

# DIGITAL / COMPUTERISED MICRO VICKERS HARDNESS TESTER

Models : MET-AD-AT, MET-MD-AT, MET-AC-AT



*Mastering the fine art of testing*

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## Principle of Vickers Hardness (HV) :

The top two with the provisions of the relative surface angle is Diamond Indenter foot pressed into the surface of the sample with the test beat, maintaining a specified time, then removable test force, measuring indentation diagonal length surface of the sample.

Vickers hardness value is the test force divided by surface area obtained by indentation, indentation has been regarded as having a square base surface and with the same indenter angle of the ideal shape.

$HV = 1.854 F / D^2$ . Where: F = Test Force in N ; D = Average 2 indentation diagonal length in mm.

## Test Instruction :

Vickers hardness test is relative to the material to a permanent indentation size of the job.

The beginning of the test, tester makes indenter down until just touch the surface of the specimen. Test Force at this point starts to load and has chosen to reach a good setting. Hardness Tester and then choose a good insurance charge by the time the forced will remain for some time.

The final dwell time of the test forced rapidly return to the initial point. Then the turntable to 40X times the lens location, measuring indentation diagonal. The two thin micrometer eyepieces can be separately regulated to just stuck indentation diagonal. Users can press the eyepiece micrometer measurement of spin wheel near the input key to the measured data input host. The host will then use the formula given in this chapter, and show the Vickers hardness values.

Test consists of two parts. In the first part, the diamond indenter is driven by a known force, pressed into the surface of the tested materials. In the second part, the user measure the diagonal length of indentation, and to input measured readings to the mainframe, and mainframe computing the corresponding Vickers hardness value.

## Application :

The Digital/Computerized micro Vickers hardness tester is best suited to test metal structures, including small parts, sheet, metal foil, high-quality wires, thin layer of hardened layer and the plating. In particular, it follows the structure of metals, testing such as induction hardening or carburization of the internal hardness of the material.

Machine has a more faster testing speed than other ordinary Micro Hardness Tester. The hardness value can be displayed directly and not need to enter the length of the diagonal. High quality imported components ensure the instrument can stable working for a very long time. Protected by the stage patient application of the lift and down system after upgrading, the control system, can provide more measuring data, and control more precise.

## Auto Turret :

Digital/Computersied Micro Vickers Hardness tester is owned observation - test- measuring the location of switching from the stepper motor control turntable auto-complete, but also to meet the manual jog operation of the turntable.

## Hardness Tester consists of following parts like :

1.	Eye piece micrometer	11.	Test Force Transformation hand wheel
2.	Cold lighting source	12.	Turntable
3.	10 X objective lens	13.	40X Objectives
4.	Indenter	14.	Outlet
5.	X - Y platform	15.	RS-232 interface
6.	Lift shaft	16.	Elevating hand wheel
7.	LCD screen	17.	Source Interface
8.	Membrane keyboard	18.	Printer (can be configured according to user needs).
9.	Level adjustment screws	19.	Lift kits
10.	Optical channel knob		



### Key functions on LCD screen :

1.	Start	Press key to start a Vickers (HV)
2.	OK	Press key to confirm your choices or settings and return to a higher level menu or main menu
3.	Esc	Press key to return to higher menu from a sub-menu
4.	Delete	Press key to clear the history of test records.
5.	Dwell	Press key to set up dwell time
6.	Set up	Press key for adjustment menu in displayed in the LCD
7.	Contrasting Hardness	Press key to choose the control hardness option and desired hardness contrast.
8.	Test hardness	Press key to choose options for testing hardness and desired hardness testing mode
9.	Test Force Units	Press key to choose options for pilot power units and to select the test force unit (in "gf" or "mN").
10.	Threshold Setting	Press key to choose the domain value set options.
11.	Language Set	Press key to choose the language setting options
12.	Zero	Press key in order to ensure hardness measurement accuracy, the system requirements for each instrument after power start carrying out the hardness before the test. You must first measurement of the zero operation eyepiece
13.	Print	Press key to print data format.

### Eye piece Micrometer :

Micrometer eyepiece optional system is part of the hardness tester. It can help you observe and measure the actual indentation diagonal length. Micrometer eyepiece has two thin, a thin line at the end of the indentation after the move to remain stationary, while the other root rotation through the rotating measuring wheel, to continue to move to the other side of the indentation diagonal. When you think the two diagonal lines at both ends just in time, you can press the measurement of spin-wheel measurement data input keys to enter the hardness of the computer system.

### RS 232 Interface :

Hardness Tester equipped with RS 232 interface. The interface has -

- 1) Through this port will be the latest version of the software hardness write, right hardness tester upgrade
- 2) Can serve as a CCD Camera system interface
- 3) Can be used as printed.

### Printer :

Hardness test machine body is equipped with mini printer.

### Tone of the image :

Total magnification of Hardness Tester of the optical system is 100 X and 400 X.

### Automatic testing :

1	Put test specimen on the stage.
2	Point moving turntable, the 40X objective lens back to working position.
3	Moving the specimen so that just below the 40 X objective lens. Focusing hand wheel clockwise rotation, raising lift shaft, until the specimen was raised to about 0.5 mm from the pressure head height.
4	Gradually focusing hand wheel clockwise rotation, the optical focusing system, until you feel satisfied with the results of the Focus.
5	To turn the stage 10 X objective lens back to working position, observation, select the test points and focusing.
6	The 40 X objective point of moving back to the work location and precise focusing. Focusing is complete, the sample surface texture should be visible in the field of view.
7	Press <Start> turntable will automatically put pressure head back to the work location, and then start a test, the system displays a wait message.
8	Upon completion of testing, 40X objective lens turret automatically go back to working position. At this point, the system waiting for you to measure and enter the diagonal measurement readings.
9	When you are operating proficiency, you can omit the step 5 & 6.



### Main Function and Features :

1	Equipped with digital eyepiece and Data computing systems which accuracy can reach to 0.01 $\mu\text{m}$ : just click one button the hardness value will display on screen directly.
2	Main components adopted : American 3 M Allegro, and Japanese Omran, NKK brand, ensure the instrument can stable working for a very long time.
3	Requirements, but also can observe the micro structure of the material, image is very clear.
4	According to different visual habits of the operators, the strength of the light source can be adjusted. To avoid the visual fatigue for long time operation.
5	Automatic measuring the indentation diagonal length, the hardness and conversion hardness will show on the screen directly, no need to check hardness table.
6	Industrial digital screen can direct display hardness value, conversion hardness, testing method, testing force, dwell time, test number and testing process. The built-in printer can print testing times, hardness value, average value, Maximum Value, Minimum Value, X max - X min directly, easy for operator to save the data.
7	Equipped with data transfer software, all the testing data can be transfer to computer via RS232 port, then Can edit and save the data on computer.
8	One time casting aluminium molding shell ensure structure more stable. Adopted car painting technology, pure white color looking more decent. High scratch resistance capability, used for years still brightness like new.
9	Reserved image channel, can be connected with computer, used the image analysis software.
10	Main purpose application - 1)Steel, nonferrous metals, tinsel, cemented carbide, sheet metal, metallographic structure. 2)Carburization, nitriding and decarburization layer, surface hardening layer, galvanized coating, coating. 3)Glass, chip and ceramic material.

### Functions :

1.	The testing data able to be printed directly by the built in printer.
2.	Can be connected with computer, used the image analysis
3.	Testing method, testing power and duration time can be displayed directly onj the LCD screen. The hardness value can be displayed directly by enteringthe indentation diagonal length and avoid the complication of the look up table.
4.	According to different visual habits of the operators, the strength of the light source can be adjusted. To avoid the visual fatigue for long time operation.
5.	The independent research and development of liftingsystem and positioning system, ensured the accuracy and repeatedly of the testing process.
6.	The optical system designed not only met the definition of hardness testing requirements, but also can observe the micro structure of the material.
7.	Reserved image channel, can be connected with computer, used the image analysis software to analyzing the physical and chemical properties of the material.





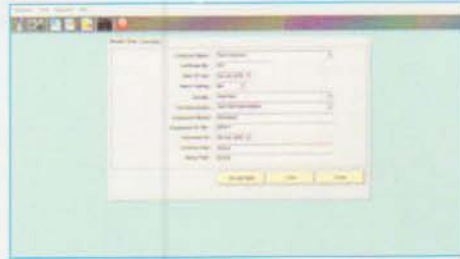
Model	MET-AD-AT	MET-MD-AT	MET-AC-AT	MET-MC-AT
Turret	Automatic Turret (AT)			
Hardness Values Measured	Automatic Digital Display (AD)	Manual Digital Display (MD)	Automatic Computerised Display (AC)	Manual Computerised Display (MC)
Hardness Scale	HV 0.01, HV 0.025, HV 0.05, HV 0.1, HV 0.2, HV 0.3, HV 0.5 & HV 1			
Conversion Scale	HRA, HRB, HRC, HRD, HK, HBS, H15N, H30N, H45N, H15T, H30T, H45T			
Testing force	10 g (0.098N), 25g (0.245N), 50 g (0.49N), 100 g (0.98N) 200 g (1.96N), 300 g (2.94N), 500 g (4.9N), 1000 g (9.8N)			
Accuracy of Test Force	± 1.0%			
Test Force Units	gf, mN			
Loading speed	≤ 50 µm/sec			
Indenter	Standard Rectangular pyramid diamond indenter (136° ± 0.5°)			
Min. Measuring Unit	0.01 µm			
Hardness value Range	1 HV – 4000 HV			
Hardness value of Reading	Digital LCD Screen (62 x 44 mm)			
Optical System	Objectives : 10 X (observe), 40 X (test) Eye piece : 10 X Total Magnification : 100 X (For Observation), 400 X (For Measurement) Range : 200 µm Resolution : 0.01 µm			
Loading method / Control	Automatically (Load, dwell and unload the testing force)			
Dwell time	1 - 99 seconds (1 second increments)			
Objective lens center and indenter center	Coincidence accuracy error < 1 µm (objective lens center position can be adjusted).			
Maximum height	70mm			
Throat depth	110mm			
X-Y Testing Table (Stage)	Dimensions = 100 x 100 mm Maximum Travel Range = 25 x 25 mm Moving Resolution = 0.01 mm			
Data Output	Built-in Printer, Built-in RS-232 Interface (transfer data to computer, easy for long time save)			
Standard Accessories	<p><b>Machine consists of :</b> 10X digital eye piece : 10X and 40 X objective lens, Vickers Indenter : X-Y Testing Table, Flat fixture, Sheet specimen fixture, Small parts fixture; Gradienter, Data transfer software, Data line, Power line, Dust Cover, Manual book, Hardness conversion tables, Quality Certificate, Warranty Card,</p> <p><b>Accessory case consists of :</b> 2 piece Standard block of hardness 4 pieces Horizontal adjusting screw</p>			
Industrial Digital Camera specifications used			3.0 MP ½" Color USB 2.0 APTINA CMOS Sensor, which contains photo detector and an active amplifier offers sharper image than a normal CCD camera. Fitted with fixed Microscope Adaptor FMA050.	3.0 MP ½" Color USB 2.0 APTINA CMOS Sensor, which contains photo detector and an active amplifier offers sharper image than a normal CCD camera. Fitted with fixed Microscope Adaptor FMA050.
Light source	LED cold light source (can be continuous use for 24 hours, no heat generate ensure stable working, servicing life can reach 100,000 hours)			
Light brightness	8 range adjustable			
Light source	5V / 3W LED			
Loading generator	2.5W, 220V AC, 4 rpm			
Power supply	220V + 5%, 50 Hz, AC			
Total consumption	≤ 30 W			
Executed Standard	IS ; 1754, ASTM-E-384 & EN-ISO-6507			
Instrument size	490 x 185 x 515 mm (L x W x H)			
Net Weight	45 kg			
Packing size	625 x 430 x 900 mm (L x W x H)			
Gross Weight	57 kg			
Test Force Options Optional	Test Force Transformation by hand wheel selection, power choose displayed on the screen.			
Optional Purchase Accessories	Hardness measuring software & hardness block			

# Screen Shots For Computerised Models : MET-AC-AT & MET-MC-AT

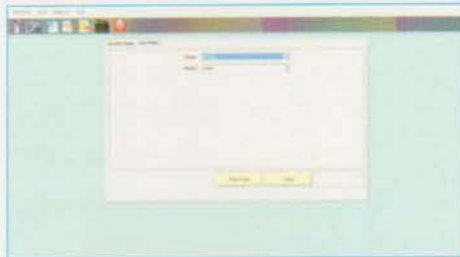
Login Screen



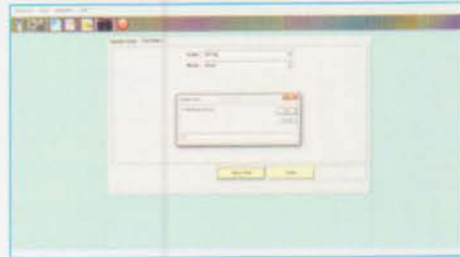
Test Details Form



Test Parameter form



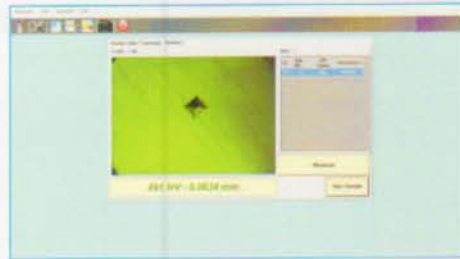
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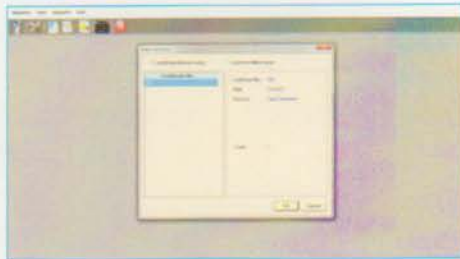
Test Form



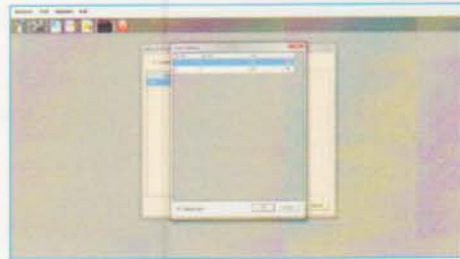
Test Form with reading



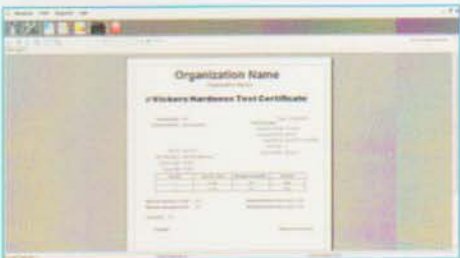
Select certificate number



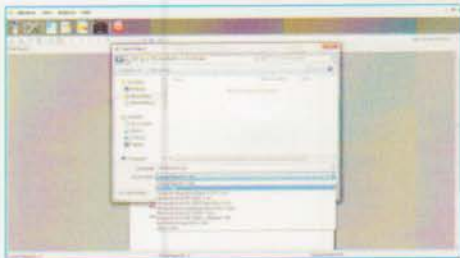
Select readings to show in certificate



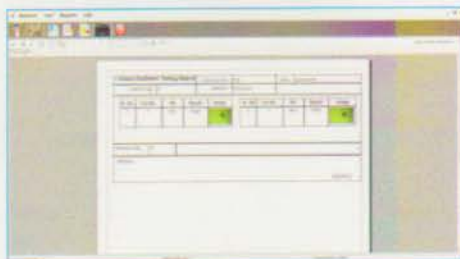
Certificate Report



Export report in various format



Test report with impression image



Statistical analysis report

