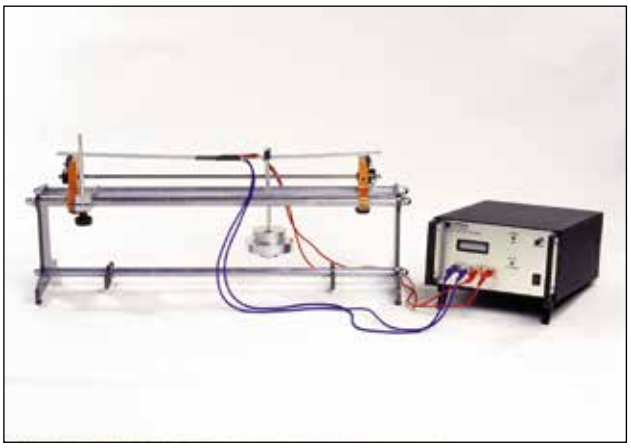
MT3005 comprises:
- Twist and Bend Testing Machine
- Two loading devices (0.25 Kg)
- Two 1 kg weights
- Four 0.5 kg weights
- One dial gauge
- Seven steel test pieces of rectangular cross-section
- One wood test piece of rectangular cross-section
- Three test pieces, diameter 8 mm, of resp. steel, aluminium, and brass
- Two end fixtures
- Laboratory manual

Technical data

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

MT3004-E Strain Gauge Bridge with PC Interface

MT3004-E Strain Gauge Bridge



MT3004-E connected to MT3005

MT3004-E is a measuring bridge for the study of deflection and load variations, suitable for use in combination with the Twist and Bend Testing Machine MT3005 and the test pieces of steel and aluminium. The two included test pieces are provided with two strain gauges (120 Ω) 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.

MT3004-E comprises
- Strain Gauge Bridge
- 2 test pieces with strain gauges (2 different steels)
- Connecting cables and contacts (4 mm)
- Manual
- Software

Technical data

Self zeroing	
Adjustable Gauge Factor value	(1.5 < K > 2.5)
Range	+/- 2000 microstrain
Linearity	0.2 %
Accuracy	1 %
Supply Voltage	230 V 50/60 Hz (MT3004-E)
	110 V 60 Hz (MT3004-E-116)
Dimensions	250 x 150 x 300 mm
Weight	2 Kg

MT3012-E 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.
MT3012-E provides a simple way of learning the effect of radius of fillet, surface smoothness, etc. on a material subjected to fluctuating flexural stresses.
The machine is delivered with interface to PC and Software.

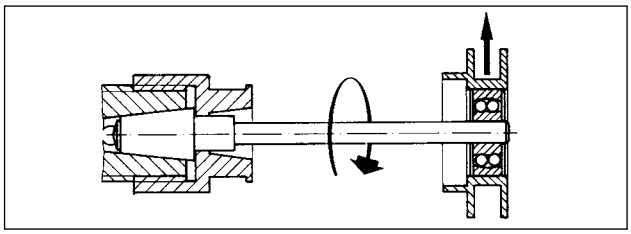
MT3012-E is driven by a 1-phase asynchronous motor. The number of load changes is read directly on the LCD-display as well as the applied force.
The tapered test pieces is attached to a very stable shaft in two spherical ball bearings.
The force is applied to the test piece with a spring and can be varied between 0 and 255 N
Test can be carried out with

a) Fixed applied force

b) Fixed deviation

By use of the front panel you can program the test to stop at certain preset values.
This ensure exact measurement and is of great advantage in experiments of a lengthy nature such as recording of a complete Wöhler curves.
By using the included software you can set all para-meters and start and stop the machine.
During the test the revolutions, force, limited force and real time diagram will be indicated on the screen.
The events will be recorded and can be printed.

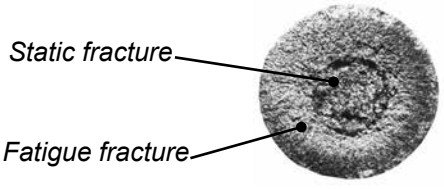
The machine can be used with or without PC.
MT3012-E has a micro-processor which, on the fracture of



Working principle

the test piece, automatically switch-off the voltage to the motor via a relay. This ensures exact measurement and is of great advantage in experiments of a lengthy nature, such as the recording of complete Wöhler curves.

- 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



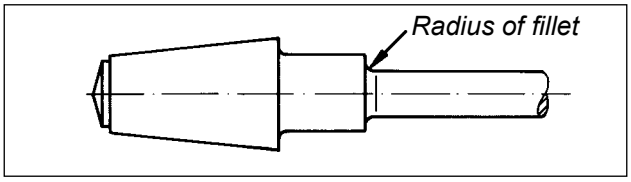
Examples of experiments

MT3012-E comprises

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

Test pieces steel	Qty	Radius of fillet	Surface smoothnes
1 (MT3026-1)	5	0.5 mm	4 µ
2 (MT3026-2)	5	2 mm	4 µ
3 (MT3026-3)	5	2 mm	25 µ

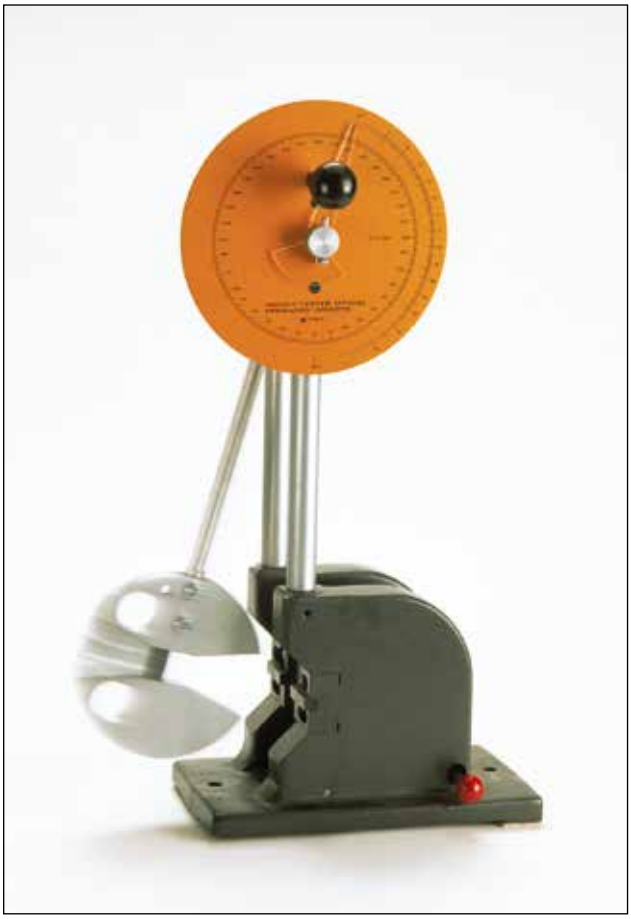
Optional:
Testpieces in aluminum and brass are available on request.



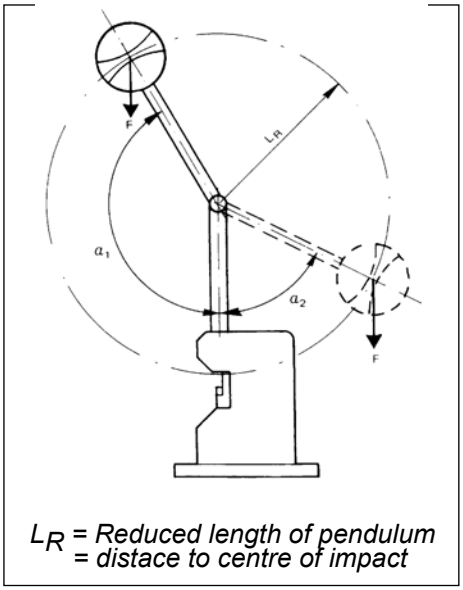
Technical data

Test piece diameter	8 mm
Max. load	255 N
Supply voltage 230V	50-60Hz (MT3012-E)
	110V 60Hz (MT3012-E-116)
Speed (approx)	3000 rpm resp. 3600 rpm
Dimension	980x280x460 mm
Weight	24 kg

MT3016 Impact Tester

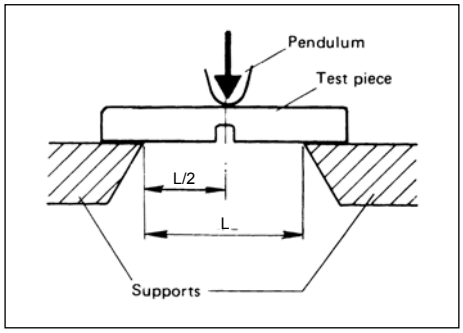


MT3016 Impact Tester



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

Impact strength



MT3016 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 MT3016 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

MT3016 comprises:
- Impact Tester
- 10 sets test pieces of 3 different steel qualities (Tot 30 pieces)
- Laboratory Manual

Test pieces for MT3016

Item no.	Impact Test Piece	Qty
MT3027-1	Construction Steel (red)	5
MT3027-2	Engineering Steel (yellow)	5
MT3027-3	Tooling Steel (green)	5

Technical data

Max. impact energy	15 joule (1 J= 1 Nm)
1 Scale graduation	0.1 joule
L_R	358 mm
Dimensions of test pieces	6x6x44 mm
Dimensions	170x290x615 mm
Weight	30 kg

MT3017 Tensile and Brinell Testing

MT3017 Tensile and Brinell Testing Machine

MT3017 Tensile and Brinell Testing Machine 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 MT3017 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 MT3017 are 5 mm in diameter with threaded ends. This makes them very easy to mount and also ensures reliable fastening.

The MT3017 can also be used for Brinell testing.
A Brinell kit MT3019-3017 and measuring magnifier are included. This machine may also be used for bending and buckling tests.

Tensil Rods holders are Incl. in MT3017

Technical data	
Maximum load	20 kN
Max movment of operating cylinder	Approx. 20mm
Dimensions	360x360x820 mm
Weight	24 kg

MT3017 Tensile and Brinell Testing Machine comprices:

- Tensile Equipment

MT3018 Test piece holders (standard model)
- MT3018-1, Tensile Test Rods, steel - 5 pcs
- MT3018-2, Tensile Test Rods, aluminium - 5 pcs
- MT3018-3, Tensile Test Rods, brass - 5 pcs
- MT3018-4, Tensile Test Rods, copper - 5 pcs

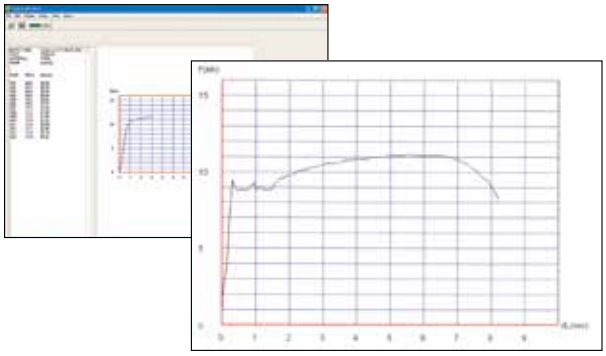
- Brinell Testing Set
- Steel ball intendor (10 mm)
- MT3019-1, Brinell Test Piece, steel - 5 pc
- MT3019-2, Brinell Test Piece, aluminium - 5 pc
- MT3019-3, Brinell Test Piece, brass - 5 pc
- MT3019-4, Brinell Test Piece, copper - 5 pc

- Laboartory Manual and - Tool Box containing Sliding Caliper and above test pieces

Optional Accessories or MT3017

MT3047 PC Measuring Device

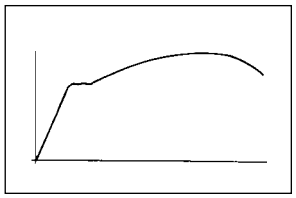
MT3017 with MT3047 adapted.



MT3047 is a kit of components designed to be adapted on the Terco Tensile Testing Machine MT3017. Together with a computer interface and dedicated software, (the same as for MT3037), 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 user friendly installation description is included.

MT3047 comprises:
- Pressure transducer
- Digital dial gauge
- Computer interface
- Software
- Mounting details incl. cables
- Manual
- Adapter 230 V (MT3047)
  or 110V (MT3047-116)

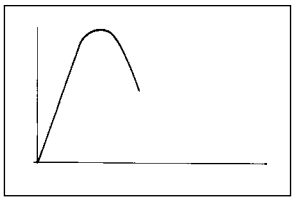
Tensile diagrams for different materials



Steel

Aluminium

Brass



Copper

MT3007 Bending Test Set (optional)

MT3007 Terco Bending Test Set is an easy to use kit for bending tests, and can be used together with our Tensile Testing Machines MT3017.
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 100 and 200 mm.
The test set comprises:
- Holders
- Test piece of steel, length 250 mm, dim. 6x25 mm
- Test piece of steel, length 250 mm, dim. 6x35 mm
- Test piece of steel, length 250 mm, dim. 8x25 mm
- Test piece of steel, length 250 mm, dim. 10x25 mm

Tensile Test pieces

Separate orders of Tensile Test Rods

- MT3018-1, Tensile Test Rods, steel - 5 pcs
- MT3018-2, Tensile Test Rods, aluminium - 5 pcs
- MT3018-3, Tensile Test Rods, brass - 5 pcs
- MT3018-4, Tensile Test Rods, copper - 5 pcs

(Standard Tensile holders are incl. in MT3017)

Sets of Tensile Test Roads

Brinell Test pieces

Separate orders of Tensile Test Piecses

- MT3019-1, Brinell Test Piece, steel - 5 pc
- MT3019-2, Brinell Test Piece, aluminium - 5 pc
- MT3019-3, Brinell Test Piece, brass - 5 pc
- MT3019-4, Brinell Test Piece, copper - 5 pc

(Standard Steel ball intendor 10 mm is incl in MT3017)

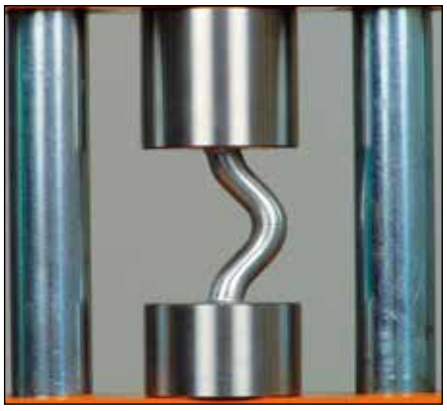
Brinell Test Piece after Brinell Indent

MT3037-2 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.

Test material is no included.

Technical data	
Maximum speciment thickness	2 mm
Max width of speciment	22 mm
Weight	1.5 kg



MT3037 Compression Test Set (optional)

- MT3037 Compression test holders incl. Test Rods below

Separate ordes of Compression Test Rods

- MT3017-51, 5 mm, steel - 5pcs
- MT3017-52, 5 mm, aluminium - 5pcs
- MT3017-53, 5 mm, brass - 5pcs
- MT3017-54, 5 mm, copper - 5pcs

MTH600 Brinell Hardness Tester

- Measuring the Brinell hardness of unquenched steels, cast iron, non-ferrous metals and soft bearing-alloys etc.
- High testing precision, extensive testing range, automatic load system
- High accuracy, wide measuring range.
- Automatic force loading.
- Standards conforming to: ASTM E-10, ISO 6506.2

Specifications	
Test force	1839N(187.5kgf), 2452N (250kgf), 7355N (750kgf), 9807N (1000kgf), 29420N (3000kgf)
Indenter ball diameter	2.5 mm, 5 mm and 10 mm
Test force dwell time	6~99s adjustable
Testing range	8~650HBW
Vertical testing space	Max. 230 mm (9")
Horzontal testing space	Max. 120 mm (4.7")
Power supply	220V/110V, 50~60Hz, 2A
Net weight	220 kg
Dimensions	730 x 230 x 890 mm (max)

MTH600 comprises:

• Main unit	1	• F 120mm round flat anvil	1
• Test bock 10/3000 incl. certificat	1	• Vee anvil	1
• 20X microscope	1	• Power supply cable	1
• F 10mm hardened alloy ball indenter	1	• Dust cover	1

Terco reserves the right to make changes in the design and modifications or improvements of the products at any time without incurring any obligations

ORDER DETAILS MATERIAL TESTING LABORATORY			
Item	**Description**	**Pcs**	**Page**
Twist and Bend Testing			
MT3005	Twist and Bend Test Machine Set	1	3
MT3004E	Strain Gauge Bridge, 220 V, 50 Hz	1	4
Fatique Testing			
MT3012E	Fatigue Testing Machine, 220 V, 50 Hz	1	5
MT3026-1	Fatigue Test Piece, (5 pcs), 0,5 mm/4u	1	5
MT3026-2	Fatigue Test Piece, (5 pcs), 2 mm/4u	1	5
MT3026-3	Fatigue Test Piece, (5 pcs), 2 mm/25u	1	5
Impact Testing			
MT3016	Impact Tester	1	6
MT3027-1	Impact testpiece (construction steel) 5 pcs	1	6
MT3027-2	Impact testpiece (engineering steel) 5 pcs	1	6
MT3027-3	Impact Test Piece (tooling steel) 5 pcs	1	6
Tensile and Brinell Testing			
MT3017	Tensile and Brinell Test Machine incl Standard holders, Box with Slide Caliper, 40 test peices in different material for Tensile and Brinell Testing	1	7
Optional accessories for MT3017			
MT3047	PC Measuring Device for MT 3017	1	8
MT3007	Bending Test Set for MT3017 incl. test peices	1	8
MT3037-2	Clamping Jaws for test of thin material (Material not incl.)	1	9
MT3037-3	Compression Test Set incl. Holders and Test Rods	1	9
Test pieces for MT3017			
MT3018-1	Tensile set 5 pcs / steel diam. 5 mm	1	9
MT3018-2	Tensile set 5 pcs/aluminium diam. 5 mm	1	9
MT3018-3	Tensile set 5 pcs / brass diam. 5 mm	1	9
MT3018-4	Tensile set 5 pcs / copper diam. 5 mm	1	9
MT3019-1	Brinell Test Piece steel 5 pcs	1	9
MT3019-2	Brinell Test Piece aluminium 5 pcs	1	9
MT3019-3	Brinell Test Piece m brass 5 pcs	1	9
MT3019-4	Brinell Test Piece copper 5 pcs	1	9
MT3017-51	Compression Test Rods 5 mm, steel 5 pcs	1	9
MT3017-52	Compression Test Rods 5 mm, aluminium, 5 pcs	1	9
MT3017-53	Compression Test Rods 5 mm, brass, 5 pcs	1	9
MT3017-54	Compression Test Rods 5 mm, copper, 5 pcs	1	9
MTH600	Brinell Hardness Tester	1	10

TERCO HEADOFFICE

Terco headoffice and factory outside Stockholm, Sweden

TERCO AB was founded in 1963 with the aim of producing and supplying practically oriented equipment for technical education.

TERCO develops, manufactures and markets advanced equipment and systems for technical education. TERCO is today represented in more than 50 countries world wide.

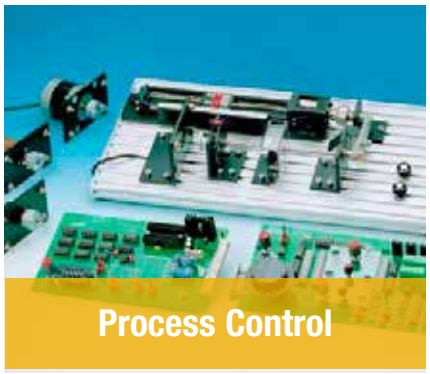
TRAINING FOR TOMORROW´S WORLD

Power Systems

High Voltage

Electrical Machines & Drives

Mechatronics



Process Control

Energy

Material Testing

Furniture & Power Distribution

Training

TERCO AB
P.O. Box 5014
SE-141 05 HUDDINGE
SWEDEN

Office/Works: Pyramidbacken 6
SE-141 75 KUNGENS KURVA
STOCKHOLM

Phone: +46 8 506 855 00
Fax +46 8 506 855 01
e-mail export@terco.se
www.terco.se

worlddidac member

SS-EN ISO 9001

2019-08-09_550