

**MF40**

## Materials Laboratory with Data Capture

***A hydraulic machine with electronic instruments and software. It tests the hardness and tensile properties of materials.***



Screenshots of the software supplied with the MF40

- Ideal for classroom demonstrations and for use by small groups of students
- For Brinell Hardness tests and tensile tests of materials
- Includes an Extensometer for accurate tensile test results
- Electronic instruments with digital displays for easy use – includes a ‘peak hold’ function to store the maximum force (load) during a test
- Supplied with a set of tensile test specimens - additional test specimens available separately
- Supports all teaching levels up to and including first year university courses
- Includes software to automatically record results and produce charts (you need a suitable computer – not supplied)

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
- **T** +44 115 972 2611 • **F** +44 115 973 1520 • **E** info@tecquipment.com • **W** www.tecquipment.com
- An ISO 9001 certified company

# MF40

# Materials Laboratory with Data Capture

## Description

A hydraulic tensile and Brinell hardness testing machine. The machine tests any suitably shaped specimens of various materials. The material must not exceed the maximum strength or hardness limits (see 'specifications'). TecEquipment also supply additional low-cost test specimens (available separately).

The main parts of the equipment are:

- A load frame
- A display unit with a digital display of force (load)
- A ball indenter for Brinell hardness tests.
- An extensometer with a digital display for tensile tests

The load frame bolts to a bench (template included). To apply loads, students pump a handle connected to a hydraulic ram.

The display unit shows force and works as an interface to send data to a suitable computer. The extensometer has a digital display of extension and connects to the display unit for data capture.

Included is TecEquipment's MF40 software to allow students to use the equipment with a computer (computer not included). The software records the data and produces detailed graphs of force against elongation and stress against strain.

Typically students will work in small groups, with one student working the hydraulic ram, while others note readings or use the software.

To do a hardness test, students put a hardness specimen on a platen and lock a guard in position. They apply a suitable load with the ball indenter and measure the impression in the specimen. They then use an equation to calculate Brinell hardness.

To do a tensile test, students fit a specimen to the machine, attach the extensometer to the specimen, and zero the display unit and extensometer. They then lock a guard and apply loads, taking various readings, until the specimen breaks. Students use the results to find the ultimate tensile strength, the proof stress and Young's modulus of the material.

The Materials Laboratory comes with a teacher guide that shows experiment methods, information, references and tips. A student guide shows students how to do the experiments.

## Standard Features

- Supplied with comprehensive user guides (student guide and teacher guide)
- Two-year warranty
- Manufactured in accordance with the latest European Union directives

## Experiments

- Tensile testing to destruction and Brinell hardness testing of various specimens
- Modulus of elasticity
- Yield stress
- Ultimate tensile stress
- Percentage elongation
- Brinell hardness test and hardness number derivation

## Recommended Ancillaries

- Computer (not supplied by TecEquipment – see 'specifications' for details)
- Additional tensile test specimens of different materials:
  - ML1MS – Mild Steel
  - ML2CS – Carbon Steel
  - ML3SS – Stainless Steel
  - ML4AL – Aluminium
  - ML5BR – Brass
 See separate specimens datasheets for full details.
- Hardness test specimens of different materials:
  - HTPAL – Aluminium
  - HTPBR – Brass
  - HTPMS – Mild Steel
  - HTPNY – Nylon
 See separate specimens datasheets for full details.

## Essential Services

*Electrical supply:*

90 VAC to 264 VAC 50 Hz to 60 Hz at 1 A

## 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

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
- **T** +44 115 972 2611 • **F** +44 115 973 1520 • **E** info@tecquipment.com • **W** www.tecquipment.com
- An ISO 9001 certified company

# MF40

# Materials Laboratory with Data Capture

## Specifications

Packed dimensions and weight: 0.073 m<sup>3</sup> and 35 kg

- Minimum bench thickness to mount the machine: 19 mm
- Maximum machine capacity: 40 kN (4 tonne)
- Extensometer: Gauge length 50 mm, maximum indicator travel 8 mm

*Tensile specimens (five supplied):*

- Dimensions: total specimen length 210 mm, test length 77 mm and 6 mm outside diameter. Secured by threaded ends. Material: mild steel.
- Maximum allowable ultimate tensile strength: 850 MPa

*Hardness specimens (not supplied):*

- Nominal dimensions: 25 mm diameter, 15 mm thick
- Maximum allowable hardness: 450 BHN

*Computer specifications needed for the MF40 software:*

- Microsoft® Windows® 2000, XP, Vista or Windows® 7 operating systems
- Monitor that works with at least 800 x 600 resolution
- CD-ROM drive
- A spare USB port
- 20 MB of hard disc space

- TecEquipment Ltd, Bonsall Street, Long Eaton, Nottingham NG10 2AN, UK
- **T** +44 115 972 2611 • **F** +44 115 973 1520 • **E** info@tecequipment.com • **W** www.tecequipment.com
- An ISO 9001 certified company