DuraScan

Struers

Micro/macro hardness tester with extended load range from 10 gf - 10 kgf for Vickers and Knoop tests

- Unique test load range from 0.098 N (10 gf) to 98.1 N (10 kgf) enables DuraScan to replace two single task machines
- Suitable for Vickers and Knoop tests
- Unique system of combined closed-loop and dead weight technology ensuring accurate and repeatable test loads (patented)
- Completely automatic test cycles eliminate operator influence and frees operator time
- Extremely fast test cycle
- Extremely fast exchange of test methods
- Automatic exchange of lens and indenter eliminates the number one cause of machine misalignment
- Automatic 6-position turret eliminates need for manual exchange of indenters and objective lenses
- Vertically movable test head and fixed stage/anvil (z-direction) for optimal precision and stability
- State-of-the-art focusing system, ensures extremely fast and automatic focus on all surfaces (patented)
- Automatic image evaluation assures the highest possible repeatability and reproducibility
- High-resolution evaluation camera
- LED system for uniform illumination intensity
- A second camera (overview camera) makes it easy to select starting points and test series with just a few mouse clicks
- Unique, user-defined templates simplify and automate repetitive testing jobs
- Automatic case hardness depth CHD, Rht, and nitrited depth (Nht) test runs
- Automatic stop function once a defined case hardness limit has been reached minimizes the number of indents and time required to perform an evaluation
- Case depth evaluation is projected graphically for reporting, including multiple curves
- Automatic indent spacing ensures perfect spacing according to norms
- Workflow based software for easy setup and execution of test runs (ecos Workflow™)
- Multiple specimens software makes automatic measuring of test lines on multiple specimens easily programmed, allowing hours of unattended testing
- QR-code reader/writer
- Ideal for case hardness depth measurement and test of welds
- European developed and manufactured

Extended test load range

The unique test load range from 10 gf to 10 kgf enables you to cover many applications, which usually requires a minimum of 2 pieces of equipment – a micro- and a macro indentation hardness tester. With DuraScan, just one hardness tester will do the job!
DuraScan covers all of the following test methods:

Vickers: HV0.01, HV0.025, HV0.05, HV0.1, HV0.2, HV0.3, HV0.5, HV1, HV2, HV2.5, HV3, HV5, HV10

Knoop: HK0.01, HK0.025, HK0.05, HK0.1, HK0.2, HK0.3, HK0.5, HK1, HK2

Additionally the DuraScan can automatically convert hardness values according to EN ISO 18265, DIN 50150 & ASTM E140.

Time saving automatic test cycles

DuraScan is supplied with the user-friendly ecos Workflow™ software system.
Regardless of which DuraScan model you choose, the entire test cycle of applying the load, uploading, focusing, capturing the image and evaluating hardness is performed fully automatically. The full-automatic measuring of indentations with image analysis software significantly improves the repeatability of the results and eliminates variations among operators. In combination with a motorized stage, entire test series can be run automatically, saving time and allowing the operator to attend to other tasks.

Innovative combination of load cell and dead weight technology – the best of two worlds

The load cell technology implies that test loads are applied via a closed loop control unit with a load cell, DC motor and electronic measurement and control unit. The technique ensures the highest possible degree of accuracy and repeatability during load application, as the common over- and undershoot from dead weight systems is eliminated. The absence of mechanical weights not only eliminates friction problems but also makes the equipment less sensitive to misalignments caused by vibrations.
As the benefits of the load cell technology are limited to higher loads a dead weight system is applied for the lower loads (≤50 gf) in order to obtain the highest possible degree of repeatability. The result is a unique and patented hardness testing system ensuring that the DuraScan not only conforms to all standards but instead offers the highest possible degree of accuracy and repeatability throughout its entire load range.

Extremely fast cycle time

The unique loading system also enables the machine to change test method and load in less than a second. Combined with a state-of-the-art measurement turret the entire measurement cycle of loading, indenting, unloading, focusing and evaluating is carried out extremely quicly.

Unique autofocus technology

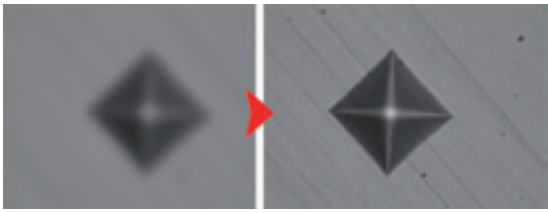
The unique autofocus technology and high quality optical system enable you to perform fast autofocus and automatic hardness evaluation on even non-reflective surfaces, such as ceramics and etched or welded surfaces. As this is possible for even the smallest loads and highest magnifications the result is a highly versatile machine suitable for most hardness applications. Furthermore the LED illumination system ensures a constant and uniform illumination intensity.

Automatic illumination adjustment

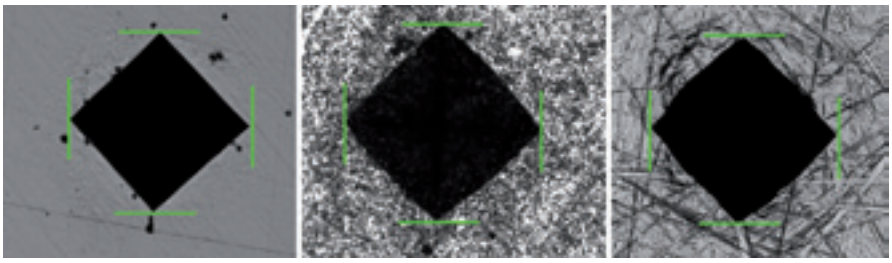
The DuraScan will automatically adjust the illumination intensity according to the material surface condition being tested, whether it being bright, dark, polished, ground or etched. That means the operator does not need to manually adjust the illumination, which otherwise will affect the repeatability and calibration of the system.

Efficient measurement procedure

On DuraScan models equipped with automatic stage (DuraScan-50/-70/-80) you can choose between two test procedures, depending on your application. Either all indentations can be made first and then evaluated, or each indent can be evaluated immediately after it has been made. For automatic CHD the latter procedure implies that you don't have to perform more measurements than actually required to measure your CHD, as the material hardness is monitored "live". The machine can therefore be programmed to have a cut-off at, or just after the hardness limit, thus avoiding additional and unnecessary test points. At the end of the day this will significantly save you time and effort.



Autofocus on the DuraScan is standard



Automatic hardness evaluation on all surfaces

Vertical concept and asymmetric design

The DuraScan is based on a compact and asymmetric design with the patented V-concept, implying a motorized test head and a vertically fixed stage. The test head is movable in the y- and z-directions whereas the stage is movable in the x-direction. Advantages of this patented concept are many.

- Larger effective stroke on the same workspace
- Larger vertical capacity, 260 mm (10.2") meaning taller samples can be measured
- Samples with different height can be tested fully automatically
- Stage is fixed in the z-direction, meaning an elimination/reduction of play in spindle
- Stage is fixed in the y-direction, resulting in a higher degree of precision in positioning of test points during test series
- Ergonomic design due to constant working height

For details on the various model configurations, please refer to the Specifications section.

Automatic turret

The DuraScan is available with a 6-position automatic measurement turret which can hold up to two indenters (e.g. Vickers and Knoop) and four objective lenses, or one indenter and five objective lenses. With an automatic turret the tedious task of continuously exchanging indenters and/or objectives lenses is eliminated, hereby avoiding subsequent calibration and/or potential human sources of errors.

Manual 3-position turret
(Standard with DuraScan-10/-20)

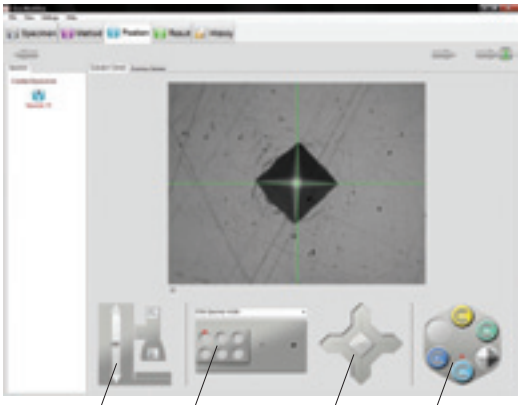
Automatic 6-position turret
(Standard with DuraScan-50/-70/-80, optional with DuraScan-10/-20)

With the low magnification overview camera option the DuraScan can facilitate up to a total of 7 positions in the turret, hereby offering a previously unseen flexibility in the testing.
The turret works extremely quickly and precisely due to the pre-programmed test methods and high quality mechanics enabling the DuraScan to exchange test methods or turret position in less than 2 seconds.

Workflow based software (ecos Workflow™) **for easy and intuitive operation**
The user interface is based on a concept that follows the natural sequential steps related to the hardness test, i.e. preparing and setting up the test, executing the test, reviewing and editing the results, and managing and reporting the data. In other words, each tab-page in the software represents each step in the hardness testing workflow. The software follows and guides you through the natural workflow in the test lab, prompting you to input information when needed. This also means that no unnecessary and confusing software options are available when not needed, as only necessary software functions will be available on the different steps.

Ecos Workflow™ is a very user-friendly software requiring only a minimum of training. Even if the machine is extremely advanced, why should the software not be simple and straightforward? DuraScan with ecos Workflow™: a state-of-the-art solution bringing hardness testing into the 21st century.

Software controls on DuraScan -50/-70/-80

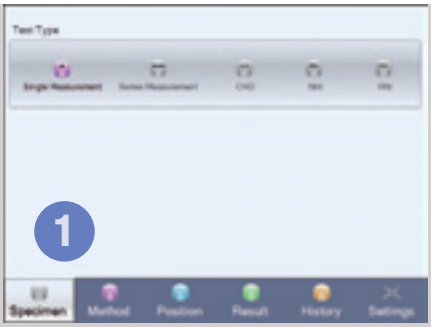


The software guides you through setting up and running the hardness test, with each tab-page representing each step in the hardness testing workflow.

Two different software designs are available, one for the DuraScan-10 and -20; (touch screen operated) and one for the DuraScan-50/-70 and -80, but based on the same workflow oriented concept:

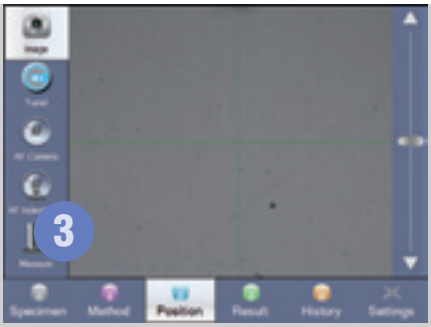
The DuraScan-10/-20 is operated via the integrated touch screen

DuraScan-10/-20

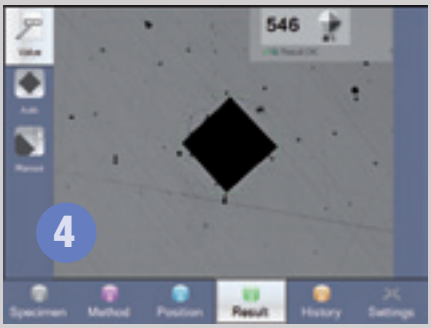


Setting up specimen, incl. naming and generic information

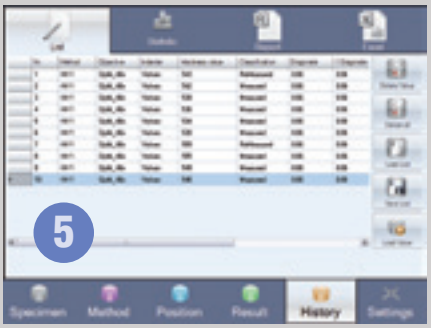
Determination of test method and procedure



Positioning of test point(s) and execution of test

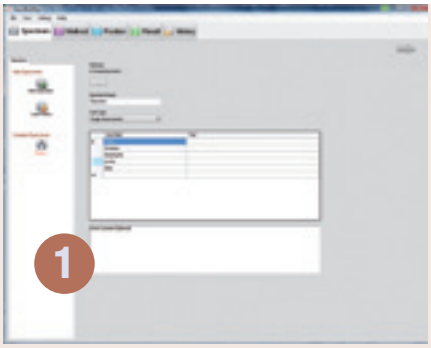


Display and review of results

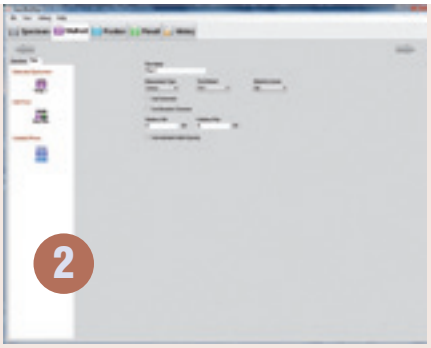


Analyzing, reporting and archiving

DuraScan-50/-70/-80

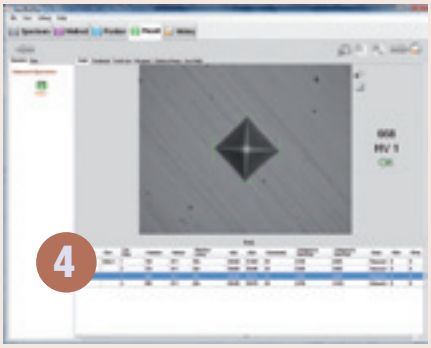


Setting up specimen, incl. naming and generic information

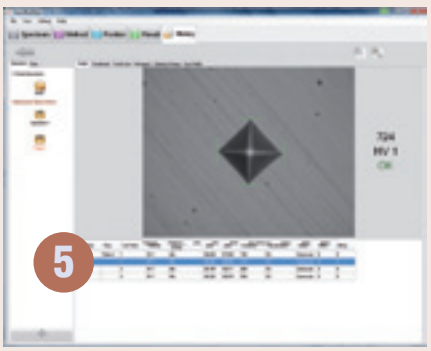


Determination of test method and procedure

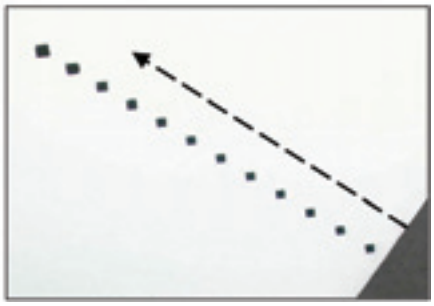
Positioning of test point(s), under objective lens or overview camera, and execution of test



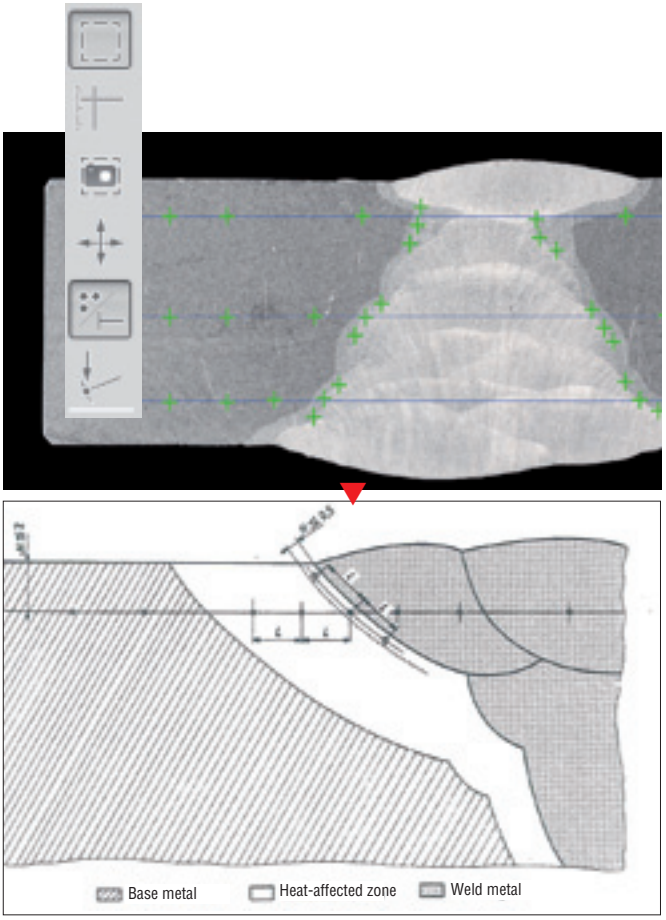
Display and review of results



Analyzing, reporting and archiving



CHD measurement



Testing of Welds

Applications

Case Hardness Depth (CHD) measurement

The case hardness depth is defined as the distance from the sample surface to the area inside the sample where a certain hardness is measured, ie. the hardness limit. The CHD measurement is typically performed as a series of measurements perpendicular to a polished cross-section of the sample surface.
CHD-measurements are typically performed using low load Vickers (≤HV1) or low load Knoop test methods.
With DuraScan, the overview camera option gives you the possibility to easily position and execute your test series, in a macro view, with just a few mouse clicks. You can save single and multiple test point series as templates and easily position them across your sample. This functionality is very helpful if you are performing repetitive or high volume CHD-measurements or just want easy set-up and execution of your test series.

Welds

DuraScan makes it possible to perform fully automatic testing of welds using test methods HV5 and HV10.
The optional overview camera (DuraScan-70/-80) enables the user to see the entire sample in the macro view and easily place and align the test points in accordance with the sample geometry.

Typically, a line or series of indentations is made a few mm parallel to the sample edge across the sample surface. In particular the hardness around the heat affected zone (HAZ) is of interest, as too high hardnesses might incur risks to the strength of the weld.
As the measurements usually are performed over a large area or long distance, they can be difficult to carry out under a normal high-magnification objective lens.
With a fully automatic DuraScan hardness tester, the low magnification overview camera option gives you the possibility to easily position and execute your test series, with just a few mouse clicks. You can also save your test point patterns as templates for future use. All this will save you valuable time during both the setup and execution of the test series. Testing of welds is usually performed using HV5 and HV10, making DuraScan the obvious choice.

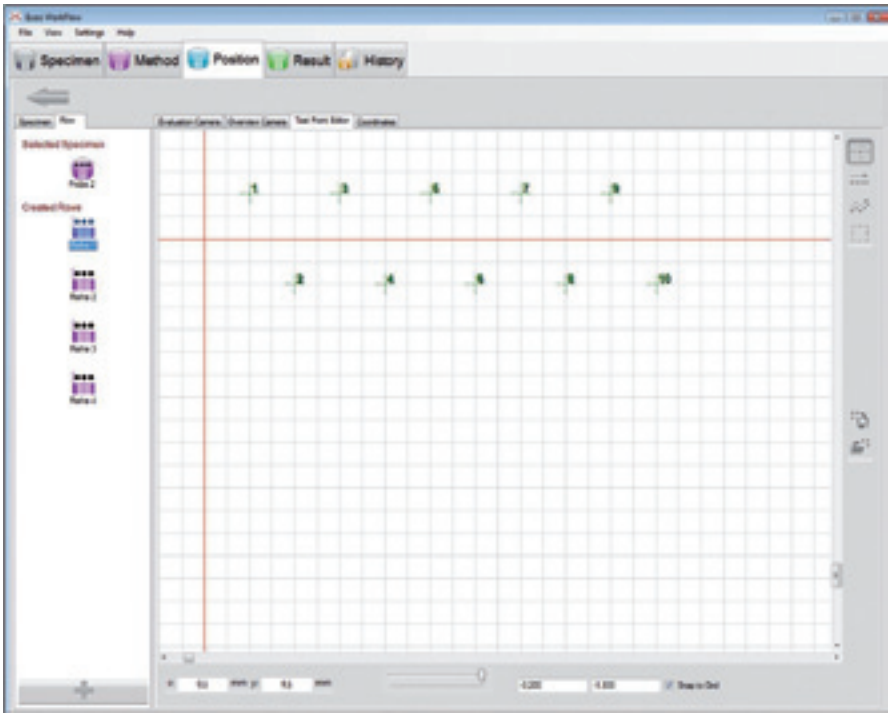
In the following section you can read more about features related to these applications:

The time saver for case depth measurement and testing of welds

The DuraScan is second to none when it comes to automatic case hardness depth measuring (CHD) and testing of welds. A motorized XY stage and automatic test cycles are important in that respect. But no other equipment on the market will allow you to perform case depth evaluations and hardness testing of welds as quickly and reliably as the DuraScan. These unique features are time savers you would not want to be without:

- Easy test point editor
- Overview camera
- Automatic stop at defined hardness limit (for CHD)
- Automatic indent spacing (for CHD)
- Graphical projection of case depth evaluation (for CHD)
- Multiple specimens software
- Possibility to save test point patterns for future use.

Easy test point editor



Easy test point editor

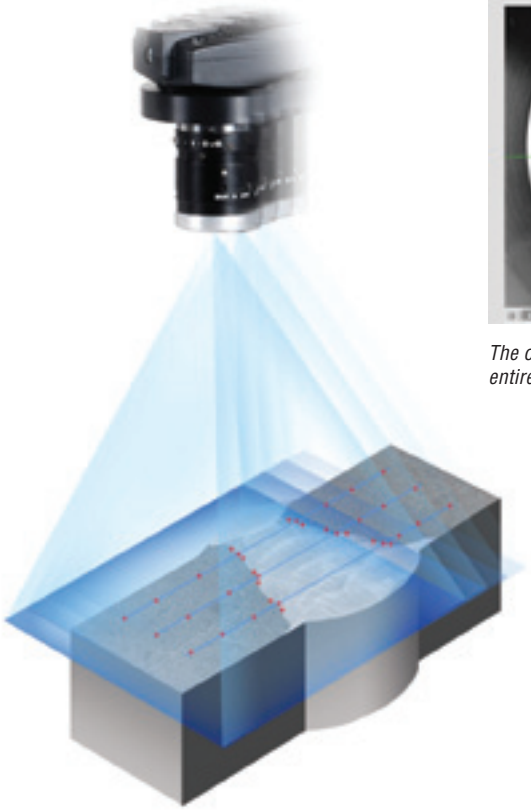
The test point editor allows you to freely select test points just by clicking coordinates with the mouse. Alternatively, you can draw a line and set the number of test points or the distance between the points: all set with a few mouse clicks.

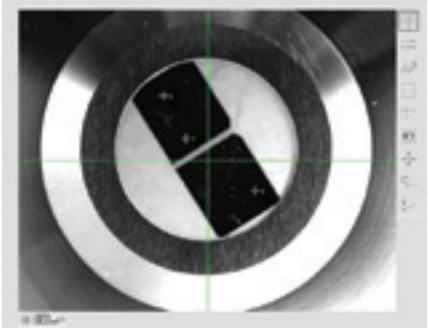
Overview camera

The second CMOS-camera offers a field of view of 52 x 40 mm. It allows you to view your entire specimen surface and with a few mouse clicks you can easily select starting test points for case depth measuring or define test series. An infinite number of test points can be set, and the motorized stage will automatically take you to each one for fine-positioning if necessary. This will save you setup time and once you start the testing, DuraScan can run unattended due to the fully automatic testing cycles.
In addition, a picture from the second camera can be included in your report for easy identification and viewing.

Multiple specimens software

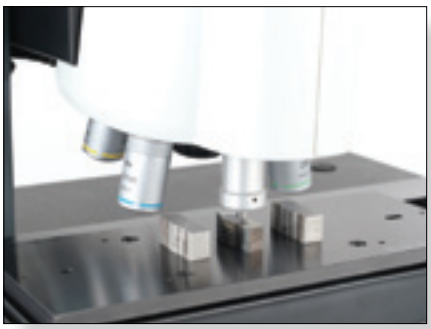
The overview camera allows for fast setup of multiple test points or series on your specimen. With the multiple specimens software added on, you can set up test runs on multiple samples and further increase the level of automation. Again, this will save you setup time and once you start the testing, DuraScan can run unattended for hours, or even overnight, due to the fully automatic testing cycles.





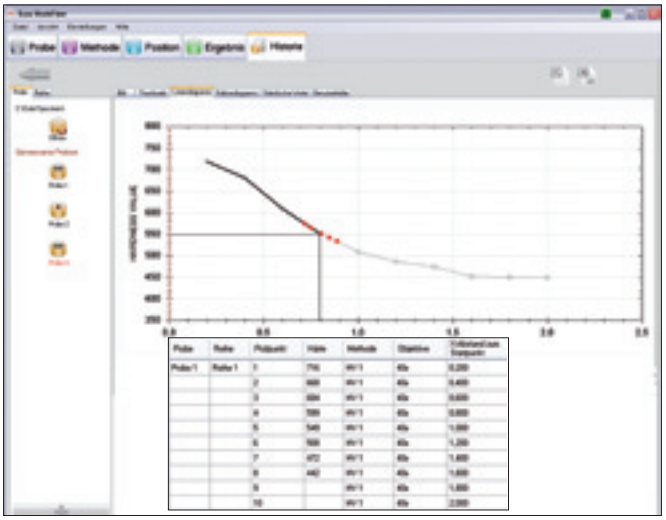
The overview camera allowing you to view the entire sample and place test points via mouse clicks

Multiple CHD testing



Multiple testing of welds

Additionally the following features are available if you perform CHD measurements:



Graphical projection of case depth

Automatic stop at defined hardness limit

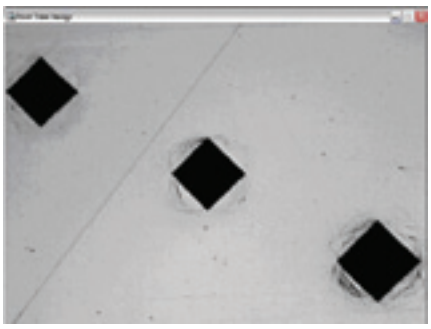
On DuraScan, set-up of automatic case depth test runs is done easily and without guessing. You simply define a hardness limit and decide how many additional indentations you want after the limit is reached. This way, you do not need to know in advance how many indentations are necessary to reach the case depth.

Automatic indent spacing

When running case depth measurements, you traditionally need to set a fixed spacing (in µm) between your indents, regardless of the fact that the size of your indentations changes through the case. DuraScan offers the unique automatic indent spacing feature, allowing the spacing to be set according to actual indentation size (e.g. 3x indentation diagonal).
The spacing between each indentation is calculated individually, ensuring that spacing increases as the indentation increases in size. The result is perfectly spaced indentations and a more smooth and accurate projection of the case depth curve.

Graphical projection of case depth evaluation

The case depth evaluation is automatically plotted graphically as a curve together with the preset hardness limit. The curve is shown in real-time and new points are added continuously as indentations are measured, allowing you to monitor the test run. Multiple test series can be displayed simultaneously and compared individually.



Automatic spacing based on diagonal lengths

Templates

If you often perform hardness tests on similar samples, you can define templates that will simplify and automate your entire process. The benefits are obvious:

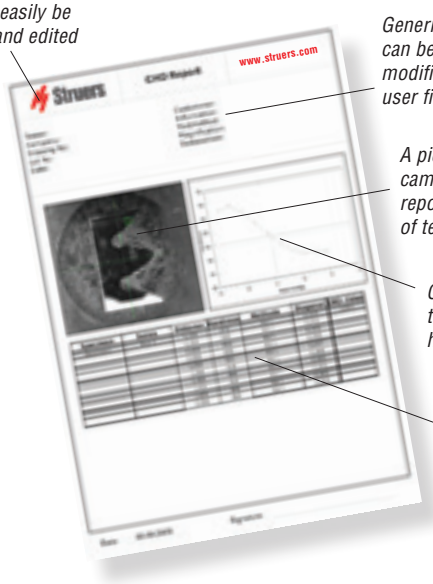
- Templates contain pre-defined patterns and minimise set up time
- Repeatability is ensured as the operator does not need to setup anything on his own
- Standardised procedures are ensured and independent of the operator
- Operators without extensive training are able to perform sophisticated hardness testing with ease.

Statistics

All measurement series can be displayed and analyzed statistically via the flexible statistical functions.

Reporting and exporting

An advanced exporting tool enables you to retrieve data from your databases for processing in other programs. Export templates can be defined to include only the fields you find relevant.
In addition DuraScan comes with a number of reporting templates that present your measurement data professionally and include sample pictures and graphs. The build-in List&Label® report editor allows you to modify reports and create new reports.



Logo can easily be changed and edited

Generic sample information can be included and modified via customizable user fields

A picture from the overview camera can be included in test report to visualize placement of test points

Graphics can be included to show progression of hardness values

Hardness values and statistics can be displayed

Machine overview

The DuraScan offers solutions from semi-automatic to full-automatic hardness testers.

European developed and manufactured
DuraScan is the result of a close cooperation between Struers, with our many years of experience within the field of materialography, and EMCO-TEST, the no. one expert in hardness testing systems on the market! DuraScan has been entirely developed and manufactured at the same location, EMCO-TEST in Salzburg, Austria, in close cooperation with Struers: right from the basic hardware (tester and automation mechanics), to the operation and the sophisticated control software. You get a hardness tester of highest quality you can rely on throughout its lifetime, from delivery and use to after sales service.
DuraScan: Developed and manufactured at EMCO-TEST, represented by Struers! Struers and EMCO-TEST are both ISO9001 certified companies.

Online solutions
Struers offers online solutions for fast and easy support. The e-training module guides you through the set-up and operation of the product and the e-education module explains more about hardness testing and the various applications.
Furthermore, we are able to offer you fast live online support via the internet in case you experience urgent issues. The only requirement is that your hardness tester PC is connected to the internet. Contact your local Struers representative for further information.

DuraScan-10: The easy entry model for one-off hardness tests. Touch screen operated.

DuraScan-20: As DuraScan-10, but with manual xy-stage and software for CHD determination.

DuraScan-50: The fully automatic hardness tester. PC operated, with motorized x-stage and 6-position automatic turret.

DuraScan-70: as DuraScan-50, but with overview camera for easy positioning of test points.

DuraScan-80: as DuraScan-70, but with larger x-stage. The ultimate hardness tester.

Specifications

Cat.no.

DuraScan-10 Hardness Tester EMDS10

Low load hardness tester based on combined dead weight and load cell technology, with extended test load range of 0.098 - 98.1 N (10 gf - 10 kgf). With high-resolution camera, LED illumination, auto focus and automatic image evaluation. Vertical movable test head (motorised) and manual 3-position measurement turret. Integrated PC with 8.4” colour touch screen and ecos Workflow compact software. Ø90 mm dia. fixed test anvil. Automatic 6-position measurement turret is optional (EMF01). Objective lenses and indenter are ordered separately.

DuraScan-20 Hardness Tester EMDS20

Low load hardness tester based on combined dead weight and load cell technology, with extended test load range of 0.098 - 98.1 N (10 gf - 10 kgf). With high-resolution camera, LED illumination, auto focus and automatic image evaluation. Vertical movable test head (motorised) and manual 3-position measurement turret. Integrated PC with 8.4” colour touch screen and ecos Workflow compact software, incl. software module for CHD determination. Manual XY-stage, size 135×135 mm, stroke 25×25 mm. Automatic 6-position measurement turret is optional (EMF01). Objective lenses and indenter are ordered separately.

DuraScan-50 Hardness Tester EMDS50

Low load hardness tester based on combined dead weight and load cell technology, with extended test load range of 0.098 - 98.1 N (10 gf - 10 kgf). Fully automatic testing, with automatic 6-position measurement turret, high-resolution camera, LED illumination, auto focus and automatic image evaluation. Software for fully automatic measuring and case depth evaluation. Multiple specimen software is optional (EMS04). Motorised stage, size 200×120 mm, effective stroke 140×140 mm. Objective lenses and indenters are ordered separately.
PC and monitor are necessary but not included

DuraScan-70 Hardness Tester EMDS70

Low load hardness tester based on combined dead weight and load cell technology, with extended test load range of 0.098 - 98.1 N (10 gf - 10 kgf). Fully automatic testing, with automatic 6+1-position measurement turret, high-resolution camera, LED illumination, auto focus and automatic image evaluation. Overview camera with FOV 52×40 mm. Software for fully automatic measuring and case depth evaluation. Multiple specimen software is optional (EMS04). Motorised stage, size 200×120 mm, effective stroke 140×140 mm.
Objective lenses and indenters are ordered separately. PC and monitor are necessary but not included

DuraScan-80 Hardness Tester EMDS80

Low load hardness tester based on combined dead weight and load cell technology, with extended test load range of 0.098 - 98.1 N (10 gf - 10 kgf). Fully automatic testing, with automatic 6+1-position measurement turret, high-resolution camera, LED illumination, auto focus and automatic image evaluation. Overview camera with FOV 52×40 mm. Software for fully automatic measuring and case depth evaluation. Multiple specimen software is optional (EMS04). Motorised stage, size 280×120 mm, effective stroke 280×140 mm.
Objective lenses and indenters are ordered separately. PC and monitor are necessary but not included.

Clamping jaw

Indenters and turrets

Vickers indenter for DuraScan EMIV1

Standard Vickers indenter for DuraScan. With MPA certificate

Knoop indenter for DuraScan EMIK1

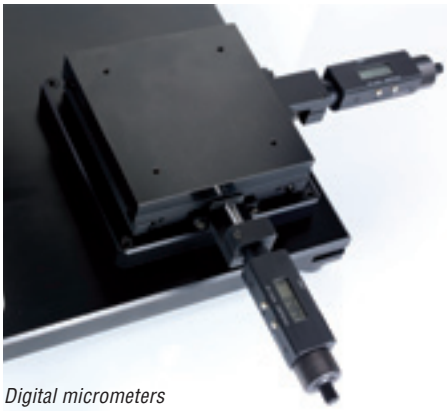
Standard Knoop indenter for DuraScan. With MPA certificate

Automatic 6-position turret for DuraScan-10/-20 EMF01

Automatic 6-position measurement turret for DuraScan-10 and DuraScan-20

Adapter for multiple indenters EMZ06

For use with DuraScan with 6–position turret (EMF01).
Required if two indenters are to be installed in turret.



Digital micrometers

Objective Lenses

Objective Lens 2.5x EML25

Objective lens for DuraScan

Objective Lens 4x EML4

Objective lens for DuraScan

Objective Lens 10x EML10

Objective lens for DuraScan. Recommended for HV5-HV10 and HK2

Objective Lens 20x EML20

Objective lens for DuraScan. Recommended for HV2-HV3 and HK0.5-HK1

Objective Lens 40x EML40

Objective lens for DuraScan. Recommended for HV0.3-HV1 and HK0.2-HK0.3

Objective Lens 60x EML60

Objective lens for DuraScan. Recommended for HV0.05-HV0.2 and HK0.05-HK0.1

Objective Lens 100x EML100

Objective lens for DuraScan. Recommended for HV0.01-HV0.025 and HK0.01-HK0.025

Manual XY-Stage

Machine vice

Specimen holder

PC interface on DuraScan-10/-20 (integrated)

PC and Software modules	**Cat.no.**
ecos Workflow multiple specimens software Software module for programming of test lines on multiple specimens for automatic measuring. For DuraScan-50/-70/-80	EMS04
DuraScan-10 to -20 upgrade kit ecos Workflow CHD software module. Includes manual XY-stage (size 135 x 135 mm, stroke 25 x 25 mm), and analogue micrometers. Only for DuraScan-10	EMZ09
PC system for DuraScan, German PC system for DuraScan-50/-70/-80. Including PC with Windows Vista, 19” TFT monitor, keyboard and mouse. With 2nd Ethernet (RJ45) port.	EMZ12-D
PC system for DuraScan, English PC system for DuraScan-50/-70/-80. Including PC with Windows Vista, 19” TFT monitor, keyboard and mouse. With 2nd Ethernet (RJ45) port.	EMZ12-E
Colour Printer, A4 Colour printer, incl. USB cable	EMM1Z060
Others	
Dust Cover for DuraScan-10/-20 Dust protection for DuraScan-10/-20	EMZ07
Dust Cover for DuraScan-50/-70/-80 Dust protection for DuraScan-50/-70/-80	EMZ08
Digital micrometers for DuraScan-20 (with machine) Resolution 0.001 mm / 0.00005"	EMF13
Digital micrometers for DuraScan-20 (retrofit) Resolution 0.001 mm / 0.00005"	EMZ10
Analog micrometers for DuraScan-20, inch (with machine) Inch read-out. Resolution 0.0005"	EMF21
Analog micrometers for DuraScan-20, inch (retrofit) Inch read-out. Resolution 0.0005"	EMZ22
Specimen Holders	
Machine vice Jaw width 50 mm	EMM1Z071
Clamping jaw Sample holder with 3 cheeks, width 80 mm	EMM1Z075
Specimen holder for 1 specimen of 30 mm / 1" diameter	EMM1Z076
Specimen holder for 1 specimen of 40 mm / 1½" diameter	EMM1Z077
Specimen holder for 1 specimen of 50 mm / 2" diameter	EMM1Z078
Specimen holder for 6 specimens of 30 mm / 1" diameter	EMM1Z676
Specimen holder for 6 specimens of 40 mm / 1½" diameter	EMM1Z677
Specimen holder for 4 specimens of 50 mm / 2" diameter	EMM1Z478G2

Minimum PC requirements for DuraScan-50/-70/-80:
Intel Core 2 Duo E7500, 2.93 GHz, 80 GB hard drive,
DVD-ROM, 2 GB RAM, 1 x RS232, 3-6 x USB 2.0 ports, 1-2 x RJ45,
1 x VGA or DVI, 2 x PS/2 (keyboard / mouse)
19” TFT monitor, keyboard, mouse
Windows 7, Vista Business or XP Pro with SP 3

Technical Data

	DuraScan-10	DuraScan-20	DuraScan-50	DuraScan-70	DuraScan-80
Stage / Cross slide					
Size XY [mm]	Ø90	135 x 135	200 x 120	200 x 120	280 x 120
Stage movement XY [mm]	-	25 x 25	140 x 0	140 x 0	280 x 0
Effective stroke XY [mm]	-	25 x 25	140 x 140	140 x 140	280 x 140
Movement	-	Manual	Motorized	Motorized	Motorized
Stage resolution [µm]	-	10	0.5	0.5	0.5
Positioning accuracy [mm]	-	0.01	+/- 0.008	+/- 0.008	+/- 0.008
Max. sample weight [kg]	50	50	10	10	10
Test head					
Movement (Z)	Motorized	Motorized	Motorized	Motorized	Motorized
Movement (Y)	-	-	Motorized	Motorized	Motorized
Stroke (Y) [mm]	-	-	140	140	140
Measurement Turret					
Automatic	Optional	Optional	Yes	Yes	Yes
No. of positions	3 / 6*	3 / 6*	6	6+1**	6+1**
Max. no. of indenters	1 / 2*	1 / 2*	2	2	2
Overview camera	No	No	No	Yes	Yes
Field of view [mm]	-	-	-	52 x 40	52 x 40
Interfaces					
Operation	Embedded Windows XP PC with 8.4” touch screen	Embedded Windows XP PC with 8.4” touch screen	External PC	External PC	External PC
Communication Ports	2 x USB 2.0, RS232 (serial), RJ45 (LAN), VGA, PS2	2 x USB 2.0, RS232 (serial), RJ45 (LAN), VGA, PS2	See PC requirements	See PC requirements	See PC requirements
Software					
CHD module	Optional	Yes, manual input	Yes	Yes	Yes
Multiple specimen software	-	-	Optional	Optional	Optional

** Manual 3-positions turret standard; Automatic 6-position optional*
*** Incl. overview camera*

Common technical data

Test load range	0.098 N – 98.1 N (0.01 – 10 kgf)
Loading mechanism	Dead weights (0.01 – 0.05 kgf) Load cell (0.1 – 10 kgf)
Test methods available	Vickers HV0.01-HV10, Knoop HK0.01-HK2
Conforms with standards	Vickers: EN ISO 6507, ASTM E384, JIS Z 2244, Knoop: EN ISO 4545, ASTM E384, JIS Z 2251
Evaluation camera	½" high res CMOS 1.3 mpix
Overview camera	½" high res 1.3 mpix
Illumination source	LED
Focus	Automatic
Hardness evaluation	Automatic
Test head movement (Z)	Motorized
Test head resolution (Z)	5 nm
Test anvil height adjustment	Fixed
Max. sample height / vertical capacity	260 mm
Throat depth	N/A
Base plate material	Granite (DuraScan-50/-70/-80), Aluminium (DuraScan-10/-20)
Power supply	110-230 V / 50-60 Hz
Operating conditions	23 +/-5°C, 40-70% relative humidity
Dimensions H x W x D [mm]	670-690 x 505-680 x 420-450
Weight	68-96 kg (150-211 lbs)

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Struers' equipment is in conformity with the provisions of the applicable International Directives and their appurtenant Standards. (Please contact your local supplier for details).

Struers' products are subject to constant product development. Therefore, we reserve ourselves the right to introduce changes in our products without notice.

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