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Mitutoyo

Micro-Vickers Hardness Testing Machines HM-210/220

Series 810

This is a high performance hardness testing machine that uses advanced technology and is ideal for quality control. The HM-210/220 series offers you the following benefits:

- Touchscreen and software controlled types
- Its electromagnetic generation system enables nonstop setup for testing force.
- A high performance optical system provides a high quality image of the indentation load.
- A long working distance greatly reduces the possibility of collision.
- A range of six different objectives: 10X, 20X, 50X and 100X for measuring indentation images, and 2X and 5X for enabling wide-range overview images for positioning of indentation patterns.
- LED lighting gives you an observation image in natural colour, with better contrast, as well as longer operation due to lower power consumption.
- You can set different kinds of conditions on a touch panel, and display test results for easy operation.
- Software AVPAK-20 offers a multitude of options for automatic measurement and statistics.
- Test forces starting from as low as **0,4903 x 10-3N** (0,05gf) as well as standard test forces

Touchscreen type

Software type

HM-210

Model	HM-210	HM-210.
No.	**810-401D**	**810-404D**
Test force	**mN: 98,07; 196,1; 294,2; 490,3; 980,7; 1961; 2942; 4903; 9807** (gf) 10; 20; 30; 50; 100; 200; 300; 500; 1000	**mN: 98,07; 196,1; 294,2; 490,3; 980,7; 1961; 2942; 4903; 9807** (gf) 10; 20; 30; 50; 100; 200; 300; 500; 1000
System	System A	System A

HM-220

Model	HM-220	HM-220.
No.	**810-406D**	**810-409D**
Test force	**mN: 0,4903; 0,9807; 1,961; 2,942; 4,903; 9,807; 19,61; 29,42; 49,03; 98,07; 196,1; 294,2; 490,3; 980,7; 1961; 2942; 4903; 9807; 19610** (gf): 0,05; 0,1; 0,2; 0,3; 0,5; 1; 2; 3; 5; 10; 20; 30; 50; 100; 200; 300; 500; 1000; 2000	**mN: 0,4903; 0,9807; 1,961; 2,942; 4,903; 9,807; 19,61; 29,42; 49,03; 98,07; 196,1; 294,2; 490,3; 980,7; 1961; 2942; 4903; 9807; 19610** (gf): 0,05; 0,1; 0,2; 0,3; 0,5; 1; 2; 3; 5; 10; 20; 30; 50; 100; 200; 300; 500; 1000; 2000
System	System B / C / D	System B / C / D

Specifications

Standard	ISO 6507-2, JIS B 7725
Indenter / Objective turret	Motor driven and manual operation
Data output	RS-232C, Digimatic, USB 2 interface
XY stage [mm]	**Travel range system A + B**: 25 x 25 / 50 x 50 manual **Travel range system C + D :** 50 x 50 / 100 x 100 motorized
Arbitrary test force	1 type [Default: 245,2mN (25gf)]
Control panel	Built-in touch panel, 5,7" Color LCD (HM-210A/220A for System A), Control software (PC for System B/C/D)
External dimensions Main unit mass	System A: 315(W)×671(D)×595(H)mm/38,5kg System B/C/D: 315(W)×586(D)×741(H)mm/37,4kg
Functions	Calculation of Vickers / Knoop*2 hardness, and ceramic fracture toughness based on IF method (JIS R1697), 3 display format (standard, list, simple), GO/NG judgment, test condition guide, curve and user correction, hardness corresponding value, statistics calculation
Objective lens unit	Up to 4 pcs. mountable (one mounted 50X as standard)
Output	Digimatic, serial, USB2 series A (for memory)*1, USB2 B Type (for system communication)
Resolution of diagonal length of an indentation	Objective lens less than 50X: 0,1µm (Objective lens more than 50X: 0,01µm)
Specimen dimensions	System A/B: height 133mm, depth 160mm (when using manual XY stage 25X25) System C: height 112mm, depth 160mm, System D: height 72mm, depth 160mm
Test force control	Electromagnetic generation of force (force motor) and automatic control (load, duration, unload)
Turret drive	Motor-driven and manual operation

Power turret with 2 indenter mounts and 4 objective mounts

Hardness Testing Machines brochure on request

For a list of optional accessories, refer to the following page.
Hardness test blocks can be found in the Hardness Testing Machines brochure.

Micro-Vickers Hardness Testing Machines HM-210/220

Manual or complete automatic testing

Optional accessories

No.	Description
19BAA062MPA	Knoop diamond indenter ISO 4545 cert., M400 HK0.01 HM-100, HM-200, MVK Series
63ETB601	Reference material Vickers ISO 6507-3, 500 HV0,1
63ETB606	Reference material Vickers ISO 6507-3, 750 HV0,1
63ETB635	Reference material Vickers ISO 6507-3, 500 HV0,3
63ETB640	Reference material Vickers ISO 6507-3, 750 HV0,3
63ETB670	Reference material Vickers ISO 6507-3, 500 HV1
63ETB675	Reference material Vickers ISO 6507-3, 750 HV1
810-017	Special vise, (opening width 100mm)
810-013	Sheet specimen table
810-014	Thin specimen table, (horizontal type)
810-015	Thin specimen table, (vertical type)
810-019	Tilting specimen table
810-020	Adjustable specimen holder, Ø15-30mm
810-018	Rotary table, 360°
810-084	Rotatable adjustable specimen table, Ø15-30mm / 360°
810-085	Sheet specimen table
810-095	Rotary tilting specimen table, vise Ø15-50mm
375-056	Calibration Micro Scale
810-650-1	Resin mold specimen table, Ø25.4 mm
810-650-2	Resin mold specimen table, Ø30 mm
810-650-3	Resin mold specimen table, Ø31.75 mm
810-650-4	Resin mold specimen table, Ø38.1 mm
810-650-5	Specimen holder f. resin molded specimen, 1 specimen Ø40 mm
02ATE760	Table, QV-E/QS
810-641	Vibration Isolator, (for testing machine)

System A

HM-210A/HM-220A

Features:
- Touch-panel operation
- Measurement of indentation dimensions using a measuring microscope
- Positioning using a manual XY stage

System C

HM-210C/HM-220C

Features:
- Operated using AVPAK-20
- Automatic indentation reading
- Automatic positioning with motorized XY stage

System B

HM-210B/HM-220B
Automatic measurement by AVPAK-20 eliminates operator measurement errors.

Features:
- Operation using AVPAK-20
- Automatic measurement of indentations
- Positioning using a manual XY stage

System D

HM-210D/HM-220D
Top-end model with autofocus

Features:
- Operated using AVPAK-20
- Automatic identation reading
- Automatic positioning with motorized XY stage
- Autofocusing

Video camera unit 810-454D
(Can be used with the manual model main unit) CCD camera and 8.4"/213,4mm TFT monitor Enables observation and measurement of indentations at high magnification, thereby reducing operator error

AVPAK-20 software for automatic hardness testing systems. Software that supports control, testing and report creation related to hardness testing. Supports parameter setting and automatic measurement.

High-functionality PC and TFT monitor Compatible with Windows® 7/10* Professional. Supports a wide-screen TFT and provides improved operability. *depending the version

Micro-Vickers Hardness Testing Machines HM-210/220

Configuration

Up to three additional objective lenses can be added

		Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
TOUCH SCREEN MODELS	SYSTEM A	HM-210 SYSTEM A	Main unit standard test force	810-401D	Video camera unit	810-454D	
			Manual XY stage 25 x 25mm	810-420	Objective lens 2X	11AAC104	
					Objective lens 5X	11AAC105	
		HM-210 SYSTEM A	Main unit standard test force	810-401D	Objective lens 10X	11AAC106	
			Manual XY stage 50 x 50mm	810-423	Objective lens 20X	11AAC107	
					Objective lens 100X	11AAC108	
					Indenter shaft unit	11AAC109	with 19BAA061 Knoop indenter
		HM-220 SYSTEM A	Main unit low test force	810-406D	Video camera unit	810-454D	
			Manual XY stage 25 x 25mm	810-420	Objective lens 2X	11AAC104	
					Objective lens 5X	11AAC105	
		HM-220 SYSTEM A	Main unit low test force	810-406D	Objective lens 10X	11AAC106	
			Manual XY stage 50 x 50mm	810-423	Objective lens 20X	11AAC107	
					Objective lens 100X	11AAC108	
					Indenter shaft unit	11AAC110	with 19BAA062 Knoop indenter

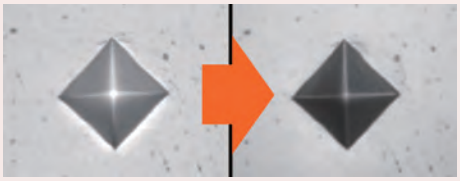
		Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
SOFTWARE MODELS	SYSTEM B	HM-210 SYSTEM B	Main unit standard test force	810-404D	Objective lens 2X	11AAC104	
			Manual XY stage 25 x 25mm	810-420	Objective lens 5X	11AAC105	
			AVPAK-20*	11AAC666	Objective lens 10X	11AAC106	
					Objective lens 20X	11AAC107	
		HM-210 SYSTEM B	Main unit standard test force	810-404D	Objective lens 100X	11AAC108	
			Manual XY stage 50 x 50mm	810-423	Indenter shaft unit	11AAC109	with 19BAA061 Knoop indenter
			AVPAK-20*	11AAC666	Measuring microscope	11AAC129	
		HM-220 SYSTEM B	Main unit low test force	810-409D	Objective lens 2X	11AAC104	
			Manual XY stage 25 x 25mm	810-420	Objective lens 5X	11AAC105	
			AVPAK-20*	11AAC666	Objective lens 10X	11AAC106	
					Objective lens 20X	11AAC107	
		HM-220 SYSTEM B	Main unit low test force	810-409D	Objective lens 100X	11AAC108	
			Manual XY stage 50 x 50mm	810-423	Indenter shaft unit	11AAC110	with 19BAA062 Knoop indenter
			AVPAK-20*	11AAC666	Measuring microscope	11AAC129	

		Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
SOFTWARE MODELS	SYSTEM C	HM-210 SYSTEM C	Main unit standard test force	810-404D	Objective lens 2X	11AAC104	
			Motorized XY stage 50 x 50mm	810-461D	Objective lens 5X	11AAC105	
			AVPAK-20*	11AAC666	Objective lens 10X	11AAC106	
					Objective lens 20X	11AAC107	
		HM-210 SYSTEM C	Main unit standard test force	810-404D	Objective lens 100X	11AAC108	
			Motorized XY stage 100 x 100mm	810-462D	Indenter shaft unit	11AAC109	with 19BAA061 Knoop indenter
			AVPAK-20*	11AAC666	Measuring microscope	11AAC129	
		HM-220 SYSTEM C	Main unit low test force	810-409D	Objective lens 2X	11AAC104	
			Motorized XY stage 50 x 50mm	810-461D	Objective lens 5X	11AAC105	
			AVPAK-20*	11AAC666	Objective lens 10X	11AAC106	
					Objective lens 20X	11AAC107	
		HM-220 SYSTEM C	Main unit low test force	810-409D	Objective lens 100X	11AAC108	
			Motorized XY stage 100 x 100mm	810-462D	Indenter shaft unit	11AAC110	with 19BAA062 Knoop indenter
			AVPAK-20*	11AAC666	Measuring microscope	11AAC129	

		Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
SOFTWARE MODELS	SYSTEM D	HM-210 SYSTEM D	Main unit standard test force	810-404D	Objective lens 2X	11AAC104	
			Motorized XY stage 50 x 50mm	810-461D	Objective lens 5X	11AAC105	
			Auto Focus stage unit	810-465	Objective lens 10X	11AAC106	
			AVPAK-20*	11AAC666	Objective lens 20X	11AAC107	
					Objective lens 100X	11AAC108	
		HM-210 SYSTEM D	Main unit standard test force	810-404D	Indenter shaft unit	11AAC109	with 19BAA061 Knoop indenter
			Motorized XY stage 100 x 100mm	810-462D	Measuring microscope	11AAC129	
			Auto Focus stage unit	810-465			
			AVPAK-20*	11AAC666			
		HM-220 SYSTEM D	Main unit low test force	810-409D	Objective lens 2X	11AAC104	
			Motorized XY stage 50 x 50mm	810-461D	Objective lens 5X	11AAC105	
			Auto Focus stage unit	810-465	Objective lens 10X	11AAC106	
			AVPAK-20*	11AAC666	Objective lens 20X	11AAC107	
					Objective lens 100X	11AAC108	
		HM-220 SYSTEM D	Main unit low test force	810-409D	Indenter shaft unit	11AAC110	with 19BAA062 Knoop indenter
			Motorized XY stage 100 x 100mm	810-462D	Measuring microscope	11AAC129	
			Auto Focus stage unit	810-465			
			AVPAK-20*	11AAC666			

* The above set does not include PC.

For all systems: 50 x objective as standard.



Observation image of the indentation (50X)
Stray light reduction around the indentation

Wide range of lenses available for different magnifications

Objectives	Vickers-Scale		
	HV 0,00005 - 0,02	HV 0,2 - 1	HV 1-2
2x	Use this objectives only for probe overview		
5x	Use this objectives only for probe overview		
10x			
20x			
50x			
100x			
10x objective for easy focus			
Use this table for first orientation			

Vickers Hardness Testing Machine HV-110/120

Specifications

External dimensions [mm]	System A: 307(W)×696(D) ×786(H)mm System B/C/D: 307(W) ×627(D)×875(H)mm
Objective lens	Up to 3 pcs. mountable (one standard lens 10X mounted as standard)
Force dwell time	5-999 sec (selectable)
Optical system	Infinity corrected optical system
Standard	JIS B 7725, ISO 6507-2
Illumination unit	LED light
Data output	RS-232C, Digimatic, USB 2. 0 interface
Indenter approach speed	60 µm/s, 150 µm/s selectable
Control panel	Built-in touch panel, 5,7" Color LCD (HM-110A/120A for System A), Control software (PC for System B/C/D)
Functions	Calculation of Vickers / Knoop*2 / Brinell*3 hardness, and ceramic fracture toughness based on IF method (JIS R1697), 3 display format (standard, list, simple), GO/NG judgment, test condition guide, curve and user correction, hardness corresponding value, statistics calculation
Main unit mass	HV-110: Approx. 60kg, HV-120: Approx. 58kg
Output	Digimatic, serial, USB2 series A (for memory)*1, USB2 B Type (for system communication)
Resolution of diagonal length of an indentation	Objective lens less than 50X: 0,1µm (Objective lens more than 50X: 0,01µm)
Specimen dimensions	System A: height 210mm, depth 170mm (when using flat anvil) System B: height 181mm, depth 170mm (when using manual XY stage 50X50mm) System C: height 172mm, depth 170mm, System D: height 132mm, depth 170mm
Test force control	Lever method and automatic control (load, duration, unload)
Turret drive	Motor driven and manual operation

Hardness Testing Machines brochure on request

Series 810

HV 110/120 has the following benefits:

- Line-up from manual operation to CNC
- **144 mm** (5,7 inch) colored touchsreen display (Type A) with higher visibility, easy to operate user interface
- Configuring a fully automatic system dramatically shortens the total cycle time for hardness testing using AVPAK-20 (Type B, C, D) for batch control of the testing, analysis and report creation process
- Integrated features of motorized type successfully reduce the total testing tact time
- Electromagnetic test force control for all models
- LED illumination employment extends the service life and offers a natural-colored observation image
- Supports Micro Brinell up to 62,5KG with an optional test force weight.

Manual type A **Software type D**

HV-110

Model	HV-110	HV-110,
No.	**810-440D**	**810-443D**
Test force	N: 9807; 19,61; 29,42; 49,03; 98,07; 196,1; 294,2; 490,3 (kgf): 1; 2; 3; 5; 10; 20; 30; 50	N: 9807; 19,61; 29,42; 49,03; 98,07; 196,1; 294,2; 490,3 (kgf): 1; 2; 3; 5; 10; 20; 30; 50
System	System A	System A

HV-120

Model	HV-120	HV-120.
No.	**810-445D**	**810-448D**
Test force	N: 2942; 4903; 9807; 24,51; 49,03; 98,07; 196,1; 294,2 (kgf): 0,3; 0,5; 1; 2,5; 5; 10; 20; 30	N: 2942; 4903; 9807; 24,51; 49,03; 98,07; 196,1; 294,2 (kgf): 0,3; 0,5; 1; 2,5; 5; 10; 20; 30
System	System B / C / D	System B / C / D

Scan QR Code with your mobile device and watch our product videos on YouTube

Vickers Hardness Testing Machine HV-110/120

Manual or complete automatic testing

System A

HV-110A/HV-120A

Features:
- 144 mm (5.7 inch) color LCD display
- 3 types of display styles settable
- Equipped measuring microscope allows diagonal length measurement by visual observation
- Positioning using a manual XY stage

System C

HV-110C/HV-120C

Features:
- Operation using highly functional AVPAK-20 software
- Light intensity of the LED illumination adjusted with aperture diaphragm or through AVPAK-20
- Automatic indentation reading
- Automatic positioning using motorized XY stage

System B

HV-110B/HV-120B

Features:
- Operation using highly functional AVPAK-20 software
- Light intensity of LED illumination adjusted with aperture or AVPAK-20
- Positioning using a manual XY stage

System D

HV-110D/HV-120D

Features:
- Operation using highly functional AVPAK-20 software
- Light intensity of the LED illumination adjusted with aperture diaphragm or through AVPAK-20
- Automatic positioning with motorized XY stage
- Auto focussing

Optional accessories

No.	Description
19BAA063MPA	Knoop diamond indenter ISO 4545 cert., V100 HK0.2 HV-100, AVK Series
63ETB775	Reference material Vickers ISO 6507-3, 750 HV1
63ETB749	Reference material Vickers ISO 6507-3, 500 HV10
63ETB754	Reference material Vickers ISO 6507-3, 750 HV10
63ETB875	Reference material Vickers ISO 6507-3, 500 HV20
63ETB880	Reference material Vickers ISO 6507-3, 750 HV20
63ETB897	Reference material Vickers ISO 6507-3, 500 HV30
63ETB902	Reference material Vickers ISO 6507-3, 750 HV30
810-038	Round table, Ø250 mm
810-040	V-anvil, groove length 40 mm, Ø15 mm-Ø60 mm
810-041	V-anvil, groove length 40 mm, Ø3 mm-Ø9 mm
810-423	Manual XY stage w. digital micrometers, 50x50mm HM-200 and HV-100 Series
11AAC702	Vickers hardness testing machines, Steel stand for HV-100 Series machine
11AAC719	Vickers hardness testing machines, Vibration isolator stand HV-100 Series
810-644	Adittional rack for 11AAC719

Manual type with 810-454D video system

Vickers Hardness Testing Machine HV-110/120

Configuration

Two additional objective lenses can be selected

TOUCH SCREEN MODELS — SYSTEM A

Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
HV-110 SYSTEM A	Main unit standard test force	810-440D	Video camera unit	810-454D	
	Manual XY stage 50 x 50mm	810-423	Objective lens 2X	11AAC712	
			Objective lens 5X	11AAC713	
			Objective lens 20X	11AAC714	
			Objective lens 50X	11AAC715	
HV-120 SYSTEM A	Main unit low test force	810-445D	Video camera unit	810-454D	
	Manual XY stage 50X50 mm	810-423	Objective lens 2X	11AAC712	
			Objective lens 5X	11AAC713	
			Objective lens 20X	11AAC714	
			Objective lens 50X	11AAC715	

SOFTWARE MODELS — SYSTEM B

Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
HV-110 SYSTEM B	Main unit standard test force	810-443D	Measuring microscope	11AAC718	Cannot be used simultaneously with the vision unit
	Manual XY stage 50 x 50mm	810-423	Objective lens 2X	11AAC712	
	AVPAK-20*	11AAC666	Objective lens 5X	11AAC713	
			Objective lens 20X	11AAC714	
			Objective lens 50X	11AAC715	
HV-120 SYSTEM B	Main unit low test force	810-448D	Measuring microscope	11AAC718	Cannot be used simultaneously with the vision unit
	Manual XY stage 50 x 50mm	810-423	Objective lens 2X	11AAC712	
	AVPAK-20*	11AAC666	Objective lens 5X	11AAC713	
			Objective lens 20X	11AAC714	
			Objective lens 50X	11AAC715	

SOFTWARE MODELS — SYSTEM C

Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
HV-110 SYSTEM C	Main unit standard test force	810-443D	Measuring microscope	11AAC718	Cannot be used simultaneously with the vision unit
	Motorized XY stage 50 x 50mm	810-451	Objective lens 2X	11AAC712	
	AVPAK-20*	11AAC666	Objective lens 5X	11AAC713	
			Objective lens 20X	11AAC714	
HV-110 SYSTEM C	Main unit standard test force	810-433D	Objective lens 50X	11AAC715	
	Motorized XY stage 100 x 100mm	810-452D			
	AVPAK-20*	11AAC666			
HV-120 SYSTEM C	Main unit low test force	810-448D	Measuring microscope	11AAC718	Cannot be used simultaneously with the vision unit
	Motorized XY stage 50 x 50mm	810-451D	Objective lens 2X	11AAC712	
	AVPAK-20*	11AAC666	Objective lens 5X	11AAC713	
			Objective lens 20X	11AAC714	
	Main unit standard test force	810-433D	Objective lens 50X	11AAC715	
HV-120 SYSTEM C	Motorized XY stage 100 x 100mm	810-452D			
	AVPAK-20*	11AAC666			

SOFTWARE MODELS — SYSTEM D

Minimum system configuration			In addition selectable FACTORY OPTIONS		Remarks
HV-110 SYSTEM D	Main unit standard test force	810-443D	Video camera unit	810-454D	
	Motorized XY stage 50 x 50mm	810-451D	Objective lens 2X	11AAC712	
	Auto Focus stage unit	810-465	Objective lens 5X	11AAC713	
	AVPAK-20*	11AAC666	Objective lens 20X	11AAC714	
			Objective lens 50X	11AAC715	
HV-110 SYSTEM D	Main unit standard test force	810-443D	Objective lens 100X	11AAC716	
	Motorized XY stage 100 x 100mm	810-452D	Measuring microscope	11AAC718	Cannot be used simultaneously with the vision unit
	Auto Focus stage unit	810-465			
	AVPAK-20*	11AAC666			
HV-120 SYSTEM D	Main unit low test force	810-448D	Video camera unit	810-454D	
	Motorized XY stage 50 x 50mm	810-451D	Objective lens 2X	11AAC712	
	Auto Focus stage unit	810-465	Objective lens 5X	11AAC713	
	AVPAK-20*	11AAC666	Objective lens 20X	11AAC714	
			Objective lens 50X	11AAC715	
HV-120 SYSTEM D	Main unit low test force	810-448D	Objective lens 100X	11AAC716	
	Motorized XY stage 100 x 100mm	810-452D	Measuring microscope	11AAC718	Cannot be used simultaneously with the vision unit
	Auto Focus stage unit	810-465			
	AVPAK-20*	11AAC666			

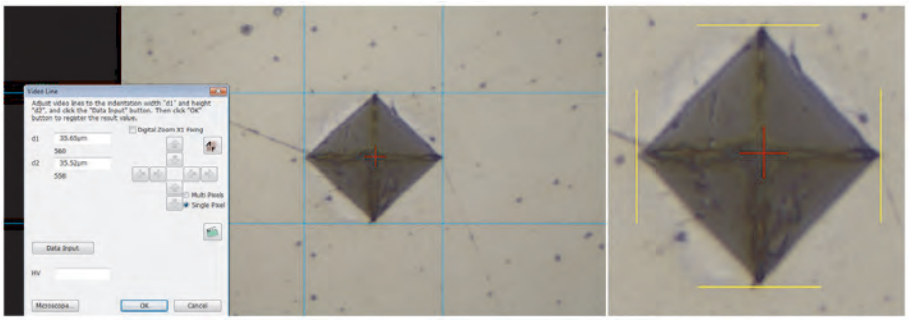
* The above set does not include PC.

For all systems: 10 x objective as standard.

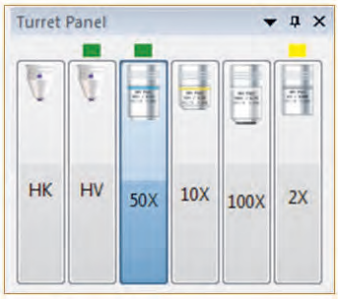
Vickers Hardness Testing Software

Software AVPAK-20 for System B,C and D No. 11AAC666

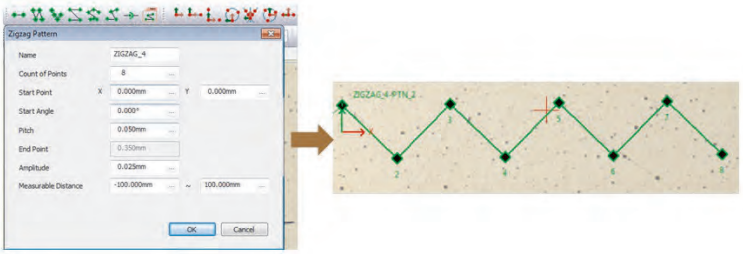
Software to control test sequence, evaluate hardness and make report
Supports Windows® 7/10*, 64 bit operating system
*depending the version.



Indentation analysis function

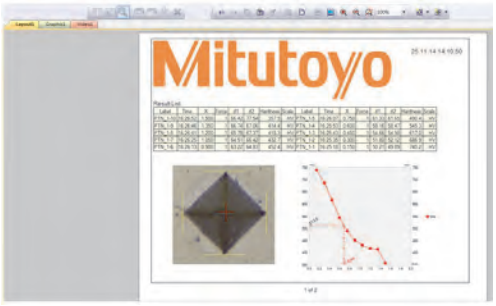


Turret control function



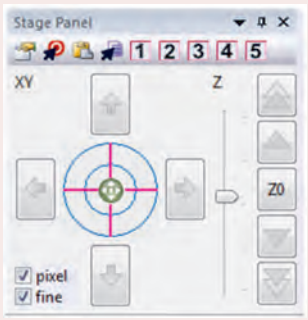
Test pattern function
Available to execute the test according to several patterns (line, zigzag, grid or circle/ arc) or its combination or generated pattern with arranged points done by the operator freely.

Coordinate alignment function
Several alignment methods (1-point, 2-points, 3-points, arc, and centre of circle, bisector, midpoint) are available.
Available to establish the coordinate along the contour for the several types of tests (offset, pattern, grid).



Analysis and report function
Provides to display several types of graph (carburise transition, carburize distribution, X-R control chart) and layouts.
It is possible to edit these graphs on the report.

Stitching function



Stage control function

Functions

Stitching
Controls camera at lattice-like arranged positions and makes wide area image with several camera images (motorized XY stage is required)

Indentation analysis function
Analyse an indentation and to measure it´s diagonal length according EN ISO 6507-1

Illumination control function
Control the illumination by 100 levels. Provides to adjust the level according to the specimen automatically and to display saturation on the camera image

Stage control function
Control the motorized XY stage unit (for type C and D) and the autofocus stage unit (type D) by the joystick on the AVPAK-20 window. Also available to memorize and recall five XY positions

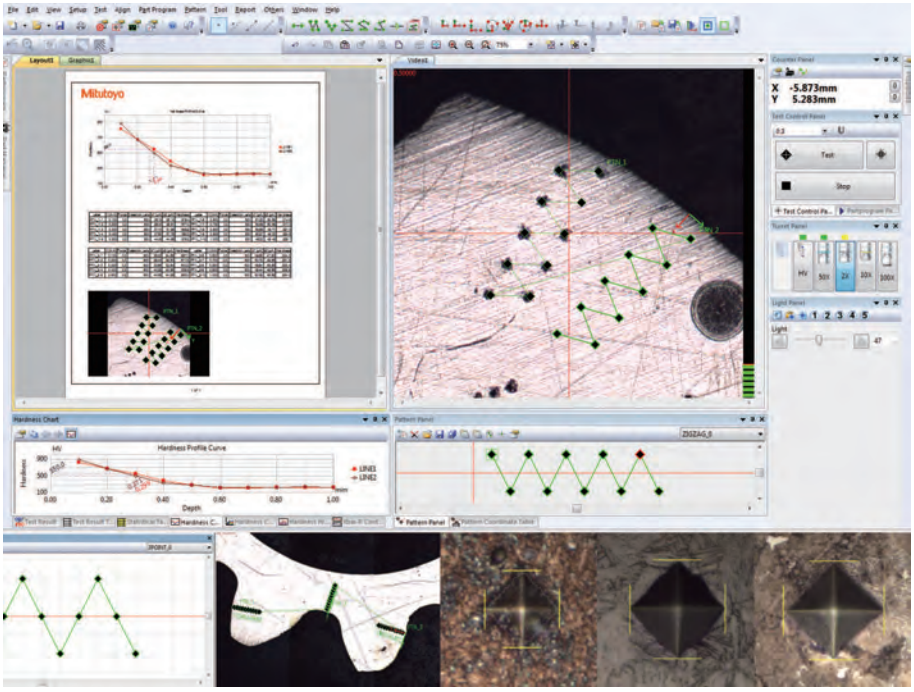
Turret control function
Provides to change the effective objective lenses or indenter by rotating the turret

Automatic execution function
Always records executed operations and play back this operation at anytime

Vickers Hardness Testing Software

Software AVPAK-20 for System B, C and D

Graphic view (of stored images)
For displaying the entire specimen and checking the pattern positioning The digital zoom function can be used to easily magnify and check the indentation site.



Screen layout for control, testing status and result display can be changed freely.

FUNCTIONS

Layout view
Photos from individual views, graphs, tables, etc., can be laid out freely to create the report in need.

Stitching
Takes images of an entire rectangular field from the moving stage then combines the images. Use stitching for a complete overview of sample.

Auto trace
Automatically traces the shape of the sample. Take images as the stage moves along the outer contours of the specimen, then combines the images.

Navigation function
(System B)
When the test position is to be moved during multipoint testing(CHD etc.), this function guides the travel of the XY fine adjustment manual stage to the next position by pop up on screen menu.

Handling of multiple specimens
Part program and Part Manager function support testing of multiple and irregular specimens.

Multi-specimen testing
Executes different part programs for each irregular specimen.

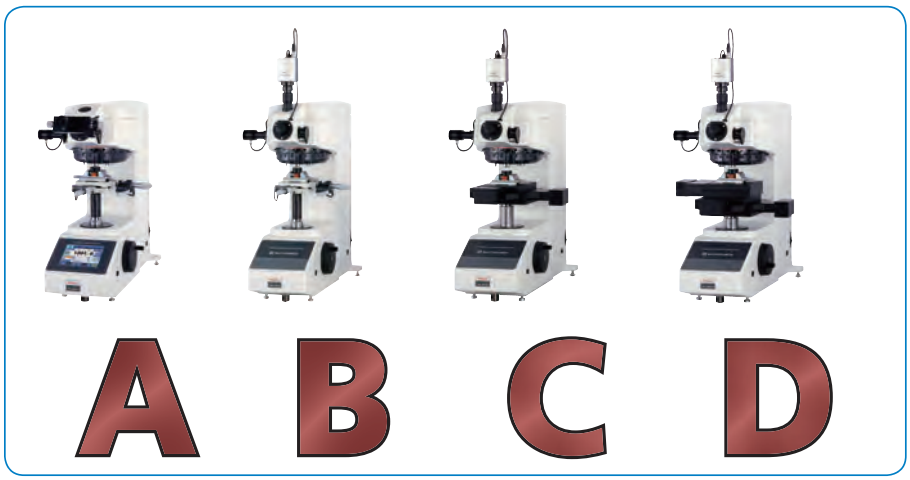
Parts Manager:
Executes a common part program for specimens having the same shape.

Pattern creation:
This tool supports the creation of test patterns such as straight lines, zigzag lines and teaching patterns.

Pattern pasting :
This tool supports the pasting of created test patterns by applying a coordinate system. It adjusts the origin, direction, etc. of the before created pattern.

Micro-Vickers and Vickers Set

Configuration



Please order AVPAK-20 Software **11AAC666** and the PC additionally!

Single indenter configuration HM-200 A-Type sets

Contains:	810-401D-ASET HM-210A
810-401D	Manual main unit HM-210
11AAC106	10x Objective lens
Standard lens	50x Objective lens
810-420	Manual XY stage 25x25mm

810-016 vise not included

Contains:	810-406D-ASET HM-220A
810-406D	Manual main unit HM-220
11AAC106	10x Objective lens
11AAC108	100x Objective lens
Standard lens	50x Objective lens
810-420	Manual XY stage 25x25mm

810-016 vise not included

Single indenter configuration HM-200 B-Type sets

Contains:	810-404D-BSET1 HM-210B
810-404D	System main unit HM-210
11AAC106	10x Objective lens
Standard lens	50x Objective lens
810-420	Manual XY stage 25x25mm

810-016 vise not included

Contains:	810-409D-BSET1 HM-220B
810-409D	System main unit HM-220
11AAC106	10x Objective lens
11AAC108	100x Objective lens
Standard lens	50x Objective lens
810-420	Manual XY stage 25x25mm

810-016 vise not included

Double indenter configuration HM-200 B-Type sets

Contains:	810-404D-BSET2 HM-210B
810-404D	System main unit HM-210
11AAC109	Second indenter shaft unit for Knoop test
11AAC106	10x Objective lens
Standard lens	50x Objective lens
810-420	Manual XY stage 25x25mm

810-016 vise not included

Contains:	810-409D-BSET2 HM-220B
810-409D	System main unit HM-220
11AAC110	Second indenter shaft unit for Knoop test
11AAC106	10x Objective lens
11AAC108	100x Objective lens
Standard lens	50x Objective lens
810-420	Manual XY stage 25x25mm

810-016 vise not included

Single indenter configuration HM-200 C-Type sets

Contains:	810-404D-CSET HM-210C
810-404D	System main unit HM-210
11AAC104	2x Objective lens
11AAC106	10x Objective lens
Standard lens	50x Objective lens
810-462D	Motorized XY stage 100x100mm

810-016 vise not included

Contains:	810-409D-CSET HM-220C
810-409D	System main unit HM-220
11AAC104	2x Objective lens
11AAC106	10x Objective lens
11AAC108	100x Objective lens
Standard lens	50x Objective lens
810-462D	Motorized XY stage 100x100mm

810-016 vise not included

Single indenter configuration HM-200 D-Type sets

Contains:	810-404D-DSET HM-210D
810-404D	System main unit HM-210
11AAC104	2x Objective lens
11AAC106	10x Objective lens
Standard lens	50x Objective lens
810-462D	Motorized XY stage 100x100mm
810-465	Autofocus unit

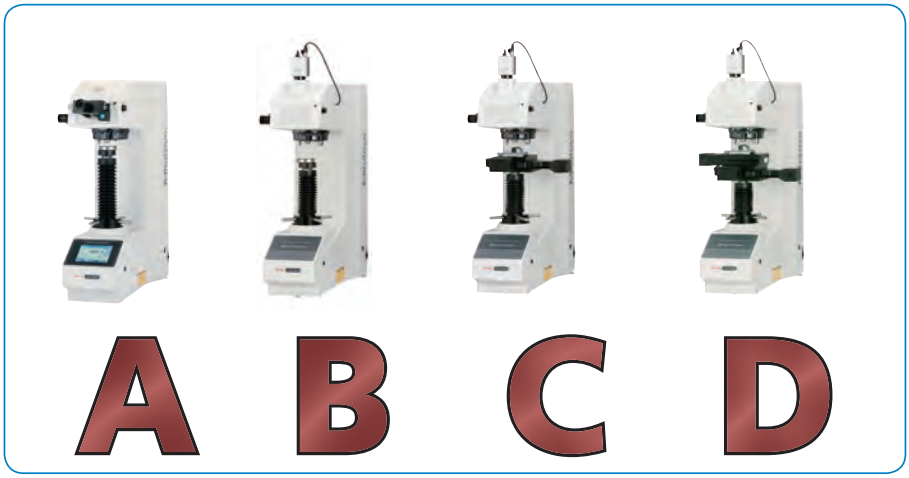
Contains:	810-409D-DSET HM-220D
810-409D	System main unit HM-220
11AAC104	2x Objective lens
11AAC106	10x Objective lens
11AAC108	100x Objective lens
Standard lens	50x Objective lens
810-462D	Motorized XY stage 100x100mm
810-465	Autofocus unit

810-016 vise not included

Micro-Vickers and Vickers Set

Please order AVPAK-20 Software **11AAC666** and the PC additionally!

Configuration



Configuration HV-100 A-Type Sets

Contains:	810-440D-ASET HV-110A
810-440D	Manual main unit HV-110
11AAC714	20x Objective lens
Standard lens	10x Objective lens

Contains:	810-445D-ASET HV-120A
810-445D	Manual main unit HV-120
11AAC714	20x Objective lens
Standard lens	10x Objective lens

Configuration HV-100 B-Type Sets

Contains:	810-443D-BSET HV-110B
810-443D	System main unit HV-110
11AAC714	20x Objective lens
Standard lens	10x Objective lens

Contains:	810-448D-BSET HV-120B
810-448D	System main unit HV-120
11AAC714	20x Objective lens
Standard lens	10x Objective lens

Configuration HV-100 C-Type Sets

Contains:	810-443D-CSET HV-110C
810-443D	System main unit HV-110
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm

810-016 vise not included

Contains:	810-448D-CSET HV-120C
810-448D	System main unit HV-120
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm

810-016 vise not included

Configuration HV-100 D-Type Sets

Contains:	810-443D-DSET HV-110D
810-443D	System main unit HV-110
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm
810-465	Autofocus unit

810-016 vise not included

Contains:	810-448D-DSET HV-120D
810-448D	System main unit HV-120
11AAC712	2x Objective lens
11AAC714	20x Objective lens
Standard lens	10x Objective lens
810-462D	Motorized XY stage 100x100mm
810-465	Autofocus unit

810-016 vise not included

Mitutoyo

Wizhard Rockwell, Rockwell Superficial, Brinell Hardness Testers HR-500 Series

Series 810

These hardness testing machines give you high performance and improved productivity.
The Wizhard Rockwell, Rockwell Superficial, Brinell Hardness Testers HR-500 Series offers you the following benefits:

- Multiple test force generation for Rockwell, Rockwell Superficial and Brinell hardness.
- A dolphin-nose indenter arm gives you easy reach of interior surfaces (min. ø40mm / ø22mm, when using an optional diamond indenter) and exterior surfaces.
- Real-time electronic test force control gives you accurate loading, and completely eliminates load force overshoot.
- An indenter escape function allows you carry out continuous testing at a fixed table position, which eliminates instability caused by table retraction.
- Auto-stop table elevation and automatic preloading provide stable test force generation.
- EXPAK software for simple data collection and statistics 11AAC237
- HR-500L long type with an optional max. specimen height of 395 mm

HR-521 / HR-522

HR-523

Conversion function [HV, HK, HR (Rockwell hardness A, B, C, D, F, G / Rockwell Superficial 15T, 30T, 45T, 15N, 30N, 45N), HS, HB, Tensile strength]
OK/NG judgment function
Continuous measurement function (for specimens of the same thickness)
Cylindrical correction, spherical correction, offset correction, multi-point correction functions
Statistical calculation function
Graph generation function (X-R control charts)

Model	HR-521	HR-521.	HR-522	HR-522.	HR-523	HR-523.
No.	**810-202D**	**810-205D**	**810-203D**	**810-206D**	**810-204D**	**810-207D**
Max. specimen height	250 mm	395 mm	250 mm	395 mm	250 mm	395 mm
Table lifting	Manual (with automatic brake)	Manual (with automatic brake)	Manual (with automatic brake)	Manual (with automatic brake)	Power drive	Power drive
Brinell Scale [N]	1839	1839	61.29 ; 98.07 ; 153.2 ; 245.2 ; 294.2 ; 306.5 ; 612.9 ; 980.7 ; 1226 ; 1839	61.29 ; 98.07 ; 153.2 ; 245.2 ; 294.2 ; 306.5 ; 612.9 ; 980.7 ; 1226 ; 1839	61.29 ; 98.07 ; 153.2 ; 245.2 ; 294.2 ; 306.5 ; 612.9 ; 980.7 ; 1226 ; 1839	61.29 ; 98.07 ; 153.2 ; 245.2 ; 294.2 ; 306.5 ; 612.9 ; 980.7 ; 1226 ; 1839

Specifications

Standard	JIS B 7726 / ISO6508-2 /ASTM E18)
Preleminary test force	26,42 : 98,07 N
Operation Unit	Touch-screen type
Load control	Automatic (load, dwell, unload)
Force dwell time	0-120 s (1 s increments)
Max. specimen depth	150 mm (from the center of the indenter shaft to back)
Data output	RS-232C, Digimatic code (SPC) and Centronics
Dimensions (WxDxH)	**Main unit** 250 x 670 x 605 mm **Control unit** 165 x 260 x 105 mm
Rockwell [N]	588,4; 980,7; 1471
Total test force Superficial [N]	147,1; 294,2; 441,3
Mass	65 kg

Wizhard Rockwell, Rockwell Superficial, Brinell Hardness Testers HR-500 Series

Series 810

Additional product description and accessories for HR-500 series

Standard accessories

No.	Description
810-039	Flat anvil, Ø64 mm
810-040	V-anvil, groove length 40 mm, Ø15 mm- Ø60 mm
19BAA517	Hardness testing machines, Vinyl Cover HR-500 Series

Hardness test blocks, Diamond indenter, steel balls and split level are standard accessories.

Optional accessories

No.	Description
264-504-5D	Statistic Processing Printer DP-1VR, CEE Type
11AAC237	EXPAK-07 data processing program, HR-500 Series
Anvils	
810-037	Round table, Ø180 mm
810-038	Round table, Ø250 mm
810-041	V-anvil, groove length 40 mm, Ø3 mm- Ø9 mm
810-042	Stepped V-anvil, step height 13 mm, groove length 10 mm, Ø4mm- Ø16 mm
810-029	V-anvil, groove length 400 mm, Ø50 mm- Ø100 mm
810-030	Diamond spot anvil, for Rockwell Superficial scales Ø3.5 mm
810-043	Spot Anvil, Spot Ø12 mm
810-044	Stepped spot Anvil, Spot Ø5.5 mm, step height 13 mm
Indenter	
19BAA292MPA	Rockwell diamond indenter ISO 6508 cert., Short type for HR-500 Series
19BAA072MPA	Rockwell diamond indenter ISO 6508 cert., LR100 standard type
Portable microscopes for Brinell testing	
19BAA161D	Portable Microscope, 20x for Brinell measurement
19BAA318D	Portable Microscope, 40x for Brinell measurement
19BAA319D	Portable Microscope, 100x for Brinell measurement

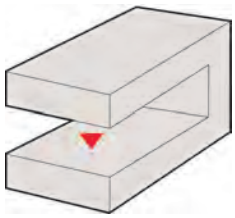
Additional accessories are available for Brinell hardness testing. Refer to the Hardness Testing Machines brochure.
For identers and Hardness test blocks see chapter Hardness Test Blocks

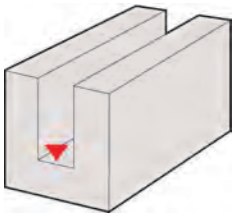
The dolphin-nose indenter arm for inside testing

Hardness Testing Machines brochure on request

Control units

Touch-screen type
- **Touch-screen operation with a back-lit LCD graphic display.**
- **Remote selection of the test force linked to the hardness scale selection.**
- **Choice of message language in English, German, French, Spanish, Italian and Japanese for user-friendly operation.**
- **Cylindrical and spherical surface compensation.**
- **Data offset**
- **Conversion to other hardness scales.**
- **Powerful statistical processing with flexible data point editing and 1024 data memory.**
- **Measurement data editing**
- **OK/±NG tolerance judgement.**
- **Statistical processing, histogram and X-R chart**
- **Expak software for simple data collection 11AAC237**





Various shapes of specimen can be tested (a dolphin nose type indenter mechanism has been adopted). The dolphin-nose indenter mechanism allows internal measurement of pipe samples as well as the top surface of a flat sample.

Mitutoyo

Rockwell HR-100/200/300/400

Series 963

These are five economical Rockwell hardness testing machines to suit practically every application you need.
The Rockwell HR-100/200/300/400 offers you the following benefits:

- The newly designed frame provides maximum clearance for positioning the work piece, all you need is a flat table for mounting these testing machines.
- They are very simple to operate: the analogue types HR-110/HR-210 use an automatic presetting dial gauge.
- HR-110MR does not require a power source, and is considered to be environmentally friendly.
- Digital models HR-430MR/MS use automatic steering wheel braking and load sequencing for easy handling.
- Digital models HR-320MS and HR-430MR/MS can use our Digimatic Mini-processor (DP-1VR) for printing results, and you can use an input tool (USB-ITN-E) to connect to a PC for data transfer, analysis and storage.
- You can perform Brinell hardness tests by using the following optional accessories: a Brinell indenter, a weight set and a measurement microscope.

HR-110MR
Rockwell hardness testing machine

An environmentally friendly energy-saving model.
The basic operation is all manual, including weight-changing (total test force selection).

HR-210MR
Rockwell hardness testing machine

Manual weight changing (with total test force selected) and handling of preload force. Motor drive controls loading sequence.

HR-110MR and HR-210MR gauge

Model	HR-110MR	HR-210MR	HR-320MS	HR-430MR	HR-430MS
No.	**963-210-20**	**963-220D**	**963-231D**	**963-240D**	**963-241D**
Standard	JIS B 7726	JIS B 7726	JIS B 7726 / ISO6508-2 (ASTM E18)	JIS B 7726 / ISO6508-2 (ASTM E18)	JIS B 7726 / ISO6508-2 (ASTM E18)
Preliminary test force (N)	98,07	98,07	29,42; 98,07	98,07	29,42; 98,07
Test force Superficial (N)	-	-	147,1; 294,2; 441,3	-	147,1; 294,2; 441,3
Test force Rockwell (N)	588,4; 980,7; 1471	588,4; 980,7; 1471	588,4; 980,7; 1471	588,4; 980,7; 1471	588,4; 980,7; 1471
Display	Analog	Analog	Digital	Digital	Digital
Preliminary test force setting	-	-	-	Dial switching	Dial switching
Resolution	0,5 HR graduation	0,5 HR graduation	0,1 HR indication	0,1 HR indication	0,1 HR indication
Test force selection	Weight exchange	Weight exchange	Weight exchange	Dial switching	Dial switching
Test force application	Manual	Semi-automatic	Semi-Automatic	Automatic	Automatic
Test force duration	Manual	Fixed 3-5-5 sec. or manual	Fixed 3-5-5 sec. or manual	1-99 sec or manual	1-99 sec or manual
Data output	-	-	Digimatic (SPC), RS-232C	Digimatic (SPC), RS-232C	Digimatic (SPC), RS-232C

Specifications

Height	Max. 180 mm (100 if cover is attached) mm
Measuring depth	Max. 165 mm (from the center of the endenter axis)
Functions	HR-320MS, HR-430MR, HR-430MS : GO/NG, Compensation fubction, Hardness conversion

Optional accessories

No.	Description
56AAK286B	Brinell weight set, HR-110MR HR-210MR 3pcs.
56AAK287B	Brinell weight set, HR-320MS 4pcs.
56AAK288B	Brinell weight set, HR-430MR 3pcs.
56AAK289B	Brinell weight set, HR-430MS 4pcs.
810-037	Round table, Ø180 mm
810-038	Round table, Ø250 mm
19BAA161D	Portable Microscope, 20x for Brinell measurement
Anvils	
810-030	Diamond spot anvil, for Rockwell Superficial scales Ø3.5 mm
810-027	Hardness testing machines, Adjustable support for long workpieces
810-029	V-anvil, groove length 400 mm, Ø50 mm- Ø100 mm
810-026	Fine feed adjustment stage, for Jominy test(end quench test)specimen
810-028	Hardness testing machines, Height adjustable jack rest
810-040	V-anvil, groove length 40 mm, Ø15 mm-Ø60 mm
810-043	Spot Anvil, Spot Ø12 mm
810-041	V-anvil, groove length 40 mm, Ø3 mm-Ø9 mm
810-044	Stepped spot Anvil, Spot Ø5.5 mm, step height 13 mm
810-042	Stepped V-anvil, step height 13 mm, groove length 10 mm, Ø4mm- Ø16 mm
810-048	Steel table, for Rockwell hardness testing machines
Computer accessories (not HR-110, HR-210)	
264-504-5D	Statistic Processing Printer DP-1VR, CEE Type
06ADV380E	USB Input Tool Direct (Digimatic USB) cable, 2m, Round 6-Pin Type
937387	Digimatic Cable, Round 6-Pin Type, 1 m
965013	Digimatic Cable, Round 6 -Pin Type, 2m

For idenders and Hardness test blocks see chapter Hardness Test Blocks

Scan QR Code with your mobile device and watch our product videos on YouTube

Rockwell HR-100/200/300/400

Optional accessories
For identers and Hardness test blocks see chapter Hardness Test Blocks

Series 963

Additional product description for HR-100/200/300/400 Series

HR-320MS

Dual type (Rockwell / Rockwell Superficial) hardness testing machine:

**Manually handles test force and preload force selection.
Motor drive controls loading sequence.**

HR-430MR

Rockwell hardness testing machine:

**Economy type, but supports dial switching, power steering and support of all test standards and is equipped with automatic brake handle auto start feature.
Motor drive controls loading sequence.**

HR-430MS

Dual type (Rockwell / Rockwell Superficial) hardness testing machine:

**Economy type, but supports dial switching, power steering and support of all test standards and is equipped with automatic brake handle auto start feature.
Motor drive controls loading sequence.**

Features preload force selection

Automatic steering wheel brake

SPC Digimatic and RS-232C interface

Mitutoyo

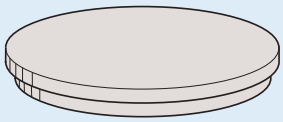
Rockwell HR-100/200/300/400

Series 963

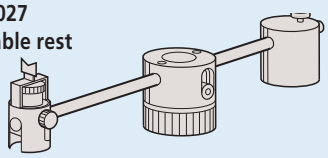
Additional product description and accessories for HR-100/200/300/400 Series

810-038
Round table OD Ø250 mm

For large probes
like profiles



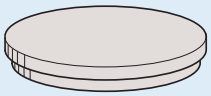
810-027
Variable rest



Test of long object probes (used together with anvil)

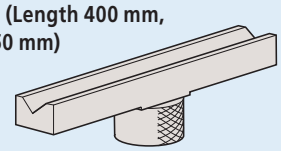
810-037
Round table OD Ø180 mm

For large probes
like profiles

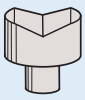


810-029
Special V-anvil (Length 400 mm, groove width 50 mm)

For shaft material
(max. Ø100 mm)

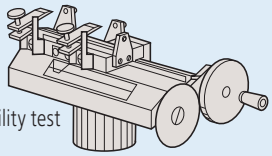


810-040
V-anvil (large)
(OD Ø40 mm, groove width 30 mm)
For shaft material (max Ø60 mm)



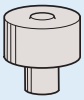
810-026
Micromovement table for Jominy test

JIS G 0561
Steel hardenability test



810-043
Spot anvil

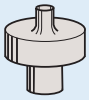
(OD Ø12 mm)



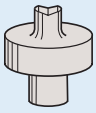
810-030
Diamond spot anvil
(OD Ø10 mm)
For plate material
Exclusive use for Rockwell superficial hardness test

810-041
V-anvil (small)
(OD Ø 40 mm, groove width 6 mm)
For shaft material (max. Ø8.4 mm)

810-044
Spot anvil
(OD Ø5.5 mm)
For plate material

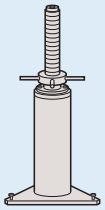


810-042
Small V-anvil
(OD Ø10 mm)
For shaft material (max. Ø16 mm)

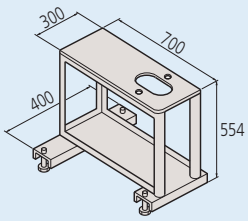


810-028
Jack rest

Testing of long object probes
(used together with anvil
or round table)



810-048
Mount for testing machine



264-504-5
Digimatic miniprocessor DP-1VR
Connecting cable not included (sold separately), please order separately. Connecting cable (1 m), part No. 937387

06ADV380E
USB input tool
Direct USB-ITN

Easy data input to PC

Impact Type Hardness Testing Unit
HARDMATIC HH-411

Series 810

This is a lightweight, digital-reading portable hardness testing instrument for metal workpieces. The Hardmatic HH-411 offers you the following benefits:

- It operates on the rebound hardness principle (standardised according to ASTM A 956).
- Measurement is conducted with hardness value L (Leeb-value) but you can convert to any desired hardness scale.
- The display automatically shows GO/±NO GO with the tolerance function set and selected.
- It has a memory function for 1800 measured values, and automatic measuring direction angle-compensation.
- Expak software gives you simple data collection 11AAC238

810-298

Sample application

Specifications

Impact device	Impact hammer with integrated carbide-ball tip, D scale (ASTM A 956)
Functions	Auto angle compensation, Offset, OK/NG judgement, Hardness scale conversion, Data storage (1800 data entries), Statistical analysis (Average value, Max. value, Min. value, Dispersion), Auto sleep function, Impact counter display function
Power supply	Battery LR6 (2 pcs.) or AC adapter (optional)
Data output	RS-232C, SPC

Standard accessories

No.	Description
19BAA457	Replacement carbide ball, HH-411
19BAA460	Detector Cable f. UD-41X
19BAA258	Cleaning brush, HH-411
19BAA265	Reference material, 800HLD HH-411

Optional accessories

No.	Description
19BAA458	Impact hammer, DL impact device
06AEG302D	AC-Adapter, 9V 500mA, CEE Type
11AAC238	EXPAK-08 data processing program, HH-411
Computer accessories	
937387	Digimatic Cable, Round 6-Pin Type, 1 m
19BAA263	Reference material Vickers ISO 6507
264-504-5D	Statistic Processing Printer DP-1VR, CEE Type
Indenters	
810-288	Leeb impact device, HLDC impact device UD-412
810-289	Leeb impact device, HLD+15 impact device UD-413
810-290	Leeb impact device, HLDL impact device UD-414
Reference material (all blocks are 115 mm diameter, 33 mm thick, 3.7 kg mass)	
19BAA243	Reference material, 880HLD HH-411
19BAA244	Reference material, 830HLD HH-411
19BAA245	Reference material, 730HLD HH-411
Support rings for D/DC type impact devices	
19BAA248	Support ring cylindrical specimen, R10-20 HH-411
19BAA249	Support ring hollow cylindrical specim., R14-20 HH-411
19BAA250	Support ring spherical specimen, R10-27.5 HH-411
19BAA251	Support ring hollow spherical specim., R13.5-20 HH-411 (D/DC impact devices)

Model	HH-411
No.	**810-298**
Accuracy	±12 HL (800 HL +/- 1,5%)
Display unit	7-segment LCD
Hardness Display range	Leeb hardness: 1 to 999HL
	Conversion range / Increment
Vickers	43-950HV / 1 HV
Brinell	20-894 HB / 1 HB
Rockwell C	19,3-68,2 HRC / 0,1 HRC
Rockwell B	13,5-101,7 HRB / 0,1 HRB
Shore	13,2-99,3 HS / 0,1 HS
Tensile strength	499-1996 MPa / 1 MPa
Specimen Thickness	Min. 5 mm
Specimen Mass	5 kg or more
Dimensions	
Measuring/Display unit	ø28 x 175 mm / 70 x 110 x 35 mm
Specimen requirements	Min. specimen thickness of 5mm or more and mass of 5kg or more (However, a specimen of mass of 0.1 to 5kg is measurable by securing to a massive base) Testing point: 5mm or more from edge of specimen, 3mm or more between testing points Specimen surface roughness: Ra of 2µm or less
Resolution	1-999 HL
Mass	320 g

UD-412 Impact device
HLDC scale
Use for inner walls of cylinders. The grip is short to allow positioning within a cylinder.

UD-413 Impact device
HLD+15 scale
Use for concave workpieces such as gear teeth, ball bearings, etc.

UD-414 impact device
HLDL scale
Use for gear teeth, welded corners, etc.

Mitutoyo

Digital and Analogue Durometers
HARDMATIC HH-300

Series 811

These compact digital/dial durometers can test a range of different materials and offer you the following benefits:

– You can use them for testing the hardness of the materials including natural rubber, neoprene, polyesters, PVC, leather, Thiokol, nitrite rubber, wax, vinyl, cellulose acetates, glass polystyrene, etc.
– Shore hardness „A", „D" and „E".

HH-329; HH-331; HH-333; HH-335

Model	HH-329	HH-331	HH-333	HH-335
No.	**811-329-10**	**811-331-10**	**811-333-10**	**811-335-10**
Display	Analog Dial	Analog Dial	Analog Dial	Analog Dial
Shore Scale	Shore E	Shore A	Shore D	Shore A
Indenter b	ø 5 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm
Indenter d	-	ø 0,79 mm	-	ø 0,79 mm
Indenter r	Ø 2,5	-	R 0,1 mm	-
θ	-	35°	30°	35°
Pressure foot a	ø 5,4 mm	ø3mm	ø 3 mm	ø 3 mm
Pressure foot f	44 x18 mm	ø 18 mm	ø 18 mm	44 x 18 mm
Indenter protrusion	2,5 mm	2,5 mm	2,5 mm	2,5 mm
Spring force WE, WA, WD	WE=550+75 HE [mN]	WA=550+75HA [mN]	WD=444,5HD [mN]	WA=550+75HA [mN]
Dimensions (WxDxH)	146 x 68 x 34 mm	188 x 68 x 35 mm	188 x 68 x 35 mm	146 x 68 x 34 mm
Mass	0,3 kg	0,32 kg	0,32 kg	0,3 kg

HH-337; HH-335-01; HH-337-01

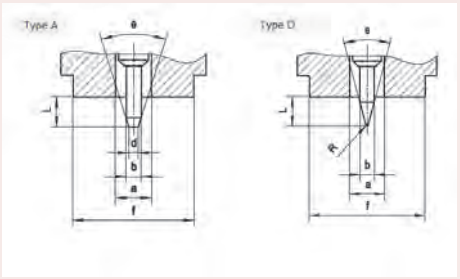
Model	HH-337	HH-335-01	HH-337-01
No.	**811-337-10**	**811-335-11**	**811-337-11**
Display	Analog Dial	Analog Dial	Analog Dial
Shore Scale	Shore D	Shore A	Shore D
Indenter b	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm
Indenter d	-	ø 0,79 mm	-
Indenter r	R 0,1 mm	-	R 0,1 mm
θ	30°	30°	30°
Pressure foot a	ø 3 mm	ø 3 mm	ø 3 mm
Pressure foot f	44 x 18 mm	ø 18 mm	ø 18 mm
Indenter protrusion	2,5 mm	2,5 mm	2,5 mm
Spring force WE, WA, WD	WS=444,5HD [mN]	WA=550+75HA [mN]	WD=444,5HD [mN]
Dimensions (WxDxH)	146 x 68 x 34 mm	146 x 68 x 34 mm	146 x 68 x 34 mm
Mass	0,3 kg	0,27 kg	0,27 kg

811-335-11

811-333-10

Images show rectangular and round pressure foot models. Please refer to pressure foot f dimensions in the table for the choice of correct pressure foot.

For the choice of long or short type, refer to the dimensions column (WxDxH) in the table



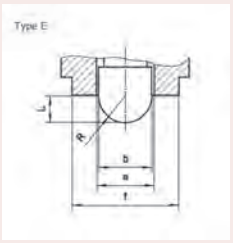


Diagrama da geometria do indentador

64AAA964

Digital and Analogue Durometers
HARDMATIC HH-300

Series 811

HH-330, HH-332, HH-334; HH-336, HH-338

Model	HH-330	HH-332	HH-334	HH-336	HH-338
No.	**811-330-10**	**811-332-10**	**811-334-10**	**811-336-10**	**811-338-10**
Display	Digital	Digital	Digital	Digital	Digital
Shore Scale	Shore E	Shore A	Shore D	Shore A	Shore D
Indenter b	ø 5 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm	ø 1,25 mm
Indenter d	-	ø 0,79 mm	-	ø ,079 mm	-
Indenter r	Ø 2,5 mm	-	R 0,1 mm	-	R 0,1 mm
θ	-	35°	30°	35°	30°
Pressure foot a	ø 5,4 mm	ø 3 mm	ø 3 mm	ø 3 mm	ø 3 mm
Pressure foot f	44x18 mm	ø 18 mm	ø 18 mm	44x18 mm	44x18 mm
Indenter protrusion	2,5 mm	2,5 mm	2,5 mm	2,5 mm	2,5 mm
Spring force WE, WA, WD	WE=550+75HE [mN]	WA=550+75HA [mN]	WD=444,5HD [mN]	WA=550+75 HA [mN]	WD=444,5HD [mN]
Dimensions (WxDxH)	147 x 59 x 40	193 x 60 x 29,5	193 x 60 x 29,5	151 x 60 x 28,5	151 x 60 x 28,5
Mass	0,29 kg	0,31 kg	0,31 kg	0,29 kg	0,29 kg

HH-336-01, HH-338-01

Model	HH-336-01	HH-338-01
No.	**811-336-11**	**811-338-11**
Display	Digital	Digital
Shore Scale	Shore A	Shore D
Indenter b	ø 1,25 mm	ø 1,25 mm
Indenter d	ø 0,79 mm	-
Indenter r	-	R 0,1 mm
θ	35°	30°
Pressure foot a	ø 3 mm	ø 3 mm
Pressure foot f	ø 18 mm	ø 18 mm
Indenter protrusion	2,5 mm	2,5 mm
Spring force WE, WA, WD	WA=550+75HA [mN]	WS=444,5HD [mN]
Dimensions (WxDxH)	151 x 60 x 28,5	151 x 60 x 28,5
Mass	0,26 kg	0,26 kg

811-336-11

811-332-10

Optional accessories

No.	Description
Computer accessories	
264-504-5D	Statistic Processing Printer DP-1VR, CEE Type
905338	Digimatic Cable, Flat Straight Type, 1m
Hardness Testing block sets	
64AAA590	Reference material Shore, HH-300 Series Shore D 3pcs.
64AAA964	Reference material Shore, HH-300 Series Shore A 3pcs.
Testing stand	
811-012	Testing stand, HH-300 Series Shore D all types
811-013	Testing stand, HH-300 Series Shore A compact types
811-019	Testing stand, HH-300 Series Shore A long types

Testing stand

- Workstage dimension : ø90 mm
- Max. specimen height : 90 mm

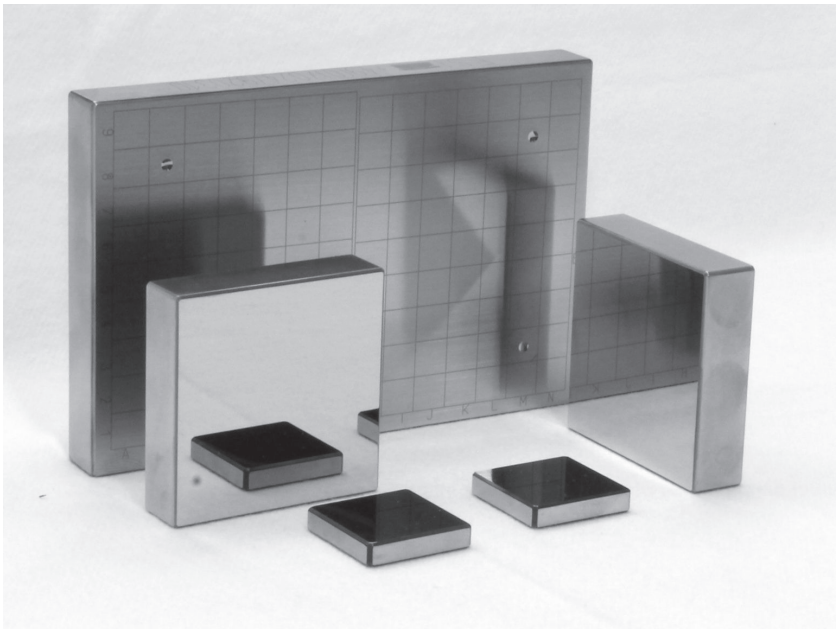
Testing stand applications
These stands are used to mount Durometers. They allow constant-pressure hardness measurement by ensuring that the Durometer presses vertically on the workpiece surface at all times.
• Anyone can perform repeatable hardness measurement due to fewer possibilities of human error and measurement variations.
• The supplied weights can be attached directly to a Durometer and allow constant-pressure hardness measurement of large samples for which a stand cannot be used.
• The supplied weights are used for calibrating the spring tension of Durometers

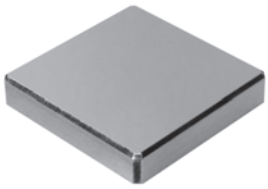
Direct application of weights

Hardness Test Blocks / Indenters

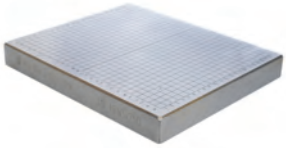
Hardness Test Blocks / Indenters

The daily or periodic verification of the hardness testing machine by the user is an important point on the way to a safe test result. In order to ensure perfect functioning of the hardness testing system, an indirect check of the machine by means of calibrated reference materials, also called hardness test blocks, is recommended to be carried out right before the daily use. In the indirect test, all parameters of the hardness testing system (test force, measuring system, indenter) are checked by the indentation on the calibrated reference material block. If the device is used only once a week, the check should only take place on this day. In three-shift operation, a check at the beginning of the shift is useful.
The hardness range of the hardness comparison plates should be selected so as to correspond as closely as possible to the hardness of the material to be tested. Now, at least one indentation, but more preferably several, is generated and evaluated. For example, damage to the indenter, and other disturbancies are easily noticed before testing the actualmaterial.

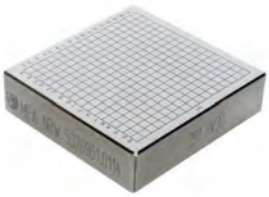




(30x30x6 mm)
Grid on request



(150x100x16 mm)
Grid on request



(60x60x16 mm)
Grid on request

Hardness Test Blocks / Indenters

1. Rockwell Test Block with DAkkS / ISO certificate

No.	Description	Value	Scale	Shape	Size	Material
63ETB001	Reference material Rockwell ISO 6508-3	31	HRA	rectangle	60x60x16 mm	aluminum
63ETB010	Reference material Rockwell ISO 6508-3	68	HRA	rectangle	60x60x16 mm	steel
63ETB018	Reference material Rockwell ISO 6508-3	85	HRA	rectangle	60x60x16 mm	steel
63ETB021	Reference material Rockwell ISO 6508-3	40	HRBW	rectangle	60x60x16 mm	aluminum
63ETB023	Reference material Rockwell ISO 6508-3	65	HRBW	rectangle	60x60x16 mm	aluminum
63ETB028	Reference material Rockwell ISO 6508-3	95	HRBW	rectangle	60x60x16 mm	steel
63ETB031	Reference material Rockwell ISO 6508-3	20	HRC	rectangle	60x60x16 mm	steel
63ETB037	Reference material Rockwell ISO 6508-3	45	HRC	rectangle	60x60x16 mm	steel
63ETB042	Reference material Rockwell ISO 6508-3	65	HRC	rectangle	60x60x16 mm	steel
63ETB045	Reference material Rockwell ISO 6508-3	40	HRD	rectangle	60x60x16 mm	steel
63ETB050	Reference material Rockwell ISO 6508-3	60	HRD	rectangle	60x60x16 mm	steel
63ETB055	Reference material Rockwell ISO 6508-3	74	HRD	rectangle	60x60x16 mm	steel
63ETB059	Reference material Rockwell ISO 6508-3	81	HREW	rectangle	60x60x16 mm	aluminum
63ETB060	Reference material Rockwell ISO 6508-3	86	HREW	rectangle	60x60x16 mm	aluminum
63ETB065	Reference material Rockwell ISO 6508-3	80	HRF	rectangle	60x60x16 mm	aluminum
63ETB066	Reference material Rockwell ISO 6508-3	94	HRF	rectangle	60x60x16 mm	aluminum
63ETB071	Reference material Rockwell ISO 6508-3	32	HRG	rectangle	60x60x16 mm	aluminum
63ETB073	Reference material Rockwell ISO 6508-3	66	HRG	rectangle	60x60x16 mm	steel
63ETB075	Reference material Rockwell ISO 6508-3	83	HRG	rectangle	60x60x16 mm	steel
63ETB082	Reference material Rockwell ISO 6508-3	56	HRK	rectangle	60x60x16 mm	aluminum
63ETB083	Reference material Rockwell ISO 6508-3	73	HRK	rectangle	60x60x16 mm	aluminum
63ETB085	Reference material Rockwell ISO 6508-3	95	HRK	rectangle	60x60x16 mm	aluminum
63ETB089	Reference material Rockwell ISO 6508-3	72	HR15N	rectangle	60x60x16 mm	steel
63ETB094	Reference material Rockwell ISO 6508-3	85	HR15N	rectangle	60x60x16 mm	steel
63ETB096	Reference material Rockwell ISO 6508-3	90	HR15N	rectangle	60x60x16 mm	steel
63ETB102	Reference material Rockwell ISO 6508-3	46	HR30N	rectangle	60x60x16 mm	steel
63ETB106	Reference material Rockwell ISO 6508-3	64	HR30N	rectangle	60x60x16 mm	steel
63ETB109	Reference material Rockwell ISO 6508-3	77	HR30N	rectangle	60x60x16 mm	steel
63ETB115	Reference material Rockwell ISO 6508-3	25	HR45N	rectangle	60x60x16 mm	steel
63ETB120	Reference material Rockwell ISO 6508-3	55	HR45N	rectangle	60x60x16 mm	steel
63ETB122	Reference material Rockwell ISO 6508-3	66	HR45N	rectangle	60x60x16 mm	steel
63ETB128	Reference material Rockwell ISO 6508-3	73	HR15TW	rectangle	60x60x16 mm	aluminum
63ETB130	Reference material Rockwell ISO 6508-3	82	HR15TW	rectangle	60x60x16 mm	aluminum
63ETB131	Reference material Rockwell ISO 6508-3	88	HR15TW	rectangle	60x60x16 mm	aluminum
63ETB139	Reference material Rockwell ISO 6508-3	43	HR30TW	rectangle	60x60x16 mm	aluminum
63ETB141	Reference material Rockwell ISO 6508-3	60	HR30TW	rectangle	60x60x16 mm	aluminum
63ETB142	Reference material Rockwell ISO 6508-3	73	HR30TW	rectangle	60x60x16 mm	aluminum
63ETB147	Reference material Rockwell ISO 6508-3	12	HR45TW	rectangle	60x60x16 mm	aluminum
63ETB149	Reference material Rockwell ISO 6508-3	38	HR45TW	rectangle	60x60x16 mm	aluminum
63ETB151	Reference material Rockwell ISO 6508-3	58	HR45TW	rectangle	60x60x16 mm	aluminum

Hardness Test Blocks / Indenters

2. Brinell Test Block with DAkkS / ISO certificate

No.	Description	Value	Scale	Shape	Size	Material
63ETB238	Refenrence material Brinell ISO 6506-3	80	HBW 1/30	rectangle	60x60x16 mm	aluminum
63ETB242	Refenrence material Brinell ISO 6506-3	200	HBW 1/30	rectangle	60x60x16 mm	steel
63ETB246	Refenrence material Brinell ISO 6506-3	400	HBW 1/30	rectangle	60x60x16 mm	steel
63ETB250	Refenrence material Brinell ISO 6506-3	600	HBW 1/30	rectangle	60x60x16 mm	steel
63ETB299	Refenrence material Brinell ISO 6506-3	80	HBW 2,5/62,5	rectangle	60x60x16 mm	aluminum
63ETB318	Refenrence material Brinell ISO 6506-3	200	HBW 2,5/187,5	rectangle	60x60x16 mm	steel
63ETB322	Refenrence material Brinell ISO 6506-3	400	HBW 2,5/187,5	rectangle	60x60x16 mm	steel
63ETB324	Refenrence material Brinell ISO 6506-3	500	HBW 2,5/187,5	rectangle	60x60x16 mm	steel
63ETB326	Refenrence material Brinell ISO 6506-3	600	HBW 2,5/187,5	rectangle	60x60x16 mm	steel
63ETB343	Refenrence material Brinell ISO 6506-3	80	HBW 5/62,5	rectangle	60x60x16 mm	aluminum
63ETB345	Refenrence material Brinell ISO 6506-3	130	HBW 5/62,5	rectangle	60x60x16 mm	aluminum
63ETB358	Refenrence material Brinell ISO 6506-3	80	HBW 5/125	rectangle	60x60x16 mm	aluminum
63ETB359	Refenrence material Brinell ISO 6506-3	110	HBW 5/125	rectangle	60x60x16 mm	aluminum
63ETB360	Refenrence material Brinell ISO 6506-3	130	HBW 5/125	rectangle	60x60x16 mm	aluminum
63ETB387	Refenrence material Brinell ISO 6506-3	80	HBW 5/250	rectangle	150x100x16 mm	aluminum
63ETB388	Refenrence material Brinell ISO 6506-3	110	HBW 5/250	rectangle	150x100x16 mm	aluminum
63ETB389	Refenrence material Brinell ISO 6506-3	130	HBW 5/250	rectangle	150x100x16 mm	aluminum
63ETB390	Refenrence material Brinell ISO 6506-3	160	HBW 5/250	rectangle	150x100x16 mm	aluminum
63ETB403	Refenrence material Brinell ISO 6506-3	110	HBW 5/750	rectangle	150x100x16 mm	aluminum
63ETB408	Refenrence material Brinell ISO 6506-3	300	HBW 5/750	rectangle	150x100x16 mm	steel
63ETB412	Refenrence material Brinell ISO 6506-3	500	HBW 5/750	rectangle	150x100x16 mm	steel
63ETB415	Refenrence material Brinell ISO 6506-3	650	HBW 5/750	rectangle	150x100x16 mm	steel
63ETB418	Refenrence material Brinell ISO 6506-3	80	HBW 10/250	rectangle	150x100x16 mm	aluminum
63ETB450	Refenrence material Brinell ISO 6506-3	80	HBW 10/1000	rectangle	150x100x16 mm	aluminum
63ETB451	Refenrence material Brinell ISO 6506-3	110	HBW 10/1000	rectangle	150x100x16 mm	aluminum
63ETB454	Refenrence material Brinell ISO 6506-3	200	HBW 10/1000	rectangle	150x100x16 mm	steel
63ETB488	Refenrence material Brinell ISO 6506-3	400	HBW 10/3000	rectangle	150x100x16 mm	steel
63ETB490	Refenrence material Brinell ISO 6506-3	500	HBW 10/3000	rectangle	150x100x16 mm	steel
63ETB493	Refenrence material Brinell ISO 6506-3	650	HBW 10/3000	rectangle	150x100x16 mm	steel

Hardness Test Blocks / Indenters

3. Vickers Test Block with DAkkS / ISO certificate

No.	Description	Value	Scale	Shape	Size	Material
63ETB497	Reference material Vickers ISO 6507-3	200	HV0,01	square	30x30x6 mm	steel
63ETB498	Reference material Vickers ISO 6507-3	250	HV0,01	square	30x30x6 mm	steel
63ETB499	Reference material Vickers ISO 6507-3	300	HV0,01	square	30x30x6 mm	steel
63ETB514	Reference material Vickers ISO 6507-3	200	HV0,015	square	30x30x6 mm	steel
63ETB516	Reference material Vickers ISO 6507-3	300	HV0,015	square	30x30x6 mm	steel
63ETB518	Reference material Vickers ISO 6507-3	400	HV0,015	square	30x30x6 mm	steel
63ETB531	Reference material Vickers ISO 6507-3	200	HV0,02	square	30x30x6 mm	steel
63ETB535	Reference material Vickers ISO 6507-3	400	HV0,02	square	30x30x6 mm	steel
63ETB537	Reference material Vickers ISO 6507-3	500	HV0,02	square	30x30x6 mm	steel
63ETB548	Reference material Vickers ISO 6507-3	200	HV0,025	square	30x30x6 mm	steel
63ETB553	Reference material Vickers ISO 6507-3	450	HV0,025	square	30x30x6 mm	steel
63ETB558	Reference material Vickers ISO 6507-3	700	HV0,025	square	30x30x6 mm	steel
63ETB578	Reference material Vickers ISO 6507-3	200	HV0,05	square	30x30x6 mm	steel
63ETB583	Reference material Vickers ISO 6507-3	450	HV0,05	square	30x30x6 mm	steel
63ETB591	Reference material Vickers ISO 6507-3	850	HV0,05	square	30x30x6 mm	steel
63ETB595	Reference material Vickers ISO 6507-3	200	HV0,1	square	30x30x6 mm	steel
63ETB600	Reference material Vickers ISO 6507-3	450	HV0,1	square	30x30x6 mm	steel
63ETB607	Reference material Vickers ISO 6507-3	800	HV0,1	square	30x30x6 mm	steel
63ETB612	Reference material Brinell ISO 6507-3	200	HV0,2	square	30x30x6 mm	steel
63ETB617	Reference material Vickers ISO 6507-3	450	HV0,2	square	30x30x6 mm	steel
63ETB624	Reference material Vickers ISO 6507-3	800	HV0,2	square	30x30x6 mm	steel
63ETB629	Reference material Vickers ISO 6507-3	200	HV0,3	square	30x30x6 mm	steel
63ETB634	Reference material Vickers ISO 6507-3	450	HV0,3	square	30x30x6 mm	steel
63ETB641	Reference material Vickers ISO 6507-3	800	HV0,3	square	30x30x6 mm	steel
63ETB647	Reference material Vickers ISO 6507-3	200	HV0,5	square	30x30x6 mm	steel
63ETB652	Reference material Vickers ISO 6507-3	450	HV0,5	square	30x30x6 mm	steel
63ETB659	Reference material Vickers ISO 6507-3	800	HV0,5	square	30x30x6 mm	steel
63ETB664	Reference material Vickers ISO 6507-3	200	HV1	square	30x30x6 mm	steel
63ETB669	Reference material Vickers ISO 6507-3	450	HV1	square	30x30x6 mm	steel
63ETB676	Reference material Vickers ISO 6507-3	800	HV1	square	30x30x6 mm	steel
63ETB764	Reference material Vickers ISO 6507-3	200	HV1	square	60x60x16 mm	steel
63ETB769	Reference material Vickers ISO 6507-3	450	HV1	square	60x60x16 mm	steel
63ETB776	Reference material Vickers ISO 6507-3	800	HV1	square	60x60x16 mm	steel
63ETB684	Reference material Vickers ISO 6507-3	200	HV2	square	60x60x16 mm	steel
63ETB689	Reference material Vickers ISO 6507-3	450	HV2	square	60x60x16 mm	steel
63ETB696	Reference material Vickers ISO 6507-3	800	HV2	square	60x60x16 mm	steel
63ETB704	Reference material Vickers ISO 6507-3	200	HV3	square	60x60x16 mm	steel
63ETB709	Reference material Brinell ISO 6507-3	450	HV3	square	60x60x16 mm	steel
63ETB716	Reference material Vickers ISO 6507-3	800	HV3	square	60x60x16 mm	steel
63ETB724	Reference material Vickers ISO 6507-3	200	HV5	square	60x60x16 mm	steel
63ETB729	Reference material Vickers ISO 6507-3	450	HV5	square	60x60x16 mm	steel
63ETB736	Reference material Vickers ISO 6507-3	800	HV5	square	60x60x16 mm	steel
63ETB743	Reference material Vickers ISO 6507-3	200	HV10	square	60x60x16 mm	steel
63ETB853	Reference material Vickers ISO 6507-3	450	HV10	square	60x60x16 mm	steel
63ETB755	Reference material Vickers ISO 6507-3	800	HV10	square	60x60x16 mm	steel
63ETB869	Reference material Vickers ISO 6507-3	200	HV20	square	60x60x16 mm	steel
63ETB874	Reference material Vickers ISO 6507-3	450	HV20	square	60x60x16 mm	steel
63ETB881	Reference material Vickers ISO 6507-3	800	HV20	square	60x60x16 mm	steel
63ETB891	Reference material Vickers ISO 6507-3	200	HV30	square	60x60x16 mm	steel
63ETB896	Reference material Vickers ISO 6507-3	450	HV30	square	60x60x16 mm	steel
63ETB903	Reference material Vickers ISO 6507-3	800	HV30	square	60x60x16 mm	steel
63ETB909	Reference material Vickers ISO 6507-3	200	HV50	square	60x60x16 mm	steel
63ETB914	Reference material Vickers ISO 6507-3	450	HV50	square	60x60x16 mm	steel
63ETB921	Reference material Vickers ISO 6507-3	800	HV50	square	60x60x16 mm	steel
63ETB927	Reference material Vickers ISO 6507-3	800	HV100	square	60x60x16 mm	steel
63ETB932	Reference material Vickers ISO 6507-3	450	HV100	square	60x60x16 mm	steel
63ETB939	Reference material Vickers ISO 6507-3	800	HV100	square	60x60x16 mm	steel

4. Knoop Test Block with DAkkS / ISO certificate

No.	Description	Value	Scale	Shape	Size	Material
63ETB942	Reference material Knoop ISO 4545-3	140	HK0,005	square	30x30x6 mm	steel

Hardness Test Blocks / Indenters

4. Knoop Test Block with DAkkS / ISO certificate

No.	Description	Value	Scale	Shape	Size	Material
63ETB946	Reference material Knoop ISO 4545-3	450	HK0,005	square	30x30x6 mm	steel
63ETB950	Reference material Knoop ISO 4545-3	140	HK0,01	square	30x30x6 mm	steel
63ETB954	Reference material Knoop ISO 4545-3	450	HK0,01	square	30x30x6 mm	steel
63ETB958	Reference material Knoop ISO 4545-3	140	HK0,15	square	30x30x6 mm	steel
63ETB962	Reference material Knoop ISO 4545-3	450	HK0,15	square	30x30x6 mm	steel
63ETB966	Reference material Knoop ISO 4545-3	140	HK0,025	square	30x30x6 mm	steel
63ETB970	Reference material Knoop ISO 4545-3	450	HK0,025	square	30x30x6 mm	steel
63ETB973	Reference material Knoop ISO 4545-3	720	HK0,025	square	30x30x6 mm	steel
63ETB974	Reference material Knoop ISO 4545-3	140	HK0,05	square	30x30x6 mm	steel
63ETB978	Reference material Knoop ISO 4545-3	450	HK0,05	square	30x30x6 mm	steel
63ETB982	Reference material Knoop ISO 4545-3	840	HK0,05	square	30x30x6 mm	steel
63ETB983	Reference material Knoop ISO 4545-3	140	HK0,1	square	30x30x6 mm	steel
63ETB987	Reference material Knoop ISO 4545-3	450	HK0,1	square	30x30x6 mm	steel
63ETB991	Reference material Knoop ISO 4545-3	840	HK0,1	square	30x30x6 mm	steel
63ETB992	Reference material Knoop ISO 4545-3	140	HK0,2	square	30x30x6 mm	steel
63ETB995	Reference material Knoop ISO 4545-3	450	HK0,2	square	30x30x6 mm	steel
63ETB999	Reference material Knoop ISO 4545-3	840	HK0,2	square	30x30x6 mm	steel
63ETB563	Reference material Knoop ISO 4545-3	140	HK0,3	square	30x30x6 mm	steel
63ETB567	Reference material Knoop ISO 4545-3	450	HK0,3	square	30x30x6 mm	steel
63ETB571	Reference material Knoop ISO 4545-3	840	HK0,3	square	30x30x6 mm	steel
63ETB464	Reference material Knoop ISO 4545-3	140	HK0,5	square	30x30x6 mm	steel
63ETB468	Reference material Knoop ISO 4545-3	450	HK0,5	square	30x30x6 mm	steel
63ETB472	Reference material Knoop ISO 4545-3	840	HK0,5	square	30x30x6 mm	steel
63ETB473	Reference material Knoop ISO 4545-3	140	HK1	square	30x30x6 mm	steel
63ETB477	Reference material Knoop ISO 4545-3	450	HK1	square	30x30x6 mm	steel
63ETB495	Reference material Knoop ISO 4545-3	840	HK1	square	30x30x6 mm	steel
63ETB496	Reference material Knoop ISO 4545-3	140	HK2	square	60x60x16 mm	steel
63ETB530	Reference material Knoop ISO 4545-3	450	HK2	square	60x60x16 mm	steel
63ETB594	Reference material Knoop ISO 4545-3	840	HK2	square	60x60x16 mm	steel

5. Brinell Indenter

No.	Ball Indenter	Ball only	Material	Machine type	Comment
19BAA162		5 mm	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate
19BAA162MPA		5mm	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	with ISO certificate
19BAA163		10 mm	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate
19BAA163MPA		10mm	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	with ISO certificate
19BAA277	1mm		with carbide ball	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate
19BAA279	2,5mm		with carbide ball	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate
19BAA280	5mm		with carbide ball	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate
19BAA281		1 m	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate
19BAA281MPA		1mm	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	with ISO certificate
19BAA283		2,5 mm	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate
19BAA283MPA		2,5mm	carbide	HR-100-200-300-400-500 Series Durotwin HV-100 Series	with ISO certificate
19BAA284	10mm		with carbide ball	HR-100-200-300-400-500 Series Durotwin HV-100 Series	without certificate

6. Vickers Indenter

No.	Diamond Indenter	Material	Machine type	Comment
19BAA059MPA	HV 0,01	HM/MVK	HM-100 HM-200 MVK Series	with ISO certificate
19BAA060MPA	HV 0,2	HV/AVK	HV-100 AVK Series	with ISO certificate

7. Knoop Indenter

No.	Diamond Indenter	Material	Machine type
19BAA062MPA	HK 0,01	HM/MVK	HM-100 HM-200 MVK Series with ISO certificate
19BAA063MPA	HK 0,2	HV/AVK	HV-100 AVK Series with ISO certificate

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8. Rockwell Indenter

No.	Diamond Indenter	Ball Indenter	Ball only	Material	Machine type	Comment
19BAA072ASTM	Rockwell diamond			standard	all Mitutoyo Rockwell machines	ASTM E-18
19BAA072MPA	Rockwell diamond			standard	all Mitutoyo Rockwell machines	with ISO certificate
19BAA072MPA10	Rockwell diamond			standard	all Mitutoyo Rockwell machines	extended measuring range down to 10HRC
19BAA072MPAL	Rockwell diamond			slim 6mm wide	all Mitutoyo Rockwell machines	with ISO certificate
19BAA073MPA	Rockwell diamond			standard	all Mitutoyo Rockwell machines	ISO 6508-3
19BAA292MPA	Rockwell diamond			short for Ø22mm	HR 500 Series	with ISO certificate
19BAA504		3,175 mm		with carbide ball	all Mitutoyo Rockwell machines	without certificate
19BAA505		6,35 mm		with carbide ball	all Mitutoyo Rockwell machines	without certificate
19BAA506		12,7 mm		with carbide ball	all Mitutoyo Rockwell machines	without certificate
19BAA507			1,5875 mm	carbide	all Mitutoyo Rockwell machines	without certificate
19BAA507MPA			1,5875 mm	carbide	all Mitutoyo Rockwell machines	with ISO certificate
19BAA508			3,175 mm	carbide	all Mitutoyo Rockwell machines	without certificate
19BAA508MPA			3,175 mm	carbide	all Mitutoyo Rockwell machines	with ISO certificate
19BAA509			6,35 mm	carbide	all Mitutoyo Rockwell machines	without certificate
19BAA509MPA			6,35 mm	carbide	all Mitutoyo Rockwell machines	with ISO certificate
19BAA510			12,7 mm	carbide	all Mitutoyo Rockwell machines	without certificate
19BAA510MPA			12,7 mm	carbide	all Mitutoyo Rockwell machines	with ISO certificate
19BAA515		1,5875 mm		with carbide ball	all Mitutoyo Rockwell machines	without certificate