



HARDNESS TESTING

DUROLINE R SERIES





**ROCKWELL/SUPERFICIAL ROCKWELL
CLOSED-LOOP CONTROLLED AUTOMATIC HARDNESS TESTING**



DUROLINE R1

Smart hardness testing with smashing performance
- NEW GENERATION -

Main system features

- Versatile load range from 3 kgf up to 250 kgf
- Closed-Loop Controlled load application by load cell technology
- Complete Rockwell and Superficial Rockwell test scales
- Brinell Depth test scales up to 250 kgf
- Flexible Windows 10 based hardness test & measurement program METKON N-Sure
- Database generating test results and reports
- User Interface by 11.6" HD 10-point multi-touch screen
- Integrated Windows operated mini-PC, Intel, SSD specs
- Interface network USB[x6], HDMI[x1], RS232[x2], LAN[x1] and Wireless LAN
- Large sample accommodation capacity
- Very robust housing for precise measurement
- New generation electronics and submicron precision depth measurement unit in full system integration
- Service friendly, remote accessibility
- Meets latest ISO, ASTM and JIS standards

DESIGN

DUROLINE R-Series are ideal instruments for quality assurance, quality control, research and metallurgical departments to monitor the hardness during fabrication and after heat treatment or welding as well as for the performance analysis on metal parts and new alloys. Typical applications are determining the Rockwell hardness of steel alloys and metal components, small cut samples or large pieces, cylindrical or spherical parts, pipes, large rings, gears, crankshaft and performing Jominy test etc.

Recently developed by an international multi-disciplinary team with a wide hardness testing experience, the DUROLINE R-Series are based on the latest technology available, focused on fast cycle time with high reproduceable accuracy within international standards. The system features a smart and very service-friendly synergy of a robust and proven mechanical construction with load cell force control and integrated electronics system control featured by a fast CANBUS technology and a high-quality Windows based mini-pc. Monitoring the hardness testing process significantly improved by using modern user interfacing technology such as 10-point multi-touch screen operation supported by a fast & secure display connection. Combined with top quality components and a high performance mini-pc, this system guarantees customers a solid and accurate performance over many years to come. In this way, the DUROLINE R Rockwell hardness tester series offers a highly functional and reliable automated indentation test & measurement system.



DUROLINE R1 Rockwell Hardness Tester



Robust Mechanical Design



11.6" HD Capacitive 10-point Multi-Touch Monitor

Versatile load range from 3 kgf up to 250 kgf

DUROLINE R has a force range from 3 kgf up to 250 kgf. It can perform the complete Rockwell and Superficial Rockwell test scales. Moreover, it is also possible to perform Brinell Depth measurements up to 250 kgf test loads. Any specimen can be tested and measured within the applicable standards. Fast and easy settings of test scale from the touch screen monitor menu icon.

N-Sure TEST & MEASUREMENT SOFTWARE

The METKON N-Sure software program features a flexible Windows based user interface that increases productivity and operator efficiency by automating the test & measurement process. Since the application and removal of the test loads and measurement are fully automatic, repeatability is excellent, testing time is reduced and throughput is increased. As a result, costly and time-consuming rework is eliminated.

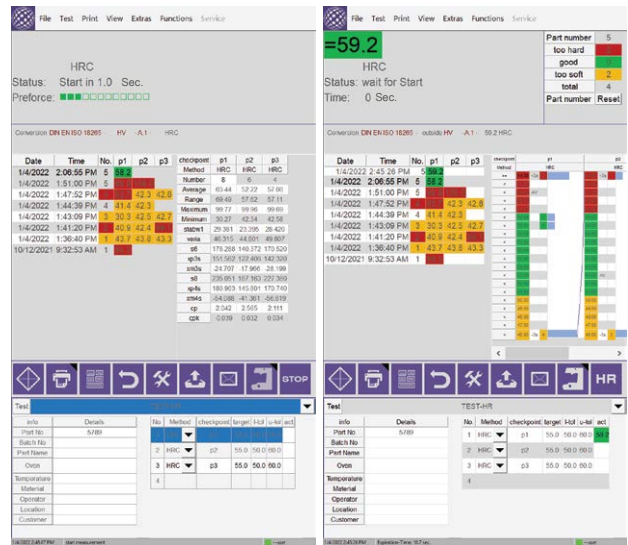
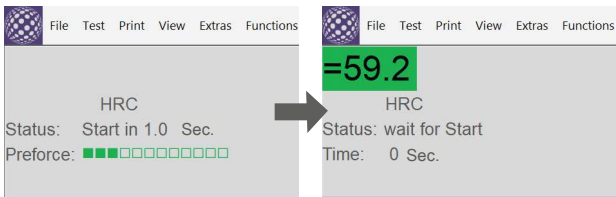


METKON N-Sure Advanced User Interface Software

Automatic Preload & Automatic Test Start & Automatic Measurement

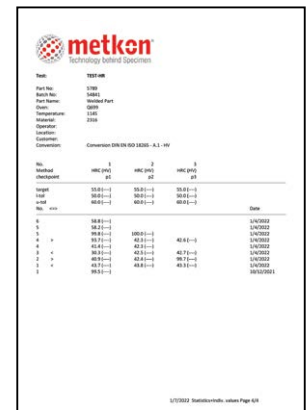
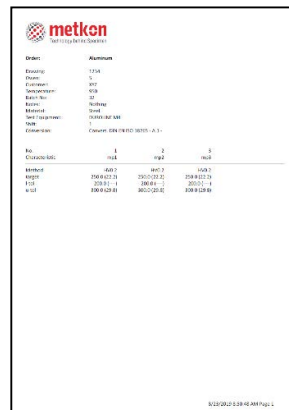
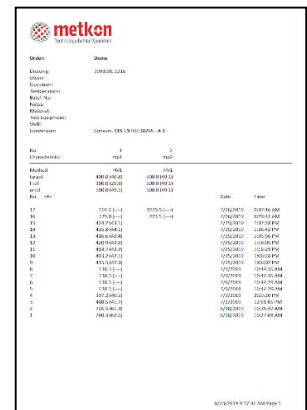
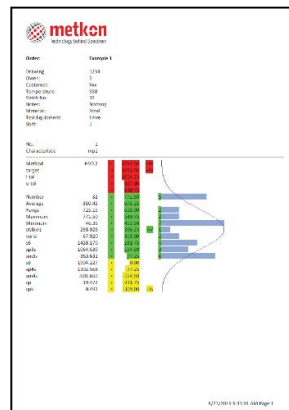
After sample is clamped by moving up the spindle, press start button and measurement cycle automatically started. Preload application, main force application, Indentation depth measurement and Hardness calculation are performed automatically.

If clamping nose is not used, in this case software will visually inform and guide the operator for touch the indenter on the sample. The DURLINE R will automatically detect contact between the sample and indenter and will start the test cycle automatically. It is not necessary to apply manual preload even with the unclamped test. If you want to make multiple measurements on the sample or another sample with the same height, it is not necessary to contact indenter and sample again. The DURLINE R automatically recognize the previous contact position and will start the test automatically.



Database generating test results and reports

METKON N-Sure software program provides advanced database management of test results, report generation and printing functions. Saving and retrieving measurement data is an absolute requirement when it comes to testing hardness results of critical components in various industrial segments. The N-Sure program ensures that data is safely stored and presented in standard or customized reporting form.





Factory Certificated Direct and Indirect Calibration Report

All DUROLINE R-Series testers are calibrated in Metkon Factory according to DIN ISO 6508-2:2015 Rockwell hardness test standard.

Optional Diamond Cone Rockwell and Carbide Ball Rockwell/Brinell indenters with ISO/DaKKs Certificated (Made in Germany)

DUROLINE R is suitable for Rockwell diamond cone indenter, Rockwell carbide ball indenter from 1/16" to 1/2" and Brinell carbide ball indenter from 1 mm to 10 mm. With these indenters, all Rockwell and Superficial Rockwell test scales can be performed. In addition, Brinell Depth tests can be made up to 250 kgf test force.



GENERAL FEATURES HIGHLIGHT



Automatic Test Cycle

The test cycle for Rockwell hardness testing such as preload application, main load application and depth measurement, is performed automatically. This provides quick and simple tests with maximum repeatability.



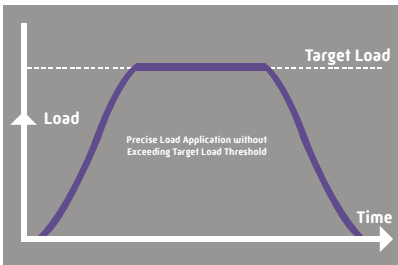
N-Sure Advanced User Interface Software

The METKON N-Sure software program features a flexible Windows based user interface that increases productivity and operator efficiency by automating the test & measurement process. The User Interface has an immediate recognition and provides a user-friendly flexibility in settings and daily operation.



Integrated All in One PC with 11.6" HD Multi-Touch Screen

A Windows operated industrial All in One PC is attached on the right side of hardness tester. Thus, no additional space is required for your laboratory. It is capable to work 24/7 thanks to its compact, robust design. Equipped with powerful Intel processor and SSD drive to provide smooth and fast operation. 11.6" HD Multi-Touch Screen display provide the lab staff easy access and shared visibility of indent results to analyze and discuss together.



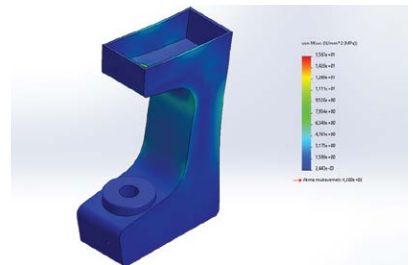
Closed-Loop Controlled Load Application by Load Cell Technology

DUROLINE R-Series testers equipped high technology closed-loop load cell system. Load cell system provides wide load range with maximum accuracy and repeatability for all test loads without exceeding target load threshold.



High Precision and Robust Spindle

For accurate Rockwell hardness testing, the spindle must withstand the Rockwell test force and must have zero displacement during force application. By using quality components and design experience, the DUROLINE R-Series spindles guarantee long life without loss of accuracy due to wear and friction, even for large and heavy specimens.

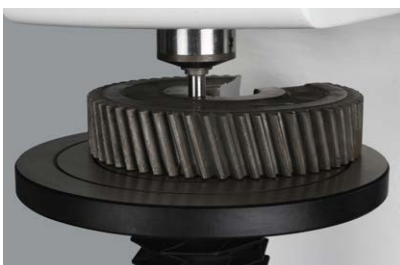
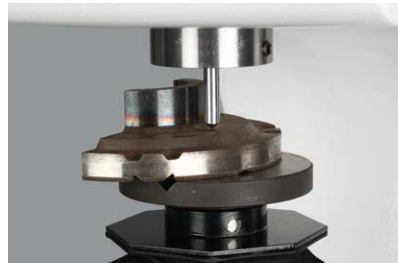


Very Robust Cast-Iron Housing









The housing of DUROLINE R is made of rugged cast iron and all areas where bending can occur have been strengthened. This allows ultra high precision depth measurement after test force application for Rockwell hardness calculation.

Ideal for Testing Various Sample Types

DUROLINE R is ideal for quick and easy testing of many different sample types. It has large sample accommodation capacity and various optional test anvils available for various applications.



ACCESSORIES

<p>Flat Anvil, diameter 80 mm</p>  <p>GR 2021</p>	<p>Large Flat Anvil, diameter 235 mm</p>  <p>GR 2121</p>	<p>Flat Anvil with V-groove, diameter 80mm</p>  <p>GR 2022</p>	<p>V-anvil, diameter 80mm, for cylindrical parts from 4 to 120 mm diameter</p>  <p>GR 2122</p>	<p>Anvil for round specimens, diameter 80mm, for spherical parts from 6 to 25 mm dia.</p>  <p>GR 2123</p>	<p>Indenters for Rockwell Hardness Testing</p>  <p>GR 2141 GR 2142 GR 2143 GR 2144 GR 2145</p>
<p>Indenters for Brinell Depth Hardness Testing</p>  <p>GR 2146 GR 2147 GR 2148 GR 2149</p>	<p>Certificated Standard Test Blocks</p>  <p>GR 2161 GR 2162 GR 2163 GR 2164</p>				

Test stages

The DUROLINE R-Series can be equipped various test tables that fit any application such as samples like small cut samples or large pieces, cylindrical or spherical parts, pipes, large rings, gears and crankshafts. The large sample accommodation capacity of harness testes makes possible to directly test on large samples. The standard clamping nose on the test head can securely fix many different type of samples.



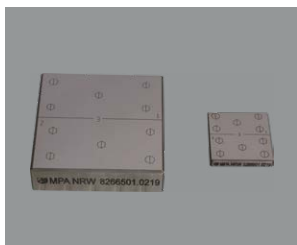
Flat Anvil

Flat Anvil with V-Groove

V-Anvil Cylindrical Specimens

Anvil for Spherical Specimens

Large Flat Anvil for Large Specimens



ISO/DaKKS Certificated Test Blocks



ISO/DaKKS Certificated Rockwell and Brinell Indenters

Test Blocks

ISO/DaKKS certificated German made test blocks are optionally available for indirect verification of tester.

Indenters

ISO/DaKKS certificated German made Rockwell and Brinell indenters are optionally available for testing any Rockwell/Superficial Rockwell scales and Brinell depth scales up to 250 kgf.

SPECIFICATIONS

ORDER NO	72 51	
MODEL NO	R1	
Hardness Scales	Rockwell Regular Scales as per ISO 6508 & ASTM E18	HRA, HRBW, HRC, HRD, HREW, HRFW, HRGW, HRHW, HRKW
	Rockwell Regular Scales as per ASTM E18	HRLW, HRMW, HRPW, HRRW, HRSW, HRVW
	Rockwell Superficial Scales as per ISO 6508 & ASTM E18	HR15N, HR30N, HR45N, HR15TW, HR30TW, HR45TW
	Rockwell Superficial Scales as per ASTM E18	HR15WW, HR30WW, HR45WW, HR15XW, HR30XW, HR45XW, HR15YW, HR30YW, HR45YW
	Brinell Depth Scales	HBT 1/5 to 10/250
Test Loads	Preload for Superficial Rockwell [kgf]	3 kgf
	Preload for Rockwell [kgf]	10 kgf
	Test Loads for Superficial Rockwell [kgf]	15 kfg, 30 kgf, 45 kgf
	Test Loads for Rockwell [kgf]	60kfg, 100kgf, 150kgf
	Test Loads for Brinell Depth [kgf]	5 kgf to 250 kgf
	Test Load Accuracy	As per ISO 6508 and ASTM E18
	Load Force Application	Motorised force application with closed loop load cell control, Automatic preload, Automatic main load, dwell, unload
	Load Selection	By METKON N-Sure test settings
Indenters	Indenters for Rockwell Hardness Testing	Rockwell diamond cone indenter [ISO/DaKKs Certified, Made in Germany] Rockwell carbide ball indenter 1/16" [ISO/DaKKs Certified, Made in Germany] Rockwell carbide ball indenter 1/8" [ISO/DaKKs Certified, Made in Germany] Rockwell carbide ball indenter 1/4" [ISO/DaKKs Certified, Made in Germany] Rockwell carbide ball indenter 1/2" [ISO/DaKKs Certified, Made in Germany]
	Indenters for Brinell Depth Hardness Testing	Brinell carbide ball indenter 1 mm [ISO/DaKKs Certified, Made in Germany] Brinell carbide ball indenter 2.5 mm [ISO/DaKKs Certified, Made in Germany] Brinell carbide ball indenter 5 mm [ISO/DaKKs Certified, Made in Germany] Brinell carbide ball indenter 10 mm [ISO/DaKKs Certified, Made in Germany]
Controller System	Controller	"Built-in Windows operated All in One PC with 11.6" HD Multi-Touch Screen, communicates the hardness tester electronics by CANBUS Protocol"
	Interface Network	USB(x6), HDM(x1), RS232(x2), LAN(x1) and Wireless LAN
	Auxilliary	Optional Keyboard, Mouse (wireless)
User Interface	Operating System	Windows 10
	User Interface Software	METKON N-Sure
Tester Body	Operational Environmental Conditions	"Ambient Operating Temperature Range: 23°C +/- 5°C Ambient Humidity Range: RH 40% to 70% relative humidity, non-condensing"
	Dimensions, WxDxH	200x535x804 mm
	Specimen Accomodation	Verlical 248 mm, Horizontal [throat depth] 181 mm
	Weight	132 kgs
	Mains	100-240 V, 1-phase, 50/60 Hz, autosecting

SPECIFICATIONS

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— DUROLINE R1

Rockwell/Superficial Rockwell Hardness Tester with Test & Measurement software Windows 10 "N-Sure", closed loop load cell controlled force application, 3-250 kgf force range
Preload for Superficial Rockwell: 3kgf
Preload for Rockwell: 10kgf
Test Loads for Superficial Rockwell: 15kgf, 30kgf, 45kgf
Test Loads for Rockwell: 60kgf, 100kgf, 150kgf
Test Loads for Brinell Depth: HBT 1/5 to 10/250 in compliance with standard ISO 6508 and ASTM E18
User Interface by 11.6" HD 10-point multi-touch monitor, with automatic test sequence by load motor, force control by closed loop load cell system, large sample accommodation area, emergency stop.
Automatic voltage setting 100-240 V, 1-phase, 50/60 Hz.

Standard delivery includes:

Hardness Tester equipped with macro-spindle, Monitor, METKON N-Sure software, 4 adjustable tester feet, Water level indicator, Removable Sample Clamping Nose, Dust Cover, Power Cable, Monitor Interface Cable, Factory Test Certificate with ISO/ASTM verifications, solid accessories box.

Note: Select below anvils, indenters and test blocks.

Operational Accessories for Rockwell Hardness Testing Anvils for Hardness Testing

- GR 2021** — Flat anvil, diameter 80 mm
- GR 2121** — Large Flat anvil, diameter 235 mm
- GR 2022** — Flat Anvil with V-groove, diameter 80mm
- GR 2122** — V-anvil, diameter 80mm, for cylindrical parts from 4 to 120 mm diameter
- GR 2123** — Anvil for round specimens, diameter 80mm, for spherical parts from 6 to 25 mm dia.
- GR 2132** — Extender Shaft for Measurement on Deep Surfaces
- GR 2166** — Floor Cabinet for DUROLINE R1

Indenters for Rockwell Hardness Testing

- GR 2141** — ISO/ASTM Certificated Rockwell diamond cone indenter
- GR 2142** — ISO/ASTM Certificated Rockwell carbide ball indenter 1/16"
- GR 2143** — ISO/ASTM Certificated Rockwell carbide ball indenter 1/8"
- GR 2144** — ISO/ASTM Certificated Rockwell carbide ball indenter 1/4"
- GR 2145** — ISO/ASTM Certificated Rockwell carbide ball indenter 1/2"
- GR 2140** — Large test head for 1/4", 1/2" and 10 mm carbide ball indenters

Indenters for Brinell Hardness Testing

- GR 2146** — ISO/ASTM Certificated Brinell carbide ball indenter 1 mm
- GR 2147** — ISO/ASTM Certificated Brinell carbide ball indenter 2.5 mm
- GR 2148** — ISO/ASTM Certificated Brinell carbide ball indenter 5 mm
- GR 2149** — ISO/ASTM Certificated Brinell carbide ball indenter 10 mm

Verification Tools for Rockwell Hardness Testing

- GR 2161** — ISO Dkks Germany Certified standard block 30HRC [60x60mm]
- GR 2162** — ISO Dkks Germany Certified standard block 45HRC [60x60mm]
- GR 2163** — ISO Dkks Germany Certified standard block 60HRC [60x60mm]
- GR 2164** — ISO Dkks Germany Certified standard block 100HRB [60x60mm]

*Other standard test blocks are on request

DIMENSIONS

