NEMESIS 9800G2

AUTOMATIC HARDNESS TESTER

UNIVERSAL | ROCKWELL, VICKERS, KNOOP & BRINELL

INNOVATEST®
Advanced Hardness Testing Solutions

NEMESIS **9800**G2

Large, Larger, Largest...

Welcome to the world of heavy-duty hardness testing, with the NEMESIS 9800G2, the latest addition to our Universal Hardness tester range. This cutting-edge machine is designed to simplify testing processes, offering unparalleled versatility and efficiency.

The NEMESIS 9800G2 boasts a large radial frame that allows testing either on the machine base or beside it. The heavy-duty test head easily pivots, ensuring seamless positioning of workpieces without any hindrance. Forget the hassle of manual workpiece adjustments. Use a crane or forklift truck to effortlessly position your parts.

With its unique dual Z-axis, the 9800G2 provides an impressive range of test scales. From Vickers 500gf to Brinell 3000kgf, this tester can determine the hardness of objects ranging from small to remarkably large. The standard delivered removable cast iron block stage makes it convenient to test smaller parts at an ergonomic working height, ensuring precision and ease of use. Contrary to expectations, the NEMESIS 9800G2 is not a customized product; it is a standard serial product of INNOVATEST.
However, it can be easily adapted to specific requirements, providing the best of both worlds - reliability and flexibility.

HARDNESS SCALES

- **VICKERS** + HVD (HVT) 500gf - 150kgf
- **BRINELL** + HBD (HBT) with AI 1kgf - 3000kgf
- **KNOOP** 500gf - 5kgf
- **ROCKWELL** 3kgf - 150kgf

Select your required test force range...

500gf – 250kgf	NEMESIS 9800G2 / A	3000kgf
500gf – 3kgf – 750kgf	NEMESIS 9800G2 / B	3000kgf
500gf – 5kgf	NEMESIS 9800G2 / C	3000kgf

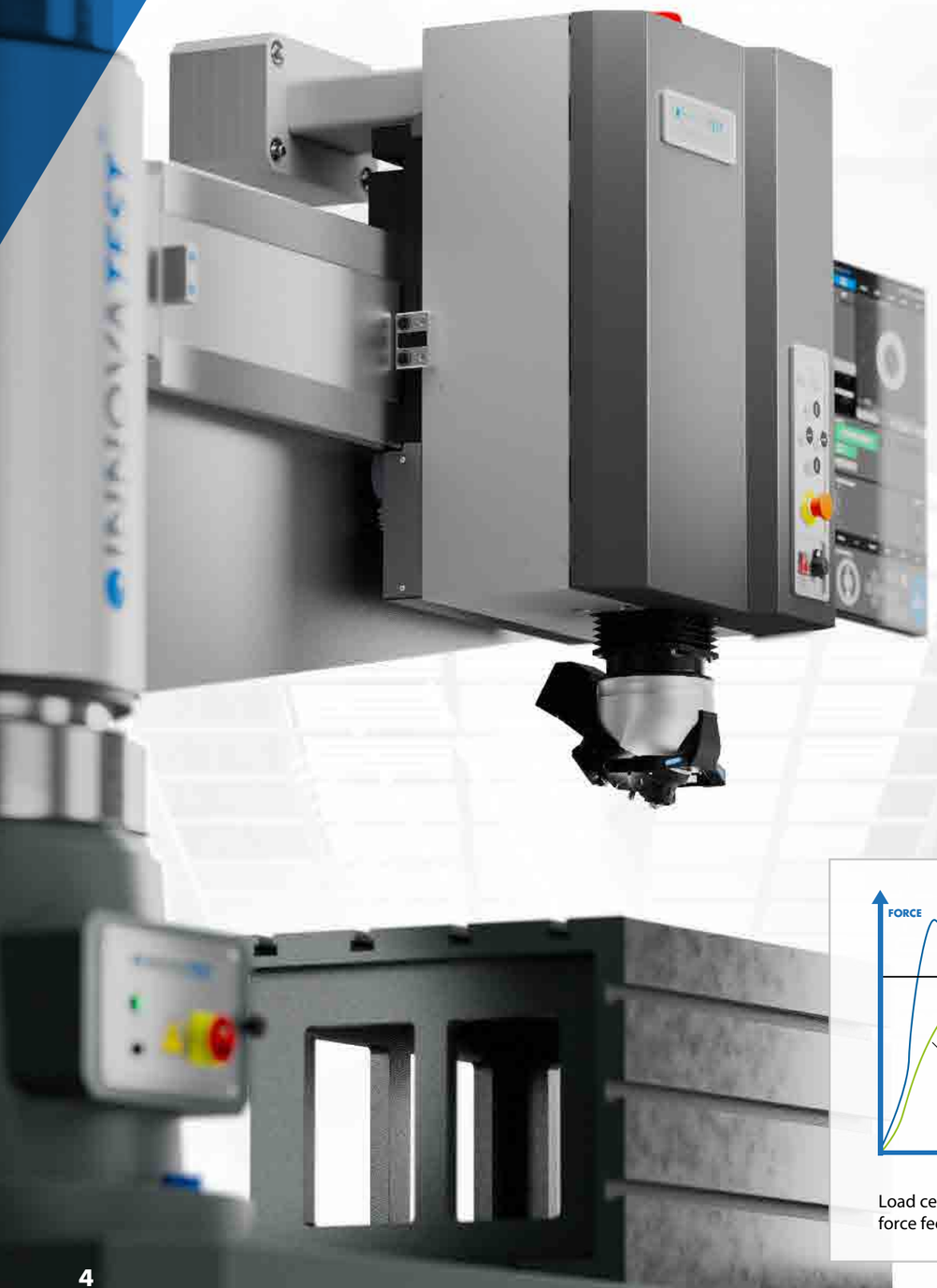
Upgrade now, later, at any moment, during order or online!

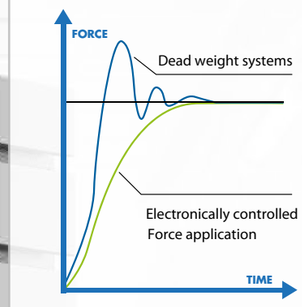
OPTION 1	500gf - 3kgf
OPTION 2	500gf - 5kgf

HIGHLIGHTS

1. Multi load cell, closed loop system, custom test force configuration
2. Force range from 500gf up to 3000kgf
3. Force upgrade available also years after first installation
4. 9 position tool changer (turret) with visual LED process indicators
5. Free to configure 8 objectives, 8 indenters, cross laser, touch probe, optional tools
6. 18 megapixel full color measurement camera, bright white LED TTL illumination
7. 18 megapixel full color sample image & stage overview camera, anti-glare filter, camera zoom for variable field of view and autofocus at any field of view
8. Adjustable & rotatable dual LED workspace illumination
9. Automatic workpiece height detection
10. Unique collision detection and test head retraction system
11. Integrated or External high performance, MS Windows based i7 system controller
12. IMPRESSIONS™ 4 full tester workflow and tester control system with 22" (touch)screen
13. Artificial Intelligence (AI) for enhanced Brinell readings

SUPPORTED
METHODS & SCALES





Load cell, closed loop,
force feedback system

ROCKWELL

EN-ISO 6508, ASTM E-18, JIS Z 2245

Regular Rockwell scales; Pre Load 10kgf, Main Load 60kgf | 100kgf | 150kgf

A	B	C	D	E	F	G	H	K	L	M	P	R	S	V

Superficial Rockwell scales; Pre Load 3kgf, Main Load 15kgf | 30kgf | 45kgf

15N	30N	45N	15T	30T	45T	15W	30W	45W	15X	30X	45X	15Y	30Y	45Y

VICKERS

DIN EN ISO 6507, ASTM E-92, ASTM E-384

HV0.5	HV1	HV2	HV2.5	HV3
HV4	HV5	HV10	HV20	HV25
HV30	HV40	HV50	HV100	HV120
HV150				

KNOOP

DIN EN ISO 4545, ASTM E-92, ASTM E-384

HK0.5	HK1	HK2	HK5	

BRINELL

DIN EN ISO 6506, ASTM E-10

HBW1/1	HBW1/1.25	HBW1/2.5	HBW1/5	HBW1/10
HBW1/30	HBW1/31.25	HBW2.5/6.25	HBW2.5/7.8125	HBW2.5/15.625
HBW2.5/31.25	HBW2.5/62.5	HBW2.5/187.5	HBW5/25	HBW 5/31.25
HBW 5/62.5	HBW5/125	HBW5/250	HBW5/750	HBW10/100
HBW10/125	HBW10/250	HBW10/500	HBW10/1000	HBW10/1500
HBW10/3000				

CONVERSIONS

DIN EN ISO 18265, DIN EN ISO 50150, ASTM E140

IDEAL FOR VERY **LARGE COMPONENTS**

The giant 6000kg - 9800G2 provides in hardness testing of heavy and large components, parts or steel fabricated structures. Universal because of its ability to perform its test in many scales including Rockwell, Brinell, Vickers, Knoop, HVD, HBD, ISO 2039, Carbon and others following ISO and ASTM standardized procedures with a highly automated testing process.

The Dual Z-axis provides in extreme rapid rough test head height positioning while the integrated force actuator with a stroke of 125mm controls the correct approach speed and indentation process at micron stepping accuracy.

The workpiece height can be up to 1500mm while other dimensions are theoretically unlimited. The test head travels maximum 2000mm on the radial arm, depending on the required test load. The field of application can be best described as;

The INNOVATEST NEMESIS 9800G2 is tailored for industries that deal with substantial workpieces, including:

MINING
Parts of heavy duty machinery such as excavators, drilling rigs, and haul trucks.

AGRICULTURE
Parts of Agriculture machinery, including tractors, combines, and other equipment used in large-scale farming

ENERGY AND POWER
Parts of Heavy machinery and equipment for extracting and processing natural resources

AEROSPACE AND DEFENSE
Parts of military vehicles, and defense systems often involve heavy-duty materials and precision machinery.

AUTOMOTIVE MANUFACTURING
The production of parts for heavy-duty vehicles such as trucks, buses, and construction vehicles falls under heavy-duty industries within the automotive sector.

SHIPBUILDING
Parts of the ships engines and drive mechanics, and offshore structures

STEEL AND METAL PRODUCTION
Industries involved in the production of steel, aluminum and other large automotive components.

PRECISION IN EVERY ANGLE

In the realm of quality control and material testing for large components, the INNOVATEST NEMESIS 9800G2 stands out as an engineering marvel. INNOVATEST develops a groundbreaking feature that sets the NEMESIS 9800G2 apart—the capability of its testing arm to rotate a full 360 degrees. This innovation opens new frontiers in large component material testing, allowing for unprecedented adaptability and precision.

Addressing Challenges in Large Component Testing:

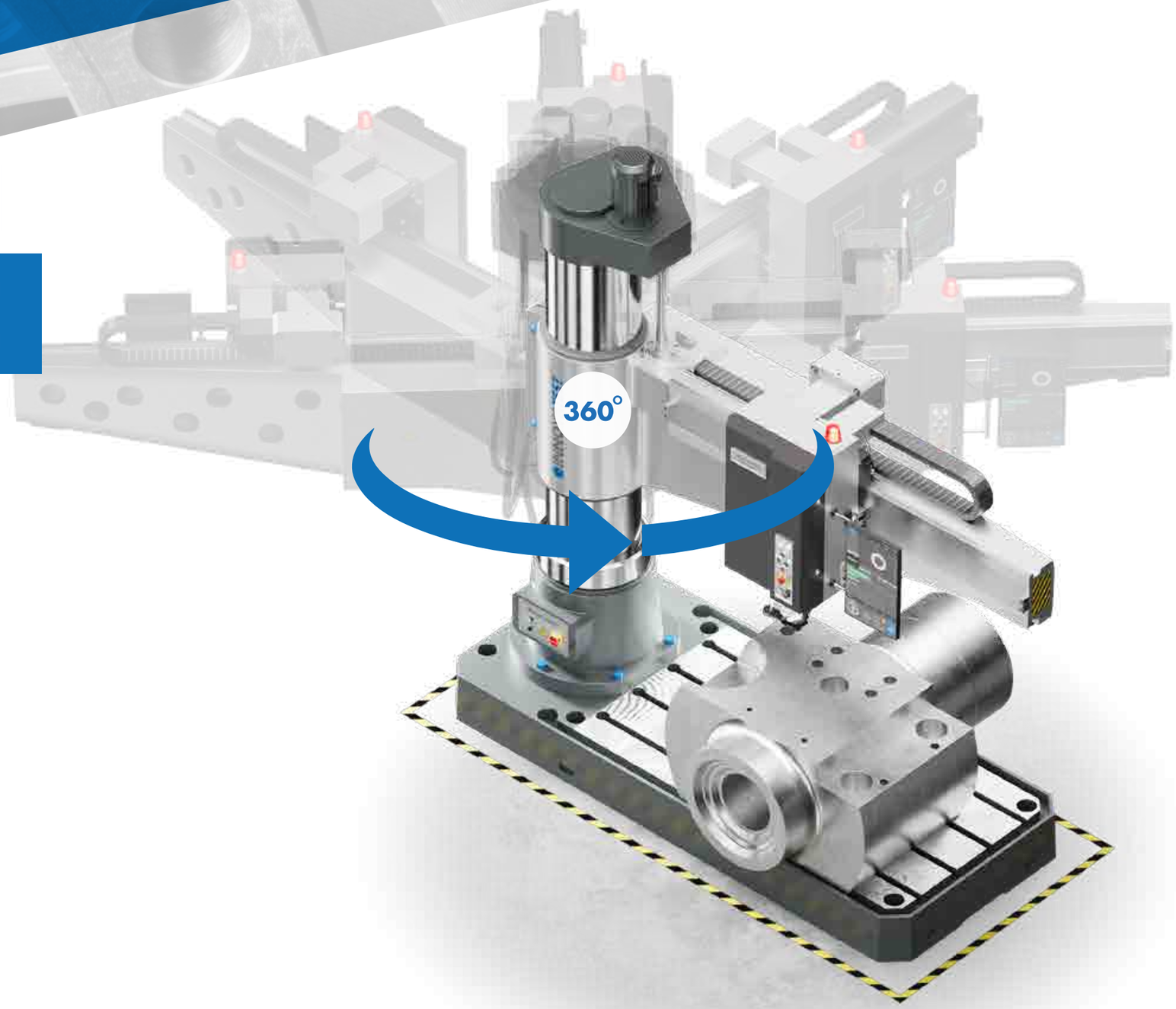
Large components, such as those used in heavy machinery, aerospace, and other critical industries, present unique challenges in material testing. The NEMESIS 9800G2 addresses these challenges head-on with its 360-degree rotating testing arm, offering a solution that surpasses the limitations of traditional hardness testers.

Precision in Every Angle

The NEMESIS 9800G2's testing arm is engineered with a high-precision mechanism that enables it to rotate a full 360 degrees. This feature ensures that large components with intricate geometries and varying surface orientations can be thoroughly tested, providing engineers with comprehensive and precise hardness readings.

Hydraulic Central Clamping System

With a single touch of the locking button, the hydraulic clamping system securely immobilizes the machine in its optimal testing position. This entails the fixation of both the horizontal displacement of the test head and the rotation of the column. To release this position, a simple press of the button effortlessly unlocks the system.

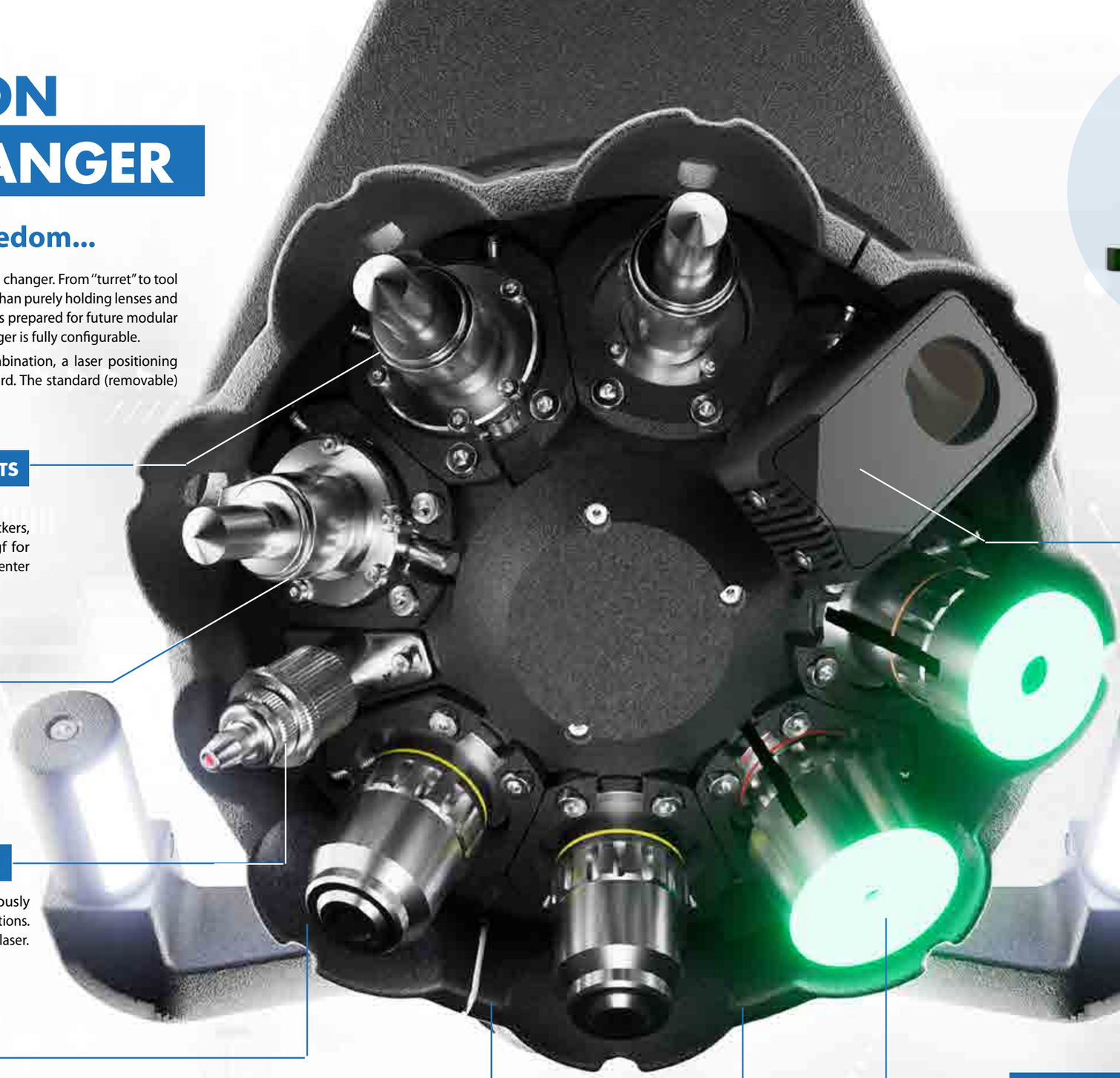


9-POSITION TOOL CHANGER

Full configuration freedom...

Newly developed 9 position state-of-the-art tool changer. From "turret" to tool changer because the 9800G2 turret offers more than purely holding lenses and indenters. The high-speed rotating mechanism is prepared for future modular plug & play tooling development. The tool changer is fully configurable.

Either 8 indenters or 8 objectives, or any combination, a laser positioning system and touch probe are installed as standard. The standard (removable) skirt protects tooling from damage.



MEDIUM FORCE INDENTER SEATS

This indenter seat allows hardness testing ranging from option A: 500gf up to 45kgf for Vickers, Knoop, Brinell or option B: 1kgf up to 250kgf for Vickers, Knoop Brinell and Rockwell. Multiple indenter seats can be installed on the tool changer.

HIGH FORCE INDENTER SEAT

This indenter seat allows hardness testing ranging from 500gf up to 3000kgf for Vickers, Knoop and Brinell. Multiple indenter seats can be installed on the tool changer.

CROSS LASER & TOUCH PROBE

The cross laser & touch probe can be simultaneously used in the 9th position without loss of tooling positions. Multi touch probes available, with or without cross laser.

LWD OBJECTIVES

High quality long working distance objectives.

COLLISION DETECTION SYSTEM

The collision detection system prevents tooling damage by early detecting obstructions in the testpath. The tool changer is continuously monitored during all movement processes and instantaneously stops and retractes if an obstruction is detected.

The LED bars on the front of the tool changer continuously inform you about the device status. The range of flash intervals and color codes (red, blue, green) indicate the process mode of the tester; red: automatic operation, (busy & hands off), blue: in single test procedure; or green: idle, ready for next task.

BRILIGHT OBJECTIVE

Brinell objective optimized with straight bundle LED illumination for better results with shallow Brinell impressions.

STAGE ILLUMINATION

Adjustable power LED banks provide excellent diffused stage illumination.

CRYSTAL CLEAR™ RINGLIGHTS

Brinell ringlights optimized for each magnification in combination with Artificial Intelligence (AI see page 21).

PROTECTION SKIRT

The skirt mounted on the rotating centre of the tool changer protects each individually installed tool against accidental damage.

The purpose of software is to control complexity...

For the more advanced users, for whom the standard applications would not be sufficient, IMPRESSIONS™ 4 has an unmatched level of optional "apps" that can be installed as plugins, later, at any moment. During the purchase of your tester, decide on what you need at that moment. Widen your options at any moment by a simple e-mail and a few mouse clicks, to install optional functionality. As easy or simpler than installing an app on your mobile phone.

POWERED BY

IMPRESSIONS v4

Next gen workflow & tester control...

Just buy a software release ticket, and your tester has added functionality, regardless where it is located. A revolutionary system taking care of all your needs.
In this way we keep the learning curve, the process to work efficiently with our software limited to the level of "need to have" and "need to know". The proportion of installed and activated software never needs to be more than your requirements.

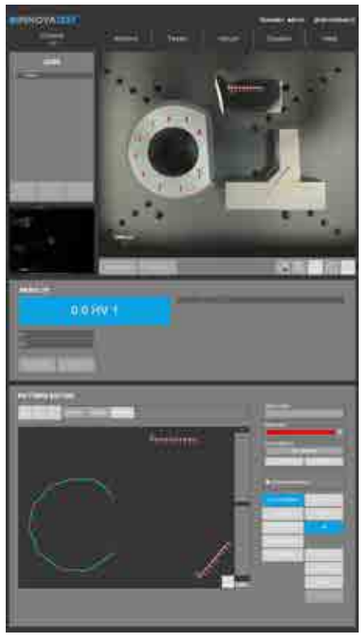
On the higher end, IMPRESSIONS 4 connects flawlessly with quality control systems such as QDAS, exports files in CVS, XML or other formats and if your requirement is not standard, our team of engineers will efficiently find ways to handle your data properly. Bespoke solutions such as connectivity to robotic systems are standard solutions for INNOVATEST™.

Unique to IMPRESSIONS™ 4 is a choice for screen size and position. Whether you wish your interface to be in portrait mode or landscape, all functionality is supported in both positions. For table top solutions like testers in laboratories, users often opt for landscape screen(s).

On the shopfloor the large landscape screens are often an unwanted component either requiring a table top or machine mounted bracket taking a lot of space and cables to deal with. IMPRESSIONS 4 leaves you the option to go for landscape or for portrait mode on a large selection of our machines.

For the NEMESIS 9800G2, INNOVATEST recommends the 27" industrial quality landscape screen operated by both touch as well as mouse and keyboard. One screen is standard included with the hardness tester, optional is the Dual view function, these are 2 x 24" industrial quality landscape screens. New applications are added to IMPRESSIONS™ on a regular basis; while INNOVATEST provides 10 years free updates, upgrades to more functionality or new additions can be purchased at any time.

TIME REDUCING SOFTWARE SOLUTIONS...



1 PATTERN EDITOR

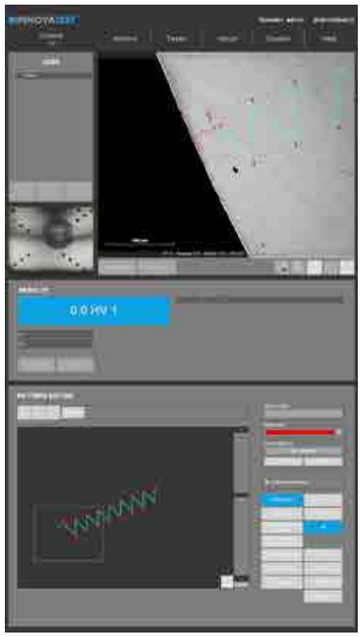
The IMPRESSIONS™ pattern editor allows the user to create any number of test patterns with a large number of variable settings. Create test patterns with great precision and freedom. Verify the settings in the preview mode. Drag & drop patterns from one test sample to another sample. Live vision technique over zoom overview camera, no image stitching required.

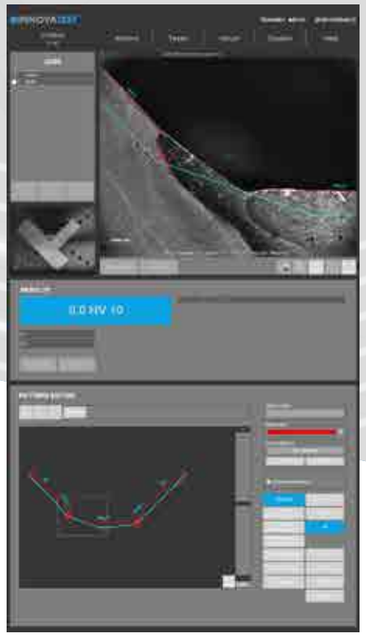
Combine different patterns and even different test forces in one program, and run them fully automatically. All test points can be identified individually or to customer specifications. The label is shown in the test result list and in the test results overview and in the results print out. An important function for sample analyses at the end of a test and in the future for review of previous tests.

2 CHD, SHD, NHD

How do you increase throughput in your lab? Make the most common testing design as easy to set up as possible to perform automatically and still adhere to the applicable standards. CHD/SHD/NHD testing can be started directly from the surface view or from the overview. Additional core points of hardness can be defined separately for NHD measurements.

The distances of test points are automatically set to a minimum distance, following the standard, to assure correct testing is conducted. Time saving test mode “complete all indentations – then evaluate” and “auto-stop” to complete test series as soon as the lower hardness limit has been reached. Report Generator is enhanced with reporting features for this application.

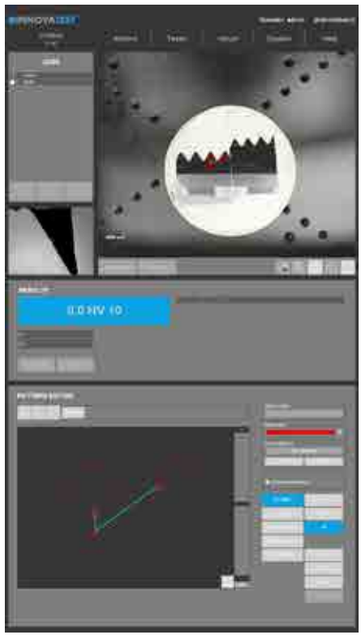




3 WELD INSPECTION (ISO 9015)

This especially developed tool enables you to conduct hardness testing on welded parts or segments according to ISO standard. Setting up the pattern according to the requirements becomes “easy-to-do”, due to pre-set test points in the different zones of the weld and automatic correlation between test points. The system will run a fully automatic test procedure and display and record the results accordingly.

The Report Generator is enhanced with reporting features for this application.



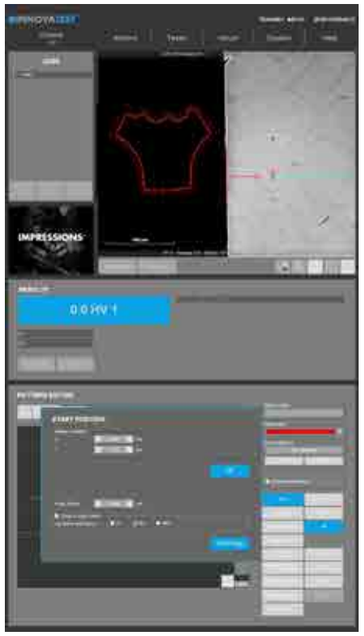
4 HARDNESS OF SCREW THREAD DECARBONIZED ZONE (ISO898-1)

A specialized software tool of IMPRESSIONS™ allows you to set up and conduct fully automatic testing as per ISO898-1 for screw thread measurement of (de)-carbonized part.

The Report Generator is enhanced with reporting features for this application.

5 EDGE DETECTION

Technology that automatically or at a mouse click recognizes the edge of your sample. This helps to determine and fix the desired starting position for CHD or other pattern testing jobs.

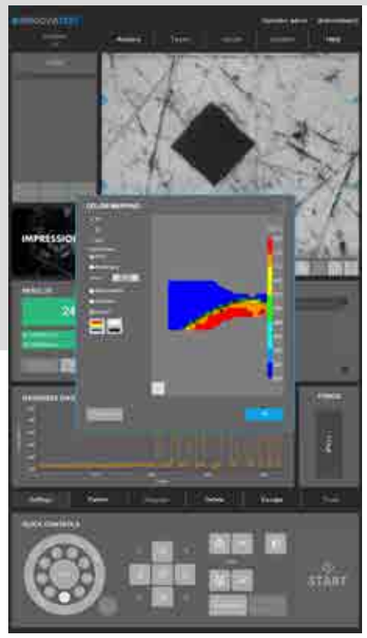


6 AUTOMATIC CONTOUR SCANNING

This application scans the entire outline (or partial) area of a sample. The function can be used with an objective by using the overview zoom camera for high speed scanning. The system scans the entire outline defined and stores all relevant data in the test program.

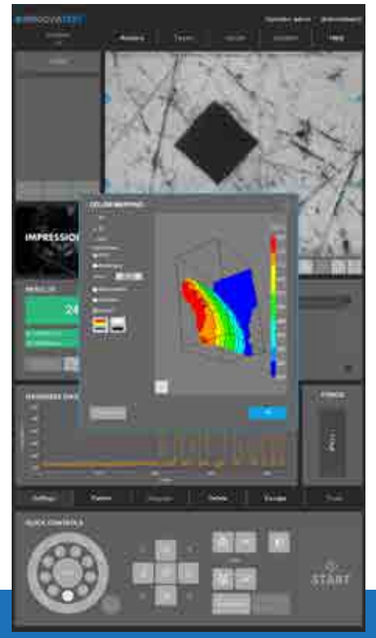
7 2D HARDNESS CHART

The application „Plane hardness chart“, is also referred to as Color Mapping happens to be the perfect tool for securing the detail of the effective hardness distribution over the total sample cross section of heat treated samples. An important feature in material exploration, weld testing or in damage analysis.



8 3D HARDNESS CHART

In addition to 2D graphic diagrams, the system can also automatically generate 3D diagrams. 2D and 3D hardness charts are included in one application.



9 Kic CRACK MEASUREMENT

For those requiring more in depth knowledge on materials behavior, wishing to study material fracture and fatigue, crack growth can be predicted and measured by using the Kic application.

The software supports Kic crack detection under load with customized Kic result reporting. By way of one or both methods, Palmqvist or Median / Radial, fracture toughness is now a repeatable and reproducible test across multiple operators.

ISO/IEC 17025 UKAS ACCREDITED.

10 SNAPSHOT FUNCTION

This handy function in IMPRESSIONS™ allows you to make screen captures of the viewing area by way of objective view and/or Overview camera. It gives the opportunity to store such images with comments or to paste them into the report generator for further processing.

11 USER DEFINED PROGRAMS

For repeating jobs, IMPRESSIONS™ utilizes the option of setting up and storing custom test programs. For each task, a "job" can be created. All application specific parameters, such as hardness scale, force, dwell-time, pattern, conversion and the report template are stored in the same program.

12 REPORT GENERATOR

Imagine having a report created for you that includes: Your company name, address, contact information, labeled results related to patterns or sequential, pictures of your optical measurements, stitched images, notes section for each result or pictures, rendition of the pattern performed, overview picture of your pattern on your sample, full statistics, summary of your results, go no-go results, Pass or fail…

All this information or having the ability to only have what you need reported, we call this our Report Configurator. You decide how much or how little you report by PDF or laser printer. We even keep it simple by choosing export to CSV file, to a thumb drive or network file location. Data management at its best!

VIBRATION | TEMPERATURE | HUMIDITY

MONITORING

Our world is going through processes that have influence on climate and environment. More often we see extreme heat, extreme cold and periods of extreme rain. To assure that such disturbances of nature do not coincidentally effect your measuring or testing results, we have prepared our machines to climate change and forces of nature.

13 VIBRATION & EARTH QUAKE MONITORING

The integrated high precision accelerometer electronics continuously monitor your tester's stability environment. While the tester has vibration isolators (machine dampers) installation environment is often not ideal. Think of heavy traffic, loaded fork lift trucks, excentre presses or other equipment making shop floor installation a base of trouble.

For certain countries/area's in the world where light earthquakes are so common that they are hardly noticed, the vibration monitoring system will give a warning message and stop the hardness testing process to avoid incorrect readings.

14 TEMPERATURE & HUMIDITY MONITORING

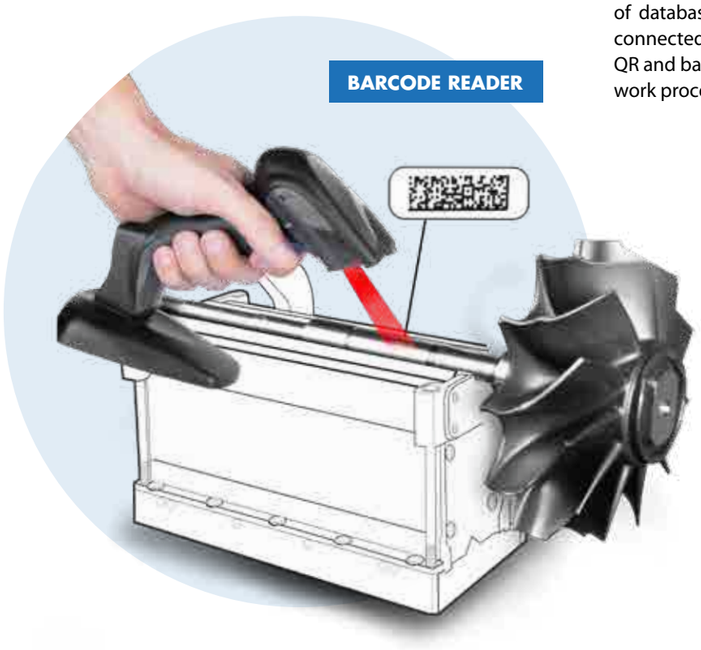
Extreme high or low temperatures might not only effect the hardness readings of your machine (think of installation in extremely warm countries or nearby furnaces) extreme humidity might even damage the sensitive electronics.

BARCODE & QR SOLUTIONS

IDENTIFICATION

15 The basic function of the barcode reader is to load data in to determined user fields.
The BAR | QR code module of INNOVATEST connects the machine to a database or network environment loading samples and data.

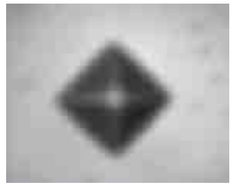
Whether simply inserting header files (single or serial) or the complete integration of reading devices for the automatic selection of database templates, retrieving data from connected ERP or quality systems (optional) QR and barcode readers simplify complicated work procedures for the operator.



In the above application, a turbo part has been engraved with a QR code. Extra challenging was the fact that the QR code was engraved in a high polished part of the turbo shaft.

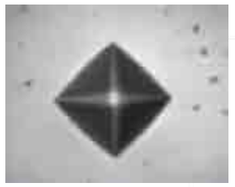
All data for the particular turbo part was fixed in the underlaying QR code. The scanner loads all customer data in the hardness testing machine and assures that the testing outcome is included in the particular test report database, fully automatic.

AUTOMATIC IMAGE EVALUATION



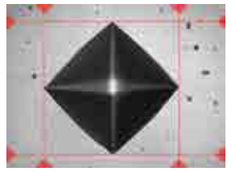
AUTO FOCUS

Fast & precise, observe how IMPRESSIONS™ finds focus from a large distance, as far as the travel of the Z-axis allows. Algorithms used for close distance autofocusing set new standards in AF speed.



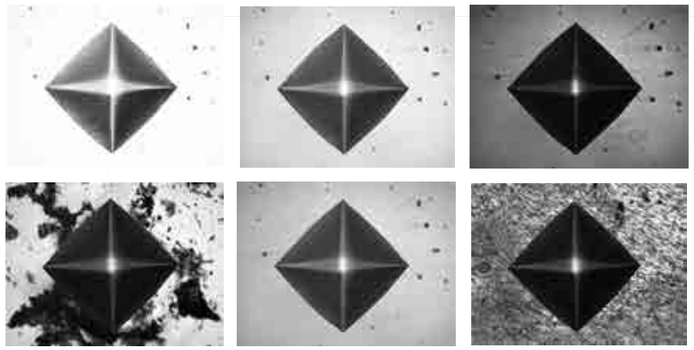
AUTOMATIC MEASUREMENT

Manual positioning of filar lines is no longer required. IMPRESSIONS™ refined measurement algorithms detect indents even on very poor or scratched surfaces and measure the relevant indent dimensions according to standards. Stay in control by switching to manual measure mode and have the option of adjusting measurements by touching the screen or using the mouse. Filar lines can be colored to give the best contrast against the specimen's surface. To assure that measurements meet relevant standards on symmetry, enable the automatic indent check. All hardness values can be converted to other scales according to ISO 18265, ISO 50150, ASTM E140.



ILLUMINATION SETTINGS

IMPRESSIONS™ software automatic illumination system adapts to the correct illumination regardless of the sample surface quality, wherever on the sample, independent from material (steel, carbide, coated or ceramic). Contrast, Brightness and program, can be set automatically for each measurement or controlled manually. Sharpness can be stored with the pre-determined test.



Complex, refined algorithms ensure reproducible measurements on different materials and even on scratched and damaged surfaces.

SUPERIOR ARTIFICAL INTELLIGENCE (AI)

We include an advanced physics development breakthrough in the image analyses of our Brinell capable hardness testing machines.

The conventional image processing methods on hardness testing machines are fairly successful for clean images that present clear indentation boundaries. In practice, however, workpieces or samples often have rough surfaces that compromise the quality of the image processing which could potentially result in incorrect hardness values.

A human observer can easily find the indentation in both images and the exact boundaries of such indentation (see fig. 1). For a computer algorithm, finding the indentation in the right image is much more challenging due to the many gradients in this image (see fig. 2). Artificial intelligence can overcome this difficulty by training a complex computer neural network to "think" as a human observer.

The INNOVATEST Brinell AI model is trained in our research facility/R&D department using powerful supercomputers. The training phase optimizes millions and millions of weight factors in a neural network, to learn how an indent can look like, using a gradient descent approach. Weight factors have been optimized by a human observer and after optimum weigh factors where determined. Using the AI function on our hardness tester to detect new indentations is called "inference" and requires significantly less computing power. The AI model has been created.

The integrated Intel® Core™ i7 processor can easily handle this task which makes it possible to install and use the INNOVATEST Brinell AI module on the NEMESIS 9800G2 as well.

During inference , a new image (a new Brinell indent image) is entered in to the neural network with weights that where determined during training (see fig. 3).

The complex algorithm is capable to calculate a "mask" on its own, this mask is plotted on top of the indent image, exactly filling the indent and marking the edges that then can be easily detected by automatic image recognition system (see fig. 4).

This super advanced technology requires no special objectives and provides even indents with poor visibility, often the case with shallow indents in rough surface materials, to be perfectly detected and measured.

The system is far superior to special objectives and standard Brinell measuring systems.

fig.1-2

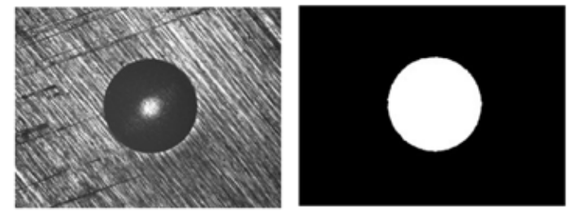
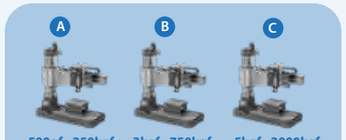


fig.3-4

NEMESIS 9800G2

STEP 1: Select machine type



STEP 2: Additional force range

OPTION 1 500gf - 3kgf

OPTION 2 500gf - 5kgf

STEP 3: Indenter seats

1 Laser & touch probe

- A Cross laser
- B Touch probe
- C Touch probe laser

2 Indenter seats

= Standard included

STEP 4: Indenters

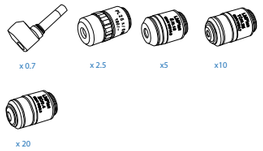
3 Indenters

- A Rockwell
- B Brinell
- C Vickers
- D Knoop

STEP 5: Optical

4 Overview camera

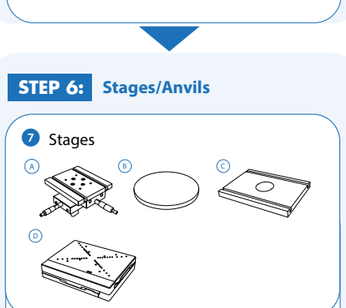
5 Objectives



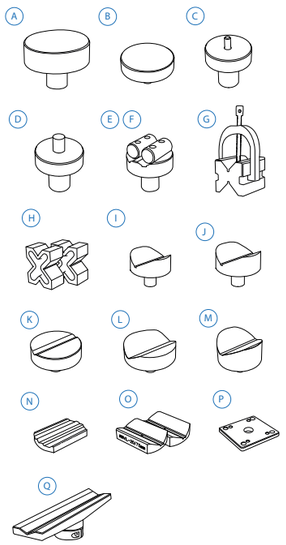
6 Ringlights

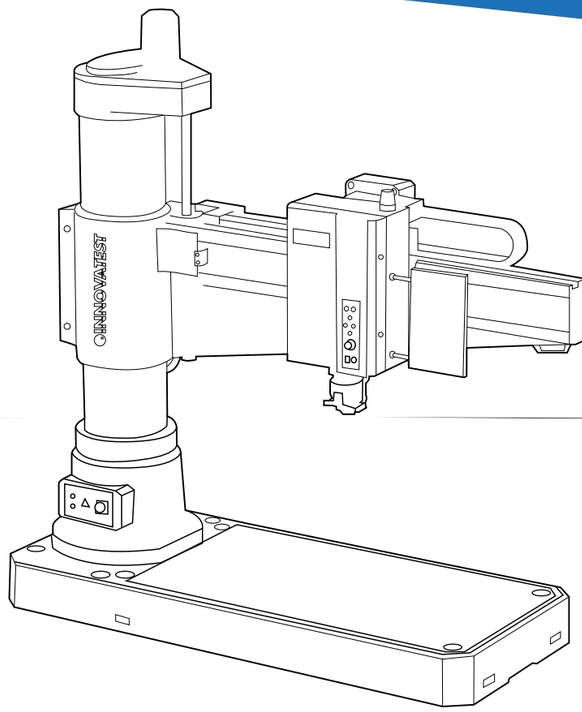
STEP 6: Stages/Anvils

7 Stages



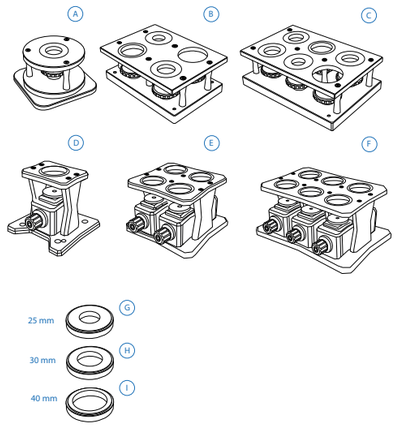
8 Anvils





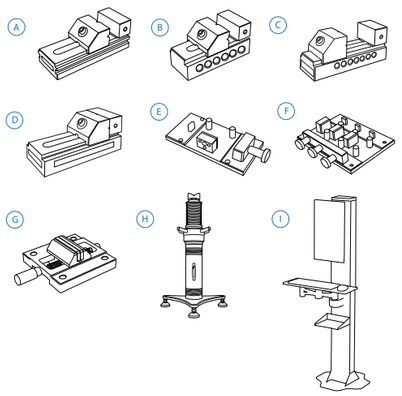
STEP 7: Sample holders

10 Sample holders



STEP 8: Fixtures & Vices

9 Fixtures & Vices



STEP 9: Software

= Standard included

Not all accessories are displayed on this page. Full details can be found on the Order details page.

ORDER DETAILS

NEMESIS 9800G2

		NEMESIS 9800G2/A Universal hardness tester, 500gf - 250kgf	NEMESIS 9800G2/A	
		NEMESIS 9800G2/B Universal hardness tester, 3kgf -750kgf	NEMESIS 9800G2/B	
		NEMESIS 9800G2/C Universal hardness tester, 5kgf - 3000kgf	NEMESIS 9800G2/C	
		Option 1: Force range extension 500gf - 3kgf, for 9800G2/B only	F9800G2O1	
		Option 2: Force range extension 500gf - 5kgf, for 9800G2/C only	F9800G2O2	

ACCESSORIES

STEP 3	Indenter seats				
1	Laser & touch probe	A	Cross laser & touch probe base	SA-05-0027	STANDARD
		B	Touch probe laser based, closed	SA-10-0036	STANDARD
		C	Touch probe laser based, open	SA-10-0045	STANDARD
2	Indenter seats	A	Indenter seat 6.35mm, 200gf - 62.5kgf	SA-10-0035	
		B	Indenter seat 6.35mm, 1kgf - 250kgf	SA-10-0034	
		C	Fixed indenter seat base 6.35mm, 3000kg	SA-10-0046	
			Indenter seat adjustment base, mounting set (1 for each SA-10-0034, 35 & 47)	SA-10-0031	
STEP 4	Indenters				
3	Rockwell	A	Rockwell C Diamond Indenter, ISO & ASTM certified	UPI/6005	
			Rockwell Ball Indenter 1/16". Includes 1 carbide ball, ISO & ASTM certified	UPI/7506	
			Rockwell Ball Indenter 1/8". Includes 1 carbide ball, ISO & ASTM certified	UPI/7606	
			Rockwell Ball Indenter 1/4". Includes 1 carbide ball, ISO & ASTM certified	UPI/7706	
			Rockwell Ball Indenter 1/2". Includes 1 carbide ball, ISO & ASTM certified	UPI/7806	
	Brinell	B	Brinell Indenter 1mm. Includes 1 carbide ball. Ø6.35mm. ISO & ASTM certified	UPI/7000	
			Brinell Indenter 2.5mm. Includes 1 carbide ball. Ø6.35mm. ISO & ASTM certified	UPI/7005	
			Brinell Indenter 5mm. Includes 1 carbide ball. Ø6.35mm. ISO & ASTM certified	UPI/7010	
			Brinell Indenter 10mm. Includes 1 carbide ball. Ø6.35mm. ISO & ASTM certified	UPI/7015	
	Vickers	C	Macro Vickers Indenter Ø6.35mm, ISO & ASTM certified	UPI/8010	
	Knoop	D	Macro Knoop Indenter Ø6.35mm, ISO & ASTM certified	UPI/8220	
STEP 5	Optical				
4	Overview camera		Overview / Full view zoom camera + software functionality, field of view 57x60mm up to 225x180mm, Includes overview lights	SA-05-0038	
5	Objectives		BRILIGHT objective 0.7x	SA-05-0046	
			2.5x Long Working Distance objective	ASSUN-OBJ2.5X	
			5x Long Working Distance objective	ASSUN-OBJ5X	
			10x Long Working Distance objective	ASSUN-OBJ10X	
			20x Long Working Distance objective	ASSUN-OBJ20X	
			Adjustable objective socket 2.5x – 100x (1x required for each objective)	SA-05-0025	
			Adjustable objective socket 0.7x (required for 0.7 objective)	SA-05-0026	

6	Ringlights	A	Crystal™ Clear LED ring light, multi use for 2.5x objectives	SA-05-0021	
		B	Crystal™ Clear LED ring light, multi use for 5x objectives	SA-05-0022	
STEP 6	Stages/Anvils				
7	Stages	A	Manual X-Y stage with analogue metric micrometers, 180x160mm Displacement: 25x25mm, scale 0.01mm, max load 300kg	UN-TESTTABLE/030	
	Clamping, locking & fixing adapters		Lock flange	UN-XYZ BUSH50	
			Mounting plate for lock flange	UN-XYZ30FP50-55	
		B	Testing table flat ø200mm, screwfix	UN-TESTTABLE/010	
			Testing tabe flat ø235mm, screwfix	UN-TESTTABLE/012	
			Testing table Ø200mm (61 - 65HRC) requires lock flange	CM-08-0194	
		C	Large flat surface testing table 350x250mm, thickness 30mm with 2 T-slots, for large components	UN-TESTTABLE/015	
			Large flat surface testing table 450x350mm, thickness 35mm with 2 T-slots, for large components	UN-TESTTABLE/016	
		D	iSMART™ motorized CNC X-Y stage, 215x160mm, total load up to 400Kgf max. Displacement: 75x75mm, resolution 0.001mm, repeatability+/-0.0015mm	MA-XY7575S	
			iSMART™ stage, 260x205mm, total load up to 400Kgf max. Displacement: 120x120mm, resolution 0.001mm, repeatability+/-0.0015mm	MA-XY1212S	
			iSMART™ stage, 360x205mm, total load up to 400Kgf max. Displacement: 220x120mm, resolution 0.001mm, repeatability+/-0.0015mm	MA-XY2212S	
			iSMART™ stage, 490x224mm, total load up to 400Kgf max. Displacement: 340x120mm, resolution 0.001mm, repeatability+/-0.0015mm	MA-XY3412S	
			iSMART™ stage, 410x265mm, total load up to 4000Kgf max. Displacement: 200x150mm, resolution 0.001mm, repeatability+/-0.0015mm	MA-XY2015S	
			iSMART™ stage, 510x265mm, total load up to 4000Kgf max. Displacement: 300x150mm, resolution 0.001mm, repeatability+/-0.0015mm	MA-XY3015S	
			iSMART™ stage, 560x265mm, total load up to 4000Kgf max. Displacement: 400x150mm, resolution 0.001mm, repeatability+/-0.0015mm	MA-XY4015S	
	Cable sets, mounting & Connectivity for motorized stage		Dove tail mounting plate, for UN motorized stages	CM-08-0033	
			iSMART™ quick connect foot	SA-08-0024	
8	Anvils	A	Flat anvil 60mm	AS3000-19-04	
		B	Flat anvil 80mm	UN-TESTTABLE/002	
		C	Spot anvil 5mm	UN-ANVIL/010	
		D	Spot anvil 10mm	UN-ANVIL/011	
		E	Cylindrical V anvil 6-80mm	UN-CVANVIL680	
		F	Cylindrical V anvil 50-200mm	UN-CVANVIL50200	
		G	V block with bracket 40x40x50mm (LxBxH)	UN-VBLOCK404050	
		H	Steel, cross type, (X) V-block 60x120x100mm 8-90mm pair	UN-CROSSBLOCK01	
		I	V-anvil ø40mm 6-60mm	UN-ANVIL/005	
		J	V-anvil ø63mm 10-100mm	UN-ANVIL/006	
		K	V-Anvil ø80mm 3.3-20mm	UN-ANVIL/040	

		L	V-Anvil ø80mm 12-80mm	UN-ANVIL/045	
		M	V-Anvil ø80mm 20-140mm	UN-ANVIL/050	
			Test table 100x100mm, V grove 20mm wide, 10mm deep	UN-TESTTABLE/040	
		N	Small V-Anvil 3-20mm requires base plate (Requires Manual/Autom. X-Y stage)	UN-ANVILSV/105	
		O	Large V-Anvil 20-75mm requires base plate (Requires Manual/Autom. X-Y stage)	UN-ANVILLV/106	
		P	Base plate for V-anvils, UN-ANVILSV/105 & UN-ANVILLV/106	UN-VANVILBASEPL	
		Q	Extra long V-Anvil (Ø10 - Ø100)	CM-08-0186	
	Clamping, locking & fixing adapters		Quick change anvil base (required for mounting testing tables, anvils)	AS5000-450B	
			Lock flange	AS9000-21-01B	
STEP 7	**Sample holders**				
10	Sample holders	A	1 position sample holder, for 1 embedded sample, diameter 50mm or 2″	UN-ESH1	
		B	4 position sample holder, for max. 4 embedded samples, diameter 50mm or 2″	UN-ESH4	
		C	6 position sample holder, for max. 6 embedded samples, diameter 50mm or 2″	UN-ESH6	
		D	1 position sample holder, for 1 embedded sample, diameter 50mm or 2″ with front operation elevator knob	BM-08-0052	
		E	4 position sample holder, for max. 4 embedded samples, diameter 50mm or 2″ with front operation elevator knob	BM-08-0053	
		F	6 position sample holder, for max. 6 embedded samples, diameter 50mm or 2″ with front operation elevator knob	BM-08-0054	
			12 position sample holder, for max. 12 embedded samples, diameter 50mm or 2″ with front operation elevator knob	BM-08-0056	
		G	1 insert reduction ring 25mm	UN-ESHI25	
		H	1 insert reduction ring 30mm	UN-ESHI30	
		I	1 insert reduction ring 40mm	UN-ESHI40	
			1 insert reduction ring 1″	UN-ESHI1	
			1 insert reduction ring 1 1/4″	UN-ESHI125	
			1 insert reduction ring 1,5″	UN-ESHI15	
			12 position sample holder, for max. 12 embedded samples, diameter 50mm or 2″ with front operation elevator knob	BM-08-0056	
STEP 8	**Fixtures & vices**				
11	Fixtures & vices	A	Polished precision vice with lock down system, jaw width 25mm, opens 20mm	UN-VICE/210	
		B	Polished precision vice with lock down system, jaw width 36mm, opens 42mm	UN-VICE/215	
		C	Polished precision vice with lock down system, jaw width 48mm, opens 75mm	UN-VICE/220	
		D	Polished precision vice with lock down system, jaw width 75mm, opens 100mm	UN-VICE/230	
		E	JOMINY Fixture, for 1 quench end test sample, quick release function	UN-JOMFIX1	
		F	JOMINY Fixture, for 3 quench end test sample, quick release function	UN-JOMFIX3	
		G	Small parts vice jaw width 55mm, open 50mm, self centering	UN-VICE/115	
		H	Jack Rest	SA-08-0010	
		I	Remote Console Floor type operation console for remote tester operation	UN-REMCON	

STEP 9	**Software**			
	Additional software	Manual on-screen measurement	UN-MANM	STANDARD
		Automatic measurement	UN-AUTOM	STANDARD
		Automatic focussing	UN-AUTOFOC	STANDARD
		Report configurator	UN-REPORTA	STANDARD
		Snapshot function	UN-SNAPSH	STANDARD
		Advanced 3 axis coordinate & free style indent pattern configurator, for motorized stage only	UN-TESTPAT01	
		Image stitching, composes full stage overview, and detailed sample overview in high resolution. Requires a motorized stage.	UN-IMST01	
		KiC crack detection under load. Palmqvist & Median / Radial fracture toughness	UN-CRKPAR	
		Automatic Contour scanning	UN-CSCAN	
		2D / 3D hardness scanning (mapping, includes automatic contour scanning)	UN-CSCAN2D3D	
		Drawing and measuring (distance & angles) application	UN-DRMEAS	
		Automatic edge detection	UN-EDGEDTC	
		Force depth/time diagram	UN-FDDIAGR	
		ISO898-1 screw thread measurement of (de)-carbonized part. Requires UN-CSCAN	UN-ISO898/1	
		ISO-2702 tap screw thread measurement	UN-ISO2702	
		User level management	UN-LEVMAN	
		CHD, SHD, NHD configurator & graphic interface requires: indent pattern configurator (TESTPAT01)	UN-PATCHD	
		Q-DAS Certified connectivity protocol	UN-QDAS	
		Advanced 3-axis communication protocol for robotic systems	UN-REMC	
		ISO bullets casings pattern configurator and reporting system	UN-SHELLCONF	
		ISO 9015 Weld pattern conifgurator (automatic weld pattern configurator), requires overview camera or AS9000-0.7OBJ	UN-WELDPAT	
		Vibration, temperature & humidity monitoring	UN-VIBCLC	
		Artificial Intelligence Deep Learning Brinell module	UN-AIDLB01	STANDARD
		Barcode & QR data mapping software	UN-SCANFLOW	
	Connectivity plus	Powerfull external intel core i7 pc, with 16GB ram, and 512GB SSD drive Windows 10 pre-installed including wiring and integration with tester.	UN-SYSPCIMP01	
		Powerful external intel core i9 pc, with 16GB ram, and 512GB SSD drive Windows 10 pre-installed including wiring and integration with tester.	UN-SYSPCIMP02	
		Application of customer supplied PC, plus wiring and integration with tester	UN-SYSPCIMPCS	
		Bluetooth connectivity	UN-BTADAPT	
		Utility software; Import test results in MS applications like Excel	UN-SW/905	
		USB to USB null modem cable 2.5M	BE-99-0025	
		Wireless system Keyboard & wireless mouse	UN-SKBSET	STANDARD
		Virtual joystick, on screen		STANDARD

	Additional items			
	Printer	Laser Printer	UN-PRINT	
	Projector	On request, any brand of choice	UN-PROJECTOR	
	ISO 17025 UKAS ISO / ASTM Calibration	BRINELL direct and indirect calibration & certification, traceable, in compliance with ISO & ASTM, NADCAP. Includes direct force and indirect verification report (block readings), report, flat fee for selected common scales, per scale.	CCERTUKAS/1B	
	ISO 17025 UKAS ISO / ASTM Calibration	VICKERS direct and indirect calibration & certification, traceable, in compliance with ISO & ASTM, NADCAP. Includes direct force and indirect verification report (block readings), report, flat fee for selected common scales, per scale.	CCERTUKAS//1V	
	ISO 17025 UKAS ISO / ASTM Calibration	KNOOP direct and indirect calibration & certification, traceable, in compliance with ISO & ASTM, NADCAP. Includes direct force and indirect verification report (block readings), report, flat fee for selected common scales, per scale.	CCERTUKAS/1K	
	ISO 17025 UKAS ISO / ASTM Calibration	ROCKWELL direct and indirect calibration & certification, traceable, in compliance with ISO & ASTM, NADCAP. Includes direct force and indirect verification report (block readings), report, flat fee for selected common scales, per scale.	CCERTUKAS/1R	

ACCESSORIES

INDENTER SEATS

Laser & touch probe

A SA-05-0027

B SA-10-0036

C SA-10-0045

Indenter seats

A SA-10-0035

B SA-10-0034

C SA-10-0046

INDENTERS

Indenters

A

Rockwell Diamond Indenter

1/16″ Carbide Ball Indenter

1/8″ Carbide Ball Indenter

1/4″ Carbide Ball Indenter

1/2″ Carbide Ball Indenter

B

1mm Carbide Ball Indenter Ø6.35mm

2.5mm Carbide Ball Indenter Ø6.35mm

5mm Carbide Ball Indenter Ø6.35mm

10mm Carbide Ball Indenter Ø6.35mm

C

Macro Vickers Indenter Ø6.35mm

D

Macro Knoop Indenter Ø6.35mm

OPTICAL

Overview camera

SA-05-0038

Objectives

2.5x Long Working Distance objective

5x Long Working Distance objective

10x Long Working Distance objective

20x Long Working Distance objective

BRILIGHT objective 0.7x

Ringlights

A SA-05-0021

B SA-05-0022

STAGES/ANVILS

Stages

A

UN-TESTTABLE/030

B

UN-TESTTABLE/010
UN-TESTTABLE/012
CM-08-0194

C

UN-TESTTABLE/015
UN-TESTTABLE/016

STAGES/ANVILS

D

Wired stages

UN-XY571212TT
UN-XY571712TT
UN-XY572212TT
UN-XY902015
UN-XY903015
UN-XY904015
UN-XY932015
UN-XY933015
UN-XY934015

iSMART™ stages

MA-XY7575S
MA-XY1212S
MA-XY2212S
MA-XY3412S
MA-XY2015S
MA-XY3015S
MA-XY4015S

Anvils

A

AS3000-19-04

B

UN-TESTTABLE/002

C

UN-ANVIL/010

D

UN-ANVIL/011

E F

UN-CVANVIL680
UN-CVANVIL50200

G

UN-VBLOCK404050

H

UN-CROSSBLOCK01

I

UN-ANVIL/005

J

UN-ANVIL/006

K

UN-ANVIL/040

L

UN-ANVIL/045

M

UN-ANVIL/050

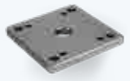
N

UN-ANVILSV/105

O

UN-ANVILSV/106

P



UN-VANVILBASEPL

Q

CM-08-0186

SAMPLE HOLDERS

Sample holders - Regular model

A B

C

UN-ESH1
UN-ESH4
UN-ESH6

Sample holders - Front operation

D

E

F

BM-08-0052
BM-08-0054
BM-08-0056

G

UN-ESHI25

H

UN-ESHI30

I

UN-ESHI40

UN-ESHI1

UN-ESHI125

UN-ESHI15

FIXTURES & VICES

Fixtures & vices

A

UN-VICE/210

B

UN-VICE/215

C

UN-VICE/220

D

UN-VICE/230

E

UN-JOMFIX1

F

UN-JOMFIX3

G

UN-VICE/115

H

SA-08-0010*

I

UN-REMCON

* Required in combination with stages/anvils

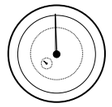
MACHINE STANDS

UN-STAND/955

UN-STAND/965

SPECIFICATIONS

HARDNESS SCALES

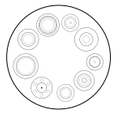


ROCKWELL EN-ISO 6508 ASTM E-18 JIS Z 2245	Regular Rockwell scales; Pre Load 10kgf, Main Load 60kgf | 100kgf | 150kgf A | B | C | D | E | F | G | H | K | L | M | P | R | S | V Superficial Rockwell scales; Pre Load 3kgf, Main Load 15kgf | 30kgf | 45kgf 15N | 30N | 45N | 15T | 30T | 45T | 15W | 30W | 45W | 15X | 30X | 45X | 15Y | 30Y | 45Y
VICKERS ISO 6507 ASTM E384, E92 JIS B 7725	HV0.5, HV1, HV2, HV2.5, HV3, HV4, HV5, HV10, HV20, HV25, HV30, HV40, HV50, HV60, HV100, HV120, HV150
Kic Fracture toughness	All Vickers forces & scales
KNOOP ISO 4545 ASTM E92 JIS Z 2251	HK0.5, HK1, HK2, HK5
BRINELL ISO 6506, ASTM E10 JIS Z 2243	HBW1/1 | HBW1/1.25 | HBW1/2.5 | HBW1/5 | HBW1/10 | HBW1/30 | HBW1/31.25 HBW2.5/6.25 | HBW 2.5/7.8125 | HBW2.5/15.625 | HBW2.5/31.25 | HBW2.5/62.5 | HBW2.5/187.5 HBW5/25 | HBW5/31.25 | HBW5/62.5 | HBW5/125 | HBW5/250 | HBW5/750 HBW10/100 | HBW10/125 | HBW10/250 | HBW10/500 | HBW10/1000 | HBW10/1500 | HBW10/3000
HVD (HVT) VDI/VDE 2616-1	HV5 | HV10 | HV20 | | HV25 | HV30 | HV40 | HV50 | HV60 | HV100 | HV120 | HV150
HBD (HBT) VDI/VDE 2616-1	HBW1/5 | HBW1/10 | HBW1/30 | HBW2.5/6.25 | HBW2.5/7.8125 | HBW2.5/15.625 | HBW2.5/31.25 | HBW2.5/62.5 HBW2.5/187.5 | HBW5/25 | HBW5/31.25 | HBW5/62.5 | HBW5/125 | HBW5/250 | HBW10/100 | HBW10/125 HBW10/250
PLASTIC ISO 2039	49,03 N, 132,9 N, 357,9 N, 961 N
CARBON	HR 2.5/7 | HR 5/7 | HR 5/15 | HR 5/20 | HR 5/40 | HR 5/60 | HR 5/100 | HR 5/150 | HR 10/20 HR 10/40 | HR 10/60 | HR10/100 | HR 10/150
CONVERSIONS	Conversion to other hardness scales according to ASTM E140, ISO 18265, GB/T 1172

TEST FORCE

Force application	Servo drive, precision gearbox, motion & torque feedback system	
	Multi-load cell, closed loop, force feedback	
Test forces	500gf – 3000kgf	
Force range per model	NEMESIS 9800G2/A	500gf - 250kgf
	NEMESIS 9800G2/B	3kgf - 750kgf
	NEMESIS 9800G2/C	5kgf - 3000kgf
Optional force ranges	OPTION 1	500gf - 3kgf
	OPTION 2	500gf - 5kgf
Test force tolerance	< 0.25% for test force 100gf to 3000kgf	
	< 0.5% for test force below 100gf	

MOTORIZED TOOL CHANGER

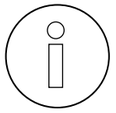


Dwell time settings	Default 10 seconds, user defined. Up to 999 seconds
Motorized tool changer (turret)	Ultra-fast, 9 position, 8 free to configure, 1 fixed
Free tool positions	8 for indenters, 8 for objectives (8 max total)
Fixed tool positions	1 for cross laser & touch probe
Objectives	Long working distance 0.7x, 2.5x, 5x, 10x, 20x
Indenters	Certified indenters (ISO/ASTM) available at choice
Camera 1 (objective)	18 Mpx, HD, 4K+, Machine vision system
Camera 2 (overview)	18 Mpx Full HD, Full Color, Optical zoom system, variable FOV 40 x 30mm - 140 x 110mm

SYSTEM

Electronic system Standard (Recommended)	High performance embedded controller, i7 mSSD, 120 GB MS Windows® 10 operated , up to 8 years* INNOVATEST warranty
Electronic system (Optional)	High performance external controller, i7 or i9 SSD, 1TB MS Windows® 10 operated, 1 year factory warranty
Screen(s)	22" capacitive touchscreen (portrait mode)
Display resolution	0.01 HV, HK, HB
Statistics	Total test, max, min, average, range, standard deviation, All in real time after each test
Hardness conversion	Rockwell, Rockwell Superficial, Vickers, Brinell, Knoop, Leeb & Tensile
Software	IMPRESSIONS™ V4, work flow system & tester control
Data storage capacity	Internal and external mSSD, SSD or HDD
Data output	XML, CSV, Certified for Q-DAS (optional)
Data input	Keyboard, touchscreen, barcode scanner, database
Connectivity	5 USB ports, 2x RJ45 Ethernet LAN, W-LAN, Blue Tooth, Dual HDMI screen connector
Printer	A4, A3 full color laser printer (optional)

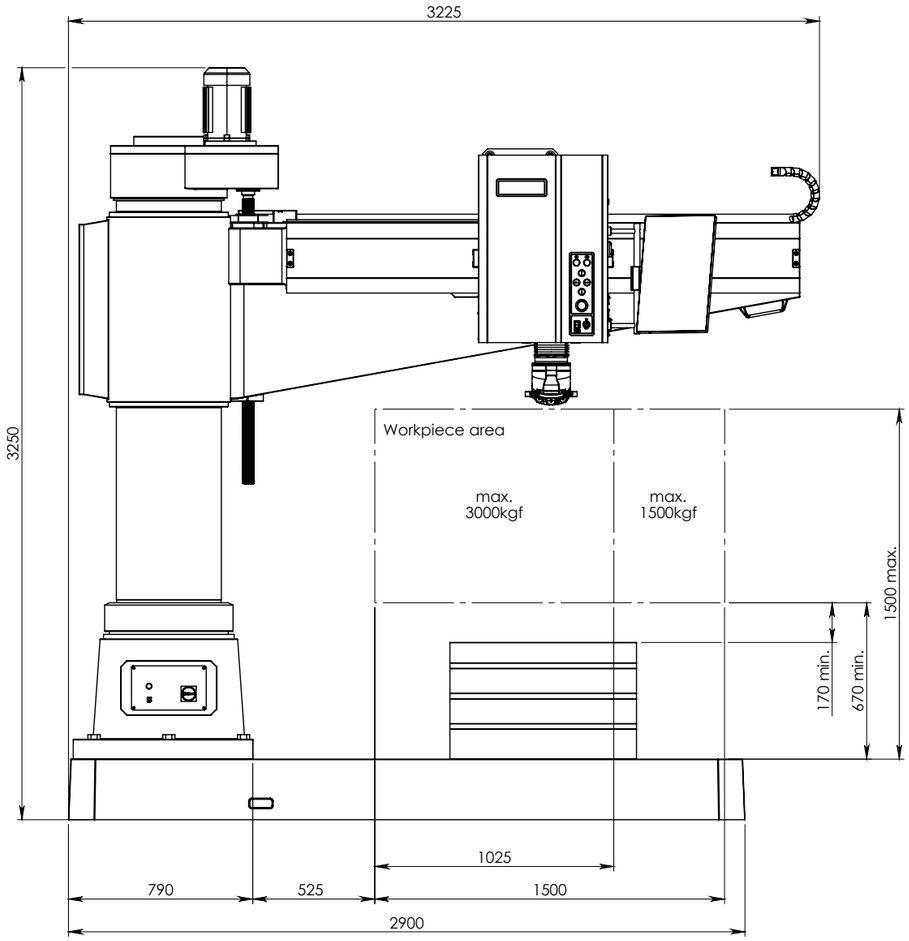
GENERAL

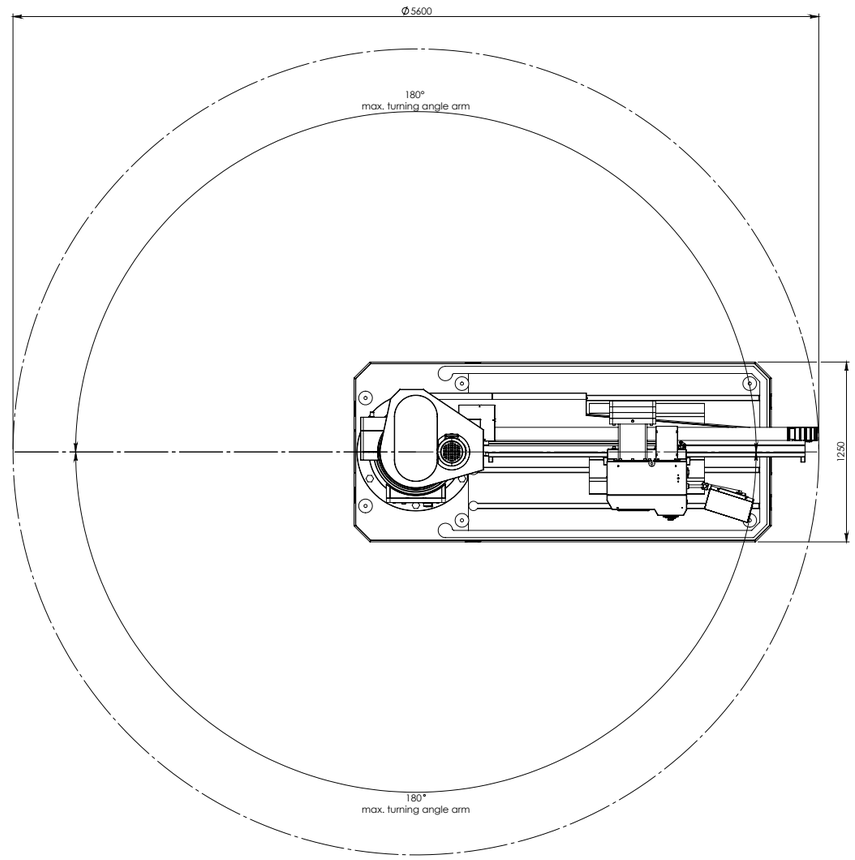


Machine dimension	3250mm x 3225mm x 1250mm
Machine weight	6000 kg
Workpiece accommodation	1500mm (H) x 1500mm (D)
Power supply	100VAC to 240VAC, 50/60Hz, single phase
Operating temperature	10°C to 35°C
Power consumption	2750W
Humidity	10% to 90%, non-condensing
Noise	< 80 db(A)

* Check individual warranty conditions

TECHNICAL DRAWINGS





All dimensions in these drawings are in mm, approximate. Working heights and or workpiece accommodation varies depending on the stages and stage accessories used.

Please contact our sales department for more details.

OTHER MODELS IN THE
UNIVERSAL RANGE

VERZUS 750U

Fully automatic, load cell, Closed loop, force feedback universal hardness tester with electronic micrometer or analogue eyepiece. IMPRESSIONS™ 8.5″ full color touchscreen.
See brochure B19V750U/XX

FENIX 300U

Load Cell, Closed loop, force feedback, test force application system Universal hardness tester with I-TOUCH™ system.
See brochure B20F300/XX

NEXUS 7700G2

Fully automatic, load cell, closed loop, force feedback universal hardness tester with full HD optical zoom stage overview camera, IMPRESSIONS™ 22″ full color touchscreen.
See brochure B23N7700G2/XX

NEXUS 8100

Heavy duty fully automatic, load cell, Closed loop, force feedback universal hardness tester with full HD optical zoom stage overview camera, IMPRESSIONS™ 15″ full color touchscreen.
See brochure B19N8100/XX

NEXUS 8100XL

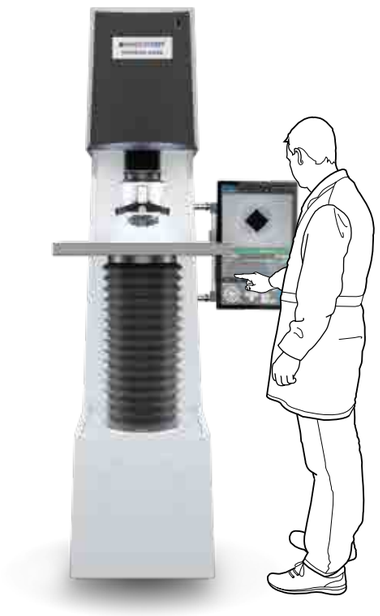
Heavy duty fully automatic, load cell, Closed loop, force feedback universal hardness tester with full HD optical zoom stage overview camera, IMPRESSIONS™ 15″ full color touchscreen.
See brochure B19N8100/XX

NEMESIS 5100G2

Multi load cell, Closed loop
Fully automatic, 8 position turret
Rockwell, Superficial Rockwell, Micro/Macro Vickers, Knoop & Brinell Hardness testers
Descending test head, 150 mm fixed work piece position.
See brochure B23N5100G2/XX

NEMESIS 9100G2

Multi load cell, Closed loop
Fully automatic, 8 position turret
Rockwell, Superficial Rockwell, Micro/Macro Vickers, Knoop & Brinell Hardness testers
Descending test head, 300 mm fixed work piece position.
See brochure B23N9100G2/XX



NEMESIS 9600

Heavy duty fully automatic, load cell, Closed loop, force feedback universal hardness tester with full HD optical zoom stage overview camera, IMPRESSIONS™ 15″ full color touchscreen.
See brochure B19N9600/XX

Changes in products and/or product specifications can emerge due to new technologies and continuous development.

We reserve the right to change or modify specifications of the products without prior notice. We recommend you to contact our sales office for up-to-date information.

Brochure B23N9800G2/02/EN

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