

Universal Testing Machine

HSM58



Description

The HSM58 is a modular, flexible, compact, safe, materials tester allowing students to conduct up to nine experiments on nine different material types.

The results of these experiments allow students to gain a thorough understanding of materials properties and how the performance of these effects design.

The fully enclosed unit allows safe 360° viewing maximising visibility for large class sizes.

Learning Capabilities – includes optional extras

- Tensile and compression testing.
- Recording of stress-strain diagrams.
- Modulus of elasticity testing.
- Percentage elongation.
- Shear (unsymmetrical, symmetrical shear both supported and unsupported).
- Deep draw testing.
- Three-point bending.
- Hardness testing.

Related Laws/Study Areas

- **YM** Young's Modulus
- **HL** Hooke's Law
- **PR** Poisson's Ratio
- **ME** Modulus of Elasticity
- **SM** Shear Modulus
- **MH** Material Hardness (Brinell Method)
- **BB** Beam Bending Theory
- **MI** Planar Moment of Inertia
- **DD** Deep Drawing

Features

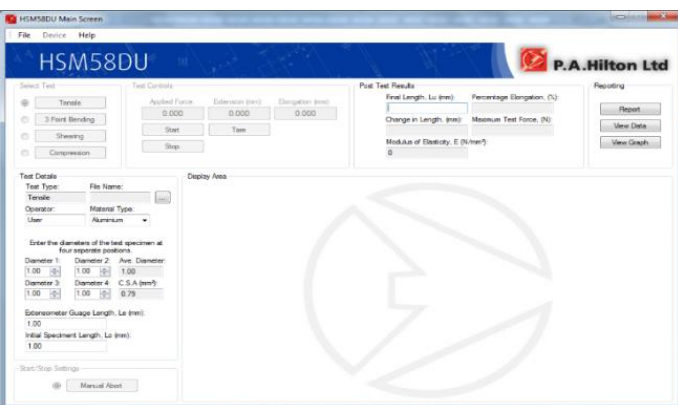
- Apparatus fully enclosed behind safety guard.
- Interface and Software supplied as standard.
- Compressive and Tensile Testing as standard.
- Supplied with Tensile Specimens as standard.
- Tensile Specimen Elongation measured on actual specimen for increased accuracy.
- 100mm mechanical stroke.
- 6 optional experiments available.
- Replacement test specimens available.

HSM58 – Base Unit YM PR ME



The HSM58 base unit is supplied with the following items that allow for the study of compression and tensile experiments:

- Main base rated to 35kN breaking force.
- 360° Safety Guard.
- Data Acquisition System.
 - The system displays and captures data relating to elongation, extension and applied force.
- 2 x Tensile Grips.
- 2 x Compression Plates
- 1 x Linear Displacement Transducer.
- 1 x Electronic Force Sensor.
- 40 x Tensile Test Specimens (Aluminium, Brass, Steel & Titanium).



Experimental Capabilities

1. Material Tensile Test, with supplied samples.
2. Material Compression Test, with supplied samples.
3. A Base testing unit for a range of other options.

Technical Specification – HSM58 only

- Fully enclosed safety guard for operator safety.
- Sturdy ground steel pillars – for durability and repeatability.
- Utilises linear slide bearings – for ease of use.
- Digital Extensometer accurate to 3 decimal places.
- Fixing and accessories designed to x 2.5 factor of safety.
- 7 accessory items available.
- Ear Defenders.
- Safety Glasses.
- Basic Maintenance Kit.
- Instruction Manual including example experiments and results.

Application: Material selection and production quality control

HSM58B– Brinell Hardness Test Set (optional extra) MH



Brinell type indenter attachment to the base unit to allow the testing of various samples for material hardness.

- Test sphere - diameter 10mm
- Set of 16 Hardness specimens
- Dimensions: 30(L) x 30(W) x 10(H) mm
- 4 x Steel (DIN:9SMn28BS970:230M07)
- 4 x Aluminium (DIN: AlMgSi0.5F22, 6063)
- 4 x Copper (DIN:E-Cu)
- 4 x brass (DIN:CuZn39Pb3; CZ121Pb3)

Experimental Capabilities

1. To measure the Brinell Hardness value of different materials using a test sphere of known diameter
2. To measure the indentation of the test sphere and the accuracy involved.

Example Applications: Material selection and production quality control

HSM58C – Bending Test Set (optional extra) MI BB



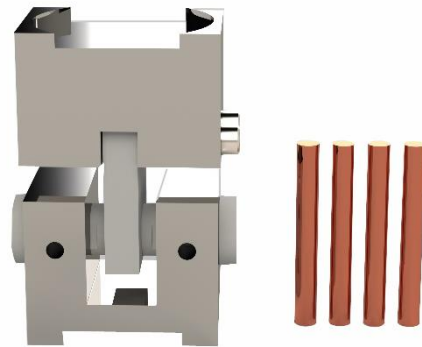
- Elastic deformation of bending bars subject to a point force
- Test bars to be placed on two sliding bearings for span adjustment
- Test bars to be loaded with a point force generated by the tester
- Test bars made of:
 - Flat section steel (EN1A), cross-section 38.1mm x12.7mm, length 320mm (nominal)
 - Flat section steel (EN1A), cross-section 19.05mm x12.7mm, length 320mm (nominal)
 - Flat section aluminium (6082), cross-section 38.1mm x12.7mm, length 320mm (nominal)
 - Flat section aluminium (6082), cross-section 19.05mm x12.7mm, length 320mm (nominal)
 - Flat section brass (CZ121), cross-section 19.05mm x12.7mm, length 320mm (nominal)
- Span adjustable, width 100...300mm

Experimental Capabilities

1. Bending test - To demonstrate the relationship between the load on a bending bar and its elastic deformation.
 - a. The influence of the modulus of elasticity
 - b. The planar moment of inertia

Example Applications: Roof joists, Bridges

HSM58E– Symmetrical Shearing Test Set (optional extra) SM



- Symmetrical Shear Testing with lower support block and upper shear anvil
- 5 x test specimens made of electrical grade copper, Ø6.35mm x 54mm long
- Shearing anvil and inserts in support block made of hardened steel

Experimental Capabilities

1. Shear Strength for a double blade device

Example Applications: Fixings and Fasteners

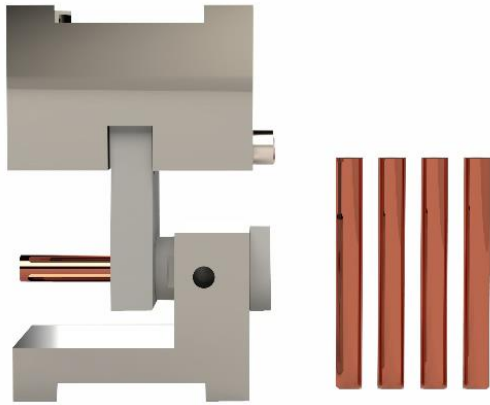
HSM58F – Brinell Microscope



Representative image, actual product may vary in design.

- The Brinell Microscope is a small microscope with a detachable light source for measuring small indentations within the test specimens.
- The light source creates illumination of the surface of the test specimen thus ensuring visibility of any indentations.

HSM58G – Asymmetrical Shearing Test Set (optional extra) SM



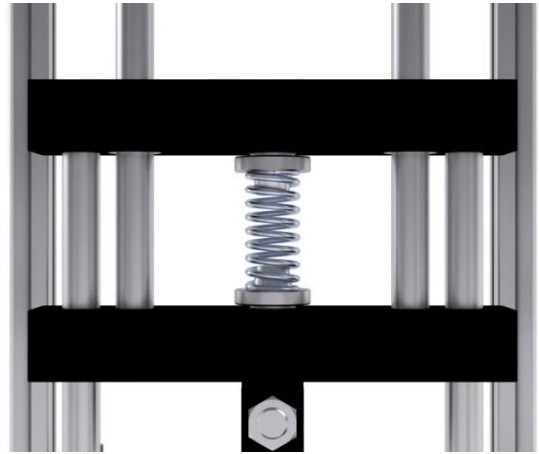
- Asymmetrical Shear Testing with lower support block and upper shear anvil
- 5 test specimens made of electrical grade copper, Ø6.35mm x 54mm long
- Shearing anvil and inserts in support block made of hardened steel

Experimental Capabilities

1. Shear Strength for a single blade device

Example Applications: Fixings and Fasteners

HSM58I – Spring Testing Test set (optional extra) HL



- Characteristic curves of springs with various spring stiffness's
- Mounted within compression area of apparatus
- 3 x helical springs
- 2 x disc springs

Experimental Capabilities

1. To measure the stiffness of a spring and compare it with the theoretical value and manufactured tabulated values.
2. To note how the stiffness is affected by the physical dimensions of the springs.
3. To see how different spring arrangements can affect forces required for the same amount of movement.

Example Applications: Suspension systems, machine valvetrains

HSM58P– Deep Draw Test Set (optional extra) DD



- Also known as cupping
- Includes Punch, die and Die holder
- Punch and specimens comply with BS EN ISO 20482:2003
- 10 x test specimens made of aluminium (1100) , Ø90mm x 1mm thickness
- 10 x test specimens made of brass (CZ121) , Ø90mm x 1mm thickness

- *Example Applications: Manufacture of drinks cans.*


Experimental Capabilities

1. To obtain a value for the samples so that a comparison can be made to determine the suitability of the sample for the drawing process.
2. To use the Erichsen cupping index value as well as other results obtained from the experiment to compare samples and their properties.

HSM58 Operational Conditions

- Storage temperature: -10°C to +70°C
- Operating temperature range: +10°C to +50°C
- Operating relative humidity range: 0 to 95%, non-condensing

Minimum System Require for HSM58 Software

- Intel Pentium 3 or equivalent processor > 800MHz processor speed
-  Microsoft Windows WIN7 operating system and above (end user must have operating system CD for XP and below)
- VGA Monitor capable of at least 16-bit colour at 800 x 600 resolution
- 150Mb space available on hard drive
- USB1.1 and USB2 for data acquisition connection.
- Powered USB port(s) if possible

Weights & Dimensions (approx.) – HSM58 only

- Gross Packed Weight – 140kg
- Gross Packed Dimensions – 790mm x 790mm x 156mm





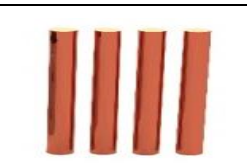
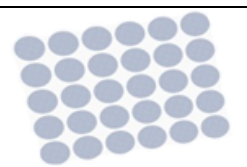
What's in the Box? – HSM58 only

- 1 x Base unit
 - Tensile and Compression Grips
 - Levelling Feet
 - Ear Defender & Safety Glasses
 - 40 x Tensile Specimens (Aluminium, Brass, Steel & Titanium)
 - 8 x Compression Specimens
 - 1 x Linear Potentiometer
 - 1 x Data Acquisition System
 - 1 x Set of Tools
 - 2 Year Spares

Order Code

Code	Description
HSM58	Base Unit
HSM58B	Brinell Hardness Test Set <ul style="list-style-type: none"> • Test sphere - diameter 10mm • Set of 16 Hardness specimens • Dimensions 30(L) x 30(W) x 10(H) mm • 4 x steel (DIN:9SMn28; BS970:230M07) • 4 x aluminium (DIN: AlMgSi0.5F22, 6063) • 4 x copper (DIN:E-Cu) • 4 x brass (DIN:CuZn39Pb3; CZ121Pb3)
HSM58C	Bending Test Set <ul style="list-style-type: none"> • Test bars made of: • Flat section steel (EN1A), cross-section 38.1mm x12.7mm, length 320mm (nominal) • Flat section steel (EN1A), cross-section 19.05mm x12.7mm, length 320mm (nominal) • Flat section aluminium (6082), cross-section 38.1mm x12.7mm, length 320mm (nominal) • Flat section aluminium (6082), cross-section 19.05mm x12.7mm, length 320mm (nominal) • Flat section brass (CZ121), cross-section 19.05mm x12.7mm, length 320mm (nominal)
HSM58E	Symmetrical Shearing Test Set <ul style="list-style-type: none"> • 5 test specimens made of electrical grade copper, Ø6.35mm x 54mm long • Shearing anvil and inserts in support block made of hardened steel
HSM58F	Measuring Magnifier for Brinell
HSM58G	Asymmetrical Shearing Test Set <ul style="list-style-type: none"> • 5 test specimens made of electrical grade copper, Ø6.35mm x 54mm long • Shearing anvil and inserts in support block made of hardened steel
HSM58I	Spring Test Set <ul style="list-style-type: none"> • Helical and disc springs • 3 x helical springs • 2 x disc springs • Characteristic curves of springs with various spring stiffness's • Mounted within compression area of apparatus
HSM58P	Deep Draw Test Set <ul style="list-style-type: none"> • Also known as cupping • Includes Punch, die and Die holder • Punch and specimens comply with BS EN ISO 20482:2003 • 10 test specimens made of aluminium , Ø90mm x 1mm thickness • 10 test specimens made of brass , Ø90mm x 1mm thickness

Spare Specimens Ordering Matrix

	Sample Material	Steel	Aluminium	Brass	Titanium	Copper	Wood	Plastic
Sample Type								
Tension		Unit Code: HSM58A Quantity: 10	Unit Code: HSM58A Quantity: 10	Unit Code: HSM58A Quantity: 10	Unit Code: HSM58A Quantity: 10	N/A	N/A	N/A
Compression		N/A	N/A	N/A	N/A	N/A	Unit Code: HSM58L Quantity: 8	Unit Code: HSM58L Quantity: 8
Hardness		Unit Code: HSM58U Quantity: 4	Unit Code: HSM58U Quantity: 4	Unit Code: HSM58U Quantity: 4	N/A	Unit Code: HSM58U Quantity: 4	N/A	N/A
Bending		Unit Code: HSM58M Quantity: 2 of different thicknesses	Unit Code: HSM58M Quantity: 2 of different thicknesses	Unit Code: HSM58M Quantity: 1	N/A	N/A	N/A	N/A
Symmetrical and Un-symmetrical Shear		N/A	N/A	N/A	N/A	Unit Code: HSM58H Quantity: 16	N/A	N/A
Deep Draw		N/A	Unit Code: HSM58Q Quantity: 30 Of 4 different thicknesses	N/A	N/A	N/A	N/A	N/A

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COUNTRY OF ORIGIN – UK

WARRANTY PERIOD – 2 YEAR