MHXR-45-150DX

- 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 Double Rockwell Hardness Tester

Overview

Mitech MHRX-45-150DX Digital Display Double Rockwell Hardness Tester, based on the mechanical principle of conical diamond or hard alloy indenter pressing into the sample surface to produce indentation, realizing the material hardness measurement by measuring the depth of the indentation. Capable of inspecting the finished or semi-finished parts of the machined sample, it is suitable for high accuracy hardness testing for batches parts with various metal or non-metallic materials. According to statistics, Rockwell hardness testing is the most widely used hardness testing method in metal processing industry, which utilization ratio is more than 70%. With novel appearance, stable performance and integration of electro mechanical integration and touch screen, it can be tested on the hardness of all rockwell and surface rockwell scale. It is widely used in metal processing and manufacturing, various metal material's failure analysis and other fields like colleges and research institutions, and it is the sophisticated detection equipment to test the Rockwell hardness of metal and other materials.

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Technical Parameters

Technical specifications	Technical Parameters
Surface preliminary testing force	29.4N (3kgf)
Preliminary testing force	10kgf(98.07N)
Surface testing force	15kgf (147.1N) , 30kgf (294.2N) , 45kgf (441.3N)
Testing force	60kgf (588N) , 100kgf (980N) , 150kgf (1471N)
Measuring range	HRA:20-96、 HRB:20-100、HRC:20-70、 HRD:40-77、 HRE:70-100、HRF:60-100 HRG:30-94、 HRH:80-100、 HRK:40-100、HRL:50-115、HRM:50-115、HRR:50-115
Surface measuring range	HR15N : 70-94、HR30N : 42-86、HR45N : 20-77 ; HR15T : 67-93、HR30T : 29-82、HR45T : 10-72
Indentor specification	Diamond cone rockwell pressure indentor , Φ1.5875mm steel ball indenter
Duration time	0~60s
Rockwell scale	Rockwell scale, surface Rockwell scale
Testing Force Application Mode	Automatic loading (preliminary test force needs manual loading)
Display	High sensitivity touch screen
Conversion scale	HV、HBW、HK
Indication error	0.1HR
Maximum height of specimen	170mm
Distance of Indenter to outer wall	165mm
Power supply	AC220V/50Hz
Dimension	540*230*710mm
Main unit weight	85kg

Indication Error

Scale	Standard Hardness Range	Allowed Maximum Tolerance
HRA	(20-75)HRA ; (75-88)HRA	±2HRA ; ±1.5HRA
HRB	(20-45)HRB ; (45-80)HRB; (80-100)HRB	±4HRB ; ±3HRB ; ±2HRB
HRC	(20-70)HRC	±1.5HRC
HRD	(40-70)HRD ; (70-77)HRD	±2HRD ; ±1.5HRD
HRE	(70-90)HRE ; (90-100)HRE	±2.5HRE ; ±2HRE
HRF	(60-90)HRF ; (90-100)HRF	±3HRF ; ±2HRF
HRG	(30-50)HRG ; (50-75)HRG ; (75-94)HRG	±6HRG ; ±4.5HRG ; ±3HRG
HRH	(80-100)HRH	±2HRH
HRK	(40-60)HRK ; (60-80)HRK ; (80-100)HRK	±4HRK ; ±3HRK ; ±2HRK
HRL	(100-120)HRL	±1.2HRL
HRM	(85-110)HRM	±1.5HRM
HRR	(114-125)HRR	±1.2HRR

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.

Working Conditions

- Operation Temperature : 10 ~ 30℃ ;
- Relative Humidity : ≤65% ;
- The surrounding environment should avoid of vibration, strong magnetic field, corrosive medium and heavy dust.

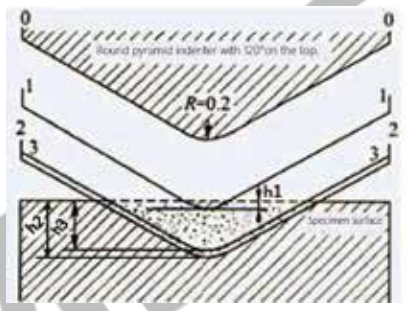
Working Principle

The Rockwell hardness test is taking the diamond cone with 120°apex angle or the hardened steel ball with specified diameter as the indenter to press into sample surface with specific test force, then get the Rockwell hardness of the measured metallic materials according to the sample surface indentation depth.

The Rockwell hardness measurement principle is shown as below figure. 0-0 is the position that the diamond indenter is not yet in contact with the sample. 1-1 figure is the indenter position under the affect of the preliminary test force, the indentation depth is h_1. The preliminary test is to eliminate the influence to the testing result accuracy caused by the roughness of the sample surface. 2-2 in the figure is the indenter position under the influence of the testing force (the preliminary test force and the main test force). The depth is h_2. 3-3 in the figure is the indenter position after dismounting the main test force. As the metal elasticity will recovery some degree after deformation, the really indentation depth of the indenter is h_3. The plastic deformation caused by the main test force make the indenter pressing into the depth is $h = h_3 - h_1$. Rockwell hardness value is determined by the size of h, the greater the depth h, the lower the hardness, otherwise, the higher the hardness. In the traditional concept, usually use a constant C minus h to represent the level of hardness, while the depth of indentation per 0.002mm as a unit of hardness. The hardness value obtained is called the Rockwell hardness value, denoted by the symbol HR.

$$HR = \frac{c - h}{0.002}$$

In the formula, c is a constant (for HRC, HRA, c is 0.2; for HRB, c is 0.26). The Rockwell hardness value HR obtained is an unknown number which is usually read directly on the test machine indicator when testing.



Rockwell hardness tester working principle Figure

It should be noted that the measured hardness values would be different with different indenter and test force. Therefore, the Rockwell hardness testing specifies 15 different hardness test scales according to the different indenter specification and test force sizes. And the HRB, HRC, HRA are the most widely used.

Scale

Scale	Indenter type	preliminary testing	Testing force	Measuring range	Application
HRA	Diamond cone	98.07 N (10kgf)	60kgf(588.4N)	20-88HRA	hard alloy, carbide, surface quenched steel, carburizing steel
HRD			100kgf(980.7N)	40-77HRD	thin steel sheet, surface quenched steel
HRC			150kgf(1471N)	20-70HRC	quenched steel, tempered steel, chilled cast iron
HRF	Φ1.5875mm (1/16inch) steel ball		60kgf(588.4N)	60-100HRF	cast iron, aluminum, magnesium alloy, bearing alloy
HRB			100kgf(980.7N)	20-100HRB	mild steel, copper alloy, annealed steel
HRG			150kgf(1471N)	30-94HRG	phosphorus iron, beryllium bronze, malleable cast iron
HRH	Φ3.175mm (1/8inch) steel ball		60kgf(588.4N)	80-100HRH	aluminum, zinc, lead etc.
HRE			100kgf(980.7N)	70-100HRE	bearing alloy, tin, hard plastics and other soft materials
HRK			150kgf(1471N)	40-100HRK	bearing alloy, tin, hard plastics and other soft materials
HRL	Φ6.35mm(1/4 inch)steel ball		60kgf(588.4N)	50-115HRL	Hard plastic ,hard rubber, aluminum, tin, bronze, mild steel, synthetic resin, friction materials and etc.
HRM			100kgf(980.7N)	50-115HRL	
HRR	Φ12.7(1/2 inch)steel ball		60kgf(588.4N)	50-115HRL	

Note: Rockwell hardness test commonly used for the A, B, C three.

Scale	Indenter type	Initial pressure	Combined pressure	Application
HR15N	Diamond cone	3kfg (29.42N)	15kgf (147.1N)	Surface carburizing layer, surface nitriding layer, surface hardened steel plate and so on.
HR30N			30kgf (294.2)	
HR45N			45kgf (441.3N)	
HR15T	Φ1.5875mm (1/16in) ball indenter		15kgf (147.1N)	Material for the cast iron, magnesium alloy, bearing alloy, mild steel, copper alloy, annealed steel,Phosphor bronze, beryllium bronze, malleable cast iron and other thin specimens.
HR30T			30kgf (294.2)	
HR45T			45kgf (441.3N)	
HR15W	Φ3.175mm (1/8in) ball indenter		15kgf (147.1N)	Material for the aluminum, zinc, lead, tin, hard plastic and other thin specimens
HR30W			30kgf (294.2)	
HR45W			45kgf (441.3N)	
HR15X	Φ6.35mm (1/4in) ball indenter		15kgf (147.1N)	Material for the hard rubber, copper, synthetic resin and friction materials such as thin specimens.
HR30X			30kgf (294.2)	
HR45X			45kgf (441.3N)	
HR15Y	Φ12.7mm (1/2in) ball indenter		15kgf (147.1N)	
HR30Y			30kgf (294.2)	
HR45Y			45kgf (441.3N)	

Feautures

- Widely used for high-precision hardness testing for parts with a variety of metal and non-metallic materials;
- Mechanical and electrical integration of high-tech products, high test efficiency;
- Option for various specifications of the indenter, support many types of Rockwell hardness scales testing;
- Equipped with high-speed thermal printer, quickly print out the test data;
- Support the conversion among various hardness scales such as Brinell, Vickers and etc;
- Adopt touch screen display interface, display operation integration, simple and intuitive, the technical requirements of the operator is not high;
- With RS-232C interface, serial communication with the computer for the user to expand the function;
- Equipped with excellent performance of the carbide indenter or diamond indenter, high hardness, wear resistance, good toughness, with high temperature, corrosion resistance, accurate measurement, stable and reliable;
- The use of automatic closed-loop pressure sensor control system, showing the instantaneous force value, can dynamically reflect the loading process load changes;
- With the error value correction function, the hardness value of the error can be corrected by key input, the hardness value more accurately meet the test requirements;
- With threshold overrun automatic alarm function, apply to the bulk of finished products or semi-finished pieces of paper-by piece detection;
- Original environment temperature real-time display function, to avoid the instrument in the case of high or low temperature for a long time, otherwise it will lead to increased test error, the instrument life is reduced;
- Consistent with GB / T230.1 GB / T230.2, JJG112, GB / T230.2 ISO 6508-2, ASTM E18 and other relevant domestic and foreign standards.

Configurations

	NO.	Name	QTY.	Remarks
Standard Configuration	1	Main unit	1	
	2	Diamond Rockwell indenter	1	
	3	Φ1.5875mm 1/16in ball indenter	1	
	4	Thermal printing paper	1	
	5	Small Testing Table	1	
	6	Large Testing Table	1	
	7	V-shape Testing Table	1	
	8	Standard Rockwell Hardness Blocks	3	
	9	Standard surface Rockwell hardness block	2	
	10	RS232 communication cable	1	
	11	Fuse	2	
	12	Power cable	1	
	13	Plastic dust cover	1	
	14	Attached files	1	
	15	Instrument case	1	
Optional Configuration	1	Φ3.175mm 1/8inch ball indenter	1	Mainly used for testing hard plastic non-ferrous materials
	2	Φ6.35mm 1/4inch ball indenter	1	
	3	Φ12.7mm 1/2inch ball indenter	1	