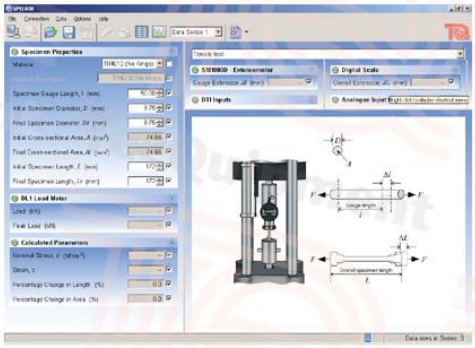
SM1000

Universal Testing Machine

A compact machine for compressive and tensile tests on different materials and structures

Works with VDAS®



Screenshot of the optional VDAS® software

Shown with the optional Hand Pump (SM1000b)

- Compact bench-mounting machine, ideal for classroom demonstrations and student experiments
- Finds tensile properties and compressive properties of many materials and structures
- Can connect to TecQuipment's Versatile Data Acquisition System (VDAS®) to log experiment results, and automatically calculate answers and create charts of your results
- Includes set of tensile test specimens of different grades of steel for comparison experiments
- TecQuipment can supply range of optional parts for experiments in beam deflection, hardness testing and spring rate and deflection
- Optional Extensometer (SM1000d) available for accurate tests to find Young's modulus of tensile specimen

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TecQuipment

SM1000 Universal Testing Machine

Description

The Universal Testing Machine is ideal for classroom demonstrations and for safe use by small groups of students. It fits onto any suitable strong desk or bench top, but TecQuipment offers the optional Support Table and Cupboard (SM1000a).

A steel frame with four columns supports a hydraulic ram. The ram pushes up a loading platform. The area above the loading platform is for compression tests on a wide range of materials such as wood, brick and mortar. The space below the platform is for tensile tests.

A high-impact strength clear-plastic guard protects the user during tests.

During tests, force sensors measure the load applied by the ram. A digital load meter shows the real-time force and stores the peak force. A digital displacement indicator measures and displays the vertical movement of the loading platform or part of the structure under test.

Students use the force and the dimensions of the part under test to find the applied stress. They also use the vertical displacement to find the strain.

For accurate measurements of the small changes in length of a specimen tested in its elastic region, TecQuipment offers the optional Extensometer (SM1000d). Students use this to find the Young's modulus of a tensile test specimen.

Students can use the Universal Testing Machine to test many materials, engineering parts and structures, but TecQuipment also offers optional parts for the machine. These allow students to do Brinell hardness tests on materials, and tests on coil springs, leaf springs and beams.

Included with the Universal Testing Machine is a set of different grade steel tensile test specimens. These allow students to compare the tensile qualities of steel in its 'as drawn' state and 'normalised' steel. You can order extra specimens, and the user guide includes a diagram to help you create your own tensile test specimens from suitable materials.

TecQuipment offers a choice of pumps to force oil into the ram: either the Hand Pump (SM1000b) or the Motorised Pump (SM1000c). The hand pump bolts to the bottom of the Universal Testing Machine. The motorised pump includes a connection to a safety interlock circuit on the Universal Testing Machine.

For quick and reliable tests, TecQuipment can supply the optional Versatile Data Acquisition System (VDAS®). This gives accurate real-time data capture, monitoring and display, calculation and charting of all important readings on a computer (computer not included).eadings on a computer. The computer is not supplied.

Standard Features

- Supplied with comprehensive user guide
- Two-year warranty
- Manufactured in accordance with the latest European Union directives

Experiments

- Tensile tests on different materials

When used with the optional ancillaries:

- Brinell hardness tests
- Deflection of a coil spring
- Deflection of a leaf spring
- Deflection of beams

Essential Services

Bench space needed:
1.2 m x 800 mm

Electrical supply (SM1000):
Single Phase 100 VAC to 230 VAC
50 Hz to 60 Hz

Electrical supply – Optional Motorised Pump (SM1000c):

- 380/440 VAC, three-phase, 50 Hz

  or

- 220/240 VAC, three-phase, 60 Hz

  State your needs when you order.

Operating Conditions

Operating environment:
Laboratory environment

Storage temperature range:
–25°C to +55°C (when packed for transport)

Operating temperature range:
+5°C to +40°C

Operating relative humidity range:
80% at temperatures < 31°C decreasing linearly to 50% at 40°C

Sound Levels

- Universal Testing Machine: Less than 70 dB(A)
- Optional motorised pump: 75 dB(A) at operator's ear level

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Essential Ancillaries

- Hand-Operated Pump (SM1000b)

  or

- Motorised Pump (SM1000c)

Recommended Ancillaries

- Bench-mounted version of the Versatile Data Acquisition System (VDAS-B)
- Support Table and Cupboard (SM1000a) – A steel-frame table with a pre-drilled work-top to accept the Universal Testing Machine. Includes a cupboard underneath.
- Extensometer (SM1000d) – A precision sliding gauge with a digital indicator

Extensometer (SM1000d)

- Brinell Indenter (SM1000e) – A hardened steel ball indenter in a holder. Includes a magnifying glass with a built-in measurement scale.

Brinell Indenter (SM1000e)

- Coil Spring Attachment (SM1000f) – A strong compression spring with two mounting bosses to fit safely in the Universal Testing Machine.

Coil Spring Attachment (SM1000f)

- Beam and Leaf Spring (SM1000g) – Two beams (one solid and one channel section) and one leaf spring. Includes a large support beam to support the test beams and leaf spring.
- 'Square-Shouldered' Tensile Test Specimens – Choice of three different grades of steel tensile test specimens that fit in the Universal Testing Machine. Supplied singly.

Tensile Test Specimens

Beam and Leaf Spring (SM1000g)

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Specification

Universal Testing Machine

Nett dimensions and weight:
800 mm x 800 mm x 1500 mm maximum height and 140 kg

Packed dimensions and weight:
1 m^3 and 220 kg

Maximum load:
100 kN (10 tonne)

Maximum distance between compression platens:
220 mm

Tensile test specimens:
- 2 x TH4010 75A 0.1% carbon steel, as drawn
- 1 x TH4015 75AN 0.1% carbon steel, normalised

Optional Support Table and Cupboard (SM1000a)

Nett dimensions:
1230 mm x 750 mm x 980 mm high

Optional Extensometer (SM1000d)

Gauge length:
50 mm

Optional Brinell Indenter (SM1000e)

Indenter ball:
Hardened steel, 10 mm diameter

Optional Coil Spring Attachment (SM1000f)

Nominal dimensions:
Length 135 mm, wire diameter 14.3 mm

Four active coils, spring rate 173 N/mm

Optional Beam and Leaf Spring (SM1000g)
- 1 x aluminium channel-section beam
  51 mm x 51 mm x 6.5 mm x 860 mm
- 1 x solid steel beam
  25 mm x 13 mm x 560 mm
- 1 x leaf spring with four leaves and bearings at each end
- 1 x support beam with movable supports
- 1 x datum beam

Optional 'Square Shouldered' Tensile Test Specimens
TH4010 0.1% carbon steel, as drawn

TH4015 0.1% carbon steel, normalised

TH4035 0.4% carbon steel, normalised

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