

FH Series

Hardness Testing Machines

FH Series THE EQUIPMENT

ROCKWELL HARDNESS TESTERS



FH-30 Series
to 187.5kg

FH-31 Series
to 250kg

FH-1 Series
to 250kg

FH-2 Series
to 250kg

FH-7 Series
to 250kg

FH-8 Series
to 3000kg

FH-10 Series
to 250kg

FH-11 Series
to 3000kg

FH-12 Series
to 3000kg

VICKERS HARDNESS TESTERS



FH-4 Series
to 2kg

FH-5 Series
to 62.5kg

FH-2 Series
to 250kg

FH-6 Series
to 250kg

FH-7 Series
to 250kg

FH-8 Series
to 3000kg

FH-10 Series
to 250kg

FH-11 Series
to 3000kg

FH-12 Series
to 3000kg

BRINELL HARDNESS TESTERS



FH-30 Series
to 187.5kg

FH-31 Series
to 250kg

FH-1 Series
to 250kg

FH-2 Series
to 250kg

FH-8 Series
to 3000kg

FH-9 Series
to 3000kg

FH-10 Series
to 250kg

FH-11 Series
to 3000kg

FH-12 Series
to 3000kg

UNIVERSAL HARDNESS TESTERS



FH-1 Series
to 250kg

FH-2 Series
to 250kg

FH-7 Series
to 250kg

FH-8 Series
to 3000kg

FH-10 Series
to 250kg

FH-11 Series
to 3000kg

FH-12 Series
to 3000kg



HARDNESS

Hardness is the property of a material enabling it to resist plastic deformation, usually by penetration of another object. The term may also refer to stiffness, temper or resistance to bending, scratching, abrasion or cutting. Scientists and journalists often confuse stiffness with hardness. For example, the element Osmium is stiffer than, but not as hard as, diamond.

In materials science there are three principal operational definitions of hardness:

- **Scratch hardness** Resistance to fracture or plastic (permanent) deformation due to friction from a sharp object.
- **Indentation hardness** Resistance to plastic (permanent) deformation due to a constant load from a sharp object.
- **Rebound hardness** Height or speed of the bounce of an object dropped on the material, related to elasticity.

Hardness is not an intrinsic material property. There are no precise definitions in terms of fundamental units of mass, length and time. A hardness property value is the result of a

defined measurement procedure.

Hardness of materials has long been assessed by resistance to scratching or cutting. An example would be that material B scratches material C, but not material A. Alternatively, material A scratches material B slightly and scratches material C heavily.

The usual method of obtaining a hardness value is to measure the depth or area of an indentation left by an indenter of a specific shape, with a specific force applied for a specific time.

There are several principal standard test methods to express the relationship between hardness and the size of the impression or the rebound velocity on specific materials. Vickers, Rockwell, Brinell and Leeb are the most common scales. For practical and calibration reasons, each of these methods is divided into a range of scales, defined by a combination of applied load and indenter geometry or, in the case of the rebound method, by the weight of the impact body.

MOST COMMON HARDNESS TESTS

Rockwell (HR scales)

Indenting the test material with a diamond cone (HRC) or hardened (tungsten) steel ball indenter (HRB etc.). Applying a preload of 10kgf first and a main test force of 60, 100 or 150kgf.

Rockwell Superficial (HR scales)

Indenting the test material with a diamond cone or hardened (tungsten) steel ball indenter, depending on the scale preliminary set. The Superficial Rockwell scales use lower force and shallower impressions on brittle and very thin materials. Applying a preload of 3kgf first and a main test force of 15, 30 or 45kgf.

Vickers (HV)

Indenting the test material with a diamond indenter, in the form of an upside down perfect pyramid with a square base and an angle of 136° between opposite faces, subjected to test forces of 1 to 120kgf. A microscope or USB camera visualizes and measures the indentation.

Micro-Vickers (HV)

Indenting the test material with a diamond indenter, in the form of an upside down perfect pyramid with a square base and an angle of 136° between opposite faces, subjected to test forces usually not exceeding 1kgf. A precision microscope or high resolution USB camera is used to visualize and measure the indentations. Magnifications up to 600x are most common, but magnifications up to 1000x are becoming popular as well.

Knoop (HK)

Indenting the test material with an 'elongated' diamond pyramid, subjected to test forces usually not exceeding 1kgf. A precision microscope or high resolution USB camera visualizes and measures the indentations. Magnifications up to 600x are most common.

Brinell (HB)

Indenting the tested material with a 1, 2.5, 5 or 10mm diameter hardened steel or carbide ball subjected to a load/force ranging from 1 to 3000kg. A microscope or USB camera is used to visualize and measure the rather large indentations.

Leeb (HL) (rebound method)

Portable hardness testing. An impact body with a spherical tungsten carbide tip is impelled onto the test surface by spring force. The impact creates a plastic deformation of the surface – an indentation – that causes the impact body to lose part of its original speed (or energy). The softer the material is, the more speed will be lost at rebound of the impact body. Applicable to a wide variety of components, minimum test requirements should be obeyed.

Ultrasonic (UCI)

Portable hardness testing. A Vickers shaped diamond indenter fixed on a vibrating rod that presses on the test surface with a specific force and then measures its hardness by applying ultrasonic vibrations and analyzing its damping effect. Commonly used for small, thin components that cannot be tested by rebound hardness testers.

Shore (HS scales)

Portable (rubber/plastics) hardness testing. Hardness is determined by pressing the indenter foot firmly onto the sample. The indenter is connected to a linear measuring device and measures the indent depth, which is then converted through a mechanical or an electronic system to the Shore value. The deeper the indent, the softer the material.

IRHD

Measures the indentation resistance of elastomeric or rubber materials based on the depth of penetration of a ball indenter. An initial contact force is applied to a 1, 2.5 or 5mm ball indenter and penetration is set to zero. The force is increased to a specified total load and the depth of penetration is measured. The IRHD value is related to the depth of indenter penetration. Commonly used for testing small parts and O-rings.

Webster

Portable hardness testing. The object to be tested is placed between the anvil and the penetrator. Pressure is then applied to the handles until 'bottom' is felt, at which time the dial indicator is read. There are different types of indenters and different force settings for different materials.

LESS COMMON SCALES

- HM – Martens (formerly HU – universal hardness).
- H – ball indentation hardness.
- HVT – modified Vickers method, depth measurement.
- HBT – modified Brinell method, depth measurement.

FH-30 SERIES



Model FH-30

SUPPLIED AS STANDARD

- V-anvil 40mm (8-55mm range)
- Flat anvil 60mm (2.36in)
- Round testing table 150mm diameter
- Brinell microscope for FH30-1
- Power cable
- Four adjustable feet
- Mouse and keyboard
- Certificate
- Operation manual

FH-30 Series features

- Load cell-based, closed loop operation.
- Advanced user interface.
- Automatic testing procedure.
- Conversion to Brinell, Vickers, Leeb and UTM hardness scales.
- Shape correction settings for curved surfaces.
- Scale resolution (depth) of 0.1 micron.
- Database for test programs.
- Large workpiece accommodation.
- USB output.

MODEL FH-30-2

ROCKWELL/SUPERFICIAL ROCKWELL

- Scales:
 - Rockwell – A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
 - Superficial Rockwell – 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Load range: 2.5 to 150kgf (330lbf)

MODEL FH-30-3

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL

- Scales:
 - Rockwell – A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
 - Superficial Rockwell – 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
 - Brinell – HB1/1, 2.5, 5, 10, 30kgf; HB2.5/6.25, 15.625, 31.25, 62.5, 187.5kgf; HB5/25, 62.5, 125kgf; HB10/100kgf
- Load range: 2.5 to 187.5kgf (413.36lbf)

OPTIONAL ACCESSORIES

- Certified hardness test blocks
- Certified indenters
- Long indenters
- Goose neck indenter holder
- Large testing table 300 x 200mm (11.81 x 7.87in) with T-slot
- Custom testing tables
- Precision vises, V-blocks and special clamps

FH-31 SERIES



Model FH-31-0

SUPPLIED AS STANDARD

- V-anvil
- Flat anvil 60mm (2.36in)
- Round testing table 150mm diameter
- Brinell microscope for FH31-1
- Power cable
- Four adjustable feet
- Mouse and keyboard
- Certificate
- Operation manual

FH-31 Series features

- Load cell-based, closed loop operation.
- Advanced user interface.
- Automatic testing procedure.
- Conversion to Brinell, Vickers, Leeb and UTM hardness scales.
- Shape correction settings for curved surfaces.
- Scale resolution (depth) of 0.1 micron.
- Database for test programs.
- Large workpiece accommodation.
- USB output.

MODEL FH-31-0

ROCKWELL/SUPERFICIAL ROCKWELL

- Scales:
 - Rockwell – A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
 - Superficial Rockwell – 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Load range: 2.5 to 150kgf (330lbf)

MODEL FH-31-1

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL

- Scales:
 - Rockwell – A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
 - Superficial Rockwell – 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
 - Brinell – HB1/1, 2.5, 5, 10, 30kgf; HB2.5/6.25, 15.625, 31.25, 62.5, 187.5kgf; HB5/25, 62.5, 125kgf; HB10/100kgf
- Load range: 2.5 to 187.5kgf (413.36lbf)

OPTIONAL ACCESSORIES

- Certified hardness test blocks
- Certified indenters
- Long indenters
- Goose neck indenter holder
- Custom testing tables
- Precision vises, V-blocks and special clamps

FH-1 SERIES



Model FH-1-4



FH-1 Series features

- Load cell-based, closed loop operation.
- Advanced user interface.
- Automatic testing procedure.
- Conversion to all other hardness scales.
- Convex and concave test modes.
- Database for test programs.
- Large workpiece accommodation.
- USB output.

MODEL FH-1-4

ROCKWELL/SUPERFICIAL ROCKWELL

- Scales:
 - Rockwell – A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
 - Superficial Rockwell – 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Load range: 2.5 to 150kgf (330lbf)

MODEL FH-1-5

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL

- Scales:
 - Rockwell – A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
 - Superficial Rockwell – 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
 - Brinell – HB1/1, 2.5, 5, 10, 30kgf; HB2.5/6.25, 15.625, 31.25, 62.5, 187.5kgf; HB5/25, 62.5, 125, 250kgf; HB10/100, 250kgf
- Load range: 1 to 250kgf (2.2 to 550lbf)
- Brinell microscope with LED ring light

SUPPLIED AS STANDARD

- Brinell palm scanner with LED backlight for dark field illumination (FH-1-5)
- V-anvil, hardened, 80mm (3.15in)
- Flat anvil, hardened, 60mm (2.36in)
- Fuse 3A slow (2 pcs)
- Power cable
- Certificate
- Installation and user manual

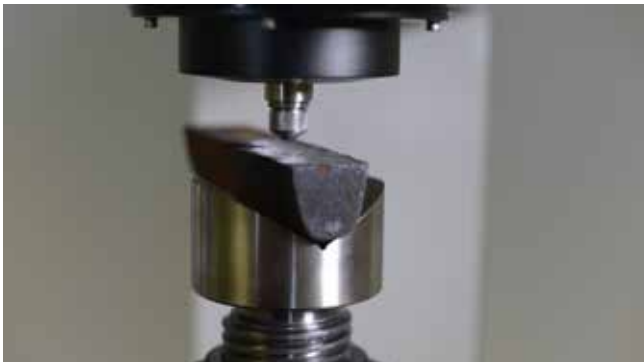
OPTIONAL ACCESSORIES

- Certified hardness test blocks
- Certified indenters
- Long indenters
- Goose neck indenter holder (350x250)
- Large testing table with T-slot
- Custom testing tables
- Precision vises, V-blocks and special clamps
- Testing table, hardened, Ø180mm (7.09in)
- Manual X-Y stage 100 x 60mm; micrometer travel 25 x 25mm
- Motorized spindle option

FH-2 SERIES



Model FH-2-1



SUPPLIED AS STANDARD

- Built-on microscope with LED light for dark field illumination
- Installation and user manual
- Objectives for 2.5x, 5x and 10x magnification
- Sliding testing table
- Flat anvil, hardened, $\varnothing 60\text{mm}$ (2.36in)
- V-anvil hardened $\varnothing 80\text{mm}$ (3.6in)
- Fuse 3A slow (2 pcs)
- Power cable
- Certificate
- Wireless mouse and keyboard

FH-2 Series features

- Color multi-function touchscreen controller.
- Load cell-based, closed loop operation.
- Advanced user interface.
- Automatic testing procedure.
- Conversion to all other hardness scales.
- Convex and concave test modes.
- Database for test programs.
- Large workpiece accommodation.
- USB output.

MODEL FH-2-1

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL/
VICKERS/KNOOP/HBT/HVT

- CCD – USB video system, manual and automatic measurement of Brinell and Vickers/Knoop indentations, indent video zoom function
- Scales:
 - Rockwell – A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
 - Superficial Rockwell – 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
 - Brinell – HB1/1, 2.5, 5, 10, 30kgf; HBT2.5/62.5, 187.5kgf; HBT5/250kgf; HB2.5/6.25, 15.625, 31.25, 62.5, 187.5kgf; HB5/25, 62.5, 125, 250kgf; HB10/100, 250kgf; HBT2.5/62.5, 187.5kgf; HBT5/250kgf
 - Vickers – HV 1, 2, 3, 5, 10, 20, 30, 50, 100, 120kgf; HVT 50, 100kgf
- Built-on electronic digital microscope for Brinell and Vickers indent measurement

OPTIONAL ACCESSORIES

- Certified hardness test blocks
- Certified indenters, long indenters
- Goose neck indenter holder
- Large testing table with T-slot
- Custom testing tables
- Precision vises, V-blocks and special clamps
- Testing table, hardened, $\varnothing 180\text{mm}$ (7.09in)
- Manual X-Y stage 100 x 60mm; micrometer travel 25 x 25mm
- Motorized spindle option
- LED ring light for Brinell testing

FH-4 SERIES



Model FH-4-50

FH-4 Series features

- Motorized turret.
- Optional analogue or digital microscope.
- Conversion to other hardness scales (option 3).
- Motorized load control.
- Statistics and conversions.
- X-Y stage with 0.01mm (.00039in) resolution.
- Built-in high speed printer.
- Dual channel optical system.

MODEL FH-4-50

- Motorized turret
- Three objectives – 10x, 20x, 40x
- Load range – 10gf to 2kgf

SUPPLIED AS STANDARD

- Manual X-Y stage
- Standard objectives 10x, 20x and 40x
- Built-in silent thermal printer
- USB connectivity
- Set of workpiece fixtures, vise, chuck, clamp
- Level gauge
- Four adjustable feet
- Spare halogen lamp
- Installation and user manual
- Certificate

OPTIONAL ACCESSORIES

- Objectives at choice
- Horizon – manual or automatic measuring and filing systems
- Motorized X-Y stage
- Motorized X-Y-Z stage (auto focus)
- Certified indenters and hardness test blocks
- Solid tester table and storage cabinet
- Manual X-Y stage with digital micrometers
- Analogue or digital microscope (15x magnification)



FH-4 Series with PC-based Horizon software and digital microscope (option 4)

FIVE LEVELS OF INCREASING AUTOMATION

First level

- Horizon on-screen measurement
- CCD camera
- Touchscreen display

Second level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Manual X-Y stage with one digital micrometer for either X or Y axis

Third level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Manual X-Y stage with two digital micrometers

Fourth level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Precision motorized X-Y stage 257x205mm with travel of 120x100mm, resolution 0.001mm, repeatability 0.002mm
- Virtual mouse

Fifth level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Precision motorized XY and Z stage 257x205mm, with travel of 120x100mm, resolution 0.001mm, repeatability 0.002mm
- Virtual mouse
- Pattern test module

FH-5 SERIES



FH-5 load cell-based closed loop system with analogue microscope.

SUPPLIED AS STANDARD

- Manual X-Y stage
- Flat anvil 60mm
- Objectives 5x, 10x, 20x or 10x, 20x, 40x
- Set of workpiece fixtures, vise, chuck, clamp
- Built-in thermal printer
- RS-232 data output
- Four adjustable feet
- Spare halogen lamp
- Fuse
- Installation and user manual
- Certificate

OPTIONAL ACCESSORIES

- Objectives 5x, 40x, 60x
- Horizon video measuring and filing systems
- Motorized X-Y stage
- Motorized X-Y-Z stage (auto focus)
- Certified indenters and hardness test blocks
- Solid tester table and storage cabinet
- Analogue or digital microscope (15x magnification)

FH-5 Series features

- Load cell, closed loop, force feed back system.
- Fully automatic four-position turret can be customized using different indenters, objectives, stages or systems.
- Test loads 0.02-62.5kgf, depending on model.
- Conversion to other hardness scales including tensile strength.
- Optional analogue or electronic digital microscope with precision encoder providing 15x magnification.

MODEL FH-5-11

MICRO/MACRO-VICKERS/KNOOP/BRINELL

- Test loads of 0.02, 0.025, 0.05, 0.1, 0.2, 0.3, 0.5, 1, 2, 2.5, 3, 4, 5, 6.25, 10, 15.625, 20, 30, 31.25kgf

MODEL FH-5-12

MICRO/MACRO-VICKERS/KNOOP/BRINELL

- Test loads of 0.1, 0.2, 0.3, 0.5, 1, 2, 2.5, 3, 4, 5, 6.25, 10, 15.625, 20, 30, 31.25, 50, and 62.5kgf



FH-5 with level 5 automation and digital microscope

FIVE LEVELS OF INCREASING AUTOMATION

First level

- Horizon on-screen measurement
- CCD camera
- Touchscreen display

Second level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Manual X-Y stage with one digital micrometer for either X or Y axis

Third level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Manual X-Y stage with two digital micrometers

Fourth level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Precision motorized X-Y stage 257x205mm with travel of 120x100mm, resolution 0.001mm, repeatability 0.002mm
- Virtual mouse

Fifth level

- Horizon on-screen measurement
- CCD camera
- Automatic measure
- Touchscreen display
- Precision motorized XY and Z stage 257x205mm, with travel of 120x100mm, resolution 0.001mm, repeatability 0.002mm
- Virtual mouse
- Pattern test module

FH-6 SERIES



FH-6 Series features

Micro-Vickers and Knoop

- Advanced measurement options include:
 - Single measurement, which allows you to set individual test points wherever you like.
 - Or, serial measurement, which allows one or more test rows with positioning co-ordinates to be recorded; or case hardness depth (CHD/Nht/Rht) measurement, where a series of tests can be set to determine the CHD/Nht/Rht data of specimens according to standard.

In each case, the test can be started directly from the surface view or from the overview without the need to identify co-ordinate positions on the workpiece. These capabilities are a direct consequence of our unique two-camera system.

- All models feature Intelligent Workpiece Positioning. This two-button control system allows ultra-fast pre-positioning, and a scroll wheel that provides pulse control for fine adjustment on the focus position. This is a dynamic feedback system and the Z-axis speed depends on the selected magnification of the vertical microscope and camera system. Fine positioning is further enhanced by using a leadscrew rather than Acme thread screw.

SUPPLIED AS STANDARD

- Load cell, closed loop force control
- Horizon operator control
- Auto brightness
- Auto contrast
- Auto sharpness
- Auto focus
- Automatic indent measurement
- Anti-collision system for objectives and indenters
- Calibrated step less indent zoom system
- Auto save, program setup, data storage
- Motorized Z-axis
- Z-axis intelligent control
- Quality optical system
- 5MP HD camera
- High power LED vertical illuminator with filter position
- Powerful embedded micro controller; MS Windows, 80GB dual SSD data storage, keyboard and mouse
- 15in portrait mode, HD industrial touch screen on adjustable table stand
- Connectivity: four USB ports, RJ45 Ethernet LAN, W-LAN, RS232, Bluetooth, motorized X-Y stage controller
- Up to two indenter positions, four objective positions
- One indenter position/actuator installed
- One objective 10x
- One objective 50x (20x low force (200g) models)
- Manual X-Y stage 100 x 100mm, travel 25 x 25mm
- Wireless mouse and keyboard
- Vise for small workpieces
- Clamp for thin workpieces
- Chuck for round workpieces
- Four vibration dampers
- Operator manual
- Power cable
- Spare fuse



MODEL DETAILS

● FH-6-1	3g-2kgf	Vickers, Knoop	● FH-6-8	1g-31.25kgf	Vickers, Knoop, Brinell
● FH-6-3	10g-10kgf	Vickers, Knoop	● FH-6-9	200g-62.5kgf	Vickers, Knoop, Brinell
● FH-6-5	200g-31.25kgf	Vickers, Knoop, Brinell	● FH-6-10	10g-62.5kgf	Vickers, Knoop, Brinell
● FH-6-7	10g-31.25kgf	Vickers, Knoop, Brinell	● FH-6-11	1g-62.5kgf	Vickers, Knoop, Brinell

MODEL FH-6-1

VICKERS/KNOOP

- Test loads – 3g-2kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

MODEL FH-6-3

VICKERS/KNOOP

- Test loads – 10g-10kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

MODEL FH-6-5

VICKERS/KNOOP/BRINELL

- Test loads – 200g-31.25kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

MODEL FH-6-7

VICKERS/KNOOP/BRINELL

- Test loads – 10g-31.25kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

MODEL FH-6-8

VICKERS/KNOOP/BRINELL

- Test loads – 1g-31.25kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

MODEL FH-6-9

VICKERS/KNOOP/BRINELL

- Test loads – 200g-62.5kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

MODEL FH-6-10

VICKERS/KNOOP/BRINELL

- Test loads – 10g-62.5kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

MODEL FH-6-11

VICKERS/KNOOP/BRINELL

- Test loads – 1g-62.5kgf
- Motorized turret – customizable up to six positions
 - two indenters
 - four objectives

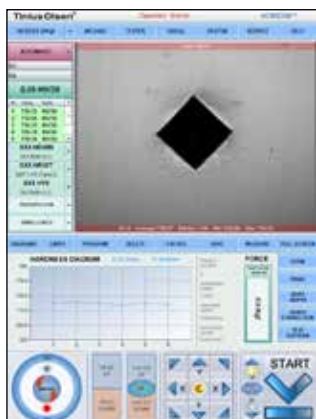


Super fast, high accurate motorized CNC X-Y stages:

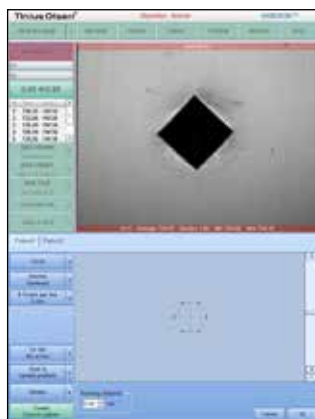
Part no.	Surface area	Travel limits
FH-049-0000	250 x 205mm	120 x 100mm
FH-049-0001	300 x 225mm	170 x 120mm
FH-049-0002	350 x 225mm	220 x 120mm



HORIZON ON-BOARD CONTROL SOFTWARE



Screen 1: Results from a five-location hardness test showing the mean and standard deviation of the results.



Screen 2: User-defined pattern/sequence of hardness measurement locations.



Screen 3: Test selection menu.



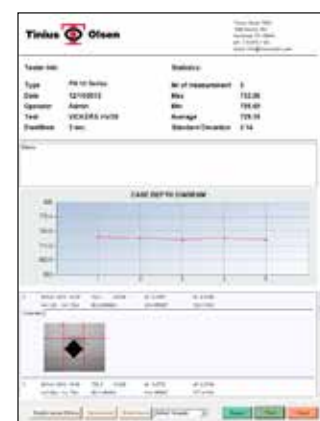
Screen 4: Filar lines option to manually define the precise edges of the indent, along with the zoom measurement option.



Screen 5: The conversion options between the different scales.



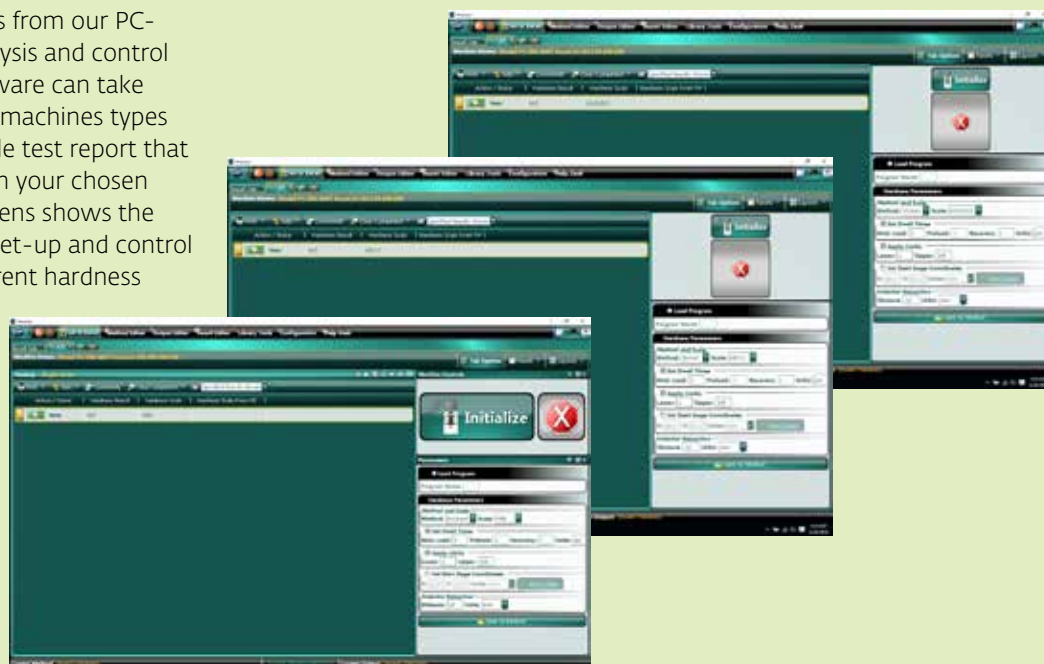
Sample screenshots from our on-board Horizon hardness software show the simple menu-driven simplicity of the software.



Screen 6: Report generation process. Reports are printed directly from the tester.

HORIZON ANALYSIS AND CONTROL SOFTWARE

Sample screenshots from our PC-based Horizon analysis and control software. This software can take data from multiple machines types and produce a single test report that displays all results in your chosen formats; these screens shows the different machine set-up and control capabilities of different hardness scales.



FH-7 SERIES



Super fast, high accurate motorized CNC X-Y stages:

	Surface area	Travel limits
Standard	400 x 255mm	220 x 120mm
Optional	630 x 160mm	450 x 160mm

MODEL FH-7-1

VICKERS/MICRO-VICKERS/KNOOP/
LOW FORCE BRINELL/KIC

- Test loads – 10g-62.5kgf
- Motorized turret – eight positions
 - Objectives positions – four
 - Indenter positions – two
 - Laser pointer and overview camera

MODEL FH-7-2

VICKERS/MICRO-VICKERS/KNOOP/LOW FORCE
BRINELL/KIC/ROCKWELL/SUPERFICIAL ROCKWELL

- Test loads – 10g-150kgf

FH-7 Series features

Micro/Macro-Vickers and Low Force Brinell

- Scales All models can test Micro/Macro-Vickers, Knoop and Low Force Brinell; FH-7-2 adds Rockwell and Superficial Rockwell.
- Unparalleled test force range Servo-driven force actuator enables range of 10-250kgf.
- Advanced high speed turrets High speed eight-position turret incorporates standard built-in laser positioning system and two HD cameras with auto focus and optical zoom.
- Quick change stage and anvil post enabled with option to install large T-slot stages, fixed stages and number of anvils.
- Collision detection system.
- Clamping device.

- Motorized turret – eight positions
 - Objectives positions – four
 - Indenter positions – two
 - Laser pointer and overview camera

MODEL FH-7-3

VICKERS/MICRO-VICKERS/KNOOP/LOW FORCE
BRINELL/BRINELL/KIC/ROCKWELL/SUPERFICIAL
ROCKWELL/HBT/HVT/ISO 2039 1/2

- Test loads – 10g-250kgf
- Motorized turret – eight positions
 - Objectives positions – four
 - Indenter positions – two
 - Laser pointer and overview camera

SUPPLIED AS STANDARD

- Load cell, closed loop force control
- Horizon operator workflow control and advanced report generator
- Auto brightness, contrast, sharpness and focus
- Automatic indent measurement
- Anti-collision system for objectives and indenters, and illumination
- Calibrated step-less indent zoom system
- Auto save, program setup, data storage
- Motorized Z-axis
- Z-axis intelligent control
- Motorized CNC X-Y stage.
- Click & Go software for random point testing
- Pattern testing for advanced pre- program test patterns
- CHD, Nht, Rht according to standard
- KiC fracture toughness measurement
- Stage overview camera
- Laser positioning system
- Best-in-class optical system
- 5Mpx HD indent viewing camera
- Powerful embedded micro controller; MS Windows, 80GB dual SSD data storage, keyboard and mouse
- 15in portrait mode, HD industrial touch screen
- Connectivity: USB ports, RJ45 LAN, W-LAN, HDMI

FH-8 SERIES

Universal

HR

HV

HB



Model FH-8

MODEL FH-8-0

ROCKWELL/SUPERFICIAL
ROCKWELL/BRINELL/KNOOP/ HVT
& HBT SCALES

- Test loads: 1-250kgf (2.2-551lbf)
- Scales:
 - Rockwell: A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm
 - Superficial Rockwell: 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y, 30TM, HMR 5/25
 - Brinell: 1kgf/9.8Nw to 250kgf/2.45kN
 - Vickers: HVT 1kgf/9.8Nw, 120kgf/1.2kN
- Objectives positions: three
- Indenter positions: three
- High definition magnification (0.7-1000x)
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 350mm, depth 250mm

- Large workpiece accommodation: height 350mm, depth 250mm

MODEL FH-8-2

ROCKWELL/SUPERFICIAL
ROCKWELL/BRINELL/KNOOP/
HVT & HBT SCALES

- Test loads: 10-3000kgf (22-6613lbf)
- Scales:
 - Rockwell: A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm
 - Brinell: 1kgf/9.8Nw to 3000kgf/29.4kN
 - Vickers: HVT 10kgf/98Nw, 120kgf/1.2kN
- Objectives positions: three
- Indenter positions: three
- High definition magnification (0.7-1000x)
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 350mm, depth 250mm

FH-8 Series features

Micro/Macro-Vickers and Low Force Brinell

- Load cell, force feedback, closed loop system.
- Complies to all applicable EN/ISO and ASTM standards.
- Shape correction for curved surfaces.
- High accuracy depth measuring system (Rockwell, HBT, HVT).
- 15in industrial LCD display shows measured values, online statistics, memory overview, tester settings.
- User-friendly, low training requirements.
- Direct printer and/or PC connections via RS232 and USB-2.
- Large workpiece accommodation.

MODEL FH-8-1

ROCKWELL/SUPERFICIAL
ROCKWELL/BRINELL/KNOOP/HVT
& HBT SCALES

- Test loads: 3-750kgf (6.6-1,653lbf)
- Scales:
 - Rockwell: A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm
 - Superficial Rockwell: 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y, 30TM, HMR 5/25
 - Brinell: 1kgf/9.8Nw to 250kgf/2.45kN
 - Vickers: HVT 3kgf/29Nw, 120kgf/1.2kN
- Objectives positions: three
- Indenter positions: three
- High definition magnification (0.7-1000x)
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled

MODEL FH-8-7

EXTRA HEIGHT ROCKWELL/
SUPERFICIAL ROCKWELL/BRINELL/
KNOOP/HVT & HBT SCALES

- Test loads: 1-250kgf (1.1-551lbf)
- Scales:
 - Rockwell: A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm
 - Superficial Rockwell: 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y, 30TM, HMR 5/25
 - Brinell: 1kgf/9.8Nw to 250kgf/2.45kN
 - Vickers: HVT 1kgf/9.8Nw, 120kgf/1.2kN
- Objectives positions: three
- Indenter positions: three
- High definition magnification (0.7-1000x)
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 490mm, depth 285mm

SUPPLIED AS STANDARD

- Objective for 70x magnification
- Objective for 140x magnification
- Clamping protection nose

- Testing table ø80mm (3.15in)
- Large 2-T slotted work surface; 600 x 450mm (extra height models)
- Power cable
- Operation manual and certificate

FH-8 SERIES

MODEL FH-8-21

EXTRA HEIGHT ROCKWELL/
SUPERFICIAL ROCKWELL/BRINELL/
VICKERS/KNOOP/HVT & HBT TESTER

- Test loads: 3-750kgf (6.6-1,653lbf)
- Scales:
 - Rockwell: A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm
 - Superficial Rockwell: 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y, 30TM, HMR 5/25
 - Brinell: 3kgf/29Nw to 750kgf/7.35kN
 - Vickers: HVT 3kgf/29Nw, 120kgf/1.2kN
- Objectives positions: three
- Indenter positions: three
- High definition magnification (0.7-1000x)
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 490mm, depth 285mm

MODEL FH-8-22

EXTRA HEIGHT ROCKWELL/
SUPERFICIAL ROCKWELL/BRINELL/
VICKERS/KNOOP/HVT & HBT TESTER

- Test loads: 10-3000kgf (22-6613lbf)
- Scales:
 - Rockwell: A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm
 - Superficial Rockwell: 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y, 30TM, HMR 5/25
 - Brinell: 10kgf/98Nw to 3,000kgf/29kN
 - Vickers: HVT 10kgf/98Nw, 120kgf/1.2kN
- Objectives positions: three
- Indenter positions: three
- High definition magnification (0.7-1000x)
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 490mm, depth 285mm

MODEL FH-8-13

BRINELL TESTER

- Test loads: 1-250kgf (1.1-551lbf)
- Scales:
 - Brinell: 1kgf/9.8Nw to 250kgf/2.45kN
 - Vickers: HVT 50kgf/490Nw, 100kgf/980.7Nw
- Indenter positions: one
- High resolution Brinell scanner
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 350mm, depth 250mm

MODEL FH-8-14

BRINELL TESTER

- Test loads: 3-750kgf (6.6-1653lbf)
- Scales:
 - Brinell: 3kgf/29Nw to 750kgf/7.35kN
 - Vickers: HVT 50kgf/490Nw, 100kgf/980.7Nw
- Indenter positions: one
- High resolution Brinell scanner
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 350mm, depth 250mm

MODEL FH-8-15

BRINELL TESTER

- Test loads: 10-3000kgf (22-6613lbf)
- Scales:
 - Brinell: 10kgf/98Nw to 3,000kgf/29kN
 - Vickers: HVT 50kgf/490Nw, 100kgf/980.7Nw
- Indenter positions: one
- High resolution Brinell scanner
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 350mm, depth 250mm

MODEL FH-8-17

EXTRA HEIGHT BRINELL TESTER

- Test loads: 1-250kgf (1.1-551lbf)
- Scales:
 - Brinell: 1kgf/9.8Nw to 250kgf/2.45kN
 - Vickers: HVT 50kgf/490Nw, 100kgf/980.7Nw
- Indenter positions: one
- High resolution Brinell scanner
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 490mm, depth 285mm

MODEL FH-8-18

EXTRA HEIGHT BRINELL TESTER

- Test loads: 3-750kgf (6.6-1,653lbf)
- Scales:
 - Brinell: 3kgf/29Nw to 750kgf/7.35kN
 - Vickers: HVT 50kgf/490Nw, 100kgf/980.7Nw
- Indenter positions: one
- High resolution Brinell scanner
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 490mm, depth 285mm

MODEL FH-8-19

EXTRA HEIGHT BRINELL TESTER

- Test loads: 10-3000kgf (22-6613lbf)
- Scales:
 - Brinell: 10kgf/98Nw to 3,000kgf/29kN
 - Vickers: HVT 50kgf/490Nw, 100kgf/980.7Nw
- Indenter positions: one
- High definition magnification (0.7-1000x)
- USB 2 (4), UTP RJ45, LAN, W-LAN, and RS232 outputs, WiFi enabled
- Large workpiece accommodation: height 490mm, depth 285mm

OPTIONAL ACCESSORIES

- **FH-50-25** V-anvil ø80mm (3.15in) for 3.3-20mm
- **FH-50-26** V-anvil ø80mm (3.15in) for 12-80mm

- **FH-50-27** V-anvil ø120mm (4.72in) for 20-140mm
- **FH-50-79** Large testing table 350 x 250mm (13.8 x 9.8in) with two T slots, 250kgf maximum load
- Manual XY-stages

- Certified indenters
- Certified hardness test blocks
- Testing table ø150mm (5.9in)
- Testing table ø235mm (9.25in)



FH-9 SERIES STANDARD HEIGHT FRAMES



Model FH-9-0

Model FH-9-26

FH-9 Series features

Brinell

- Load cell, closed loop system.
- Test loads – 30-3000kgf.
- LCD display showing Brinell value, statistics and tester settings.
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb.
- External microscope with analog scale for indentation measurement or external CCD camera for automatic indent measurement.

MODEL FH-9-0

BRINELL

- Load cell, closed loop system
- Test loads – 30-3000kgf
- FH-9-24 – analog measuring microscope with 20x magnification

MODEL FH-9-26

BRINELL

- Load cell, closed loop system
- Test loads – 62.5-3000kgf
- Brinell digital scanner, Horizon automatic measuring and filing system, and supplied with three objectives.

SUPPLIED AS STANDARD FOR ALL FH-9 MODELS

- FH-9-24 – Analog measuring microscope with 20x magnification (selected models)
- V-anvil $\varnothing 80\text{mm}$ (3.1496in)
- Large flat anvil $\varnothing 200\text{mm}$ (7.87401in)
- FH-9-30 – Brinell digital palm scanner (on selected models) for automatic indent measurement.
- Fuse 2A (3 pcs)
- RS232, USB and/r RJ45 Connections for data output
- Adjustable feet (4 pcs)
- Certificate
- Installation and user manual
- Two position turret with fully automated systems (FH-9-20 only)
- Operation manual

OPTIONAL ACCESSORIES FOR ALL FH-9 MODELS

- Certified ball indenters
- Certified hardness test blocks
- Motorized spindle on XL models
- FH-50-79 – Large testing table 350 x 250mm (13.8 x 9.8in) with two T slots, 250kgf maximum load
- Motorized X-Y stage
- Solid tester table and storage cabinet
- 20x, 40x, 60x manual microscopes with light
- 5mp palm scanner for 0.5-1.7mm indent readings

FH-9 SERIES EXTENDED HEIGHT FRAMES



Model FH-9-1



Model FH-9-28

FH-9 Series features

Brinell

- Load cell, closed loop system.
- Extended frame 450mm workpiece height, 250mm throat depth.
- Test loads – 30-3000kgf.
- LCD display showing Brinell value, statistics and tester settings.
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb.
- External microscope with analog scale for indentation measurement or external CCD camera for automatic indentation measurement.

Model FH-9-20



MODEL FH-9-1

BRINELL

- Load cell, closed loop system
- Test loads 30-3000kgf
- Analog measuring microscope with 20x magnification

MODEL FH-9-17

BRINELL

- Load cell, closed loop system
- Test loads 30-3000kgf
- Analog measuring microscope with 20x magnification
- Motorized spindle

MODEL FH-9-27

BRINELL

- Load cell, closed loop system
- Test loads 62.5-3000kgf
- Brinell digital scanner, Horizon automatic measuring and filing system, and supplied with three objectives

MODEL FH-9-28

BRINELL

- Load cell, closed loop system
- Test loads 62.5-3000kgf
- Brinell digital scanner, Horizon automatic measuring and filing system, and supplied with three objectives
- Motorized spindle

MODEL FH-9-20

BRINELL

- Load cell, closed loop system
- Test loads 30-3000kgf
- Brinell digital scanner, Horizon automatic measuring and filing system, and supplied with three objectives
- Motorized spindle
- Motorized turret, CCD camera, and Horizon touchscreen software

FH-10 SERIES

Universal



HR



HV

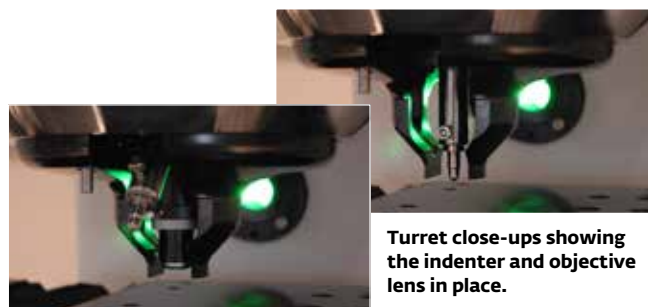


HB



Display on FH-10 Series

Model FH-10-0



Turret close-ups showing the indenter and objective lens in place.

SUPPLIED AS STANDARD

- Objective for 95x magnification
- Objective for 150x magnification
- Clamping protection nose
- Testing table $\varnothing 80\text{mm}$ (3.15in)
- Power cable
- Installation and user manual
- Certificate

FH-10 Series features

Rockwell, Superficial Rockwell, Brinell, Vickers, HVT and HBT

- Load cell, force feedback, closed loop system.
- Test loads – 500gf-250kgf.
- Complies to all applicable EN/ISO and ASTM standards.
- Optical system high precision optical path, mat screen diameter 135mm.
- Shape correction for curved surfaces.
- High accuracy depth measuring system (Rockwell, HBT, HVT).
- Large LCD display shows measured values, online statistics, memory overview, tester settings.
- User-friendly, low training requirements.
- RS232 and USB-2 connections.
- Large workpiece accommodation (H 300mm).

MODEL FH-10-0

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL/VICKERS/KNOOP/BALL INDENTATION/HVT/HBT

- Load cell, force feedback, closed loop system
- Test loads – 0.5-250kgf (1.1-551lbf)

OPTIONAL ACCESSORIES

- Certified indenters.
- Certified hardness test blocks
- Objectives for 10x, 20x, 44x magnification
- Testing table $\varnothing 150\text{mm}$ (5.9in) and $\varnothing 235\text{mm}$ (9.25in)
- V-anvil $\varnothing 180\text{mm}$ (7.1in) & $\varnothing 120\text{mm}$ (4.72in)
- Long Vickers indenter
- Other testing tables and XY-stages
- Precision vises, V-blocks and special clamps
- Software solutions for advanced application
- Precision vises for small parts with jaw widths of 36mm, 42mm or 75mm
- Manual X-Y stage
- Motorized X-Y stage
- 450 x 350mm large testing table with T slots



FH-11 SERIES



Model FH-11-0
with large table.

FH-11 Series features

- Superior test loads/force application from 1kgf (2.2lbf) to 3000kgf (6614lbf).
- Fixed workpiece position (no spindle).
- Descending test head with automatic workpiece detection.
- Free definable, manual or motorized six-position turret.
- High definition optical system – 0.7-1000X.
- Large, adjustable 15in (381mm) industrial touchscreen.
- Horizon hardness testing firmware and database.
- Automatic or manual focus, manual or fully automatic indent measurement, standard.
- LAN, WLAN, USB-2, RS232, printer and DVI connectivity.
- Built-in hard drive.
- Free definable test patterns, optional.
- Covers made of shock, damage and fire resistant and recyclable materials.
- Large testpiece accommodation H 300mm (11.8in), D 220 mm (8.7in).

SUPPLIED AS STANDARD

- Flat anvil ø80mm (3.15in)
- V-anvil ø80mm (3.15in)
- Testing table ø200mm (7.87in)
- Installation and user manual
- Certificate

OPTIONAL ACCESSORIES

- Certified indenters
- Certified hardness test blocks
- Large testing table 350 x 250mm/138 x 98in with T-grooves
- Extra large testing table 450 x 350mm with grooves and support
- Long bar supports, to ease testing long bars
- Motorized X-Y stages (CNC), motorized rotary or tilting tables (250kg maximum capacity)
- Built-in five-axis support driver
- Certified reference blocks
- Single or multiple Jominy stage
- Automated Jominy testing
- Laser position guide
- Overview camera and laser position guide

MODEL FH-11-0

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL/
VICKERS/KNOOP/BALL INDENTATION/HVT/HBT

- Load cell, force feedback, closed loop system
- Test loads – 1-250kgf (2.2-551lbf)

MODEL FH-11-1

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL/
VICKERS/KNOOP/BALL INDENTATION/HVT/HBT

- Load cell, force feedback, closed loop system
- Test loads – 3-750kgf (6.6-1,653lbf)

MODEL FH-11-2

ROCKWELL/SUPERFICIAL ROCKWELL/BRINELL/
VICKERS/KNOOP/BALL INDENTATION/HVT/HBT

- Load cell, force feedback, closed loop system
- Test loads – 10-3,000kgf (22-6,600lbf)

MODEL FH-11-32

ROCKWELL/SUPERFICIAL ROCKWELL/HVT/HBT/
PLASTIC ISO 2039/1

- Load cell, force feedback, closed loop system – no turret and no optical system
- Test loads – 1-250kgf (2.2-551lbf). With XY tables, allows automatic Jominy and pattern testing

FH-12 SERIES

Universal

HR

HV

HB

SUPPLIED AS STANDARD

- Motorized turret with six positions (Universal models)
- Objectives for 0.7-1000x magnification (Universal models)
- Single indenter position (models FH-27, 29, 34, 35)
- 5MPx palm scanner (Brinell models)
- Built-in three-axis support driver
- Toolset
- Large testing table
- Certificate
- Operation manual



Model FH-12-o

FH-12 Series features

Brinell, Vickers, Rockwell, HVT, and HBT

- FH-12 is a universal hardness tester most suitable for heavy duty testing.
- For tough environments and extra large workspace accommodation.
- Suitable for parts up to 500kg.
- Floor type frame height of 2m, workspace height of 650mm and throat depth of 300mm.
- Range of test loads up to 250, 750 or 3000kgf.
- Motorized elevator spindle allows each test piece to be tested at an ergonomic working height.
- Test head is equipped with a six-position modular turret (indenters and objectives in universal models) and an optical zoom video system with a 5MP HD camera (in Brinell models).
- High performance controller-driven automatic and manual indent measurement with automatic filing and storage functions.
- Refined algorithms for automatic measurement.

OPTIONAL ACCESSORIES

- Testing table ø235mm (9.25in)
- V-anvil ø80mm (3.15in) for 3.3 to 20mm
- V-anvil ø80mm (3.15in) for 12 to 80mm
- V-anvil ø120mm (4.72in) for 20 to 140mm
- Large testing table 350mm x 250mm (13.8in x 9.8in) with two T slots, 250kgf maximum load
- Manual XY-stages
- Certified indenters
- Certified hardness test blocks
- Objectives for 10x, 20x, 44x magnification
- Testing table ø150mm (5.9in)

MODEL FH-12-0

UNIVERSAL HARDNESS

- Load range from 1-250kgf

MODEL FH-12-1

UNIVERSAL HARDNESS

- Load range from 3-750kgf

MODEL FH-12-2

UNIVERSAL HARDNESS

- Load range from 10-3000kgf

MODEL FH-12-27

ROCKWELL/
SUPERFICIAL ROCKWELL

- Load range from 1-250kgf

MODEL FH-12-29

ROCKWELL/BRINELL

- Load range from 10-3000kgf
- 5MPx-HD Brinell palm scanner

MODEL FH-12-34

BRINELL

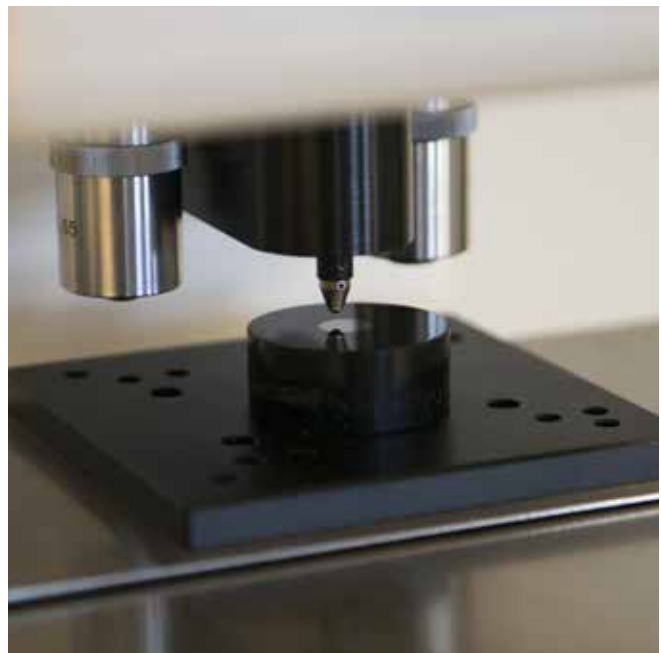
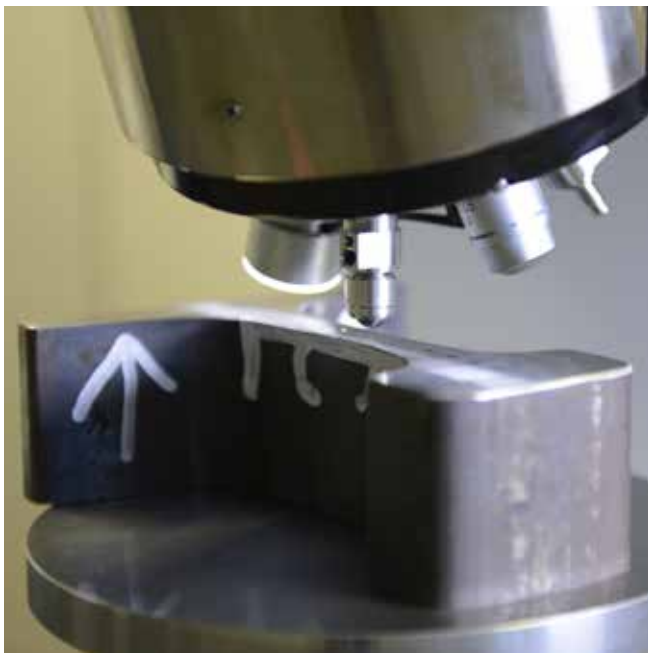
- Load range from 3-750kgf.
- 5MPx-HD Brinell palm scanner

MODEL FH-12-35

BRINELL

- Load range from 10-3000kgf
- 5MPx-HD Brinell palm scanner

FH SERIES APPLICATIONS



APPLICATIONS

Above left: Close-up of automated turret on FH-8 showing sample on motorized X-Y stage

Above: Vickers test on auto focus-enabled FH-4 tester stage

Left: Automated Jominy testing on motorized X-Y stage of FH-11 tester

Below: Rockwell hardness scale test on FH-2



INDENTERS AND TABLES

CERTIFIED BRINELL INDENTERS

- **FH-200-0015** 1.0mm, includes carbide ball
- **FH-200-0016** 1.0mm, includes carbide ball for FH-4, FH-5 and FH-6 series
- **FH-200-0017** 2.5mm, includes carbide ball
- **FH-200-0018** 2.5mm, includes carbide ball for FH-4, FH-5 and FH-6 series
- **FH-200-0019** 5mm, includes carbide ball
- **FH-200-0020** 10mm, includes carbide ball
- **FH-200-0024** Spare tungsten carbide ball 1mm
- **FH-200-0025** Spare tungsten carbide ball 2.5mm
- **FH-200-0026** Spare tungsten carbide ball 5mm
- **FH-200-0027** Spare tungsten carbide ball 10mm

CERTIFIED VICKERS AND KNOOP INDENTERS

- **FH-300-0040** Vickers Diamond indenter, L7mm – ASTM
- **FH-300-0041** Vickers Diamond indenter, L7mm – ISO
- **FH-300-0044** Knoop indenter (7mm) – ASTM
- **FH-300-0045** Knoop indenter (7mm) – ISO
- **FH-300-0046** Vickers Diamond indenter, L17mm – ASTM
- **FH-300-0047** Vickers Diamond indenter, L17mm – ISO
- **FH-300-0048** Knoop indenter (17mm) – ASTM
- **FH-300-0049** Knoop indenter (17mm) – ISO

CERTIFIED ROCKWELL (DIAMOND) INDENTERS

- **FH-300-0001** 17mm A, C & D scale – ASTM
- **FH-300-0002** 17mm 15N, 30N, 45N scales – ISO
- **FH-300-0003** 17mm A, C, D & N scales – ASTM
- **FH-300-0004** 17mm A, C, D & N scales – ISO
- **FH-300-0005** 17mm A, C, D & N scales – ISO & ASTM
- **FH-300-0006** ASTM B-294 certification to HRA – Carbide scale

CERTIFIED ROCKWELL (CARBIDE) INDENTERS

- **FH-300-0020** 1/16in carbide ball – ASTM
- **FH-300-0021** 1/16in carbide ball – ISO
- **FH-300-0022** 1/16in carbide ball – ASTM & ISO
- **FH-300-0023** 1/8in carbide ball – ASTM
- **FH-300-0024** 1/8in carbide ball – ISO
- **FH-300-0025** 1/8in carbide ball – ASTM & ISO
- **FH-200-0039** Indenter 1/4in carbide ball shaft ø6.35 L 28mm
- **FH-200-0040** Indenter 1/2in carbide ball shaft ø6.35 L 28mm
- **FH-200-0041** Spare carbide balls 1/16in
- **FH-200-0042** Spare carbide balls 1/8in
- **FH-200-0043** Spare carbide balls 1/4in
- **FH-200-0044** Spare carbide balls 1/2in

Note: Certified steel ball indenters available on request



HARDNESS BLOCKS

ROCKWELL, ASTM E18, NOMINAL HARDNESS

● FH-100-0000	60 HRA
● FH-100-0001	70 HRA
● FH-100-0002	80 HRA
● FH-100-0003	60 HRC
● FH-100-0004	45 HRC
● FH-100-0005	25 HRC
● FH-100-0006	90 HRBW
● FH-100-0007	80 HRBW
● FH-100-0008	60 HRBW
● FH-100-0009	45 HRBW
● FH-100-0010	65 HRFW
● FH-100-0011	85 HRFW
● FH-100-0012	95 HRFW
● FH-100-0013	70 HR45N
● FH-100-0014	45 HR45N
● FH-100-0015	25 HR45N
● FH-100-0016	80 HR30N
● FH-100-0017	60 HR30N
● FH-100-0018	40 HR30N
● FH-100-0019	90 HR15N
● FH-100-0020	80 HR15N
● FH-100-0021	70 HR15N
● FH-100-0022	60 HR45TW
● FH-100-0023	40 HR45TW
● FH-100-0024	20 HR45TW
● FH-100-0025	80 HR30TW
● FH-100-0026	60 HR30TW
● FH-100-0027	40 HR30TW
● FH-100-0028	90 HR15TW
● FH-100-0029	80 HR15TW
● FH-100-0030	70 HR15TW
● FH-100-0031	Custom

VICKERS, ASTM E384, NOMINAL HARDNESS

● FH-100-0032	450 HV 10kgf
● FH-100-0033	200 HV 10kgf
● FH-100-0034	700 HV 500gf
● FH-100-0035	200 HV 500gf
● FH-100-0036	Custom

KNOOP, ASTM E384, NOMINAL HARDNESS

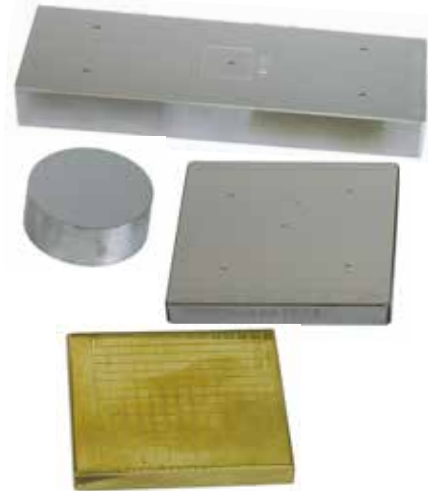
● FH-100-0037	700 HK 500gf
● FH-100-0038	700 HK 300gf
● FH-100-0039	Custom

BRINELL, ASTM E10, NOMINAL HARDNESS

● FH-100-0040	450 HBW 10/3000
● FH-100-0041	300 HBW 10/3000
● FH-100-0042	200 HBW 10/3000
● FH-100-0043	125 HBW 10/3000
● FH-100-0044	95HBW 10/500
● FH-100-0045	60 HBW 10/500
● FH-100-0046	450 HBW 5/750
● FH-100-0047	125 HBW 5/750
● FH-100-0048	450 HBW 2.5/187.5
● FH-100-0049	125 HBW 2.5/187.5
● FH-100-0050	Custom

ROCKWELL, ISO 6508-3, NOMINAL HARDNESS

● FH-100-0051	60 HRA
● FH-100-0052	70 HRA
● FH-100-0053	80 HRA
● FH-100-0054	90 HRBW
● FH-100-0055	80 HRBW
● FH-100-0056	60 HRBW
● FH-100-0057	45 HRBW
● FH-100-0058	60 HRC
● FH-100-0059	45 HRC
● FH-100-0060	25 HRC
● FH-100-0061	65 HRFW
● FH-100-0062	85 HRFW
● FH-100-0063	95 HRFW
● FH-100-0064	70 HR45N
● FH-100-0065	45 HR45N
● FH-100-0066	25 HR45N
● FH-100-0067	80 HR30N
● FH-100-0068	60 HR30N
● FH-100-0069	40 HR30N
● FH-100-0070	90 HR15N
● FH-100-0071	80 HR15N
● FH-100-0072	70 HR15N
● FH-100-0073	60 HR45TW
● FH-100-0074	40 HR45TW
● FH-100-0075	20 HR45TW
● FH-100-0076	80 HR30TW
● FH-100-0077	60 HR30TW
● FH-100-0078	40 HR30TW
● FH-100-0079	90 HR15TW
● FH-100-0080	80 HR15TW
● FH-100-0081	70 HR15TW
● FH-100-0082	Custom



VICKERS, ISO 6507-3, NOMINAL HARDNESS

● FH-100-0083	450 HV 10kgf
● FH-100-0084	200 HV 10kgf
● FH-100-0085	700 HV 500gf
● FH-100-0086	200 HV 500gf
● FH-100-0087	Custom

KNOOP, ISO 4545-3, NOMINAL HARDNESS

● FH-100-0088	700 HK 500gf
● FH-100-0089	700 HK 300gf
● FH-100-0090	Custom

BRINELL, ISO 6506-3, NOMINAL HARDNESS

● FH-100-0091	450 HBW 10/3000
● FH-100-0092	300 HBW 10/3000
● FH-100-0093	200 HBW 10/3000
● FH-100-0094	125 HBW 10/3000
● FH-100-0095	95 HBW 10/500
● FH-100-0096	60 HBW 10/500
● FH-100-0097	450 HBW 5/750
● FH-100-0098	125 HBW 5/750
● FH-100-0099	450 HBW 2.5/187.5
● FH-100-0100	125 HBW 2.5/187.5
● FH-100-0101	Custom



Hardness verification kits
are also available.



FH Series

Hardness Testing Machines

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