INNOVATEST®

Advanced Materials Testing Solutions

CATALOGUE

HARDNESS TESTING

2011

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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 products without prior notice.

We recommend you to contact our sales office for up-to-date information.

WWW.INNOVATEST-EUROPE.COM

COMPANY INFORMATION

Part of the INNOVATECH Holding, Group of companies, based in The Netherlands.

With its foundation laying in the 19th century (1890) INNOVATEST® has a rock solid position in the market of materials testing instruments, optical measuring equipment and general testing instruments such as surface roughness, wall thickness, vibration, and other portable testing equipment.
For the last 25 years, the owners have largely invested in the product tier Hardness Testing, while still keeping their focus on other product lines.

Commitment
With a wide range, - fit to any budget -, offering both traditional and state-of-the-art testing instruments, INNOVATEST® is one of the market leaders in hardness testing solutions.

Committed to solve your testing problem and not just selling products:

- *Solution driven*
- *High quality standard*
- *Traditional and state-of-the art technology*
- *Solutions & technology that fit your budget*
- *Global sales network*
- *Global service capabilities*
- *Superior guarantee system*

Development
A significant part of our revenues combined with European and local government funding are continuously invested in new product development. With our eyes firmly focused on the future, we are committed to advance and innovate our product line, in order to be a competent market player, offering our customers reliable, "fit for purpose" technology and affordable service and support.

The new NEXUS™ series of Load Cell Closed Loop hardness testers are just a first step towards implementing new technologies. The new NEMESIS 9000™ range of hardness testers, being introduced in this catalogue, will change the way we look at hardness testing for ever.

New machine vision systems will complete hardness testing technology, while new materials offer the possibility to develop more advanced multifunction equipment.

Laboratory investments
We do not just sell products. We offer solid testing solutions based upon proper research and technology.

In cooperation with our partners and specialists in sample preparation equipment, we now offer the services of a fully equipped laboratory to prepare microscopic and hardness testing samples.

This allows us to advise you even better on how to prepare your specific sample and recommend the most suitable testing procedure.

A unique service for you, our customer, who likes to have advice on the correct sample preparation and best recommended hardness tester, for your particular components.

Service and calibration
We have confidence in our products. Therefore we offer a limited guarantee of 2 years or longer on all our products. All products are supplied with a quality and guarantee certificate and a service passport.
Our modern workshops and professional technical staff offer service on demand, at any time and at any location in the world. First line, local after sales service and support.

Product portfolio
INNOVATEST® develops & manufactures hardness testing instruments, accessories and machine vision systems as well as tester automation. The company further supplies a range of optical instruments such as microscopes, profile projectors, vision measuring systems, roughness testers, wall thickness testers, coating thickness gauges, vibration meters and other quality assurance instruments.

Our goal is to bring you confidence and to reach absolute customer satisfaction by offering high quality affordable instruments and an ever lasting service.

We welcome you to challenge us.

R.H.J.M. Engbersen
Managing Director
Chief Executive Officer

HARDNESS TESTING

HARDNESS

Hardness is the property of a material enabling it to resist plastic deformation, usually by penetration of another object.

The term "hardness" may also refer to stiffness, temper or resistance to bending, scratching, abrasion or cutting.

Scientists and journalists often confuse stiffness with hardness. This however is incorrect. Osmium (platinum family) is stiffer than diamond but not as hard as diamond.

In materials science there are three principal operational definitions of hardness:

- **Scratch hardness:**
  Resistance to fracture or plastic (permanent) deformation due to friction from a sharp object
- **Indentation hardness:**
  Resistance to plastic (permanent) deformation due to a constant load from a sharp object
- **Rebound hardness:**
  Height or speed of the bounce of an object dropped on the material, related to elasticity

MEASURING HARDNESS

Hardness is not an intrinsic material property. There are no precise definitions in terms of fundamental units of mass, length and time. A hardness property value is the result of a defined measurement procedure.
Hardness of materials has probably long been assessed by resistance to scratching or cutting. An example would be material B scratches material C, but not material A.
Alternatively, material A scratches material B slightly and scratches material C heavily.

The usual method to obtain a hardness value is to measure the depth or area of an indentation left by an indentor of a specific shape, with a specific force applied for a specific time. There are several principal standard test methods to express the relationship between hardness and the size of the impression or the rebound velocity on specific materials. Vickers, Rockwell, Brinell and Leeb are the most common scales. For practical and calibration reasons, each of these methods is divided into a range of scales, defined by a combination of applied load and indentor geometry or in case of the rebound method, by the weight of the impact body.

MOST COMMON HARDNESS TESTS

Rockwell (HR scales)
Indenting the test material with a diamond cone (HRC) or hardened (tungsten) steel ball indentor (HRB etc.) applying a preload of 10kgf first and a main test force of 60, 100, or 150kgf.

Rockwell Superficial (HR scales)
Indenting the test material with a diamond cone or hardened (tungsten) steel ball indentor, depending on the scale preliminary set. The Superficial Rockwell scales use lower force and shallower impressions on brittle and very thin materials. Applying a preload of 3kgf first and a main test force of 15, 30, or 45kgf.

Vickers (HV)
Indenting the test material with a diamond indentor, in the form of an upside down perfect pyramid with a square base and an angle of 136 degrees between opposite faces, subjected to test forces of 1 to 120kgf.
A microscope or USB camera is used to visualize and measure the indentation.

Micro-Vickers (HV)
Indenting the test material with a diamond indentor, in the form of an upside down perfect pyramid with a square base and an angle of 136 degrees between opposite faces, subjected to test forces usually not exceeding 1kgf.
A precision microscope or high resolution USB camera is used to visualize and measure the indentations, magnifications up to 600x are most common. However, magnifications up to 1000x are becoming popular as well.

HARDNESS TESTING

Knoop (HK)
Indenting the test material with a "elongated" diamond pyramid, subjected to test forces usually not exceeding 1kgf. A precision microscope or high resolution USB camera is used to visualize and measure the indentations, magnifications up to 600x are most common.

Brinell (HB)
Indenting the to be tested material with a 1, 2.5, 5, or 10mm diameter hardened steel or carbide ball subjected to a load/force ranging from 1 to 3000kg. A microscope or USB camera is used to visualize and measure the rather large indentations.

Leeb (HL) (rebound method)
Portable hardness testing. An impact body which has a spherical tungsten carbide tip, is impelled onto the test surface by spring force. The impact creates a plastic deformation of the surface, an indentation, due to which the impact body loses part of its original speed (or energy). Consequently, the softer the material is, the more speed will be lost at rebound of the impact body. Applicable for a wide variety of components, minimum test requirements should be obeyed.

Ultrasonic (UCI)
Portable hardness testing. A Vickers shaped diamond indentor fixed on a vibrating rod that presses on the test surface with a specific force and then measures its hardness by applying ultrasonic vibrations and analyzing its damping effect. Commonly used for small, thin components that cannot be tested by rebound hardness testers.

Shore (HS scales)
Portable (rubber/plastics) hardness testing. The hardness value is determined by pressing the indentor foot firmly onto the sample. The indentor is connected to a linear measuring device and measures the indent depth which is then converted through a mechanical or an electronical system to the Shore value. The deeper the indent, the softer the material.

IRHD
Measures the indentation resistance of elastomeric or rubber materials based on the depth of penetration of a ball indentor. An initial contact force is applied to a 1, 2.5 or 5mm ball indentor and the penetration is set to zero. The force is increased to a specified total load and the depth of the penetration is measured. The IRHD value is related to the depth of indentor penetration. The method is commonly used for testing small parts and O-rings.

Webster
Portable hardness testing. The object to be tested is placed between the anvil and the penetrator. Pressure is then applied to the handles until "bottom" is felt, at which time the dial indicator is read. There are different types of indentors and different force settings for different materials.

Less common hardness scales
The following hardness methods are less frequently used or superseded by other methods:

- HM - Martens (instrumented indentation testing, formerly HU – universal hardness)
- H - ball indentation hardness
- HVT - modified Vickers method, depth measurement
- HBT - modified Brinell method, depth measurement
- BARCOL – impression hardness

SERVICE

Installation of your tester
Rest assure with a proper installation.
INNOVATEST® engineers have installed hundreds of hardness testers worldwide. Against reasonable costs, you can count on our expertise to make the installation of your valuable tester a success.

Our engineering team is equipped with load cells and test materials traceable to international standards. The final check list and final testing will be done in your presence, ensuring you of a good working machine, properly installed and meeting its all over specifications when our engineers leave.

Relocation of your equipment
Hardness testing instruments are sensitive equipment. They need to be installed on a solid table, in a vibration free environment. After installation, hardness testers cannot just be relocated to another area without taking proper precautions. Our experienced engineering team can advise you on how to move your tester or better, take care of the detailed planning, transport preparation, reinstalling, calibration and certification of your tester.

Product training, user interface & test sample familiarization
We offer training packages for each of our instruments in our well equipped training center. A one or two days course can be done directly after the installation of your equipment (on location). Alternatively, it is also possible to do a full training at our facilities in The Netherlands.

Our training center has a full sample preparation laboratory which might help you to understand the requirements of test sample preparation in a more professional way.

Support Desk
If you are in need of any immediate advice or assistance with regards to your tester, contact the INNOVATEST® support desk at +31-43-3520060. In many cases, the support desk can offer a better solution than a visit of our engineers.

Our service staff can reply your possible problem fast and effectively.

SERVICE

Firmware customizing
In the early stage of your interest in our testers, our sales team will gather the required information to offer a product adapted to your individual requirements. Do not hesitate and ask for customized solutions on both software and hardware. In close cooperation with our customers we will develop and supply the right configuration for your job.

Mechanical customizing
INNOVATEST® has developed many customized testers for particular situations such as testing of components under pressure, or at high or low temperatures. But also specific fixtures can be created to hold your sample perfectly in position.

Our testers can be equipped with motorized spindles, rotary tables, inclination systems, while workpiece positioning by robots are nowadays common requests.

Maintenance & repair
Reduce your possible down time risk. INNOVATEST® Service is available to do a regular check and standard maintenance on any of our testers regardless of the location. Regular service avoids unpleasant surprises.

At the same time our staff will update any standard firmware, if updates are available, free of charge. If in spite of regular service and good maintenance a tester is faulty, you can count on our service staff to be available at your request.
(See also our general sales conditions).

Calibration
Count on the broad experience of the INNOVATEST® service personnel for yearly calibration of your hardness testing machines.

Reference measuring equipment traceable to international standards such as UKAS, COFRAC or DKD. Our calibration, which includes possibly required adjusting, assures reliable testing results.

ALL PORTABLE INSTRUMENTS ARE COVERED BY A 3 YEARS FREE CALIBRATION SERVICE.

Simple procedure; return your instrument to INNOVATEST Europe BV and receive it back in 5 working days with a new, 12 months factory, UKAS traceable, calibration certificate. No doubts, be certain on your measurements!

Rental equipment
In many occasions INNOVATEST® will be able to offer you rental equipment if a short or long term lease will be more attractive than buying.

In particular we offer rental options for a wide range of portable instruments or leasing options for a wide range of bench hardness testers.
Ask our sales department for rates and arrangements.

CALIBRATION

All instruments in this catalogue are calibrated to ISO/EN/DIN, ASTM or factory standards.
INNOVATEST® supplies each hardness tester with a traceable calibration certificate.

Hereunder follows a part of the list of the participating organizations in the multilateral agreement WECC dated December the 1st 1989 and the respective brands showing on the calibration certificate of each individual organization.

The purpose of the harmonization of all local standards is to create a cross border platform of quality standards with no need to apply for new certificates in the other participating countries if issued by one of the member countries.

Belgium
FOD Economie, K.M.O., Middenstand en Energie

Algemene Directie Kwaliteit en Veiligheid
WTC III - 5th floor
Simon Bolivarlaan 30
1000 Brussels, Belgium
Tel. : + 32 2 277 54 34
Fax : + 32 2 277 54 41
E-mail: belac@economie.fgov.be
Web : belac.fgov.be

Denmark
Danish Accreditation and Metrology fund (DANAK)

DANAK
Dyregårdsvej 5 B
2740 Skovlunde, Denmark
Tel: +45 77 33 95 00
Fax : +45 77 33 95 01
E-mail: danak@danak.dk
Web: webtool.danak.dk

Finland
Finnish Accreditation Service (FINAS)

Finnish Accreditation Service (FINAS)
Tekniikantie 1, P.O. Box 9
FI-02151 Espoo, Finland
Tel: +358 10 6054 000
Fax: +358 10 6054 399
E-mail: finas@finas.fi
Web: www.finas.fi

France
Comité Francais d'Accreditation (COFRAC)

COFRAC
37, rue de Lyon
FR-75012 Paris, France
Tel: +33 1 44 68 82 20
Fax: +33 1 44 68 82 21
Web: www.cofrac.fr

Germany
Deutscher Kalibrierdienst (DKD)
(German Calibration Service)

Deutscher Kalibrierdienst Akkreditierungsstelle
Bundesallee 100, D-38116
Braunschweig, Germany
Tel: +49 531 592 1901
Fax: +49 531 592 1905
E-mail: info@dkd.eu
Web: www.dkd.eu

Ireland
National Accreditation Board (INAB)

National Accreditation Board (INAB)
Wilton Park House, Wilton Place
IE-Dublin 2, Ireland
Tel: +353 (0)1 6073003
Fax: +353 (0)1 6073109
E-mail: inab@inab.ie
Web: www.inab.ie

CALIBRATION

Italy
Servizio di Taratura in Italia (SIT)
(Italian Calibration Service)

Comitato del SIT, C/-IEN
Strada delle Cacce, 73
IT-10135 Torino, Italy
Tel: +39 11 3919 729
Fax: +39 11 3919 372
E-mail: segreteria@sit-italia.it
Web: www.sit-italia.it

The Netherlands
Raad voor Accreditatie (RvA)
(Dutch Council for Accreditation)

Raad voor Accreditatie
P.O. Box 2768, NL-3500 GT
Utrecht, The Netherlands
Tel: +31 30 239 4500
Fax: +31 30 239 4539
E-mail: postmaster@rva.nl
Web: www.rva.nl/home

Norway
Norwegian Accreditation (NA)

Norwegian Accreditation
Fetveien 99
N-2007 Kjeller, Norway
Tel: +47 64 848600
Fax: +47 64 848601
E-mail: akkreditert@akkreditert.no
Web: www.akkreditert.no

Poland
Polish Centre for Accreditation (PCA)

Polish Centre for Accreditation (PCA)
Szczotkarska 42 str.
01-382 Warsaw, Poland
Tel: +48 22 355 7000
Fax: +48 22 355 7018
E-mail: sekretariat@pca.gov.pl
Web: www.pca.gov.pl

United Kingdom
United Kingdom Accreditation Service
(UKAS)

Technical Enquiries Office UKAS
21-47 High Street, Feltham
Middlesex TW13 4UN, England
Tel: +44 20 89178400
Fax: +44 20 8917 8500
E-mail: info@ukas.com
Web: www.ukas.com

Spain
Entidad Nacional de Acreditación
(ENAC)

ENAC
Serrano, 240, 3°
ES-28016 Madrid, Spain
Tel: +34 91 457 3289
Fax: +34 91 458 6280
E-mail: enac@enac.es
Web: www.enac.es

Sweden
The Swedish Board for Accreditation
and Conformity Assessment (SWEDAC)

SWEDAC
Box 878
SE-501 15 Borås, Sweden
Tel: +46 33 177700
Fax: +46 33 101392
E-mail: info@swedac.se
Web: www.swedac.se

Switzerland
Swiss Accreditation Service (SAS)

Swiss Accreditation Service (SAS)
Lindenweg 50
CH-3003 Bern-Wabern, Switzerland
Tel: +41 31 32 33 511
Fax: +41 31 32 33 510
E-mail: sasmaster@sas.ch
Web: www.seco.admin.ch

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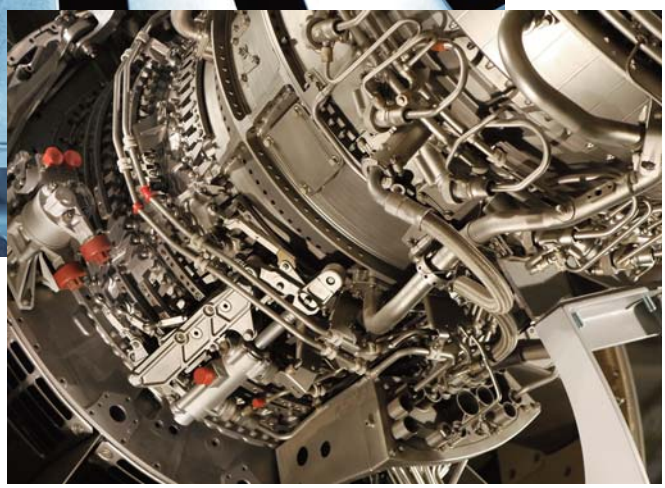

''Being certain'',...not a luxury!

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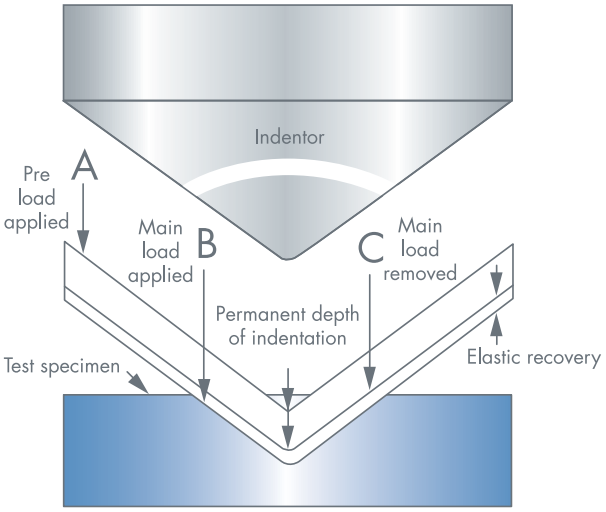
ROCKWELL HARDNESS TESTERS

90 YEARS OF ROCKWELL TESTING HISTORY

The Rockwell Hardness test is a hardness measurement based on the net increase in depth of impression when a load is applied. Hardness values are commonly given in the A, B, C, R, L, M, E and K scales. The higher the value in each of the scales, the harder the material.

Hardness has been variously defined as resistance to local penetration, scratching, machining, wear or abrasion. In the Rockwell method of hardness testing, the depth of penetration of an indentor under certain arbitrary test conditions is determined. The indentor may either be a steel (carbide) ball of some specified diameter or a spherical diamond-tipped cone of 118° angle and 0.2mm tip radius also called indentor. The type of indentor and the test load determine the hardness scale (A, B, C, etc.)

A minor load of 3kg or 10kg is first applied, causing an initial penetration and holding the indentor in place. Then, the dial is set to zero and the major load is applied. Upon removal of the major load, the depth reading is taken while the minor load is still on. The hardness number may then be read directly from the scale.



The Rockwell scale characterizes the indentation hardness of materials through the depth of penetration of an indentor, loaded on a material sample and compared to the penetration in some reference material. It is one of several definitions of hardness in materials science. Its hardness values are noted by HR'X' is the letter for the scale used. Hardness relation to strength is that both are measures of the pressure it takes to get plastic deformation to occur in materials.

The Rockwell hardness test was devised by metallurgist Stanley P. Rockwell in Syracuse, NY, around 1919, in order to quickly determine the effects of heat treatment on steel bearing races. The Brinell hardness test, invented in 1900 in Sweden, was slow, not useful on fully hardened steel, and left too large impressions to be considered non-destructive. Rockwell collaborated with an instrument manufacturer to commercialize his invention and develop standardized testing machines.

Operation

The determination of the Rockwell hardness of a material involves the application of a minor load followed by a major load, and then noting the depth of penetration, converted to a hardness value directly from a dial or display, in which a harder material gives a higher number. The major advantage of Rockwell hardness is its ability to display hardness values directly, thus obviating tedious calculations involved in other hardness measurement techniques. Also, the relatively simple and inexpensive set-up enables installation under various conditions.

Rockwell testers are typically used in engineering, metallurgy and industrial environments. The commercial popularity arises from its speed, reliability, robustness, resolution and small area of indentation.

Good practices

Cleaning indentor and test-piece to be clear of dirt, grease, rust or paint. Measuring on a perpendicular, flat surface (round work correction factors are invoked to adjust for test-piece curvature). Ensuring that the thickness of the test-piece is at least 10 times the depth of the indentation. Maintaining an adequate spacing between multiple indentations. Controlling the speed of indentation and assuring that the load duration (dwell)time is applied correctly.

Scales and values

The most common used are the "C", and "B" scales. Both express hardness as an arbitrary dimensionless number.

The B-scale is used for softer materials (such as aluminum, brass, and softer steels). It employs a tungsten carbide ball as the indentor and a 100-kg weight to obtain a value expressed as "HRB".

The C-scale, for harder materials, uses a diamond cone and a 150-kg weight to obtain a value expressed as "HRC". There are several alternative scales for other purposes.

ROCKWELL HARDNESS TESTERS

The superficial Rockwell scales use lower loads and shallower impressions on brittle and very thin materials. The 45N scale employs a 45-kg load on a diamond cone-shaped Brale indentor, and can be used on dense ceramics. The 15T scale employs a 15-kg load on a 1/16-inch diameter hardened steel ball, and can be used on sheet metal. Readings below HRC 20 are generally considered unreliable, as are readings much above HRB 100.

Typical values
Very hard steel (e.g. a good knife blade):
HRC 55 - HRC 62 Axes, chisels, etc.: HRC 40 - 45
Several other scales, including the extensive A-scale, are used for specialized applications. There are special scales for measuring case-hardened specimens.

ASTM standards
- **E18-07** Rockwell hardness and Rockwell Superficial hardness of metallic materials

EN-ISO standards
- **6508-1** Rockwell hardness and Rockwell Superficial hardness of metallic materials

Traditional dead weight versus force feedback load cell testers
Traditional hardness testers apply test force through a mechanical system of levers & weights. The required weights can usually be selected by turning a selector knob. The system of weights is complex and may cause load application problems or tester uncertainty.

New technology, making use of highly accurate load cells and state of the art amplifier and filter technology, have reduced 70% of the parts in so called Closed Loop hardness testers. Basically, a motor applies direct force to the load actuator. The indentor which is mounted on the load cell (force sensor) gives feed back to the computer, which on its turn adjusts the force applied load application motor. All of this in just a fraction of a second. Fast, secure and highly accurate.

INNOVATEST® load cell, closed loop, force feedback Rockwell hardness testers provide a computer controlled load application system that assures superior GR&R results at an unmatched testing cylce speed.

ROCKWELL HARDNESS TESTERS — VALUE LINE

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600A

Rockwell
- Manually operated
- Analogue
- Scales A, B, C and F

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600MA

Rockwell
- Motorized
- Semi automatic
- Analogue
- Scales A, B, C and F

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600MA/S

Rockwell Superficial
- Motorized
- Semi automatic
- Analogue
- Scales HRT and HRN

Analogue indicator

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600BD

Rockwell
- Manually operated
- Digital, LCD display
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V

Page 18

600MBD

Rockwell
- Motorized
- Semi automatic
- Digital, LCD display
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V

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600MBD/S

Rockwell Superficial
- Motorized
- Semi automatic
- Digital, LCD display
- Scales HRN, HRT, HRX and HRY

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Basic digital indicator

ROCKWELL HARDNESS TESTERS — VALUE LINE

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600BDL

Rockwell
- Manually operated
- Digital, OLED display
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V
- Full color display
- Conversion to Vickers, Brinell and other Rockwell scales
- On-line statistics
- USB/RS-232 output

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600MBDL

Rockwell
- Motorized
- Automatic
- Digital, OLED display
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V
- Full color display
- Conversion to Vickers, Brinell and other Rockwell scales
- On-line statistics
- USB/RS-232 output

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600MBDL/S

Rockwell Superficial
- Motorized
- Automatic
- Digital, OLED display
- Scales HRN, HRT, HRX and HRY
- Full color display
- Conversion to Vickers, Brinell and other Rockwell scales
- On-line statistics
- USB/RS-232 output

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Advanced digital indicator

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600D

Rockwell
- Motorized
- Automatic
- Digital, large LCD
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V
- Large LCD display
- Conversion to Vickers, Brinell and other Rockwell scales
- On-line statistics
- USB/RS-232 output

ROCKWELL HARDNESS TESTERS — HIGH END LINE

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655

Rockwell
- Digital, touch screen
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V
- Motorized
- Automatic
- Conversion to all other hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output

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656

Rockwell
- Digital, touch screen
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V
- Motorized
- Automatic
- Automatic load selector
- Conversion to all o her hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output

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657

Rockwell
- Digital, touch screen
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S and V
- Motorized
- Fully automatic, auto trip, auto workpiece detection, auto testing
- Conversion to all other hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output
- Automatic load selector
- Motorized spindle

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675

Rockwell & Superficial Rockwell
- Digital, touch screen
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S & V, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Motorized
- Automatic
- Conversion to all other hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output

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676

Rockwell & Superficial Rockwell
- Digital, touch screen
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S & V, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Motorized
- Automatic
- Automatic load selector
- Conversion to all o her hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output

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Rockwell & Superficial Rockwell
- Digital, touch screen
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S & V, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Motorized
- Fully automatic, auto trip, auto workpiece detection, auto testing
- Conversion to all other hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output
- Automatic load selector
- Motorized spindle

ROCKWELL HARDNESS TESTERS — HIGH END LOAD CELL LINE

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NEXUS 6001

Rockwell & Superficial Rockwell

- Load cell, closed loop
- Advanced user interface
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Motorized testing head, fixed workpiece position
- Automatic trip and testing procedure
- Conversion to all other hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output

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NEXUS 6000 MASTER

Rockwell & Superficial Rockwell

- Enhanced accuracy, suitable as standardized hardness tester
- Load cell, closed loop
- Advanced user interface
- Scales A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
- Motorized testing head, fixed workpiece position
- Automatic trip and testing procedure
- Conversion to all o her hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output

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NEXUS 6100 MICRO-ROCKWELL

Rockwell

- Load cell, closed loop
- Advanced user interface
- Scales Vickers, Knoop, HRC, HRA, HRB and WMN (converted)
- Test loads: 50gr, 100gr preload, 500gr, 1000gr main load
- Motorized testing head, fixed workpiece position
- Automatic trip and testing procedure
- Conversion to all other hardness scales
- Large workpiece accommodation
- On-line statistics
- USB/RS-232 output

Page 30

NEXUS 6000 AUTOMIZED

Rockwell, Superficial Rockwell, Master Rockwell, Micro Rockwell

- All models can be supplied with a variety of accessories and motorized X-Y stages
- All models can be supplied with a turret for 3 indentors
- A variety of large worktables available.

ROCKWELL HARDNESS TESTERS, ANALOGUE 600A/MA/MAS

600A
MANUALLY OPERATED

600MA
MOTORIZED

600MA/S
MOTORIZED SUPERFICIAL

FEATURES

- Basic regular Rockwell type tester (600A/MA) and Superficial Rockwell type tester (600MA/S) offering accuracy, reliability and durability at an extremely affordable price
- Rugged construction, will stand up to the harshest environments
- Direct reading of Rockwell scales HRC, B, A, F or Superficial: HRT, HRN
- Accuracy conforms to EN-ISO 6508 and ASTM E-18
- Easy load force selection by robust dial knob
- Oil brake with variable damping by adjustable knob
- Large capacity to accommodate large test specimen
- Electronic control of load duration (dwell time) (600MA & 600MA/S)
- Motorized testing procedure (600MA & 600MA/S)
- Standard delivery including accessories ready for testing all scales

TECHNICAL SPECIFICATIONS

Rockwell scales	
Standard	A, B, C, F (600A/600MA)
Superficial	HRT, HRN (600MA/S)
Hardness resolution	1 of a Rockwell unit
Test loads	
Rockwell	10kgf preload / 60, 100, 150kgf main load
Superficial Rockwell	3kgf preload / 15, 30, 45kgf main load
Display	Dial indicator
Test force application	By force lever (600A)
Test cycle	Motorized (preload applied manually)
Load duration	Manually set via oil damper
Dwell time	2-99 sec (1 sec. step) (600MA/S)
Data output	Non
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Specimen accommodation	Vertical space 170mm (6.7") Horizontal space (from center-line) 165mm (6.5")
Specimen access	External surfaces
Power supply	Non (600A), 220V 50Hz (600MA & 600MA/S)
Machine dimensions	150mm x 485mm x 700mm (WxDxH)
Machine weight	Approx. 85kg

ORDER DETAILS

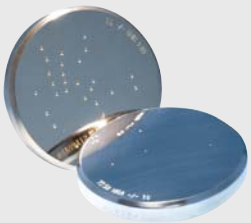
600A Analogue hand-operated
600MA Analogue motorized
600MA/S Analogue motorized Superficial scales only

STANDARD DELIVERY

- Rockwell ball indentor 1/16"
- Diamond Rockwell indentor
- Spare lamps 6V - 12W (2 pcs) (600MA/S)
- Hardness test block ±60HRC
- Hardness test block ±25HRC
- Hardness test block ±85HRB
- Spare balls 1/16" (5 pcs)
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Power cable (600MA/S)
- Fuse 0.5A (2 pcs) (600MA/S)
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- INNOVATEST® certificate
- Installation & user manual

OPTIONAL ACCESSORIES

- Reference hardness blocks
- Certified indentors & balls
- Clamping protection nose
- Pedestal spot anvil ø10mm



ROCKWELL HARDNESS TESTERS, BASIC DIGITAL 600BD/MBD/MBDS

600BD
MANUALLY OPERATED

600MBD
MOTORIZED

600MBD/S
MOTORIZED SUPERFICIAL

FEATURES

- Basic digital regular Rockwell type tester (600BD/MBD) and Superficial Rockwell type tester (600MBD/S) offering accuracy, reliability and durability at an extremely affordable price
- Rugged construction, will stand up to the harshest environments
- Direct reading of Rockwell scales HRA, B, C, D, E, F, G, K, L, M, P, R, V (600BD/600MBD)
  Superficial: HRN, T, W, X and Y (600MBD/S)
- Accuracy conforms to EN-ISO 6508 and ASTM E-18
- Easy load force selection by robust dial knob
- Oil brake with variable damping by adjustable knob
- Large capacity to accommodate large test specimen
- Selectable control of load duration (dwell time)
- Motorized testing procedure (600MBD & 600MBD/S)
- Rugged construction, will stand up to the harshest environments
- Standard delivery including accessories ready for testing all scales

TECHNICAL SPECIFICATIONS

Rockwell scales	
Standard	A,B,C,D,E,F,G,K,L,M,P,R,V (600BD/600MBD)
Superficial	HRN, T, W, X & Y (600MBD/S)
Hardness resolution	0.1 of a Rockwell unit
Test loads	
Rockwell	10kgf preload /60, 100, 150kgf main load
Superficial Rockwell	3kgf preload /15, 30, 45kgf main load
Display	Dial indicator
Test force application	By force lever (600BD) Motorized load system (600MBD & 600MBD/S)
Test cycle	Manual (600BD); Motorized (preload applied manually) (600MBD & 600MBD/S)
Load duration	Manually, following display indication (600BD), Automatic (600MBD & 600MBD/S)
Dwell time	0-99 sec (1 sec. step)
Measuring protocol	ISO / ASTM / JIS
Indications on display	Progress bar for preload, preload applied, main load applied, dwell time, invalid reading, invalid measurement, invalid procedure, Rockwell value, scale applied
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Specimen accommodation	Vertical space 170mm (6.7") Horizontal space (from center-line) 165mm (6.5")
Specimen access	External surfaces
Power supply	Input 110/220Volt 50/60Hz
Machine dimensions	150mm x 485mm x 700mm (WxDxH)
Machine weight	Approx. 85kg

ORDER DETAILS

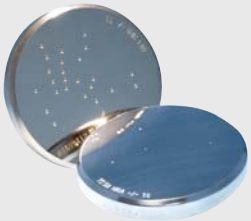
600BD Basic digital manual
600MBD Basic digital motorized
600MBD/S Basic digital motorized, Superficial scales only

STANDARD DELIVERY

- Diamond Rockwell indentor
- Rockwell ball indentor 1/16"
- Spare lamps 6V - 12W (2 pcs) (600MBD/S)
- Hardness test block ±60HRC
- Hardness test block ±25HRC
- Hardness test block ±85HRB
- Spare balls 1/16" (5 pcs)
- Flat anvil ø 60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Power cable
- Fuse 0.5A (2 pcs) (600MBD/S)
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- INNOVATEST® certificate
- Installation & user manual

OPTIONAL ACCESSORIES

- Reference hardness blocks
- Certified indentors & balls
- Clamping protection nose
- Pedestal spot anvil ø10mm



ROCKWELL HARDNESS TESTERS, ADVANCED DIGITAL 600BDL/MBDL/MBDLS

600BDL
MANUALLY OPERATED

600MBDL
MOTORIZED

600MBDL/S
MOTORIZED SUPERFICIAL

FEATURES

- Advanced regular Rockwell tester and offering accuracy, reliability and durability at an extremely affordable price
- All functions like BD/MBD series but equipped with OLED full color multi function display
- Additional advanced functions such as CONVERSION to Brinell, Vickers and all Rockwell scales. USB-2/RS-232 output, printer output for detailed measuring report, Go/No Go limit settings, 9999 memory positions, PROGRAM mode stores 50 test program settings, shape correction setting, full statistics. See also page 36 for more details
- Direct reading of Rockwell scales HRA, B, C, D, E, F, G, K, L, M, P, R, V (HRN, T, W, X & Y 600MBDL/S)
- Accuracy conforms to EN-ISO 6508 and ASTM E-18
- Easy load force selection by robust dial knob
- Oil brake with variable damping by adjustable knob
- Large capacity to accommodate large test specimen
- Selectable control of load duration (dwell time)
- Motorized testing procedure (600MBDL)
- Rugged construction, will stand up to the harshest environments
- Standard delivery including accessories ready for testing all scales

TECHNICAL SPECIFICATIONS

Rockwell scales	
Standard	A,B,C,D,E,F,G,K,L,M,P,R,V
Superficial	HRN, T, W, X & Y (600MBDL/S)
Hardness resolution	0.01 of a Rockwell unit
Test loads	
Rockwell	10kgf preload /60, 100, 150kgf main load
Superficial Rockwell	3kgf preload /15, 30, 45kgf main load
Display	Full color multi function indicator
Test force application	By force lever (600BDL) Motorized load system (600MBDL)
Test cycle	Manual (600BDL); Motorized (preload applied manually) (600MBDL)
Load duration	Manually, following display indication (600BDL); Automatic (600MBDL)
Dwell time	0-99 sec. (1 sec. step)
Measuring protocol	ISO / ASTM / JIS
Indications on display	Progress bar for preload, preload applied, main load applied, dwell time, invalid reading, invalid measurement, invalid procedure, Rockwell value, Go/No Go, shape correction, limits, program number, conversion scale, statistics, scale applied
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Specimen accommodation	Vertical space 170mm (6.7") Horizontal space (from center-line) 165mm (6.5")
Specimen access	External surfaces Cylindrical surfaces down to 3mm diameter
Data output	RS-232 and USB
Power supply	Input 110/220Volt 50/60Hz
Machine dimensions	150mm x 485mm x 700mm (WxDxH)
Machine weight	Approx. 85kg

ORDER DETAILS

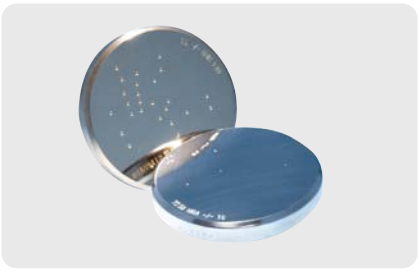
600BDL Digital manual with advanced functions
600MBDL Digital motorized with advanced functions
600MBDL/S Digital motorized with advanced functions
Superficial scales only

STANDARD DELIVERY

- Diamond Rockwell indentor
- Rockwell ball indentor 1/16"
- Hardness test block ±60HRC
- Hardness test block ±25HRC
- Hardness test block ±85HRB
- Spare balls 1/16" (5 pcs)
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Power cable
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- INNOVATEST® certificate
- Installation & user manual

OPTIONAL ACCESSORIES

- Reference hardness blocks
- Certified indentors & balls
- Clamping protection nose
- Pedestal spot anvil ø10mm



ROCKWELL HARDNESS TESTERS, DIGITAL LARGE SCREEN 600D

600D
MOTORIZED, LARGE LCD DISPLAY

FEATURES

- Digital LCD reading of 15 regular Rockwell scales
- Conversion to all other hardness scales such as Vickers and Brinell
- Menu operated LCD screen with many functions such as Go/No Go judgement, conversions, load cycle indication, date, time
- Integrated printer for test result and statistics
- RS-232 data output to Microsoft Hyperterminal, 'Win Wedge' etc
- Accuracy, reliability and durability at an extremely affordable price
- Rugged construction, will stand up to the harshest environments
- Accuracy conforms to EN-ISO 6508 and ASTM E-18
- Easy load force selection by robust dial knob
- Large working space accommodates also larger specimen
- Standard delivery including accessories ready for testing
- Electronic software calibration mode

TECHNICAL SPECIFICATIONS

Rockwell scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
Display conversion to	HV, HB, HR scales
Hardness resolution	0.1 of a Rockwell unit
Test loads	60, 100, 150kgf (10kgf preload)
LCD Display	Hardness value, Rockwell scale, test force indicator, dwell time, limits with tolerance check Go/No Go, number of tests, X-bar average, standard deviation, range R
Data entry	Membrane keypad
Test force application	Automatic main load application
Dwell time	4-99 sec
Data output	Built-in printer and RS-232C
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Specimen accommodation	Vertical space 170mm (6.7") Horizontal space (from center-line) 165mm (6.5")
Specimen access	External surfaces, Cylindrical surfaces down to 3mm diameter
Power supply	220/240V 50Hz
Machine dimensions	227mm x 516mm x 715mm (WxDxH)
Machine weight	85kg

ORDER DETAILS

600D Digital large display, advanced functions

STANDARD DELIVERY

- Built-in thermal printer
- Data-output RS-232C
- Diamond Rockwell indentor
- Rockwell ball indentor 1/16"
- Spare balls 1/16" (5 pcs)
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Hardness test blocks: ±60HRC, ±40HRC, ±85HRB
- Power cable
- Fuse 1A (2 pcs)
- Adjustable feet (4 pcs)
- Spindle protection cover
- Solid accessories case
- INNOVATEST® certificate
- Installation & users manual

OPTIONAL ACCESSORIES

- Reference hardness blocks
- Certified indentors & balls
- Clamping protection nose
- Pedestal spot anvil ø10mm

ROCKWELL HARDNESS TESTERS, REGULAR, TOUCH SCREEN 650 SERIES

655
MOTORIZED

656
AUTOMATIC LOAD SELECTOR

657
MOTORIZED SPINDLE, FULL AUTO

FEATURES

- Super rigid Rockwell hardness tester
- Simultaneous conversion to HV, HB and other HR scales
- Rugged fine casted frame with large workpiece accommodation
- ASTM, DIN-EN-ISO, JIS compliant
- Unique motorized load application system, auto selection of loads depending on HR scale (656 & 657 only)
- LCD touch screen, userinterface with user-friendly menu operation in multiple languages
- High speed: preload, loading and unloading procedure for ultra high efficiency
- Motorized elevating screw simplifies and speeds up test operation (657 only)
- Fully automatic positioning, trip and measurement procedure: trip, preload, mainload, dwell, unload (657 only)
- Storage of 50 test programs and tester settings, allowing you to set up your tester in just seconds
- Continuous automatic "online" statistics, incl. average of readings, standard deviation, etc.
- Storage of 20,000 single hardness values
- Go/No Go mode, convex and concave measuring mode
- Prints statistics to built-in printer or external printer
- Data output directly to MS Office applications such as Word and Excel
- Connects with PC or SPC network via built-in bi-directional USB2 connector

TECHNICAL SPECIFICATIONS

Rockwell scales	A, B, C, D, E, F, G, K, L, M, P, R, V
Conversion to	HV, HB, other HR scales
Hardness resolution	0.05 of a Rockwell unit
Pre-load	10kgf
Main loads	60, 100, 150kg
Pre-load application	Manual (automatic for 657)
Test load application	Fully automatic
Unload	Automatic for 657
Accuracy	Conforms to EN-ISO 6508 and ASTM E-18
Data output	Built-in high speed printer & USB2
LCD Display	Industrial touch screen showing hardness value, conversion value, test force, progress bar, dwell time, memory contents, all machine settings, Go/No Go, all statistics
Specimen accommodation	Vertical space 275mm; Horizontal space (from elevator spindle center) 190mm
Power supply	110/240V, 50 – 60Hz
Machine dimensions	Approx. 940mm x 390mm x 670mm (HxWxD)
Machine weight	Approx. 140kg

OPTIONAL JOMINY & X-Y STAGES

Motorized stages for jominy or coordinate pattern testing on the 657. Fully automatic systems with database structures.
IMPRESSIONS™ INNOVATEST® leading hardness testing software.

ORDER DETAILS

655 Touch-screen, twin scale, motorized
656 Touch-screen, twin scale, motorized, motorized load selector
657 Touch-screen, twin scale, as 656 plus motorized spindle

STANDARD DELIVERY

- Built-in printer
- Data-output USB2 and RS-232C
- Diamond Rockwell indentor
- Rockwell ball indentor 1/16”
- Rockwell testing balls
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Hardness test blocks: ±60 HRC, ±40 HRC, ±85 HRB
- Power cable
- Spare fuse
- Adjustable feet (4 Pcs)
- Spindle protection cover
- Machine cover
- Solid accessories case
- INNOVATEST® certificate
- User and installation manual

OPTIONAL ACCESSORIES

- Reference hardness blocks
- Certified indentors & balls
- Clamping and indentor protection nose
- Pedestal spot anvil
- Special support systems for large workpieces
- Tester stand with cabinet

ROCKWELL HARDNESS TESTERS, TWIN, TOUCH SCREEN 670 SERIES

675
MOTORIZED

676
AUTOMATIC LOAD SELECTOR

677
MOTORIZED SPINDLE, FULL AUTO

FEATURES

- Rockwell & Superficial Rockwell hardness tester
- Simultaneous conversion to HV, HB and other HR scales
- Rugged fine casted frame with large workpiece accommodation
- ASTM, DIN-EN-ISO, JIS compliant
- Unique motorized load application system, auto selection of loads depending on HR scale (676 & 677 only)
- LCD touch screen, user interface with user-friendly menu operation in multiple languages
- High speed: preload, loading and unloading procedure for ultra high efficiency
- Motorized elevating screw simplifies and speeds up test operation (677 only)
- Fully automatic positioning, trip and measurement procedure: trip, preload, mainload, dwell, unload (677 only)
- Storage of 50 test programs and tester settings, allowing you to set up your tester in just seconds
- Continuous automatic "online" statistics, incl. average of readings, standard deviation, etc.
- Storage of 20,000 single hardness values
- Go/No Go mode, convex and concave measuring mode
- Prints statistics to built-in printer or external printer
- Data output directly to MS Office applications such as Word and Excel
- Connects with PC or SPC network via built-in bi-directional USB2 connector

TECHNICAL SPECIFICATIONS

Rockwell scales	
Standard	A, B, C, D, E, F, G, K, L, M, P, R, V
Superficial	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Conversion to	HV, HB, other HR scales
Hardness resolution	0.05 of a Rockwell unit
Pre-load	3kgf / 10kgf
Main loads	15, 30, 45, 60, 100, 150kg
Pre-load application	Manual (automatic for 677 ESEMATIC™)
Test load application	Fully automatic
Unload	Automatic for 677
Data output	Built-in high speed printer & USB2
LCD Display	Industrial touch screen showing hardness value, conversion value, test force, progress bar, dwell time, memory contents, all machine settings, Go/No Go, all statistics
Specimen accommodation	Vertical space 275mm; Horizontal space (from center of elevator shaft) 190mm
Power supply	110/240 volt, 50 – 60Hz
Machine dimensions	Approx. 940mm x 390mm x 670mm (HxWxD)
Machine weight	Approx. 140kg

OPTIONAL JOMINY & X-Y STAGES

Motorized stages for jominy or coordinate pattern testing on the 677. Fully automatic systems with database structures.
IMPRESSIONS™ INNOVATEST® leading hardness testing software.

ORDER DETAILS

675 Touch-screen, twin scale, motorized
676 Touch-screen, twin scale, motorized, motorized load selector
677 Touch-screen, twin scale, as 676 plus motorized spindle

STANDARD DELIVERY

- Built-in printer
- Data-output USB2 and RS-232C
- Diamond Rockwell indentor
- Rockwell ball indentor 1/16”
- Rockwell testing balls
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Hardness test blocks: ±60 HRC, ±40 HRC, ±85 HRB
- Power cable
- Spare fuse
- Adjustable feet (4 Pcs)
- Spindle protection cover
- Machine cover
- Solid accessories case
- INNOVATEST® certificate
- User and installation manual

OPTIONAL ACCESSORIES

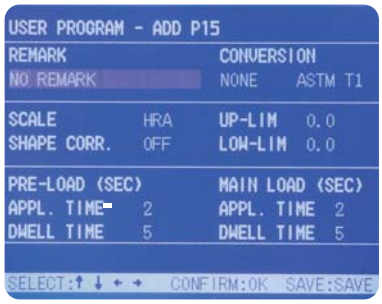
- Reference hardness blocks
- Certified indentors & balls
- Clamping and indentor protection nose
- Pedestal spot anvil
- Special support systems for large workpieces
- Tester stand with cabinet

ROCKWELL HARDNESS TESTERS, CLOSED LOOP — NEXUS 6000 SERIES

NEXUS 6001
LOAD CELL, CLOSED LOOP, ROCKWELL/SUPERFICIAL ROCKWELL

FEATURES

- Rockwell and Superficial Rockwell
- Load cell, closed loop, force feedback system, guaranteeing that pre- and main load are applied with absolute accuracy, no variety between testers and independence of the operator skills
- Superior GR & R results
- Simultaneous conversion to HV, HB and other HR scales
- Rugged fine casted frame with large workpiece accommodation
- ASTM, DIN-EN-ISO, JIS compliant
- Superior depth measuring system through high precision Heidenhain (Germany) glass scale
- No elevating screw, simplifies test operation and enhances accuracy
- Storage of 50 test programs and tester settings, allowing you to set up your tester in just seconds
- Continuous automatic "online" statistics, such as average of readings, standard deviation, etc.
- Storage of 20,000 single hardness values
- Go/No Go mode, convex and concave measuring mode, calibration date expired (reminder)
- Service mode including tests counter, maintenance system
- Prints statistics to built-in printer or external printer
- Connects with PC or SPC network via built-in bi-directional RS-232C connector



TECHNICAL SPECIFICATIONS

Rockwell scales	
Standard	A, B, C, D, E, F, G, H, K, L, M, P, R,V
Superficial	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Conversion to	HV, HB, other HR scales
Hardness resolution	0.1 & 0.01 of a Rockwell unit
Pre-load	3kgf & 10kgf
Main loads	15, 30, 45, 60, 100, 150kg through controlled closed loop system
Workpiece detection	Fully automatic
Pre-load application	Fully automatic
Test load application	Fully automatic
Unload	Automatic
Test force tolerance	<1%
Data output	Built-in high speed printer & RS-232C
LCD Display	Hardness value, conversion value, test force indicator, dwell time, memory contents, all machine settings, Go/No Go, all statistics, and many more
Specimen accommodation	Vertical space 250mm; Horizontal space (from center of elevator shaft) 220mm
Power supply	110/240V, 50 – 60Hz
Machine dimensions	Approx. 940mm x 390mm x 670mm (HxWxD)
Machine weight	Approx. 120kg

OPTIONAL JOMINY & X-Y STAGES

Motorized stages for jominy or coordinate pattern testing on the 6000. Fully automatic systems with database structures.
IMPRESSIONS™ INNOVATEST® leading hardness testing software.

ORDER DETAILS

NEXUS 6001 Closed Loop, Rockwell / Superficial Rockwell

STANDARD DELIVERY

- Built-in printer
- Data output RS-232C
- Diamond Rockwell indentor
- Rockwell ball indentor 1/16"
- Rockwell testing balls
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Hardness test blocks: ±60 HRC, ±40 HRC, ±85 HRB
- Power cable
- Spare fuse
- Adjustable feet (4 Pcs)
- Spindle protection cover
- Machine cover
- Solid accessories case
- INNOVATEST® certificate
- User and installation manual

OPTIONAL ACCESSORIES

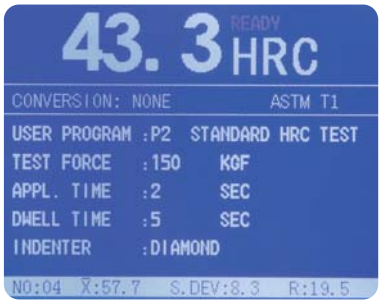
- Computer controlled auto traversing option
- Reference hardness blocks
- Certified indentors & balls
- Pedestal spot anvil
- Heavy load testing tables, flat anvil 200mm
- Clamping and indentor protection nose
- Special support systems for large workpieces
- Tester stand with cabinet

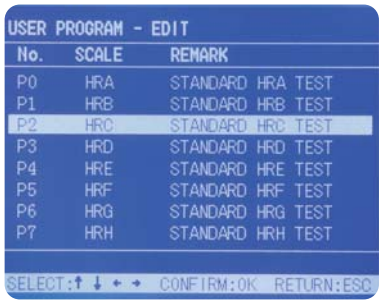
MASTER ROCKWELL HARDNESS TESTERS, CLOSED LOOP NEXUS 6000 SERIES

NEXUS 6000 MASTER
LOAD CELL, CLOSED LOOP, ROCKWELL/SUPERFICIAL ROCKWELL

FEATURES

- Rockwell and Superficial Rockwell, with enhanced accuracy, suitable to use for tasks in certified environment such as damage research, production of hardness test blocks and other top specification tasks.
- Load cell, closed loop, force feedback system, guaranteeing that pre- and main load are applied with absolute accuracy, no variety between testers and independence of the operator skills
- Enhanced force accuracy & enhanced depth reading accuracy
- Simultaneous conversion to HV, HB and other HR scales
- Rugged fine casted frame with large workpiece accommodation
- ASTM, DIN-EN-ISO, JIS compliant
- Superior depth measuring system through high precision Heidenhain (Germany) glass scale
- No elevating screw, simplifies test operation and enhances accuracy
- Storage of 50 test programs and tester settings, allowing you to set up your tester in just seconds
- Continuous automatic "online'' statistics, such as average of readings, standard deviation, etc.
- Storage of 20,000 single hardness values
- Go/No Go mode, convex and concave measuring mode, calibration date expired (reminder)
- Service mode including tests counter, maintenance system
- Prints statistics to built-in printer or external printer
- Connects with PC or SPC network via built-in bi-directional RS-232C connector





TECHNICAL SPECIFICATIONS

Rockwell scales	
Standard	A, B, C, D, E, F, G, H, K, L, M, P, R, V
Superficial	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Conversion to	HV, HB, other HR scales
Hardness resolution	0.1 & 0.01 of a Rockwell unit
Pre-load	3kgf / 10kgf
Main loads	15, 30, 45, 60, 100, 150kg through controlled closed loop system
Workpiece detection	Fully automatic
Pre-load application	Fully automatic
Test load application	Fully automatic
Test force tolerance	<0.5%
Depth meas. resolution	0.0001mm
Data output	Built-in high speed printer & RS-232C
LCD Display	Hardness value, conversion value, test force indicator, dwell time, memory contents, all machine settings, Go/No Go, all statistics, and many more
Specimen accommodation	Vertical space 250mm; Horizontal space (from center of elevator shaft) 220mm
Power supply	110/240V, 50 – 60Hz
Machine dimensions	Approx. 940mm x 390mm x 670mm (HxWxD)
Machine weight	Approx. 120kg

OPTIONAL JOMINY & X-Y STAGES

Motorized stages for jominy or coordinate pattern testing on the 6000. Fully automatic systems with database structures.
IMPRESSIONS™ INNOVATEST® leading hardness testing software.

ORDER DETAILS

NEXUS 6000 MASTER Closed Loop,
Rockwell / Superficial Rockwell

STANDARD DELIVERY

- Built-in printer
- Data output RS-232C
- Diamond Rockwell indentor
- Rockwell ball indentor 1/16"
- Rockwell testing balls
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- Hardness test blocks:
  ±60 HRC, ±40 HRC, ±85 HRB
- Power cable
- Spare fuse
- Adjustable feet (4 Pcs)
- Spindle protection cover
- Machine cover
- Solid accessories case
- INNOVATEST® certificate
- User and installation manual

OPTIONAL ACCESSORIES

- Computer controlled auto traversing option
- Reference hardness blocks
- Certified indentors & balls
- Pedestal spot anvil
- Heavy load testing tables
- Clamping and indentor protection nose
- Special support systems for large workpieces
- Tester stand with cabinet

NEXUS 6100
MICRO ROCKWELL

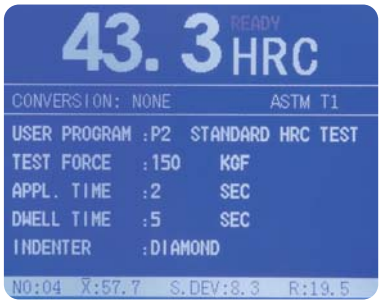
FEATURES

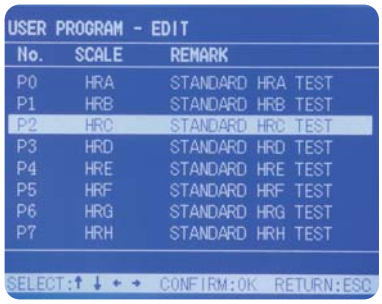
The NEXUS 6100 Micro Rockwell hardness tester is a hybrid instrument combining testloads that can normally be found on Micro-Vickers hardness testers. The advantage of the NEXUS 6100 against Micro-Vickers hardness testers is the extremely fast test speed. While a Micro-Vickers hardness tester requires an optical measuring system, the NEXUS 6100 obtains its test values from a highly accurate depth measurement system.

User selectable test forces of 500 and 1000grams or additional test loads based on your typical application widens the range of materials regardless of surface reflection or indent visibility.

The tester's motorized force actuator can easily be integrated in automate systems for operator independent operation.

This tester is based upon the same advanced design principles as applied in our NEXUS 6000 series Rockwell testers.





TECHNICAL SPECIFICATIONS

Micro Rockwell	HR Converts values to other scales
Conversion to	Vickers, Knoop, Rockwell A, B, C
Hardness resolution	0.1 & 0.01 of a Rockwell unit
Pre-load	50gram / 100gram
Main loads	0.5kgf / 1kgf
Workpiece detection	Fully automatic
Pre-load application	Fully automatic
Test load application	Fully automatic
Dwell time	15 seconds
Data output	Built-in high speed printer & RS-232C
LCD Display	Hardness value, conversion value, test force indicator, dwell time, memory contents, all machine settings, Go/No Go, all statistics, and many more
Specimen accommodation	Vertical space 250mm; Horizontal space (from center of elevator shaft) 220mm
Power supply	110/240V, 50 – 60Hz
Machine dimensions	Approx. 940mmx390mmx670mm (HxWxD)
Machine weight	Approx. 120kg

OPTIONAL JOMINY & X-Y STAGES

Motorized stages for jominy or coordinate pattern testing on the 6100. Fully automatic systems with database structures.
IMPRESSIONS™ INNOVATEST® leading hardness testing software.

ORDER DETAILS

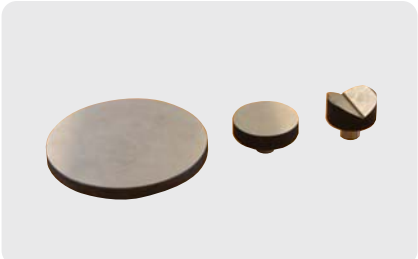
NEXUS 6100 Low force Micro Rockwell

STANDARD DELIVERY

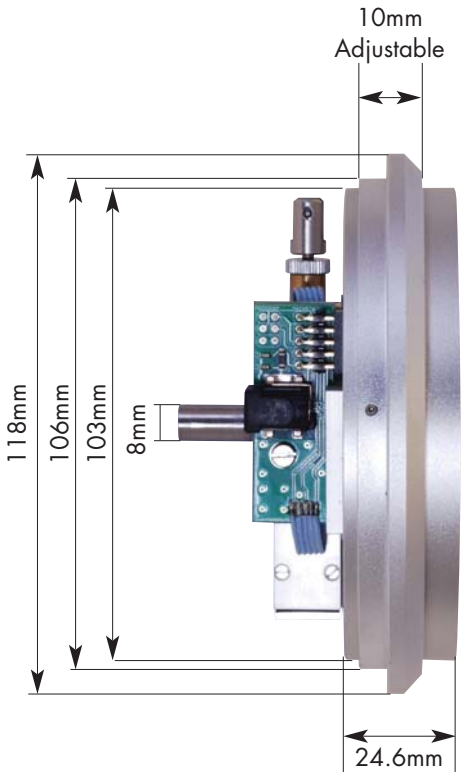
- Built-in printer
- Data output RS-232C
- Diamond Rockwell indentor
- Flat anvil ø60mm
- Testing table large ø150mm
- V-anvil ø40mm
- 3 hardness test blocks at choice
- Power cable
- Spare fuse
- Adjustable feet (4 Pcs)
- Spindle protection cover
- Machine cover
- Solid accessories case
- INNOVATEST® certificate
- User and installation manual

OPTIONAL ACCESSORIES

- Computer controlled auto traversing option
- Reference hardness blocks
- Certified indentors & balls
- Pedestal spot anvil
- Heavy load testing tables
- Special support systems for large workpieces
- Tester stand with cabinet



UNIVERSAL DIGITAL ROCKWELL INDICATOR — DRI 01 SERIES



DRI 01
UNIVERSAL DIGITAL ROCKWELL INDICATOR

FEATURES

Incorrect reading on analogue gauges
Reading values on an analogue Rockwell scale (indicator), is not ideal and very often leads to serious mistakes. Misinterpretation of the indicator position can cause confusion or misunderstanding of the actually measured hardness values. Incorrect hardness values can lead to damages of components and constructions. In the worst case, incorrect readings can even result in the loss of lives. Analogue hardness testers are still commonly sold, due to their low cost and simple measurement procedure.

OEM (retrofit) universal digital Rockwell indicator
Hardness specialist INNOVATEST® has developed a series of UNIVERSAL DIGITAL ROCKWELL INDICATORS fitting in a wide range of Rockwell Hardness testers, often regardless of the manufacturer. As the Rockwell and Superficial Rockwell testing procedure demands highly accurate depth readings, a new sensor has been developed and applied to ensure that the penetration of the indentor in the tested object is measured with an accuracy of 0.001mm or better. Well within the applicable ISO/ASTM or JIS standards. More accurate results can be obtained from your new or old analogue testers, while at the same time it is easier to read the measured values. No need to buy new equipment or make large investments.

SOFTWARE INTELLIGENCE

With the Rockwell indicator, your instrument becomes more reliable and more accurate, regardless of the operator skills. Intelligent detection of preload and main load application in combination with acoustic and visual warnings.

Power supply
The UNIVERSAL Rockwell indicator comes with a CE approved power supply and connects with main power as easily as your mobile phone. Optionally you can order a rechargeable battery pack, allowing the indicator to work without the need of main power for at least 36 hours continuously.

Advantages of the digital Rockwell indicator

- Large backlit LCD display with load progress bar, visual control over the load application process
- Avoids reading error and increases efficiency of your Rockwell hardness tester
- Superior accurate readings even from your old, but properly working hardness tester
- Low cost improvement and easy updating of your current Rockwell tester
- Automatic measuring procedure after preload has been reached
- Automatic conversion to all common Rockwell scales
- Automatic ISO / ASTM procedure function (can be switched off)
- Easy to install on many types and brands of Rockwell hardness testers

TECHNICAL SPECIFICATIONS

Rockwell scales	A, B, C, D, E, F, G, K, L, M, P, R, V
Superficial Rockwell scales	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Indications on display	Progress bar for preload, preload applied, main load applied, dwell time, invalid reading, invalid measurement, invalid procedure, Rockwell value, scale applied
Measuring protocol	ISO / ASTM / JIS
Sensor	INNOVATECH – INCDC/0702
System accuracy	<0.001mm / 0.5 HRC
Display	Blue/white backlit graphical LCD
Power supply	9Volt DC – 800mA

ORDER DETAILS

DRI 01 Rockwell and Superficial Rockwell scales, English menu.(Please specify required language: English, German, French). Other languages on request.

STANDARD DELIVERY

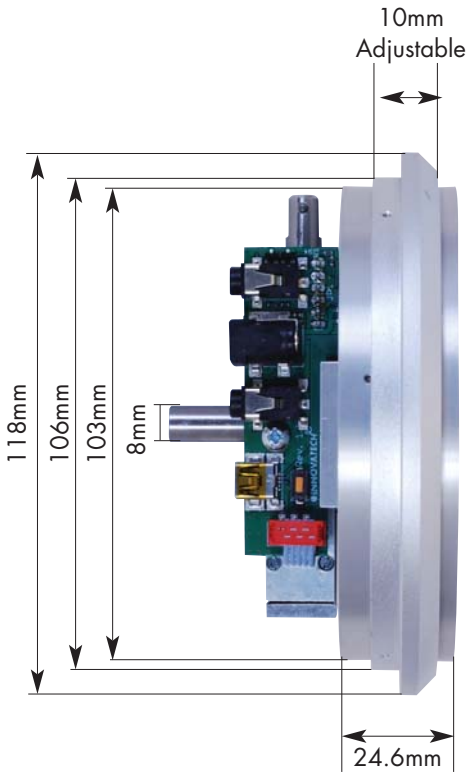
- Standard 8mm stem on backside
- Adjustable front spacer
- Power adapter
- User manual
- Quality certificate
- Assembly instructions

FITS DIRECTLY IN

HASSLE FREE INSTALLATION

- 600 Series CV Instruments
- 600 Series INNOVATEST®
- 600 Series Eseway
- 500 Series Wolpert
- 500 Series Wilson
- TH500 Series TIME
- HR150A, DT, S
- 3814/EDP 67754 Starret
- 900 series Phase II

...and many more!
Ask our sales department



DRI 02

ADVANCED UNIVERSAL DIGITAL ROCKWELL INDICATOR

FEATURES

OEM (retrofit) advanced universal Rockwell indicator

Advanced DIGITAL ROCKWELL INDICATOR fitting in a wide range of Rockwell Hardness testers, in many cases regardless of the manufacturer of the hardness tester itself. As the Rockwell and Superficial Rockwell testing procedure demands highly accurate depth readings, a new sensor has been developed and applied to ensure that the penetration of the indentor in the tested object, is measured with an accuracy of 0.001mm or better. Well within the applicable ISO/ASTM or JIS standards. More accurate results can be obtained from your new or old analogue testers, while at the same time it is easier to read the measured values. No need to buy new equipment or make large investments.

Similar use & functionality as the basic model on previous pages, but now with full color bright multifunction OLED display. The DRI-2 offers many advanced functions such as full color display changes color from green to red if readings are out of limits (Go/No Go) conversion to VICKERS, BRINELL and portable scale LEEB. The DRI-2 has a progammable memory, allowing to compose 50 test programs that can each store all unique settings for your standard frequently returning workpieces. Each batch of test records up to 99 individual measurements which will be stored in the system. Direct online statistics keep you informed of the entire batch measurement results.
An optional printer can be connected.

SOFTWARE INTELLIGENCE

Your tester now becomes a more reliable and more accurate instrument, regardless of the operator skills. Intelligent detection of preload and main load application in combination with acoustic and visual warnings.

Functions of the advanced digital Rockwell indicator

- Bright full color OLED display with load progress bar, visual control over the load application process
- Multi system colors for messages and warnings. Readings out of limits will be displayed in a red field.
- Conversion to other hardness scales like Vickers, Brinell and Leeb.
- Program mode, allowing to set up standard test programs
- Memory for 50 batches of 99 readings
- Service mode for tester control and general settings
- Advanced connectivity, USB, RS-232, motor control, switch control
- Automatic measuring procedure after preload has been reached
- Easy to install on many types and brands of Rockwell hardness testers

TECHNICAL SPECIFICATIONS

Rockwell scales	A, B, C, D, E, F, G, K, L, M, P, R, V
Superficial Rockwell scales	15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Conversion to	Vickers, Brinell, Leeb
Indications on display	Progress bar for preload, preload applied, main load applied, dwell time, invalid reading, invalid measurement, invalid procedure, Rockwell value, scale applied
Other display functions	Color indication, converted value, limits settings, shape correction setting, program indication, statistics, service menu
Sensor	INNOVATECH – INCDC/0702
Connectivity	USB-2, RS-232, printer, power, connectors for motorized testers
System accuracy	<0.001mm / 0.5 HRC
Display	Blue/white backlit graphical LCD
Data output	RS-232 and USB
Power supply	9Volt DC – 800mA

ORDER DETAILS

DRI 02A Manual, Rockwell and Superficial Rockwell, multi language firmware (English, German, French).

DRI 02B Motorized, Rockwell and Superficial Rockwell, multi language firmware (English, German, French).

STANDARD DELIVERY

- Standard 8mm stem on backside
- Adjustable front spacer
- Power adapter
- User manual
- Quality certificate
- Assembly instructions

FITS DIRECTLY IN

HASSLE FREE INSTALLATION

- 600 Series CV Instruments
- 600 Series INNOVATEST®
- 600 Series Eseway
- 500 Series Wolpert
- 500 Series Wilson
- TH500 Series TIME
- HR150A, DT, S
- 3814/EDP 67754 Starret
- 900 series Phase II

...and many more!
Ask our sales department

VICKERS HARDNESS TESTERS

VICKERS HARDNESS TEST

The Vickers hardness test was developed in 1924 by Smith and Sandland at Vickers Ltd as an alternative to the Brinell method to measure the hardness of materials.

The Vickers test is often easier to use than other hardness tests, since the required calculations are independent of the size of the indentor, and the indentor can be used for all materials irrespective of hardness.

The basic principle, as with all common measures of hardness, is to observe the questioned material's ability to resist plastic deformation from a standard source.

The Vickers test can be used for all metals and has one of the widest scales among hardness tests. The unit of hardness given by the test is known as the Vickers Pyramid Number (HV) or Diamond Pyramid Hardness (DPH).

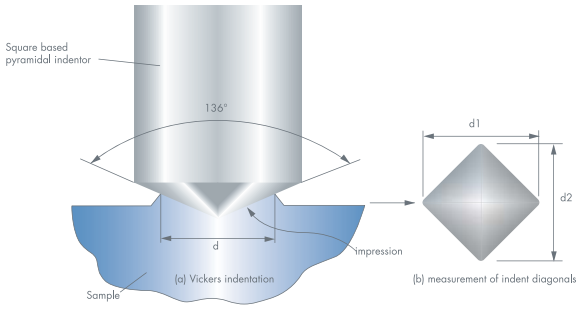
The hardness number can be converted into units of Pascals, but should not be confused with a pressure, which also has units of Pascals. The hardness number is determined by the load over the surface area of the indentation and not the area normal to the force, and is therefore not a pressure.

The hardness number is not really a true property of the material and is an empirical value that should be seen in conjunction with the experimental methods and hardness scale used.

When doing the hardness tests the distance between indentations must be more than 2.5 indentation diameters apart to avoid interaction between the work-hardened regions.

Implementation
An indentation left in case-hardened steel after a Vickers hardness test. It was decided that the indentor shape should be capable of producing geometrically similar impressions, irrespective of size; the impression should have well-defined points of measurement; and the indentor should have high resistance to self-deformation. A diamond in the form of a square-based pyramid satisfied these conditions. It had been established that the ideal size of a Brinell impression was 3/8 of the ball diameter. As two tangents to the circle at the ends of a chord 3d/8 long intersect at 136°, it was decided to use this as the included angle of the indentor. The angle was varied experimentally and it was found that the hardness value obtained on a homogeneous piece of material remained constant, irrespective of load. Accordingly, loads of various magnitudes are applied to a flat surface, depending on the hardness of the material to be measured.

The HV number is then determined by the ratio F/A where F is the force applied to the diamond in kilograms-force and A is the surface area of the resulting indentation in square millimetres. A can be determined by the formula which can be approximated by evaluating the sine term to give where d is the average length of the diagonal left by the indentor.



Vickers hardness numbers are reported as xxxHVyy, e.g. 440HV30, or xxxHVyy/zz if duration of force differs from 10s to 15s, e.g. 440Hv30/20, where:

440 is the hardness number,
HV gives the hardness scale (Vickers),
30 indicates the load used in kg.
20 indicates the loading time if it differs from 10s to 15s
Vickers values are generally independent of the test force: they will come out the same for 500gf and 50kgf, as long as the force is at least 200gf.

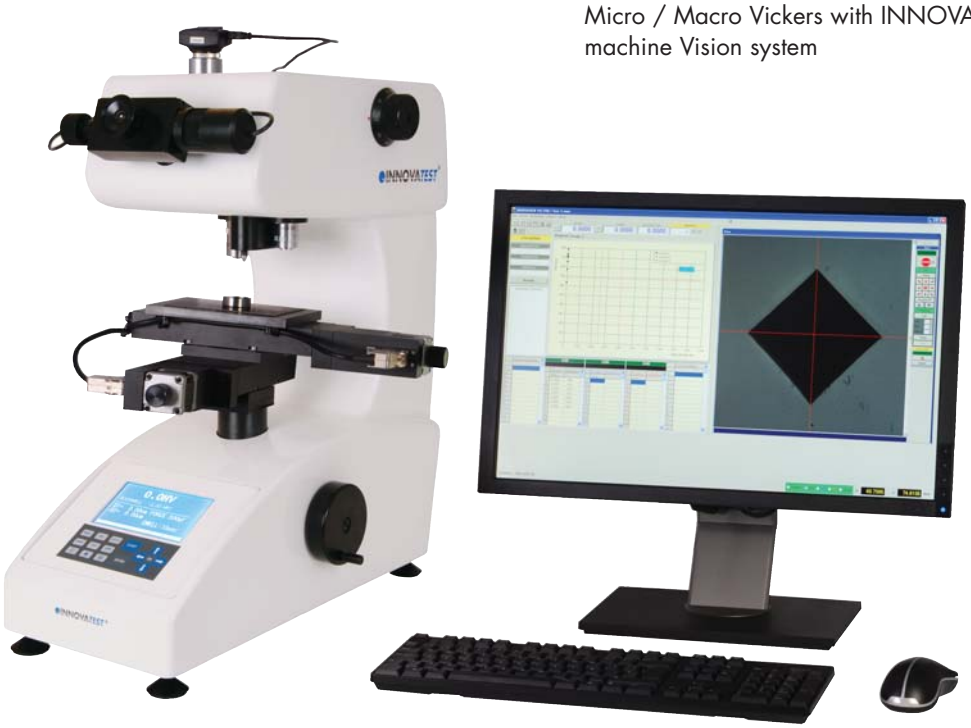
Examples of HV values for various materials

Material	**Value**
316L stainless steel	140HV30
347L stainless steel	180HV30
Carbon steel	55–120HV5
Iron	30–80HV5

VICKERS HARDNESS TESTERS

Micro / Macro Vickers
with digital eyepiece

Micro / Macro Vickers with INNOVAVIEW™
machine Vision system



MICRO-VICKERS HARDNESS TESTERS 400 SERIES

Page 44

412A/413A

ANALOGUE MICROSCOPE, 1KGF TEST FORCE

Micro-Vickers & Knoop

- Motorized turret, 2 objectives or 3 objectives
- Test loads 10gr-1kgf
- Analogue microscope
- Built-in hardness calculator
- Shows calculated values on display
- Large workpiece accommodation
- RS-232 output
- Built-in printer

Page 44

412D/413D

ELECTRONIC MICROSCOPE, 1KGF TEST FORCE

Micro-Vickers & Knoop

- Motorized turret, 2 objectives or 3 objective
- Test loads 10gr-1kgf
- Electronic microscope, digital value transfer
- Large LCD display shows measured values, on-line statistics, memory overview, tester settings
- Large workpiece accommodation
- RS-232 output
- Built-in printer

Page 44

422A/423A

ANALOGUE MICROSCOPE, 2KGF TEST FORCE

Micro-Vickers & Knoop

- Motorized turret, 2 objectives or 3 objectives
- Test loads 10gr-2kgf
- Analogue microscope
- Built-in hardness calculator
- Shows calculated values on display
- Large workpiece accommodation
- RS-232 output
- Built-in printer

Page 44

422D/423D

DIGITAL MICROSCOPE, 2KGF TEST FORCE

Micro-Vickers & Knoop

- Motorized turret, 2 objectives or 3 objectives
- Test loads 10gr-2kgf
- Electronic microscope, digital value transfer
- Large LCD display shows measured values, on-line statistics, memory overview, tester settings
- Large workpiece accommodation
- RS-232 output
- Built-in printer

Page 50

NEXUS 4300 SERIES

CLOSED LOOP 20GF TO 31.25KGF

Micro-Vickers, Vickers, Knoop & low force Brinell

- Load cell, closed loop, force feed back system
- Motorized turret with 2 or 3 objectives
- Test loads 20gr-31.25kgf
- Conversion to other hardness scales including Tensile Strength
- Digital eyepiece and camera adaptor
- Large LCD display shows measured values, on-line statistics, memory overview, tester settings
- Large workpiece accommodation
- RS-232 output
- Built-in printer

Available force configurations:

- **NEXUS 4300**
  1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
- **NEXUS 4301**
  1 - 2 - 2.5 - 3 - 4 - 5 - 6.25 - 10 - 15.625 - 20 - 31.25kgf
- **NEXUS 4302**
  0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
- **NEXUS 4303 (most common)**
  0.02 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
- **NEXUS 4304**
  As 4303 + additional 2.5 - 6.25 - 15.625 - 31.25kgf

Page 50

NEXUS 4500 SERIES

CLOSED LOOP 100GF TO 62.5KGF

Micro-Vickers, Vickers, Knoop & low force Brinell

- Load cell, closed loop, force feed back system
- Motorized turret with 2 or 3 objectives
- Test loads 100gr-62.5kgf
- Conversion to other hardness scales including Tensile Strength
- Digital eyepiece and camera adaptor
- Large LCD display shows measured values, on-line statistics, memory overview, tester settings
- Large workpiece accommodation
- RS-232 output
- Built-in printer

Available force configurations:

- **NEXUS 4500**
  1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30 - 50kgf
- **NEXUS 4501**
  1 - 2 - 2.5 - 3 - 4 - 5 - 6.25 - 10 - 15.625 - 20 - 31.25 - 62.5kgf
- **NEXUS 4502**
  0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30 - 50kgf
- **NEXUS 4503 (most common)**
  0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 – 30 - 50kgf
- **NEXUS 4504**
  As 4503 + additional 2.5 - 6.25 - 15.625 - 31.25 – 62.5kgf

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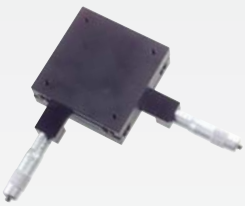
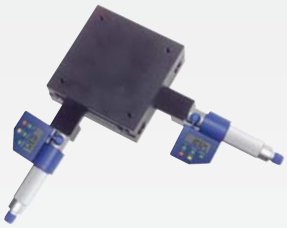
MICRO-VICKERS

400, MOTORIZED X-Y STAGE

Analogue	Digital	Motorized, small	Motorized, large
			
INV1	INV2	INV3 & INV4	INV3 & INV4

INNOVAVIEW™ INV1 (Basic system)

- Basic vision indent measuring system with advanced capabilities.
- Manual measurement of the indent on the LCD screen
- Case Hardness Depth, store, file, handle images and data on the harddisk
- Auto indent measuring optional

INNOVAVIEW™ INV2 (Basic system, digital X-Y stage)

- The same as INV1 plus digital micrometer(s) on the X-Y stages to measure stage displacement
- Control accurate indent coordinate
- Auto indent measuring optional

INNOVAVIEW™ INV3 (Semi Automatic, motorized X-Y stage)

- INV1 plus motorized X-Y stage (small or large)
- Automatic pattern and traverse system
- Workpiece position control over PC operation
- High resolution CCD system shows real time measurement.
- Auto indent measuring optional

INNOVAVIEW™ INV4 (Fully automatic, auto focus, auto measure)

- Equals to INV 3
- Full options including automatic indent measuring
- Automatic focussing Z-axis (Built-in system)
- Allows a series of automatic test with storage of test results and test images without operator interference
- Saves time and money.

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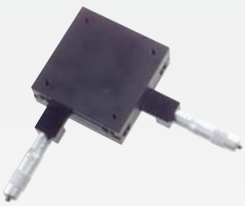
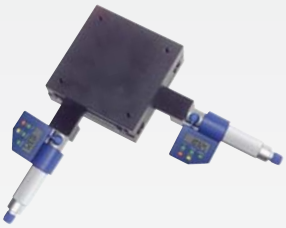
REGULAR VICKERS

NEXUS 4000, MOTORIZED X-Y STAGE

Analogue	Digital	Motorized, small	Motorized, large
			
INV1	INV2	INV3 & INV4	INV3 & INV4

INNOVAVIEW™ INV1 (Basic system)

- Basic vision indent measuring system with advanced capabilities
- Manual measurement of the indent on the LCD screen
- Case Hardness Depth, store, file, handle images and data on the harddisk
- Auto indent measuring optional

INNOVAVIEW™ INV2 (Basic system, digital X-Y stage)

- The same as INV1 plus digital micrometer(s) on the X-Y stages to measure stage displacement
- Control accurate indent coordinate
- Auto indent measuring optional

INNOVAVIEW™ INV3 (Semi Automatic, motorized X-Y stage)

- INV1 plus motorized X-Y stage (small or large)
- Automatic pattern and traverse system
- Workpiece position control over PC operation
- High resolution CCD system shows real time measurement.
- Auto indent measuring optional

INNOVAVIEW™ INV4 (Fully automatic, auto focus, auto measure)

- Equals to INV 3
- Full options including automatic indent measuring
- Automatic focussing Z-axis (Built-in system)
- Allows a series of automatic tests with storage of test results and test images without operator interference
- Saves time and money

MICRO-VICKERS HARDNESS TESTERS — 400 SERIES

400 ANALOGUE
MICRO-VICKERS & KNOOP

400 DIGITAL
MICRO-VICKERS & KNOOP

FEATURES

400A series

- Motorized turret
- Analogue microscope
- Motorized load control
- Statistics and conversions
- X-Y stage with 0.01mm resolution
- Built-in high speed printer
- Second optical or Video path

FEATURES

400D series

- Motorized turret
- High resolution electronic microscope, digital value transfer
- Conversion to other hardness scales
- Motorized load control
- Statistics and conversions
- X-Y stage with 0.01mm resolution
- Built-in high speed printer
- Second optical or Video path

400A SERIES - ANALOGUE EYEPIECE READING

A traditional hardness testing system using a high precision load application mechanism. The 400 series is available in different configurations starting at 10gf ranging to 2kgf maximum force.
The standard motorized single objective turret can be completed with a second indentor or 3 objectives to ensure maximum flexibility. The 400 series has an analogue eyepiece (15x magnification) with bright micrometer reading to determine the indent diagonals. The values obtained from the micrometer can be keyed in to the graphic user interface. The automatically calculated Vickers or Knoop hardness will be shown on the bright display.

400D SERIES - DIGITAL EYEPIECE READING

As an alternative to the standard 400 series, the series 400D offers a digital electronic microscope with enhanced functionality and high resolution readings. Obtained diagonal measurements are transferred automatically to the CPU system and calculated to the actual Vickers or Knoop value. The 400D has more advanced display functions. The system shows realtime statistic values, converts to Rockwell, Brinell, Leeb and UTS (tensile strength). The 423D the top model of the range, is one of the most advanced traditional Micro-Vickers systems currently available.

FORCE RANGING FROM 10GF UP TO 2KGF WITHOUT CHANGING WEIGHTS

The 400 series allows testing workpieces of a wide variety. The test force can be selected with the help of an easy to operate selector knob on the side of the tester. Replacing any weights is not necessary. The tester does the full range up to 2kg by just turning the selector knob to the required force position. The test range of the 400 series is quite unique for a traditional micro-hardness tester.

High accuracy, flexibility and pure efficiency are synonyms for the 400 series.

400A ANALOGUE EYEPIECE

400D DIGITAL EYEPIECE

AVAILABLE FORCE CONFIGURATIONS

412A	1kg Analogue, 2 objectives for measuring/observation
413A	1kg Analogue, 3 objectives for measuring/observation
412D	1kg Digital, 2 objectives for measuring/observation
413D	1kg Digital, 3 objectives for measuring/observation
422A	2kg Analogue, 2 objectives for measuring/observation
423A	2kg Analogue, 3 objectives for measuring/observation
422D	2kg Digital, 2 objectives for measuring/observation
423D	2kg Digital, 3 objectives for measuring/observation

ALL MODELS HAVE A MOTORIZED TURRET.
DUAL INDENTOR POSITION ON REQUEST.

STAGES

Manual X-Y-Z stage, Motorized X-Y stage, Motorized X-Y-Z stage
INNOVAVIEW™ CCD system with Video filar INV-1, 2 or 3
INNOVAVIEW™ CCD system with auto focus and Video filar, INV-4

TURRET CONFIGURATION

Fully automatic 4 position turret for Micro-Vickers / Macro Vickers, Knoop measurements, 2 or 3 objectives at choice, all 3 objectives can be used for measuring and observation, 1 or 2 indentor positions (Vickers & Knoop)

INDENTORS

Vickers or Knoop

EYEPIECE

Electronic eyepiece microscope with high resolution encoder
(Standard 15x magnification, optional 10x magnification)

OBJECTIVES

5x for 75x	magnification
10x for 150x	magnification
20x for 300x	magnification
40x for 600x	magnification
60x for 900x	magnification

TESTER COLORS

INC-1LW	Laboratory White
INC-2CGM	Charcoal Grey Metallic
INC-3FR	Ferrari Red
INC-4BRG	British Racing Green
INC-5ABL	Atlantic Blue
INC-RAL XXXX	Any RAL color on demand

RAL COLOR ON DEMAND

TECHNICAL SPECIFICATIONS

Test force selection	Manual
Test procedure	Automatic, loading/dwell/unloading
Hardness value	5 digits
Turret	4 positions over 360°, fully automatic, memorized start position, option for 2 indentors and 2 objectives or 1 indentor and 3 objectives
Test force accuracy	<1% for test force 200gr to 2kg, <1.5% for test force below 100gr
User display	Length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HV, HK
Hardness conversion	Rockwell, Rockwell Superficial, Brinell, Leeb & Tensile (D models)
Standardization	EN, ISO 6507, EN ISO 6506, ASTM E-384, ASTM E-10-08
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, light intensity, dwell time, print, clear. Menu operation for date, time, scale and load settings, language (D models)
Firmware	V2.01, German, English, French (standard) V2.02, English, Italian, Spanish
Memory	Memory for batch testing results
Data output	RS-232 Bi-Directional
Dwell time setting	Default 10 seconds, user defined 0 to 60 seconds
Printer	Built-in, silent high speed thermal printer
Eyepiece microscope	Bright Dual line filar eyepiece with 15x magnification, 0.1µm reading
Light source	Halogen 12V, 30 Watt, green filter, dimmable
Optical path	2 way, eyepiece / CCD camera
Vertical capacity	90mm (maximum specimen height)
Horizontal capacity	130mm (from center-line)
Stage dimensions	100mm x 100mm, travel 25mm x 25mm, reading 0.01mm
Operating temperature	5°C to 40°C (+/-20° for force 25gr & 50gr)
Humidity	10% to 90% non condensing
Machine dimensions	420mm x 250mm x 490mm
Machine weight	37.5kg
Power requirements	100VAC to 240VAC, 50/60Hz, single phase
Power consumption	390W
Guarantee	2 years limited guarantee

STANDARD DELIVERY

- Manual X-Y–Z stage
- Objectives according to model (10x and 20x or 10x, 20x and 40x)
- Analogue or Electronic microscope 15x
- Vickers test block
- Built-in silent thermal printer
- RS-232 data output
- Set of workpiece fixtures, vice, chuck, clamp
- Level gauge
- 4 adjustable feet
- Spare halogen lamp
- Installation & user manual
- Quality certificate
- Color: Laboratory White

OPTIONAL ACCESSORIES

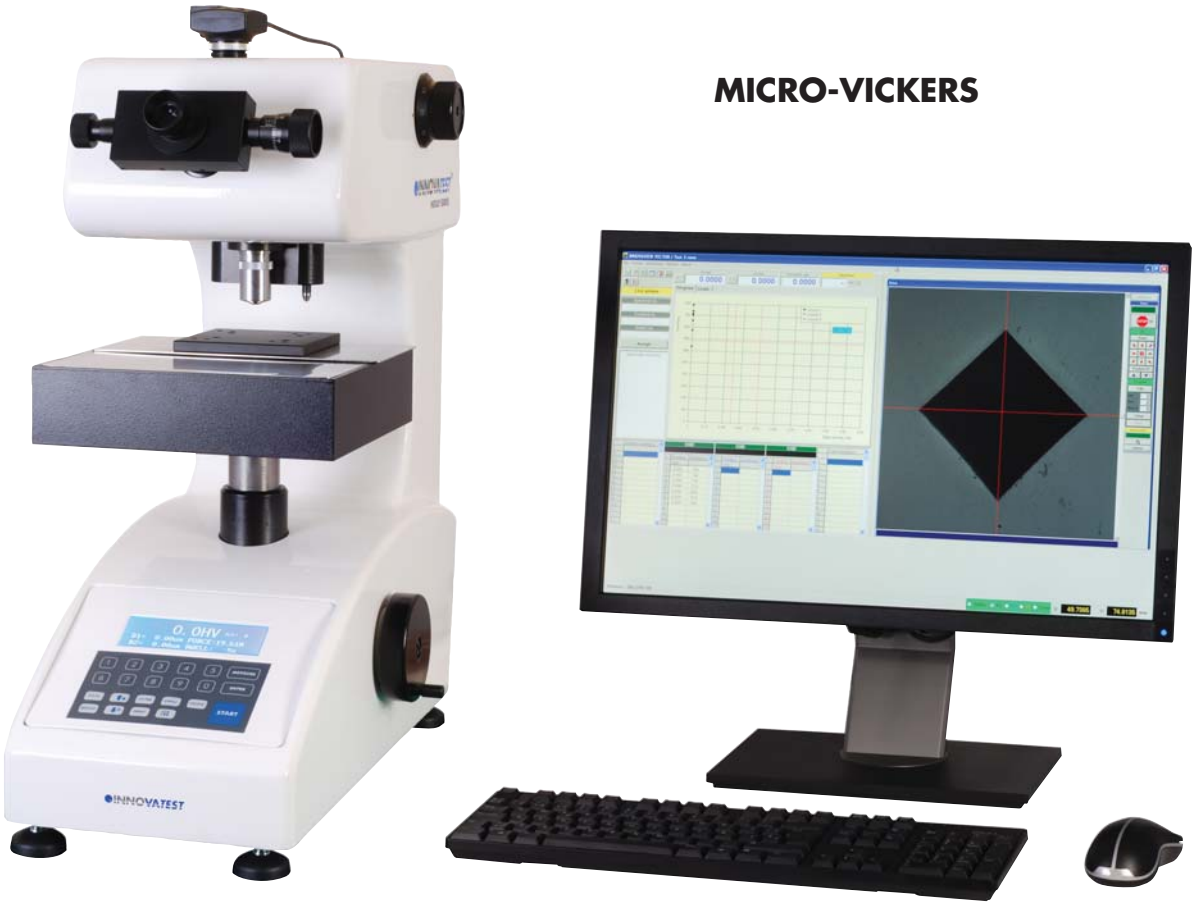
- Objectives at choice
- INNOVAVIEW™ Vision manual or automatic measuring and filing systems
- Motorized X-Y stage (small or large)
- Motorized X-Y–Z stage (auto focus)
- Indentors & hardness test blocks
- Certified indentors
- Reference hardness blocks
- Solid tester table & storage cabinet
- Customized tester color

ORDER DETAILS

412A Analogue, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1kgf (HV)
413A Analogue, 3 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1kgf (HV)
412D Digital, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1kgf (HV)
413D Digital, 3 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1kgf (HV)

422A Analogue, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2kgf (HV)
423A Analogue, 3 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2kgf (HV)
422D Digital, 2 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2kgf (HV)
423D Digital, 3 objectives, 0.01 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2kgf (HV)

400 SERIES — INNOVAVIEW™ (USB) INDENT VISION SYSTEM



MICRO-VICKERS

INV VISION SYSTEM

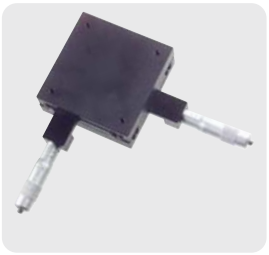


TABLE OPTION 1
ANALOGUE STAGE MICROMETERS

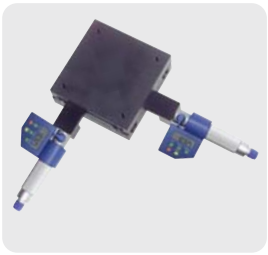


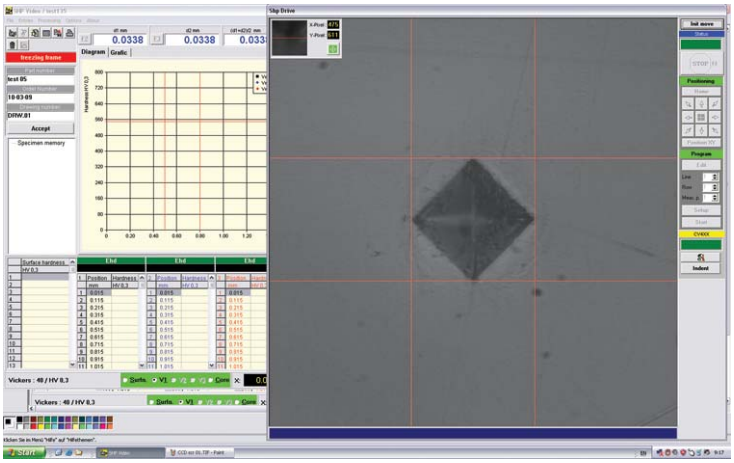
TABLE OPTION 2
DIGITAL STAGE MICROMETERS

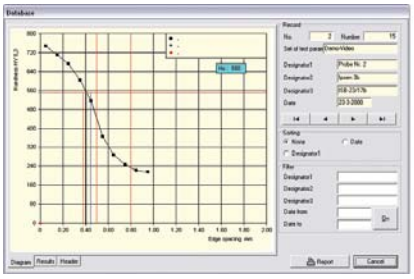
TABLE OPTION 3
SMALL MOTORIZED STAGE

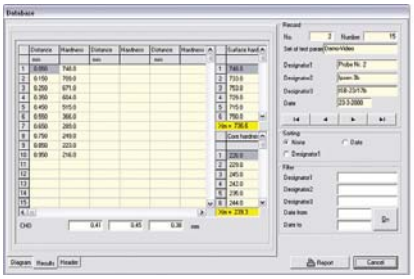
TABLE OPTION 4
LARGE MOTORIZED STAGE

FEATURES

- High resolution 2 mega pixels video camera creating crisp indent images
- Manual & automatic image measuring mode
- Save, print and store image
- Report generator
- Data export to Excel or other MS applications
- Pattern programming, saving and recall
- Return to position and re-measure option
- Variable distance point plotting







INV-1

PC- based camera indent measuring system.
Manual measurement of the indent on the LCD screen.
Store, file, handle images and data on the harddisk.

INV-2

INV-1 plus digital micrometers to measure stage displacement to control accurate indent coordinates and to ease case depth measurement.
Automatic measuring optional.

INV-3

INV-2 plus motorized X-Y stage, automatic pattern and traverse system, workpiece position control over external or built-in PC.
Indent vision system shows real time measurement.
Semi-Automatic system. Automatic measuring optional.

INV-4

INV-3 plus motorized Z-axis for auto focus, X-Y table controlled by external or internal computer. Fully automatic system, including automatic measurement.
Allows a series of automatic test with storage of test results without operator interference. Saves time and money.

ORDER DETAILS

CCD INV1 Manual measurement
CCD INV2 Manual measurement with digital micrometers
CCD INV3 Motorized, X-Y stage (choose stage size)
CCD INV4 Fully automatic, auto focus X-Y-Z stage (choose stage size)

NEXUS 4000
LOAD CELL, CLOSED LOOP SYSTEM

FEATURES

High-end Vickers/Knoop/Brinell tester with low and high force ranging from HV0.02 to HV50. Closed Loop, Load Cell, Force Feedback technology for a reliable fast measurement procedure. Modular design, fits to almost any budget.

The NEXUS 4000 series of Micro/Macro Vickers, Knoop & Brinell hardness testers combines a practical design with universal specifications. State-of-the-art closed loop, load cell technology and a - Patent Pending - force feedback system, assure fast test results at the highest possible accuracy.

Unmatched consistency, repeatability and reliability now become affordable.
The closed loop system applies force, calculates, filters and controls digital data in a 32-bits embedded CPU system.

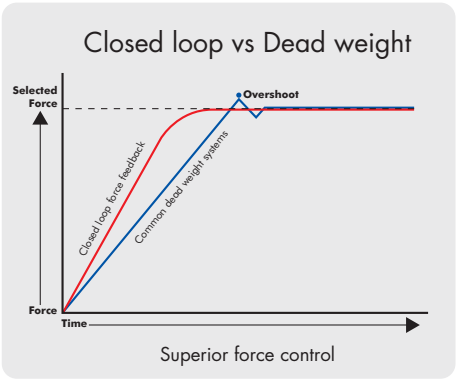
The tester has a 4 position turret which can be customized by using different indentors, objectives, stages or Vision systems, meeting your particular request and budget.

The NEXUS 4000 series meets all applicable EN, ISO and ASTM standards.

TEST PROCEDURE CONTROL

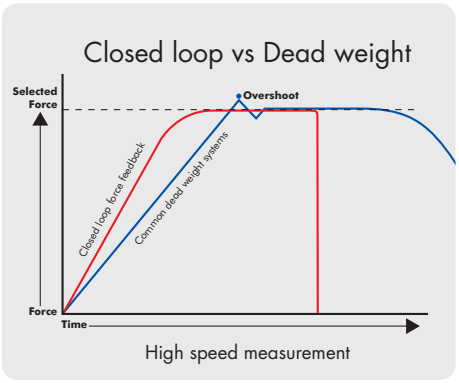
Traditional hardness testing systems use a "dead weight" mechanical design or inaccurate spring force mechanism to apply the test force. Such systems are lacking test control, as there is no feed-back on the actual applied force.

The Closed Loop technology with a force feedback system, as applied in the NEXUS 4000 Series, constantly measures and controls the applied force on the tester's indentor and tested surface. Consequently, this superior control system offers an almost unlimited selection of test loads and test rates for virtually any test condition imaginable.



ACCURACY, RELIABILITY & EFFICIENCY

Elimination of overshoot due to sophisticated algorithms detecting contact between the indentor and the object's surface.
The application and removal of the test force is fully automatic, as well as the positioning of the indentor and the positioning of the pre-determined objective. The result is a flawless absolute vibration free operation while reducing the operator's efforts to a minimum.



UPGRADE YOUR NEXUS LATER

The NEXUS series offers upgrades on request. For instance, your budget and your requirements allow a Vickers tester. Your choice could be a NEXUS Vickers / Knoop tester 4300. At any moment after your purchase you can upgrade your tester from for instance Vickers to Macro, Micro-Vickers or even to Brinell at fixed prices. The upgrades are possible in the 4300 or 4500 range. It requires simply a phone call to your distributor or to INNOVATEST® and the upgrade does not take more than a couple of hours, including calibration. Investing in a NEXUS series tester guarantees access to almost any load application in the Vickers, Knoop and Brinell range up to 62.5kg.

High accuracy, flexibility and pure efficiency are synonyms for the NEXUS 4000 series.

AVAILABLE FORCE CONFIGURATIONS

NEXUS 4300	1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
NEXUS 4301	1 - 2 - 2.5 - 3 - 4 - 5 - 6.25 - 10 - 15.625 - 20 - 31.25kgf
NEXUS 4302	0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
NEXUS 4303	0.02 - 0.025 - 0.05 - 0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30kgf
NEXUS 4304	As 4303 + additional 2.5 - 6.25 - 15.625 - 31.25kgf
NEXUS 4500	1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30 - 50kgf
NEXUS 4501	1 - 2 - 2.5 - 3 - 4 - 5 - 6.25 - 10 - 15.625 - 20 - 31.25 - 62.5kgf
NEXUS 4502	0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 - 30 - 50kgf
NEXUS 4503	0.1 - 0.2 - 0.3 - 0.5 - 1 - 2 - 2.5 - 3 - 4 - 5 - 10 - 20 – 30 - 50kgf
NEXUS 4504	As 4503 + additional 2.5 - 6.25 - 15.625 - 31.25 – 62.5kgf

STAGES

Manual X-Y-Z stage, Motorized X-Y stage, Motorized X-Y-Z stage
INNOVAVIEW™ CCD system with Video filar level INV-1, 2 or 3
INNOVAVIEW™ CCD system with auto focus and Video filar INV-4

TURRET CONFIGURATION

Fully automatic 4 position turret for Micro-Vickers / Macro Vickers, Knoop or Brinell measurements.
Featuring 3 objectives at choice, all 3 objectives can be used for measuring and observation. Optional, 2 indentor positions.

INDENTORS

Vickers, Knoop or Brinell or 2 of these simultaneously

EYEPIECE

Electronic digital microscope with precision encoder providing 15x magnification

OBJECTIVES

5x for 75x	magnification
10x for 150x	magnification
20x for 300x	magnification
40x for 600x	magnification
60x for 900x	magnification

TESTER COLORS

INC-1LW	Laboratory White
INC-2CGM	Charcoal Grey Metallic
INC-3FR	Ferrari Red
INC-4BRG	British Racing Green
INC-5ABL	Atlantic Blue
INC-RAL XXXX	Any RAL color on demand

RAL COLOR ON DEMAND

TECHNICAL SPECIFICATIONS

Test force selection	Test force selectable over menu operation
Test procedure	Automatic, loading/dwell/unloading
Hardness value	5 digits
Loading speed	Variable, depending on load application
Turret	4 positions over 360°, fully automatic, memorized start position, option for 2 indentors and 2 objectives or 1 indentor and 3 objectives
Test force accuracy	<1% for test force from 100gr to 30kg, < 1.5% for test force below 100gr
User display	Length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HV, HK and HB
Hardness conversion	Rockwell, Rockwell Superficial, Brinell, Leeb & Tensile
Standardization	EN, ISO 6507, EN ISO 6506, EN ISO 4545, ASTM E-384, ASTM E-10-08, ASTM E-384
Statistics	Total test, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, light intensity, dwell time, print, clear, menu operation for date, time, scale and load settings, language
Firmware	V2.01, German, English, French (standard) V2.02, English, Italian, Spanish
Memory	Memory for batch testing results
Data output	RS-232 Bi-Directional
Loading mechanism	Fully automatic, closed loop, force feedback, loading, dwell, unloading
Dwell time setting	Default 10 seconds, user defined 0 to 60 sec.
Printer	Built-in, silent high speed thermal printer
Electronic microscope	Bright Dual line filar eyepiece with 15x magnification, 0.01µm reading
Light source	Halogen 12V, 30 watt, green filter, dimmable
Optical path	2 way, eyepiece / video/ccd/cmos camera
Vertical capacity	160mm (maximum specimen height)
Horizontal capacity	135mm (from center-line)
Stage dimensions	100mm x 100mm, travel 20mm x 20mm, reading 0.01mm
Operating temperature	5°C to 40°C (+/-20° for force 25gr & 50gr)
Humidity	10% to 90% non condensing
Dimensions and weight	220mm x 540mm x 650mm, 51kg
Power requirements	100VAC to 240VAC, 50/60Hz, single phase
Power consumption	390W
Guarantee	3 years limited guarantee

ORDER DETAILS

NEXUS 4300 Vickers / Knoop, 30kgf
NEXUS 4301 Brinell, 31.25kgf
NEXUS 4302 Macro Vickers / Knoop, 30kgf
NEXUS 4303 Micro/Macro Vickers / Knoop, 30kgf
NEXUS 4304 Micro/Macro Vickers / Knoop / Brinell, 31.25kgf
NEXUS 4500 Vickers / Knoop, 50kgf
NEXUS 4501 Brinell, 61.5kgf
NEXUS 4502 Macro Vickers / Knoop, 50kgf
NEXUS 4503 Micro/Macro Vickers / Knoop, 50kgf
NEXUS 4504 Micro/Macro Vickers / Knoop / Brinell, 61.5kgf

STANDARD DELIVERY

- Manual X-Y-Z stage
- Flat anvil 60mm
- Objectives 5x, 10x, 20x or 10x, 20x, 40x
- Electronic digital eyepiece 15x
- Vickers test block
- Set of workpiece fixtures, vice, chuck, clamp
- Built-in thermal printer
- RS-232 data output
- 4 adjustable feet
- Spare halogen lamp
- Fuse
- Installation & user manual
- Quality certificate
- Color: Laboratory White

OPTIONAL ACCESSORIES

- Objectives 5x, 40x, 60x
- INNOVAVIEW™ Vision measuring and filing systems
- Motorized X-Y stage (small or large)
- Motorized X-Y-Z stage (auto focus)
- Indentors & hardness test blocks
- Certified indentors
- Reference hardness blocks
- Solid tester table & storage cabinet
- Color according to demand

NEXUS 4000 SERIES — INNOVAVIEW™ (USB) INDENT VISION SYSTEM

REGULAR VICKERS

INV VISION SYSTEM

TABLE OPTION 1
ANALOGUE STAGE MICROMETERS

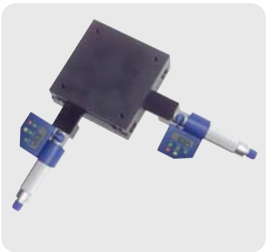


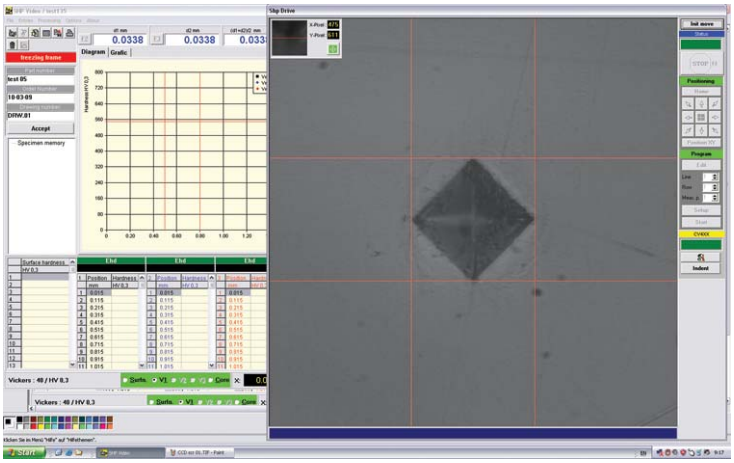
TABLE OPTION 2
DIGITAL STAGE MICROMETERS

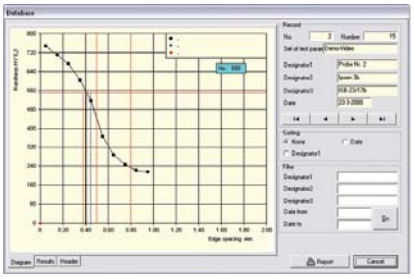
TABLE OPTION 3
SMALL MOTORIZED STAGE

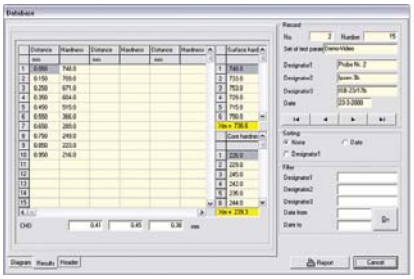
TABLE OPTION 4
LARGE MOTORIZED STAGE

FEATURES

- High resolution 5 mega pixels video camera allowing crisp indent images
- Manual & automatic image measuring mode
- Save, print and store image
- Report generator
- Data export to Excel or other MS applications
- Pattern programming, saving and recall
- Return to position and re-measure option
- Variable distance point plotting







INV-1

PC- based camera indent measuring system.
Manual measurement of the indent on the LCD screen.
Store, file, handle images and data on the harddisk.

INV-2

INV-1 plus digital micrometers to measure stage displacement to control accurate indent coordinates and to ease case depth measurement.
Automatic measuring optional.

INV-3

INV-2 plus motorized X-Y stage, automatic pattern and traverse system, workpiece position control over external or built-in PC.
Indent vision system shows real time measurement.
Semi-Automatic system. Automatic measuring optional.

INV-4

INV-3 plus motorized Z-axis for auto focus, X-Y table controlled by external or internal computer. Fully automatic system, including automatic measurement.
Allows a series of automatic test with storage of test results without operator interference. Saves time and money.

ORDER DETAILS

CCD INV1 Manual measurement
CCD INV2 Manual measurement with digital micrometers
CCD INV3 Motorized, X-Y stage (choose stage size)
CCD INV4 Fully automatic, auto focus X-Y-Z stage (choose stage size)
CCD AUTO Automatic measurement option for INV1, 2, 3

BRINELL HARDNESS TESTERS

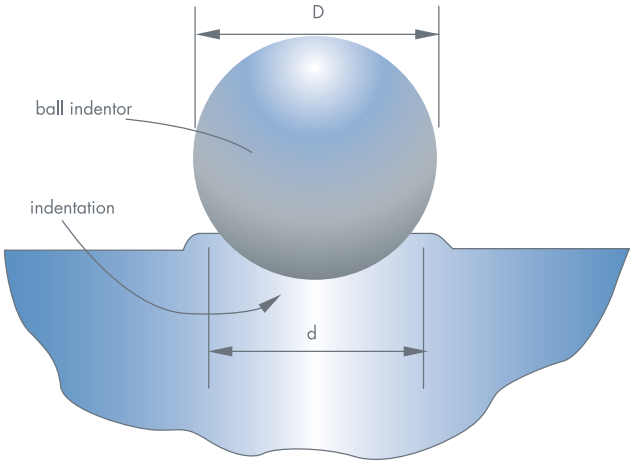
BRINELL HARDNESS TESTING

The Brinell scale characterizes the indentation hardness of materials through the scale of penetration of an indentor, loaded on a material test-piece.

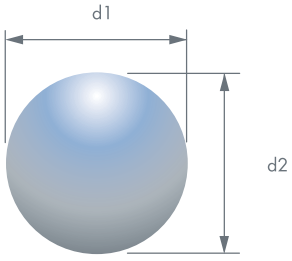
Proposed by Swedish engineer Johan August Brinell in 1900, it was the first widely used and standardized hardness test in engineering and metallurgy.

The typical tests use a 10, 5, 2.5 or 1mm diameter steel ball as an indentor with a test force starting at 1kgf up to 3,000kgf (29 kN) force. For softer materials, a lower force is used; for harder materials, a tungsten carbide ball is substituted for the steel ball.

After the impression is made, a measurement of the diameter of the resulting round impression (d) is taken. It is measured to plus or minus 0.05mm using a low-magnification microscope. The hardness is calculated by dividing the load by the area of the curved surface of the indention, (the area of a hemispherical surface is arrived at by multiplying the square of the diameter by 3.14159 and then dividing by 2).



(a) Brinell indentation



(b) measurement of indent diameter

Common values

The standard format for specifying tests can be seen in the example "HBW 10/3000". "HBW" means that a tungsten carbide (from the chemical symbol for tungsten) ball indentor was used, as opposed to "HBS", which means a hardened steel ball. The "10" is the ball diameter in millimeters. The "3000" is the force in kilograms force.

Standards

- European & international EN ISO 6506-1
- American ASTM E10-08

BRINELL HARDNESS TESTERS

NEXUS 3000 SERIES

BRINELL OPTICAL SCANNING SYSTEM HB100

BRINELL HARDNESS TESTERS

NEXUS 3000 SERIES

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3000LDB BASIC

WITH ANALOGUE MICROSCOPE

Brinell

- Load cell, closed loop system
- Test loads 61.5kgf - 3000kgf
- External microscope with analogue scale for indentation measurement
- Brinell video microscope system optional

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NEXUS 3001

WITH ANALOGUE MICROSCOPE

Brinell & Vickers

- Load cell, closed loop system
- Test loads 30kgf - 3000kgf
- LCD display showing Brinell and Vickers value, statistics and tester settings
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb.
- External microscope with analogue scale for indentation measurement
- Brinell video microscope system (optional)

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NEXUS 3002

WITH DIGITAL MICROSCOPE

Brinell & Vickers

- Load cell, closed loop system
- Test loads 30kgf - 3000kgf
- LCD display showing Brinell and Vickers values, statistics and tester settings
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb
- External digital microscope for automatic indentation measurement

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NEXUS 3001 XL

WITH ANALOGUE MICROSCOPE

Brinell & Vickers

- Load cell, closed loop system
- Test loads 30kgf - 3000kgf
- LCD display showing Brinell and Vickers value, statistics and tester settings
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb.
- External microscope with analogue scale for indentation measurement
- Brinell video microscope system (optional)

- **XL version, 450mm workpiece height, 250mm throat depth**

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NEXUS 3002 XL

WITH DIGITAL MICROSCOPE

Brinell & Vickers

- Load cell, closed loop system
- Test loads 30kgf - 3000kgf
- LCD display showing Brinell and Vickers values, statistics and tester settings
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb
- External digital microscope with analogue scale for automatic indentation measurement

- **XL version, 450mm workpiece height, 250mm throat depth**

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NEXUS 3000 XL SERIES

MOTORIZED SPINDLE

Nexus 3000 XL options

- The XL models can be supplied with a motorized spindle, featuring automatic workpiece detection, force application, unloading, repositioning. Fully automatic without operator interference.

BRINELL OPTICAL SCANNING SYSTEM HB100

Portable video scanning system to automatically measure Brinell indentations and determine the Brinell hardness value. Excellent solution for quick and easy measurement of Brinell hardness values with ball diameters 1, 2, 2.5, 5 and 10mm and for applied loads of 1 to 3000kg.

- Including (removable) magnetic base for accurate and precise measuring
- Easy to use: Position the scanning system on the indentation made in a flat or curved surface, press the button to determine the relative hardness and diameter of the indentation
- Accuracy of the measured diameter is up to 0.001µm
- Possibility to set tolerance value Yes/No (upper & lower limits)
- Possibility to show the last 5 hardness measurements taken
- Automatic storage of images and accompanying measurement data files
- Storage of operator id, date/hour, hardness parameters, measured hardness values, location of stored image

Software Features

- Measures the indentation automatically or by hand
- Saves the image of the indentation in a dedicated format and folder
- Test results can be imported into Excel
- Each measurement is filed with information about the ball diameter, applied load, load duration
- The 5 last measurements can be shown on screen
- Images taken can be copied

BRINELL HARDNESS TESTER 3000LDB

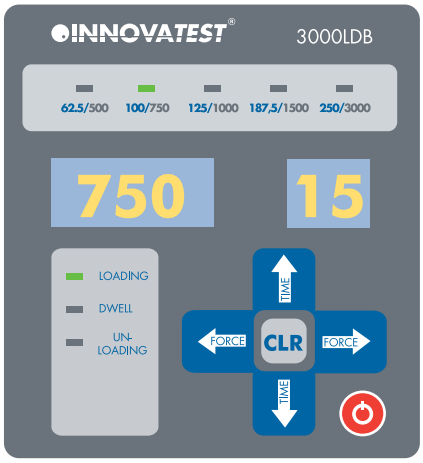
3000LDB
BRINELL 61.5KGF TO 3000KGF

FEATURES

Simple straight forward Brinell hardness tester with test force ranging from 61.5kgf to 3000kgf.
Closed loop, load cell, force feedback system for reliable load application, without overshoot.

- Sturdy, regular, 30kN (3000kg) test allowance
- Rugged construction to with-stand harsh environments
- Very affordable price
- External microscope with analogue scale for indentation measurement

*ALSO AVAILABLE WITH BRINELL SCANNING SYSTEM HB100



TECHNICAL SPECIFICATIONS

Brinell scales	HBW 10/3000, HBW 10/1500, HBW 10/1000, HBW 10/500, HBW 10/250, HBW 10/125, HBW 10/100, HBW 5/750, HBW 5/250, HBW 5/62.5, HBW 2.5/187.5
Test loads	62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000kgf
LCD display indication	Test force selected, applied test force, dwell Time
Test force application	Closed loop controlled load motor
Load duration	Adjustable dwell time 5-60 sec (5 sec step)
Accuracy	Conforms to EN-ISO 6506
Specimen accommodation	Vertical space 220mm Horizontal space (from center-line) 135mm
Specimen requirements	External surfaces roughly ground, Ra <21.6µm
Power supply	220V AC, 50Hz
Measuring microscope	Magnification 20x, resolution 5µm
Machine dimensions	236mm x 550mm x 753mm (WxDxH)
Machine weight	125kg

ORDER DETAILS

3000LDB Closed loop Brinell hardness tester

STANDARD DELIVERY

- Measuring microscope 20x
- Ball indentors ø2.5mm, ø5mm and ø10mm
- V-anvil
- Large (160mm) flat anvil
- Small flat anvil
- Testing table ø80mm
- Fuse 2A (3 pcs)
- Hardness test block 150-250 HBW 10/3000
- Hardness test block 75-125 HBW 10/1000
- Hardness test block 150-250 HBW 2.5/187.5
- INNOVATEST® certificate
- Installation and user manual

OPTIONAL ACCESSORIES

- Brinell microscope with dual filar line, objectives for 10x, 15x, 20x, 30x and 40x magnification
- Brinell video microscope system
- Certified indentors & balls
- Reference hardness blocks

BRINELL HARDNESS TESTER — NEXUS 3000 SERIES

NEXUS 3001
WITH ANALOGUE MICROSCOPE

NEXUS 3000 XL SERIES
MOTORIZED SPINDLE

NEXUS 3002 XL INV
AUTOMATIC MEASUREMENT

FEATURES

Top quality Brinell & Vickers testing in one super rigid frame. ''Made in Germany'' optical system with high quality objectives and either analogue or digital reading. Conversion to other hardness scales and online statistics. Connectivity for data output via RS-232.

- Load cell, closed loop system
- Test loads 30kgf - 3000kgf
- LCD display showing Brinell and Vickers value, statistics and tester settings
- Simultaneous conversion to Rockwell, Vickers, Brinell and Leeb rebound testing
- Microscope with analogue scale for indentation measurement (3001 model)
- Digital microscope for automatic indentation measurement (3002 model)
- Standard supplied with opjectives for 10x, 25x and 150x magnification
- Brinell video microscope system (optional)
- Brinell INV-IMPRESSIONS automatic indent measuring and filing system

- **XL version, 450mm workpiece height, 250mm throat depth**

TECHNICAL SPECIFICATIONS

NEXUS 3001/3002

Brinell scale HB	31.25, 62.5, 100, 125, 187.5, 250, 500, 750, 1000, 1500, 3000kgf
Vickers HV	30, 40, 50, 60, 80, 100, 120kgf
Ball indentors	10, 5, 2.5, 1mm
Test force selection	Electronic, closed loop, load cell, force feedback system, indication in kgf or N. Test force selectable over menu operation
Test procedure	Automatic, loading/dwell/unloading
Loading speed	Variable, depending on load application
Test force accuracy	< 1% full range
User display	Diameter of indent, length of diagonals, hardness value, converted value, test force, online statistics
Display resolution	0.1 HB, HV
Hardness conversion	Rockwell, Vickers, Brinell, Leeb & Tensile 2 scales simultaneously
Standardization	EN, ISO 6507, EN ISO 6506, ASTM E-384, ASTM E-10-08, ASTM E-384
Statistics	Total tests, max, min, average, range, standard deviation, all in real time after each test
Control panel	Start test, stop test, dwell time, print, clear, menu operation for date, time, scale and load settings, language
Firmware	V2.01, German, English, French (standard) V2.02, English, Italian, Spanish
Memory	Large memory for testing results
Data output	RS-232, Bi-Directional, USB
Loading mechanism	Fully automatic, closed loop, force feedback, loading, dwell, unloading
Dwell time setting	Default 10 seconds, user defined 1 to 99 seconds
Printer	Optional silent high speed printer
Eyepiece microscope	Analogue or optional bright dual line filar eyepiece with 15x magnification, 0.1µm reading
Vertical capacity	220mm (450mm XL model)
Horizontal capacity	135mm (250mm XL model) from center-line
Humidity	10% to 90% non condensing
Machine weight	130kg (160kg XL model)
Power requirements	100VAC to 240VAC, 50/60Hz, single phase
Power consumption	390W
Guarantee	2 years limited guarantee

INV-IMPRESSIONS

High performance PC- based camera indent measuring system.
Automatic measurement of the indent on the LCD screen.
Store, file, handle images and data on the harddisk.

ORDER DETAILS

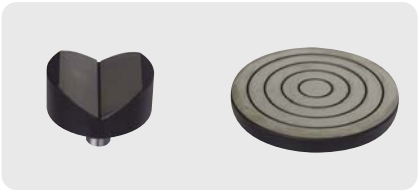
NEXUS 3001 Brinell, analogue micrometer reading
NEXUS 3001XL Brinell, analogue micrometer reading, tall version
NEXUS 3002 Brinell, Vickers, digital microscope
NEXUS 3002XL Brinell, Vickers digital microscope, tall version
NEXUS 3002XL INV Brinell, Vickers automatic measuring system

STANDARD DELIVERY

- Analogue microscope with 10x, 25x and 100x magnification (3001)
- Digital microscope with 10x, 25x and 100x magnification (3002) for automatic measurement
- Ball indentors ø1mm, ø 2.5mm, ø5mm and ø10mm
- V-anvil ø80mm
- Large flat anvil ø200mm
- Small flat anvil ø60mm
- Testing table ø80mm
- Fuse 2A (3 pcs)
- Hardness test block 150-250 HBW 10/3000
- Hardness test block 75-125 HBW 10/1000
- Hardness test block 150-250 HBW 2.5/187.5
- RS-232 data output
- 4 adjustable feet
- INNOVATEST® certificate
- Installation and user manual

OPTIONAL ACCESSORIES

- Motorized spindle for fully automatic testing on XL models
- Large testing table 350mm x 250mm
- HB100 Video measuring and data base system
- Extended height/width frame XL models
- Motorized X-Y stage
- Indentors & hardness test blocks
- Certified indentors
- Reference hardness blocks
- Solid tester table & storage cabinet
- Specified color requirement



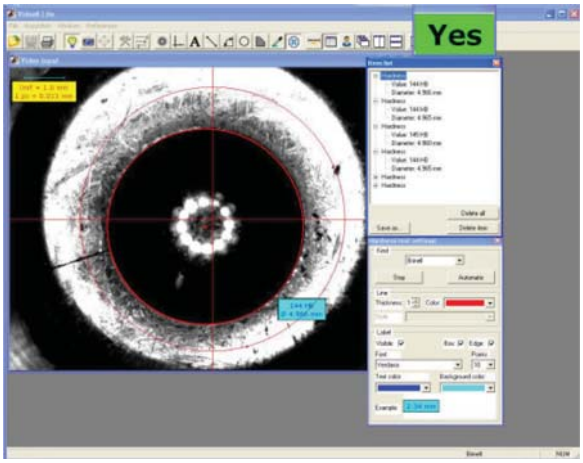
BRINELL SCANNING SYSTEM — INNOVAVIEW™ HB100

HB100
PORTABLE BRINELL INDENT SCANNER

FEATURES

Portable video scanning system to automatically measure and determine the Brinell hardness value.
Excellent solution for quick and easy measurement of Brinell hardness values made with ball diameters 1, 2, 2.5, 5 and 10mm and applied loads of 1kgf to 3000kgf.

- Including magnetic base for accurate and precise measuring
- Easy to use: Position the scanning system on the indentation made in a flat or curved surface, press the button to determine the relative hardness and diameter of the indentation
- Accuracy of the measured diameter is up to 0.001µm
- Possibility to set tolerance value Yes/No (upper & lower limits)
- Possibility to show the last 5 hardness measurements taken
- Automatic storage of images and accompanying measurement data files
- Storage of operator id, date/hour, hardness parameters, measured hardness values, location of stored image



STANDARD DELIVERY

- Video-optical head
- Firewire interface for pc or laptop
- Software
- Power supply AC 100-240V 50/60Hz, 1.0A
- Frame grabber
- Video cable (2.3m)
- RCA-RCA video cable (1.5m)
- 12V power cable (0.85m)
- Set of USB cable, CD with driver & dongle

SOFTWARE FEATURES

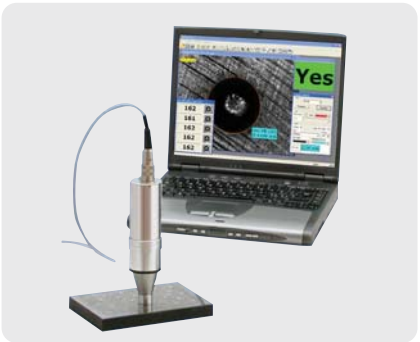
- Measures the indentation automatically or by hand
- Saves the image of the indentation in a dedicated format and folder
- Test results can be imported into Excel
- Each measurement is filed with information about the ball diameter, applied load, load duration
- 5 last measurements can be shown on screen
- Images taken can be copied

OPTIONAL ACCESSORIES

- Battery charger 12V, 7A
- Battery charger 12V, 1.2A
- Aluminum carrying case for HB100 + battery only
- PC or laptop

TECHNICAL SPECIFICATIONS

Power supply	12V
Power consumation	300mA
Dimensions	ø43mm x 270mm
Dimensions carrying case	Ext. 380mm x 265mm x150mm Int. 350mm x 250mm x140mm
Weight	650gr



ORDER DETAILS

HB100 Portable Brinell video scanning system

UNIVERSAL HARDNESS TESTERS

UNIVERSAL HARDNESS TESTING

Universal hardness testers are in fact hybride instruments allowing the user to make Rockwell, Vickers and Brinell hardness tests according to the applicable EN-ISO and ASTM standards, with one single machine.

Universal hardness testers do not convert hardness values but apply tests according to standard procedures.

While most hardness testers in particular measure only one kind of scale; either Rockwell or Vickers or Brinell, the Universal testers cover a wide range of testloads and measurement procedures.

While traditional Universal hardness testers were complex mechanical structures, built of many parts and complicated weight stacks, newer generations based on load cell technology and closed loop force feedback systems have taken away most of the complexity of earlier models.

Nowadays, Universal hardness testers offer the user the comfort of having one single tester covering all scales.
The advantage is obvious. While Universal hardness testers are often a more expensive asset, money can be saved on maintenance, after sales service and calibration. Due to technology of the load application system, closed loop Universal hardness testers offer a wide range of testloads generally superceeding single scale testers traditionally having dead weight load application systems.

INNOVATEST® manufactures a vast range of Universal hardness testers. Regardless of your budget, there is a tester for each application. Starting from simple traditional dead weight series like the 700M, or the simple to operate but very advanced 703 and 704 models to state-of-the-art machines like the new NEMESIS 9000™ series.

Due to the size of the range we present on this page and following pages a more detailed overview. Don't hesitate to ask our sales department for your particular requirement or advice on the best choice for your budget.

700M
Rockwell, Vickers, Brinell
Traditional dead weight hardness tester with an analogue Rockwell scale and analogue microscope for indent measuring. Ideal for educational purpose or general metal working workshops.
Limited test loads varying between 31.25kgf and 187.5kgf.

NEXUS 700 SERIES
Rockwell, Vickers, Knoop, Brinell, HVT, HBT
Load cell, closed loop, force feedback system. Advanced digital measurement system, digital display readings, memory and conversion to other hardness scales. Ideal for a very large range of smaller parts and components. Extreme suitable for educational purposes, research institutes and light industry. Offering a wide range (18) of test loads starting at 2kgf to 187.5kgf

NEXUS 7000 SERIES
Rockwell, Vickers, Knoop, Brinell, HVT, HBT
Load cell, closed loop, force feedback system. Advanced digital system, digital readings, memory and conversion to other hardness scales. Mat screen for Vickers and Brinell indents. Large workpiece accommodation that can be extended on request. Wide range of test loads starting at 1kgf to 250kgf.

NEMESIS 9000™ SERIES
Rockwell, Vickers, Knoop, Brinell, HVT, HBT
Load cell, closed loop, force feedback system. State of the art hardness testing machine. Built-in Industrial PC for video indent measuring system. Advanced firmware, automatic measurement, descending testhead, turret with 3 indentor positions and 3 objectives, optical ZOOM system, flexible working height, long working distance objectives, superior test range, depending on model allowing 500gram to 3000kgf force application.

UNIVERSAL HARDNESS TESTERS

UNIVERSAL HARDNESS TESTERS — NEXUS 700 SERIES

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NEXUS 702A
ANALOGUE EXTERNAL MICROSCOPE

Rockwell, Superficial Rockwell & Brinell
- Load cell, closed loop system
- Test loads 2kgf - 187.5kgf
- External microscope with analogue scale for indentation measurement
- Built-in hardness calculator
- Digital full color OLED display shows all hardness values, statistics and tester settings. Advanced functions
- Conversion to Rockwell, Superficial Rockwell, Vickers, Brinell scales

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NEXUS 703A
ANALOGUE BUILT-ON MICROSCOPE

Rockwell, Superficial Rockwell, Brinell & Vickers
- Load cell, closed loop system
- Test loads 2kgf - 187.5kgf
- Built-on microscope with analogue scale for indentation measurement
- Built-in hardness calculator
- Digital full color OLED display shows all hardness values, statistics and tester settings. Advanced functions
- Conversion to Rockwell, Superficial Rockwell, Vickers, Brinell scales

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NEXUS 704A
ANALOGUE BUILT-ON MICROSCOPE

Rockwell, Superficial Rockwell, Brinell, Vickers, HVT & HBT
- Load cell, closed loop system
- Test loads 2kgf - 187.5kgf
- Built-on microscope with analogue scale for indentation measurement
- Built-in hardness calculator
- Digital full color OLED display shows all hardness values, statistics and tester settings. Advanced functions
- Conversion to Rockwell, Superficial Rockwell, Vickers, Brinell scales

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NEXUS 703D
DIGITAL MICROSCOPE

Rockwell, Superficial Rockwell, Brinell & Vickers
- Load cell, closed loop system
- Test loads 2kgf - 187.5kgf
- Built-on digital microscope for automatic indentation measurement
- Digital full color OLED display shows all hardness values, statistics and tester settings. Advanced functions
- Conversion to Rockwell, Superficial Rockwell, Vickers, Brinell scales

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NEXUS 704D
DIGITAL MICROSCOPE

Rockwell, Superficial Rockwell, Brinell, Vickers, HVT & HBT
- Load cell, closed loop system
- Test loads 2kgf - 187.5kgf
- Built-on digital microscope for automatic indentation measurement
- Digital full color OLED display shows all hardness values, statistics and tester settings. Advanced functions
- Conversion to Rockwell, Superficial Rockwell, Vickers, Brinell scales

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NEXUS 700
CUSTOMIZED

NEXUS 700
Can be configured according to your request
- Special anvils
- Special testing tables or stages
- Knoop scale (optional)
- Custom scales

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NEXUS 703 INV1

UNIVERSAL SYSTEM WITH VIDEO MEASURING SYSTEM

Rockwell, Superficial Rockwell, Brinell, Vickers & Knoop

- Load cell, closed loop system
- Test loads 2kgf - 187.5kgf
- Vision indent measuring system with advanced capabilities Manual measurement of the indent on the LCD screen Case Hardness Depth, Store, file, handle images and data on the harddisk
- Digital full color OLED display shows all hardness values, statistics and tester settings. Advanced functions
- Conversion to Rockwell, Superficial Rockwell, Vickers, Brinell scales
- Indent measurement optional

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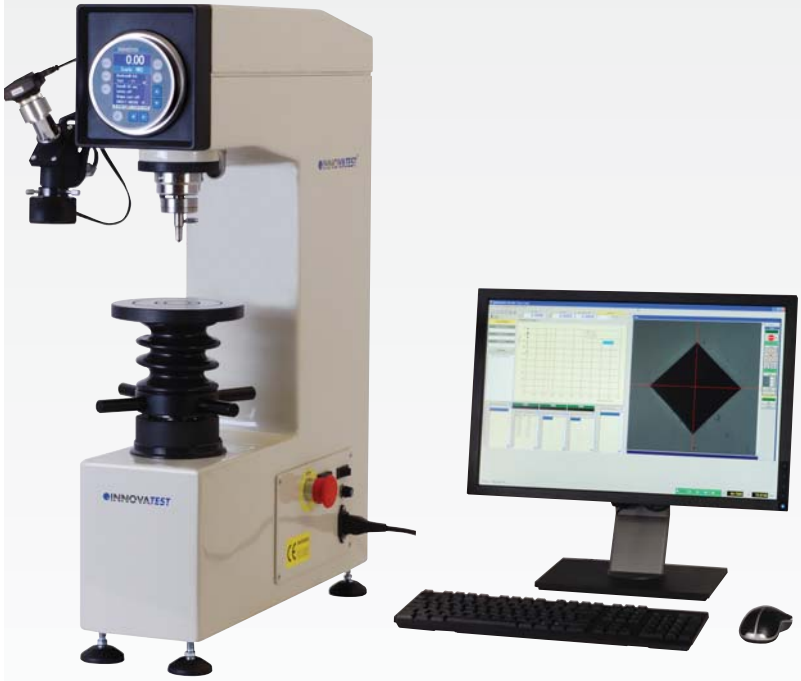

NEXUS 704 INV1

UNIVERSAL SYSTEM WITH VIDEO MEASURING SYSTEM

Rockwell, Superficial Rockwell, Brinell, Vickers, Knoop & HVT, HBT, HB

- Load cell, closed loop system
- Test loads 2kgf - 187.5kgf
- Vision indent measuring system with advanced capabilities Manual measurement of the indent on the LCD screen Case Hardness Depth, Store, file, handle images and data on the harddisk
- Digital full color OLED display shows all hardness values, statistics and tester settings. Advanced functions
- Conversion to Rockwell, Superficial Rockwell, Vickers, Brinell scales
- Indent measurement optional

NEXUS 7000
1KGF TO 250KGF

Rockwell, Superficial Rockwell, Brinell, Vickers & HVT, HBT

- Load cell, force feedback, closed loop system
- Test loads 1kgf-250kgf
- Complies to all applicable EN/ISO and ASTM standards
- Optical system high precision optical path, mat screen diameter 135mm
- Shape correction for curved surfaces
- High accuracy depth measuring system (Rockwell, HBT, HVT)
- Large LCD display shows measured values, online statistics, memory overview, tester settings
- User-friendly, low training requirements
- Possibility to store 20 batch files with 50 measuring results
- Direct printer and/or PC connections via RS-232 and USB-2
- Large workpiece accommodation (H=300mm)

NEXUS 7000 XL
1KGF TO 250KGF

Rockwell, Superficial Rockwell, Brinell, Vickers & HVT, HBT

- Load cell, force feedback, closed loop system
- Test loads 1kgf-250kgf
- Complies to all applicable EN/ISO and ASTM standards
- Optical system high precision optical path, screen diameter 135mm
- Shape correction values for curved surfaces
- High accuracy depth measuring system (Rockwell, HBT, HVT)
- Large LCD display shows measured values, online statistics, memory overview, tester settings
- User-friendly, low training requirements
- Possibility to store 20 batch files with 50 measuring results
- Direct printer and/or PC connections via RS-232 and USB-2
- Extra large workpiece accommodation (H=450mm)

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NEMESIS 9000™ SERIES
0.5KGF TO 3000KGF

Rockwell, Superficial Rockwell, Brinell, Vickers & HVT, HBT

- Load cell, force feedback, closed loop system
- Test load settings from 500gf to 3000kgf
- IMPRESSIONS™ manual & automatic video indent measuring system
- High resolution indent image ZOOM system
- Turret with 6 positions, 3 indentors, 3 objectives
- Built-in industrial PC
- Large 15'' industrial touch screen with easy to use interface
- Complies to all applicable EN/ISO and ASTM standards
- Large database for hardness conversion values, converts to any hardness scale and any material.
- High accuracy depth measuring system
- Possibility to store 10,000 batch files with each 199 measurements
- RS-232, video out, USB-2, LAN connections
- Built-in driver pack for X-Y or jominy stages
- Specimen accommodation; maximum test height 300mm, maximum depth 220mm (from the center)

NEMESIS 9000™ XL SERIES
0.5KGF TO 3000KGF

Rockwell, Superficial Rockwell, Brinell, Vickers & HVT, HBT

- Load cell, force feedback, closed loop system
- Test load settings from 500gf to 3000kgf
- IMPRESSIONS™ manual & automatic video indent measuring system
- High resolution indent image ZOOM system
- Turret with 6 positions, 3 indentors, 3 objectives
- Built-in industrial PC
- Large 15'' industrial touch screen with easy to use interface
- Complies to all applicable EN/ISO and ASTM standards
- Large database for hardness conversion values, converts to any hardness scale and any material.
- High accuracy depth measuring system
- Possibility to store 10,000 batch files with each 199 measurements
- RS-232, video out, USB-2, LAN connections
- Built-in driver pack for X-Y or jominy stages
- Specimen accommodation; maximum test height 450mm, maximum depth 220mm (from the center)

UNIVERSAL HARDNESS TESTER 700M

700M
ANALOGUE, DEAD WEIGHT

FEATURES

Rockwell, Vickers, Brinell, traditional dead weight hardness tester with an analogue Rockwell scale and analogue microscope readings. Ideal for educational purpose or general metal working workshops.
Limited test loads ranging between 31.25kgf and 187.5kgf.

- Dead-weight universal hardness tester with rigid design
- Rockwell, Brinell and Vickers testing procedures combined in one tester
- Sliding table between indentor and measuring microscope
- Magnification by 3 objective lenses giving up to 150x magnification (optional)
- Conforms to DIN-EN-ISO 6506, 6507, 6508 and ASTM
- Simple test cycle by operation lever
- Elevating spindle with precision guide bush, high precision bearings to eliminate back-lash from the system

TECHNICAL SPECIFICATIONS

Hardness parameters	Rockwell, Brinell, Vickers	
Optics	Eyepiece magnification 15x	
Objectives for	2.5x for 37.5x magnification, 5x for 75x magnification and 10x for 150x magnification (optional)	
Standards	Conforms to DIN-EN-ISO 6506, 6507, 6508 and ASTM	
Test loads	6 Test Loads Selectable	
Test load type	Dead weight via load selector	
Test cycle	Manually operated	
Test loads	Rockwell	60 - 100 - 150kg
	Brinell	31.25 - 62.5 - 187.5kg
	Vickers	30 - 100kg
Indentor types	Rockwell	Diamond cone 120°, Balls 1/16"
	Brinell	Balls 1mm - 2.5mm - 5mm
	Vickers	Diamond cone 136°
Load duration	Conforms to standards	
Data output	Non	
Specimen accommodation	Maximum test height 180mm, Maximum depth 200mm (from the center)	
Specimen access	External surfaces, Cylindrical surfaces down to 3mm diameter	
Power supply	220V / 50Hz	
Machine dimensions	560mm x 260mm x 760mm (WxDxH)	
Machine weight	90kg	

ORDER DETAILS

700M Analogue, universal hardness tester

STANDARD DELIVERY

- Objectives for 37.5x and 75x magnification
- Sliding testing table
- V-anvil ø40mm and ø60mm
- Flat anvil ø60mm
- Testing table ø160mm
- Hardness test block ±450HV
- Hardness test block ±200HB
- Hardness test block ±60HRC
- Hardness test block ±30HRC
- Hardness test block ±85HRB
- Rockwell Diamond cone 120°
- Rockwell ball indentors 1/16"
- Brinell balls indentors 1mm, 2.5mm, 5mm
- Vickers diamond cone 136°
- Fuse 7A (2 pcs)
- Spare light bulb 6V/15W (2 pcs)
- External light source for improved Brinell indent viewing
- Power cable
- INNOVATEST® certificate
- Installation and user manual

OPTIONAL ACCESSORIES

- Objective for 150x magnification
- Dual filar microscope
- LED ring light
- Certified indentors & balls
- Reference hardness blocks

NEXUS 700A
ANALOGUE MICROSCOPE

NEXUS 700D
DIGITAL MICROSCOPE

FEATURES

Rockwell, Vickers, Knoop, Brinell, HVT, HBT Load cell, closed loop, force feedback universal hardness tester. Advanced digital measurement system, digital display readings, memory and conversion to other hardness scales. Ideal for a very large range of smaller parts and components. Extremely suitable for educational purposes, research institutes and light industry. Offering a wide range of test loads starting at 2kgf to 187.5kgf.

- Load cell, force feedback, closed loop system
- Load range 2 up to 187.5kgf
- Complies to all applicable EN/ISO and ASTM standards
- Shape correction values for curved surfaces
- High-quality depth measuring system (Rockwell, HBT, HVT)
- Very user-friendly, low training requirements
- Possibility to store 49 batch files with statistic results
- Direct printer and/or PC connections via USB-2

Suitable to determine the hardness of a wide variety of metal and plastic parts.

TECHNICAL SPECIFICATIONS

Hardness scales	Brinell, Vickers, Rockwell (HVT and HBT)
Load application	Load cell, force feed back, closed loop system
Load range	2kgf to 187.5kgf
Optical system	Analogue (A) or electronic (D) digital microscope with bright LED illumination
Eyepiece	15x magnification (10x optional)
Objectives	Interchangeable 2.5x, 5x and 10x magnification
Scale resolution	0.001mm (1 micron)
Display	Full color OLED display, testing results, statistics, built-in hardness calculator, etc.
Standards	Complies to EN/ISO and ASTM standards
Test loads	2, 2.5, 3, 5, 10, 15, 15.625, 20, 30, 31.25, 45, 50, 60, 62.5, 100, 125, 150, 187.5
Vickers test range	HV 2, 3, 5, 10, 20, 30, 50, 100, 120; HVT 50, 100kgf
Brinell test range	HB1/2.5, 5, 10, 31.25kgf; HB2.5/6.25,15.625, 31.25, 62.5, 187.5kgf; HB5/25, 62.5, 125kgf; HB10/100kgf; HBT2.5/62.5, 187.5kgf
Rockwell test scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Test cycles	Automatic, Load, Dwell, Unload
Indentors	Brinell / Balls 1 - 2.5 - 5 - 10mm; Vickers Diamond 136°; Rockwell Diamond Cone 120°; Rockwell balls 1/16", 1/8", 1/4", 1/2"; Some are optional
Force control	1- 99 seconds
Data output	USB-2, RS-232
Specimen accommodation	Max. height: 170mm Max. throat: 165mm

ORDER DETAILS

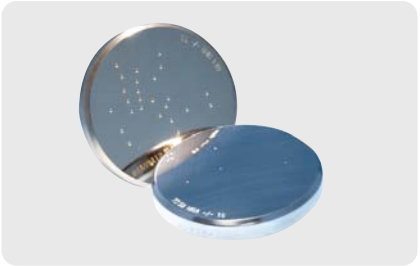
702A Rockwell, Superficial Rockwell, Brinell
703A Rockwell, Superficial Rockwell, Vickers, Brinell
704A Rockwell, Superficial Rockwell, Vickers, Brinell, HVT & HBT
703D See 703A, with digital built-on microscope
704D See 704A, with digital built-on microscope

STANDARD DELIVERY

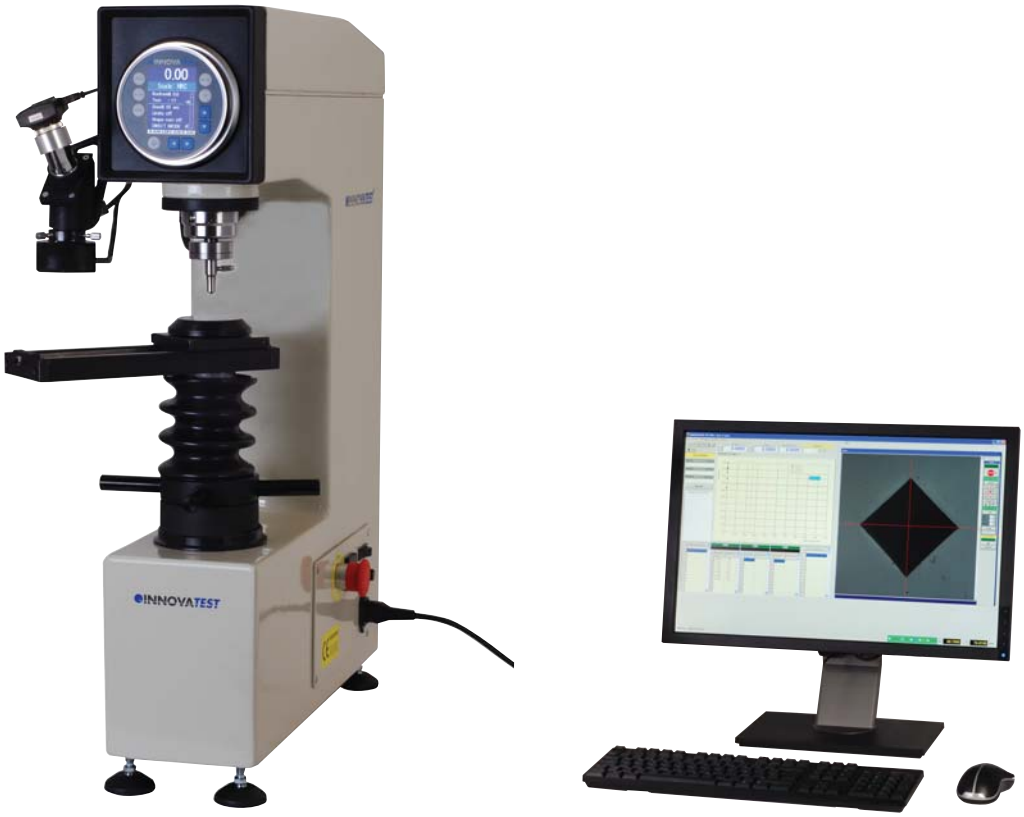
- Objectives for 37.5x, 75x and 150x magnification
- Rockwell diamond cone 120°
- Rockwell ball indentor 1/16"
- Brinell balls indentors 1mm, 2.5mm, 5mm, 10mm
- Vickers diamond cone 136°
- Sliding testing table
- V-anvil ø40mm and ø60mm
- Flat anvil ø60mm
- Testing table ø160mm
- Hardness test block ±450HV
- Hardness test block ±200HB
- Hardness test block ±60HRC
- Hardness test block ±30HRC
- Hardness test block ±85HRB
- Fuse 7A (2 pcs)
- Spare light bulb 6V/15W (2 pcs)
- External lamp for Brinell measurements
- Power cable
- INNOVATEST® certificate
- Installation and user manual

OPTIONAL ACCESSORIES

- LED ring light for microscope
- Certified indentors
- Reference hardness blocks
- Eyepiece 10x
- Long Vickers indentor
- Custom testing tables
- Precision vices, V-blocks and special clamps
- Software solutions for advanced applications



UNIVERSAL TESTER WITH VISION SYSTEM — INNOVAVIEW™ 700 SERIES



NEXUS 704 INV1

FEATURES

Rockwell, Vickers, Knoop, Brinell, HVT, HBT Load cell, closed loop, force feedback universal hardness tester.
Advanced digital measurement system, digital display readings, memory and conversion to other hardness scales.
Innovaview INV-1 PC based high resolution indent viewing system.
Ideal for a very large range of smaller parts and components. Extremely suitable for educational purposes, research institutes and light industry. Offering a wide range of test loads starting at 2kgf to 187.5kgf.

- Load cell, force feedback, closed loop system
- Load range 2 up to 187.5kgf
- Complies to all applicable EN/ISO and ASTM standards
- Shape correction values for curved surfaces
- High-quality depth measuring system (Rockwell, HBT, HVT)
- Very user-friendly, low training requirements
- Rockwell readings; possibility to store 19 batch files with statistic results
- Direct printer and/or PC connections via USB-2

Suitable to determine the hardness of a wide variety of metal and plastic parts.

TECHNICAL SPECIFICATIONS

Hardness scales	Brinell, Vickers, Rockwell (HVT and HBT)
Load application	Load cell, force feed back, closed loop system
Load range	2kgf to 187.5kgf
Optical system	High resolution CCD USB camera
Eyepiece	15x magnification (10x optional)
Objectives	Interchangeable 2.5x, 5x and 10x magnification
Scale resolution	0.001mm (1 micron)
Display	Full color OLED display, testing results, statistics, built-in hardness calculator, etc.
Standards	Complies to EN/ISO and ASTM standards
Test loads	2, 2.5, 3, 5, 10, 15, 15.625, 20, 30, 31.25, 45, 50, 60, 62.5, 100, 125, 150, 187.5
Vickers test range	HV 2, 3, 5, 10, 20, 30, 50, 100, 120; HVT 50, 100kgf
Brinell test range	HB1/2.5, 5, 10, 31.25kgf; HB2.5/6.25,15.625, 31.25, 62.5, 187.5kgf; HB5/25,62.5, 125kgf; HB10/100kgf; HBT2.5/62.5, 187.5kgf
Rockwell test scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Test cycles	Automatic, Load, Dwell, Unload
Indentors	Brinell / Balls 1 - 2.5 - 5 - 10mm; Vickers Diamond 136°; Rockwell Diamond Cone 120°; Rockwell balls 1/16", 1/8", 1/4", 1/2"; Some are optional
Force control	1- 99 seconds
Data output	USB-2, RS-232
Specimen accommodation	Max. height: 170mm Max. throat: 165mm

ORDER DETAILS

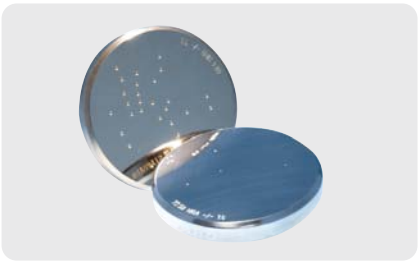
703 INV1 Rockwell, Superficial Rockwell, Vickers, Brinell
704 INV1 Rockwell, Superficial Rockwell, Vickers, Brinell, HVT, HBT

STANDARD DELIVERY

- Objectives for 37.5x, 75x and 150x magnification
- Rockwell diamond cone 120°
- Rockwell ball indentor 1/16"
- Brinell balls indentors 1mm, 2.5mm, 5mm, 10mm
- Vickers diamond cone 136°
- Sliding testing table
- V-anvil ø40mm and ø60mm
- Flat anvil ø60mm
- Testing table ø160mm
- Hardness test block ±450HV
- Hardness test block ±200HB
- Hardness test block ±60HRC
- Hardness test block ±30HRC
- Hardness test block ±85HRB
- Fuse 7A (2 pcs)
- Spare light bulb 6V/15W (2 pcs)
- External lamp for Brinell measurements
- Power cable
- INNOVATEST® certificate
- Installation and user manual

OPTIONAL ACCESSORIES

- LED ring light for microscope
- Certified indentors
- Reference hardness blocks
- Eyepiece 10x
- Long Vickers indentor
- Custom testing tables
- Precision vices, V-blocks and special clamps
- Software solutions for advanced applications



NEXUS 7000
DIGITAL, MAT SCREEN

NEXUS 7000XL
DIGITAL MAT SCREEN, LARGE FRAME

FEATURES

Rockwell, Vickers, Knoop, Brinell, HVT, HBT Load cell, closed loop, force feedback system. Advanced digital system, digital readings, memory and conversion to other hardness scales. Mat screen for Vickers and Brinell indents. Large workpiece accommodation in the range of test loads starting at 1kgf to 250kgf.

- Load cell, force feedback, closed loop system
- Wide test load range up to 250kgf
- Complies to all applicable EN/ISO and ASTM standards
- Shape correction values for curved surfaces
- High-quality depth measuring system (Rockwell, HBT, HVT)
- Very user-friendly, low training requirements
- Possibility to store 20 batch files with 50 measuring results each
- Direct printer and/or PC connections via RS-232 and USB-2

Suitable to determine the hardness of castings and forgings, meets a wide variety of applications within the automotive and aerospace industry

TECHNICAL SPECIFICATIONS

Hardness scales	Brinell, Vickers, Rockwell
Load application	Load cell, force feed back, closed loop system
Load range	1 - 250kgf
Optical system	High precision optical path, screen diameter 135mm
Objectives	Interchangeable 20x, 44x, 70x, 140x magnification
Scale Resolution	0.001mm (1 micron)
Display	Full function LCD screen, testing results, statistics, built-in hardness calculator, etc.
Standards	Complies to all applicable EN/ISO and ASTM standards
Test loads	(0.5*) 1, 2, 2.5, 3, 5, 10, 15, 15.625, 20, 30, 31.25, 45, 50, 60, 62.5, 100, 125, 150, 187.5, 250kgf (*Optional)
Vickers test range	HV (0.5*), 1, 2, 3, 5, 10, 20, 30, 50, 100; HVT 50, 100kgf (*Optional)
Brinell test range	HB1/1, 2.5, 5, 10, 30kgf; HB2.5/6.25, 15.625, 31.25, 62.5, 187.5kgf; HB5/ 25, 62.5, 125, 250kgf; HB10/ 100, 250kgf; HBT2.5/62.5, 187.5kgf; HBT5/250kgf
Rockwell test scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V, Bm, Fm, Ralpha, 15N, 30N, 45N, 15T, 30T, 45T, 15W, 30W, 45W, 15X, 30X, 45X, 15Y, 30Y, 45Y
Test cycles	Automatic & Manual
Indentors	Brinell / Balls 1 - 2.5 - 5 - 10mm; Vickers Diamond 136°; Rockwell Diamond Cone 120°; Rockwell balls 1/16", 1/8", 1/4", 1/2"; Some are optional
Force control	2- 99 seconds
Data Output	RS-232 Serial Interface (printer/PC), USB
Specimen accommodation	TYPE A: Max. height: 300mm (standard) Max. throat: 150mm (standard) TYPE B: Max. height: 450mm Max. throat: 150mm
Cylindrical Surfaces	Starting at 3mm diameter
Machine dimensions	TYPE A: 250mm x 567mm x 1030mm TYPE B: 250mm x 567mm x 1180mm
Machine weight	TYPE A: 201kg, TYPE B: 212kg
Power Supply	220V / 50Hz other voltages and/or frequencies on request
Guarantee	2 years limited guarantee

ORDER DETAILS

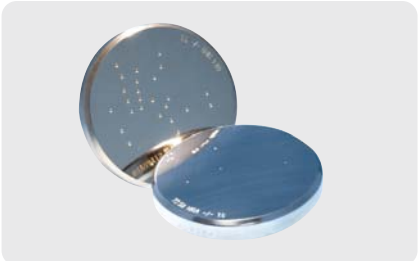
7000 Universal hardness tester, standard
7000XL Universal hardness tester, extended work height

STANDARD DELIVERY

- Diamond Rockwell indentor
- Vickers indentor
- Brinell indentor 2.5mm
- Hardness test block HRA
- Hardness test block HRC
- Hardness test block HRB
- Hardness test block HV30
- Hardness test block HB2.5/187.5
- Objective for 70x magnification
- Objective for 140x magnification
- Clamping protection nose
- Testing table ø80mm
- Installation & user manual
- Calibration certificate
- Toolset

OPTIONAL ACCESSORIES

- Objectives for 10x, 20x, 44x magnification
- Testing table ø150mm
- Testing table ø235mm
- V-Anvil ø80mm
- V-Anvil ø120mm
- Certified indentors & hardness test blocks
- Long Vickers indentor
- Other testing tables and XY-stages
- Precision vices, V-blocks and special clamps
- Software solutions for advanced applications



NEMESIS 9000™ SERIES
0.5KGF TO 3000KGF, 6 POSITION MOTORIZED TURRET

UNIVERSAL HARDNESS TESTERS NEMESIS 9000™ SERIES

NEMESIS 9000™ Series, represents the latest top of the range development on universal hardness testing by Innovatest. Modern design, innovated technology, multi purpose hardness testing instrument, based on the application of mechatronic components and high resolution video machine vision systems. A superior level of precision combined with High Definition imaging creates an almost unlimited field of applications.

The NEMESIS 9000™ Series represents universal hardness testing, in the most versatile meaning of Universal.
Aircraft engine parts, automobile parts, production lines, general quality assurance and laboratory use, are all fields covered by the NEMESIS 9000™ Series.

Manual operation or full scale automation to the highest possible level are both standard on NEMESIS.

NEMISIS 9000™, Load Cell, Closed loop, Force feedback system, to give what is due, in a modern way, with unlimited flexibility, suitable for the following:

OPTICAL HARDNESS TESTING METHODS:
- Vickers (HV), EN ISO 6507, ASTM E 92
- Knoop (HK) ISO 4545, 4546
- Brinell (HB) EN ISO 6506, ASTM E 10

DEPTH MEASURING HARDNESS TESTING METHODS:
- Rockwell (HR) EN ISO 6508, ASTM E 18
- Vickers depth measurement HVT VDI/VDE 2616-1
- Brinell depth measurement HBT VDI/VDE 2616-1
- Ball indentation hardness (H) (ISO 2039-1) (plastics)

FEATURES

- Rockwell, Superficial Rockwell, Vickers, Knoop, Brinell, Ball indentation, HVT and HBT scales
- Superior range of testloads/force application ranging from 500gf to 3000kgf (over 3 models)
- Fixed workpiece position (no spindle)
- Descending test head with automatic workpiece detection
- Free definable, manual or motorized 6 position turret for objectives and indentors at choice
- High Definition INNOVAZOOM™ optical system for images of 0.7x to 1000x magnification
- PC based INNOVATEST IMPRESSIONS™ hardness testing firmware and database file system, standard
- Large, adjustable 15'' industrial touch screen (or mouse with normal 22''LCD screen at choice)
- Automatic or manual focus, manual or fully automatic indent measurement, standard
- Built-in hard disk offers nearly endless file storing, standard
- LAN, WLAN, USB-2, RS-232, Printer and DVI connectivity, standard
- On board built-in driver for (optional) motorized X-Y stage, standard
- Free definable test patterns case depth, traverse, free style, etc., optional
- Machine covers made of shock, damage and fire proof recyclable materials
- Large range of optional accessories
- Large testpiece accommodation H=300mm, D=220mm
  can be upgraded to a taller frame of for instance H=450mm, D=220mm or 300mm;
  even years after purchasing the tester
- 3 years free firmware upgrade, standard
- Designed and manufactured in The Netherlands, 24 months limited guarantee

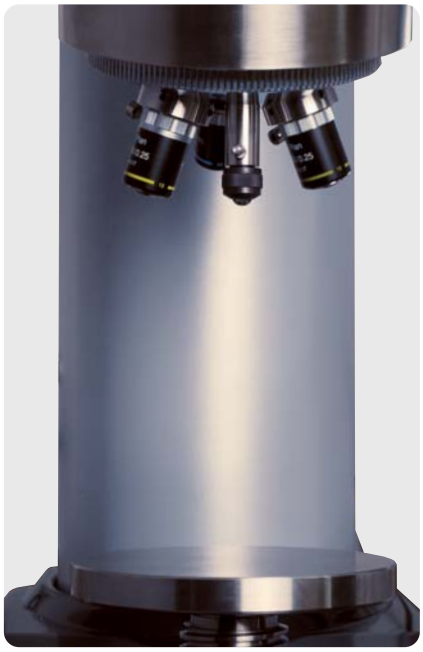
NEMESIS has a rigid linear force actuator to move the test head in the required position. This can be done in 3 different ways. Automatic: the test head will decent to the workpiece after pressing the start button. Automatic workpiece position detection. The descending can also be realized in a manual high speed mode or in a manual ''focus'' mode.

6 POSITION TURRET, STANDARD ON NEMESIS

A special feature of the NEMESIS 9000™ is the motorized turret which comes as a standard on each system. The turret can hold 3 different indentors and 3 objectives up to 40x magnification, or 6 different indentors on a PURE ROCKWELL model

Combine the turret with an optional X-Y stage, a rotary table or inclination table and create the worlds most comprehensive 4 or 5 axis hardness testing system.

Workpiece position is fixed. No handwheels, no difficult supporting and no spindle to carry heavy parts. No wear and tear caused by heavy workpieces. No workload and no additional drive systems required.



PROTECTION, SAFETY, ONLINE SYSTEMS

NEMESIS 9000™ intelligent sensor systems will register any irregular or unusual force being applied to the turret, and will stop the test head from descending. In this way the system cannot cause injuries. No significant force is applied when any of the objectives are in viewing position.

The NEMESIS test head with force actuator, with or without turret, can be used in on-line structures or being integrated in to production lines requiring automatic testing procedures. The newly developed INNOVAZOOM™ optical system allows stunning, High Definition indent magnification (0.7x to 1000x). Refined algorithms guarantee for accurate automatic measurement.

IMPRESSIONS 9000™, FIRMWARE

IMPRESSIONS 9000™ is the advanced user operating system of the NEMESIS 9000™ Series. The software incorporates, manual and automatic measurement for all scales, image editing, file storing, image storing, report printing, turret operation, manual or automatic focussing and many other advanced functions.

The firmware converts to 3 different hardness (and tensile) scales simultaneously. The conversions can be set to material and standard (ISO/ASTM)

The system also controls an (optional) X-Y stage, rotary or inclining table that can be plugged into the standard built-in driver of the tester. No additional charges, no external devices.

In combination with an X-Y stage the tester offers the option of running case depth hardness programs, pre defined testing patterns and/or other specific or special tasks defined by the user.

All data can be copied or exported in to MS applications like Word, Excel, or a report generator that emails test results directly to your workstation, or server. All data can be accessed over the LAN or WLAN connections.

ANVILS , TEST TABLES, SPECIAL INDENTORS

Each NEMESIS 9000™ is supplied with a standard set of test anvils and worktables. Such set includes 1 V-groove anvil, 1 flat anvil 80mm, 1 large round testing table ø200mm.
Additionally, you can opt for a large range of specific anvils such as a spot anvil, set of V-groove anvils tungsten alloy or diamond surface anvils.

The tester can be equipped with a furnace or cooling unit to test workpieces under high or low temperature. Robot workpiece loading and unloading can be supported by the built-in industrial computer.

To support large workpieces or cylinder blocks you can opt for the (350mm x 250mm) large working stage that incorporates T-grooves for solid workpiece fixing.

Flexible working heights
The NEMESIS 9000™ has a standard working height of 300mm. In case you have larger components NEMESIS is available with different frame heights ranging up to 500mm workpiece height and up to 350mm depth. Ask our sales department for customized options.

X-Y STAGES, ROTARY TABLES, INCLINATION DEVICES

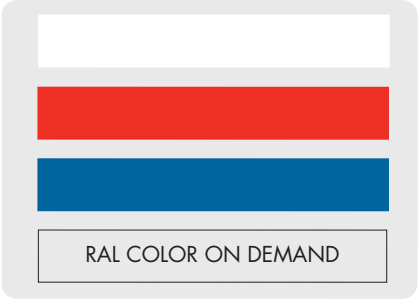
Being Universal means being ready for any task. NEMESIS 9000™ can be equipped with a variety of X-Y stages suitable for different applications. Different testforces require different specifications of the X-Y stages. Size, testload and positioning accuracy can be offered according to your particular requirement.

CNC rotary tables and inclining testing tables are available depending on the complexity of your workpieces.

TESTER COLORS

The standard color of NEMESIS 9000™ "ABS" covers is ''black''.
Your tester can be supplied in any color or paint structure of your choice.

INC-1LW	Laboratory White
INC-2CGM	Charcoal Grey Metallic
INC-3FR	Ferrari Red
INC-4BRG	British Racing Green
INC-5ABL	Atlantic Blue
INC-RAL XXXX	Any RAL color on demand



UNIVERSAL HARDNESS TESTERS

TECHNICAL SPECIFICATIONS	NEMESIS 9001™ UNIVERSAL	NEMESIS 9002™ UNIVERSAL
SCALES / TEST LOADS/FORCE	**0.5kgf to 250kgf**	**1kgf to 750kgf**
ROCKWELL, A, B, C, D, E, F, G, H, K, L, M, P, R,V	All scales	All scales
SUPERFICIAL ROCKWELL, N, T, X, Y	All scales	All scales
MACRO ROCKWELL HRM	Yes	Yes
VICKERS HV	500gr to 120kgf	500gr to 120kgf
KNOOP	All scales	All scales
HVT	50, 100kgf	50, 100kgf
BRINELL	500gr to 250kgf	1 to 750kgf
HBT	5/250	5/250
H (ball indentation)	Up to 250kgf	Up to 750kgf
FORCE APPLICATION SYSTEM		
Linear force actuator	Standard	Standard
Load cell, closed loop, force feed back system	Standard	Standard
Motorized heavy duty TURRET with 6 positions	Standard	Standard
Indentor positions	3	3
Objective positions	3	3
LED optical indent illumination	Standard	Standard
LED ring light indent illumination	Optional	Optional
OPTICAL MEASURING SYSTEM		
5 mega pixels INNOVAVIEW™ optical ZOOM system	Standard	Standard
Auto focus	Standard	Standard
Manual focus	Standard	Standard
Fully automatic indent measuring	Standard	Standard
Manual on screen indent measuring	Standard	Standard
Zoom and magnification ratio	0.7x to 1000x	0.7x to 1000x
Dual view™ working area overview camera	Optional	Optional
External Electronic Brinell microscope and objectives	No	No
DEPTH MEASUREMENT SYSTEM		
Heidenhain™ high resolution scale & reading head	Standard	Standard
HARDWARE & USER INTERFACE		
Built-in industrial Pentium PC and harddrive	Standard	Standard
Adjustable 15'' full color industrial touch screen	Standard	Standard
MS Windows 7 Ultimate license	Standard	Standard
IMPRESSIONS 9000™ hardness testing firmware	Standard	Standard
Automatic image and file storage	Standard	Standard
Stores and handles 3000 files & images	Standard	Standard
Stores and handles 9000 files & images	Optional	Standard
Forms 9000™ set of customized certificates	Optional	Standard
Universal motorized X-Y stage controls	Standard	Standard
CONNECTIVITY		
External digital (DVI) TFT screen output	Standard	Standard
External keyboard & mouse connections	Standard	Standard
LAN (local area network connection)	Standard	Standard
WLAN (Wireless network connection)	Standard	Standard
Bi-directional RS-232	Standard	Standard
Printer / USB-2 output	Standard	Standard
Built-in motorized X-Y stage driver	Standard	Standard

Workpiece accommodation height : 300mm (opt. 500mm)
Workpiece accommodation horizontal : 220mm from center (opt. 300mm)
Machine dimensions : 1400mm x 420mm x 640mmn (HxWxD)
Machine weight : 242kg
Tester color (standard) : Black / Metallic silver
Light source : White power LED (Opt. green/blue/red)
Power : 220volt / 50Hz, others on request

Objectives : 3 installed for 0.7x to 1000x
Force tolerance : Max. < 1%
Force control : 1-99 sec.
Hardness resolution : 0.01 Rockwell, 0.1 Vickers, 1 Brinell

NEMESIS 9003™ UNIVERSAL	NEMESIS 9004™ PURE ROCKWELL	NEMESIS 9005™ PURE VICKERS	NEMESIS 9006™ PURE BRINELL
10kgf to 3000kgf	**0.05kgf to 150kgf**	**0.5kgf to 120kgf**	**10kgf to 3000kgf**
All scales	All scales	No	No
No	All scales	No	No
Yes	Yes	No	No
10kgf to 120kgf	No	500gf to 120kgf	No
No	No	All scales	No
50, 100kgf	No	No	No
10kgf to 3000kgf	No	No	10kgf to 3000kgf
5/250	No	No	No
Up to 3000kgf	No	No	Up to 3000kgf
Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard
Standard	Standard	Standard	No
3	3 (or 6, option)	3	None
3	None	3	None
Standard	None	Standard	None
Optional	None	Optional	None
Standard	None	Standard	None
Standard	No	Standard	No
Standard	No	Standard	No
Standard	No	Standard	No
Standard	No	Standard	No
0.7x to 1000x	No	0.7x to 1000x	No
Optional	No	Optional	No
No	No	No	Standard
Standard	Standard	No	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	No	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	No
Standard	Standard	Standard	Standard
Standard	Standard	Standard	Standard
Standard	Standard	Standard	No

Standard delivery

- Diamond Rockwell indentor (9001, 2, 3, 4)
- Vickers pyramid indentor (9001, 2, 3, 5)
- Brinell indentor (9001, 2, 3, 6)
- Flat anvil ø80mm, V-anvil ø80mm, ø200mm testing table
- Installation & user manual

Optional accessories

- Large testing table 350mmx250mm with T-grooves
- Extra large testing table 450mmx350mm with grooves and support
- Long bar supports, to ease testing long bars
- Motorized X-Y stages, motorized rotary or tilting tables
- Built-in 5 axis support driver
- Certified indentors and reference blocks (DKD, UKAS, ASTM)

Load cell, closed loop, linear force actuator, fixed workpiece position

Force configuration for maximum 750kgf or 3000kgf

6 Positions modular motorized turret, 5 Mp built-in camera, Optional overview camera

LED illumination, LED ringlight

Microscope quality optical system with long working distance objectives

Motorized spindle

High performance PC, Windows 7 driven operating system with refined algorithmes for automatic image measuring system

15" high resolution industrial touch-screen

9500™ SERIES
3KGF TO 3000KGF, 6 POSITION MOTORIZED TURRET

The 9500 is the universal hardness tester most suitable for heavy duty testing in the INNOVATEST® standard range of testers. Partly based on the technology of the NEMESIS 9000™. Built for tough environments. The floor type welded frame reaches a height of 2 meters and offers a workspace of not less than 650mm height and a throat depth of 300mm.
Rockwell, Vickers and Brinell, but also pure depth test methods such as H, HVT and HBT are part of the standard test procedures of the 9500™.
2 models cover a range of test loads either up to 750kgf or 3000kgf.

The frame of the 9500™ is equipped with a heavy duty motorized spindle, allowing to position the test piece on the required working height.
The 9500™ has a descending test head allowing each test piece to be tested on an ergonomic working height. The linear actuator of the 9500™ is equipped with a load cell closed loop system guaranteeing excellent accuracy and a wide range of fast testing procedures.

The test head is equipped with a 6 positions modular turret (indentors and objectives) and an optical zoom video system with 5mp HD camera.
High performance PC driven automatic and manual indent measurement with automatic filing and storage functions.
Refined algorithms for automatic measurement on materials normally less suitable for automatic measurement.

TECHNICAL SPECIFICATIONS

Hardness scales	Brinell, Vickers, Rockwell, HVT, HBT
Load application	Load cell, force feed back, closed loop system
Load range	3 - 750kgf, 10 - 3000kgf
Motorized turret	3 indentor positions; 3 objectives positions
Optical system	High definition, 5Mp machine Vision system
Objectives	3 installed for 0.7x - 1000x magnification
Scale resolution	0.0005mm (0.5 micron)
Electronic system	High performance built-in PC, Windows 7, 15" full color touch screen, automatic and manual measurement
Standards	Complies to all applicable EN/ISO and ASTM standards
Test loads	3, 5, 10, 15, 15.625, 20, 30, 31.25, 45, 50, 60, 62.5, 100, 125, 150, 187.5, 250, 750, 3000kgf
Vickers test range	HV 3, 5, 10, 20, 30, 50, 100; HVT 50, 100kgf
Brinell test range	10 - 3000kgf (depending on model)
Rockwell test scales	A, B, C, D, E, F, G, H, K, L, M, P, R, S, V
Test cycles	Automatic & Manual
Force control	2- 99 seconds
Connectivity	USB-2, Blue tooth, WLAN, LAN
Specimen accommodation	Max. height: 650mm Max. throat: 300mm
Machine dimensions	1930mm x 1130mm x 470mm (HxDxW)
Machine weight	870kg
Power supply	220V / 50Hz others on request

ORDER DETAILS

9500 Heavy duty universal hardness tester

STANDARD DELIVERY

- Diamond Rockwell indentor
- Vickers indentor
- Brinell indentor 2.5mm
- Hardness test block HRA
- Hardness test block HRC
- Hardness test block HRB
- Hardness test block HV30
- Hardness test block HB2.5/187.5
- Motorized turret with 6 positions
- Objectives for 0.7x - 1000x magnification
- Built-in 3 axis support driver
- Large testing table
- Installation & user manual
- Calibration certificate
- Toolset

OPTIONAL ACCESSORIES

- Built-in 5 axis support driver
- Testing table ø235mm
- V-Anvil ø80mm
- V-Anvil ø120mm
- Certified indentors & hardness test blocks
- Long Vickers indentor
- Other testing tables and XY-stages
- Precision vices, V-blocks and special clamps

PORTABLE HARDNESS TESTERS

PORTABLE HARDNESS TESTING

INNOVATEST offers a wide range of portable hardness testing instruments. Most of the common testing methods are represented in this catalogue. Portable instruments often offer an excellent alternative if the workpiece is too heavy or too large to be tested on a bench hardness tester.

Reliability

Its often understand by the public that portable hardness testing instruments are less reliable or less accurate than bench type hardness testers.

This however is a misunderstanding. Portable hardness testers, considering to be manufactured according to the applicable standards, are as accurate as bench hardness tester.
The importance of portable instruments is that they should be applied in a correct manner, respecting the testing conditions as advised for the praticular testing method.

Misuse is often laying on the basis of wrong values obtained by portable testing instruments.

Another recent problem is that there are many cheap, poor quality portable testing instruments available on the market. Such instruments offer promising specifications which in many cases cannot be reached or can be reached but only for a short period of the ''life time'' of such instrument.

It is strongly recommended to buy portable testing instruments that are covered by a decent service system offering regular checks and which have a proven track record of reliability and quality.

Portable testing methods

Most common testing methods are the Leeb hardness, rebound technology, or the UCI ultrasonic hardness test. While the rebound technology conforms to the ASTM and DIN standards, UCI offers the advantage of being more suitable for light weighted and thin components. Barcol and Webster are based on impressing the material with a sharp indentor, portable Rockwell or portable Brinell are more or less spin-offs from the applicable standard methods of such scales.

PORTABLE HARDNESS TESTERS

Being certain...

ALL PORTABLE TESTING INSTRUMENTS
ARE COVERED BY A
3 YEARS FREE CALIBRATION SERVICE.

Simple procedure; return your instrument to
INNOVATEST Europe BV and receive it back in
5 working days with a new 12 months,
UKAS traceable calibration certificate.
No doubts, BE CERTAIN about your measurements!

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WEBSTER

PORTABLE HARDNESS TESTERS

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MET-U1A

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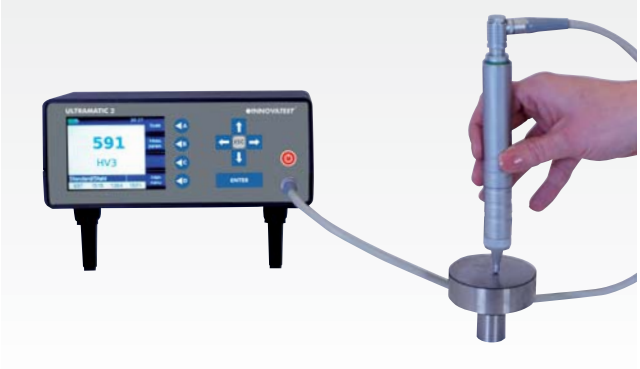

HV400

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RANGEMASTER

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BARCOL

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WEBSTER

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MAGNETIC ROCKWELL

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HB1500

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HB120

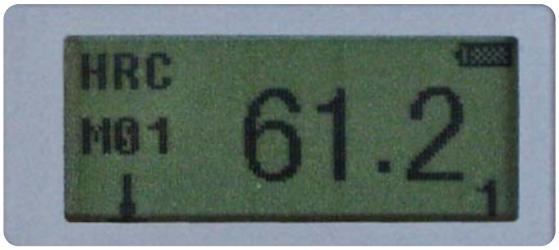
PORTABLE HARDNESS TESTER — IMPACT TH-1100

IMPACT TH-1100
PORTABLE LEEB HARDNESS TESTER

FEATURES

The IMPACT TH-1100 is a small, integrated digital hardness tester which operates according to the dynamic rebound method (standardized according to ASTM A956). The compact design allows easy on-site hardness testing on solid, components that are difficult to transport, or to be used on positions difficult to access by other hardness testers.
Quick and reproducible measurements can be made independent of impact direction.

- Leeb principle, portable rebound hardness tester
- Hardness values in Rockwell HRB, HRC, Vickers HV, Brinell HB, Shore HS, Leeb HLD
- Test results appear directly on the display
- Impact Device D integrated: no cables
- Tests at any angle, even upside down
- Bright LCD display
- Battery capacity on display
- Rechargeable Li-on battery
- Simple handling and low test expenditure



STANDARD DELIVERY

- Instrument with integrated impact device, type D
- Hardness test block with HLD value
- Coupling paste
- Support ring small
- Charger
- Cleaning brush
- INNOVATEST® certificate
- Manual
- Carrying case

TECHNICAL SPECIFICATIONS

Standard impact device	D integrated
Hardness scales	HRC, HRB, HV, HB, HS & HLD
Measuring range / materials	See table
Accuracy	±6HLD
Output	No
Min. surface roughness of workpiece	1.6µm (Ra)
Max. workpiece hardness	960HLD
Min. radius of workpiece	Rmin= 50mm (convex/concave) (with support ring Rmin= 10mm)
Min. workpiece weight	2-5kg on stable support 0.05-2kg with compact coupling
Min. workpiece thickness coupled	5mm
Min. thickness of hardened layers	0.8mm
Charging time	3 hours
Continuous working time	> 8 hours
Power	Rechargeable Li battery
Operating temperature	0°C to 40°C
Overall dimensions	145mm × 35mm × 30mm
Weight	110gr

OPTIONAL ACCESSORIES

- UKAS Reference hardness blocks
- Type Z10-15, for testing cylindrical outside surface R10~R15
- Type Z14.5-30, for testing cylindrical outside surface R14.5~R30
- Type Z25-50, for testing cylindrical outside surface R25~R50
- Type HZ11-13, for testing cylindrical inside surface R11~R13
- Type HZ12.5-17, for testing cylindrical inside surface R12.5~R17
- Type HZ16.5-30, for testing cylindrical inside surface R16.5~R30
- Type K10-15, for testing spherical outside surface SR10~SR15
- Type K14.5-30, for testing spherical outside surface SR14.5~SR30
- Type HK11-13, for testing spherical inside surface SR11~SR13
- Type HK12.5-17, for testing spherical inside surface SR12.5~SR17
- Type HK16.5-30, for testing spherical inside surface SR16.5~SR30
- Type UN, for testing cylindrical outside surface, radius adjustable R10~∞

ORDER DETAILS

TH-1100 Portable dynamic hardness tester

MEASURING RANGE

Material	HLD	HRB	HRC	HB	HV	HS
Steel & cast steel	300-900	38.4-99.8	20-68.4	81-654	81.1-955	32.5-99.5
Cold work tool steel	300-840		20.4-67.1		80-898	
Stainless steel	300-800	46.5-101.7	19.6-62.4	85-655	85-802	
Gray cast iron	360-650			93-334		
Nodular cast iron	400-660			131-387		
Cast alumumium	200-570	23.8-34.6		26.8-164		
Brass	200-550	13.5-95.3		40-173		
Bronze	300-700			60-290		
Copper	200-690			45-315		
Wrought steel				143-650		

PORTABLE HARDNESS TESTER — IMPACT TH-150 SERIES

TH-150
IMPACT DEVICE D

TH-152
IMPACT DEVICE C

TH-154
IMPACT DEVICE DL

FEATURES

The TH-150 series part of the unbeatable range of TIME Leeb type dynamic hardness testers offer a trendy design and affordable, but accurate hardness testing solution for on-site testing in workshops and in field operation.
The unit assures accurate and reliable hardness measurement. (standardized according to ASTM A956)

Most metallic products with a minimum solid mass of 2kg can be tested according to the Leeb principle.
The display shows hardness values in all common scales, such as HRC, HRB, HV, HB, HS, and HLD.
The instrument is equipped with replaceable batteries that provide as much as 300 hours of continuous operation.

- Leeb principle, portable rebound hardness tester
- Hardness values in Rockwell HRB, HRC, Vickers HV, Brinell HB, Shore HS, Leeb HLD
- Test results appear directly on the display
- Impact Device D integrated: no cables
- Tests at any angle, even upside down
- Bright LCD display
- Battery capacity on display
- Rechargeable Li-on battery
- Simple handling and low test expenditure

TECHNICAL SPECIFICATIONS

Hardness parameter	HRC, HRB, HV, HB, HS, HL
Impact Device integrated	D (TH-150) C (TH-152) DL (TH-154)
Accuracy	Within ±6HLD (TH-150), Within ±12HLC (TH-152), Within ±12HLDL (TH-154)
Memory	256 average readings
Output	RS-232
Min. Surface roughness of workpiece	1.6µm (Ra) (TH-150/154) or 0.4µm (Ra) (TH-152)
Needle front section of DL-device (TH-154)	Diameter= 4.2mm Length= 50mm
Workpiece max. hardness value	940HV (TH-150), 1000HV (TH-152) or 950HV (TH-154)
Workpiece radius (convex/concave)	Rmin = 50mm (with support ring Rmin= 10mm)
Workpiece minimum weight	2kg-5kg on solid support (TH-150/154) 0.05kg-2kg with coupling paste 0.5-1.5kg on solid support (TH-152) 0.02-0.5kg with coupling paste
Workpiece min. thickness coupled	5mm (TH-150/154) or 1mm (TH-152)
Workpiece min. case hardened depth	0.8mm (TH-150/154) or 0.2mm (TH-152)
Indentation depth	See Impact devices data
Continuous working time	300 h (without backlight)
Power	Battery Lithium 3V, CR½AA
Operating temperature	0°C to 40°C
Overall dimensions	Body diameter oval 60mm/39mm 149mm x 60mm x 39mm (TH-150/152) 213mm x 60mm x 39mm (TH-154)
Weight	150gr (TH-150/152), 170gr (TH-154)

ORDER DETAILS

TH-150 Dynamic metal tester with integrated impact device D
TH-152 Dynamic metal tester with integrated impact device C
TH-154 Dynamic metal tester with integrated impact device DL

STANDARD DELIVERY

- Instrument with integrated impact device type; D (TH-150), C (TH-152) or DL (TH-154)
- Hardness test block with HLD-value (TH-150), HLC value (TH-152) or HLDL value (TH-154)
- Cleaning brush
- Coupling paste
- Battery Lithium 3V, CR½AA
- Communication cable
- Small support ring
- INNOVATEST® certificate
- Manual
- Carrying case

OPTIONAL ACCESSORIES

- UKAS Reference hardness testblocks
- Support rings for convex, concave and spherical surfaces (only TH-150/152) (see page 93)
- Printer TA-230

SUPPORT RINGS

HARDNESS TEST BLOCK

TA-230 PRINTER

PORTABLE HARDNESS TESTER — IMPACT TH-170 SERIES

TH-170
IMPACT DEVICE D

TH-172
IMPACT DEVICE C

TH-174
IMPACT DEVICE DL

FEATURES

The world famous IMPACT™ series, part of the unbeatable series of TIME dynamic Leeb hardness testers offer very affordable, but accurate hardness testing solution for on-site testing in workshops and in field operation. The units assure accurate and reliable measurement. All results and statistics can be directly printed to the optional compact fast thermal printer. Any metallic products with a minimum solid mass starting from 0.5kg can be tested according to the Leeb principle. The display shows hardness values in all common scales, such as HRC, HRB, HV, HB, HS, and HLD.

The instrument is equipped with replaceable batteries providing 16 hours continuous operation.

- Dynamic rapid hardness test procedure
- TH-170 Impact device D integrated
- TH-172 Impact device C applying low impact energy for surface hardened components and thin walled components
- TH-174 Impact device DL for testing in confined spaces
- Wide measuring range
- Direct display of hardness Rockwell HRB, HRC, Vickers HV, Brinell HB, Shore HS, Leeb HL
- For most metallic materials
- Automatic gravity compensation for testing at any angle
- Simple handling and low test expenditure
- High accuracy ±0.5%
- Clear LCD display showing all functions and parameters
- Conforms to ASTM A 956 and DIN 50156

TECHNICAL SPECIFICATIONS

Hardness parameter	HRC, HRB, HV, HB, HS, HL
Accuracy	Within ±6HLD (TH-170) Within ±12 HLC (TH-172) Within ±12HLDL (TH-174)
Statistics	Average (max. 270 in 9 groups)
Output	USB
Min. Surface roughness of workpiece	1.6µm (Ra) (TH-170/174), 0.4µm (Ra) (TH-172)
Impact device integrated	D (TH-170) C (TH-172) DL (TH-174)
Needle front section of DL-device (TH-174)	Diameter = 4.2mm Length = 50mm
Max. hardness value	940HV (TH-170) 1000HV (TH-172) 950HV (TH-174)
Workpiece radius (convex/concave)	Rmin = 50mm (with support ring Rmin= 10mm)
Workpiece minimum weight	2kg - 5kg on solid support (TH-170/174) 0.05kg - 2kg with coupling paste 0.5 - 1.5kg on solid support (TH-172) 0.02 - 0.5kg with coupling paste
Workpiece min. thickness coupled	5mm (TH-170/174); 1mm (TH-172)
Workpiece min. case hardened depth	0.8mm (TH-170/174), 0.2mm (TH-172)
Indentation depth	See page: Impact devices data
Continuous working time	150 h (without backlight)
Power	Batteries AAA (2 pcs)
Operating temperature	0°C to 40°C
Overall dimensions	155mm x 24mm x 55mm (TH-170/172) 210mm x 24mm x 55mm (TH-174)
Weight	180gr (TH-170/172) or 200gr (TH-174)

STANDARD DELIVERY

- Instrument with integrated impact device type D, C or DL
- Hardness test block with HLD-, HLC- or HLDL-value
- AAA Batteries (2pcs)
- Cleaning brush
- Coupling paste
- Support ring small
- USB communication cable
- USB driver cd
- INNOVATEST® certificate
- Manual
- Carrying case

OPTIONAL ACCESSORIES

- UKAS Reference hardness blocks
- Support rings for convex, concave and spherical surfaces (only TH-170/172) (see page 93)

SUPPORT RINGS

HARDNESS TEST BLOCK

ORDER DETAILS

TH-170 Dynamic hardness tester with integrated impact device D
TH-172 Dynamic hardness tester with integrated impact device C
TH-174 Dynamic hardness tester with integrated impact device DL

PORTABLE HARDNESS TESTER — ROCKY TH-110

ROCKY TH-110
PORTABLE HARDNESS TESTER WITH BUILT-IN PRINTER

FEATURES

The year 1989, the first TIME Leeb portable hardness tester ROCKY HLN11A was presented to the market. Yet, the new generation of this high quality, popular hardness tester is still the best selling Leeb tester world wide. Often copied, but never equalled, the TH-110 is the 3rd generation of the ROCKY dynamic Leeb hardness testers.
(standardized according to ASTM A956)
Most metallic products with a minimum solid mass starting from 0.5kg can be tested according to the Leeb principle. The display shows hardness values in all common hardness scales.

The instrument is equipped with re-chargeable batteries providing over 16 hours continuous operation.

- Test results appear directly on the large display
- According to ASTM and DIN standards
- Display scales HRC, HRB, HV, HB, HS and conversion to tensile strength
- Highly accurate readings ±6HLD
- Correction for impact direction 360 degrees
- Chargeable battery pack to ensure many hours of undisturbed testing and printing
- Direct keys for easy set up of testing parameters
- Mini-printer installed on the main unit
- Ridged ABS anti-shock casing with sealed keypad

STANDARD DELIVERY

- Instrument with impact device type D
- Printer (on top)
- Hardness test block with HLD-value
- Charger
- Cleaning brush
- Coupling paste
- Support ring small
- INNOVATEST® certificate
- Manual
- Carrying case

OPTIONAL ACCESSORIES

- Special impact devices (see overview on page 102/103)
- UKAS Reference hardness blocks
- Support rings for convex, concave and spherical surfaces (see page 93)

TECHNICAL SPECIFICATIONS

Hardness parameter	HL, HRB, HRC, HV, HB, HS
Tensile strength U.T.S.	σb from 374 to 2652 range (steel only)
Accuracy	Within ±6HLD
Printer	Printer showing all test results and settings
Statistics	Average value
Impact device	D (standard)
Optional impact devices	DC/D+15/DL/G/C
Max. hardness value	940HV-1000HV
Workpiece radius (convex/concave)	Rmin = 50mm (with support ring Rmin= 10mm)
Min. Workpiece weight	2-5kg on stable support 0.05-2kg with compact coupling except C and G impact device
Workpiece min. thickness coupled	5mm (except with impact device G: 10mm, C: 1mm)
Workpiece min. case hardened depth	0.8mm, except C impact device 0.2mm and G impact device 1.2mm
Power	Rechargeable NiMh battery pack
Charger	12V, 600mA (1.8VA)
Charging time	2.5 - 4 hours
Operating temperature	0°C to 40°C
Overall dimensions	235mm x 90mm x 47mm
Weight	615gr (incl. impact device and printer)

SUPPORT RINGS

HARDNESS TEST BLOCK

ORDER DETAILS

TH-110/D Portable hardness tester with built-on printer and external D probe

PORTABLE HARDNESS TESTER — ROCKY TH-160

ROCKY TH-160
PORTABLE HARDNESS TESTER WITH BUILT-IN PRINTER

FEATURES

Modern, high-end, variant of the ROCKY TH-110 with additional features. Easy operating due to intuitive menu system. Fast, super silent built-in printer.

- Large memory for 1000 tests
- Auto-recognition of connected Impact Device
- Auto-recognition and gravity compensation of Impact Device test direction
- Statistical data and upper-lower limit setting
- Prints all test results and histogram
- RS-232 interface (to hyperterminal)
- Time and date setting
- Back-light LCD
- Direct display of hardness scales Rockwell HRB, HRC, Vickers HV, Brinell HB, Shore HS, Leeb HL
- Conversion to tensile strength σb (U.T.S.)
- For all metallic materials
- Impact device provides testing at any angle, even upside down
- Integral thermal printer
- High accuracy ±6HLD and conforms to ASTM A 956
- Six impact devices are available for special applications (see following pages)

TECHNICAL SPECIFICATIONS

Hardness parameter	HL, HRC, HRB, HV, HB, HS
Tensile strength U.T.S. range (steel only)	σb from 374 to 2652
Accuracy	Within ±6HLD
Functions	Auto-recognition of connected impact device and probe test direction, auto-conversion to other hardness scales
Memory	1000 test maximum
Data-output	RS-232 to Hyperterminal (MS)
Printer	Thermal printer showing all test results, settings and histogram
Statistics	Average value, min-max, upper-lower limits
Impact device	D (standard)
Optional impact devices	DC/D+15/DL/G/C (see next page)
Max. hardness value	940HV-1000HV
Workpiece radius (convex/concave)	Rmin = 50mm (with support ring Rmin= 10mm)
Min. Workpiece weight	2-5kg on stable support 0.05-2kg with compact coupling except C and G impact device
Workpiece min. thickness coupled	5mm, except with impact device G: 10mm, C: 1mm
Workpiece min. case hardened depth	0.8mm, except C impact device 0.2mm and G impact device 1.2mm
Indentation depth	See following page: Impact devices data
Power	Rechargeable Li battery, 6V (1 pc)
Charger, charging time	6V, 500mA (1.8VA), 2.5 - 4 hours
Operating temperature	0°C to 40°C
Overall dimensions	230mm x 90mm x 47mm
Weight	420gr (including impact device and printer)

STANDARD DELIVERY

- Instrument with impact device type D
- Printer (on top)
- Hardness test block with HLD-value
- Charger
- Cleaning brush
- Coupling paste
- Support ring small
- RS-232 communication cable
- INNOVATEST® certificate
- Manual
- Carrying case

OPTIONAL ACCESSORIES

- Special impact devices (see overview on page 102/103)
- UKAS Reference hardness blocks
- Support rings for convex, concave and spherical surfaces (see page 93)

SUPPORT RINGS

HARDNESS TEST BLOCK

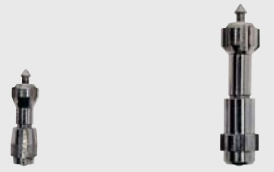
ORDER DETAILS

TH-160/D Portable hardness tester with built-on printer, external D probe, statistics and RS-232 output

IMPACT DEVICES FOR SPECIAL APPLICATIONS — TH-110/160 SERIES

IMPACT DEVICE G

- Special feature:
  Enlarged test tip, increased impact energy (approximately 9 times that of type D) Low demands on measuring surface finish.
  For measurements in the Brinell range only (max. 650 HB)
- Application:
  Solid components, e.g. heavy castings and forgings.



IMPACT BODY D — IMPACT BODY G

IMPACT DEVICE D

- Special feature:
  Universal standard unit.
- Application:
  For the majority of hardness testing assignments.

IMPACT DEVICE C

- Special feature:
  Reduced impact energy (approximately 1/4 of type D).
- Application:
  Surface hardened components, coatings, thin walled or impact sensitive components (small measuring indentation).

D C DC

IMPACT DEVICE DC

- Special feature:
  Extremely short impact device. Spring loaded with a special loading stick. Otherwise as for type D.
- Application:
  Use in very confined spaces, e.g. in holes, cylinders or for internal measurements on assembled machines.

IMPACT DEVICE D+15

- Special feature:
  Particularly slim front section and with measuring coil moved back.
- Application:
  Hardness measurements in grooves and on recessed surfaces.

IMPACT DEVICE DL

- Special feature:
  Needle front section ø4.2mm, length 50mm.
- Application:
  Measurements in extremely confined spaces

D+15 DL G

IMPACT DEVICES FOR SPECIAL APPLICATIONS — TH-110/160 SERIES

TECHNICAL SPECIFICATIONS

Impact devices	D/DC/DL	D+15	C	G
• Impact energy	11 Nmm	11 Nmm	3 Nmm	90 Nmm
• Mass of impact body	5.5gr DL: 7.2	7.8gr	3.0gr	20gr
Test tip				
• Hardness	1600HV	1600HV	1600HV	1600HV
• Diameter	3mm	3mm	3mm	5mm
• Material	Tungsten carbide	Tungsten carbide	Tungsten carbide	Tungsten carbide
Impact body				
• Diameter	20mm	20mm	20mm	30mm
• Length	147/86mm	162mm	141mm	254mm
• Weight	75/50gr	80gr	75gr	250gr
Max. hardness of sample	940HV	940HV	1000HV	650HB
Preparation of surface				
• Roughness class ISO	N7	N7	N5	N9
• Max. roughness depth Rt	10µm	10µm	2.5µm	30µm
• Average roughness Ra	2µm	2µm	0..4µm	7µm
Min. weight of sample				
• Of compact shape	5kg	5kg	1.5kg	15kg
• On solid support	2kg	2kg	0.5kg	5kg
• Coupled on plate	0.05kg	0.05kg	0.02kg	0.5kg
Min. thickness of sample				
• Coupled	5mm	5mm	1mm	10mm
• Min. thickness of hardened layers	0.8mm	0.8mm	0.2mm	1.2mm

INDENTATION OF TEST TIP

Impact devices	D/DC/DL	D+15	C	G
With 300 HV				
• Diameter	0.54mm	0.54mm	0.38mm	1.03mm
• Depth	24µm	24µm	12µm	53µm
With 600 HV				
• Diameter	0.54mm	0.54mm	0.32mm	0.90mm
• Depth	17µm	17µm	8µm	41µm
With 800 HV				
• Diameter	0.35mm	0.35mm	0.35mm	-
• Depth	10µm	10µm	7µm	-

DYNAMIC TH-180
WIRELESS PORTABLE HARDNESS TESTING STATION

FEATURES

The TH-180 is a versatile portable hardness testing instrument, combining dynamic Leeb rebound testing technology with wireless data processing. Part of the family of the world famous TIME TH series portable testing instruments, the TH-180 is the top of the range and allows the user to move freely around the workpiece without being limited or hindered by cables.

In the TH-180, today's wireless technology has been combined with over 20 years of know-how in the portable hardness testing field. According to DIN Standard 50156 and ASTM A 956.

- Hand-held device with a rugged shock-resistant housing
- Large and clear display with adjustable contrast and backlight
- Converts directly to HV, HB, HRC, HRB, HRA, HS
- Highly accurate ± 4 HL (0.5% at 800 HL) with automatic correction for impact direction
- Wide measurement range
- Simple operating menu structure and extensive on-screen help files
- Internal storage up to 2500 batches of data
- Wireless Impact device D stores over 500 groups of data
- Wired Impact device D included in standard delivery
- Down-/upload data from/to PC via USB, Ethernet or RS-232
- The main unit works with different kind of wireless slave units, such as impact device Dw, Cw and DLw
- The data of the slave unit is transferred to the main unit via bi-directional wireless communication.

FEATURES

Main unit:

- Large full color touch screen operation (320 x 240 matrix) backlit display
- Memory for up to 2500 data groups
- Upper or lower limits hardness settings, both visual and acoustic warning in case of exceeded test values
- Fast & silent thermal printer, prints all test data of the main unit and slave unit
- Six wired impact devices are available for special applications, no need for calibration when impact device is replaced
- Automatic identification of impact device and test direction
- Stand-alone working mode and wireless system working mode

Slave unit:

- Automatic transfer of impact device ID and test direction
- Matrix LCD display
- Wireless technology for communication with main unit. Can be used as stand alone instrument (See details of TH-1100)
- Stores readings and displays average test value
- Rechargeable Li-on battery

TECHNICAL SPECIFICATIONS

Measuring range	170 - 960 HLD
Highly accurate	± 4 HL (0.5% at 800 HL)
Testing direction	360°
Hardness scale	HL, HRB, HRA, HB, HRC, HV, HS
Memory	2500 groups data in main unit 500 groups transferred data from slave units
Limit setting	170 - 960 HLD
Charging time	6h (main unit), 2.5h (slave unit)
Power	12V/4A (main unit) 6V/400mA (slave unit)
Continuous working time	12h (main unit), 50h (slave unit)
Relative humidity	90%
Environment temperature	0°C to 40°C
Dimensions	260mm x 170mm x 57mm (main unit) 145mm x 35mm x 30mm (slave unit)
Weight	1070gr (main unit), 120gr (slave unit)

ORDER DETAILS

TH-180/D Dynamic wireless hardness testing station with external D probe

STANDARD DELIVERY

- Main unit
- D remote unit
- D impact device
- Type Z14.5-30, for testing cylindrical outside surface R14.5~R30
- Type HZ12.5-17, for testing cylindrical inside surface R12.5~R17
- Type K14.5-30, for testing spherical outside surface SR14.5~SR30
- Type UN, for testing cylindrical outside surface, radius adjustable R10~∞
- Cleaning brush
- Hardness test block HLD
- Coupling paste
- Charger for main unit
- Charger for D unit
- INNOVATEST® certificate
- Manual
- Carrying case

OPTIONAL ACCESSORIES

- Support rings for convex, concave and spherical surfaces (see page 93)
- Impact device, C, DC, D+15, DL, G
- Reference hardness blocks
- DL and/or C remote unit

IMPACT DEVICES

PORTABLE HARDNESS TESTER — INSTRUMATIC

INSTRUMATIC
ANALOGUE PUSH TYPE PORTABLE HARDNESS TESTER

FEATURES

The large clearly marked dials on this type of instruments covers a full range of hardness values in Vickers, Brinell, Rockwell A, B, C, and Kp/mm² according to the British, American and German specifications.

The instrument
The system is entirely mechanical employing the use of special preloaded springs which provide a load of about 15kg to the diamond. Maximum penetration of the diamond into the specimen is 0.125mm (.005").

Operation and use
The simplicity of the tester enables it to be used in almost any direction, (preferably vertically), without affecting accuracy. It can be used 'on site'. The grips are depressed to the fullest extent by using the palms of the hands and the hardness value can be read off the appropriate scale.

- **Diamond indentor**
  The instrument does not require any regular servicing. Should the diamond indentor become damaged, a new indentor can simply be fitted using the small tool supplied with the instrument.

- **Precision bench stand**
  Bench stand with vee base for round parts, available as an option.

TECHNICAL SPECIFICATIONS

Code No.		Scale	Range
POR0001	No 1	Vickers Pyramid	100 - 1000
		Brinell	100 - 500
		Rockwell C	20 - 70
POR0002	No 2	Rockwell A	40 - 85
		Rockwell B	50 - 100
		Rockwell C	20 - 70
POR0003	No 3	Vickers Pyramid	100 - 1000
		Brinell	100 - 400
		Rockwell B	50 - 99
		Rockwell C	20 - 70
POR0004	No 4	kg/mm²	35 - 140
		Brinell	100 - 400
		Rockwell B	50 - 99
		Rockwell C	20 - 70
POR0005	No 5	Vickers Pyramid	40 - 300
		Brinell	40 - 300
POR0006	No 6	Brinell	40 - 300
		Vickers Pyramid	40 - 300
POR0007	No 7	Brinell	100 - 600
POR0008	No 8	Vickers Pyramid	20 - 106
PBS0001		Precision bench stand	

ORDER DETAILS

INSTRUMATIC Fully mechanical instrument with various scales available

PBS0001 Precision bench stand (optional)

STANDARD DELIVERY

- Instrument
- UKAS Reference hardness block
- Case
- Adjuster key
- INNOVATEST® certificate
- Manual

OPTIONAL ACCESSORIES

- Adjuster bush
- Spare plastic box
- Spare diamond indentor
- Precision bench stand

RANGEMASTER
DIGITAL PUSH TYPE PORTABLE HARDNESS TESTER

FEATURES

Digital version of the world famous INSTRUMATIC push type hardness tester.
The Rangemaster plus has an advanced electronic read-out system to make reading correct hardness values an easy task.

- Dynamic test indicator
- Large digital readout
- Hardness values in all major international scales with simple conversion facilities from one to the other
- RS-232 output for connection to PC or serial printer
- Memory storage capacity for in excess of 400 readings
- Statistical summary
- Integral icon facility provides operator with easy visual identification of mode in which unit is operating
- Operates in temperatures from -5°C to +35°C
- Upper and lower control limits
- Last reading recall

TECHNICAL SPECIFICATIONS

Model	Rangemaster	
Hardness Scale	Vickers Pyramid No., Brinell, Rockwell B, Rockwell, Tensile Strength, Shore Scleroscope	
Testing Range	Vickers Pyramid No.	35 – 1000
	Brinell	100 – 500
	Rockwell B	30 – 100
	Rockwell C	20 – 70
	Tensile Strength	255 – 1999 N/mm²
	Shore Scleroscope	24 – 97
Resolution	1	Vickers Pyramid No., Brinell, Tensile Strength, Shore Scleroscope
	0.1	Rockwell B, Rockwell C
Power	9V battery or adaptor	
Output	RS-232 serial output	

TECHNICAL SPECIFICATIONS

Model	C (ROC0001) B (ROC0002)
Scale	HRC 20-70 (ROC0001) HRB 30-100 (ROC0002)
Power	9V battery or adaptor
Output	RS-232 serial output

STANDARD DELIVERY

- Instrument
- UKAS Reference hardness blocks
- Carrying case
- Adjuster key
- INNOVATEST® certificate
- Manual

OPTIONAL ACCESSORIES

- Precision bench stand
- Communication cable
- Software

ORDER DETAILS

RAN0001 Rangemaster
ROC0001 Rockmaster C
ROC0002 Rockmaster B
PBS0001 Precision bench stand (optional)

REFERENCE HARDNESS BLOCK

PORTABLE HARDNESS TESTER — BARCOL INBC-01

BARCOL INBC-01
IMPRESSOR

FEATURES

Portable indentation hardness tester.
Used to test the hardness of all kinds of aluminum, from very soft aluminum to very hard aluminum alloys.

Single hand operation; no real operating experience required; can test any flat surface.
Wide testing range equivalent to Brinell hardness 25-150HBW.
Extended application. Model INBC-01 is applied to test the hardness of aluminum, aluminum alloys, copper, copper alloys, fiber reinforced plastics and rigid plastics etc.

High sensitivity.
Featured with 100 segments scale, much more sensitive than Webster hardness testers applied in aluminum alloys industry.

No need to move or support the workpiece. Used to test super large and thick workpieces and assembly parts.

Complies to ASTM B648-2000.

Easy conversion.
The test results can be converted to HB, HR, HV and HW through a conversion table supplied with the instrument.

TECHNICAL SPECIFICATIONS

Indentor	26°panhead cone, Head face diameter 0.176mm
Testing range	0-100HBa equivalent to 25-150HBW
Resolution	0.5HBa
Indication error	Hardness range 42-52HBa ±2HBa Hardness range 84-88HBa ±1HBa
Repeatability error	Hardness range 42-52HBa ±2HBa Hardness range 84-88HBa ±1HBa
Weight	0.5kg

STANDARD DELIVERY

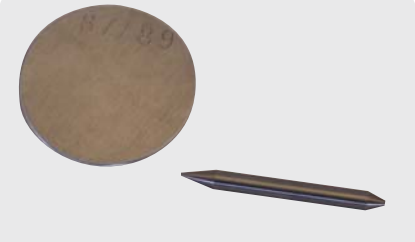
- Instrument
- Spare indentors (2 pcs)
- High value Standard hardness plate
- Low value Standard hardness plate
- Calibration wrench
- Supporting foot
- Carrying case

OPTIONAL ACCESSORIES

- Spare indentors
- Hardness test plates

ORDER DETAILS

INBC-01 Barcol impressor



MAGNETIC ROCKWELL INMR-01

MAGNETIC ROCKWELL INMR-01
PORTABLE ROCKWELL HARDNESS TESTER

FEATURES

Magnetic base hardness tester designed according to the principle of Rockwell hardness testing.

The test head can be fixed to the surface of iron and steel components by magnetic force.
Support to the test piece is not required as the 350kg+ magnetic base will hold the unit firmly in position.

The testing accuracy complies to ISO6508 or ASTM E18 and is comparable to a Rockwell bench hardness tester.

Testing can be done regardless of the shape of the component as long as there is a flat surface for positioning of the magnetic base.

Able to test large-size workpieces which are assembled, unable to cut or inconvenient to move such as the large-size moulds, steel plate, steel tube, steel structure, boiler, pressure vessel, metallic pipe lines or the slide ways of machine tools.

TECHNICAL SPECIFICATIONS

Initial test force	10kg
Rockwell test force	60kg, 100kg or 150kg
Indentor	120°diamond cone 1.588mm carbide ball
Force applying method	By screw
Maximum magnetic force	>350kg
Test range	Rockwell hardness HRC, HRB, HRA etc. 15 scales
Resolution	Rockwell hardness 0.5HR
Accuracy	In accordance with ISO6508
Minimum specimen size	60mm × 180 mm
Net weight	4.9kg
Package gross weight	7.4kg

STANDARD DELIVERY

- Instrument with magnetic base
- Rockwell diamond indentor
- Rockwell ball indentor
- Adjuster key
- Packed in solid alu-case
- INNOVATEST® certificate
- Manual

OPTIONAL ACCESSORIES

- Rockwell indentors
- Rockwell balls

ORDER DETAILS

INMR-01 Rockwell hardness tester

WEBSTER PORTABLE HARDNESS TESTERS WH100

WEBSTER WH100
MECHANICAL SHEET & STRIP METAL HARDNESS TESTER

FEATURES

The INNOVATEST® WH Series hand operated **Webster** Hardness Testers are portable instruments which can perform on-site hardness testing on aluminum alloys, brass, copper and soft steel. A quick and easy test, the hardness value can be read out directly on the indicator, with a simple clamp. The measuring procedure complies to the American Standard ASTM B647. Suitable for testing aluminum alloy profiles, tubings and sheet materials. Especially suitable for a fast, non destructive quality inspection on the production site.

The WH Series hand operated **Webster** Hardness Testers feature a fast and comprehensive testing method for testing thin, soft materials. There are several models available for different applications and with different measuring capacity. The Webster hardness values can be converted into the commonly used Vickers, Rockwell and Brinell hardness values. Each tester is packed in a strong industrial box including all standard delivery such as a set of tools, a hardness standard, and a spare indentor.

- One hand operation and portability
- Variety of anvils permits testing a great variance of shapes
- Simple operation permits readings independent of the operator's skill
- Test is made by simply applying pressure to the handles until "bottom" is felt
- Easy-to-read dial indicator with 20 graduations permits use of the tester as "Go" and "No Go" gauge
- Standard hardness gauge tests materials up to 13mm in thickness

TECHNICAL SPECIFICATIONS

Measuring scope	0-20HW
Accuracy	0.5HW
Net weight	0.5kg
Package gross weight	1.55kg
Package dimensions	330mm × 255mm × 150mm

STANDARD DELIVERY

- Instrument
- Standard hardness plate
- Spare indentor
- Calibration wrench
- Small screwdriver
- Carrying case
- INNOVATEST® certificate
- Installation & user manual

OPTIONAL ACCESSORIES

- Standard hardness plates

MODEL SELECTION & ORDER DETAILS

WH100	Material	Aluminum alloy
	Hardness range	25-110HRE, 58-131HV
	Workpiece thickness	Max. 6mm
	Workpiece inner diameter	Min. 10mm
WH110	Material	Aluminum alloy
	Hardness range	25-110HRE, 58-131HV
	Workpiece thickness	Max. 13mm
	Workpiece inner diameter	Min. 10mm
WH120	Material	Aluminum alloy
	Hardness range	25-110HRE, 58-131HV
	Workpiece thickness	Max. 8mm
	Workpiece inner diameter	Min. 6mm
WH130	Material	Brass in hard half hard state super-hard, aluminum alloy
	Hardness range	63-105HRF
	Workpiece thickness	Max. 6mm
	Workpiece inner diameter	Min. 10mm
WH140	Material	Brass in hard half hard state super-hard, aluminum alloy
	Hardness range	63-105HRF
	Workpiece thickness	Max. 8mm
	Workpiece inner diameter	Min. 6mm
WH150	Material	Soft brass pure copper
	Hardness range	18-100HRE
	Workpiece thickness	Max. 6mm
	Workpiece inner diameter	Min. 10mm
WH160	Material	Soft brass pure copper
	Hardness range	18-100HRE
	Workpiece thickness	Max. 8mm
	Workpiece inner diameter	Min. 6mm
WH170	Material	Cold-rolled steel sheet stainless steel
	Hardness range	48-100HRB
	Workpiece thickness	Max. 8mm
	Workpiece inner diameter	Min. 6mm

PORTABLE BRINELL HARDNESS TESTER SET HB1500

HB1500
RIGID PORTABLE BRINELL HARDNESS TESTER SET

FEATURES

- Solid fine finished C-frame
- Easy to operate, also under difficult and harsh conditions
- Tolerance of test force <0.5%
- Test force is controlled by a shear pin
- Two types of application: C clamp and hammer impact
- Suitable for assemblies inconvenient to be taken to the lab and not allowed to be cut
- Accuracy is much higher than any other type hammer impact tester
- Used to test the hardness of forgings, castings, steels, nonferrous metal and its alloy products, and to test the hardness of annealed, normalizing and tempered mechanical parts.

GENERAL INFORMATION

The HB1500 Portable hardness tester is designed for the Brinell hardness test method. The test force is controlled by calibrated shear pins.
After reading the diameter of the indentation with the analogue microscope, the Brinell hardness number can be obtained from the lookup table. Simple and easy to use.

The HB1500 has two types of application: C clamp or hammer impact.
It is possible to test small to very large specimens.
The unit in particular is suitable for assemblies that are inconvenient to be taken to the lab or which cannot be cut in smaller parts.
The test can be completed in any direction.

The test head itself can be used as a hammer impact tester, where the shear pin will limit the applied force. Therefore its accuracy is much higher than any other type hammer impact tester. Brinell hardness testing, with a testing force of 1580kg, indentor diameter of 7.26mm, then F/D2=30. The test applied by the hydraulic HB1500 is equivalent to the standard Brinell hardness test with 3000kgf and a 10mm ball indentor.

The tester can be widely used to test the hardness of forgings, castings, steel samples, nonferrous and alloyed metals.

STANDARD DELIVERY

- Instrument
- Steel ball indentor
- Flat anvil
- V-anvil
- Brinell standard hardness test block
- Holding handle
- Pin removal tool
- Pack of shear pins (250 pieces)
- Impact cylinder
- Reading microscope 20x
- Rubber protective caps
- Carrying case

OPTIONAL ACCESSORIES

- Carbide ball indentor
- Brinell reference hardness blocks
- Shear pins (a pack of 250pcs)
- Hemispherical spot anvil (used for testing tubing or curled specimens)
- Small flat anvil (used for testing small specimens)
- 40x reading microscope
- 3 lb hammer

TECHNICAL SPECIFICATIONS

Test force	1580kg	
Tolerance of test force	<0.5%	
Accuracy	In accordance with ISO 6506	
Indentor	7.26mm steel spherical surface indentor (range: 100-400HB) 4.0mm carbide spherical surface indentor (Optional) (range: 400-650HB)	
Opening size	150mm x 100mm (H×D)	
Net weight	C clamp	4.2kg
	Hammer impact	0.8kg

ORDER DETAILS

HB1500 Portable Brinell Hardness tester set

PORTABLE BRINELL HARDNESS TESTER HB120

HB120
PORTABLE BRINELL HARDNESS TESTER

FEATURES

- Permanence Impression can be checked and rechecked anytime
- Accuracy Calibrated to 0.5 of 1% of load;
  Can be used for higher loads up to 3000kg;
  Breaks through surface heat treatment to get to the core of the material
- Versatility Can be used in virtually any position; right-side up, upside down or sideways
- Durability Some portable Brinell testers have been working over 60 years

- **Standard test head**
  Calibrated accurate to 1/2 of 1% load. Releases at 3000kg automatically. Capable of incremental loads.
- **Standard test head with long ram**
  Same features as standard test head plus a long ram that puts impression head at end of 2" extension for easy access into recessed areas or over raised edges.
- **Low pressure test head**
  Applied load and indicator dial are coordinated for softer metals. Can be calibrated to release at loads of 62-1/2kg, 125kg, 250kg, 500kg, or 1000kg.
- **Low pressure test head with long ram**
  Same features as low pressure test head plus a long ram that puts impression head at end of 2" extension for easy access into recessed areas or over raised edges.
- **Adapter to hold test head upright without base**
  For testing large flats it enables test heads to be used under large drill presses, boring mills, arbor presses and beams that are capable of withstanding 3000kg load.
- **2.5mm and 5mm ball adapter**
  Used on softer materials or where a smaller impression is desired.
- **Chain adapter**
  Used for large cylinders it fits onto a standard test head and wraps around specimens that are too big for regular tester. High strength chrome/ molybdenum steel arms hold the chain to the test head and allow it to stay rigid while the chain takes the full thrust of the load. Supplied with 4" chain.
- **Base**
  14" base with 14" test height opening and 4" throat is standard. Optional 6" throat with either 14" or 20" test height opening available, 20" base also available with 4" throat and 20" test height opening.
- **Stage micrometer**
  Used to check calibration of Brinell Microscope by placing the microscope on the stage micrometer and aligning the grid on the stage micrometer with the grid on the microscope. If the grids doesn't match perfectly, the microscope is out of calibration and should be re-calibrated. Meets ASTM 50, and is traceable to NIST standards.
- **Brinell microscope**
  Constructed from stainless steel, the rugged and optically reliable Brinell microscope is the most versatile on the market today. Featuring a 20x pre-focused lens, the microscope has a narrow nosepiece which easily fits into tight recesses, resulting in less grinding on castings, billets and dies. For added stability when performing flat work, a slip-on base adapter is included. A side opening in the microscope allows plenty of natural light for viewing, and a cordless movable pen light can be used in dim conditions. Calibrated on equipment traceable to NIST standards, the Brinell microscope meets ASTM 5-10 specifications. It is ready to use and comes equipped with a handy storage case

ORDER DETAILS

HB120 Portable hydraulic system featuring Brinell indentations up to 3000kgf

PORTABLE ULTRASONIC HARDNESS TESTER MET-U1A

MET-U1A
ULTRASONIC HARDNESS TESTER, 15N TESTFORCE

FEATURES

The INNOVATEST MET-U1A differs completely from traditional hardness testers. Instead of measuring the size of the indentation of the test sample using a microscope, it uses a diamond indentor mounted on a vibrating rod that presses on the test surface at a fixed load and then measures its hardness by applying ultrasonic vibrations and analyzing its damping effect.

The technique is very reproducible which makes the MET-U1A a perfect tool for on-site measurements such as maintenance of large scale structures, vehicles, ships, steel towers, bridges, air planes. It is ideal for inspection of thin materials or difficult to get area such as crank shaft, gears and grooved areas.

- Hardness measurements of metals and alloys on standardized hardness scales: Rockwell (HRC), Brinell (HB), Vickers (HV) and Shore (HSD)
- Three additional scales H1, H2, H3 for calibration of selfdefined hardness scales/materials
- Rm scale for determination of tensile strength
- Typically suitable for components that are inaccessible for dynamic hardness testers (small articles, structures with thin walls, pipes, reservoirs, steel sheets etc.)
- Leaves no visible indent on the tested article surface (crankshafts necks, mirrored surface, knives)

TECHNICAL SPECIFICATIONS

Measuring principle	According to the UCI method (ultrasonic contact impedance principle)		
Measuring range	Rockwell C scale	HRC	20-70
	Brinell scale	HB	75-650
	Vickers scale	HV	75-1000
	Shore scale	HSD	23-102
	Tensile strength	MPa	378-1736
Reproducibility	Rockwell C scale	HRC	1.5
	Brinell scale	HB	10
	Vickers scale	HV	12
	Shore scale	HSD	2
	Tensile strength	MPa	5%
Measurement results processing	Computation of average value from the data stored in the memory; Selective data deleting (for example, in case of doubt in the conducted measurements)		
Display lighting	Available		
Display features	Hardness scale, measured value, number of measurement, operation mode, archival number, battery charge indication, Auto-off after 150 sec.		
Memory	100 readings, also stored when test is switched off		
Surface roughness	<Ra 2.5		
Convex/concave	>5mm		
Minimum specimen weight	>0.01kg		
Material thickness	Probe without position accessories >2mm Probe with position accessories >1mm		
Penetration depth	0.03mm average		
Probe operating life	±200000 measurement		
Measuring force	14.7 N		
Power supply	AC mains, V / Hz100-240 / 50-60 Batteries AA, 1.2V (4pcs) Consumed power <3.0VA		
Battery life	Without backlight 16 hours With backlight 8 hours		
Battery charging time	8 hours		
Transportation & storage temperature	-35°C ... +60°C		
Operating environment	Relative humidity 30% ... 80%		
Overall dimensions	Gauge 180mm x 80mm x 42.4mm Probe 160mm x 25mm x ø7mm		

ORDER DETAILS

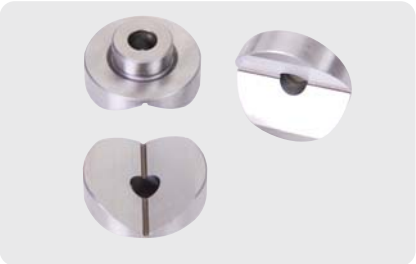
MET-U1A Ultrasonic portable hardness tester

STANDARD DELIVERY

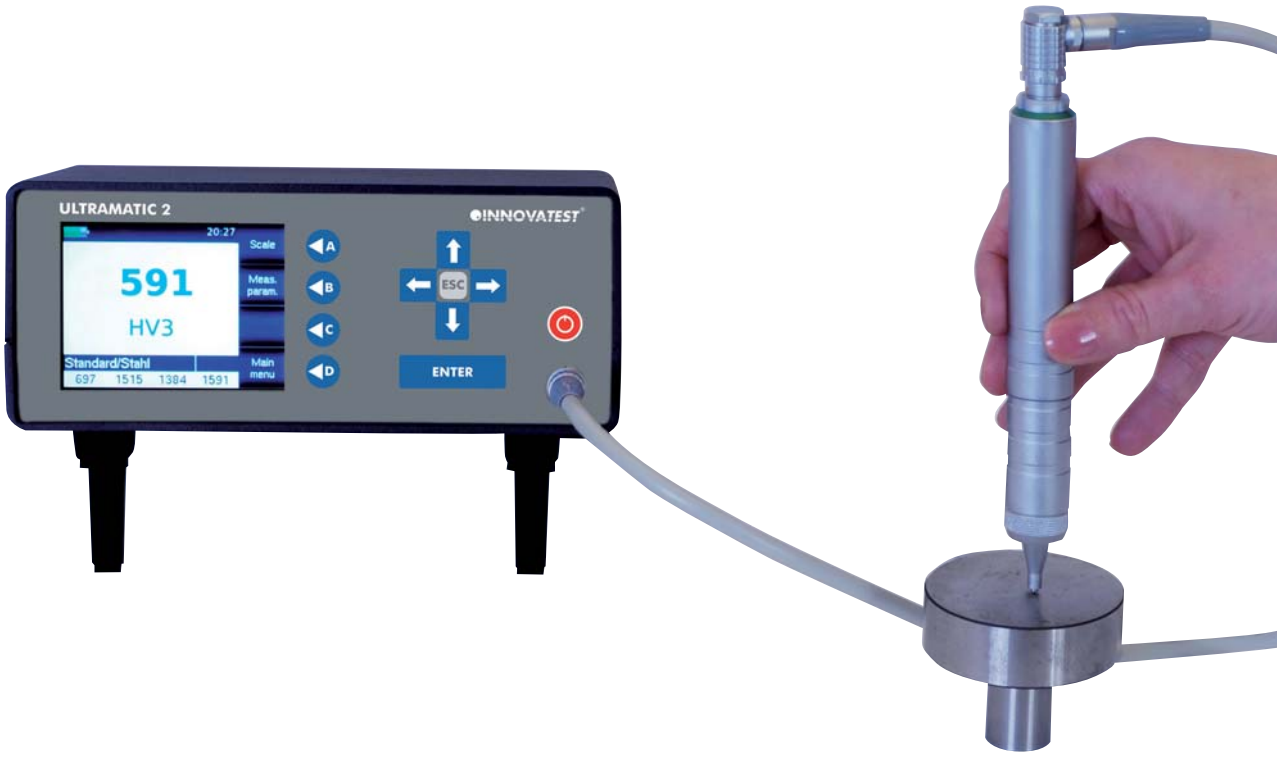
- Instrument
- U1 ultrasonic probe
- Power unit
- Batteries AA (4pcs) NiMh
- Carrying case
- INNOVATEST® certificate
- User and installation manual

OPTIONAL ACCESSORIES

- Reference hardness blocks
- Support V-anvil
- Probe stand



ULTRASONIC PORTABLE HARDNESS TESTER `ULTRAMATIC 2` HV400



ULTRAMATIC 2
ULTRASONIC HARDNESS TESTER

FEATURES

The ULTRAMATIC 2 is the next generation portable and laboratory use ultrasonic hardness tester.
The instrument covers several new advanced features that can be selected from a menu operated full color display.

- Ultrasonic Contact Impedance test principle, fast, accurate, easy to use in confined spaces
- Full color display with easy to operate user interface
- Suitable for hardness tests on metals and ceramics
- Direct reading in Vickers HV, and direct conversion to HRC, HRB, HB & UTS
- High reproducibility, tolerance within ±1%
- Extensive range of application at locations difficult to access
- Large memory, statistics and multiple data outputs
- Windows software for data transmission

TECHNICAL SPECIFICATIONS

Measuring principle	According to the UCI method (Ultrasonic Contact Impedance Principle)		
Standards	Conforms to DIN 50159, ASTM A 1038-05 and VDI/VDE directive 2616		
Indentor	Vickers diamond (angle 136°)		
Test load	10N, 20N, 30N, 49N, 98N (different probes)		
Measuring range	Vickers	HV	10 - 3000 (direct)
	Rockwell	HRC	20 - 68 (conversion)
	Rockwell	HRB	41 - 99.5 (conversion)
	Brinell	HB	(76) - 447 (conversion)
	UTS	N/mm²	255 - 2180 (conversion)
Reproducibility	Vickers	HV	±1%
	Rockwell	HRC	±0.5
	Rockwell	HRB	±1.2
	Brinell	HB	±1%
Applicable testing materials	Preferably metals, for which HV400 can be calibrated. Examinations of ceramic(s) and glass are possible, if comparative measurements are accomplished for calibration.		
Display	Large full color graphical display 3.5" Color-LCD, 320 x 240 Pixel		
Calibration	Storage of min. 100 calibrations for different materials		
Display languages	English or German (selectable)		
Memory	500,000 readings, storage in batches with date, hour, and Go/No Go judgement		
Statistics	Mean value, minimum, maximum, standard deviation absolute and relative Delete single readings		
Interface	Serial RS-232C, USB, Host, device USB-Slave for PC connection (1 pc), USB-Master for printers (2 pcs) or USB flash drives, 100Base-TX (Ethernet), RS-232		
Printer output	Prints hardness values, hour and date Prints statistics of stored data		
Power supply	100-240V / 50-60Hz		
Batteries	NiMH battery: 4.8V/2700 mAh		
Batterie life	Approx. 7 hours		
Battery charging time	Approx. 3 hours		
Operating temperature	0°C to 50°C		
Dimensions	Device: 78mm x 198mm x 160mm (HxWxD) Probe: ø19.5mm x 175mm length		
Weight	1400gr (including probe 190gr)		

ORDER DETAILS

HV400 Hardness tester HV400 for portable accurate testing on metals and ceramics

STANDARD DELIVERY

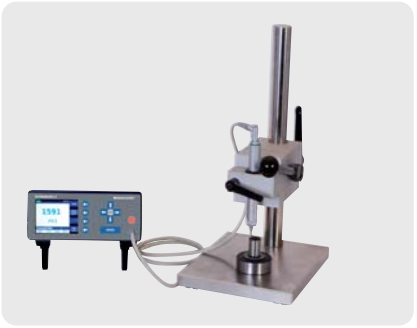
- Instrument
- Cable
- Power supply 100-240V / 50-60Hz
- Carrying case
- Manual
- INNOVATEST® certificate

OPTIONAL PROBES

- 10N, 20N, 30N, 49N, 98N force

OPTIONAL ACCESSORIES

- High precision stand for probe
- Probe shoes for flat surfaces
- Probe shoes for convex surfaces 10mm - 50mm
- Probe shoes for convex surfaces 50mm - 250mm
- Probe SL type (slim nose)
- Windows software program for data transmission to PC (incl. USB cable)
- Plastic handle for probe
- Carrying bag for main unit & accessories
- Mobile printer



SHORE DUROMETERS

SHORE DUROMETERS

The durometer hardness scale was defined by Albert F. Shore, who developed a measurement device called a durometer in the 1920s. The term durometer is often used to refer to the measurement, as well as the instrument itself. Durometer is typically used as a measure of hardness in polymers, elastomers, plastics and rubbers.

Durometer scales

There are several scales of durometer hardness, used for materials with different properties. The two most common scales, using slightly different measurement systems, are the type A and type D scales. The A scale is for softer plastics, while the D scale is for harder ones. There are 12 scales, depending on the intended use; types A, B, C, D, DO, E, M, O, OO, OOO, OOO-S, and R. Each scale results in a value between 0 and 100, with higher values indicating a harder material.

Method of measurement

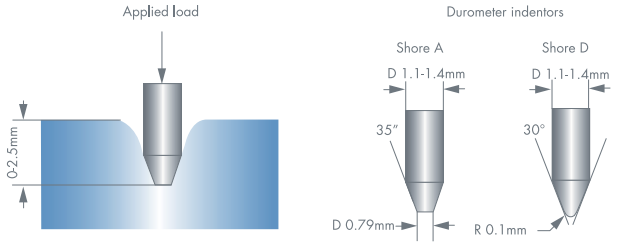
Durometer, like many other hardness tests, measures the depth of an indentation in the material created by a given force on a standardized presser foot. This depth depends on the hardness of the material, its viscoelastic properties, the shape of the presser foot, and the duration of the test. The durometers allows for measurements of the initial hardness, or the indentation hardness after a given period of time. The basic test requires applying the force in a consistent manner, without shock measuring the hardness.

Depth of the indentation

If a timed hardness is desired, force is applied for the required time and then read. The material under test should be a minimum of 6.4mm.
The final value of the hardness depends on the depth of the indentor after it has been applied for 15sec on the material. If the indentor penetrates 2.5mm or more into the material, the durometer is 0 for that scale. If it does not penetrate at all, then the durometer is 100 for that scale. It is for this reason that multiple scales exist. Durometer is a dimensionless quantity, and there is no simple relationship between a material's durometer in one scale, and its durometer in any other scale, or by any other hardness test.

Durometer hardness of various common materials

Material	Durometer Scale
Bicycle gel seat	15-30 OO
Chewing gum	20 OO
Sorbothane	40 OO
Sorbothane	0 A
Rubber band	25 A
Door seal	55 A
Automotive tire tread	70 A
Soft skateboard wheel	75 A
Hydraulic O-rings	70-90 A
Hard skateboard wheel	98 A
Ebonite rubber	100 A
Solid truck tires	50 D



SHORE DUROMETERS

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INRH SERIES

SHORE DUROMETERS HS100

HS100
ANALOGUE TYPE A

FEATURES

- Testing rubber, plastic, leather and all other soft materials
- Fast and easy to read
- Portable
- Use by hand
- Available in Shore A

TECHNICAL SPECIFICATIONS

Test scales available	A
Result display	Hardness result Shore
Measuring range	0-100
Result display resolution	1pt. increments
Pointer sweep	360°
Pressure foot	ø18mm x 25mm length
Weight	200gr

STANDARD DELIVERY

- Instrument
- INNOVATEST® certificate
- Carrying case

OPTIONAL ACCESSORIES

- Reference block

ORDER DETAILS

HS100 Handheld durometer for Shore A hardness testing

HS100
PENETRATOR

SHORE DUROMETERS SHA0001/SHD0002

SHA0001
SHORE "A" TESTER

SHD0002
SHORE "D" TESTER

FEATURES

- Fast and easy to read
- Portable
- Hand-held operation or via optional bench stand
- Available in either Shore A or Shore D
- Testing rubber, plastic, leather and other soft materials
- Supplied with a setting / reference block
- The optional bench stand is intended for use with 1kg loading for Shore 'A' scales and 5kg loading for Shore 'D' scales
- According to DIN 53505, ASTM D2240, ISO R/868
- Standard UKAS certified

TECHNICAL SPECIFICATIONS

Test scales available	A or D Scale
Standards	Conforms to DIN 53505, ASTM D2240, ISO R/868
Result display	Hardness result Shore
Pressure foot	ø18mm
Applications A scale	Soft rubber, natural rubber products, neoprone, polyester, soft PVC, leather, thiokol, nitrille rubbers, etc.
Applications D scale	Hard rubber, hard synthetic materials, thermoplastics, polystyrol, vinyl sheets, cellulose acetates, densified wood, etc.
Penetrator	A scale blunt taper 35° D scale sharp point 35°
Measuring range	0-100

ORDER DETAILS

SHA0001 Shore "A" scale
SHD0002 Shore "D" scale
SHA0003 Bench stand

STANDARD DELIVERY

- Instrument
- UKAS certificate of calibration
- Blunt taper 35° penetrator (A scale)
- Sharp point 35° penetrator (D scale)
- Reference block
- Carrying case
- Manual

OPTIONAL ACCESSORIES

- Bench stand (SHA0003)
- Reference block

REFERENCE BLOCK

SHA PENETRATOR

SHD PENETRATOR

SHORE DUROMETERS DSAS001/DSDS001

DSAS001
SHORE "A" TESTER

DSDS001
SHORE "D" TESTER

FEATURES

- Testing rubber, plastic, leather and all other soft materials
- Fast and easy to read
- Large digital display, digits 8mm high
- Supplied as standard with UKAS certificate of calibration
- Portable
- Use by hand or mounted on a stand
- Available in Shore A or Shore D
- Supplied with a reference block
- Data output for SPC
- Power on/off automatic
- Electronic module protection to IP65, even with data output
- According to DIN 53505, ASTM D2240, ISO R/868
- Can be used in conjunction with Shore bench stand

TECHNICAL SPECIFICATIONS

Scale	Shore A or Shore D	
Resolution	0.1 unit	
Standards	Conforms to DIN 53505, ASTM D2240 and ISO R/868	
Measuring range	0-100	
Pressure foot	ø18mm	
Penetrator	A scale	blunt taper 35°
	D scale	sharp point 35°
Indentor	ø1.25mm	
Battery	Lithium 3V, CR2032	
Data output	RS-232 combined with external power supply	

ORDER DETAILS

DSAS001 Handheld digital durometer for Shore A hardness testing
DSDS001 Handheld digital durometer for Shore D hardness testing
SHA0003 Bench stand

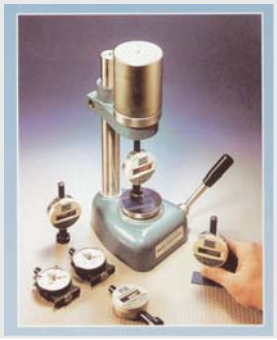
STANDARD DELIVERY

- Instrument
- Button battery
- Reference block
- Blunt taper 35° penetrator (A scale)
- Sharp point 35° penetrator (D scale)
- UKAS certificate of calibration
- Carrying case
- Manual

OPTIONAL ACCESSORIES

- Bench stand
- Communication cable
- Reference block
- Software

SHA0003



DSAS PENETRATOR

DSDS PENETRATOR

SHORE DUROMETERS THS-200

THS-200
SHORE "A" TESTER

FEATURES

- Digital durometer for Shore A hardness testing
- Pocket size model with integrated probe
- Testing soft rubber, plastic and other soft materials
- According to DIN 53505, ASTM D 2240, ISO 7619, JIS K7215
- RS-232 data output
- Operating stand optional
- Bright and clear LCD display
- 300 hours continuous use with standard batteries: no cables!
- Automatic switch off
- Battery low indication

TECHNICAL SPECIFICATIONS

Test scales available	Shore A
Standards	Conforms to DIN53505, ASTM D2240, ISO 7619, JIS K7215
Result display	Hardness result, average value, max value (peak value lock), battery indication
Measuring range	0-100
Result display resolution	0.2 unit
Data output	RS-232
Statistics	Highest hardness, average
Features	Automatic switch off, battery low alarming
Operating temperature	0°C to 40°C
Power requirements	3 x 1.5V batteries
Battery life	300 hours
Dimensions	168mm x 31mm x 30mm
Weight	144gr

STANDARD DELIVERY

- Instrument
- Batteries
- Manual
- INNOVATEST® certificate

OPTIONAL ACCESSORIES

- Communication cable
- Operating stand with constant load THS-200/01

ORDER DETAILS

THS-200/A Handheld digital durometer for Shore A hardness testing

THS-200/01 Stand for THS-200/A (see below)

THS-200/01 STAND FOR THS-200/A

- Operating stand for THS-200/A
- Convenient and accurate way for repetitive testing of hardness
- Eliminates human error
- Measured values are more accurate and reliable
- Hardness of rubber and plastics can be measured

THS-200/01

TECHNICAL SPECIFICATIONS

Max. sample thickness	20mm
Construction	Aluminum and steel
Net weight	19.8kg
Durometer types	THS-200/A

SHORE DUROMETERS THS-210

THS-210
SHORE "D" TESTER

FEATURES

- Digital durometer for Shore D hardness testing
- Pocket size model with integrated probe
- Testing hard rubber, plastic and other soft materials
- According to DIN 53505, ASTM D 2240, ISO 7619, JIS K7215
- RS-232 data output
- Operating stand optional
- Bright and clear LCD display
- Automatic switch off
- Battery low indication

TECHNICAL SPECIFICATIONS

Test scale available	Shore D
Standards	Conforms to DIN53505, ASTMD2240, ISO 7619, JIS K7215
Display	Hardness result, average value, max. value (peak value lock), battery indication
Data output	RS-232
Measuring range	0-100
Measurement deviation	Within 20-90 HSD, error <±1HSD
Display resolution	0.2 unit
Operating temperature	0°C to 40°C
Power requirements	Built-in 3.7V rechargeable battery
Dimensions	173mm x 56mm x 42mm
Weight	233gr

STANDARD DELIVERY

- Instrument
- Charger
- Manual
- INNOVATEST® certificate

OPTIONAL ACCESSORIES

- Communication cable
- Operating stand THS-210/01
- Printer TA-230

ORDER DETAILS

THS-210/D Handheld digital durometer for Shore D hardness testing

THS-210/01 Stand for THS-210/D (see below)

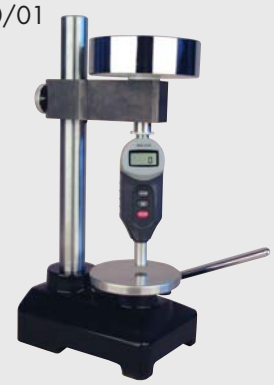
THS-210/01 STAND FOR THS-210/D

- Operating stand for THS-210/D
- Convenient and accurate way for repetitive testing of hardness
- Eliminates human error
- Measured values are more accurate and reliable
- Hardness of rubber and plastics can be measured

TECHNICAL SPECIFICATIONS

Durometer types	THS-210/D
Max. sample thickness	80mm
Max. diameter of working table	ø116mm
Max. lifting displacement	24mm
Max. touch distance between pressure foot and working table	0.05mm
Dimensions	420mm × 200mm × 170mm
Weight	22kg

THS-210/01



INRH SERIES

HIGH END LAB INSTRUMENT FOR RUBBER, SOFT PLASTICS AND POLYMERS

FEATURES

Micro measuring force hardness tester for soft materials such as rubbers and polymers based on voice coil closed loop force feedback technology. Motorized test head can move 100mm up/down and allows large workpiece accommodation. The voice coil motor has made it possible to set the load to be measured as required. In addition, since it is possible to set any required measuring time, measurement can automatically be performed for the optimum time, and this makes it possible to deal with soft samples (like jellies, chewing gum, bread, etc.) that could not be measured using conventional standards.

Can be operated stand alone or over PC. Software available for data analysing and file storage.

Available configurations:
INRH-01(micro measuring force hardness tester) JIS K 6253 (type A / type E) / ASTM D 2240 (type OO) emulation
INRH-02 (IRHD rubber hardness tester, M method), JIS K 6253, ISO 48, DIN 53 519, BS903, ASTM D 1415

By connecting the unit to a personal computer, the relationship between time and displacement can be shown in graph form. Information on the manner of displacement can also be obtained as numeric data, which is useful in the evaluation of physical properties.

TECHNICAL SPECIFICATIONS

Hardness testing method INRH-01 INRH-02	Fixed load system (IRHD/original), Variable load system (A, E, OO) Conforming to JIS K 6253	
Measuring range	INRH-01 INRH-02	0-100 degrees 30-100 IRHD
Minimum display unit	INRH-01 INRH-02	0.1 degrees 0.1 IRHD
External interface	RS-232C (3 m max.), start switch	
Power supply	100-240 VAC, adapter for 24 VDC	
Rated power	Approx. 18 W	
Statistical processing	Easement curve and general statistical processing (mean value, median value, etc.)	
Load application method	Voice coil motor	
Position detection method	Differential transformer	
Indicating accuracy	INRH-01 INRH-02	±0.1 degrees ±0.1 IRHD
Quantizing error	INRH-01 INRH-02	0.1 degrees 0.1 IRHD
Measuring head rise /drop distance	100mm	
Measurable sample dimensions	W = 160, D = 110, H = 100 (H min. = 0.3 or less)	
Working temperature range	5°C - +40°C, In storage: -10°C - +60°C	
Working ambient humidity	40 - 80% RH (to be no condensation)	
Standards	Conforms to EC Directive (EN61326)	
Weight	Approx. 8kg (body) / Approx. 0.6kg (power supply unit)	

STANDARD DELIVERY

- Main unit
- Indentors
- INNOVATEST® certificate
- Installation & user manual

OPTIONAL ACCESSORIES

- Hardness blocks
- PC measuring system

ORDER DETAILS

INRH-01	Micro measuring force hardness tester
INRH-02	IRHD hardness tester

ASTM STANDARDS

MOST COMMON ASTM HARDNESS RELATED STANDARDS

ROCKWELL

- E18-07 Rockwell hardness and Rockwell Superficial hardness of metallic materials
- E1842-96 Macro-Rockwell hardness testing of Metallic materials
- C748-98 Rockwell hardness of fine-grained graphite materials
- D785-03 Rockwell hardness of plastics and electrical insulating materials

VICKERS, KNOOP, MICRO HARDNESS

- E92-82 Vickers hardness of metallic materials
- C1327-03 Vickers indentation hardness of advanced ceramics
- B578-87 Microhardness of electroplated coatings
- B721-91 Microhardness and case depth of powder metallurgy parts
- C730-98 Knoop Indentation hardness of glass
- C849-88 Knoop Indentation hardness of ceramic Whitewares
- C1326-03 Knoop Indentation hardness of advanced ceramics
- B934-04a Case depth of ferrous powder metallurgy parts by microindentation testing
- E384-06 Standard test method for Microhardness of materials

BRINELL

- E10-07a Brinell hardness of metallic materials

DUROMETERS & IRHD

- D2240-05 Rubber property-durometer hardness
- D1415-06 Standard test procedure for rubber property-international hardness
- C661-06 Indentation hardness of elastomeric sealants using a Durometer
- F1957-99 Composite foam Durometer hardness testing

VARIOUS

- E103-84 Rapid indentation hardness testing of metallic materials
- E110-82 Indentation hardness of metallic materials by portable hardness testers
- E448-82 Scleroscope hardness testing of metallic materials
- C886-98 Scleroscope hardness testing of fine-grained carbon and graphite materials
- A833-84 Indentation hardness of metallic materials by comparison hardness testers
- A956-06 Rebound hardness testing of steel products
- A623-06a Tin mill products, general requirements
- B647-84 Indentation hardness of aluminum alloys by a Webster type hardness tester
- B648-78 Indentation hardness of aluminum alloys by means of a Barcol impressor
- D2 D1474-98 Indentation hardness of organic coatings
- 583-06 Indentation hardness of rigid plastics by means of a Barcol impressor
- B277-95 Standard test method for hardness of electrical contact materials
- B294-92 Standard test method for hardness testing of cemented carbides
- E140-05 Hardness conversion tables for metals

DIN / EN / ISO STANDARDS

MOST COMMON DIN/EN/ISO HARDNESS RELATED STANDARDS

ROCKWELL

- DIN 50103 T1 — Rockwell hardness and Rockwell Superficial hardness of metallic materials, C, A, B, F
- DIN 50103 T2 — Rockwell hardness and Rockwell Superficial hardness of metallic materials, N and T
- DIN 50103 T3 — Rockwell hardness and Rockwell Superficial hardness of metallic materials, Bm, Fm and 30 Tm
- ISO 6508-2 — Rockwell hardness and Rockwell Superficial hardness of metallic materials, A, B, C, D, E, F, G, H, K, N, T

VICKERS, KNOOP, MICRO HARDNESS

- DIN 50133 — Vickers hardness of metallic materials
- ISO 6507-1 — Vickers hardness of metallic materials
- ISO 4545-1 — Knoop hardness of metallic materials
- ISO 14705 — Vickers hardness of fine ceramics
- ISO 3878 — Vickers hardness of hard metals

BRINELL

- DIN 50351 — Brinell hardness of metallic materials
- ISO 6506-1 — Brinell hardness of metallic materials

DUROMETERS & IRHD

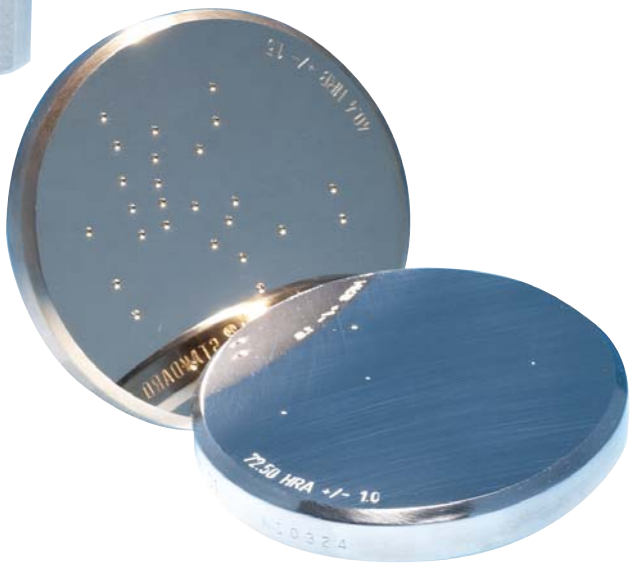
- DIN 53505 — Testing of rubber components
- ISO 7619 — Rubber property-durometer hardness
- ISO 21509 — Plastics and ebonite
- ISO 1823 — Rubber hoses and hose assemblies

VARIOUS

- ISO 18265 — Hardness conversion tables for metallic materials
- ISO 14577 — Indentation test for metal and nn-metallic coatings

INDENTORS AND REFERENCE HARDNESS BLOCKS

INDENTORS



REFERENCE HARDNESS BLOCKS

With INNOVATEST® factory certificate or according to international standards UKAS, DKD, ASTM

INNOVATEST® offers a wide range of indentors. All certified indentors will be issued with a certificate traceable to internationally recognised standards such as UKAS, DKD or ASTM. We also offer low cost factory certified indentors and specials.

Specials

INNOVATEST® also offers special adaptors for indentors to enlarge the field of application. Small gooseneck adaptors are available in three sizes to permit regular or superficial Rockwell hardness testers to perform internal tests on rings, tubes and annular parts where the inside diameter, plus the wall thickness, is less than 50.8mm or 2 inches. These adaptors will fit any of the standard Rockwell hardness testers. The gooseneck adaptor can be clamped into the bottom of the plunger rod (in the same manner as an indentor) and is not heavy enough to affect a reading due to increasing the applied load. The minimum internal diameter which can be tested is 11.5mm or 7/16 inch.

INDENTORS AND REFERENCE HARDNESS BLOCKS

With INNOVATEST® factory certificate or according to international standards UKAS, DKD, ASTM

INNOVATEST® reference hardness blocks are used for annual verification and calibration of hardness testing machines, as well as for periodical check and sometimes for overtaking of hardness scales on a hardness testing machine. That's why reference hardness blocks are a necessary help of industrial Quality Management. Only the use of high quality, precise reference hardness blocks calibrated to applicable standards can ensure the functionality and relative reliability and accuracy of measurement of a hardness testing machine.

The reference hardness blocks used for indirect verification should conform largely to the workpiece to be tested, in terms of material characteristics and hardness range. For this reason a reference hardness block made of aluminum was developed for the lower hardness range which cannot be covered by steel, using new materials technology methods.

When using reference hardness blocks it is irrelevant whether the value of the nominal hardness to be delivered corresponds exactly to the actual calibration value observed, since scale adaptation should be carried out with at least two hardness values. A reference hardness block shall only be used according to the standards to that method and test condition for which it was calibrated.

INNOVATEST® certified reference hardness blocks are available as follows and all conform to the international standards as mentioned.

All INNOVATEST® reference hardness block certificates are based on following international standards:

Brinell	DIN-EN-ISO 6506-3	ASTM E 10
Vickers	DIN-EN-ISO 6507-3	ASTM E 92 / E 384
Rockwell	DIN-EN-ISO 6508-3	ASTM E 18
Knoop	ISO 4545-3	ASTM E 384
Rockwell carbide	DIN 30999	ISO 3738
Martens hardness	DIN 50359	ISO DIS 14577

Scale	UKAS	DKD	DKD/MPA	ASTM	INNOVATEST
Regular Rockwell (all scales)	•	•	•	•	•
Superficial Rockwell (all scales)	•	•	•	•	•
Brinell (all scales)	•	•	•	○	•
Macro Vickers (all scales)	•	•	•	•	•
Micro-Vickers (all scales)	•	•	•	•	•
Knoop	•	•	•	•	○
Martens hardness	•	•	•	•	○

Order your blocks based on nominal values. Please ask for our separate product list of nominal hardness values available per hardness scale and type of certificate.

Reference hardness "soft" blocks made of aluminum

These INNOVATEST® reference hardness blocks are available with DKD/MPA certificate only. For several years there has been a need for "soft" blocks. Using new materials technology methods, it is now possible to produce blocks made of aluminum. They are available in lower nominal values in Rockwell, Brinell and Vickers scales.

INDENTORS FOR VARIOUS HARDNESS SCALES

ROCKWELL INDENTORS

Code No.	Description
IN/6001	Diamond Rockwell indentor including INNOVATEST® certificate
IN/6002	Diamond Rockwell indentor including DKD certificate
IN/6005	Diamond Rockwell indentor including UKAS certificate
IN/6010	Diamond Rockwell indentor, short version, including DKD certificate
IN/7501	"1/16" "Ball indentor including 1 steel ball & INNOVATEST® certificate"
IN/7505	"1/16" "Ball indentor including 1 steel ball & UKAS certificate"
IN/7510	"1/16" "Ball indentor including 1 steel ball & DKD certificate"
IN/7601	"1/8" "Ball indentor including 1 steel ball & INNOVATEST® certificate"
IN/7605	"1/8" "Ball indentor including 1 steel ball & UKAS certificate"
IN/7701	"1/4" "Ball indentor including 1 steel ball & INNOVATEST® certificate"
IN/7705	"1/4" "Ball indentor including 1 steel ball & UKAS certificate"
IN/7801	"1/2" "Ball indentor including 1 steel ball & INNOVATEST® certificate"
IN/7805	"1/2" "Ball indentor including 1 steel ball & UKAS certificate"
IN/2505	"Spare steel balls 1/16" "including UKAS certificate (set of 10 pcs.)"
IN/2510	"Spare steel balls 1/8" "including UKAS certificate (set of 10 pcs.)"
IN/2515	"Spare steel balls 1/4" "including UKAS certificate (set of 10 pcs.)"
IN/2520	"Spare steel balls 1/2" "including UKAS certificate (set of 10 pcs.)"

MICRO-VICKERS INDENTORS

Code No.	Description
IN/8101	Micro-Vickers 136° indentor including INNOVATEST® certificate
IN/8105	Micro-Vickers 136° indentor including UKAS certificate
IN/8110	Micro-Vickers 136° indentor including DKD certificate for HV 0.1 upto HV1
IN/8115	Micro-Vickers 136° indentor including DKD certificate for HV 0.2 upto HV2

KNOOP INDENTORS

Code No.	Description
IN/8205	Knoop indentor including UKAS certificate for 400 series
IN/8210	Knoop indentor including DKD certificate for 400 series

INDENTORS FOR VARIOUS HARDNESS SCALES

VICKERS INDENTORS

Code No.	Description
IN/8015	Vickers 136° indentor including INNOVATEST® certificate
IN/8010	Vickers indentor including UKAS certificate
IN/8005	Vickers 136° indentor including DKD certificate for HV0.2 and higher
IN/8000	Vickers 136° indentor including DKD certificate for HV5 and higher

BRINELL INDENTORS FOR 3000LDB AND NEXUS 3000 SERIES

Code No.	Description
IN/7105	Brinell indentor 1mm including carbide ball & INNOVATEST® certificate
IN/7110	Brinell indentor 2.5mm including carbide ball & INNOVATEST® certificate
IN/7115	Brinell indentor 5mm including carbide ball & INNOVATEST® certificate
IN/7120	Brinell indentor 10mm including carbide ball & INNOVATEST® certificate
IN/2105	Tungsten carbide ball 1mm including INNOVATEST® certificate
IN/2110	Tungsten carbide ball 2.5mm including INNOVATEST® certificate
IN/2115	Tungsten carbide 5mm ball including INNOVATEST® certificate
IN/2120	Tungsten carbide 10mm ball including INNOVATEST® certificate

Code No.	Description
IN/7000	Brinell indentor 1mm including carbide ball & UKAS certificate
IN/7005	Brinell indentor 2.5mm including carbide ball & UKAS certificate
IN/7010	Brinell indentor 5mm including carbide ball & UKAS certificate
IN/7015	Brinell indentor 10mm including carbide ball & UKAS certificate
IN/2005	Tungsten carbide ball 1mm including UKAS certificate
IN/2010	Tungsten carbide ball 2.5mm including UKAS certificate
IN/2015	Tungsten carbide ball 5mm including UKAS certificate
IN/2020	Tungsten carbide ball 10mm including UKAS certificate

Code No.	Description
IN/7205	Brinell indentor 1mm including carbide ball & DKD certificate
IN/7210	Brinell indentor 2.5mm including carbide ball & DKD certificate
IN/7215	Brinell indentor 5mm including carbide ball & DKD certificate
IN/7220	Brinell indentor 10mm including carbide ball & DKD certificate
IN/2205	Tungsten carbide ball 1mm including DKD certificate
IN/2210	Tungsten carbide ball 2.5mm including DKD certificate
IN/2215	Tungsten carbide ball 5mm including DKD certificate
IN/2220	Tungsten carbide ball 10mm including DKD certificate

Further indentors available on request.

MASTERBLOCK®

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

ROCKWELL & SUPERFICIAL ROCKWELL HARDNESS TEST BLOCKS

TEST BLOCKS SUPPLIED WITH A STANDARD **MASTERBLOCK®** FACTORY CERTIFICATE

All mentioned hardness values are nominal values, the actual calibrated values may vary.

ROCKWELL **NOMINAL VALUES**

HRC	20	25	30	35	40	45	50	55	60	62	63	65
HRA soft	40	49	55									
HRA hard	60	62	65	67	70	73	75	78	81	82	83	
HRD	40	44	48	51	55	59	63	67	71	73	75	
HR15N	68	71	74	76	79	82	85	88	90	90,8	92	
HR30N	41	46	50	55	59	64	68	72	77	79	81	
HR45N	19	25	31	37	43	49	55	60	66	69	72	

Block size: ø60mm x 10mm thickness *Weight: 0.230kg*

ROCKWELL **NOMINAL VALUES**

Blocks below are calibrated using a **Steel ball**

HRB	60	75	90	100								
HRE	95											
HRF	90	95										
HRG	62	81	87	94								
HRH												
HRK	76	97										
HR15T	80	87	91	92								
HR30T	56	69	77	82								
HR45T	33	53	65	72								

Block size: ø64mm x 12mm thickness *Weight: 0.250kg*

ROCKWELL **NOMINAL VALUES**

Blocks below are calibrated as standard using a **Carbide ball**

HRB (W)	60	75	90	100								
HRE (W)	95											
HRF (W)	90	95										
HRG (W)	62	81	87	94								
HRH (W)												
HRK (W)	76	97										
HR15T (W)	80	87	91	92								
HR30T (W)	56	69	77	82								
HR45T (W)	33	53	65	72								

Block size: ø64mm x 12mm thickness *Weight: 0.250kg*

MASTERBLOCK®

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

VICKERS HARDNESS TEST BLOCKS

TEST BLOCKS SUPPLIED WITH A STANDARD **MASTERBLOCK®** FACTORY CERTIFICATE

All mentioned hardness values are nominal values, the actual calibrated values may vary.

STANDARD LOADS **NOMINAL VALUES**

HV1	140	240	300	400	450	540	620	720	840		
HV2	140	240	300	400	450	540	620	720	840		
HV3	140	240	300	400	450	540	620	720	840		
HV5	140	240	300	400	450	540	620	720	840		
HV10	140	240	300	400	450	540	620	720	840		
HV20	140	240	300	400	450	540	620	720	840		
HV30	140	240	300	400	450	540	620	720	840		
HV50	140	240	300	400	450	540	620	720	840		
HV60	140	240	300	400	450	540	620	720	840		
HV100	140	240	300	400	450	540	620	720	840		
HV120	140	240	300	400	450	540	620	720	840		
HV125	140	240	300	400	450	540	620	720	840		
HV150	140	240	300	400	450	540	620	720	840		

Macro block size: ø60mm x 10mm thickness *Weight: 0.230kg* *Polished surface*

MICRO VICKERS BLOCKS **NOMINAL VALUES**

HV10	240	300	400	450	540	620	720	840			
HV5	240	300	400	450	540	620	720	840			
HV3	240	300	400	450	540	620	720	840			
HV2	240	300	400	450	540	620	720	840			
HV1	240	300	400	450	540	620	720	840			
HV0.5	240	300	400	450	540	620	720	840			
HV0.3	240	300	400	450	540	620	720	840			
HV0.2	240	300	400	450	540	620	720	840			
HV0.05	240	300	400	450	540	620	720	840			

All blocks will possibly be supplied within +/- 25 Vickers of the ordered value

Micro block size: ø25mm x 5mm thickness *Weight: 0.035kg* *Polished surface*

MASTERBLOCK®

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

BRINELL HARDNESS TEST BLOCKS

TEST BLOCKS SUPPLIED WITH A STANDARD **MASTERBLOCK®** FACTORY CERTIFICATE

All mentioned hardness values are nominal values, the actual calibrated values may vary.

BRINELL **NOMINAL VALUES**

HBW 10/3000	150	200	250	300	350	400	450	500	600		
HBW 10/1500											
HBW 10/1000	150	200									
HBW 10/500	150										
HBW 5/750	150	200	250	300	350	400	450	500	600		
HBW 5/250	150	200									
HBW 5/125	150										
HBW 2.5/187.5	150	300	450	600							
HBW 2.5/62.5	75	100	125								

Block size HBW10, HBW5: *ø100mm x 15mm thickness* *Weight: approx. 1.60kg*
Block size HBW2.5s: *ø90mm x 15mm thickness* *Weight: approx. 1.20kg*
Block size HBW2.5/5 Low load: *ø64mm x 12mm thickness* *Weight: approx. 0.25kg*

LEEB TEST BLOCKS

TEST BLOCKS SUPPLIED WITH A STANDARD **MASTERBLOCK®** FACTORY OR UKAS CERTIFICATE

All mentioned hardness values are nominal values, the actual calibrated values may vary.

LEEB **NOMINAL VALUES**

HLD	490	600	880								
HLG	150	300	500								
HLD UKAS	490	600	880								
HLG UKAS	150	300	500								

Additional HLD values are available on request

Block size: ø90mm x 55mm thickness

MASTERBLOCK® - UKAS

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

ROCKWELL & SUPERFICIAL ROCKWELL REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - UKAS CERTIFICATE **(BS/EN/ISO 6508 3 & ASTM E18)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

ROCKWELL **NOMINAL VALUES**

HRC	20	25	30	35	40	45	50	55	60	63	65	67
HRA Soft	22	26	31	35	40	45	47	50	53	55	59	62
HRA Hard	60	63	65	68	70	73	76	78	81	83	84	85
HRD	40	44	48	52	56	60	64	67	71	73	74	77
HR15N	69	72	75	78	81	83	85	88	90	91	92	93
HR30N	41	46	50	55	59	64	68	73	77	80	82	83
HR45N	19	25	31	37	43	49	55	61	66	70	72	74

Block size: ø64mm x15mm thickness *Weight: 0.450kg*

ROCKWELL **NOMINAL VALUES**

Blocks below are calibrated using a **Steel ball**

HRB	20	30	40	50	60	70	75	80	85	90	95	100
HRE		75	81	87	93	100						
HRF		74	80	86	91	97	100					
HRG				3	18	33	41	49	58	66	74	83
HRH	94	98										
HRK	38	47	56	65	73	81	86	91	95	99		
HR15T	67	70	73	77	80	83	85	86	88	90	91	93
HR30T	29	36	43	49	56	63	66	69	73	76	80	83
HR45T		2	12	22	32	43	48	53	58	63	68	73

Block size: ø64mm x15mm thickness *Weight: 0.450kg*

ROCKWELL **NOMINAL VALUES**

Blocks below are calibrated as standard using a **Carbide ball**

HRB (W)	20	30	40	50	60	70	75	80	85	90	95	100
HRE (W)		75	81	87	93	100						
HRF (W)		74	80	86	91	97	100					
HRG (W)				3	18	33	41	49	58	66	74	83
HRH (W)	94	98										
HRK (W)	38	47	56	65	73	81	86	91	95	99		
HR15T (W)	67	70	73	77	80	83	85	86	88	90	91	93
HR30T (W)	29	36	43	49	56	63	66	69	73	76	80	83
HR45T (W)		2	12	22	32	43	48	53	58	63	68	73

Block size: ø64mm x15mm thickness *Weight: 0.450kg*

MASTERBLOCK® - UKAS

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

VICKERS REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - UKAS CERTIFICATE **(BS/EN/ISO 6507 3)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

STANDARD LOADS **NOMINAL VALUES**

HV2	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV3	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV5	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV10	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV20	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV30	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV50	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV100	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	

Above blocks are supplied with UKAS Certification to BS EN ISO 6507-3 and ASTM E92
Block size: ø64mm x 15mm thickness

LOW FORCE **NOMINAL VALUES**

HV1	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV0.5	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV0.3	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV0.2	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	

Above blocks are supplied with UKAS Certification to BS EN ISO 6507-3
Calibrations to ASTM E384 on request only *Block size: ø30mm x 10mm thickness*

MICRO FORCE **NOMINAL VALUES**

HV0.1	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV0.050	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV0.025	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	
HV0.010	40	70	100	150	200	250	300	350	400	450	
	500	550	600	650	700	750	800	850	900	950	

Above blocks are supplied with UKAS Certification to BS EN ISO 6507-3
Calibrations to ASTM E384 on request only *Block Size: ø30mm x 10mm thickness*

MASTERBLOCK® - UKAS

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

VICKERS REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - UKAS CERTIFICATE **(BS/EN/ISO 6507 3 & ASTM E92)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

STANDARD LOADS	**NOMINAL VALUES**										
HV10	1180	1300	1350	1420	1500	1550	1600	1640	1700	1740	1820

Additional loads available on request only
Above blocks are supplied with UKAS Certification to BS EN ISO 6507-3 and ASTM E92
Block size: 25mm square x 6mm thickness

KNOOP REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - UKAS CERTIFICATE **(ASTM E384)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

LOW FORCE LOADS	**NOMINAL VALUES**										
HK1	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	
HK0.5	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	
HK0.3	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	
HK0.2	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	

Block size: ø30mm x 10mm thickness

MICRO FORCE LOADS	**NOMINAL VALUES**										
HK0.1	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	
HK0.050	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	
HK0.025	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	
HK0.010	40 500	70 550	100 600	150 650	200 700	250 750	300 800	350 850	400 900	450 950	

Block size: ø30mm x 10mm thickness

MASTERBLOCK® - UKAS

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

BRINELL REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - UKAS CERTIFICATE **(BS/EN/ISO 6506 3 & ASTM E10)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

BRINELL	**NOMINAL VALUES**													
HBW 10/3000	70	100	150	170	200	250	300	350	400	450	500	550	600	650
HBW 10/1500	70	100	150	170	200	250	300	350	400	450	500	550	600	650
HBW 10/1000	70	100	150	170	200	250	300	350	400	450	500	550	600	650
HBW 10/500	70	100	150	170	200	250	300	350	400	450	500	550	600	650
HBW 10/250	70	100	150	170	200	250	300	350	400	450	500	550	600	650
HBW 5/750	70	100	150	170	200	250	300	350	400	450	500	550	600	650
HBW 5/250	70	100	150	170	200	250	300	350	400	450	500	550	600	650

Remark *XXX* *Outside the ranges specified in ISO and ASTM standards. Certificate will mention the specific measured value but will state that the value is outside the allowed range.*

Block size: 150mm x 125mm x 16mm thickness

BRINELL	**NOMINAL VALUES**													
HBW 10/100	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 5/125	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 5/62.5	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 5/25	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 2.5/187.5	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 2.5/62.5	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 2.5/31.25	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 2.5/15.625	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 2.5/6.25	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 1/30	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 1/10	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 1/5	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 1/2.5	40	70	100	150	170	200	250	300	350	400	450	500	550	600
HBW 1/1	40	70	100	150	170	200	250	300	350	400	450	500	550	600

Remark *XXX* *Outside the ranges specified in ISO and ASTM standards. Certificate will mention the specific measured value but will state that the value is outside the allowed range.*

Block size: ø64mm x 15mm thickness

MASTERBLOCK® - DKD/MPA

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

ROCKWELL & SUPERFICIAL ROCKWELL REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - DKD/MPA **(NEN/EN/ISO 6508-3)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

ROCKWELL **NOMINAL VALUES**

HRC	20	25	30	35	40	45	50	55	60	62	63	65
HRA Soft	40	49	55									
HRA Hard	60	62	65	67	70	73	75	78	81	82	83	
HRD	40	44	48	51	55	59	63	67	71	73	75	
HR15N	68	71	74	76	79	82	85	88	90	90,8	92	
HR30N	41	46	50	55	59	64	68	72	77	79	81	
HR45N	9	25	31	37	43	49	55	60	66	69	72	

Block size: 60mm square x 16mm thickness *Weight: 0.450kg*

ROCKWELL **NOMINAL VALUES**

Blocks below are calibrated using a **Steel ball**

HRB	60	75	90	100								
HRE	95											
HRF	90	95										
HRG	62	81	87	94								
HRH												
HRK	76	97										
HR15T	80	87	91	92								
HR30T	56	69	77	82								
HR45T	33	53	65	72								

Block size: 60mm square x 16mm thickness *Weight: 0.450kg*

ROCKWELL **NOMINAL VALUES**

Blocks below are calibrated as standard using a **Carbide ball**

HRB (W)	60	75	90	100								
HRE (W)	95											
HRF (W)	90	95										
HRG (W)	62	81	87	94								
HRH (W)												
HRK (W)	76	97										
HR15T (W)	80	87	91	92								
HR30T (W)	56	69	77	82								
HR45T (W)	33	53	65	72								

Block size: 60mm square x 16mm thickness *Weight: 0.450kg*

ROCKWELL **NOMINAL VALUES**

HR 62.5	58	61	64	66	69	72	75	78	80	82	83	

Additional loads available on request *Weight: 0.450kg*
Block size: 60mm square x 16mm thickness

MASTERBLOCK® - DKD/MPA

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

VICKERS REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - DKD/MPA **(NEN/EN/ISO 6508-3)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

STANDARD LOADS MACRO BLOCKS **NOMINAL VALUES**

HV1	140	240	300	400	450	540	620	720	840		
HV2	140	240	300	400	450	540	620	720	840		
HT	140	240	300	400	450	540	620	720	840		
HV5	140	240	300	400	450	540	620	720	840		
HV10	140	240	300	400	450	540	620	720	840		
HV20	140	240	300	400	450	540	620	720	840		
HT0	140	240	300	400	450	540	620	720	840		
HV50	140	240	300	400	450	540	620	720	840		
HV60	140	240	300	400	450	540	620	720	840		
HV100	140	240	300	400	450	540	620	720	840		
HV120	140	240	300	400	450	540	620	720	840		
HV125	140	240	300	400	450	540	620	720	840		
HV150	140	240	300	400	450	540	620	720	840		

All blocks will possibly be supplied within +/- 25 Vickers of the ordered value

Macro block size: 70mm x 70mm x 70mm x 6mm thickness *Weight: 0.130kg*

MICRO VICKERS **NOMINAL VALUES**

HV10	240	300	400	450	540	620	720	840			
HV5	240	300	400	450	540	620	720	840			
HT	240	300	400	450	540	620	720	840			
HV2	240	300	400	450	540	620	720	840			
HV1	240	300	400	450	540	620	720	840			
HV0.5	240	300	400	450	540	620	720	840			
HV0.3	240	300	400	450	540	620	720	840			
HV0.2	240	300	400	450	540	620	720	840			
HV0.05	240	300	400	450	540	620	720	840			
HV0.03	240	300	400	450	540	620	720				
HV0.025	240	300	400	450	540	620	720				
HV0.015	240	300	400	450	540						
HV0.010	240										
HV0.005	240										

All blocks will possibly be supplied within +/- 25 Vickers of the ordered value
Micro block size: 35mm x 35mm x 35mm x 6mm thickness *Weight: 0.035kg* *Polished surface*

MASTERBLOCK® - DKD/MPA

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

ALUMINUM VICKERS REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - DKD/MPA **(NEN/EN/ISO 6508-3)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

STANDARD LOADS **NOMINAL VALUES**

HV1	60	80	100								
HV2	60	80	100								
HT	60	80	100								
HV5	60	80	100								
HV10	60	80	100								
HV20	60	80	100								
HT0	60	80	100								
HV50	60	80	100								
HV60	60	80	100								

Block size: 75mm square x 16mm thickness *Weight: 0.195kg* *Polished surface*

KNOOP REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - DKD/MPA **(ISO 4545-3 & ASTM E384)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

MICRO BLOCKS KNOOP **NOMINAL VALUES**

HK0.005	140	240									
HK0.01	140	240									
HK0.015	140	240	300	400	450	540	620	720			
HK0.025	140	240	300	400	450	540	620	720			
HK0.05	140	240	300	400	450	540	620	720	840		
HK0.1	140	240	300	400	450	540	620	720	840		
HK0.2	140	240	300	400	450	540	620	720	840		
HK0.3	140	240	300	400	450	540	620	720	840		
HK0.5	140	240	300	400	450	540	620	720	840		
HK1	140	240	300	400	450	540	620	720	840		
HK2	140	240	300	400	450	540	620	720	840		

All blocks will possibly be supplied within +/- 25 knoop of the ordered value

Micro block size: 35mm x 35mm x 35mm x 6mm thickness *Weight: 0.035kg* *Polished surface*

Macro block size HK140: 70mm x 70mm x 70mm x 6mm thickness *Weight: 0.130kg* *Polished surface*

MASTERBLOCK® - DKD/MPA

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

BRINELL REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - DKD/MPA **(NEN/EN/ISO 6508-3)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

BRINELL **NOMINAL VALUES**

HBW 10/3000	150	200	250	300	350	400	450	500	600		
HBW 10/1500											
HBW 10/1000	150	200									
HBW 10/500	150										
HBW 5/750	150	200	250	300	350	400	450	500	600		
HBW 5/250	150	200									
HBW 5/125	150										

Block size at hardness 150 HBW: 150mm x 100mm x 16mm thickness *Weight: approx. 1.88kg*
Block size all others: 100mm square x 16mm thickness *Weight: approx. 1.26kg*

BRINELL **NOMINAL VALUES**

HBW 2.5/187.5	100	150	200	250	300	350	400	450	500	600	
HBW 2.5/62.5	100	150	200								
HBW 2.5/31.25	100										
HBW 2.5/15.625	100										
HBW 1/30	150	240	300	400	450	540	620				
HBW 1/10	150	240									
HBW 1/5	150										

Above reference blocks HBW1 have a polished surface

Block size: 70mm x 70mm x 70mm x 6mm thickness *Weight: approx. 0.13kg*

MASTERBLOCK® - DKD/MPA

A GLOBAL REFERENCE FOR HARDNESS TEST BLOCKS

ALUMINUM BRINELL REFERENCE HARDNESS BLOCKS

TEST BLOCKS SUPPLIED WITH A **MASTERBLOCK®** - DKD/MPA **(DIN/EN/ISO 6506-3)**

All mentioned hardness values are nominal values, the actual calibrated values may vary.

BRINELL **NOMINAL VALUES**

HBW 10/1000	60	80	100								
HBW 10/500	60	80	100								
HBW 10/250	60	80									
HBW 5/250	60	80	100								
HBW 5/125	60	80	100								
HBW 5/62.5	60	80									

Block size: 150mm x 100mm x 16mm thickness *Weight: approx. 0.520kg*

BRINELL **NOMINAL VALUES**

HBW 2.5/62.5	60	80	100								
HBW 2.5/31.25	60	80	100								
HBW 2.5/15.625	60	80									

Block size: 75mm square x 16mm thickness *Weight: approx. 0.195kg*

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Represented by:

CORPORATE HEAD OFFICE

MANUFACTURING, DISTRIBUTION & SERVICE

INNOVATEST Europe BV
Borgharenweg 140
6222 AA Maastricht (The Netherlands)
Phone: +31 43 3520060
Fax: +31 43 3631168
Email: info@innovatest-europe.com

INNOVATEST Benelux BVBA
SALES & SERVICE
Phone: +32 12 779002
Fax: +32 12 779003
E-mail: info@innovatest-benelux.com

INNOVATEST Shanghai Co., Ltd.
DISTRIBUTION, SALES & SERVICE
101, Bld. 7, No. 59 Shennan Road,
Minhang District, Shanghai, P.R. China
Zip code: 201108
Phone: +86 21 34635955
Fax: +86 21 34635269
E-mail: info@innovatest-shanghai.com

www.innovatest-europe.com