

## Portable hardness tester with a new vision

### The method

Innovative Krautkramer technology provides another major break through for portable hardness testing, the TIV (Through Indenter Viewing) method. TIV is based on the Vickers hardness principle but uses a unique optical system to “see through” the Vickers diamond for actually monitoring the creation of the indentation.

Its so easy! You see the size of the indentation increase as you press the diamond into the material. When the specified test load is reached, the image is frozen, the diagonals measured, and the hardness value calculated and displayed.

### The benefits

The TIV hardness tester can be used regardless of the material – without any additional calibration. Confusing and lengthy calibration procedures are eliminated and there are no reference specimens to fabricate because the test load is applied statically and the resultant Vickers value is unaffected by the test material’s elastic properties. The TIV method is not limited to testing ferrous and nonferrous metals, but can be applied to other materials including plastics, glass, carbides, ceramics and a variety of coatings.

With the TIV you need access to only one side to measure thin parts such as metal in coil, sheet or foil form. Incoming inspection of material can be performed on the truck bed without cutting coupons.

Also, you receive the advantages you have come to expect from our proven line of other UCI and Rebound type portable hardness testers, e.g. direction independence, user friendly operation, full data management capability, etc.



## Measurement and evaluation: direct, automatic, fast

### Another Krautkramer innovation

Other portable hardness testers use dynamic techniques that are comparative methods. The TIV is the first portable tester using a static method that directly and automatically measures the Vickers indentation. By eliminating use of a microscope, results are not only faster but subjective diagonal measurement errors are eliminated. In addition, the displayed image ensures the quality of the measurement and the diamond’s condition.

### Special instrument features

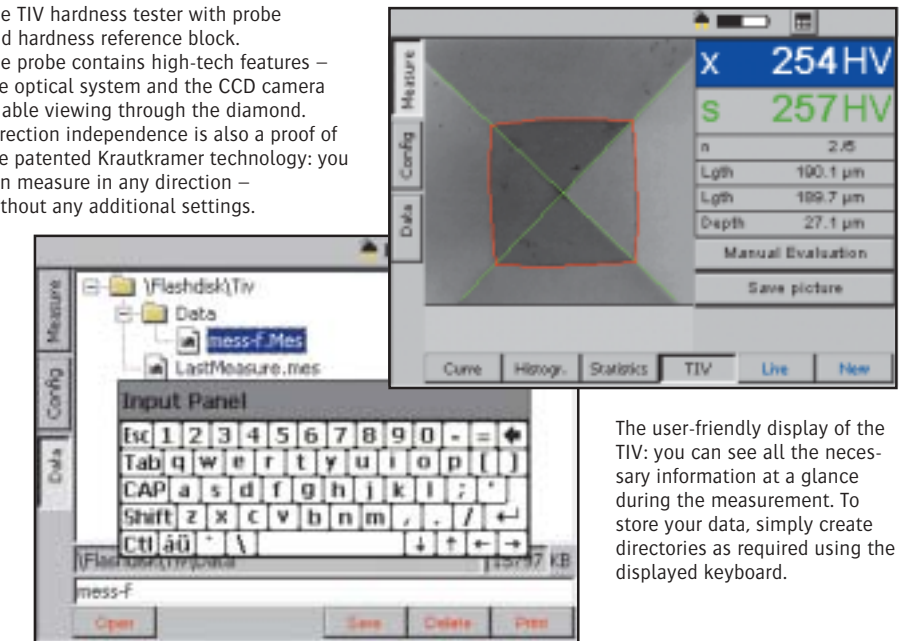
The large LCD clearly displays an image of the indentation and also effectively uses color, e.g. as indicator of the acceptance of values compared to preset limits. A familiar Windows™ graphical display makes operation easy to grasp. The user can choose from keypad or touch screen to operate and navigate through instrument functions. A stylus is provided for use with the touch screen to select characters from a displayed keyboard. This provides alphanumeric naming of files or adjustments to instrument setting.

### Easy Operation

Three main menus make it easier for you to access important functions quickly with minimal actions. You can change the view of measured data to a plotted curve, a list with statistics or display a histogram. Converting new or existing data to Rockwell, Brinell, Shore and Tensile Strength scales is easy to do. Results can be stored with attached indentation images in a file that you appropriately name using the displayed keyboard.



The TIV hardness tester with probe and hardness reference block. The probe contains high-tech features – the optical system and the CCD camera enable viewing through the diamond. Direction independence is also a proof of the patented Krautkramer technology: you can measure in any direction – without any additional settings.



The user-friendly display of the TIV: you can see all the necessary information at a glance during the measurement. To store your data, simply create directories as required using the displayed keyboard.

### Versatile operation

AC or batteries can power the TIV instrument. The power supply not only provides AC operation but also internally charges our special NiMH battery pack. Other standard size rechargeable NiMH or NiCad batter-

ies can be substituted but must be externally charged. An adjustable automatic shut-off feature turns off the instrument to conserve battery power should there be no operator interaction.

# New paths in portable hardness testing

## Extensive fields of application

The TIV from Krautkramer takes portable hardness testing to a new level. Results are not only independent of the test position and direction but also the test object's material, mass and thickness. Therefore, the TIV opens up a large variety of new application fields previously not open to portable hardness testers.

## Some application examples

Examples of possible application areas for the TIV hardness tester:

- Heat treat shops – easy and fast determination of surface hardness, no calibration required
- Aerospace – on-site hardness testing on thin-walled components and on different alloys without any additional calibration
- Incoming QC of coils – at last reliable mobile hardness testing on sheet metal
- Testing companies – on-site measurement by means of a universal, portable unit
- Research institutes, labs, and training companies – “view through the diamond”: observation of the indentation process, and measurement control

## TIV - Specifications and accessories

### Test method

“Through Indenter Viewing”: optical hardness testing method according to Vickers under test load; with an optical system including CCD camera for the automatic or manual determination of diagonal lengths through the diamond; optical control of the diamond indentation by means of display image.

### Probe

Hand-held probe TIV 105; test load 5 kgf (50 N)

### Materials tested

Static load application enables hardness testing on the most different materials without any additional calibration, e.g.: steel, nonferrous metals, carbide metals, ceramics, glass, plastics

### Range of measurement

Depends on the probe;  
For TIV 105: 100 HV – 1000 HV

### Display

1/4 VGA color TFT display, 5.7” visible range; 115.2 mm x 76.8 mm / 4.5” x 3.0”, 240 x 320 pixels, backlight

### Languages

German, English, French

### Hardness scales and resolution

HV (1.0); HB (1.0); HS (1.0/0.5/0.1); HRC (1.0/0.5/0.1); HRB (1.0/0.5/0.1); N/mm<sup>2</sup> (5.0)

### Conversion

Automatically according to DIN 50150, ASTM E140

### Evaluation

Representation of test data as a curve, histogram, or in tabular form; Calculation of statistical data, e.g.: average, standard deviation, range

### Automatic instrument switchoff

After a selectable period of time with automatic storage of test data and instrument settings

### Keyboard

Membrane keypad with an integrated touch screen

### Power supply

Line adapter (100V – 240V); custom NiMH battery pack, 4.5 Ah (internal charging); or 6 commercially available C-cells (NiCad or NiMH)

### Operating time

With custom battery pack approx. 1,000 measurements in continuous operation

### Battery charge indicator

Low-Batt indicator, instrument switchoff with undervoltage

### Operating system

WinCE

### Interfaces

RS 232 bidirectional, Ethernet 10 Mbps

### Housing

Injection-molded plastics

### Temperature ranges

Operation: -0° C to +50° C / 32° F to 122° F  
Storage: -20° C to +70° C / -4° F to 158° F

### Weight

Instr.–approx. 1.4kg /3.1 lb. w/battery  
Probe–approx. 0.8kg/1.8 lb. w/cable

### Dimensions

Instr.–78 mm x 215 mm x 180 mm  
3.1” x 8.5” x 7.1” (H x W x D)  
Probe–220 mm x 52 mm  
8.7” x 2.0” (L x dia.)

### Test attachments

Test attachment for standard applications and measurements using a support

### Other accessories

Carrying case, diamond cleansing cloth, hardness reference blocks with certificate, battery-driven grinding set for surface treatment, printer cable, different test supports, application software

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Visit the NDT Super Site, AgfaNDT.com, for more information on Krautkramer's TIV Portable Hardness Tester and to learn more about Agfa NDT's complete line of ultrasonic, x-ray, digital and film systems

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**Krautkramer**  
Ultrasonic Systems

**TIV**

**Portable  
Hardness Tester**

**A New Revolutionary  
Method**



A WORLDWIDE RESPONSE

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