Fully automatic serial testing: quick and precise

DuraVision G5

0.3-3000 kgf

- Brinell
- Vickers
- Rockwell
- Knoop
- Plastic testing
- Carbon testing
- HBT, HVT

powered by ecos Workflow™ WITH CALIBRATION INFORMATION SYSTEM

www.emcotest.com

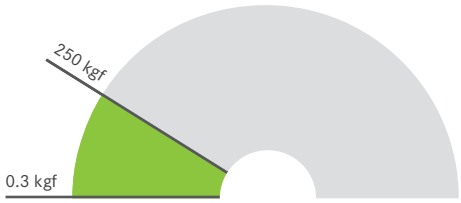
EMCO TEST

YOUR FACTOR OF SAFETY

Hardness testing for every application.

Test load range from 0.3 kgf to 3,000 kgf.

LOAD RANGE



HARDNESS TESTING MACHINE

DURAVISION 250 G5

TEST METHODS

Brinell according to ISO 6506, ASTM E10

1/1	1/2.5	1/5	1/10
1/30	2.5/6.25	2.5/15.6	2.5/31.25
2.5/62.5	2.5/187.5	5/25	5/62.5
5/125	5/250	10/100	10/250
HBT (not standardised)			

Vickers according to ISO 6507, ASTM E384, E92

HV 0.3	HV 0.5	HV 1	HV 2	HV 2.5
HV 3	HV 5	HV 10	HV 20	HV 30
HV 50	HV 60	HV 100	HV 120	HV 125
HV 150	HVT (not standardised)			

Rockwell according to ISO 6508, ASTM E18

HRA – HRZ	HR15-N/T/W/X/Y
HR30-N/T/W/X/Y	HR45-N/T/W/X/Y

Knoop according to ISO 4545, ASTM E384, E92

HK 0.3	HK 0.5	HK 1	HK 2

Carbon testing According to DIN 51917

2.5/7	5/7	5/15	5/20	5/40
5/60	5/100	5/150	10/20	10/40
10/60	10/100	10/150		

Plastic testing according to EN ISO 2039

49.03 N	132.9 N	357.9 N	961 N

LOAD RANGE

HARDNESS TESTING MACHINE

DURAVISION 350 G5

TEST METHODS

Brinell according to ISO 6506, ASTM E10

1/5	1/10	1/30	2.5/6.25
2.5/15.6	2.5/31.25	2.5/62.5	2.5/187.5
5/25	5/62.5	5/125	5/250
5/750	10/100	10/250	10/500
10/1000	10/1500	10/3000	
HBT (not standardised)			

Vickers according to ISO 6507, ASTM E384

HV 3	HV 5	HV 10	HV 20	HV 30
HV 50	HV 60	HV 100	HV 120	HV 125
HV 150	HVT (not standardised)			

Rockwell according to ISO 6508, ASTM E18

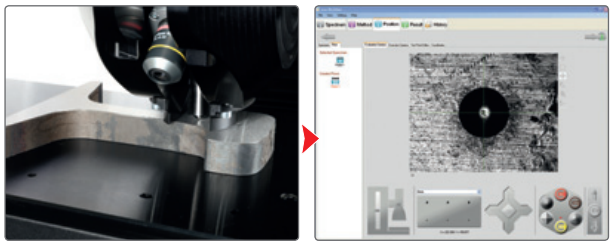
HRA – HRZ	HR15-N/T/W/X/Y
HR30-N/T/W/X/Y	HR45-N/T/W/X/Y

Carbon testing according to DIN 51917

2.5/7	5/7	5/15	5/20	5/40
5/60	5/100	5/150	10/20	10/40
10/60	10/100	10/150		

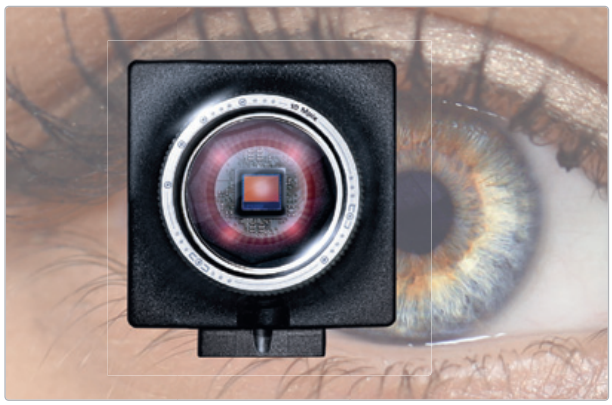
DuraVision 250 G5 and 350 G5.

Fully automated hardness testing for serial testing.



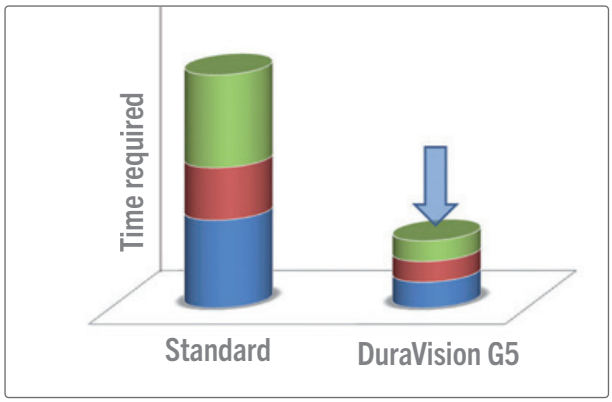
Reliably to the correct test result

Evaluation of the test indents is performed in the DuraVision G5 series with fully automatic brightness control and fast autofocus. The test load is applied using the proven concept of closed-loop control – the force is thereby continuously and precisely monitored by electronic force measuring sensors. Motorised cross slides position the test points with a high degree of repeatability and positioning accuracy, without any operator influence.



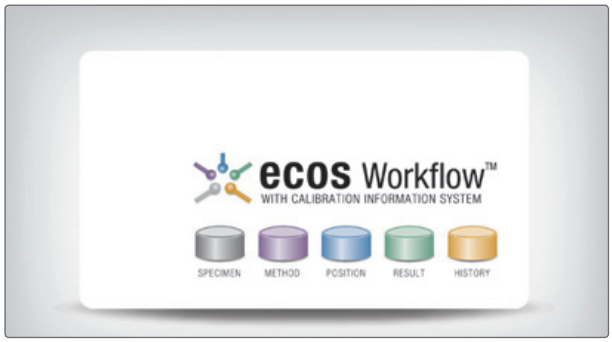
Broad spectrum of applications

The DuraVision G5 series offers a uniquely broad standard load range from 0.3 kgf to 3,000 kgf, thereby fulfilling the prerequisites for numerous different test methods. Furthermore, intelligent use of the high-resolution 10-megapixel camera allows a 3x zoom without having to accept any loss in image quality due to interpolation. This innovative solution allows a wide range of applications to be covered with a small number of lenses. In order to make full use of this potential, the DuraVision G5 uses only lenses that offer maximum optical resolution. The 7 positions of the star turret also spare you from changing tools.



Time savings thanks to fast test cycles

The DuraVision G5 Automatic helps to save time, both in serial testing and in the case of alternating test requirements. Thanks to the new, patented rapid traverse, the height of the nose cone can be adjusted at up to 25 mm/s. Combined with intuitive operation and use of the template function, this enables quick configuration. The high degree of automation of the DuraVision G5 Automatic reduces the active operating time involved in serial testing many times over. The xChange interface included as standard allows the automatic import and export of test parameters and
test results and speeds up the test cycle.



Intuitive software with calibration assistant

The **ecos** Workflow software package from EMCO-TEST provides an efficient, intelligent solution for all conventional hardness testing tasks. The user is guided step-by-step through the measuring process all the way to data backup. The intuitive user interface shortens the familiarisation time and reduces operating errors. A special feature of **ecos** Workflow is the integrated calibration assistant that monitors all calibrated methods and greatly simplifies the inspection of the hardness tester required by standards. The assistant indicates when periodic and indirect verifications in compliance with ISO and ASTM standards are due, it guides the user through the inspection process and supports documentation compliant with standards.

The DuraVision G5 Automatic.

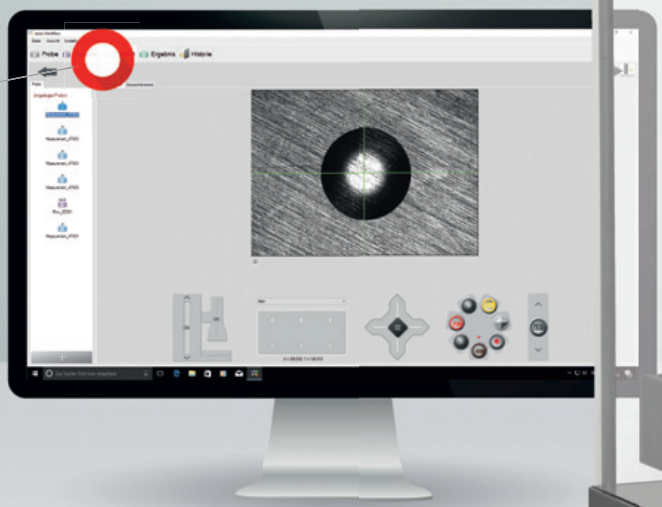
Automation with the utmost precision.

CE protective housing

Maximum protection with highest levels of user-friendliness – together with the CE protective housing, the DuraVision G5 meets international CE requirements. The light barrier system means that no safety door needs to be opened in future in order to access the machine's testing area. User-friendliness is therefore increased without compromising safety. In countries where the CE label applies, the machine may only be supplied with the protective housing. For the purposes of automation, the DuraVision G5 is also available outside these countries without a protective housing, in which case the machine is supplied without a CE label.

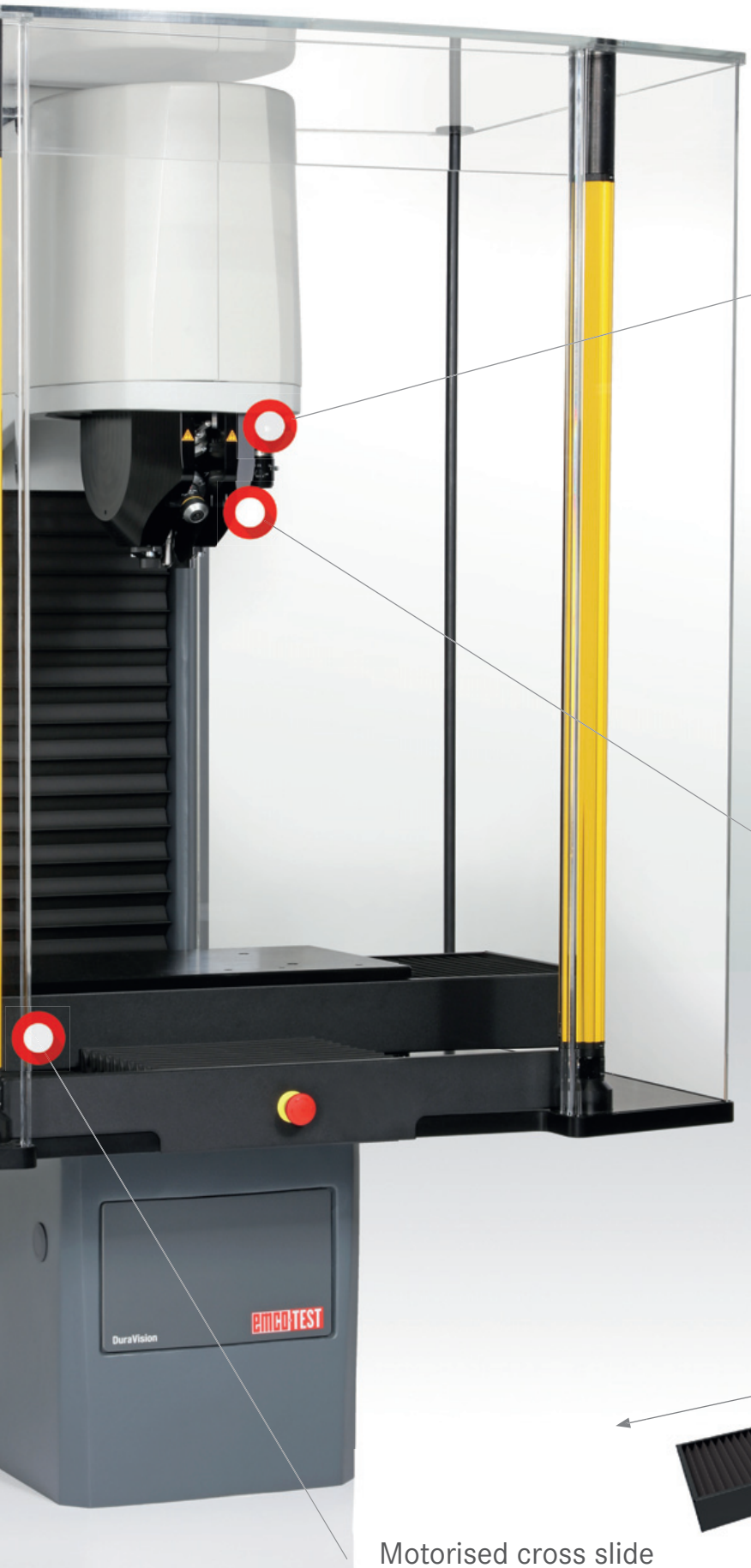
Intuitive operation

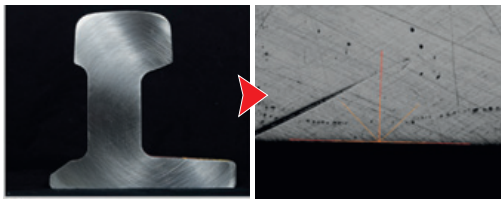
The hardness tester is controlled via the software **ecos** Workflow on an external PC.



Material and technology

Whether subjected to a 0.3 kgf or 3,000 kgf test load, the rigid cast iron stand guarantees absolute test stability for the entire range of loads. By using precious components and materials we are also able to comply with North American safety standards (control unit 'UL-listed' for the highest standards of fire resistance for plastic covers).

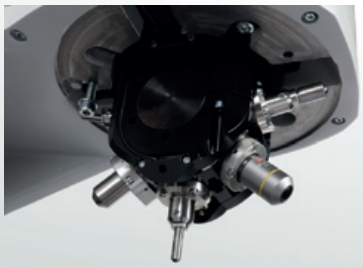




Overview camera Evaluation camera

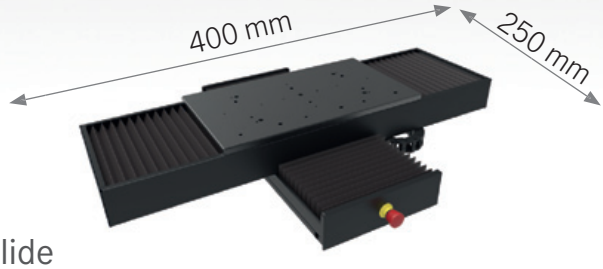
Overview camera (optional)

With the help of a “macro lens” featuring a 10x zoom, the overview camera generates a large live image of the specimen, thereby simplifying the setting of multiple test points and complicated test rows – making this an unbeatable tool in combination with the evaluation lenses.



Slim nose cone with star-shaped turret

The nose cone of the DuraVision G5 can be configured either with a 2-fold star-shaped turret (standard) or with a 7-fold star-shaped turret (optional). The slim nose cone also makes it easy to test complex components.

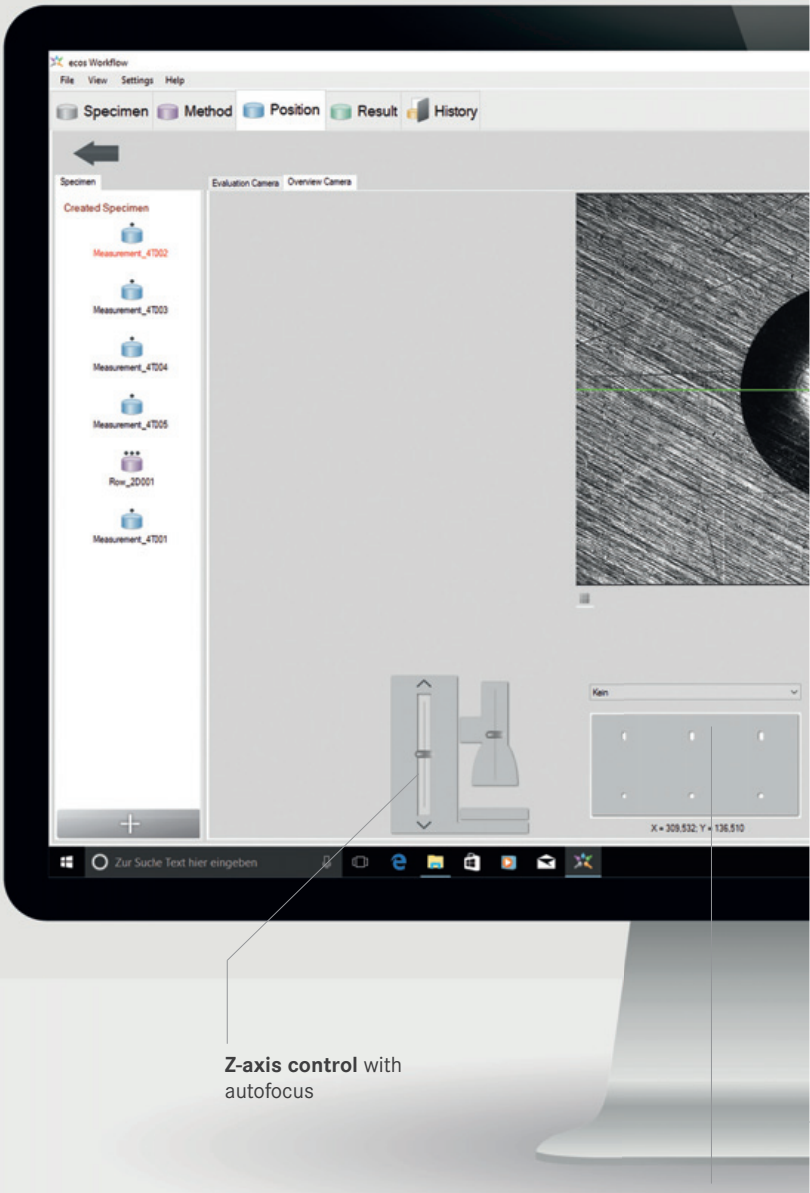


Motorised cross slide

The large travel ranges of the cross slide enable optimum, fully automatic hardness testing. The high resolution ensures a high degree of repeatability and positioning accuracy.

As simple as possible.

ecos Workflow Pro



Z-axis control with autofocus

Specimen magazines
are shown clearly on the test table. One click on the image moves the machine to the desired position.

The pioneering hardness testing software

ecos Workflow technology shows the way ahead. Simple operation of even the most complex automation tasks is becoming increasingly important in the realm of hardness testing. The software takes over the task of directing the increasingly broad range of testing requirements and guarantees simple test object administration and lasting data security. The large proportion of software in the testing equipment allows ecos Workflow to make a decisive contribution to the performance capacity and quality of the overall product.

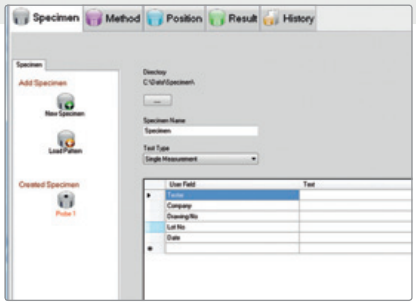
The workflow in five steps

Specimen, method, position, result and history are the five steps provided by the intuitive **ecos** Workflow operating software.

1. Specimen 2. Method 3. Position 4. Result 5. History

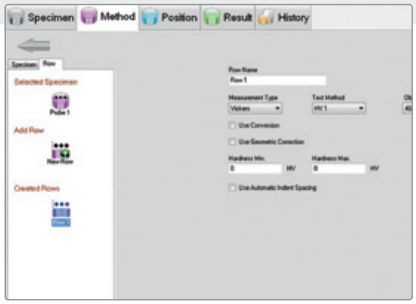
1 Specimen

Select the required test type. The available options are single measurement, serial measurement, CHD, SHD, and NHD processes.



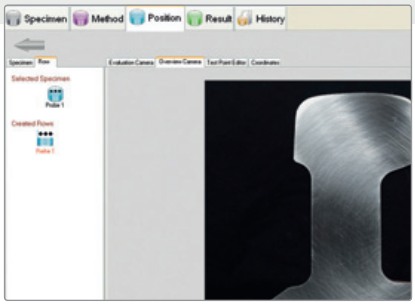
2 Method

Select the test procedure, lens, test method, zoom level and, if applicable, conversions, limit and geometric correction according to standard as well.



3 Position

Position your test points or progression rows on the workpiece. This is child's play with the tools provided. Then start the test.



Symbolic image

XY axis controller
for positioning

Star turret
with fitting info

3x zoom
Indication of the current zoom level

Single measurement

This function allows individual test points to be defined as desired. The measurement can be started directly from the surface mask or the overview camera.

Serial measurement

One or more test series can be measured with position coordinates. The measurement can be started directly from the surface mask or the overview mask.

CHD, NHD, SHD measurement

One or more test series for standard-compliant CHD, NHD or SHD evaluation of specimens. The measurement can be started directly from the surface mask or the overview mask. For NHD measurements, additional core hardness points can be defined separately.

Jominy measurement (optional)

One or more test series can be measured with position coordinates. The measurement can be started directly from the surface mask or the overview mask.

TeamViewer

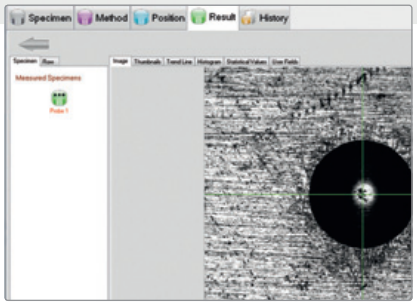
Windows 10 ready

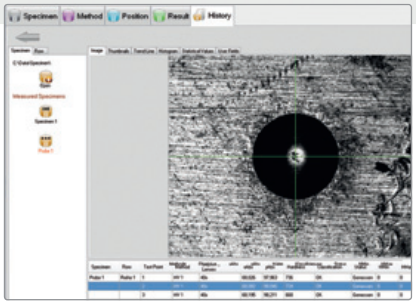
4 Result

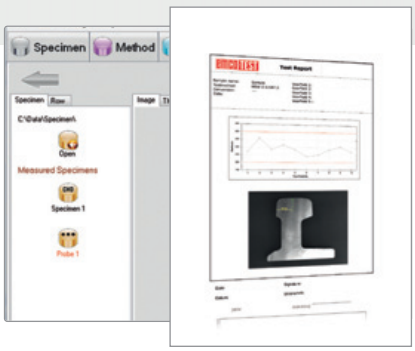
The result is shown clearly and is available for further use. The measurement can also be repeated automatically or manually if required.

5 History

All results are stored permanently with a clear structure. You have the option to archive the data in your network and other systems or to create a report via a connected printer.







Important functions.

ecos Workflow Pro

The calibration assistant of **ecos** Workflow

The calibration assistant integrated into the test software as standard supports you in the inspection of all the calibrated methods of your hardness tester required by the standards. The software notifies you of upcoming inspections, guides you through the test cycle and supports appropriate documentation.

Further details can be found at: www.emcotest.com/ecosworkflow

Guide

Guides you through the inspection procedure

Information

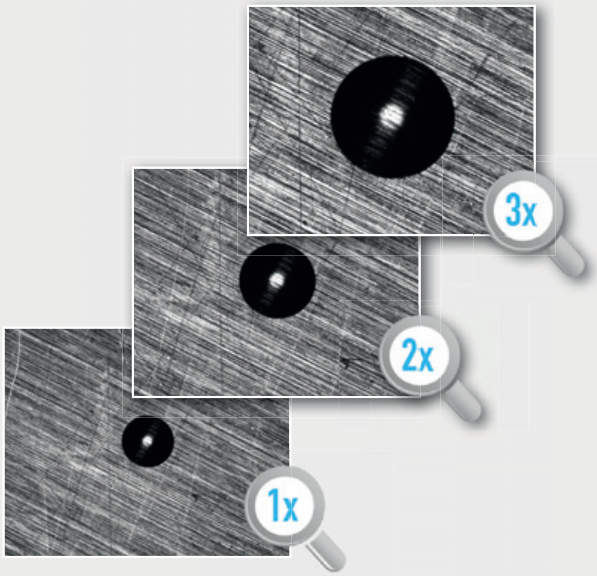
Informs you of upcoming inspections

Status

Informs you of the current status of the calibrated methods

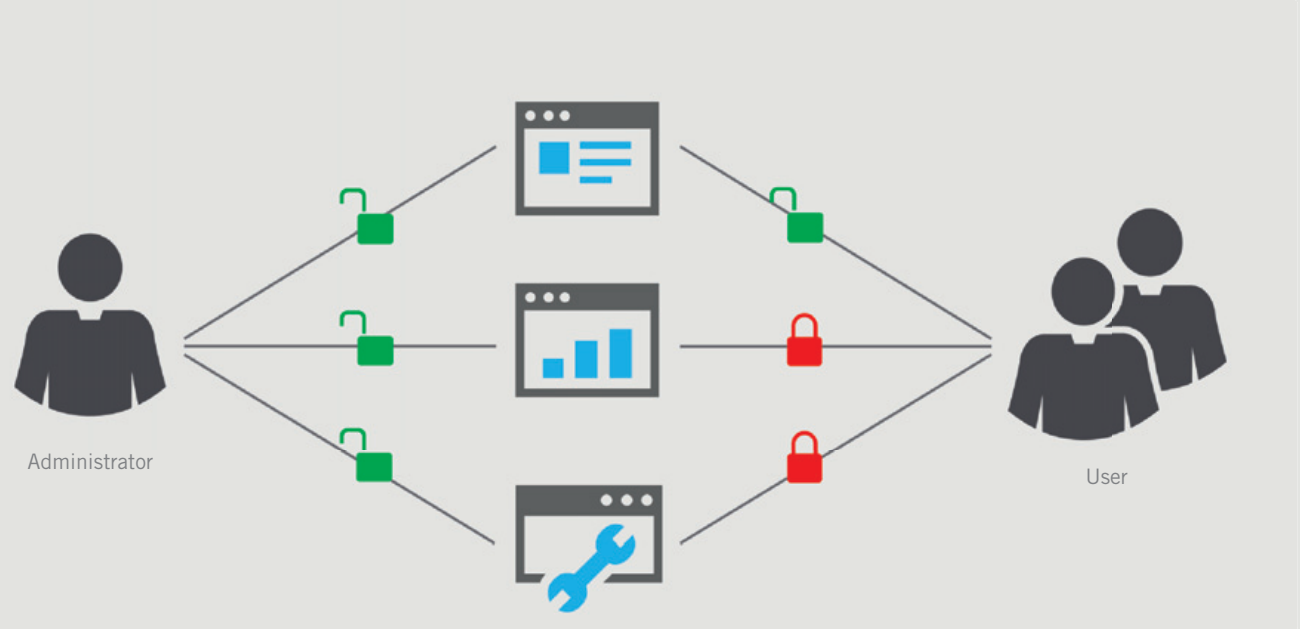
Documentation

Supports you in the documentation of the tests



One lens – three magnifications

Intelligent interaction between the optical system and the software with 3-step zoom has made it possible to trible the magnification spectrum provided by the lens - while maintaining the same high standard of image quality. The unique 3-step zoom is a standard feature of the entire DuraVision G5 series, from basic through to high-end. This saves using additional lenses and thus reduces expenditure.

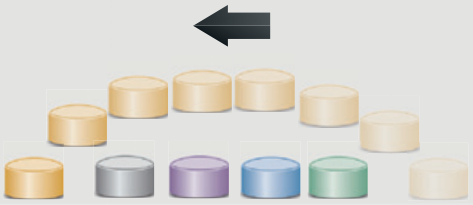


Simple management of user rights

The **ecos** Workflow operating software offers the possibility of selectively and individually controlling user rights by means of user levels. Any number of user levels with different rights can be created and changed at any time. All available rights can be very easily assigned to the desired user level with the help of a rights editor. The users are then assigned to the user level that can, if necessary, be additionally protected by means of a password. This ensures that only authorised users can perform a measurement with the required test method or can change machine settings.

Time saving pattern mode

Specimen that have already been measured are used as a guideline containing certain elements and basic settings for new specimen. The settings from the basic guideline are automatically used for new specimen. Guidelines are automatically generated for each measurement and archived specimen. Operators are recommended to use guideline settings when testing a series of identical parts, or when frequently testing parts that always conform to certain parameters, tolerance levels, test methods etc., or continually exhibit the same pattern of test results, but have varying descriptions. Conduct complex testing tasks with very few clicks.



Specimens already measured can be used as templates for new measurements.

Variable clamping force

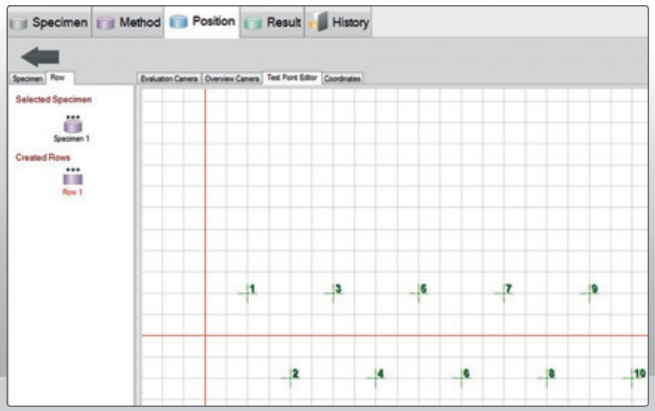
Thanks to the patented design of the Z-axis, the optimum force for clamping can be set as required in the software, depending on the specimen size and material. Even complex specimens can thus be reliably clamped by selecting a correspondingly higher clamping force. Marks on soft materials can be avoided by selecting a correspondingly lower clamping force.

Serial testing with the DuraVision G5.

Quick and easy testing of several work pieces.

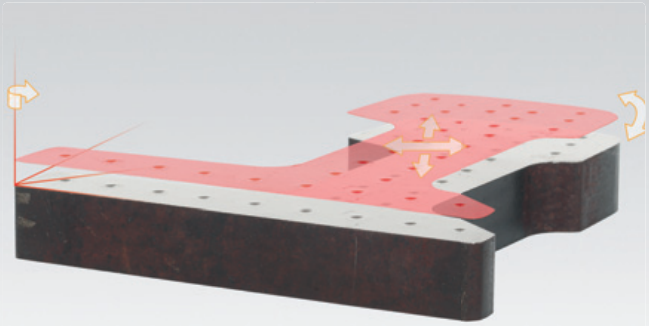
Easy generation of test series

The test point editor allows test points to be easily set up in a grid. It is also possible to set up each individual test point by entering coordinates. An even more elegant solution for serial measurement is provided by line and polygon line tools. Test series can be automatically adapted to suit work piece contours. Compliance with standard defined test distances is also enabled by an integrated tool (i.e. point distance = 3 x diagonal).



Positioning using a fixed reference point

Several test points or rows can be fixed very simply to a defined reference point and saved as a template.
Later, this template can be easily placed over the new work piece and exactly positioned by rotation over the reference point.



Testing of identical parts

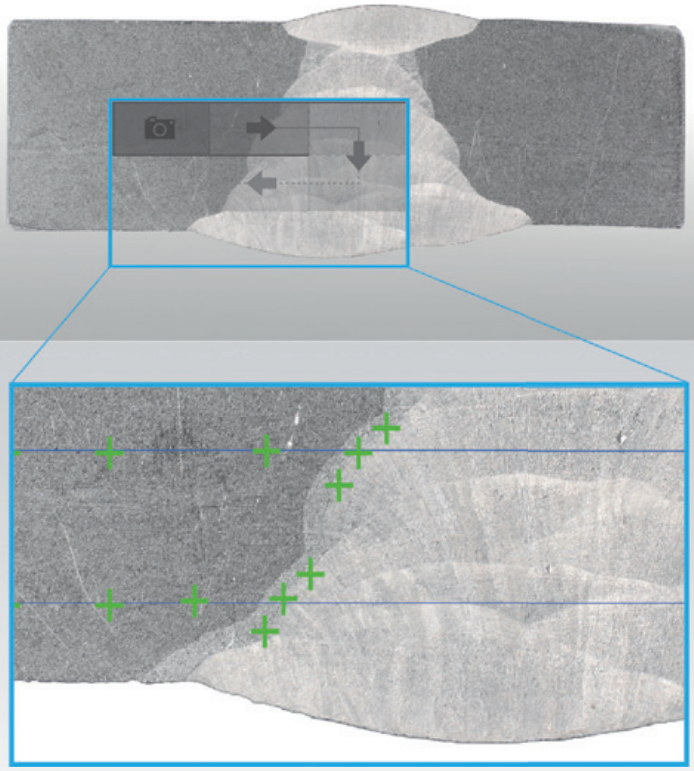
If several work pieces with the same test requirements are placed and tested on the cross slide, the DuraVision is able to show the full range of its skills. All test parameters are taken from the existing template and transferred to the new work piece.

Work pieces with different heights

Even simultaneous serial testing of multiple specimens with different heights presents no problem at all for the DuraVision G5, whether with or without nose cone.

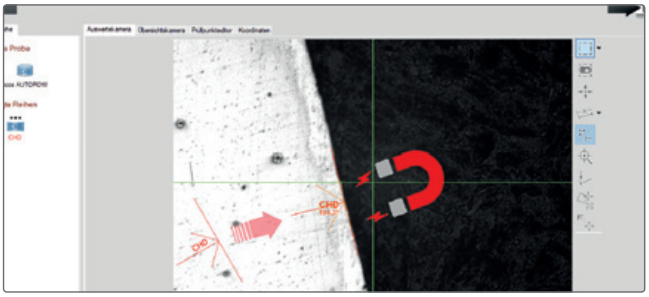
ecos PANORAMA

creates a panoramic view of your sample by taking photographs of the surface using the high precision evaluation lens and camera. The single photos are then stitched together to create an high resolution overview picture. Place test points, rows and lines directly by using this picture. The live image of the evaluation lens is shown as an overlay directly in the “off line” picture to allow high precision placement. Furthermore, this also ensures, that the specimen is still in place.



ecos AUTOROW

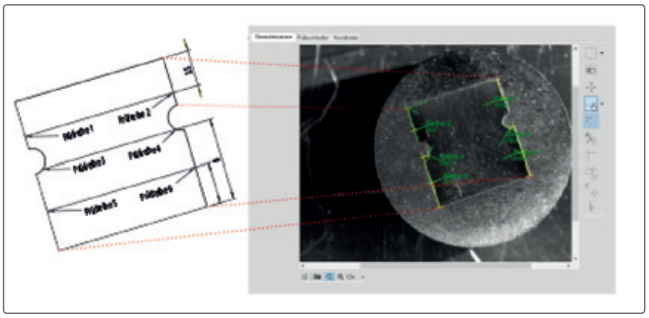
The optional **ecos** AUTOROW module allows row start points pre-positioned in the overview camera to be placed automatically at the specimen edge. In this process, the specimen edge is detected automatically and precisely in the measuring camera image, the row is shifted according to its alignment and then aligned at right angles to the specimen edge.



ecos LINEplus – your extensive toolbox

ecos LINEplus contains tools that help you place test points and rows precisely according to dimension specifications.

The reference line functions for length and angle allow you to quickly and easily define the position of row starting points or test points on the workpiece. They can also measure lengths and angles on the workpiece. All starting points and end points have a snap function, which allows multiple reference lines to be concatenated. Polylines and reference lines can always be edited at a later time and they can also be aligned on the component subsequently. This makes the efficient use of templates (samples) possible.



Modern data management with ecos Workflow.

Simple and safe handling of data.

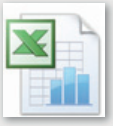
Symbolic image

Efficient data management

The vast number of measured values created during the course of comprehensive quality assurance demands highest levels of precision and availability from computerised QA systems. In order to guarantee continuous documentation and reliable allocation of measured data to the respective work piece, all DuraVision G5 models offer extensive possibilities for data output and backup. In addition to storing of the test results directly at the hardness tester, all the data collected during the test can also be saved as files in .pdf, .xls (Excel) or .xml format. The output in .xml format allows simple interfacing to Q-DAS systems. The integrated Export Editor offers extensive adaptation possibilities. In addition to the scope and sequence of the exported measurement data, a new file can also be generated automatically after each measurement, thus significantly simplifying the automatic further processing.

ecos Workflow xCHANGE

The xChange interface is standard on all hardness testers of the DuraVision G5 and DuraScan G5 series. It allows practically any customer-specific requirement for connecting the hardness tester to databases and data input devices to be satisfied, as well as enabling fully automatic or unmanned operation. Since **ecos** Workflow xChange is based on the established XML format, interaction with it is simple and structured.

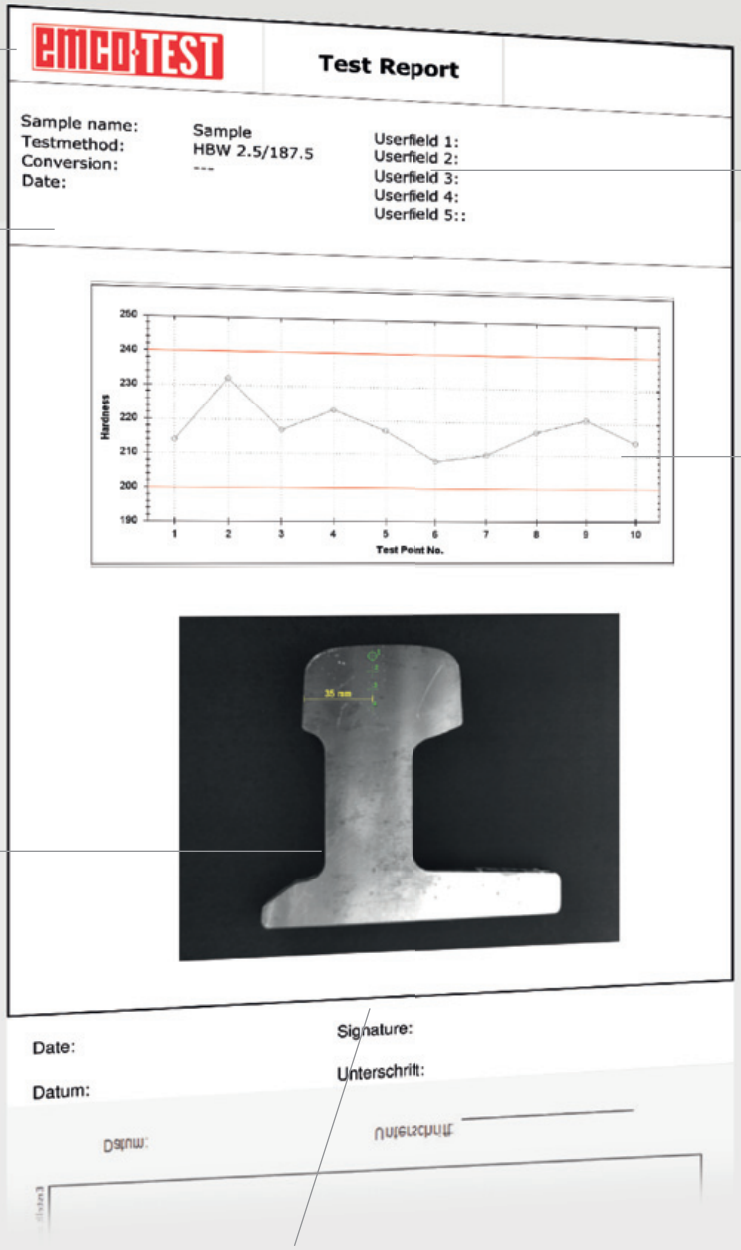


Create individual test reports

All models offer as standard the possibility of direct printing. This function allows a test report to be created using an interfaced printer. Furthermore, the form generator allows individual reports to be designed for documenting the test results.

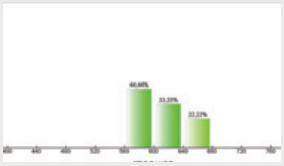
Integration of your company logo into the test report

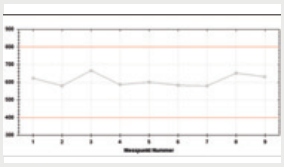
Individual fields for specimen designation and test parameters

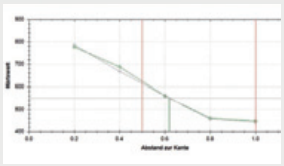


Further freely definable fields

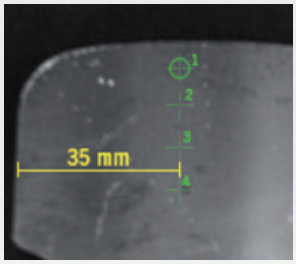
Bar diagram, statistics, trend diagram, etc.







ecos CAPTURE generates pictures of your sample to be used in reports or to be stored separately. Choose if the picture should contain test points, row start points and reference points. With the additional module **ecos** LINEplus, you can do easy measurements on your part using the helpline function. The helplines and the measurement results can be shown in the picture as well.



Measured value tables, statistical information, etc. can also be incorporated

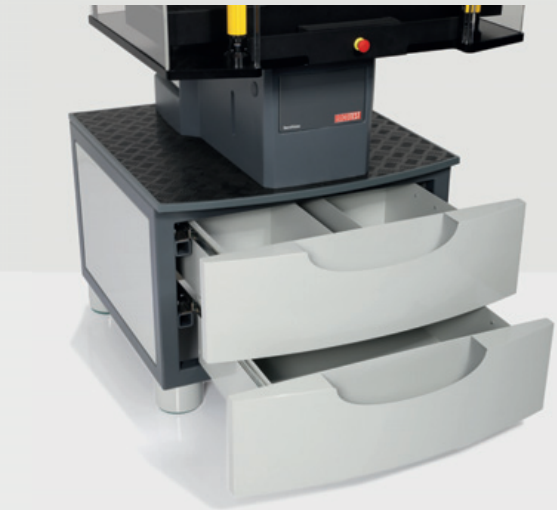
Probe	Reihe	Prüfpunkt	Härte	Methode	Objektiv	X-Abstand zum Startpunkt
Probe 1	Reihe 1	1	716	HV1	50x	0,200
		2	668	HV1	50x	0,400
		3	684	HV1	50x	0,600
		4	599	HV1	50x	0,800
		5	549	HV1	50x	1,000
		6	716	HV1	50x	1,200
		7	668	HV1	50x	1,400
		8	684	HV1	50x	1,600
		9	599	HV1	50x	1,800
		10	549	HV1	50x	2,000

Options & accessories.

Adapt the DuraVision G5 to your needs.

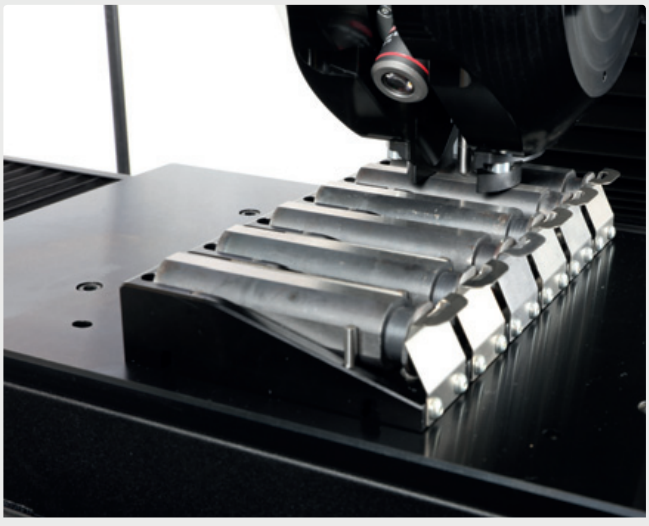
Star-shaped turret – seven at a stroke

The star turret included as standard with every machine can be expanded from the standard two positions to up to seven positions – at any time and with little effort. The star-shaped design allows not only a slim construction of the turret, but also provides seven positions for fitting any combination of indenters and lenses. A wide spectrum of test methods can thus be covered with a single machine, and frequent tool changing is not necessary. In combination with the new high-resolution camera, this reduces investment costs and set-up time. In addition, the turret rotates at a very high speed and automatically finds the shortest turning direction to the selected position.



Base – for stability and ergonomics

The DuraVision G5 base is the ideal foundation for offering operators optimum working conditions. Irrespective of whether the operator works standing up or sitting down, the base provides an optimum height for ergonomic working. Furthermore, the base features vibration-damping elements that provide the ideal conditions for precise measurement results. The generously sized drawers provide space for storing accessories and tools. The dimensions are 840 x 620 x 850 (WxHxD mm).



Jominy tests

With a separate software module **ecos** Workflow also guides the operator in the customary manner, step by step, to the result with Jominy specimens.

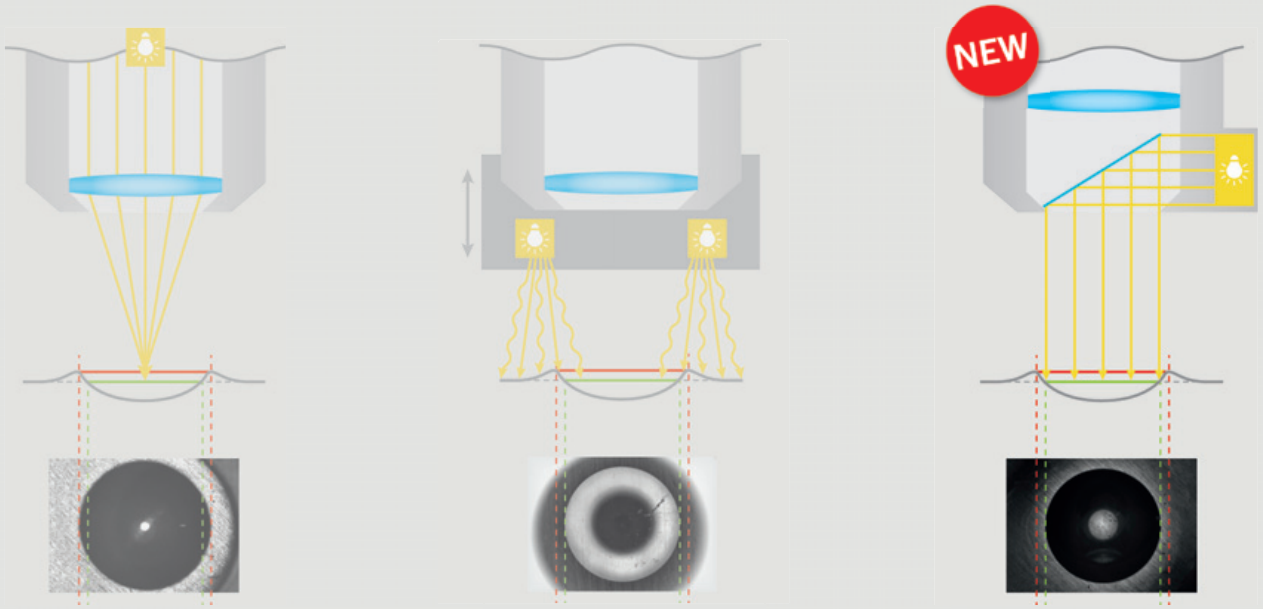
For the standard-compliant test, operators choose between HV 30 and HRC test methods in accordance with EN ISO 642 and ASTM A255 respectively. All the test parameters, including test point spacings, are predefined and guaranteed standard-compliant. For the user-defined test, operators can design the testing of Jominy specimens freely according to their requirements. All test methods are available for selection, and users can define their own test point patterns and spacings. Furthermore, multiple parallel test sequences can be created on one test surface. The result is described clearly with all hardness values in a standardised test report. Single specimen holders are used for performing Jominy tests. The Jominy specimen holders can be combined with one another, thereby enabling up to 18 specimen holders to be placed on the cross table.

Lens with Brinell SmartLight

The Brinell hardness test has always represented a challenge with soft metals and difficult surfaces. Particularly with soft materials, the edges are not always perfectly recognisable due to considerable deformation (bulging) around the indentation. The new lenses with the innovative Brinell SmartLight now ensure ideal lighting and ensure better detectability of the indent during Brinell tests. The lenses with Brinell SmartLight are available as 2.5x and 5x lenses.

In use for Brinell testing until now

Innovation in DuraVision G5



Coaxial lighting

When using coaxial lighting, the light passing through the lens is scattered on the specimen surface. As the light beams are not reflected back to the lens due to the scatter, the test indentation appears dark. Furthermore, shadowing is caused by the oblique incident light in the area of the bulging around the indent. Due to these physical factors, the edges of the indentation are difficult to detect and evaluate.

Circular light

When using circular lighting, diffuse light falls in a ring pattern from the outside onto the indentation. The light beams are reflected in the test indentation back into the lens. This allows better recognition of the edges compared with coaxial lighting.

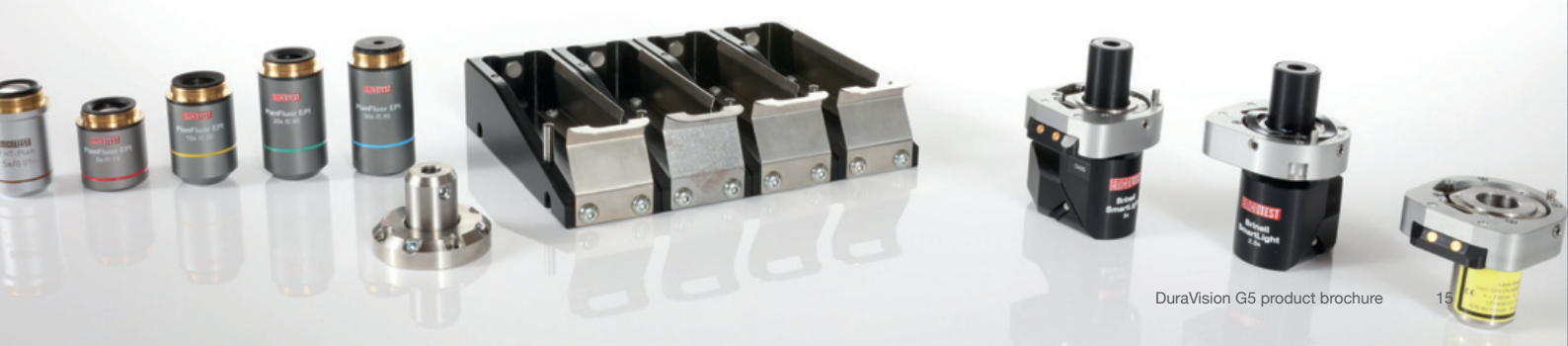
Depending on the hardness range, different height settings of the circular light are necessary in order to achieve optimum illumination of the test indentation. That these adjustments are performed manually by the operator can, however, have a negative influence on the evaluation result.

Brinell SmartLight

The SmartLight technology developed by EMCO-TEST combines a lens with “collimated light”. With this lighting, parallel light beams are directed by a mirror system onto the test indentation. The light therefore strikes the test indentation perpendicularly from above and prevents any shadowing in the area of the bulge. The contour is clearly recognisable and the indentation can be precisely evaluated. The SmartLight technology is permanently integrated into the lens and requires no further settings by the operator.

Complete accessories catalogue at www.emcotest.com

At www.emcotest.com you will find the whole range of accessories for the DuraVision G5 hardness testing machine, such as various indenters, special test tables, adapters for further indenters, lenses and much, much more.



360° FULL SERVICE COMPETENCE

Competence and experience – hand-in-hand.

Our strategy

With the vision of "building machines that don't simply do everything, but do everything simply", Ernst Alexander Maier developed EMCO-TEST from the inheritance of his father and company founder into the world technology leader in the field of hardness testing. Today we are the largest manufacturer of hardness testing machines with the most modern and most efficient technologies in Europe. In line with our mission of making everything concerning hardness testing simpler, we offer comprehensive solutions for all these applications from a single source: Development, production, calibration, consultation and supplementary services – complete coverage of all important issues. This means competence in all aspects of hardness testing: 360° FULL SERVICE COMPETENCE.

Accredited calibration laboratory to ISO 17025

In order to comply with international standards, for reproducibility of measurement results and for comprehensive documentation of the test cycles, EMCO-TEST offers accredited calibration in accordance with EN ISO / IEC 17025. Our accredited calibration laboratory ensures that the services offered always represent the state-of-the-art of the standards and technology.

Premium quality with certified quality promise (ISO 9001)

In order to ensure that only perfect quality is supplied to you, every EMCO-TEST testing machine is thoroughly and stringently tested before delivery. The ease of service is taken into consideration right from the beginning in the design phase. The results are menu-driven fault detection, integrated self-diagnosis and modular exchange of electronic components that ensure the remedying of faults in a minimum of time. Software updates that take into consideration changes in standards or optimise future processes ensure high investment security for you.

Service app

With the EMCO-TEST Service app, you can quickly and easily send a service message around the clock and from anywhere in the world. The app guides you step-by-step in easily creating your service message. This ensures that our service technicians receive all the relevant data on the machine and can quickly provide assistance in an emergency. These and many other functions await you in our EMCO-TEST Service app.

Remote support

The TeamViewer Client integrated as standard can be started directly from **ecos** Workflow and offers the optimum basis for perfect online support worldwide. This software allows remote maintenance as well as the sharing of the screen contents with other computers, e.g. for training purposes.

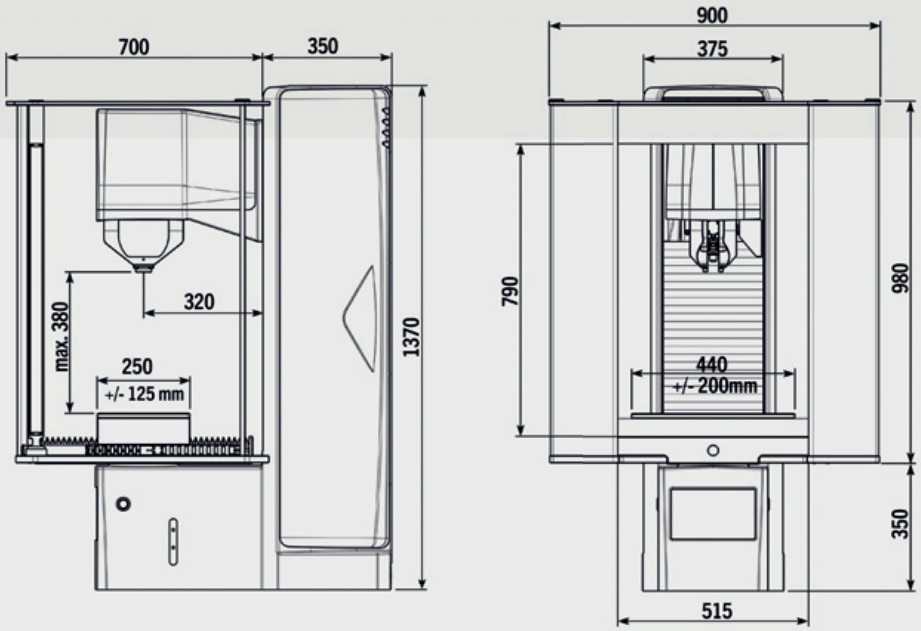
Technical data

Automatic

	DuraVision 250 G5	DuraVision 350 G5
Methods and load range		
Load range 2.942 - 2,452 N (0.3 - 250 kgf) - electronically controlled	•	-
Load range 29.42 - 29,420 N (3 - 3,000 kgf) - electronically controlled	-	•
Brinell (ISO 6506, ASTM E10)	•	•
Vickers (ISO 6507, ASTM E384, E92)	•	•
Rockwell, Super Rockwell (ISO 6508, ASTM E18)	•	•
Knoop (ISO 4545, ASTM E384, E92)	•	-
Plastics testing (ISO 2039)	•	-
Configuration		
ecos Workflow CIS Pro operating software	•	•
Automatic test cycle with brightness control, autofocus and image evaluation	•	•
3x zoom	•	•
10 Mpix evaluation camera with CMOS sensor	•	•
Machine control via integrated PLC	•	•
Motorised height adjustment of the test unit with rapid traverse	•	•
Clamping force setting 1,961.4 - 19,614 N(200 - 2,000 kgf) ±10%	•	•
Automatic 2x star-shaped turret	•	•
Automatic 7x star-shaped turret	optional	optional
Surface lighting (integrated into nose cone, dimmable)	•	•
Testing clamped/unclamped	•	•
Motorised cross table (WxD)	440 x 250 mm	440 x 250 mm
Software functions		
Template function	•	•
CHD, NHD, SHD and serial measurements	•	•
Calibration Information System with calibration assistant	•	•
ecos xCHANGE (XML-based interface for data connection)	•	•
Multiple specimen module for testing several specimens in one work cycle	•	•
Integrated TeamViewer client	•	•
ecos Panorama	•	•
Adjustable User Rights	•	•
ecos AUTOROW	optional	optional
ecos LINEplus	optional	optional
areaMASTER software module for generating hardness maps	optional	optional
Jominy software module	optional	optional
Interfaces		
Interfaces for PC connection	2x USB 2.0, 1x RJ45	2x USB 2.0, 1x RJ45
Functional dimensions		
Max. specimen weight	50 kg	50 kg
Weight of basic unit	500 kg	500 kg
Z-axis resolution	0.18 µm	0.18 µm
Max. speed on Z-axis	up to 25 mm/s	up to 25 mm/s
Max. test height	380 mm	380 mm
Max. throat depth	320 mm	320 mm
Nose cone support	53 x 42 mm	53 x 42 mm
Positioning accuracy	± 0,025 mm	± 0,025 mm

Machine data

Dimensions (W x H x D)	900 x 1370 x 1050 mm
Space requirements (W x D)	2200 x 1800 mm
Test force application resolution	0.45 nm
Length measuring probe resolution	0.05 µm
Protection class to EN 60529	IP20
Voltage supply (V)	230 V 1/N/PE
110 V 1/N/PE	IP20
Max. voltage fluctuations	± 10%
Frequency	50/60 Hz
Main fuse (110 / 230 V)	T 6.3 A
Room temperature (to ISO/ASTM)	+5°C to +40 °C
Humidity	max. 70%
Power consumption (max./standby)	600 W / 100 W



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Benefit from our worldwide sales and service network!

Our qualified sales and service partners are at your disposal in over 40 countries. We can therefore guarantee the best support for you and your machine. You can find a dealer near you on our website www.emcotest.com.

○ Headquarters Austria
● Sales and service partners

EMCO·TEST
YOUR FACTOR OF SAFETY

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Akkreditierung Austria A 0623 ISO/IEC 17025 C

Accredited ISO/IEC 17025 Calibration Laboratory

TÜV AUSTRIA ZERTIFIZIERT EN ISO 9001 ZERTIFIKAT NR. 20 100 72002130

DIN MEMBER

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