Wilson™ UH4000

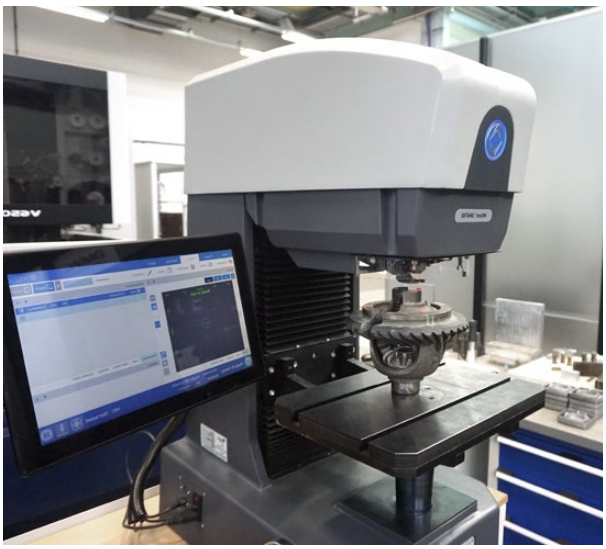
Universal Hardness Tester

BUEHLER

Wilson® UH4000 - Universal Hardness Tester

The *Ultimate* Universal Hardness Tester

Versatility for Any Environment



The Wilson® UH4000 series universal hardness tester is designed for high volume production labs and production floors. The UH4000 series is available in two load configurations, UH4250 and UH4750. Universal testers are designed to be capable of performing several hardness scales; in most cases, testing with higher loads (>5kgf).

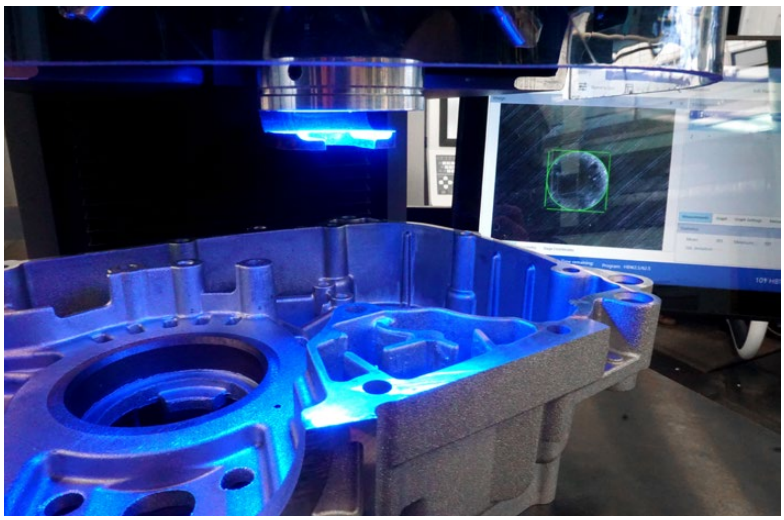
A precise indenting system is a critical requirement for a hardness tester. The innovative and newly designed turret offers up to 8 slots, with configuration flexibility to house indenters, objectives or a positioning laser.

Best in Class Optics & Software

The UH4000 ensures accurate results with best in class optics. All objectives have a long working distance, which minimizes the risk of colliding with test parts, avoids unintentional downtime and reduces service cost.

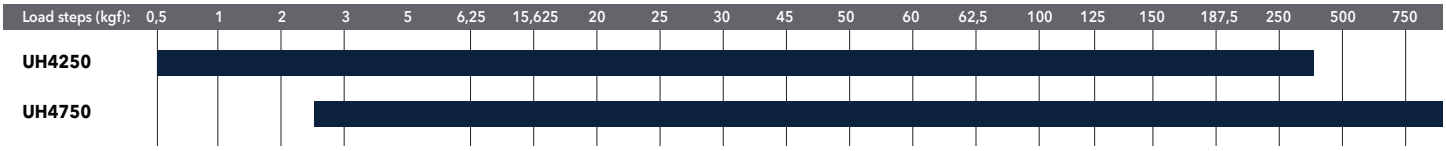
The optical measurement system is protected by a rigid aluminium casting to keep it safe from dust and dirt as well as prevent it from getting misaligned. A laser provides easy test location targeting and the ring light assists with measurement accuracy.

DiaMet™ hardness software assures accurate measurement of indentations with state of the art algorithims ensure auto-measure, illumination and focus. DiaMet is included in both configurations of the UH4000.



UH4000 Series Available in Two Load Scales

The UH4000 series Universal Hardness Tester is available in two load configurations. The UH4250 has a load range from 0.5 to 250kgf, whereas the UH4750 is available from 3 to 750kgf.



Wilson® UH4000 Series Features

Due to its sturdy construction, the UH4000 is a reliable machine and suitable for rough workshop conditions. The innovative hardness tester features very fast testing cycles and a newly developed turret to hold several indenters and objectives. The operator can test to a variety of test methods without the need for manual indenter/objective changes. The frame is made from a solid casting, along with a sturdy turret cover to protect the turret assembly and the hardness measurement system against outer influences and collisions, with test pieces. The large T-slot stage and the weight capacity enables testing of heavy and big parts.

The UH4000 hardness tester suits the following applications and many more.

- Hardness of castings and forgings
- On flat or cylindrical work pieces
- Wide field of application within the automotive and aerospace industry
- Product quality control testing
- Steels, non-ferrous metals, stainless steels, heat treated materials
- Cemented carbides, ceramics
- Plastics and carbon testing

Multi-Turret

- 8 position turret has all the objectives and indenters you need and eliminates the need to manually change indenters and objectives

Clamping

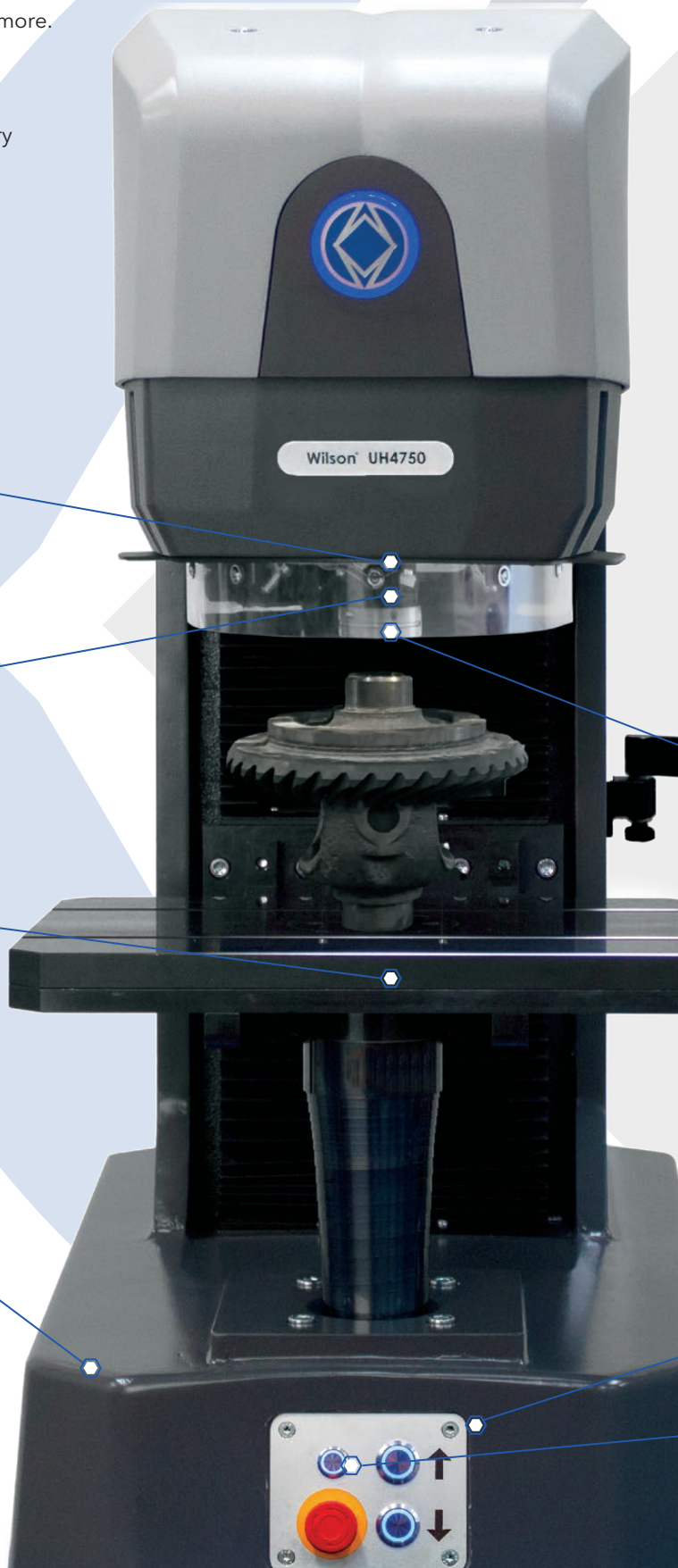
- This optional clamping tool will ensures stability during the test process

Sample Stage

- Large 300mm [11.8in] x 400mm [15.7in] stage supports large test pieces
- Anvil extention available for small or cylindrical parts

Full Protection

- Steel casting provides full protection for production environments



Advanced Functionality for Leading Industries

The global expertise of Buehler is strong as it now includes more than a century of experience from companies such as Wilson Instruments, Wolpert and Reicherter. With the design and manufacturing of the UH4000 tester, the DiaMet software and test blocks all in-house by Buehler, system integration is guaranteed. Smart software functions help the user with standards traceability.

The trend toward tighter manufacturing tolerances and more advanced heat treatment processes for the automotive industries require hardness testing systems to be durable while maintaining precise control during critical test data generation. The system and its interfaces must be easy to use, yet flexible enough to meet the increasing demands in the industry.

The Wilson UH4000 delivers exceptional performance packaged in a reliable, easy to use system that offers superior accuracy and repeatability against low training requirements. With the DiaMet automation package this testing platform is capable of performing full automatic test cycles for heat treatment applications, such as Jominy testing.

Aerospace

Automotive

Heat Treament

DiaMet™ Software

- The most intuitive usability on the market
- Available on touchscreen or standard monitor
- Easy to launch with Quick Start to operate and perfom hardness test

Advanced Options

- Get a laser for easy test location targeting and a ringlight for best Brinell measurement accuracy
- Remove the safety shield for more complex parts

Stage Movement

- Automatic and Manual stage movement
- The 300mm [11.8in] x 400mm [15.7in] stage will carry your workpieces with ease

Workspace Illumination

- Lighting provides full visibility on your workpieces underneath the turret

DiaMet™ - Hardness Testing Made Easy

Navigation within the DiaMet™ Software is made easy by its clean design and is supported by simple and intuitive gestures. Virtual tabs on top of the screen let you navigate between Home, Program, Testing and Reporting. Comprehensive feedback is shown on the status bar, which make interactions clear and efficient. Being designed for touch panel use, with an entirely new look and feel, DiaMet is simple, useful, and smart to work with, easy to operate by touch, mouse or keyboard. DiaMet will perform your hardness test as fast as possible. Quick Start will enable you to perform your test after just two clicks after starting the software.

When ordering your UH4000 with DiaMet™ you can choose between a standard PC package or a Touchscreen package.

Expert Control & Evaluation Software

DiaMet is optimized for evaluating Vickers, Rockwell, Brinell and Knoop measurements according to ISO 6506, ISO 6507, ISO 6508, ISO 4545 and ASTM E384, ASTM E10 and ASTM E18. A standard DiaMet feature is an automatic symmetry calculation for Vickers, Knoop and Brinell indents. This extra validation, with clear visual indication, helps to ensure the results conform to standards. Other features of DiaMet include:

Tab Interface

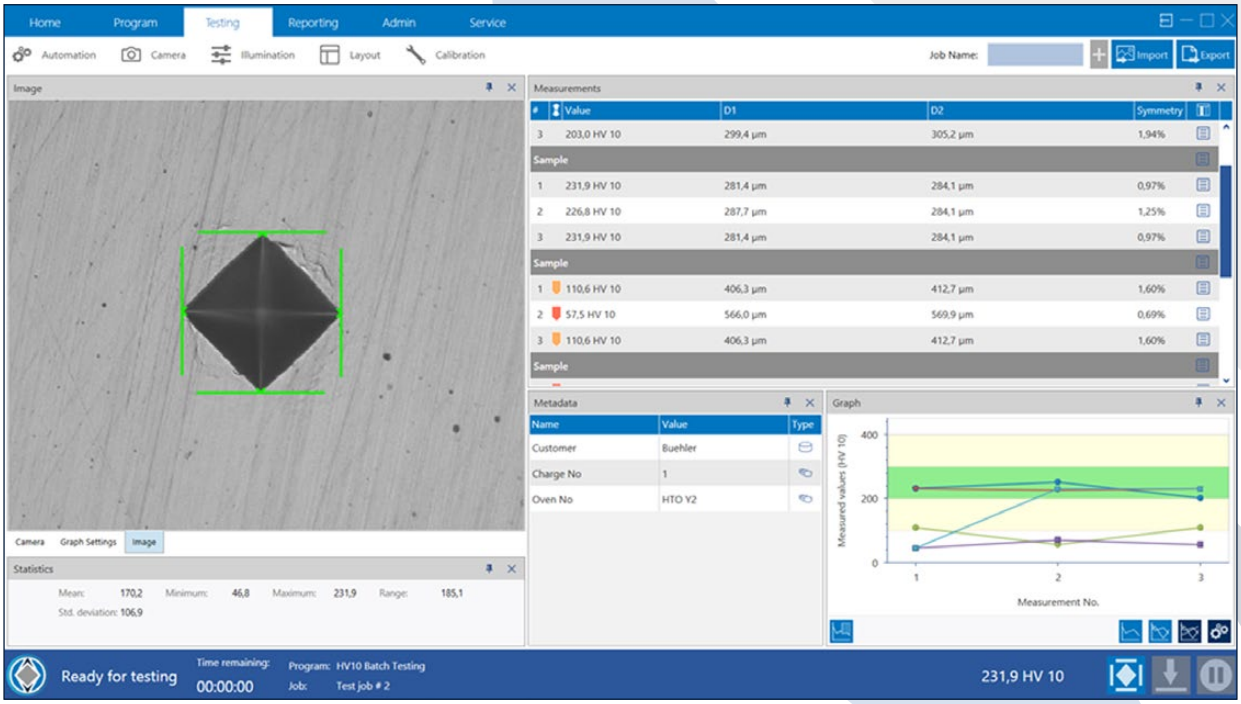
Use the functions you need – fully configurable

Flexible Layout

Show only what you want – maximize or minimize to your needs

Touch Optimized

Use a stylus or your fingers to navigate or do the test



Large Indent Image

Adjust the image window for easy remeasuring

Metadata Input

Flexible Data input for test or batch specific results

Tolerance Indicator

Direct visible feedback if your test is within tolerance or not

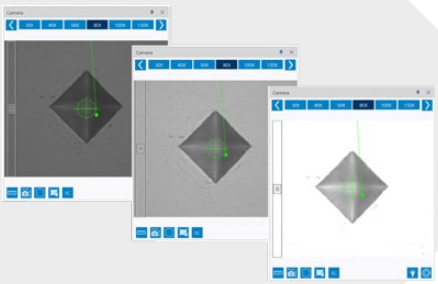
Expert Control & Evaluation Software

Often a high level of automation comes with a high level of complexity both in setup and in operation. Breaking convention, the DiaMet software focuses on fast and simple operation to compensate for less experienced operators while still offering a high feature set and flexibility required by expert users. Once a required test program is set up, any operator can run the series of Vickers, Brinell, Rockwell or Knoop indents with a minimum of two clicks or two touches depending on the monitor options.

A standard DiaMet feature is an automatic symmetry calculation for Brinell, Vickers and Knoop. This extra validation, with clear visual indication, helps to ensure the results conform to standards.

Auto-Illumination

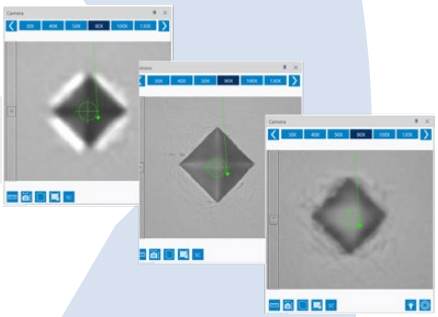
Repeatable, repeatable, repeatable – the DiaMet™ software automatic illumination adjusts to the correct illumination level on whatever sample, wherever on the sample independent from material (steels, tool steels, carbides, coatings).



Repeatable
Brightness & Contrast

Auto-Focus

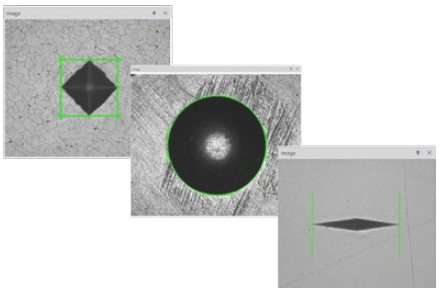
Astonishing- observe how the software finds focus from a distance as far away as 30mm or more. Enjoy the shear Auto-Focus-speed when focusing at close range. The DiaMet software Auto-Focus algorithm sets new standards.



Repeatable
Sharpness

Auto-Measurement

Manual positioning of filar lines is no longer required with the DiaMet software's refined measurement algorithm. Maintain control by switching to manual measure mode and adjust measurements by touch or mouse. Enable the automatic indent symmetry check on demand for further standards confirmation.



Repeatable
Results

Solutions for NADCAP Accreditation

The National Aerospace and Defense Contractors Accreditation Program (NADCAP) is a global cooperative accreditation program for aerospace, defense and related industries. The program develops industry-wide manufacturing processes that are applied by aerospace accredited manufacturers and suppliers. These processes can be found in different areas of material-recovery, such as coating, heat treatment and welding processes as well as inspection methods, such as hardness testing and microstructural analysis. Buehler's experience, expertise and robust equipment help suppliers and manufacturers meet the aerospace industry's NADCAP accreditation.

Buehler has the team to assist NADCAP accredited customers. As part of the ITW Test & Measurement Group, Buehler maintains its own service department of experienced service engineers and also coordinates verification with Instron and an experienced distributor service team. We have global presence and global experience in working with customers to meet NADCAP audits.

Application Cases for the UH4000 Series

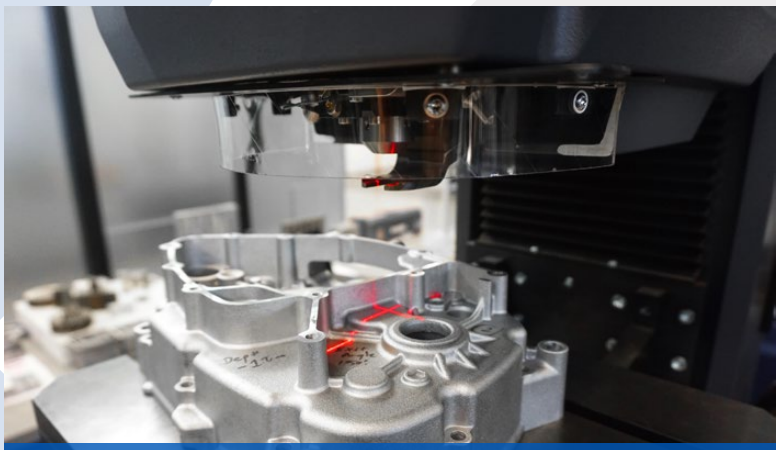
The Wilson UH4000 Universal Hardness Testers are the perfect fit for your production environment. The following examples are highlighting the capabilites for hardness testing on components using the Wilson UH4000 series testers.

Castings

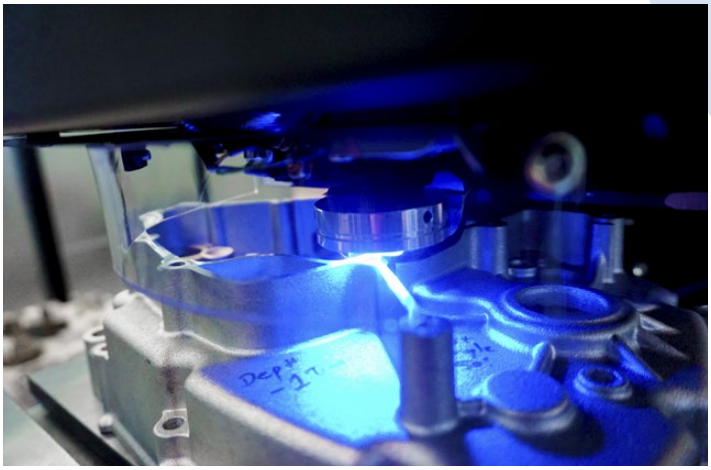
Wilson UH4750 with AlMgSi casting

The Wilson UH4750 and UH4250 work perfectly for all kind of casted components, like engine and transmission cases. Brinell testing is carried out with HBW2.5/62.5 or HBW5/250 test scales, when using Al based castings, and HBW2.5/187.5 or HBW5/750 test scales, when using Fe based castings.

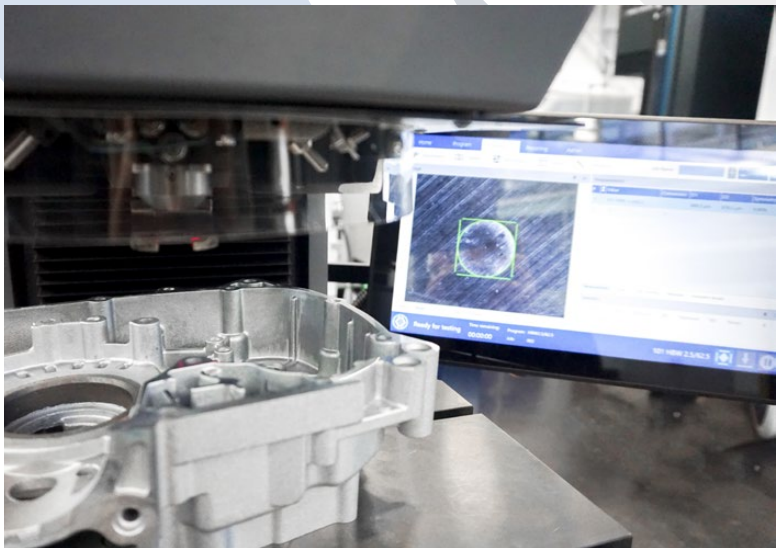
The test location can be targeted with the laser or the 2.5x objective, optionally equipped with the ringlight for better measurement accuracy.



The target laser helps to position the part correctly on the big workpiece stage.



Due to the low hardness of Al alloys and casted materials, Brinell indents can be very deep and the plastic deformation zone is large which can lead to challanges for the correct measurement of such indents. The newly developed ringlight will ensure that the Brinell indent gets measured correctly and as accurate and repeatable as possible.



Heat Treated Components

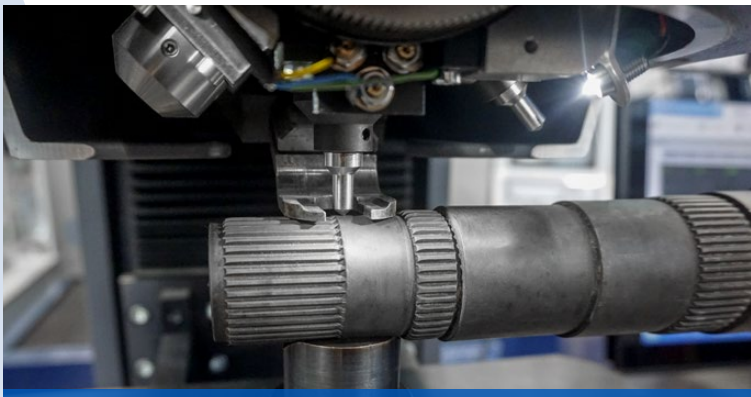
The UH4000 comes with an anvil extension to enable testing of smaller or cylindrical parts.

Different test anvils are available to support smaller or cylindrical parts as well.

Heat treatment processes, like induction heat treatment, are processes to harden components from the outside to increase wear resistance, but keep the part flexible in the inside. These heat treatments are fast to execute in production environments.

It is key to check the hardness after the heat treatment to ensure the part was processed correctly. In many cases, Rockwell hardness scales are used to perform the hardness checks.

The UH4000 can be equipped with a clamping device that secures the part before and during the testing. Rockwell testing in combination with the clamping device enables the Rockwell fast mode. In this mode, the testing will be performed automatically without operator influence.



The safety shield can get taken off to ensure full accessability for more complex part geometries.

The workspace illumination helps the operator to position the parts with ease and to have full visibility in dark environments as well

Automatic and manual stage movement are available on the Wilson UH4000 hardness testers by default, ensuring easy component movement of small as well as big and heavy parts.

Wilson UH4250 Automation Applications

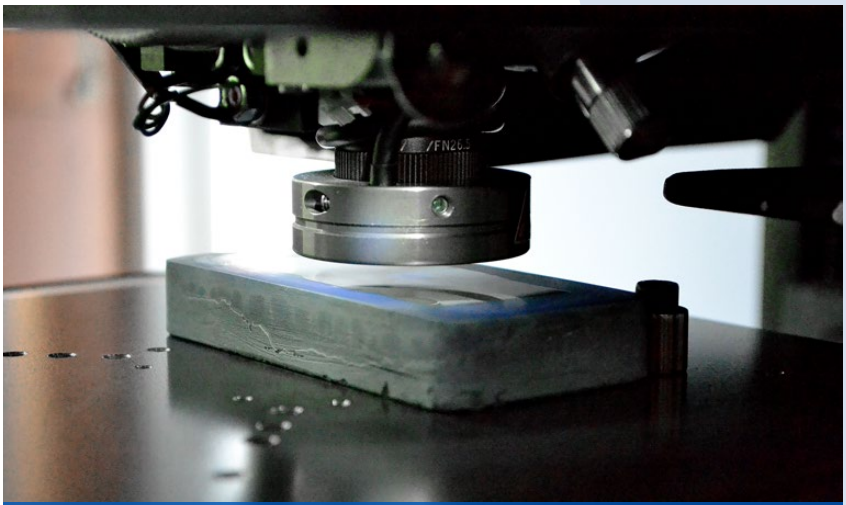
The Wilson UH4250 Auto comes with a 180x180mm motorized XY stage and DiaMet Enterprise, enabling the tester to perform full automatic testing sequences and programs. Typical applications are HRC batch testing, Brinell pattern testing (on castings or forged materials), macro sample testing, such as large weldings, and special applications like case hardened depth testing of heat treated parts.

Batch Testing

A batch of test samples on the automatic XY stage.

Batch testing is carried out when a large quanity of samples need to be verified. Testing is usually done on the complete part itself or on representative pieces of the complete part. Different test methods can be used, Rockwell testing is the most common one for heat treated parts. DiaMet can program the same or different test patterns per piece and fulfil a complete automatic test sequence, i.e. automatic test pattern placement and measurement.

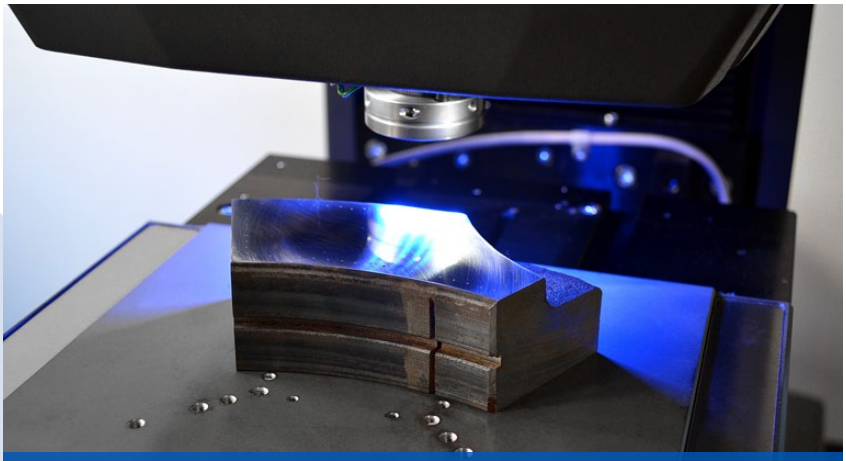
Macro Samples



Macrosamples can directly be placed on the stage.

Large crosssections of welds or other type of materials can be easily placed on the motorized stage and automatically tested. The macro objective provide scanning capability to achieve a complete overview image of the sample.

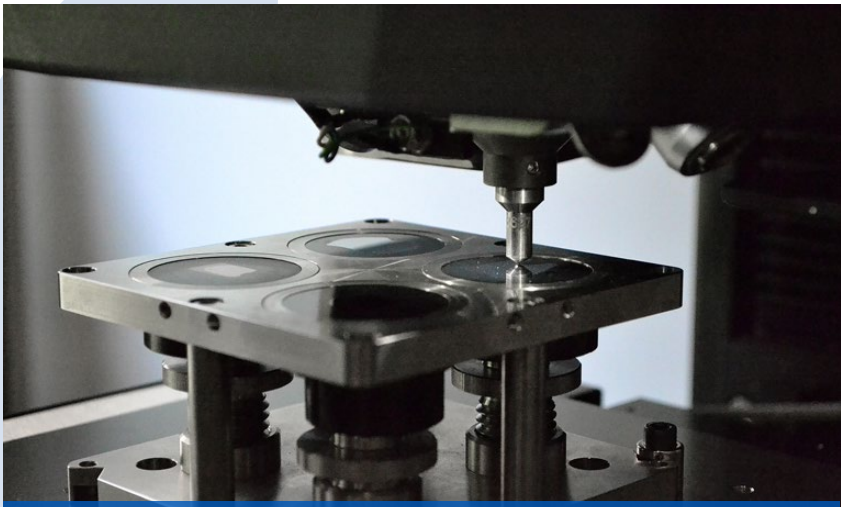
Large Unmounted Parts



Large piece of casting to perform HBW2.5/187.5 Brinell hardness testing fully automatic around the contour.

Bigger parts, such as castings, or sectioned pieces of castings and forgings can be easily placed on the stage to perform full automatic Brinell testing. Loads are applicable up to 250kgf, test piece weight up to 50kg.

Case Hardened Depth Testing Mounted Samples



Mounted samples using a sample holder for multisample testing.

The motorized stage can be used to perform also microhardness testing, e.g. CHD testing using loads from 0.5kgf. Our standard sample holders for mounted samples fit on the stage and are secured with magnets.

Celebrating 100 YEARS Wilson® Hardness

Technical Specifications

	UH4250	UH4750
Scales	HV 0.5 - HB 10/250	HV 3 - HBW 10/750
Turret	8 positions for objectives and indenters	
Indenters (Optional)	Brinell 1mm, 2.5mm, 5,0mm and 10,0mm carbide balls, Rockwell diamond cone, 1/16", 1/8", ¼", ½" carbide ball indenters, Vickers diamond and Knoop diamond	
Objectives Long Working Distance (Optional)	0.5x (optional with ring light), 5x, 10x, 20x, 40x, 50x	
Optics	5-megapixel USB 3 digital camera, with digital zoom and autofocus	
Test Loads	0.5-250 kgf	3-750 kgf
Test Load Type	Closed loop	
Test Standards	Brinell (ISO 6506-1, ASTM E10), Vickers (ISO 6507-1, ASTM E92), Rockwell (ISO 6508-1, ASTM E18), Knoop (ISO4545-1, ASTM E384), Plastic testing ball indentation (ISO 2039-1, 2039-2)	
Z Spindle	Manual hand wheel and automatic Z axis drive	
Maximum Specimen Height/Weight	300 mm (11.8 in), 70 kg (154 lb)	
Test Stage Dimensions	T-slot stage with 12mm slot width, 300mm [11.8in] x 400mm [15.7in]	
Machine Dimensions (L × W × H)	704 Mm (28 in) × 534 mm (21 in) × 995 mm (39.2 In)	
Machine Net Weight	300 kg (660 lb)	
Power	100 - 240VAC, 50-60Hz	

Wilson® Test Blocks & Indenters

Wilson test blocks and indenters are provided for a wide range of Vickers & Knoop, as well as Rockwell® and Brinell applications. Certified to a range of international standards including ASTM and ISO, we manufacture test blocks in-house to ensure the highest quality test reference standards available. Test blocks and indenters are certified using the latest standardization and optical measuring technology. Buehler operates its own calibration laboratory, traceable to NIST and are accredited to ISO/IEC 17025 by A2LA®. For more information on the test blocks and indenters please see the current catalog or vist www.buehler.com.

System Configurations

Select either the UH4250 or UH4750 with either standard or touchscreen monitor and continue on to create a customized Universal Hardness Tester

Main Unit

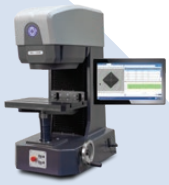
Wilson UH4250

- Load Range 0.5-250kgf, Standard Monitor 24"

W4250

- Load Range 0.5-250kgf , Touchscreen 19.5"

W4251



Wilson UH4750

- Load Range 3 - 750kgf, Standard Monitor 24"

W4750

- Load Range 3 - 750kgf, Touchscreen 19.5"

W4751

* Clamping device W4100CL not applicable

Wilson UH4250 Auto*

- Load Range 0.5- 250kgf, 24" Standard Monitor, 180 x 180mm motorized stage

W4250XY

- Load Range 0.5-250kgf, 19.5" Touchscreen, 180x180mm motorized Stage

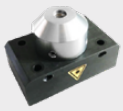
W4251XY

Configure Turret

Consult with your Buehler Sales engineer to select objectives, indenters and accessories that meet your application.

Objectives

W4100X2	2.5x Objective, optional with Ringlight
W4100X5	5x Objective
W4100X10	10x Objective
W4100X20	20x Objective
W4100X40	40x Objective
W4100X50	50x Objective



Laser

W4100L	Positioning Laser

Indenters

W4100K	Knoop Indenter with turret adapter
W4100V	Vickers Indenter with turret adapter
W4100B1	Brinell Indenter 1mm with turret adapter
W4100B2	Brinell Indenter 2.5mm with turret adapter
W4100B5	Brinell Indenter 5mm with turret adapter
W4100B10	Brinell Indenter 10mm with turret adapter
W4100R120	Rockwell Diamond Cone Indenter
W4100R16	Rockwell Indenter 1/16" Ball
W4100R8	Rockwell Indenter 1/8" Ball
W4100R4	Rockwell Indenter 1/4" Ball
W4100R2	Rockwell Indenter 1/2" Ball

Accessories

Ring Light

Ringlight for 2.5x objective
(improves reading of soft Brinell indents)

W4100RL

**Requires W4100X2 2.5x Objective*

Auto Clamping Device

The unique clamping device for the UH4000 series hardness testers ensures that workpieces will be fixed properly during testing. The device is designed to adapt different types of clamping forks.
Clamping width: 35mm [1.37in]

W4100CL

Workbench

Workbench with Drawers
1000 x 700 x 800mm [30 x 27 x 31in]
with spindle hole

944872

Anvils

V anvil for max. 45mm diameter cylindric workpieces

740096

10mm spot anvil for small workpieces

740160

Test anvil flat 80mm diameter

740191

V anvil for max. 85mm diameter cylindric workpieces

740095

Auto-leveling anvil Planoflex - flat 60mm diameter

740587

Test anvil flat 190mm diameter

740101

Celebrating 100 YEARS Wilson® Hardness

1920 - 2020

In 2011, Wilson Hardness merged with Buehler to provide an even broader product offering. With Reicherter, Wilson and Wolpert, Buehler combines the names of great innovators in the area of hardness testing under one roof. With this knowledge and experience, the company has grown into one of the world's leading suppliers of hardness testing equipment.

Wilson Rockwell, Knoop/Vickers and Brinell hardness testers, along with the associated software, hardness test blocks and a comprehensive range of accessories constitute the core of the company's current product portfolio. Buehler products and processes are used in quality assurance and in the development laboratories of major research facilities in numerous sectors, amongst them the aeronautical and aerospace, automotive, electrical, energy generation and medical equipment industries.

Globally located Buehler Solution Centers provide customers with the opportunity to directly work with the company's specialists. These Solution Centers are located throughout the United States, Asia, United Kingdom, France and Germany. They are equipped with the most up-todate technology for the preparation of materialographic specimens and with the latest-generation of hardness testers, including the DiaMet™ testing software that is perfectly adapted to hardness testing. Experienced specialists take a hands-on approach to solving our customers' testing challenges on quality assurance and research.

Buehler is a strong, trusted partner relied upon by organizations for reliable solutions and consistent results in material preparation, testing and analysis.

REICHERTER

Founded in Germany in 1899

1899

Reicherter was founded in 1899 at Esslingen am Neckar, Germany. With more than 40,000 installations Reicherter hardness and spring testing machines have earned the trust of users worldwide. Systems such as Brivisor, Briviskop and Briro are well known in laboratories for quality control, research and development, and testing and measuring laboratories.

1912

Illinois Tool Works Inc., or ITW, was founded in 1912 by Byron L. Smith. ITW produces engineered fasteners and components, equipment and consumable systems, and specialty products.

1920

Founded in 1920, Wilson® Hardness is the world leader in the hardness testing industry. Wilson introduced the first Rockwell® tester to the market over 100 years ago. The company then went on to develop the legendary Tukon line of micro-indentation testers – the industry standard for Knoop and Vickers testing.

Wilson Instruments

Founded in USA in 1920

Wilson Testor WOLPERT

Founded in Germany in 1927

1927

Wolpert, a well-known name in the hardness testing industry, is known for practical designs which meet the needs of every hardness testing application. Since its founding in 1927 at Ludwigshafen as Otto Wolpert Werke, Wolpert had long stood for devices characterized by a stable structure, high test accuracy and ease of use.

1936

Buehler was founded in 1936 in the USA by Adolph Buehler, a Swiss immigrant who saw a need for metallographic sample preparation equipment and optical inspection instruments for the steel and automotive industries in the USA. He produced world´s first Mounting Press.

1946

Established in 1946, Instron manufactures and services materials testing instruments, systems, and accessories, providing you with comprehensive solutions for all your research, quality, and service-life testing requirements. Our machines evaluate the mechanical properties of materials and components using tension, compression, flexure, fatigue, impact, torsion and hardness tests.

1993

In 1993, Wilson® and Wolpert became a part of Instron, developing our hardness testing line of products and accessories. In this time, Instron introduced the first hardness tester with closed loop system: Rockwell® 2000

2005

In October 2005 Instron and Wilson were acquired by ITW, as the beginning of their test and measurement platform. New product innovation in the 21st century has been the Minuteman ELT™ Microhardness Software for hardness testers

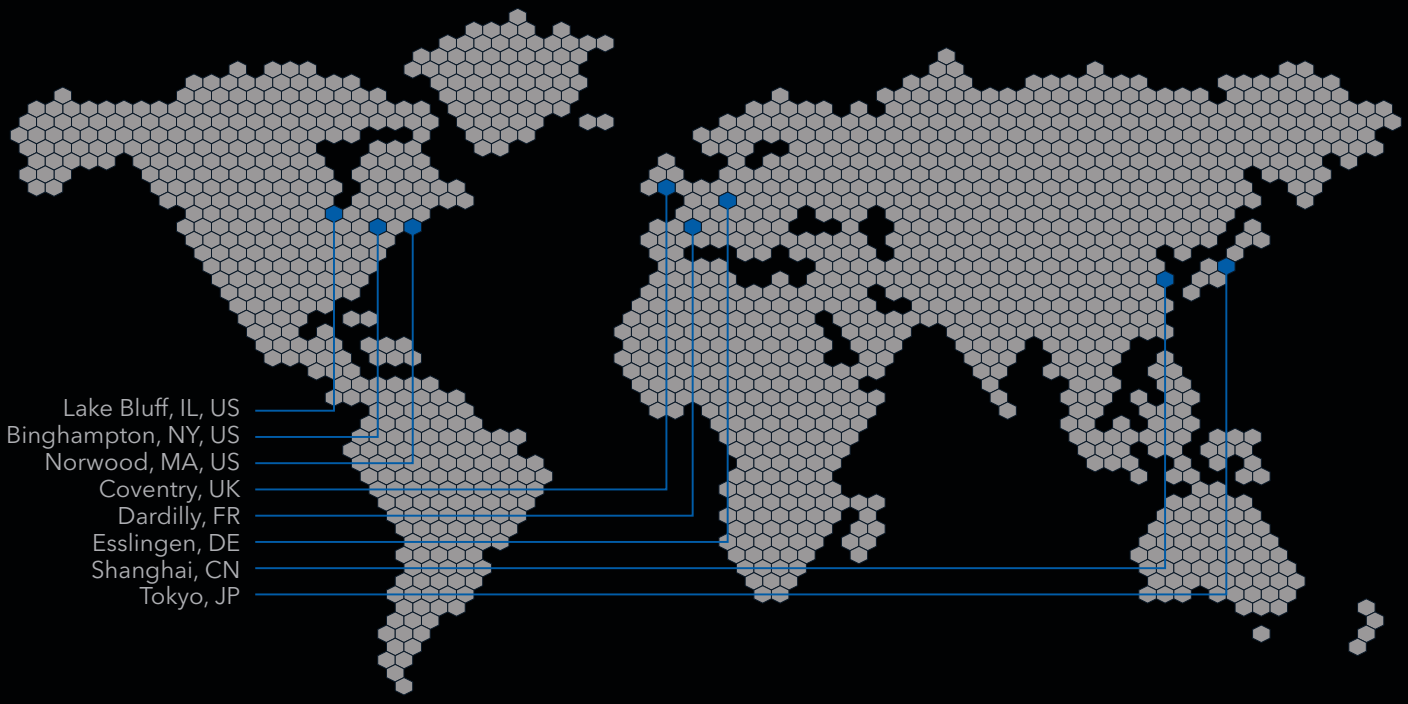
2009

In 2009, Reicherter was acquired by ITW. Reicherter complemented the range of Wilson Hardness. Ever since, the Reicherter plant in Esslingen produces and distributes the products of Reicherter, Wolpert and Wilson hardness testing. At this time all hardness products are labeled Wilson Hardness Tester.

2020

In 2012 the Wilson group of companies including Wilson Wolpert and Reicherter joined Buehler and brought a strong brand of testers.

Buehler Worldwide Locations



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CELEBRATING 75 YEARS OF PARTNERSHIP
BUEHLER

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