

MHRS-150-P

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Core technology with independent intellectual property rights, certificate of CE, GOST and etc.. ●

Digital Plastic Rockwell Hardness Tester



Overview

Mitech MHRS-150-P Digital Plastic Rockwell Hardness Tester, based on the mechanical principle of 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 plastic, hard rubber, synthetic resin, friction materials and softer metals. 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, intuitive and convenient LCD display, and easy to operate the menu design, it is widely used in the quality control of plastic products, the detection of finished products of resin rubber and other fields like colleges and research institutions. It is the sophisticated detection equipment to test the plastic and soft metal materials Rockwell hardness.

Technical Parameters

Technical specifications

Preliminary testing force
Testing force
Measuring range
Testing force application mode
Indenter specification
Display
Rockwell scale
Conversion scale
Duration time
Indication error
Maximum height of specimen
Distance of indenter to outer wall
Power supply
Dimensions
Main unit weight

Technical Parameters

98.07N , tolerance±2.0%
588.4N , 980.7N , 1471N , tolerance±1.0%
HRA : 20-88、 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
Automatic operation (preliminary test needs manual operation)
Φ3.175mm steel ball indenter ; Φ6.35mm steel ball indenter ; Φ12.7mm steel ball indenter
LCD
HRA、 HRB、 HRC、 HRD、 HRE、 HRF、 HRG、 HRH、 HRK
HRA、 HRB、 HRC、 HRD、 HR15N、 HR30N、 HR45N、 HR15T、 HR30T、 HR45T、 HV、 HK、 HBW
1~30s(The testing force duration time for plastic Rockwell hardness test is 15 seconds)
0.1HR
170mm
165mm
AC220V/50Hz
550*220*730mm
85kg

Features

- Widely used for high-precision hardness testing for plastic, hard rubber, synthetic resin, friction material and softer metal;
- Adopt electronic automatic operation system to control the testing force, easy to operate;
- 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 large-screen LCD, easy to operate, visually display the test results;
- Equipped with excellent performance of the carbide indenter, high hardness, wear resistance, good toughness, meanwhile with high temperature and corrosion resistance to ensure that the instrument test value is accurate, stable and reliable;
- With the function of threshold overrun automatic alarm, apply to the bulk of finished products or semi-finished pieces of paper-by-piece detection;
- The function of original ambient temperature real-time display can avoid the instrument working in the case of high or low temperature for a long time , resulting in increased test error and reducing the service life;
- Consistent with GB7407、 JIG884、 ASTM D785、 GB/T 3398.2 other relevant standards at home and abroad.

The Scope of Application

Scale	Indenter type	preliminary testing force	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	98.07 N (10kgf)	60kgf(588.4N)	60-100HRF	cast iron, aluminum, magnesium alloy, bearing alloy	
HRB	(1/16inch)		100kgf(980.7N)	20-100HRB	mild steel, copper alloy, annealed steel	
HRG	steel ball		150kgf(1471N)	30-94HRG	phosphorus iron, beryllium bronze, malleable cast iron	
HRH	Φ3.175mm		60kgf(588.4N)	80-100HRH	aluminum, zinc, lead etc.	
HRE	(1/8inch)		100kgf(980.7N)	70-100HRE	bearing alloy, tin, hard plastics and other soft materials	
HRK	steel ball		150kgf(1471N)	40-100HRK	bearing alloy, tin, hard plastics and other soft materials	
HRL	Φ6.35mm(1/4		60kgf(588.4N)	60kgf(588.4N)	50-115HRL	Hard plastic ,hard rubber, aluminum, tin, bronze, mild steel, synthetic resin, friction materials and etc.
HRM	inch)steel ball			100kgf(980.7N)	50-115HRL	
HRR	Φ12.7(1/2			60kgf(588.4N)	50-115HRL	

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

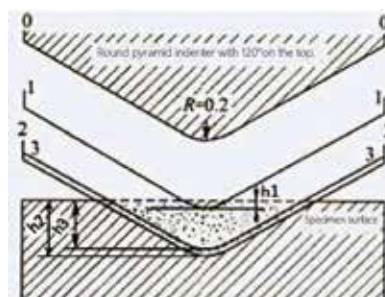
Working Principle

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.

Working Conditions

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

Applications

- Used for quality control in plastic products;
- Used for resin rubber finished product testing
- Demonstration experiment for education and teaching in Colleges and Universities;
- Hardness testing of materials in scientific research institutions

Configurations

	NO.	Name	QTY.	Remarks
	1	Main unit	1	
	2	Φ3.175mm 1/8inch steel ball indenter	1	Mainly used for measuring hard plastic and other non-metallic materials Rockwell hardness.
	3	Φ6.35mm 1/4inch steel ball indenter	1	
	4	Φ12.7mm 1/2inch steel ball indenter	1	
	5	Counterweights	3	
	6	Small testing table	1	Diameter 60mm
	7	Large testing table	1	Diameter 150mm
Standard Configuration	8	V-shape testing table	1	Test cylindrical specimens
	9	Rockwell Standard Block	4	HRE、HRL、HRM、HRR
	10	Fuse 0.5A	2	
	11	Spare LED bulbs	2	
	12	Thermal printing paper	1	
	13	Power cable	1	
	14	Plastic dust cover	1	
	15	Attached files	1	
	16	Instrument case	1	