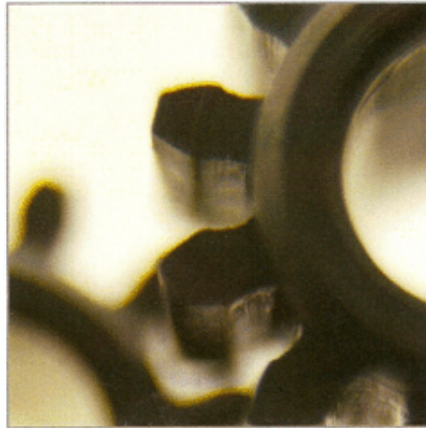


Hardness testing software



ZH μ HD
Sales Brochure



Intelligent Testing

Contents

Mosaic Image /

Layout Tools /

Precise Positioning /

- Mosaic Feature
- Reference Circle
- Multi-directional Traverses

Precision /

- Precise Imaging
- Repeatable Measurements
- Illumination Controls
- Easy Detection

Results /

- Multiple Conversion Tables
- Error-Free Validation
- Report Generation

Options /

- Multi-Purpose Tester
- Multiple Samples

When a hardness testing solution that produces reliable, accurate and repeatable test results is needed, choose from the **Indentec ZH μ .HD** line of macro and micro (single or dual) hardness testing solutions. Field proven systems, they offer unparalleled capabilities and are fully ASTM E-384 and ISO 6507 and 4545 compliant.

Precise Positioning /

With its **Background Image** of the entire samples (Mosaics) and its Annotation Tools, **Indentec ZH μ .HD** enables you to position indents precisely where they are required. No other software offers such accuracy.

Precise & Reproducible Measurements /

The **Indentec ZH μ .HD** has the highest image resolution on the market. This allows measurement of indents to be precise and reproducible. **Indentec ZH μ .HD**: combining performance with precision.

Enhance Productivity /

The **Indentec ZH μ .HD** combines ease-of-use, reliability, and auto-calibration, thus minimising subjectively associated with human intervention. The system can run for hours without interruption, saving time and money.



ZH μ -A Fully Automatic Micro Vickers Hardness Tester

Intelligent Workspace Layout /

The workspace layout is user-friendly and provides a detailed overview of the sample as well as all the necessary annotation and measuring tools.

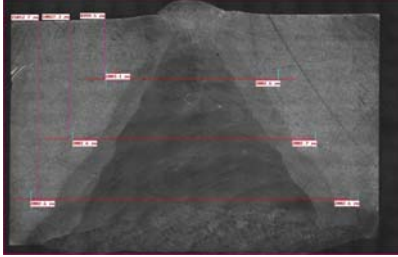
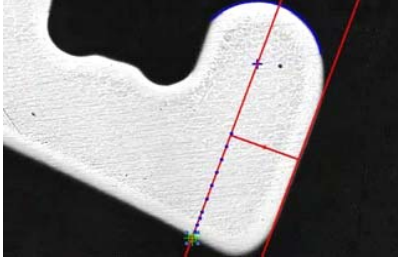
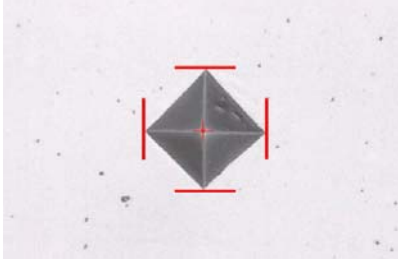
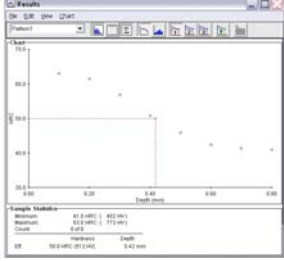


- | | |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A | HD Resolution
Maximise your workspace by running in a high-resolution environment of 1920 x 1200 pixels or more. |
| B | Image Window
The intuitive Image Window interface allows easy viewing of sample surface and indents. |
| C | Stage Pattern Window
Create or modify traverses and/or patterns and their positions, then see the stage move in real time in the Stage Pattern Window. |
| D | Results Window
Results are clearly displayed in graphical or tabular form. Track and |

Intelligent Workflow /

Indentec ZH μ .HD is the top-of-the-line automated microhardness tester. With four easy steps it provides added precision when positioning indents thanks to its integrated image stitching technique and its layout tools. By visualising the complete sample—no matter its size—traverses and/or patterns can now be mapped out with unequalled precision.

Auto focusing and automatic measuring and reporting allow this system to function unattended, thus increasing throughput and productivity.

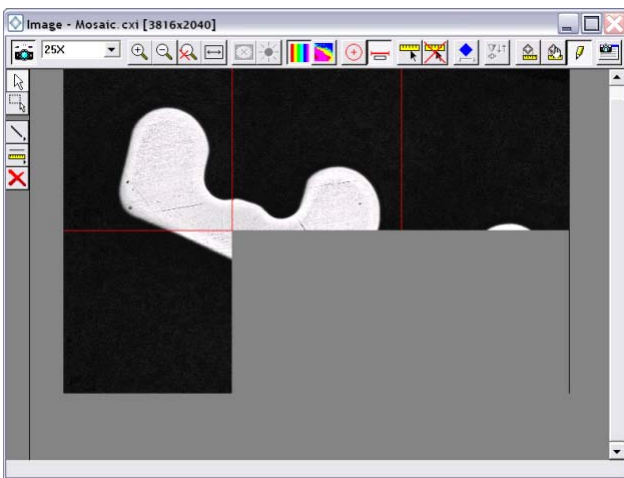
<p>step 1</p>	<p>See the Entire Sample</p> <p>Place the sample in the sample holder and—with one click—build a mosaic image of the sample and set reference points for one or more traverses using annotated tools.</p>															
<p>step 2</p>	<p>Set-Up Traverses/Patterns</p> <p>Open, modify, or create new traverses/patterns using reference points or lines. Traverses and patterns can be individually adjusted.</p>															
<p>step 3</p>	<p>Click & Walk Away</p> <p>Indentec ZHμ.HD intelligently follows the predefined patterns, indents the sample, focuses when needed, measures and generates data dynamically. Everything is automated, freeing users for other tasks.</p>															
<p>step 4</p>	<p>Get Results</p> <p>Review results in graphical and/or tabular format. Export results to the spreadsheet application of your choice, or simply print standard or customised reports.</p>	 <table border="1"><thead><tr><th colspan="2">Sample Statistics</th></tr></thead><tbody><tr><td>Minimum</td><td>41.0140C (402.001)</td></tr><tr><td>Maximum</td><td>815.049C (772.001)</td></tr><tr><td>Count</td><td>8.076</td></tr><tr><td>Minimum</td><td>Depth</td></tr><tr><td>0.0</td><td>0.00000 (0.1144)</td></tr><tr><td>0.0</td><td>0.00000</td></tr></tbody></table>	Sample Statistics		Minimum	41.0140C (402.001)	Maximum	815.049C (772.001)	Count	8.076	Minimum	Depth	0.0	0.00000 (0.1144)	0.0	0.00000
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Intelligent Mosaic Images /

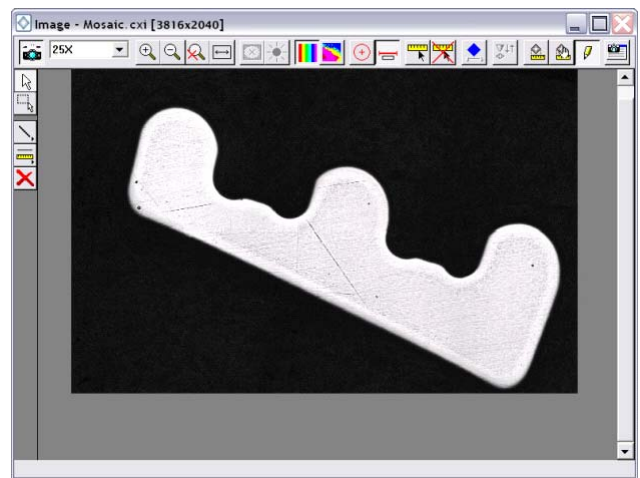
Get a detailed image of the whole sample in seconds, using our exclusive Indentec Mosaic function with the 2.5x objective. No matter the size of the sample, get a crisp and precise image. Thanks to this unique feature developed by Indentec, obtain a perfect, high resolution and evenly illuminated view of the full sample.

With Intelligent Mosaic Images an operator can see microstructural changes, heat-affected or heat-treated zones and much more. Reference points for traverses can be set exactly where they are needed so that indents yield significant data.

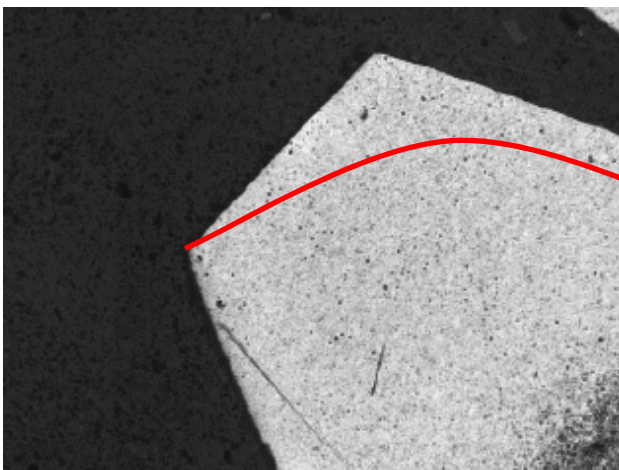
High-res mosaic images can be saved for later use, in analysis reports, or for archiving purposes.



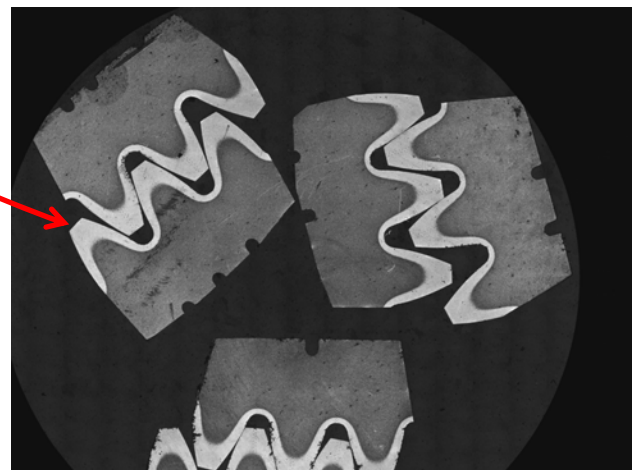
Building mosaic image.



Mosaic image complete (10x7mm).



Precise positioning at any magnification.

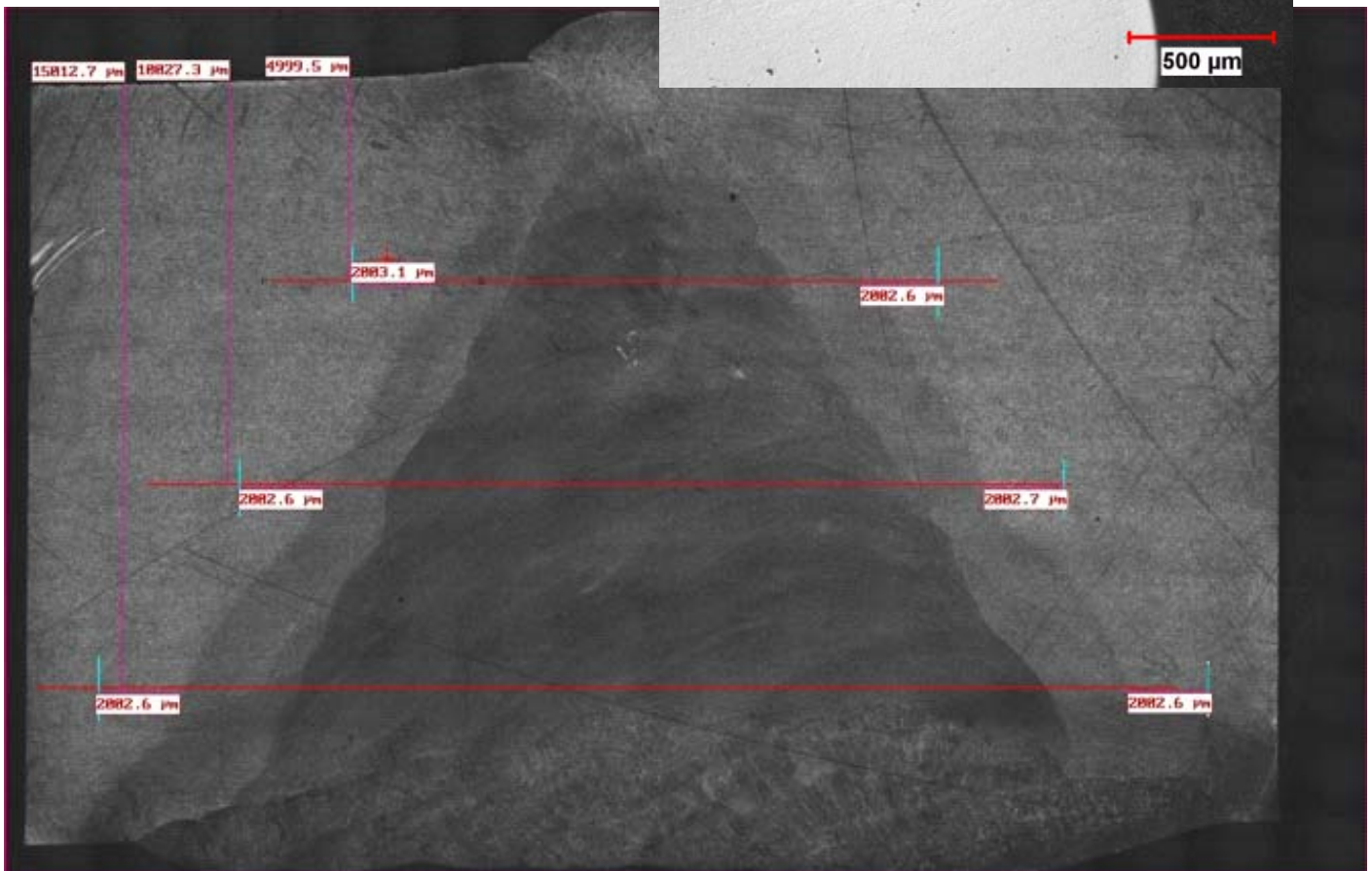
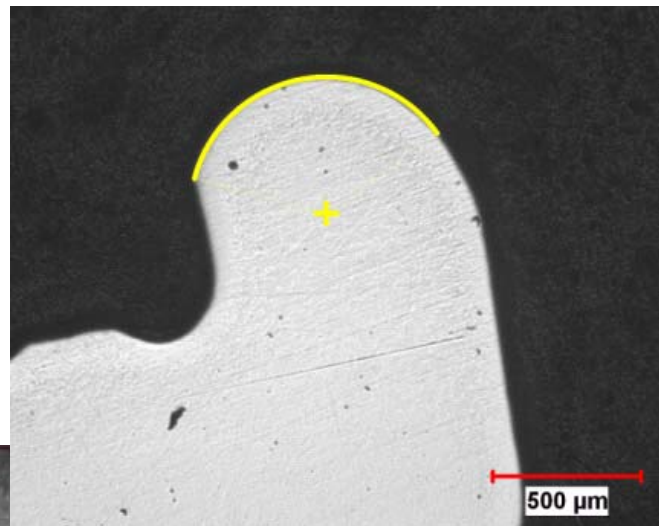


Intelligent Annotation Tools /

Positioning reference points and measuring where traverses are to be placed is made easy using the annotation tools in **Indentec ZHμ.HD**. Conveniently located on the side of the Imagine Window, these tools perform multiple functions:

- Finding the centre of the sample
- Drawing straight and/or parallel lines
- Adding ticker marks
- Adding measurements for report purposes
- And more...

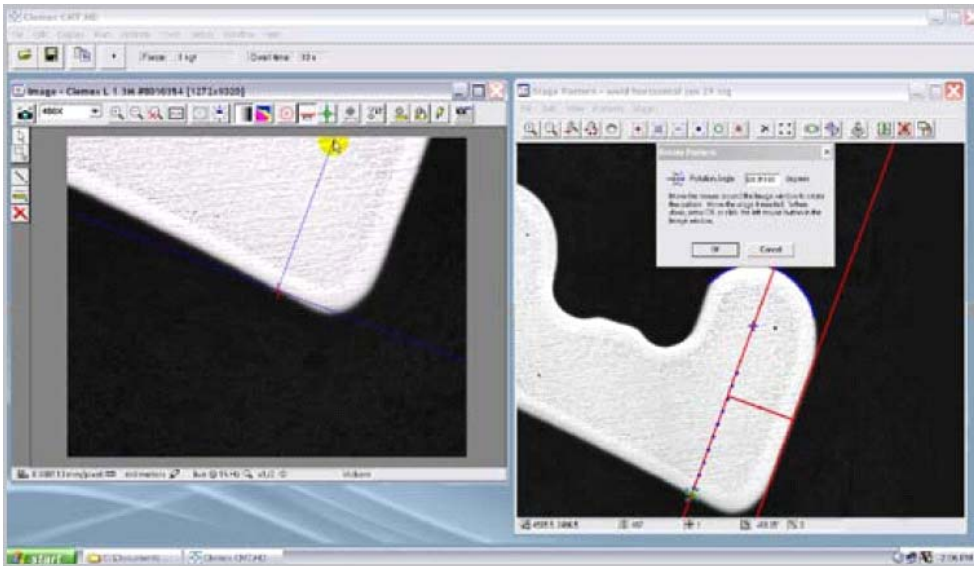
No matter the complexity of the pattern layout, combining intelligent mosaics with annotation tools allows traverses and/or patterns to be positioned precisely where they are needed.



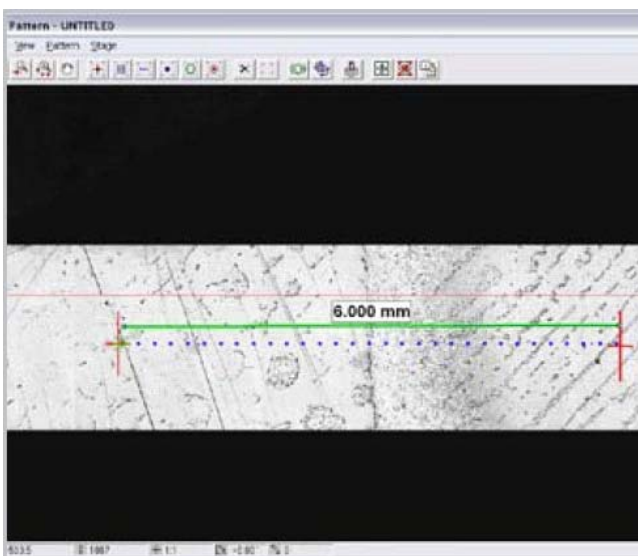
Intelligent & Precise Positioning /

Indentec Mosaic Feature

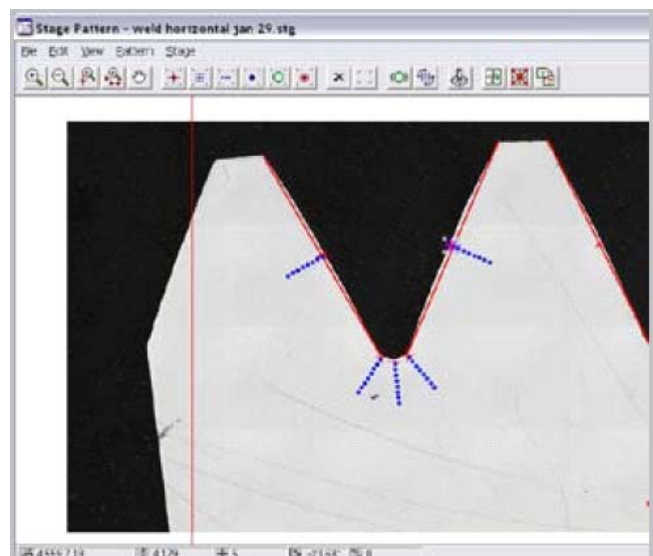
Indentec ZH μ .HD is the first ever hardness tester to offer a complete, high definition image of a sample, no matter its size. This innovative feature provides an “aerial view” of the sample, offering sharp close-ups as well as global views. The Mosaic Image makes it possible to position as many as 99 traverses—to within a few micron.



Traverse centred across the contact surface of a weld sample.



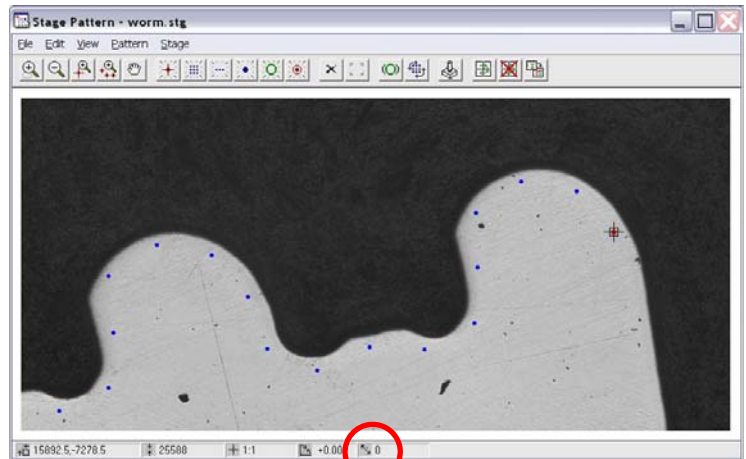
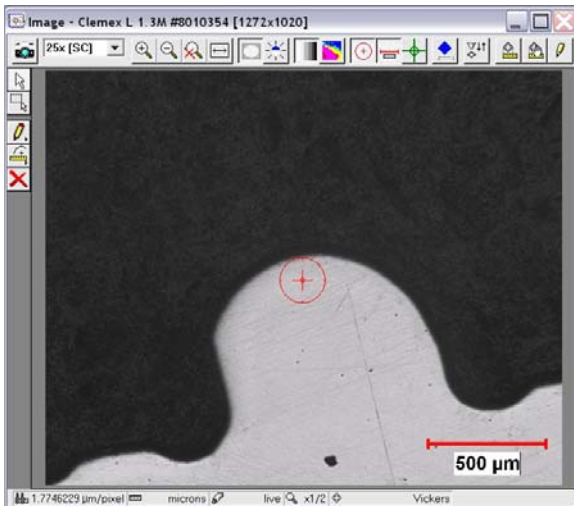
Traverse centred in weld sample.



Five traverses perpendicular to the edge of the gear.

Unique Reference Circle Tool

This exceptional tool allows indents to be positioned at precise distances from the sample's edge. The Reference Circle is the ideal tool for irregular or curved samples, where indents need to be at a given distance from the edge. Used as a visual guide in conjunction with the Stage Pattern Window, once a radius is specified, the distance between indents is determined by a Y value that resets every time a field is added to the pattern.

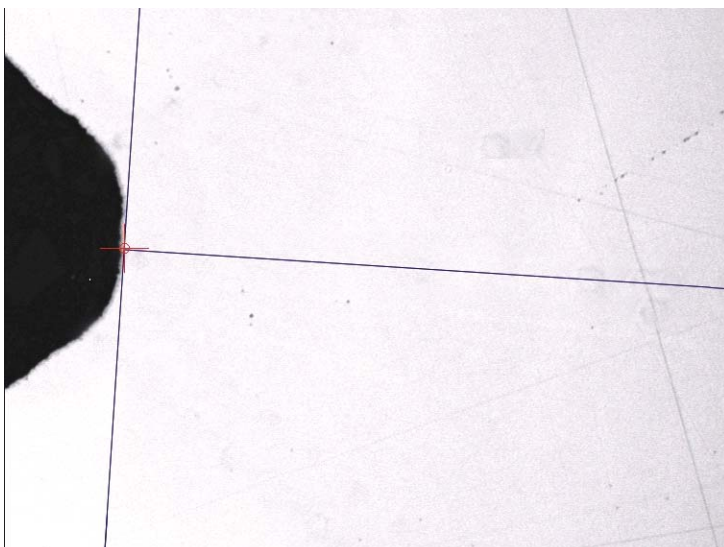


Last Y value

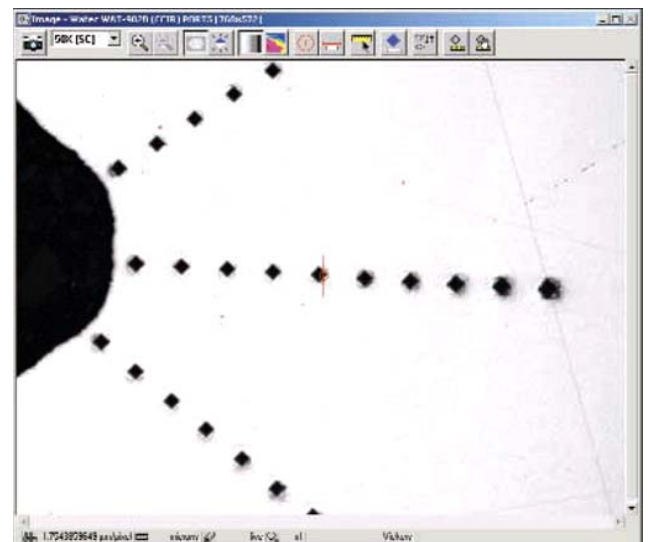
Position indent precisely along the edge.

Multidirectional Traverses

Thanks to the powerful **Indentec ZHμ.HD** stage control interface, single or multiple traverses/patterns can be rapidly created. Save, copy, or paste traverses/patterns to predefined locations with a simple click of the mouse. The T-Bar tool rotates traverses to any angle to ensure its perpendicularity with the sample edge or to accommodate sample tilt. Up to 99 patterns or traverses can be created, with each traverse comprising up to 32,000 indents.



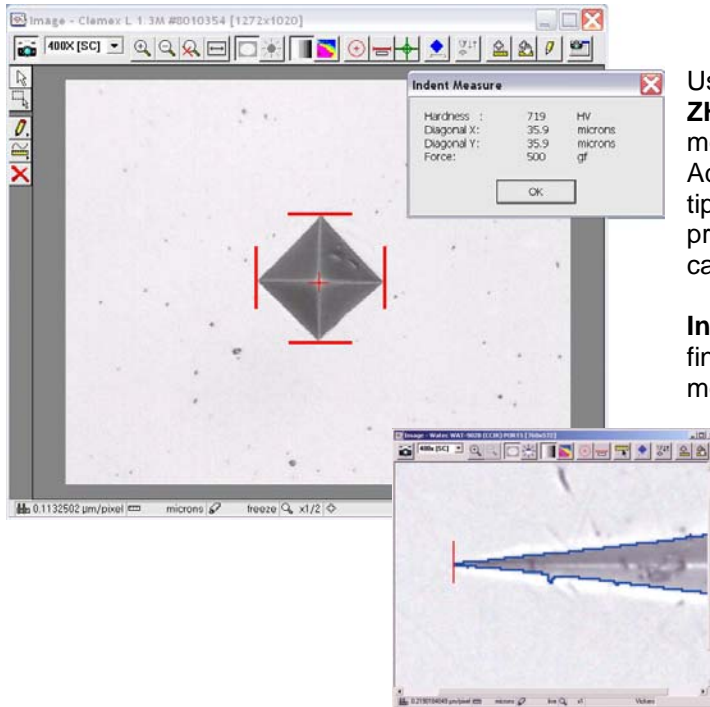
T-Bar Rotation tool.



3 Traverses perpendicular to edge.

Intelligent Precision /

Precise Imaging



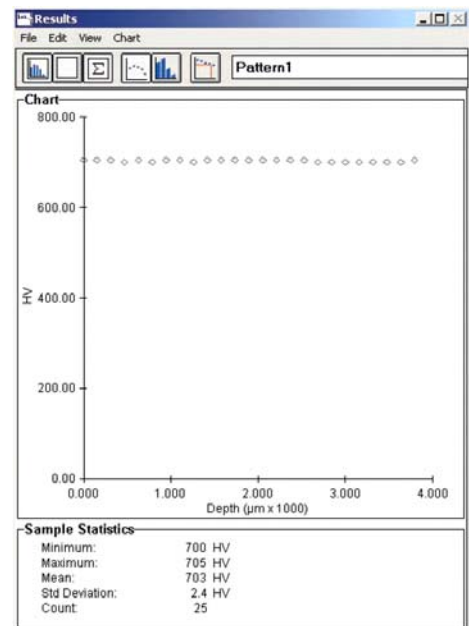
Using a high-resolution digital camera, **Indentec ZH μ .HD** acquires images with a resolution of 1.3 megapixels; that's 400% more than the competition. Additionally, indent diagonals are measured from tip to tip using dimensional calibration based on a high precision stage micrometer—unlike subjective calibration methods used by some systems.

Indentec ZH μ .HD produces the sharpest images and finest details ever seen in microhardness testing. This means precise and repeatable results.

Repeatable Measurements

With software controlled focus (0.1 micron per step) shading correction, and DC regulated light source, objective and reproducible results are obtained regardless of the number of indents measured. The graph to the right demonstrates a run on a 703 HV test block, which shows a 5 HV variation for 25 consecutive measurements on the same indent, each preceded by an autofocus.

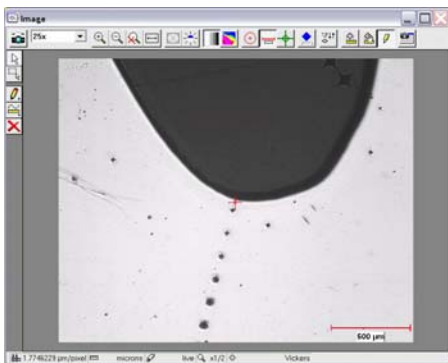
This variation of less than 1% is well within the ASTM and ISO requirements, and is far narrower than the range obtained by operators using a filar micrometer.



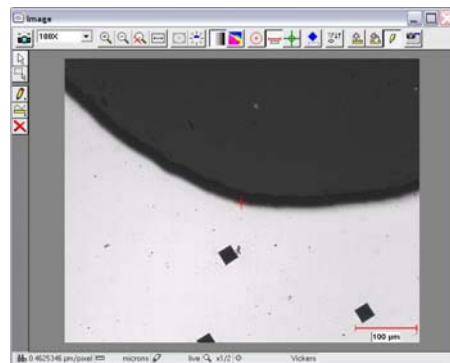
Software Controlled Illumination & Lens Positioning

Equipped with a unique software controlled illumination, **Indentec ZH μ .HD** keeps image brightness levels constant on all objectives, any magnification. Samples are always properly illuminated.

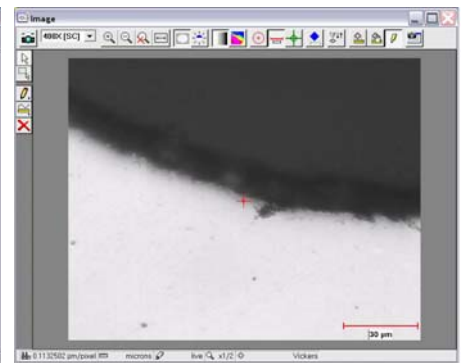
The Indentec software controlled lens adjustment offset guarantees perfect alignment of lenses and indenters.



Illumination at 25x.



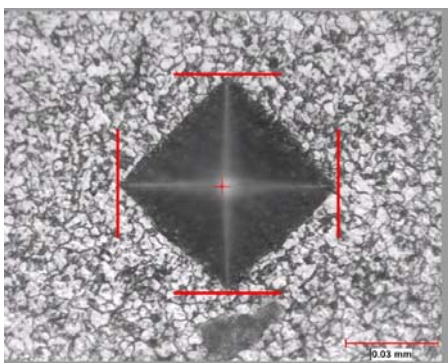
Illumination at 100x.



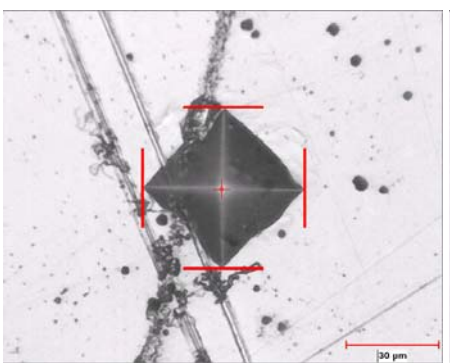
Illumination at 400x.

Background-Independent Detection

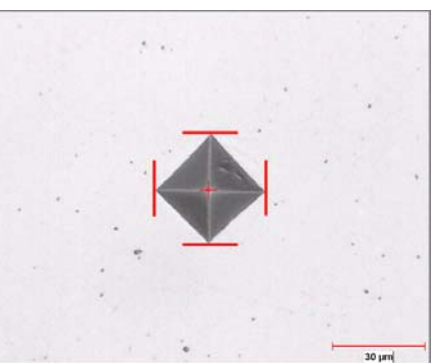
From perfectly polished to rough and etched samples, **Indentec ZH μ .HD** has the edge over traditional microhardness testers. Using its unique auto-detection capabilities, **Indentec ZH μ .HD** measures indents on any sample surface. For extreme cases, indents can be measured manually with cursors.



Etched sample.



Roughly polished sample.

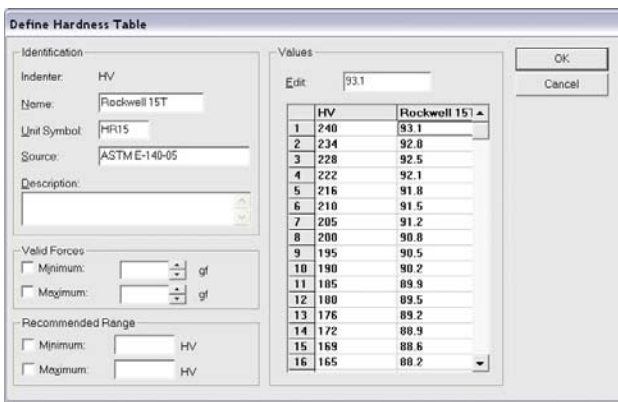


Clear sample.

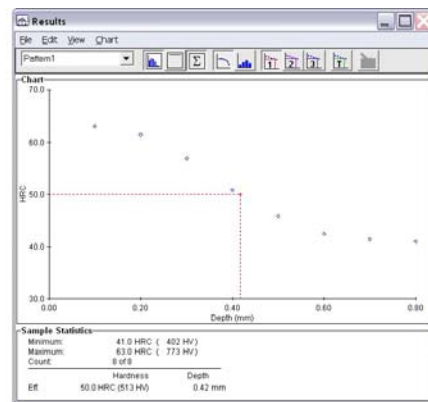
Intelligent Results /

Multiple Conversion Tables

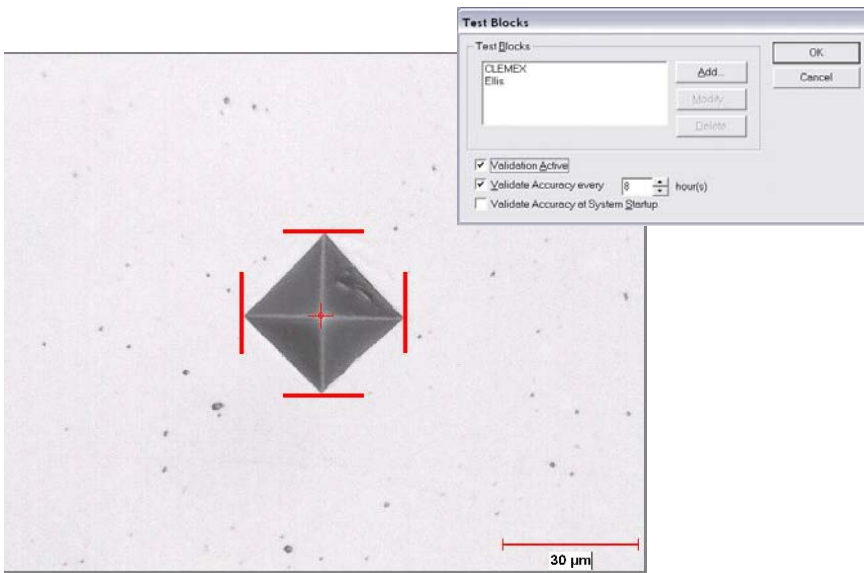
Indentec ZHμ.HDs native hardness measurements are in HV or HK. Conversion tables for HRA, HRB, and HRC scales are in compliance with ASTM E-140 standards. Up to six additional custom conversion tables can be defined. Case depths are calculated automatically by selecting a case hardness value. A total of four case depths can be displayed simultaneously on the same graph.



Custom Conversion Table.



Case depth in HRC.

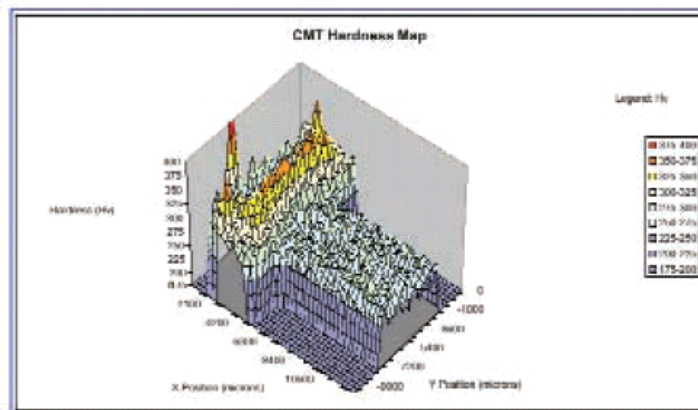


Report Generation

Print results directly from **Indentec ZHμ.HD** or export data to the spreadsheet program of your choice for further statistical analysis. Images and histograms can be copied easily and laid out in a standard, or customised, MS Office templates.

ACME Bolt, Inc. - QC Laboratory

Date:	December 8th, 2006	Report:	No.123576A
Operator:	John Smith	Sample ID:	5643S
Customer:	EMCE Inc.	Batch No:	66441A
Sample:	Type A Fastener	Plant No:	AWQ1



STATUS

REJECT

123 Bearing Blvd, Nails Town, OH 12566

Indentec ZH μ .HD Specifications /

Hardware /

International Standards : ASTM E-384, EN ISO 6507/1-3, ASTM E-92, EN ISO 4545

Indenter : Vickers or Knoop, or both (both with ZHV μ -A only)

Test Force : **ZHV μ** : 10, 25, 50, 100, 200, 300, 500, 1000, 2000 gf

ZHV30 : 0.2, 0.5, 1, 3, 5, 10, 30 kgf

Loading Procedure : Automatic

Selection of Indenter : Motorised turret

Dwell time : 5—60 seconds

Reading test force : Via PC

Standard objectives : 2.5 X

40 X

Optional objectives : 5 X

10 X

20 X

50 X

100 X

Turret : Motorised turret, up to 4 objectives and 2 indenters (ZHV μ)

/ 1 indenter (ZHV30)

Light source : LED, adjustable

Camera : Camera, B/W, USB2 (1.3 megapixel) with cable

Power supply : Wide range power supply: 100V to 240V AC/50 to 60Hz, CE

Weight : 35 kg (without PC)

Specimen Stage & Focus /

X/Y travel : Motorised 100 x 50mm (optional 150 x 100mm)

X/Y positioning increment : 0.5 μ

Focusing : Automatic 0.1 μ

Indentec ZH μ .HD Software /

Detection : Auto and semi-auto with cursors

Illumination : Computer controlled

Hardness scale : HV, HK, HRC, HRB, ASTM E-140, and 6 user defined

Number of patterns & traverses : 99

Number of indents : 32,000 per pattern

Diagonals by measurements : Image Analysis, ASTM E-384, EN ISO 6507 compliant

Data display : Diagonals d1/d2 (μ m), hardness value HV/HK,

Test load (N/gf), dwell time (S), XY position

Statistics : Mean value, maximum/minimum value, standard deviation, case depth (5 values), graphical display

Interface : RS 232