MHBRVS-187.5

- Professional manufacturer, best quality with competitive price
- Recommended by the world UT NDT inspection association for training and examination
- Core technology with independent intellectual property rights, certificate of CE, GOST and etc..

Digital Brinell Rockwell & Vickers Hardness Tester

Overview

Mitech MHBRVS-187.5 digital multifunctional hardness tester, based on the mechanical principle of conical diamond or spherical cemented carbide indenter pressing into the sample surface to produce indentation, realizing Brinell, Rockwell, Vickers three different materials hardness measurement by measuring the depth or diameter of the indentation. With novel appearance, full-featured, high sensitivity touch screen design, equipped with embedded operating system, simple and intuitive to meet the needs of a variety of hardness testing. It is widely used in metal processing and manufacturing, various metal material's failure analysis and other fields like colleges and research institutions. It is the new type multifunctional testing instrument for mental and part of the the non-metallic materials research and hardness test.

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Technical Parameters

Technical specifications	Technical Parameters
Measuring Range for Brinell	8HBW~650HBW
Measuring Range for Rockwell	20HR~100HR
Measuring Range for Vickers	14HV~1000HV
Preliminary testing force	98.07N (10kgf)
Brinell testing force	306N (31.25kg) , 613N (62.5kg) , 1839N (187.5kg) Tolerance±1.0%
Rockwell testing force	588N (60kg) , 980N (100kg) , 1471N (150kg) Tolerance±1.0%
Vickers testing force	294N (30kg) , 980N (100kg) Tolerance±1.0%
Diamond indenter specifications	Diamond Rockwell indenter, diamond Vickers indenter
Steel ball indenter specifications	φ1.5875mm、φ2.5mm、φ5mm
Brinell scale	HBW2.5/31.25、HBW2.5/62.5、 HBW2.5/187.5、HBW5/62.5
Rockwell scale	HRA 、HRB、HRC、HRD、HRE、HRF、HRG、HRK、HRH
Vickers scale	HV30 、HV100
Testing Force Application Mode	Automatic (loading, holding, unloading)
Indenter objective lens conversion mode	Manual operation
Micro-objective Magnification	2.5X(Observing), 5X(measuring)
Eyepiece magnification	15x
Maximum distance of indentor to main unit	165mm
Duration time	2~60s
Maximum height of specimen	200mm(Brinell, Vickers) , 260mm(Rockwell)
Voltage	AC220V±5% , 50-60Hz
Dimensions	520*215*700mm
Total Weight	80kg

Indication error and repeatability

Scale	Hardness range of standard block	Indication tolerance	Indication repeatability error
HRA	20~ 40HRA	±2.0HRA	≤0.02(100-H) or0.8HRC
	40~ 75HRA	±2.0HRA	
	75~ 88HRA	±1.5HRA	
HRB	20~ 45HRB	±4HRB	≤0.04(130-H) or1.2HRC
	45~ 80HRB	±3HRB	
	80~100HRB	±2HRB	
HRC	20HRC~ 70HRC	±1.5HRC	≤0.02(100-H)or0.8HRC
HBW	≤225HBW	±2.5%	0.025 $\bar{d}$
	> 225HBW	±2.0%	0.02 $\bar{d}$
HV	≤225HV	±3%	≤6.0%
	225~ 300HV	±3%	≤4.0%
	≥300HV	±2%	≤4.0%

Note: H: Standard hardness value for standard block $\bar{d}$: The average value of the indentation diameter

Working Conditions

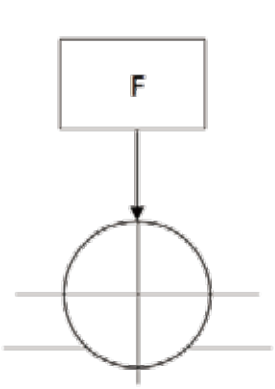
- Operation Temperature : 18 ~ 28℃;
- Relative Humidity : ≤65%;
- Clean environment, no vibration;
- No corrosive media around.

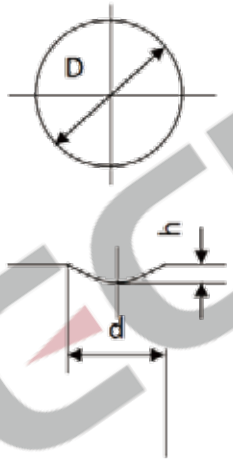
Working Principle

Brinell hardness test: Test force(F) is on the steel ball with certain diameter(D) , pressed on sample surface. After a period of time, cancel the force. The indentation diameter is get by measuring with micrometer ocular,thus to calculate the average pressure (N/mm^2).Then we can get the Brinell hardness.

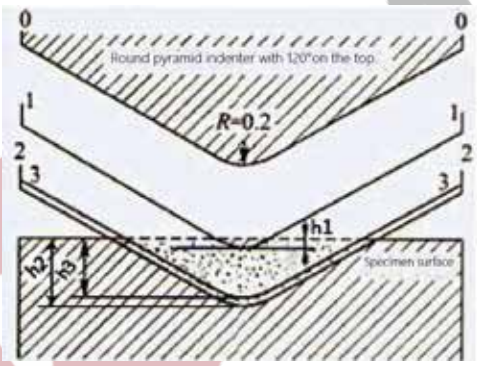
Rockwell hardness test is a vertex angle of 120 ° diamond cone or a certain diameter of the hardened steel ball as a pressure to the specified test force will be pressed into the sample surface, according to the sample surface indentation depth to be measured The Rockwell hardness of metallic materials.

Micro-Vickers (or Knoop) hardness test principle is that put the provisions of the positive pyramid diamond indenter into the sample surface(with fixed experimental force) and maintain a certain length (holding), and then unloading. Finally, there is a positive quadrangular pyramid or kenup indentation with a square surface on the surface of the specimen. Then we can attain the area of indentation via measuring the length of the diagonal by a micrometer eyepiece. Then the corresponding Vickers (or Knoop) hardness values are obtained.

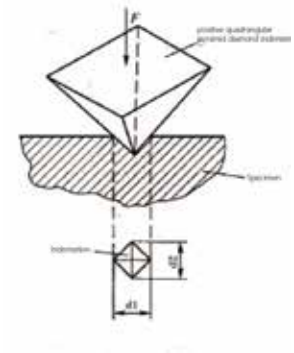




Brinell working principle Figure



Rockwell working principle figure



Vickers working principle figure

Brinell, Rockwell, Vickers hardness values can be converted according to the following formula:

① $HB = 0.102 \times \frac{2F}{\pi D(D-\sqrt{D^2-d^2})}$

② $HR = \frac{c-h}{0.002}$

③ HV=constant×test force / indentation surface area ≈0.1891 F / d^2 ;

① In a formula: F:Test force on steel ball,unit:N; D:Diameter of steel ball; unit:mm; d: Indentation diameter,unit:mm;0.102—Rule coefficient;
② In a formula: c, a constant (for HRC, HRA, c is 0.2; for HRB, c is 0.26); H:the plastic deformation caused by the main test force causes the indenter to press into the depth of the material surface; 0.002: 0.002 mm indentation depth as a hardness unit;
③ In a formula: F,test force (N); d, the arithmetic mean of of the two diagonal d1, d2.

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Features

- Equipped with Brinell, Rockwell, Vickers three hardness test indenters, full-featured, widely used, it can meet hardness testing needs for various metallic and non-metallic materials.
- With high sensitivity touch display, easy for operation, it can display the test result intuitively.
- Unique displacement sensing system design greatly reduces the error of the test result obtained by the indentation depth.
- Designed with adjustable cold light source measuring system, it can control the light strength through the software;
- Equipped with high-speed thermal printer to print test results in real time.
- Consistent with GB/T230, GB/T231, GB/T4340, JJG144-1999, ISO 6508, ASTM E 10, ASTM E92, ASTM E18, ASTM E384, ASTM E103 and other relevant domestic and foreign standards.

Scope of application

- The Brinell indenter is mainly applied to the Brinell hardness testing for metallic materials like cast iron, forged steel and etc.
- The Rockwell indenter is mainly applied to Rockell hardness testing of harden steel, quenched and tempered steel, annealed steel, cold rolled steel, hard aluminum alloy, nonferrous metals, hardened steel sheet, soft metal and other workpeice with surface treatment.
- The Vickers indenter is mainly used for Vickers hardness testing for the small and thin parts, surface coating and workpeice with surface heat treatment.

Applications

- Used for quality control in metal processing manufacturing
- Used for failure analysis testing of metallic materials;
- Demonstration experiment for education and teaching in Colleges and Universities;
- Hardness testing of materials in scientific research institutions

Configurations

	NO.	Name	QTY.	Remarks
Standard Configuration	1	Main unit	1	
	2	Rockwell diamond indenter	1	
	3	Vickers diamond indenter	1	
	4	Hard alloy steel ball indenter φ1.5875mm, φ2.5mm, φ5mm	3	
	5	Large Testing Table	1	For Rockwell hardness test
	6	Medium Testing Table	1	For Rockwell hardness test
	7	V-shape Testing Table	1	For Rockwell hardness test
	8	Standard Rockwell hardness blocks	3	
	9	Standard Brinell hardness block	1	
	10	Standard Vickers hardness block	1	
	11	Counterweight	5	Numbers 0 to 4
	12	Objective lens	2	2.5X, 5X
	13	Measuring microscopic	1	15X
	14	Microscope seat	1	
	15	Slipped Table	1	
	16	Cone-shape Table	1	
	17	Standby LED lighting bulb	2	
	18	Fuse(2A)	2	
	19	Lighting head	1	
	20	Lighting shade	1	
	21	Power cable	1	
	22	Plastic dust cover	1	
	23	Attached files	1	
	24	Host accessory box	1	