www.sinowon.com

Sinowon Ultrasonic Hardness Tester
(Product Introduction)

CONTENTS

1.1 Company Profile

Dear Customers:

We, Sinowon Innovation Metrology Manufacture Limited is one of China authorized hi-tech manufacturer of metrology instrument verified by ISO9001:2015, we are focusing to research, develop, manufacture and export the optical measurement instruments and hardness testing machines since year 2006. We have already delivered and installed more than 10,000pcs of instruments to more than 5000 customers in more than 60 countries and regions, more and more international famous manufacturers choose us as the qualified supplier of quality control machines, and our service engineers have already visited USA, Canada, Mexico, Germany, Holland, France, Poland, Hungary, Czech, Turkey, Korea, Malaysia, Thailand, Philippine, Viet Nam, Singapore, Austria, India to install our instruments at customers' site.

In the past 12 years, we concentrate ourselves to manufacture the instrument of quality control and never change our business field. We improve the quality and accuracy every year, up to now, it is 1.4+L/200um about the accuracy of our AutoVision vision measuring machine and it is 0.5HRC about the accuracy ouriRock Rockwell hardness tester. Because the high quality of ultrasonic hardness tester SU-300 family, the national standard organizations SAC/TC 183 had invited us to make China national standard, the new standard: GB/T34205-2017 and JJF14306-2013 make more customers choose this NDT method: UCI to control the hardness of products.

As a manufacturer of quality control instruments, it is very important on own quality control system. In order to supply the stable quality products, we spent a lot of time and investment for staff training and quality system establishment and improvement every year, we also invest a lot of money to equip the international brand new coordinate measuring machines, roughness testers, humidity and temperature chambers, laser machines, glass scales, gauges and blocks for our own quality control. At the same time, Sinowon has been verified by ISO9001 quality management organizations every year, and our products have been issued by CE certificate for European market and Gost certificate for Russian market.

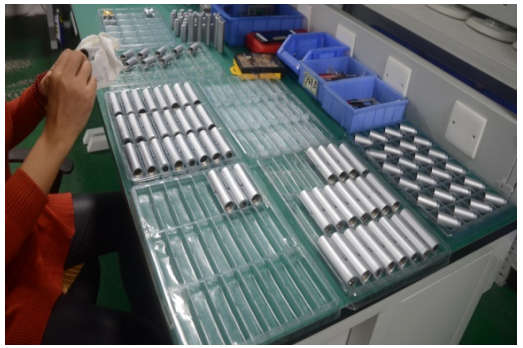
The industry 4.0 is coming, we have already been ready for the challenge. Your request of precision is our mission forever, and we will supply the timely and warm-heart support and service as usual.
Let us work together, success together.
Thanks a lot again

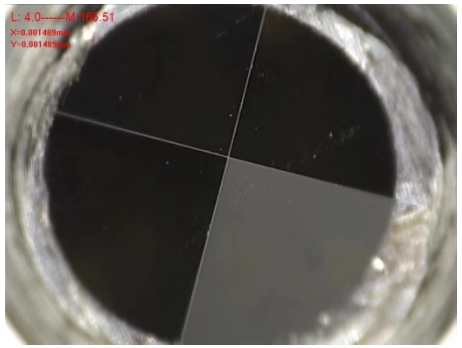
Marshall Zheng Chunping
Managing Director
Sinowon Innovation Metrology Manufacture Limited

1.2 Production Field

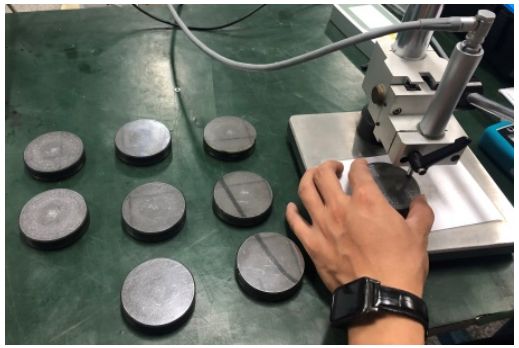
Exhibition Hall

Ultrasonic Hardness Tester production workshop





Check before shipment



1.3 Certificate of Qualification

China National Authorized Hi-Tech Enterprise certificate

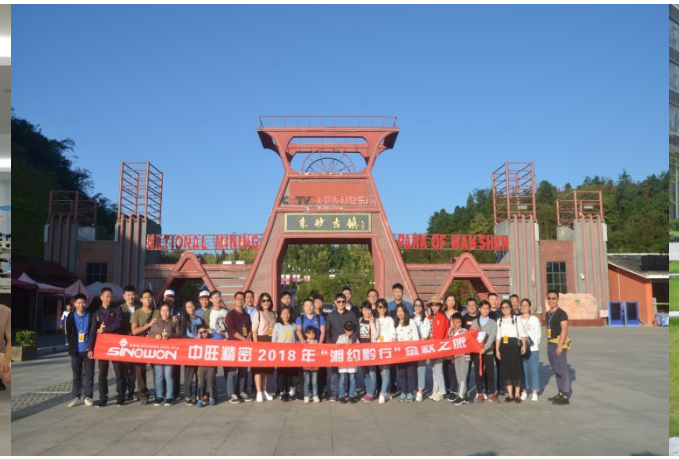
ISO Certificate

CE Certificate

Ultrasonic Hardness Tester verification certificate

Ultrasonic hardness Tester Patent Certificate

1.4 Corporate Culture



2 Introduction of Ultransonic Hardness Tester

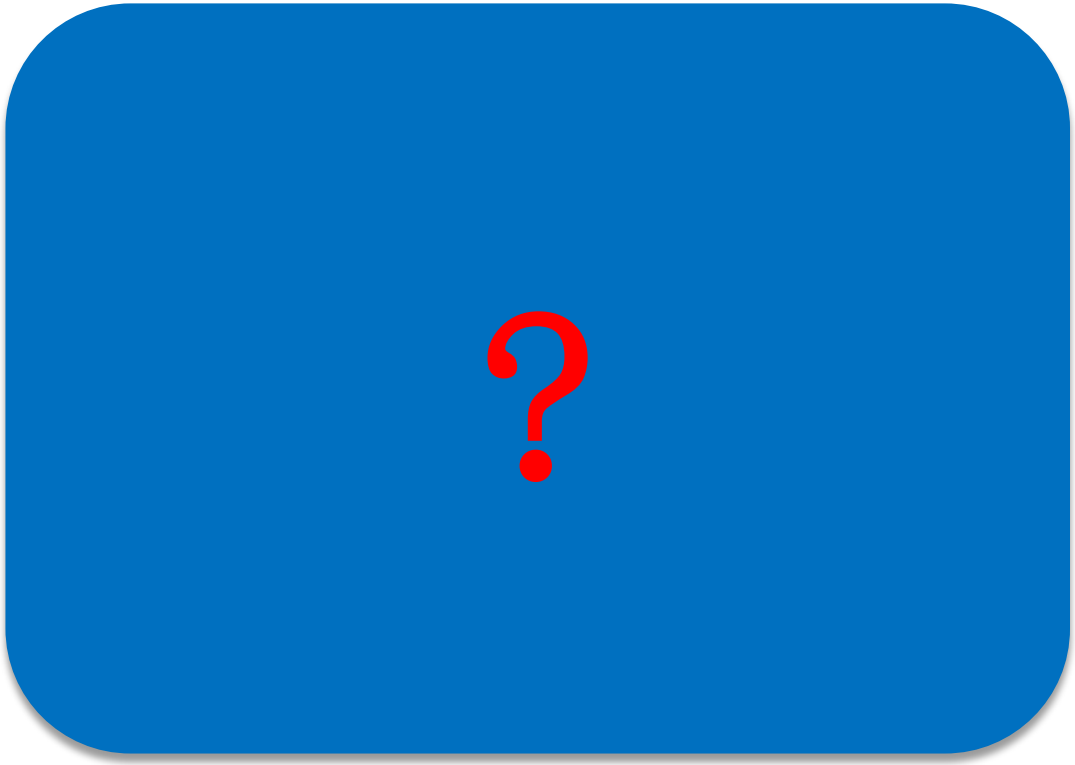
2 Introduction of Ultransonic Hardness Tester

2.1 What is Ultrasonic?

- When an object vibrates, it makes a sound. Scientists call the number of vibrations per second the frequency of sound, in Hertz.
- We human ears can hear sound waves with a frequency of 20-20KHz
- When the vibration frequency of sound wave is greater than 20kHz or less than 20Hz, we can't hear it. Therefore, we call the sound wave whose frequency is higher than 20kHz "ultrasonic".
- Ultrasonic has the characteristics of good directivity, strong penetration, easy to obtain concentrated sound energy and long distance in water.
- It can be used for ranging, speed measurement, cleaning, welding, gravel, etc. There are many applications in medicine, military, industry and agriculture.
- Theoretical research shows that under the same amplitude, the vibration energy of an object is directly proportional to the vibration frequency. When the ultrasonic wave propagates in the medium, the vibration frequency of the medium particle is very high, so the energy is very large.

B-ultrasound

2.2 What is Ultrasonic Hardness Tester



Dr.Claus Kleesattel(1917-2003)Invented Ultrasonic ContactImpedance in 1961--Used to quickly compare and measure the hardness of metal materials.

2.4 Current Developing status of Ultrasonic Hardness Tester in China

Generation 1 pointer

United States in the late 60's technical level, not accurate enough, easy to fail, and poor practicality in the market has not been a large number of popular.

Generation 2 Digital display

It only has the technical level of Europe and the United States in the late 1980s, no curve fitting function, only linear correction function, with low accuracy and poor quality. In the 1990s and the beginning of the 21st century, China's high-end users still rely on the imported ultrasonic hardness machines from Germany and Japan to solve the demand problem.

Generation 3 Sinowon Ultrasonic Hardness Tester SU-100

Digital display, support curve algorithm, but only support manual probe in the early stage, no Bluetooth and other data transmission functions

Generation 3.5 Sinowon Ultrasonic Hardness Tester SU-400

Support curve algorithm, support electric probe, support Richter probe, one instrument with two application. Support Bluetooth data transmission and other functions

- In the early 1980s, ultrasonic hardness tester was introduced to China from abroad,
- Some domestic universities began to study the principle and structure of ultrasonic hardness tester,
- Through school enterprise cooperation, we have developed the first generation of pointer ultrasonic hardness tester in China.
- At present, some European manufacturers use operating systems on data display terminals,Touch screen digital display, realize multi scale, can be regarded as the fourth generation ultrasonic hardness tester.

- 1.Europe：DIN 50159-1-2008;
- 2.America：ASTMA1038-2017；
- 3.China：JB/T 9377-2010，

JJF-1436-2013，

GB/T 34205-2017；

Remarks:
GB/T 34205-2017
National standard
JJF-1436-2013
Calibration
specification
Sinowon
Participation in
drafting

GB/T34205—2017

Ultrasonic contact impedance：UCI

When the ultrasonic frequency vibration indenter is pressed into the surface of the metal material test piece, the resonance frequency of the resonating rod changes due to the difference in contact area at the indentation.

Effcctive elastic modulus

The elastic modulus of the test system during the ultrasonic hardness test.
Note: The test system includes a resonating rod, indenter and test piece.

Principle

Ultrasonic contact impedance method is a dynamic indentation method that does not directly measure indentation. The resonating rod with a specific indenter at the end (such as a regular pyramid diamond indenter) is excited to perform longitudinal ultrasonic oscillation. Press the indenter into the test surface with a certain test force.The longitudinal ultrasonic oscillation of the resonating rod will be subjected to impedance and resonance frequency shift. The frequency shift is a function of the indentation surface area and the system of the effective elastic modulus , and the hardness value is obtained from the measurement of the frequency shift.

2.7 Mathematical model of Ultrasonic Hardness Tester?

$$\Delta f = f(E_{eff}, A)\ ; \quad HV = F/A$$

$$HV = \frac{F}{A}$$

$$A = \frac{F}{HV}$$

$$\Delta f = f(E_{eff}, A)$$

$$A = f(E_{eff}, \Delta f)$$

$$E_{eff} = \frac{\Delta f_1}{\Delta f_2}$$

- Δf = Frequency Shift
- A = Indentation area
- E_{eff} = Effective elastic modulus
- HV = Vickers hardness value
- F = Force applied in the hardness test

The change of ultrasonic hardness is related to the effective elastic mode and indentation area, and different materials have different elastic molds.

2.8 Hardness Value versus Frequency Shift of the Oscillating Rod

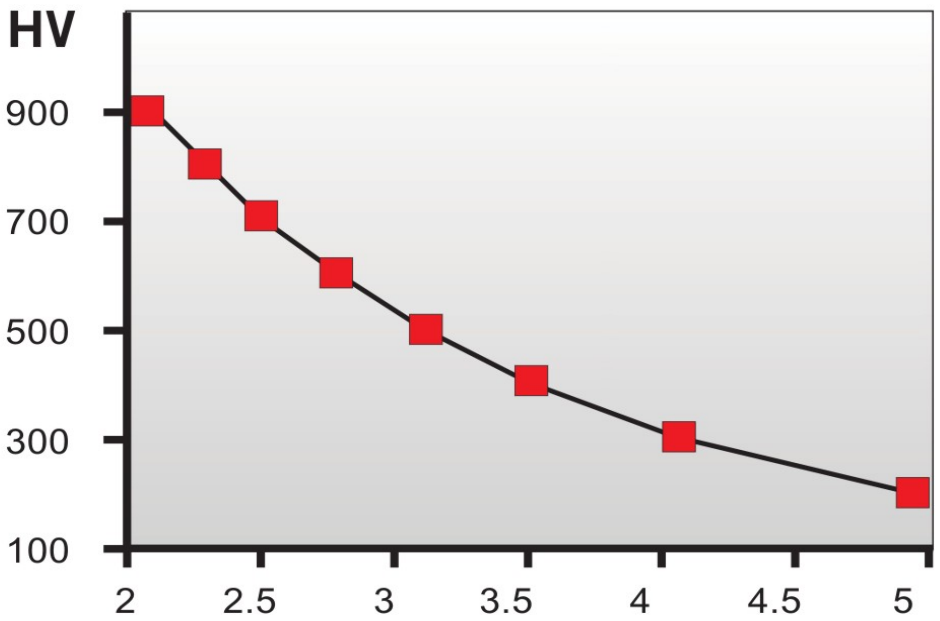


FIG. 2 Hardness Value versus Frequency Shift of the Oscillating Rod

1. The change of ultrasonic hardness and resonant frequency is nonlinear;

2. The greater the hardness, the greater the frequency change of resonance;

3. The smaller the hardness, the smaller the resonance frequency change;

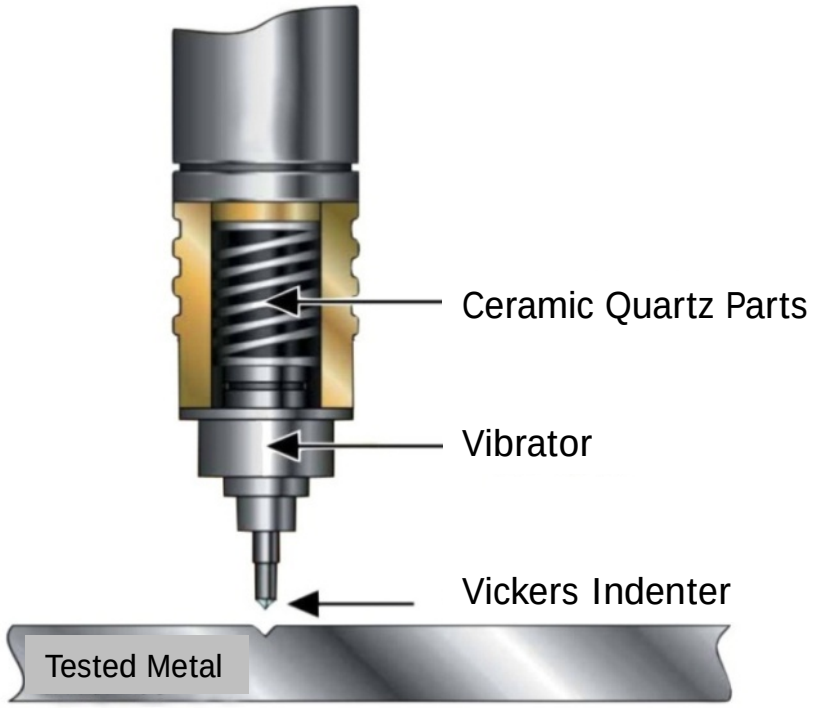
4. Changes in resonant frequency are related to indentation size,

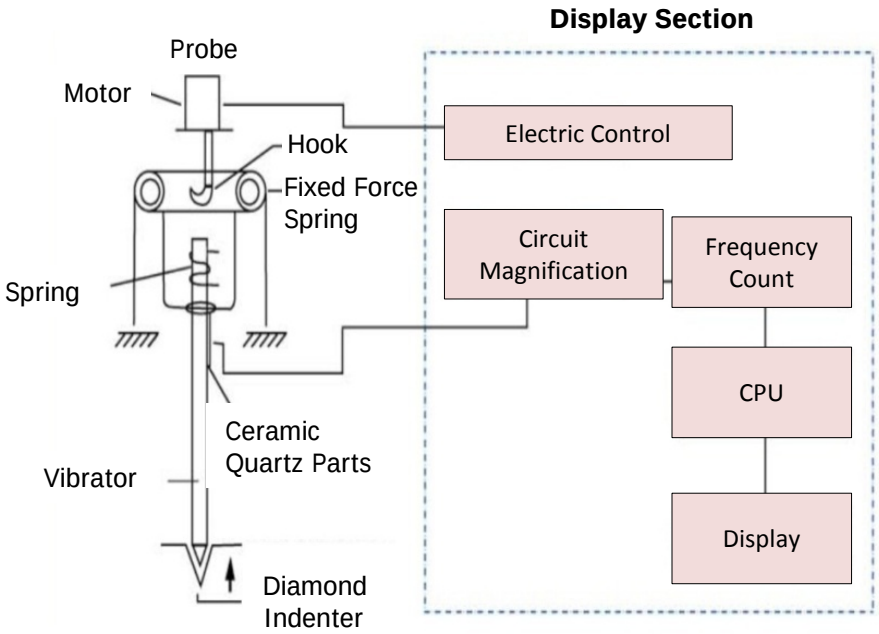
It is related to the elastic modulus of the material.

2.9 What is Yang' s Elastic Modulus?

- Young's modulus is the physical quantity that represents the tensile or compressive strength of material within the elastic limit. It is the longitudinal elastic modulus, also a term in material mechanics.
- It was named after the results of Thomas Young (1773-1829), a British doctor and physicist, in 1807. According to Hooke's law, within the elastic limit of an object, the stress and the stress become proportional. The ratio is called the young's modulus of a material. It is a physical quantity that characterizes the properties of a material and only depends on the physical properties of the material itself. The size of Young's modulus indicates the rigidity of the material. The larger the young's modulus is, the less likely it is to deform.
- Young's modulus of elasticity is one of the bases for selecting materials of mechanical parts, which is a common parameter in engineering design. The measurement of Young's modulus is of great significance to the study of mechanical properties of various materials, such as metal materials, optical fiber materials, semiconductors, nano materials, polymers, ceramics, Rubbers, etc. it can also be used in mechanical parts design, biomechanics, geology and other fields.
- The methods of measuring Young's modulus are generally tensile method, beam bending method, vibration method, internal friction method, etc. there are also experimental techniques and methods such as optical fiber displacement sensor, moire fringe, eddy current sensor and wave transfer technology (microwave or ultrasonic) to measure Young's modulus

2.10 Schematic diagram of Ultrasonic Hardness Tester probe structure

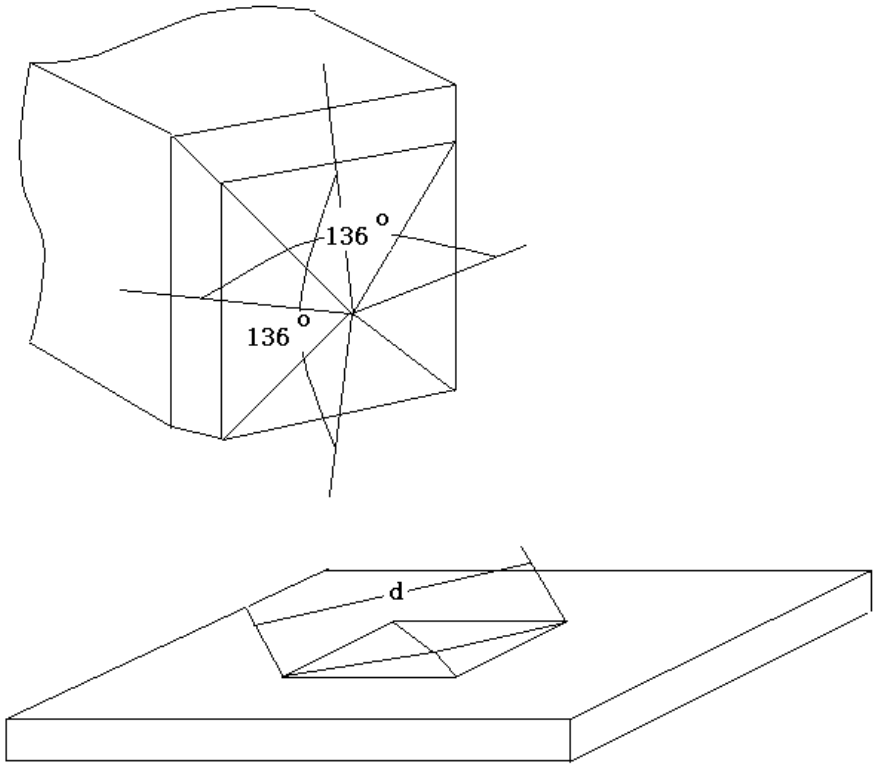


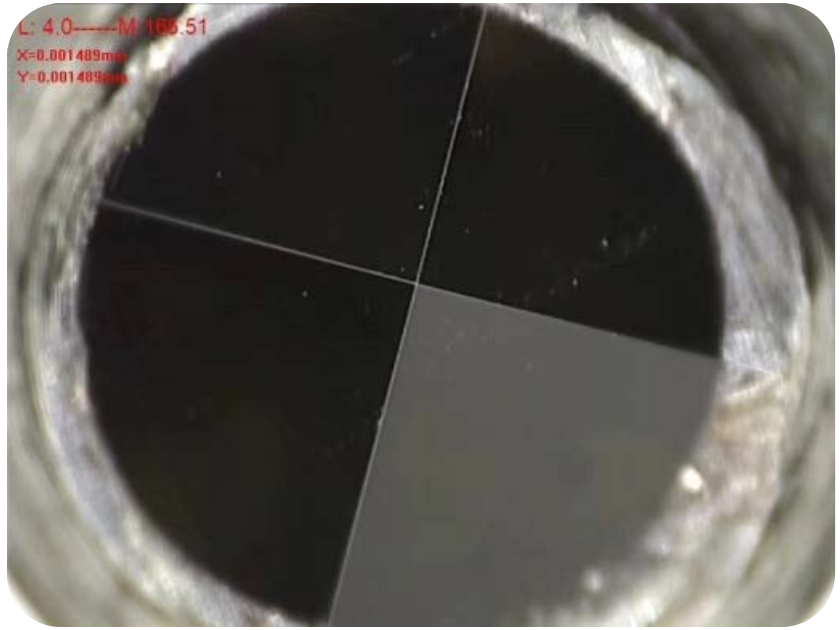


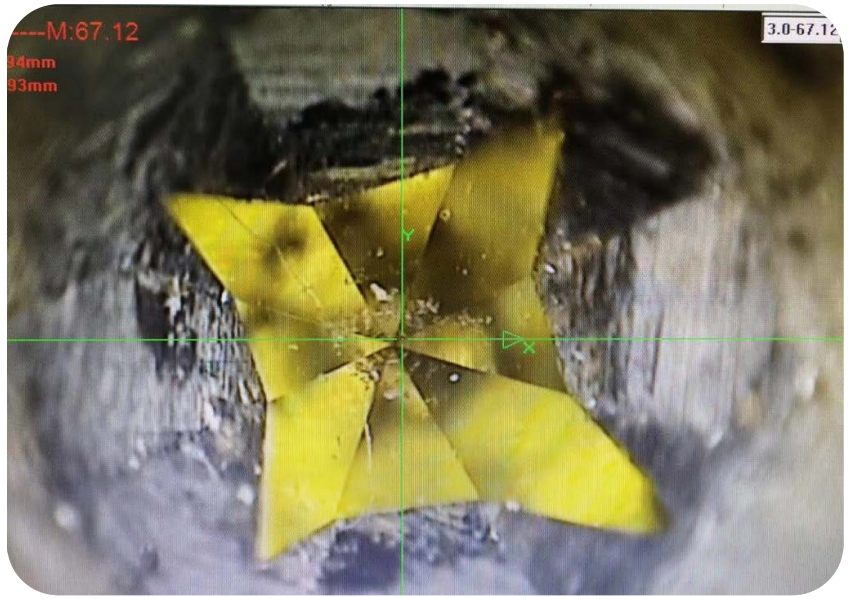
The ultrasonic hardness tester adopts the dimensional diamond indenter and the testing principle, but the area measurement method is not optical measurement method, but electronic measurement method.

The ultrasonic hardness tester is a kind of testing force, which is guaranteed by the spring.

2.11 Schematic diagram of indenter of Ultrasonic Hardness Tester





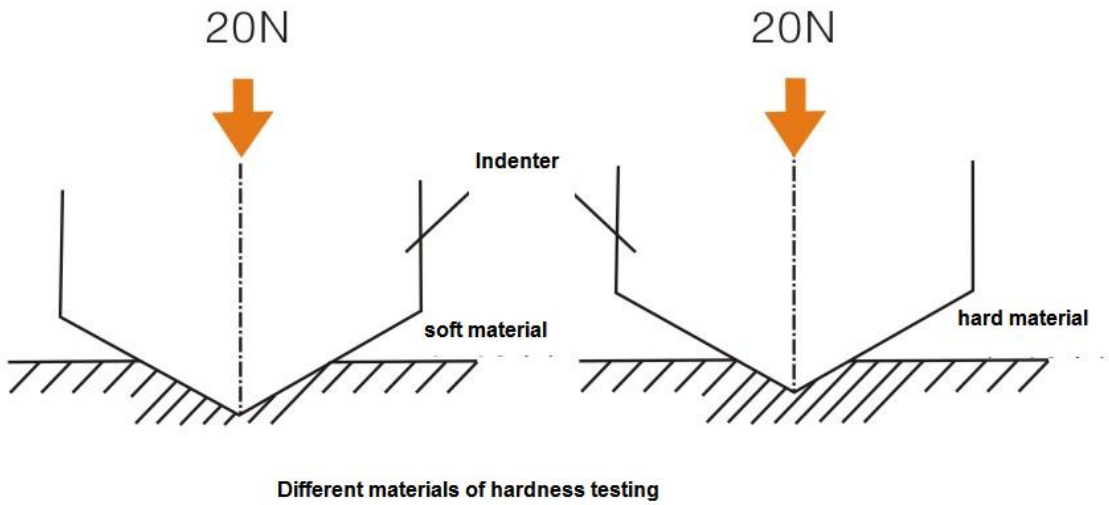


GB/T34205—2017

Indenter

Ultrasonic indenter is a136 ° diamond indenter, showed a prism indentation on samples.

2.12 Schematic diagram of testing soft and hard materials by Ultrasonic Hardness Tester



Different materials of hardness testing

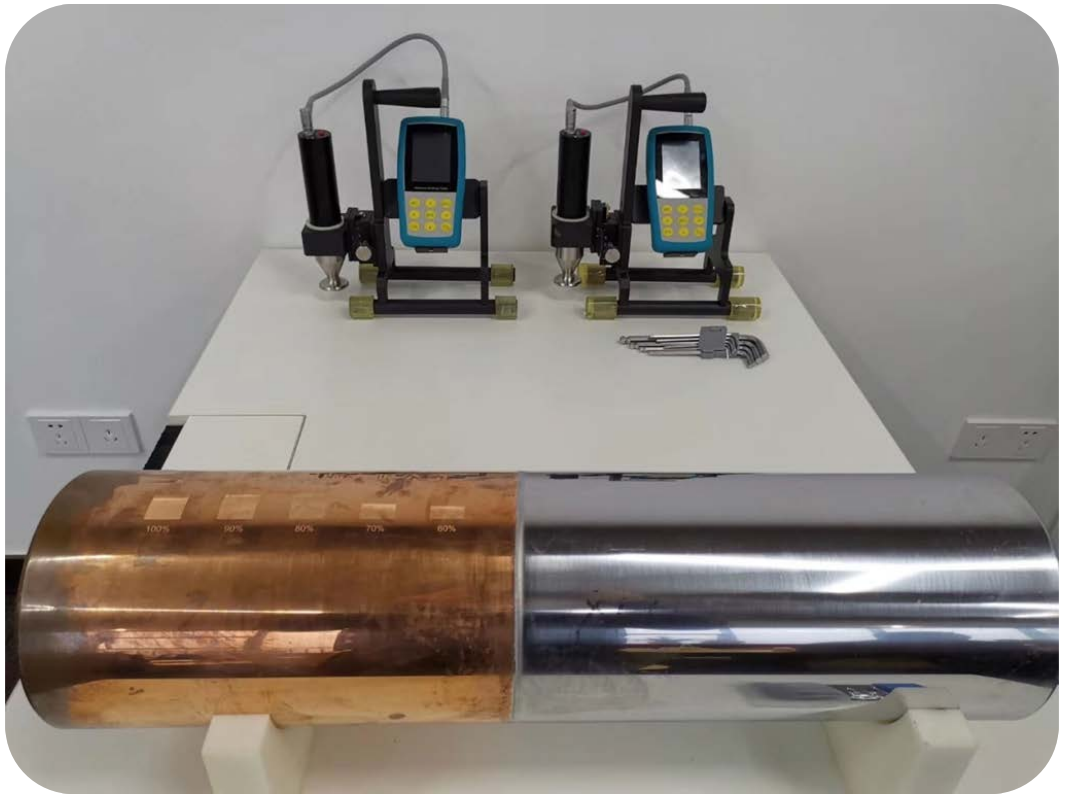


Diagram of indentation of materials with different hardness measured by ultrasonic dimensional indentation method,

Under uniform contact pressure, the resonance frequency of the vibration bar of UCI sensor changes with the change of contact area.

Ultrasonic hardness Tester is a portable comparative hardness meter, based on the measurement principle of dimensional, using electronic method to measure the hardness of the material.

Three factors affecting the tested sample of ultrasonic hardness tester:

Thickness , Weight, Roughness

Weight:

Because the mass of the sample is too small, the resonance wave will not rebound back to the instrument completely for testing,As a result, the instrument can not detect the change of resonance wave, which makes the instrument unable to measure.

According to the requirements of GB / T 34205-2017, the weight of the sample shall be more than 300g.

According to Zhongwang precision test data, if the hardness of the harder material, Samples larger than 25g can also be tested by ultrasonic hardness tester.

GB/T34205—2017

The thickness of the test piece is generally not less than 5 mm and the weight is not less than 300 g. For test piece with a thickness of 2 mm to 5 mm, it is recommended to use coupling or bonding. Thin coatings or surface layers on bulk material must have a minimum thickness of at least ten times of the indentation depth of the indenter. Note: When the thickness of the test part of the test piece is too thin, it may cause self-oscillating or interference vibration of the test piece; when the test piece weight less than 300 g, if the test piece self-oscillating occurs, it will affect the test results.

Thickness:

As the ultrasonic hardness tester uses static indentation method to measure the test, the indenter used is the same as the dimension hardness tester. Therefore, the thickness of the tested sample must be greater than 10 times the indentation depth.

Because the ultrasonic hardness tester measures the resonance wave to reflect the hardness of the sample, and the thin sample can't produce the ultrasonic resonance, so the sensor can't detect the change of the signal, so the instrument can't measure the thin sample.

If a higher measurement accuracy is required,

Sinowon recommends that the sample with total thickness less than 0.5mm should be measured by bench type hardness tester.

ASTMA1038-2017

8.2 *Minimum Thickness*—Thin coatings or surface layers on bulk material must have a minimum thickness of at least ten times of the indentation depth of the indenter used (see Fig. 3 for a Vickers indenter) corresponding to the Bueckle's rule: S_{min} = 10 × h.

ASTMA1038-2017:

Minimum thickness---Thin coatings or surface layers on larger materials must have an minimum thickness, Mini thickness of it at least on 10 times of the indentation depth （Indentation depth of Vickers is shown in the right figure）. It should satisfy：*Smin* = 10×h

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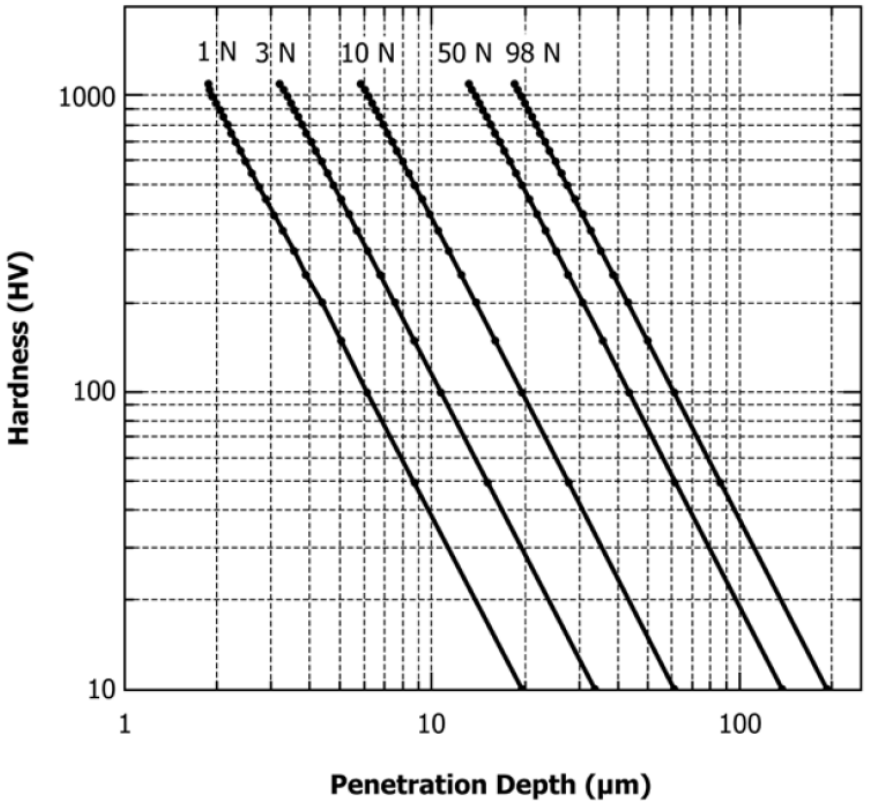


FIG. 3 Vickers Diamond Penetration Depth for Different Test Loads from 1 N to 98 N

With different Testing force of 1N to 98N Indentation depth of Vickers

Roughness:

Because the ultrasonic hardness tester adopts the dimensional indenter,

According to GB / T 34205-2017, the sample RA must meet the requirements of Table 2:

The metallographic sample preparation method can be used for surface treatment of the sample to ensure that the roughness of the sample meets the test requirements, otherwise the measurement error will be caused.

Note: conditional users are recommended Purchase a roughness tester to measure the finish of the sample, a digital balance to measure the weight of the sample, and a digital caliper to measure the thickness of the sample.

GB/T34205—2017

The surface of specimen should smooth,and the surface roughness should not exceed 30% of the indentation depth. Maximum roughness of specimen surface (Ra) is shown in Table 2. Penetration depth for a certain hardness and test load is shown in formula(1):
Remark: Roughness of specimen surface may have an effect on test result.

$$h = 0.062 \times \sqrt{\frac{F}{HV}}$$

In the formula:h-indentation depth,unit: millimeter (mm);
F-Testing force,unit:Newton (N);
HV-UCI: Vickers Hardness Value-Ultrasonic contact impedance

Table 2 Maximum roughness of specimen surface (Ra)

Testing force [a] /N	Maximum roughness of specimen surface Ra/um
98	15
50	10
10	2
3	2.5
[a] 1N、8N、20N can refer to the requirements of other Testing force，and determined by related parties through consultation.	

Ultrasonic hardness tester Vickers hardness value and indentation depth / coating minimum thickness of the table														
HV	Depth of indention (h /μm)							Min Thickness (t/μm)						
	0.3kgf	0.5kgf	0.8kgf	1kgf	2kgf	5kgf	10kgf	0.3kgf	0.5kgf	0.8kgf	1kgf	2kgf	5kgf	10kgf
50	15.0	19.4	24.6	27.5	38.8	61.4	86.8	150.4	194.2	245.5	274.6	388.3	614.0	868.3
100	10.6	13.7	17.4	19.4	27.5	43.4	61.4	106.3	137.3	173.6	194.2	274.6	434.2	614.0
150	8.7	11.2	14.2	15.9	22.4	35.4	50.1	86.8	112.1	141.7	158.5	224.2	354.5	501.3
200	7.5	9.7	12.3	13.7	19.4	30.7	43.4	75.2	97.1	122.8	137.3	194.1	307.0	434.2
250	6.7	8.7	11.0	12.3	17.4	27.5	38.8	67.3	86.8	109.8	122.8	173.6	274.6	388.3
300	6.1	7.9	10.0	11.2	15.9	25.1	35.4	61.4	79.3	100.2	112.1	158.5	250.7	354.5
350	5.7	7.3	9.3	10.4	14.7	23.2	32.8	56.8	73.4	92.8	103.8	146.8	232.1	328.2
400	5.3	6.9	8.7	9.7	13.7	21.7	30.7	53.2	68.6	86.8	97.1	137.3	217.1	307.0
450	5.0	6.5	8.2	9.2	12.9	20.5	28.9	50.1	64.7	81.8	91.5	129.4	204.7	289.4
500	4.8	6.1	7.8	8.7	12.3	19.4	27.5	47.6	61.4	77.6	86.8	122.8	194.2	274.6
550	4.5	5.9	7.4	8.3	11.7	18.5	26.2	45.3	58.5	74.0	82.8	117.1	185.1	261.8
600	4.3	5.6	7.1	7.9	11.2	17.7	25.1	43.4	56.0	70.9	79.3	112.1	177.2	250.7
650	4.2	5.4	6.8	7.6	10.8	17.0	24.1	41.7	53.8	68.1	76.2	107.7	170.3	240.8
700	4.0	5.2	6.6	7.3	10.4	16.4	23.2	40.2	51.9	65.6	73.4	103.8	164.1	232.1
750	3.9	5.0	6.3	7.1	10.0	15.9	22.4	38.8	50.1	63.4	70.9	100.3	158.5	224.2

Answer:

Because the elastic modulus of the material is almost inconsistent with that of the hardness block.

Ultrasonic hardness tester is a kind of portable comparative hardness tester, which is based on the measurement principle of dimension and adopts electronic method to measure the hardness of materials. The electronic method reflects the hardness by measuring the change of resonance wave, and the main factors causing the change of resonance wave are indentation area and Young's modulus of elasticity.

Because the young's modulus of elasticity of the tested material is inconsistent with the modulus of the hardness block in most cases, and the customer generally knows the hardness range of his own style in most cases. In the case of the ultrasonic hardness machine without calibration, the test value of the ultrasonic hardness machine deviates greatly from the value in the customer's mind, which leads the customer to think that "the ultrasonic hardness tester, The hardness block is accurate, but the sample is not.

GB/T34205—2017

Parameter calibration of hardness tester

Use a bench-top hardness tester for calibration to measure at least 5 points on a reference hardness block of the same material as the sample, and calculate the average value of the 5 point hardness values as the calibration value of the hardness tester.

Use a hardness tester to measure at least 5 points on the same reference hardness block, adjust the average value displayed by the hardness tester to the calibration value obtained from 6.6.1, and E to obtain the calibration parameters.

After the parameters of the hardness tester are calibrated, the hardness tester can be used to test the hardness of the same metal material within the same hardness scale and range.

For different metal materials, some hardness testers allow storage of all calibration data and adjustment parameters, which can be recalled when needed.

Note: Generally, the parameters of the hardness tester are calibrated by the manufacturer using standard hardness blocks of non-alloy steel and low alloy steel. When testing metallic material specimens with different modulus of elasticity from non-alloy steel and low alloy steel, the parameters of the hardness tester need to be calibrated.

- Ultrasonic hardness tester adopts Vickers hardness test method and indenter, but the area measurement method is not optical measurement method, but electronic measurement method.
- The hardness of ultrasonic hardness tester is mainly affected by elastic modulus, different materials have different elastic modulus. The random standard hardness block is mainly used to check whether the ultrasonic hardness tester is accurate.
- To accurately test the hardness of the sample, it is necessary to make a standard sample of the same material as the sample to calibrate the machine.
- In the actual operation, the thickness, roughness and minimum weight of the sample shall be paid attention to.
- To measure the hardness of the coating, pay special attention to the thickness of the coating.

3 Introduction of Sinowon Ultrasonic Hardness Tester

3.1 Sinowon Ultrasonic Hardness Tester Group Display

Motorized Ultrasonic Hardness Tester
SU-300M

Portable Motorized Universal Dynasonic Hardness Tester
SU-400M

Portable Manual Universal Dynasonic Hardness Tester
SU-400H

Manual Ultrasonic Hardness Tester
SU-300H

Ultrasonic Hardness Tester
(SPC Statistics Software)

Portable Leeb Hardness Tester
SH-500

Lengthened Ultrasonic Hardness Tester
SU-33C

Roller Ultrasonic Hardness Tester
SU-320R

Shorten Ultrasonic Hardness Tester
SU-340T

Portable Screw Durometer
SVR-110

3.2 Motorized Ultrasonic Hardness Tester SU-300M

Product characteristics

High accuracy: the test accuracy can reach HV: ± 3% HV, HR: ± 1.5hr, Hb: ± 3% HB;

Small indentation: it can't be directly observed by naked eyes, and can only be found by high-power metallographic microscope;

Fast speed: the test results are output in 6 seconds, which is 20 times more efficient than microhardness tester;

Easy to operate: it only needs to operate with a single key to get the test results quickly;

Large screen: 3.2 "color screen directly displays the current measured value, maximum value Minimum, average and hardness conversion values;

Wireless printing: support wireless Bluetooth printing and data transmission, RS232 data output

Product Introduction

The host and probe are streamlined design, anti-interference aluminum alloy shell, high-strength anti scratch glass panel, high-speed MPU system, 3.2 "high brightness color LCD, wireless Bluetooth data printing and transmission technology, clear human-computer interface, leading the portable hardness measurement to the industrial 4.0 era.

Application

The hardness of samples such as mould, bearing, roll, screw, wind power, etc. with chromium plating, copper plating, carburizing, nitriding layer, etc. can be measured by using the cordwood system design.

Specifications:

Optional probe	MP300,MP500,MP80,MP1000
Measuring Range	HBS: 100-500; HV：100-1500; HRC：20-68; HRB: 55-100; HRA: 37-85; Mpa: 255-2180N/mm
Data Storage	To save 1000-groups of measuring data and 20-groups of calibration data
Hardness Scales	Vickers(HV);Rockwell C(HRC); Rockwell A(HRA); RockwellB(HRB);Brinell(HB)
Language	Chinese, English, German, Portugese, Turkish
Word input	Letters and numerals
Working Environment	Temperature: -10°C to 50°C ; Humidity :30%-80% R.H.
Battery Voltage	Rechargeable lithium battery ; Voltage :4.2V, 3200mAh
Main unit Dimension and Weight	Main unit Dimension :160 x 80 x 30mm (L x W x H);Manual Probe:Φ22×153mm ; Weight(No Probe): 0.5Kg
Packing Dimension and Weight	Packing Dimension 320 x 430 x 155mm (L x W x H) ; Packing Weight （Standard Delivery）4.3Kg

3.3 Manual Ultrasonic Hardness Tester SU-300H

Product characteristics

High accuracy: the test accuracy can reach HV: ± 3% HV, HR: ± 1.5hr, Hb: ± 3% HB;
Small indentation: it can't be directly observed by naked eyes, and can only be found by high-power metallographic microscope;
Fast speed: the test results are output in 6 seconds, which is 20 times more efficient than microhardness tester;
Easy to operate: it only needs to operate with a single key to get the test results quickly;
Large screen: 3.2 "color screen directly displays the current measured value, maximum value Minimum, average and hardness conversion values;
Wireless printing: support wireless Bluetooth printing and data transmission, RS232 data output

#882-141H

Application

SU-300 adopts the modular modular design, which can measure the hardness of flange edge and gear root stamping parts, molds, thin plates, hardened teeth and gear grooves, taper and other parts; as well as the hardness of shaft and pipe inner and outer walls, containers; the hardness of wheel, turbine rotor, crankshaft and other metal parts; the hardness of cutting tools, drill bits, cutting edges and support seats; the hardness of weld heat affected areas Hardness.
It can be matched with automatic devices such as manipulator and assembled on the production line to become the online hardness testing equipment on the production line.

Specifications:

Optional probe	HP-1K, HP-2K, HP-5K, HP-10K
Measuring Range	HBS: 100-500; HV：100-1500; HRC：20-68; HRB: 55-100; HRA: 37-85; Mpa: 255-2180N/mm
Data Storage	To save 1000-groups of measuring data and 20-groups of calibration data
Hardness Scales	Vickers(HV);Rockwell C(HRC); Rockwell A(HRA); RockwellB(HRB);Brinell(HB)
Language	Chinese, English, German, Portugese, Turkish
Word input	Letters and numerals
Working Environment	Temperature: -10°C to 50°C ; Humidity :30%-80% R.H.
Battery Voltage	Rechargeable lithium battery ; Voltage :4.2V, 3200mAh
Main unit Dimension and Weight	Main unit Dimension :160 x 80 x 30mm (L x W x H);Manual Probe:Φ22×153mm ; Weight(No Probe): 0.5Kg
Packing Dimension and Weight	Packing Dimension 320 x 430 x 155mm (L x W x H) ; Packing Weight （Standard Delivery）4.3Kg

3.4 Shorten Ultrasonic Hardness Tester SU-340T

Application: SU-340T The short probe manual ultrasonic hardness tester is also called ultrasonic pipe hardness tester and inner wall hardness tester because the ultrasonic probe configured is very short and can directly measure the hardness of the inner wall of the pipeline without damage.

#882-141T

Specifications:

Standard Probe	HP-1T, HP-2T
Measuring Range	HBS: 100-500; HV：100-1500; HRC：20-68; HRB: 55-100; HRA: 37-85; Mpa: 255-2180N/mm
Data Storage	To save 1000-groups of measuring data and 20-groups of calibration data
Hardness Scales	Vickers(HV);Rockwell C(HRC); Rockwell A(HRA); RockwellB(HRB);Brinell(HB)
Language	Chinese, English, German, Portugese, Turkish
Word input	Letters and numerals
Working Environment	Temperature: -10°C to 50°C ; Humidity :30%-80% R.H.
Battery Voltage	Rechargeable lithium battery ; Voltage :4.2V, 3200mAh
Main unit Dimension and Weight	Main unit Dimension :160 x 80 x 30mm (L x W x H);Manual Probe:Φ22×153mm ; Weight(No Probe): 0.5Kg
Packing Dimension and Weight	Packing Dimension 320 x 430 x 155mm (L x W x H) ; Packing Weight（Standard Delivery）4.3Kg

3.5 Lengthened Ultrasonic Hardness Tester SU-330C

Application

SSU-330C with extended probe used to test hardness of gear and deep hole specimen, under extreme space limitation or on the floor of grooves.

#882-141C

Specifications:

Standard Probe	HP-1C, HP-2C
Measuring Range	HBS: 100-500; HV：100-1500; HRC：20-68; HRB: 55-100; HRA: 37-85; Mpa: 255-2180N/mm
Data Storage	To save 1000-groups of measuring data and 20-groups of calibration data
Hardness Scales	Vickers(HV);Rockwell C(HRC); Rockwell A(HRA); RockwellB(HRB);Brinell(HB)
Language	Chinese, English, German, Portugese, Turkish
Word input	Letters and numerals
Working Environment	Temperature: -10°C to 50°C ; Humidity :30%-80% R.H.
Battery Voltage	Rechargeable lithium battery ; Voltage :4.2V, 3200mAh
Main unit Dimension and Weight	Main unit Dimension :160 x 80 x 30mm (L x W x H);Manual Probe:Φ22×153mm ; Weight(No Probe): 0.5Kg
Packing Dimension and Weight	Packing Dimension 320 x 430 x 155mm (L x W x H) ; Packing Weight （Standard Delivery）4.3Kg

3.6 Portable Universal Dynasonic Hardness Tester SU-400

Features

- One instrument two applications—Support ultrasonic probe and Leeb impact device.
- Metal shell—Metallic texture, shield electromagnetic interference effectively, improve instrument stability.
- Color screen display—Display the current measurement value, accumulative measurement value, Max, Min and Ave value.
- Bluetooth transferring—Support wireless Bluetooth print and data transferring.
- Mass storage—Save 1000 groups data.
- Calibration access—Save 20 groups calibration data without doing calibration for the same material over and over.

Brief Introduction

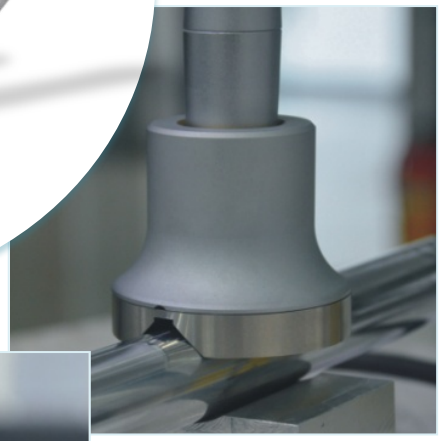
- SU-400 Dynasonic Hardness Tester is a universal portable durometerwith twin-testing-method. It applies twin-method aboutstate ultrasonic contact independence: UCIand dynamic rebound: Leebto make hardness testing in one instrument, it solves the dilemma that Leeb method can not test the hardness of plating and coating(in UCI), and UCI method can not test the coarse crystal material in the casting industry(in Leeb).
- SU-400 can not only work with the UCI motorized and manual probes, but also work with theLeeb impact probe, it is universal to test the hardness of material with the fine crystalstructure or coarse crystal structure in the metal industry.
- SU-400 UCI probe system is perfect to measure hardness testing about the coating and plating, which can measure the hardness of chrome, copper plating, carburized layer and Nitriding layer effectively.
- SU-400 dynamic Leeb probe system is suitable to measure hardness of coarse material, such as, casting and forging.
- SU-400 is a NDT durometer due to the contact indention is too small to observe, it is one of the excellent solution to test hardness of finished products, such as, the mold, gear, shaft, rod, screw, rails, etc.
- SU-400 conforms the standard ASTM A1038-2005, DIN standard DIN50159-1-2008 and China National standard GB/T 34205-2017, GB/T 17394.

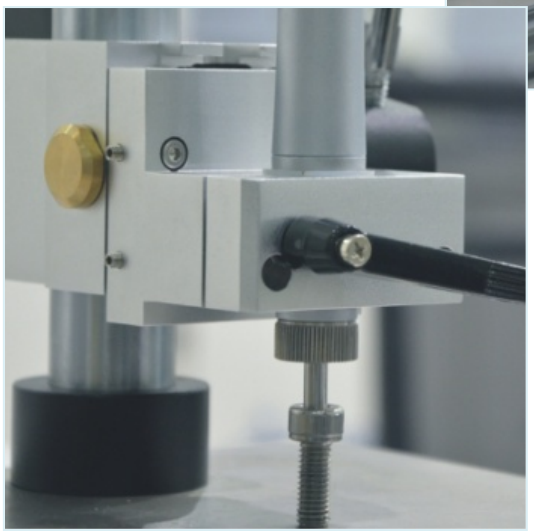
Specifications:

Ultrasonic Probe	Manual Probe HP-1K、HP-2K、HP-5K、HP-10K and Motorized ProbeMP-300、MP-500、MP-800、MP-1000
Impact Devices	Standard delivery：D（optional DC,DL,D+15,C, G）
Measuring Range	HV:50～1599; HRC:20～68; HB:76～650；HRB:41～105; HLD:170～960
Measuring Accuracy	HV:±3%HV; HRC:±1.5HRC; HB:±3%HB;HL: ±8HL
Resolution	0.1HR, 1HV, 1HB, 1HLD,0.1HS
Data Storage	1000 group test results and 20 group calibration data
Hardness Scale	HL、 HV、HB、HRC、HRB、HRA、HS, etc.
Language	Chinese, English, German, Portugese, Turkish
Word input	Letters and numerals
Working Environment	Temperature: -10°C to 50°C ; Humidity :30%-80% R.H.
Battery Voltage	Rechargeable lithium battery ; Voltage :4.2V, 3200mAh
Main unit Dimension and Weight	160x80x31mm；Weight(No Probe): 0.5Kg
Packing Dimension and Weight	350x450x150mm ， 5kg

Product Features:

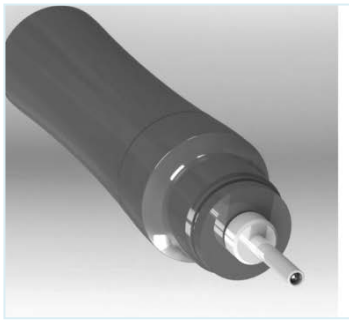
- Ultrasonic contact impedance method;
- Excellent ergonomic design, easy to grip the probe;
- 360 ° fast measurement without dead angle;
- Accurate hardness measurement can be obtained without external support;
- Perfect probe size and weight make the control of measuring angle more handy;
- In the fixed position and even the edge of the material can be accurately and quickly measured;
- The surface indentation is very small, which is very convenient for the post-processing of materials and workpieces.
- Equipped with deep hole protective cap, it can be used in various applications for measurement.

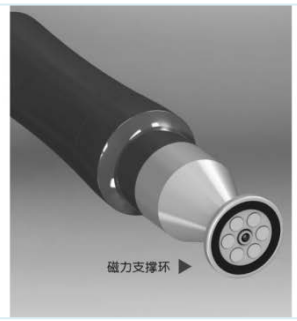




Product features:

- Ultrasonic contact impedance method;
- Accurate hardness measurement can be obtained without external support;
- Excellent ergonomic design, easy to grip the probe;
- The surface indentation is very small, which is very convenient for the post-processing of materials and workpieces;
- Electric loading / load holding / unloading;
- Accurate one button fast measurement;
- Plane support ring with magnetic force;
- It is especially suitable for the hardness measurement of thin sheet and coating, and the measurement accuracy is more accurate;
- Equipped with deep hole protective cap, it can be used in various applications for measurement.





3.9 Technical parameters and application of ultrasonic probe

Probe type	MP-300	MP-500	MP-800	MP-1000	HP-1K	HP-2K	HP-5K	HP-10K
True test force	3N	5N	8N	10N	10N	20N	50N	98N
application	Precision parts, coating (t ≥ 0.04mm), coating and hardening layer of low pressure cylinder (t ≥ 0.02mm)	Precision mold, parts, gear, bearing raceway, guide rail			Ion nitriding die, die shell, clamp, thin-walled part, bearing, tooth side, crankshaft, connecting rod turbine blade, inner wall of pipe with diameter greater than 110 mm		Induction hardening or carburizing parts, such as camshaft, turbine weld inspection, heat affected zone	Forgings, casting materials, weld inspection, heat affected zone
Maximum roughness of measuring surface	Ra<2.5um				Ra<3.2um	Ra<5um	Ra<10um	Ra<15um
Diameter	46mm				22mm			
Length	197.5mm				154mm			
Diameter of resonance rod	3.7mm				2.4mm			
Minimum weight of workpiece	0.3kg							
Minimum thickness of workpiece	2mm							

Specifications:

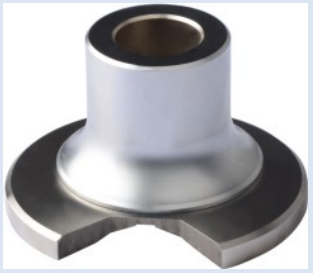
Hardness Range	Code#	Uniformity	Dimension
(28~35)HRC	882-611	±1.5HRC	Ø90x16mm
(38~45) HRC	882-621	±1.5HRC	Ø90x16mm
(48~55)HRC	882-631	±1.5HRC	Ø90x16mm
(58~65)HRC	882-641	±1.5HRC	Ø90x16mm
(300~800)HV 1	882-651	±3% HV	Ø90x16mm
(300~800)HV 5	882-661	±3% HV	Ø90x16mm
(300~800)HV 10	882-671	±3% HV	Ø90x16mm
(85~550)HB	882-681	±3%HB	Ø90x16mm

GB/T34205—2017

Standard Hardness Block

The standard hardness blocks used shall comply with the provisions of GB / T 4340.3-2012 except 3.3 thickness requirements.
In order to avoid the interference vibration caused by the ultrasonic hardness sensor in the standard hardness block, the thickness of the standard hardness block should not be less than 16mm, and the diameter should not be less than 80mm.
After the standard hardness block is calibrated, the thickness of the standard hardness block (accurate to 0.01 mm), mass (accurate to 1g) or the identification mark on its test surface should be marked on the side of the standard hardness block.

Specifications:

Support Ring Name	Plan Support Ring	Small Cylinder Support Ring	Big Cylinder Support Ring	Standard Probe Cap	Deep Hole Probe Cap
Code#	882-511	882-521	882-531	882-711	#882-721
Application	Plan Test Piece	Diameter 8-22mm Test Piece	Diameter 16-80mm Test Piece	Plan Test Piece	Deep Hole
Picture					

GB/T34205—2017

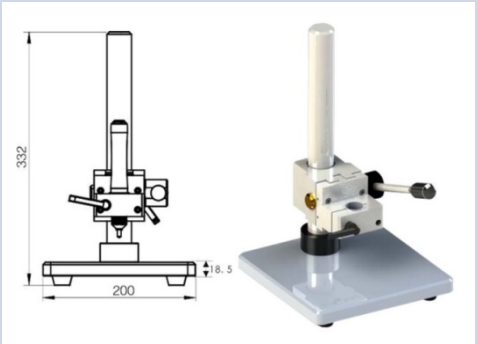
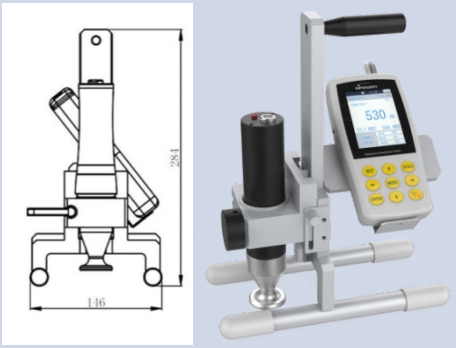
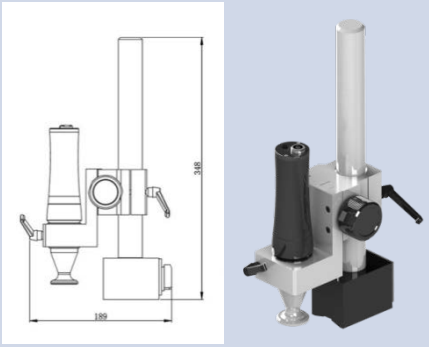
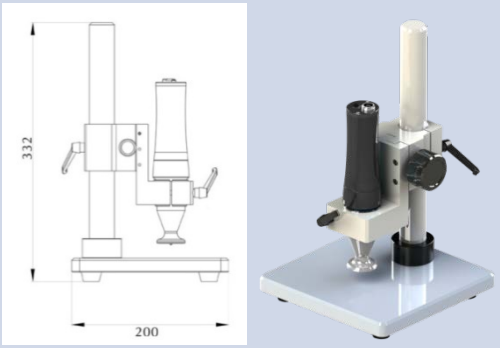
SPECIMENS

Test surface can be plane or curved. As long as the probe is accessible and the indenter can be pressed vertically into the test surface.

Note 1: Specimens refer to specimens and the test piece in the ordinary sense. The test piece includes a metal product or a part of a metal product, such as a forging, pipe, coating, etc. .

Note 2: When the test surface is curved , it is recommended to use a suitable supporting seat.

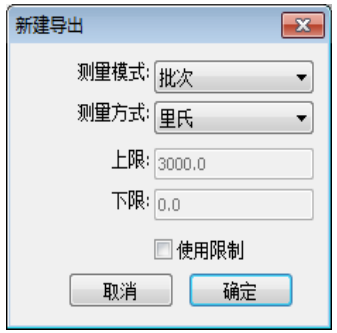
Specifications:

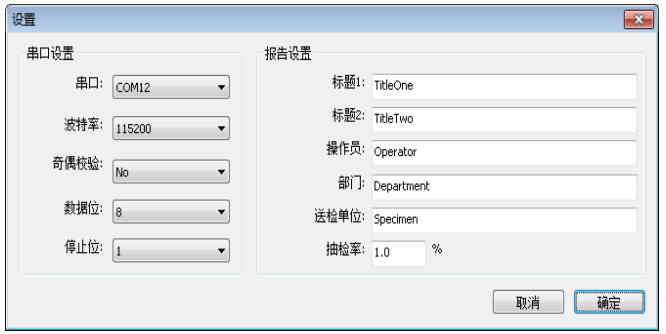
Testing stand	MU-100	MU-200	MU-300	MU-400
Code#	882-301	882-201	882-101	882-401
Material	Stainless Steel	Magnesium aluminunm alloy	Aluminum	Stainless Steel
Weight	8.8Kg	1.6Kg	4.5Kg	9.5Kg
Dimension	200x200x332mm	205x142x284mm	200x120x348mm	200x200x332mm
Packing Dimension	320x320x440mm	405x340x580mm	398x310x540mm	398x398x530mm
Application	Manual Probe Test Stand	Motorized Probe Test Stand	Motorized Probe Magnet Test Stand	Motorized Probe Test Stand
Picture				

Product features:

The software is the data processing software of ultrasonic / Leeb hardness tester, which can run on the windows system of Microsoft. Connect to Leeb hardness tester through Bluetooth, USB or COM interface, and read the measurement data stored in the memory of ultrasonic / Leeb hardness tester. Through on-line conversion, the measurement data is processed, so that the data can be visualized, displayed, stored, loaded or cleared at any time. At the same time, the measurement data can be output by connecting to the computer printer.

- ➢Support the connection of various hardness tester terminals;
- ➢Support receiving statistics of online data and historical data;
- ➢Support the import / export of historical data files;
- ➢Intuitive icon display and statistics;
- ➢The upper and lower limits can be set to highlight the abnormality;
- ➢Support Chinese, English and other multi-national language interface switching;
- ➢The measurement result report output of customizable content;
- ➢Support export Excel





4 Advantage analysis of Ultrasonic Hardness Tester

4.1 Comparison of indentation between ultrasonic and desk type hardness tester

VS

Brinell, Rockwell and Vickers hardness tester

- Large indentation: it needs to be reprocessed or scrapped after test, which is suitable for spot check
- Time: 30 seconds for Rockwell, 50 seconds for Vickers, 60 seconds for Brinell
- Difficult to operate: high requirements for operators
- Machine weight: not suitable for field test

Ultrasonic hardness tester

- Small indentation: it can not be directly observed by naked eyes, and it is suitable for full inspection
- Fast: 2 seconds at most
- Easy to operate: one key operation
- Small instrument: easy to carry, suitable for field test.

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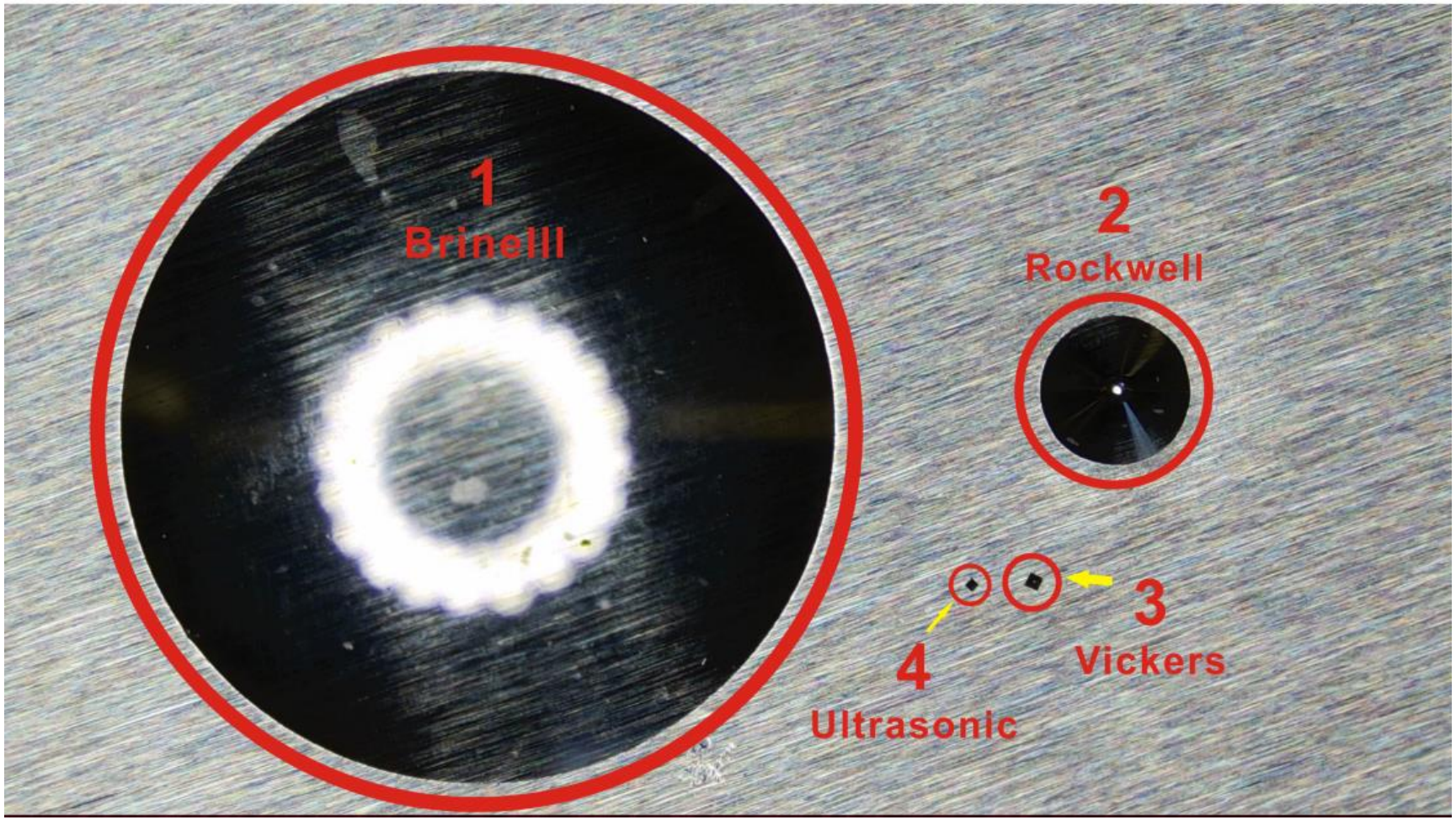
The different indentions on one specimen have been tested by Brinell, Rockwell, Vickers and Ultrasonic hardness tester.



4.2 When is it better to use Ultrasonic Hardness Tester?

- **There are many patterns of the same kind of materials, requiring full inspection or a large number of spot checks;**
  - Because the efficiency is 15 times higher than that of traditional bench hardness tester, 50 times higher than that of Brinell and Vickers.
- **The sample is too large to be tested directly by a bench hardness tester;**
  - Because the ultrasonic hardness tester is a portable hardness tester, it can solve the field measurement of the hardness of large workpieces.
- **Do not want to leave obvious test indentation on the tested sample;**
  - Due to the large test force of Brinell and Rockwell hardness tester, large indentation will be left behind after the sample. After the test, the product can not be assembled for use or needs to be processed again, and the customer requires the manufacturer to carry out hardness test
  - Because the ultrasonic hardness tester uses a small load of testing force, and uses a diamond dimension indenter, the test indentation needs more than 200X microscope to be able to clearly distinguish. It is not easy to see the indentation with naked eyes, so the above problems are solved.
- **The hardness of the surface coating of large products needs to be measured:**
  - Because the traditional portable hardness tester such as Leeb hardness tester can't measure the hardness of the surface coating of most products, and the ultrasonic hardness tester can measure the hardness of the surface coating without damaging the finished product after calibration with the test force of small load, so as to adjust and control the production process of large products and effectively guarantee the production quality of products.
  - In addition, there are many other applications. I'd like to throw a brick at you and invite you to add, criticize and correct them.

- No damage to the surface of the tested workpiece, simple operation, good stability and high test accuracy;
- It has the advantages of high speed, simple operation and high accuracy in batch testing of finished small workpieces;
- It can detect sheet metal, thin metal layer (including nitriding layer, carburizing layer, electroplated layer), small parts, special-shaped parts, large non movable workpieces, etc;
- Transformation of the three systems of Brinell, Rockwell and Vickers;
- The average value of the measured workpiece with uneven hardness value distribution can be obtained by multi-point accumulation;
- The workpiece can be directly detected by hand-held probe

- The common portable hardness machines are Richter, shore, portable Brinell, hammering Brinell, portable Rockwell, and busweller.
- The direct measurement method adopted by portable Brinell, hammer type Brinell and portable Rockwell hardness tester to obtain the hardness value also has the disadvantages of large indentation and long test flow.
- The shore hardness tester is mainly used to measure rubber, plastic, sponge, foam and other non-metallic materials. In recent years, a new shore scale also can measure the hardness of metals, but its popularity still needs to be improved.
- The hardness tester is mainly used to test the hardness of aluminum, copper, mild steel and soft metal materials.
- Generally speaking, the portable hardness tester is Leeb hardness tester. Because of its low price, simple operation and fast test speed, Leeb hardness tester has a large market share. However, because of the bouncing measurement method, it has certain requirements on the quality and thickness of the sample. Compared with the sample less than 5kg, it needs to be fixed or coupled before measurement, and the measurement error is relatively large 。
- The portable ultrasonic hardness tester has the advantages of fast speed, small indentation, easy operation and high precision. It only needs to calibrate the instrument and can test the hardness of thin materials and surface coating.

4.5 Comparison between ultrasonic and Leeb hardness tester

Hardness Tester	Leeb Hardness Tester	Ultrasonic Hardness Tester
Mass of sample	The higher the sample quality, the more reliable the hardness value of the Leeb hardness tester, The minimum quality requirement is 3kg for high hardness sample and 1.5kg for low hardness sample. If the sample does not meet the requirements, it is necessary to improve the inertia of the sample by means of coupling or compression support, estimate the effective collision mass, calculate the center of mass and deflection angle of the non dense sample, and if the treatment is not proper, it will cause large errors.	For the thin and small workpiece with complex shape, it can be directly measured with different fitting blocks of probe, which avoids the steps of fixture design and measurement value conversion and correction.

Surface roughness of sample		The higher the surface roughness is, the greater the binding force of the surface on the indenter of the resonance rod is. The higher the frequency of the resonance rod is, the lower the measured value is, the greater the impact on the low hardness sample is, but the impact is not significant when RA ≤ 12.5um (del. 3 or above).
Thickness of sample	The thickness of the test part in the test direction required by the Leeb hardness test is not only to prevent penetration, but also to prevent the support due to the shape. If there is no support or the support mode is different, the specimen will change its elastic or plastic position when it receives the impact force, and the thickness is required to be ≥ 3mm	The required thickness is ≥ 10 times the penetration depth of the indentation. Under 1.2kg weight load, the corresponding indentation depth of 25-65hrc steel is about 14-7um, so it can be applied to very thin materials.
Curvature radius of sample	The hardness value of Leeb is closely related to the volume of materials involved in indentation formation. It is required that R ≥ 10 mm for convex sample and 15mm for concave sample	The measured value is related to the projection of the contact area of the indentation, and it is not affected by the curvature radius because of the measurement under load.

Product characteristics	Fundamental Featues
Intelligent	The display terminal is systematic in operation, supports multi language, intelligently identifies different probes, and supports the storage and transfer of correction data of various materials.
Electrification	Automatic probe: motor loading to reduce measurement error. In particular, the development of small test force electric probe is the future development trend.
Multi rod	Support direct measurement of multiple scales: support direct measurement of HL scale by Leeb hardness probe; Support direct measurement of HS scale by shore hardness probe.
Data-orienting	Support RS232, USB, Bluetooth and other data transmission functions, SPC analysis of measurement results

4.7 Summary of advantages of Sinowon Ultrasonic Hardness Tester

- The ultrasonic hardness tester SU-100, sU-300 and su-400 series produced by Sinowon have high precision and good repeatability。
- Sinowon Innovation Metrology Manufacture Limited is National Authorized Hi-Tech Manufacturer (Certificate No.:GR201544000821), ISO9001:2008 Certified company.It is also one of the drafters of the corresponding national standards GB / T 34205-2017 and jjf-1436-2013 for ultrasonic hardness tester, with guaranteed quality.
- Sinowon can not only produce manual ultrasonic hardness tester and electric ultrasonic hardness tester, but also develop and produce hardness SPC data analysis and statistics software, which is more advanced in the field of hardness testing for users.
- In China, such as Special Equipment Inspection Instuitet, printing and plate making industry, precision mold industry, elevator industry, precision machine tool industry, automobile crankshaft industry, injection molding machine industry, heat treatment industry (copper plating, chromium plating, carburizing, nitriding), typical customers are using the ultrasonic hardness tester produced by Sinowon.
- SU-100，SU-300，SU-400 are also popular with European and American customers. At present, it has been exported to Europe, North America and Southeast Asia. Local users can also buy Zhongwang products locally.
- Sinowon has offices in major provinces and cities in China, which can deal with pre-sale, sale and after-sale service problems in the first time, so that you can buy conveniently and use safely

5 Application case sharing of Sinowon Ultrasonic Hardness Tester

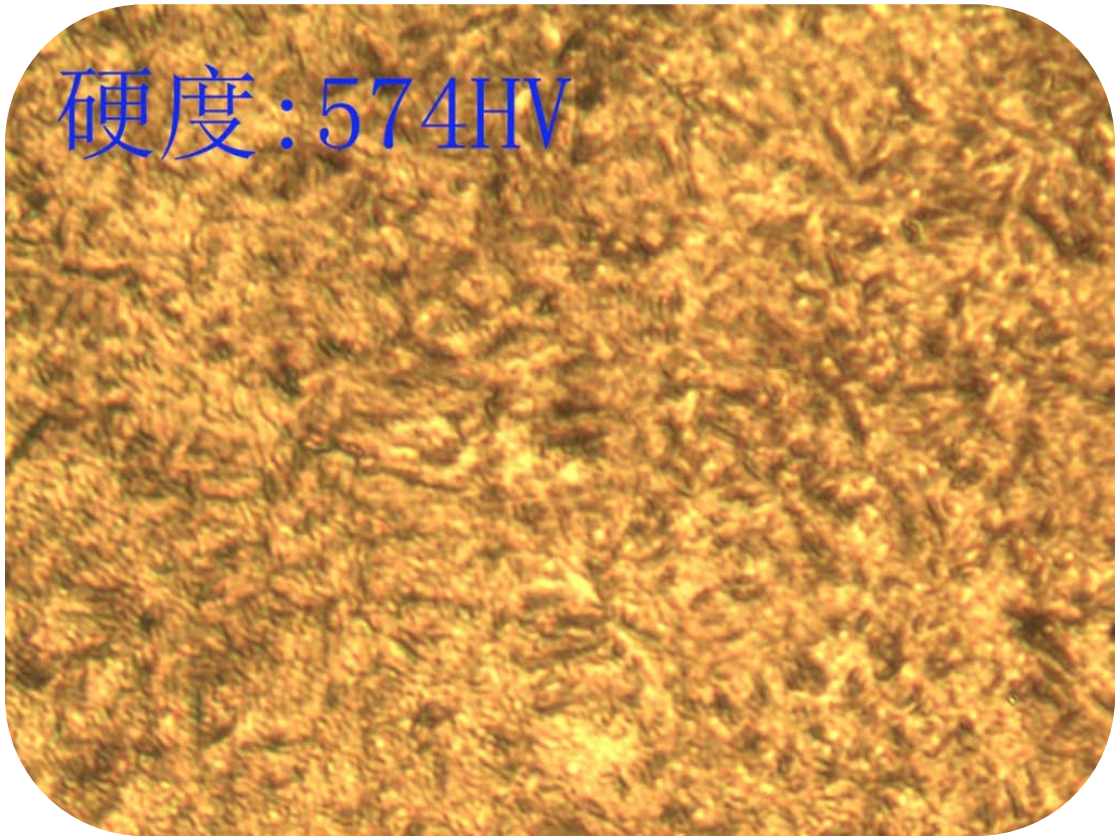
Guangdong Xinjiao heat treatment Co., Ltd

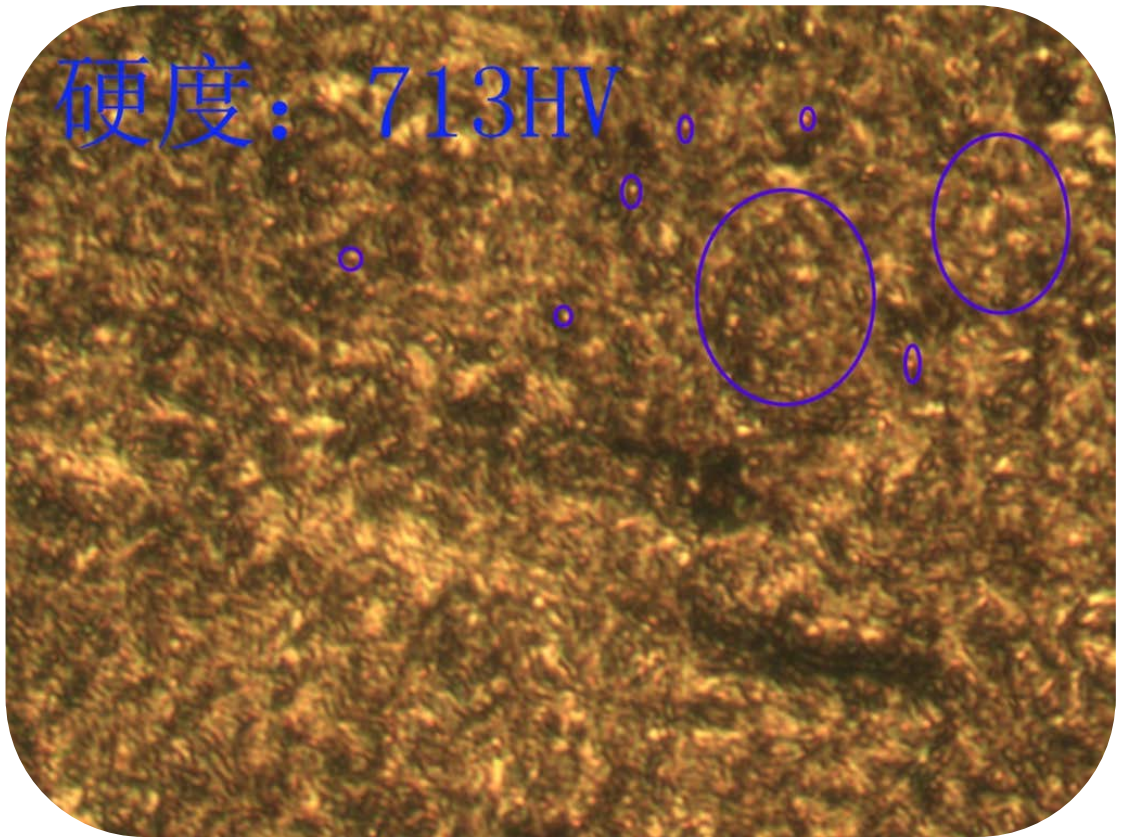
Requirement: measure the hardness of carburized layer

Instructment：SU-400+HP5K

Hundreds of thousands of large goods need to be fully inspected, and those above 650HV are unqualified products

Metallographic analysis, carbide is circled on the right



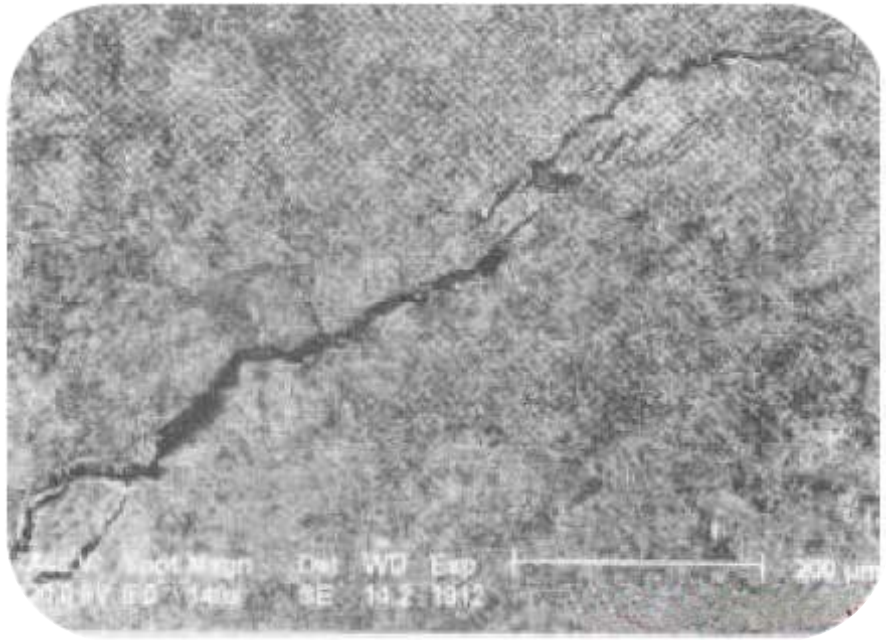


Carburizing: it is a kind of surface treatment of metal. The low-carbon steel or low-alloy steel are mostly used for carburizing. The specific method is to put the workpiece into the single-phase austenite area with active carburizing medium and heat it to 900-950 ℃. After holding for enough time, the active carbon atom decomposed from the carburizing medium will penetrate into the surface of the steel piece, so as to obtain high carbon on the surface and keep the original composition in the center. Similarly, low-temperature nitriding treatment. This is a common heat treatment process for metal materials.

Carburized workpiece materials are generally low-carbon steel or low-carbon alloy steel less than 0.25% carbon content. The surface chemical composition of carburized steel can approach that of high carbon steel. After carburizing, the workpiece is quenched and tempered at low temperature to obtain high surface hardness and high wear resistance and fatigue strength and then keep the toughness and plasticity of the low carbon steel quenched in the core, so that the workpiece can withstand the impact load. Carburizing process is widely used in aircraft, automobiles, tractors and other mechanical parts such as gear, shaft, camshaft and so on.

CAUSE AND HARM OF HIGH CARBON CONCENTRATION:

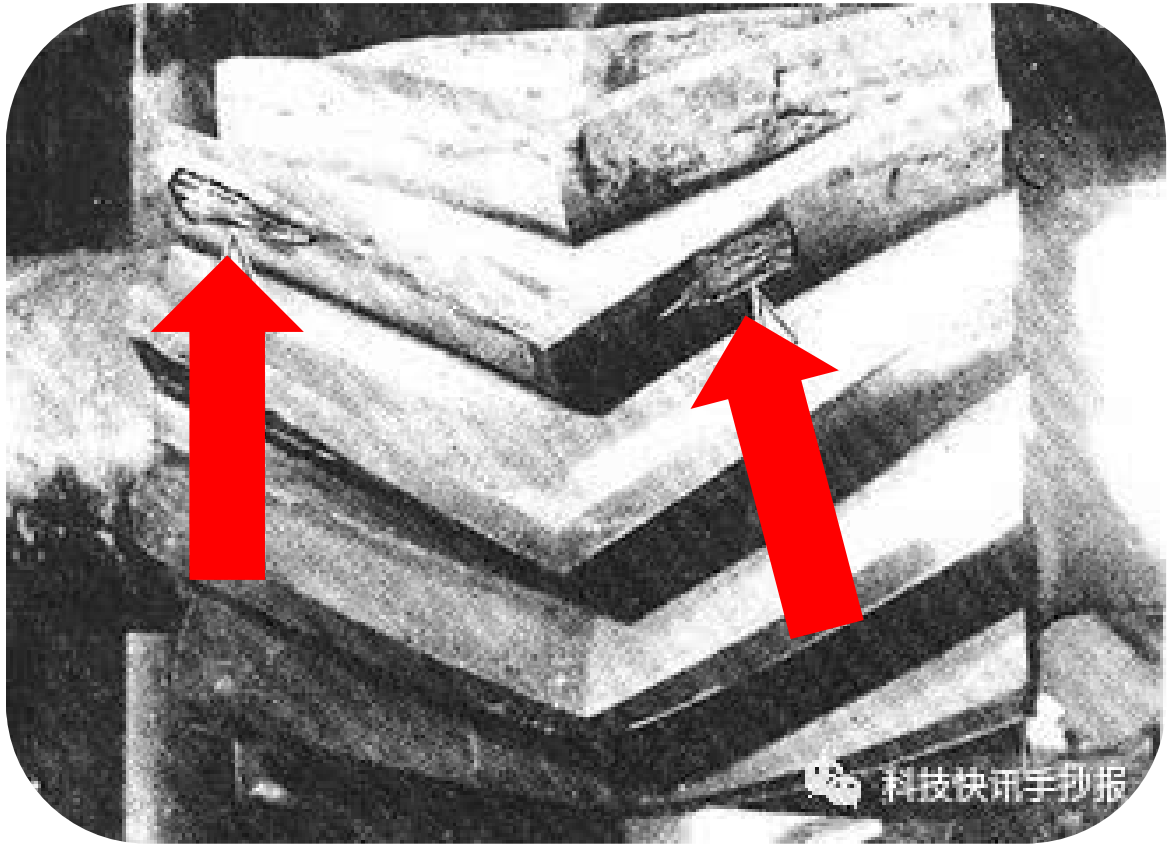
If the carburizing is heated rapidly, the temperature is too high, or if the carburizing agent is new, or if the carburizing agent is too strong, thses will all lead to high carburizing concentration . As the carbon concentration is too high, the surface of the workpiece appears massive or reticulate carbide. Because of the hard and brittle structure, the toughness of carburized layer decreases sharply. The High Carbon Martensite is formed during quenching, and the grinding cracks are easy to appear during grinding.



Causes and hazards of low carbon concentration:

A large temperature fluctuation or a small amount of accelerant will lead to a lack of carbon concentration on the surface. Parts wear easily.

The optimal carbon concentration is 0.9-1.0%, lower than 0.8% C

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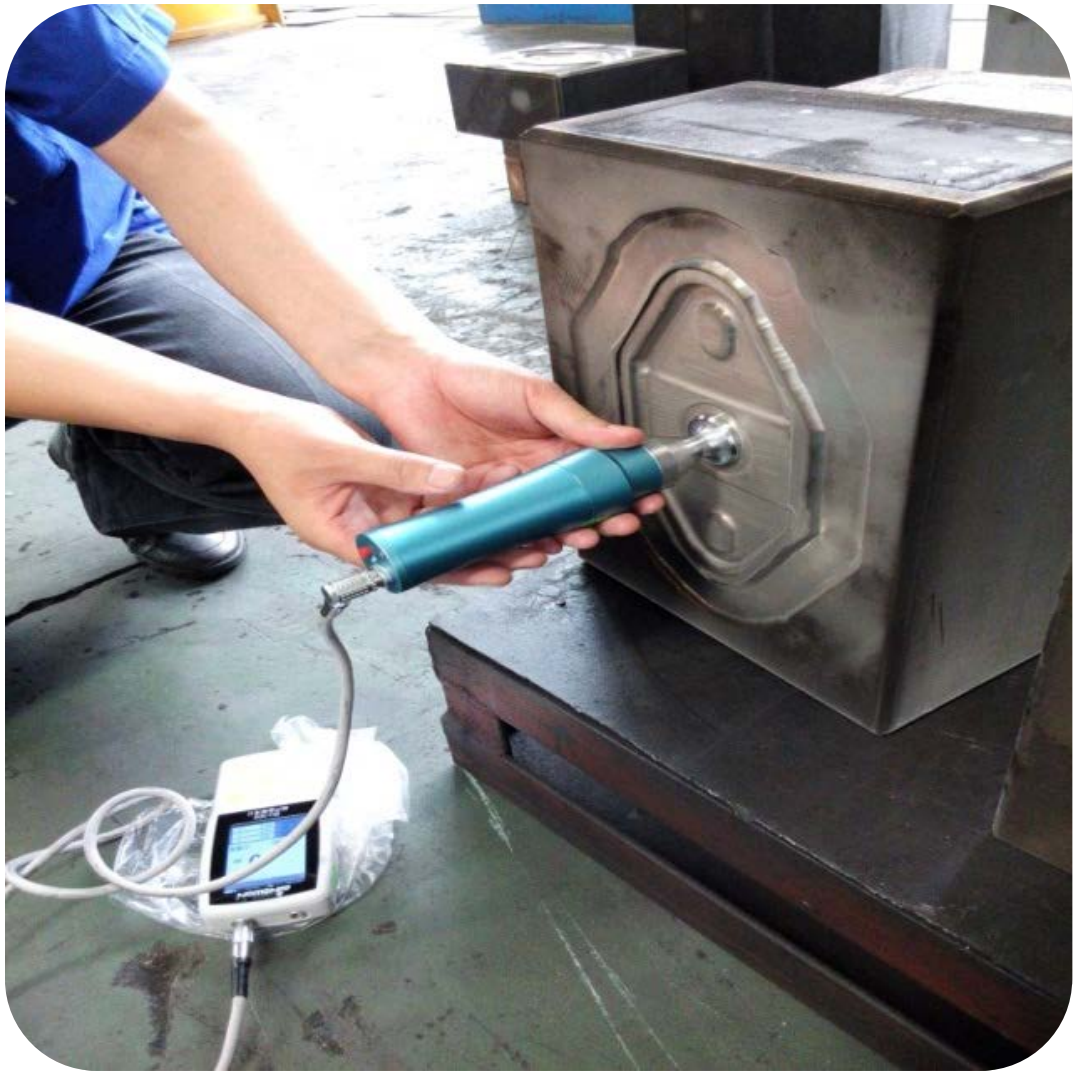
台州达兴热处理有限公司
TAIZHOU DAXING HEAT TREATMENT CO., LTD.

用户：深圳震雄集团及其上游供应商

Precision Mold



Automobile Mould

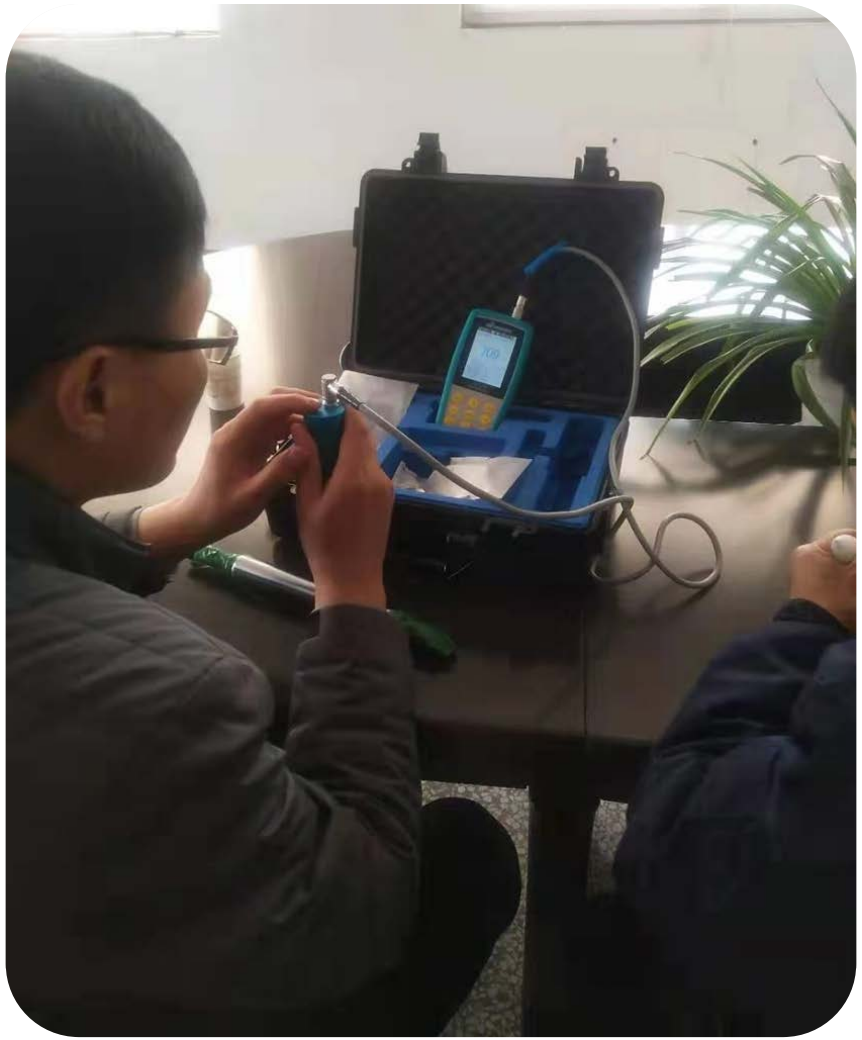
Measure the hardness of the chromium coating on the inner and outer walls of the pipe, and the thickness of the coating is 30um,
Minimum pipe diameter 125mm
Hp-1t for inner wall and mp-300 for outer wall

SU-400+HP-2K

SU-400+HP2K

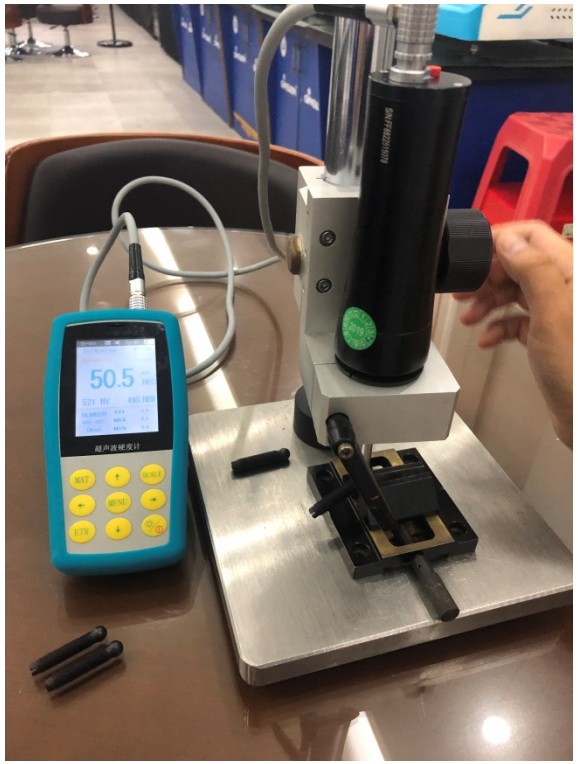

SINOWON
SU-400
Dynasonic Hardness Tester
MAT
SCALE
MENU
ETR

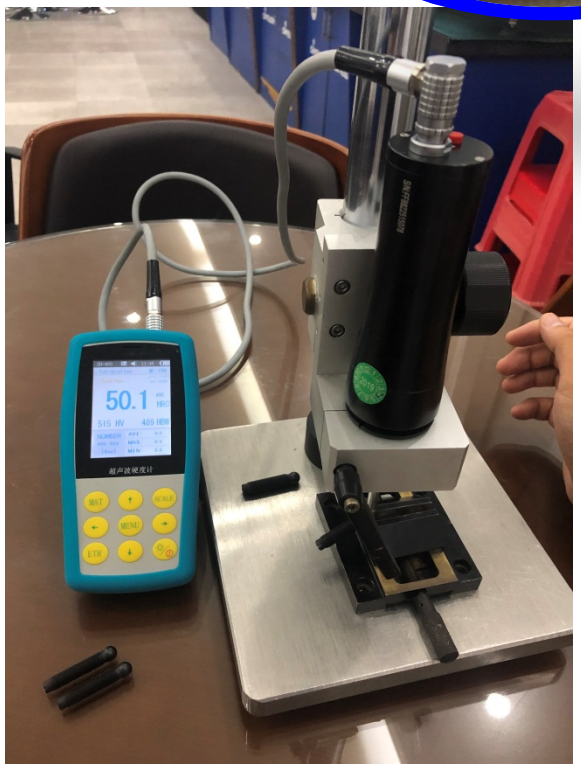
SU-300+MP-300

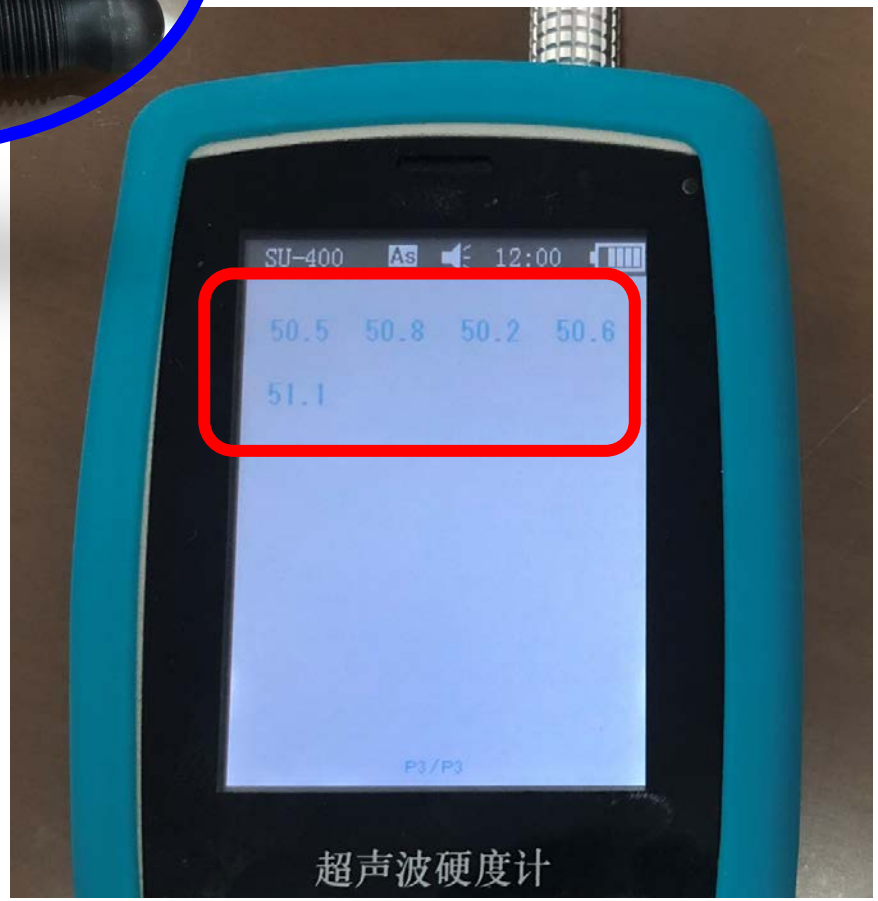


Round head screw, 8mm diameter, Material 45 steel, round head high frequency quenching, Surface bluing treatment, Required hardness48-53HRC

SU-300+MP-1000







Hardness test requirements:
1) No obvious hardness test indentation;
2) The hardness of chromium plating is 850hv0.3, and the allowable hardness error is ± 15hv;
3) Because of the high value of the workpiece, it is not allowed to destroy the workpiece for sampling test.

Plate roller is also called steel roller. It is also divided into hollow roll and solid roll, with and without shaft roll, which are generally used for plate making. The surface of the roller is copper plated, engraved with patterns by the gravure electronic engraving machine, and then plated with a layer of chromium. It is usually used in the printing of plastic packaging.

Copper plating must be nickel plated before copper plating, otherwise the combination of copper layer and roller core will be very weak.

The cylinder after copper plating shall be grinded on the grinder, first rough grinding, then fine grinding, and then polishing.

The thickness of copper plating is generally 0.1mm. The thickness of copper layer is too thick, which causes unnecessary waste. The copper layer is too thin, so it is easy to inject when carving.The hardness of copper plating should be controlled at 180 ~ 220hv. The hardness is too high. It is easy to inject when engraving. The hardness is too low and the dot is easy to deform, which is not conducive to the reduction and reproduction of the step tone.

Chromium plating

The cylinder after the electric engraving also needs to be electroplated to improve the surface hardness, wear resistance, chemical stability and other printability, so as to improve the printability of the plate roller.

The hardness of chromium plating layer is controlled at 800 ~ 1000hv. Too low hardness will result in the printing resistance of the roller.

The thickness of chromium layer is about 0.01mm.

As a result of long-term use, the water (including wetting liquid, alcohol, etc.) on the plate cylinder is transferred to the printing cylinder, and the ink is sprayed on the unused place (such as the split cylinder with four open parts for a long time), the surface corrosion and collapse will occur, which will lead to the big deterioration of the expensive printing machine and affect the printing quality.

As an important performance index, how to test the hardness of its surface? Generally, the traditional desktop computer can not be used for testing. The accuracy of the portable Leeb hardness tester is poor, while the indentation of the portable Rockwell and Brinell is too large, which will seriously damage its surface and can not meet the requirements of high accuracy of the stamping roller. As a non-destructive testing equipment in the field of hardness, ultrasonic hardness tester has very small indentation and almost no damage to the surface of the tested material, so it is very suitable for testing the hardness of the surface of the stamping drum.

5.9 Application of Ultrasonic Hardness Tester in the printing industry

In foreign countries, Ultrasonic Hardness Tester is used to detect the imprinting roller, and the effect is very good, which is worth our reference. Because the roller is cylindrical, and the size of the roller varies with the printing equipment, a special bracket is needed to complete the accurate measurement, as shown in the right figure is the test picture of the ultrasonic hardness tester.

In the regular maintenance of the embossing roller, it is usually necessary to conduct intensive hardness test on its surface, so the function of the bracket is not only to ensure that the probe can be vertical to the surface to be tested, but also to properly free hands to complete the test more easily.

Crankshaft: the main rotating part of the engine. After the connecting rod is installed, it can undertake the up and down (reciprocating) motion of the connecting rod to become a cyclic (rotary) motion.It is an important part of engine. Its material is made of carbon structural steel or nodular cast iron.

There are two important parts: main journal, connecting rod journal, (and others)。

SU-300+MP-300

5.10 Application of ultrasonic hardness tester in automobile crankshaft industry

SU-300+HP-5K

The weld is the joint formed after the weldment is welded.

By testing the hardness of weld and heat affected zone, we can judge the material's hardness indirectly（ ）?

A. impact

B. weldability

C. fatigue property

D. yielding property

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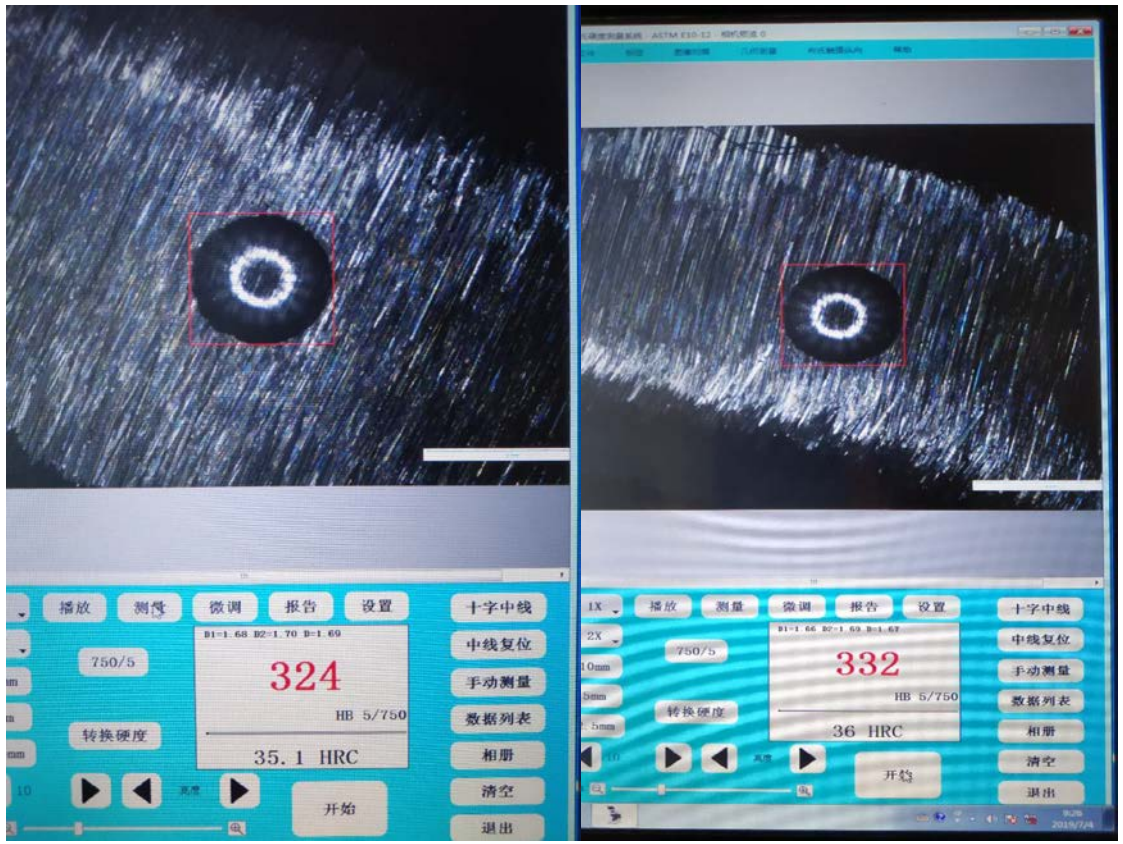
SU-300+HP-5K



VS

Welding defects can be generally divided into the following three categories

1. Defects in dimension, including unqualified weld size and poor weld shape.

2. Structural defects, including porosity, slag inclusion, incomplete fusion, incomplete penetration, undercut, crack, etc.

3. Defects in properties, including mechanical and chemical properties do not meet the requirements of the defects.

There are many mechanical properties of materials, such as strength, hardness, brittleness, elasticity, impact strength and so on. Generally speaking, the higher the hardness is, the more brittle it is.

Ultrasonic Hardness Tester testing, nondestructive, intuitive, convenient, high efficiency.

Generally, 100% inspection is required for welds of boiler and pressure vessel.

Accidents due to welding defects - Welding accidents of U.S. nuclear submarines

A spokesman for Northrop Grumman Newport News shipyard, in response to a question from the Navy times, said at least seven naval vessels were carrying out a weld defect assessment, according to US defense news.

Tank car explosion

With regard to the cause of the accident, the escort is said to have been privately welding the discharge valve pipe while the car was on the side of the road, and most suspect that it was this behavior that caused the explosion of the Tank car.

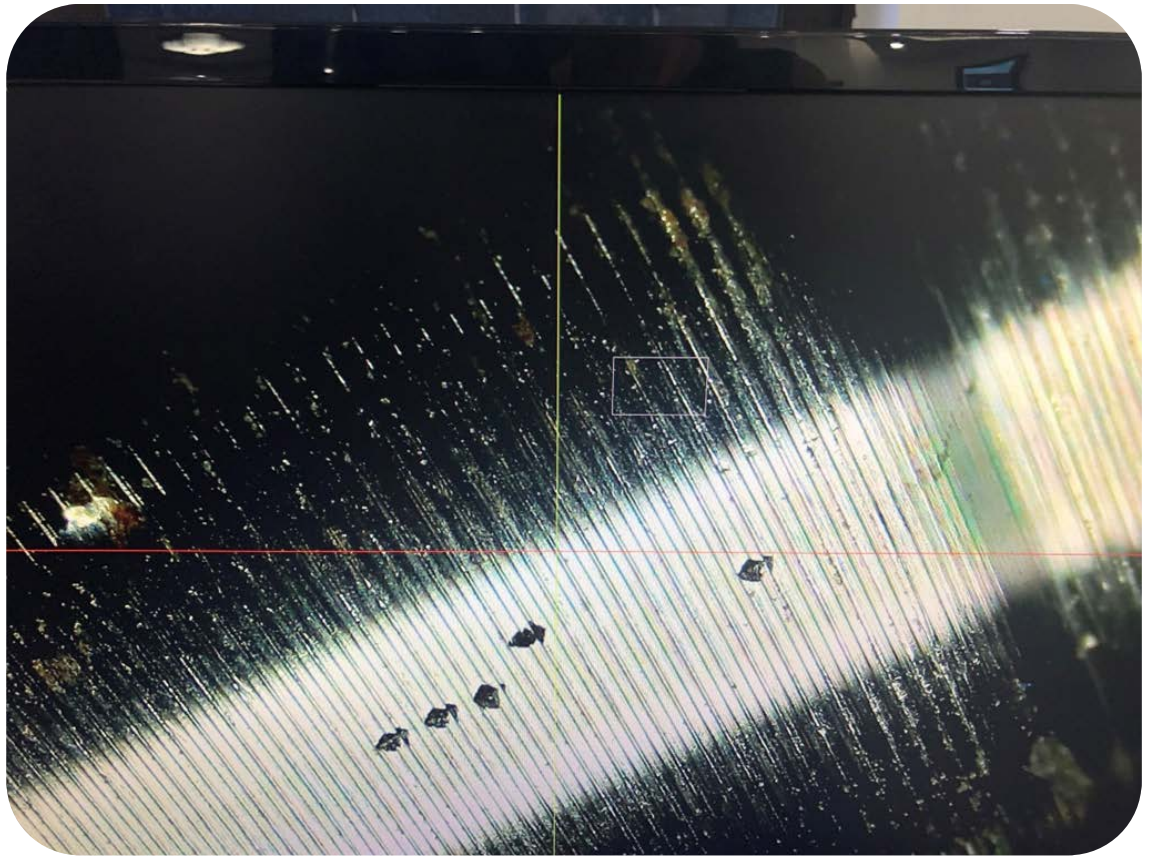
SU-300+HP-2K

SU-300+HP-2K

Not applicable to soft, thin, small and coarse-grained samples and Metal materials with thickness less than 2mm (such as cast iron, etc.)

Requirement: measure the hardness of surface titanium plating (the thickness of titanium layer is less than 1um)
Process: Copper + surface sandblasting + chrome + titanium
Size: tubular, 2-3mm thick, 15-25mm diameter
Hardness: 500 ~ 600hv

Not applicable to the specimen with deep surface grain



Black Anodized

Black anodized is a chemical surface treatment, its main role is to form a dense oxide film on the surface of the workpiece, to prevent corrosion and rust, improve the wear resistance of the workpiece, it is only a surface treatment, will not have any effect on the internal tissue, it is not heat treatment.
The thickness of the blackening layer is 1-2um

Looking forward to working with you soon

Professional Experience since Year2002

Sinowon Innovation Metrology Manufacture Limited.

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