



EQUOTIP 550

Portable Hardness Testing

Leeb • Rockwell • Manual & Motorized UCI

UNPRECEDENTED VERSATILITY FOR YOUR HARDNESS TESTS

Designed for demanding industrial environments, the Equotip 550 platform adapts to all your applications thanks to its 100% modular concept.

- Choose your method: switch in a few moments from Leeb (heavy, cast, forged parts) to Rockwell (very thin and light parts), or to manual UCI (welds, rough parts) or motorized (polished, treated, precision parts) Guaranteed
- measurements: do not doubt your measurements! Interactive wizards guide you step-by-step to ensure compliant results.
- Connectivity: Color touch screen, next-generation dual processor with optimized software capabilities.



Overview

- 100% Mobile & Standalone
- a scalable investment
- Conversion Curves
- 1-click reports
- Automatic verification
- Hybrid technology
- Interactive wizard

Hardware Connections

Probe connector, USB and ethernet port.



Intuitive user interface

Developed by industry experts for perfect operation.

High resolution touchscreen

Smooth navigation and excellent readability of results thanks to the 7-inch screen

Robust housing

Robust shock-resistant housing with IP54 certification for your toughest job sites

CUSTOMIZED SCREENS

View only the data you need



Screen	7" colour display 800x480 pixels
Memory	Internal 8 GB flash memory
Regional settings	Metric and imperial units and multi-language and timezone supported
Power Input	12 V +/-25 % / 1.5 A
Dimensions	250 x 162 x 62 mm
Weight	Approx. 1525 g (incl. battery)
Battery	Lithium polymer 3.6V /14.0Ah
Battery Life	> 10h in standard use
Humidity	0~95%, no condensing
Operation temperature	0°C – 30°C (charging*, instrument enabled) 0°C – 40°C (under load*, instrument disabled) -10°C – 50°C (not charging)
IP classification	IP 54
Certification	CE

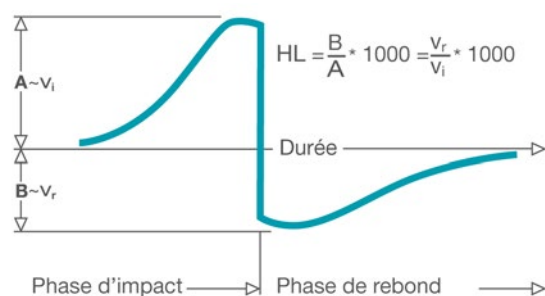
*charger intended for indoor use only (no IP rating)

EQUOTIP 550 LEEB - REBOUND METHOD

Measuring Principle

Leeb hardness principle is based on the dynamic (rebound) method.

- An impact body with a hard metal test tip is propelled by spring force against the surface of the test piece.
- Surface deformation takes place when the impact body hits the test surface, which results in loss of kinetic energy.
- This energy loss is detected by a comparison of velocities v_i and v_r when the impact body is at a precise distance from the surface for both the impact and rebound phase of the test, respectively. The loss of energy is directly related to the hardness of the surface.



Suitable for: On-site testing of heavy, bulky or already installed parts.

Wide range of hardness scales: measurements are automatically converted into all common hardness scales (HV, HB, HRC, HRB, HRA, HS) as needed.

Range of reference blocks: wide choice for accurate hardness measurement, available for each impact device with different levels of hardness for regular verification of your probes.

EQUOTIP LEEB PROBES AND CONVERSION CURVES AVAILABLE

The Equotip 550 boasts the widest library of materials and conversion curves on the market. In addition to the possibility of making custom curves (one-point offset, two-point rotation or polynomials), you cover all applications.



	D, DC, DI	DL	S	E	G	C
Impact energy	11 Nmm	11 Nmm	11 Nmm	11 Nmm	90 Nmm	3 Nmm
Indenter	Tungsten Carbide 3 mm	Tungsten Carbide 2.8 mm	Silicon Nitride (ceramic) 3 mm	Polycrystalline Diamond 3 mm	Tungsten Carbide 5 mm	Tungsten Carbide 3 mm
Scope of application	Most commonly used. For all/most applications	Narrow tip hard to reach areas, limited access spaces	Extreme hardness ranges High carbide tool steels.	As S probe but more durable	Bulky, rough, heavy components (e.g. castings and forgings).	Hardened surface, coatings, thin or impact- sensitive parts.
Accuracy	± 4 HLx (0.5% from 850 HLx)					
REFERENCE BLOCKS	<500 HLD ~600 HLD ~775 HLD	< 710HLDL ~ 780HLDC ~ 890HLDC	<815 HLS ~875 HLS	~740 HLE ~810 HCE	~ 450HLG ~ 570HLG	~565 HLC ~665 HLC ~835 HLC

Test Piece Requirements	Surface preparation	Roughness grade class ISO 1302		N7	N9	N5
		peak-to-valley height (RT)		10	30	2,5
		Average Roughness Ra (µm / µinch)		2	7	0,4
	Minimum sample mass	Of compact shape (kg / lbs)		5	15	1,5
		On solid support (kg / lbs)		2	5	0,5
		Coupled on plate (kg / lbs)		0,05	0,5	0,02
	Thickness of sample	Non coupled (mm / inch)		25	70	15
		Coupled (mm / inch)		3	10	1
		Surface layer thickness (mm / inch)		0,8		0,2
	Indentation size on test surface	With 300 HV, 30 HRC	Seat diameter (mm)	0,54	1,03	0,38
			Depth (µm)	24	53	12
		With 600 HV, 55 HRC	Seat diameter (mm)	0,45	0,9	0,32
			Depth (µm)	17	41	8
		With 800 HV, 63 HRC	Seat diameter (mm)	0,35		0,3
			Depth (µm)	10		7



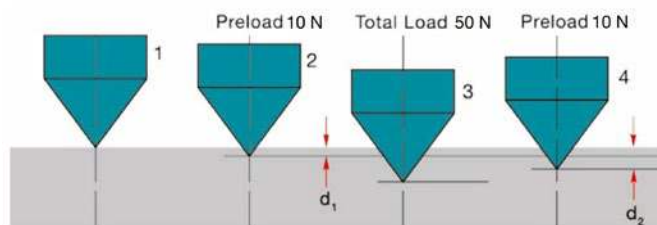
			D, DC, DI	DL	S	E	G	C
Measurement range (conversion curves)	Steel and cast steel	Vickers	HV	81-955	80-950	101-964	84-1211	81-1012
		Brinell	HB	81-654	81-646	101-640	83-686	81-694
		Rockwell	HRB	38-100	37-100			
			HRC	20-68	21-68	22-70	20-72	20-70
			HRA			61-88	61-88	
	Cold work tool steel	Shore	HS	30-99	31-97	28-104	29-103	30-102
		Rm N/mm ²	o1	275-2194	275-2297	340-2194	283-2195	275-2194
			o2	614-1480	614-1485	615-1480	616-1479	615-1479
			o3	449-847	449-849	450-846	448-849	450-846
	Stainless steel	Vickers	HV	85-802		119-934	88-668	
		Brinell	HB	85-655	*	105-656	87-661	*
		Rockwell	HRB	46-102		70-104	49-102	
			HRC	20-62		21-64	20-64	
	high-alloy steel							
	P/T91 (10Cr9Mo1VNbN)			130-300	*	*	*	*
	P/T92 (10Cr9moW2VNb8N)			130-281	*	*	*	*
	P/T92 welded			140-330	*	*	*	*
	GH4145			280-390	*	*	*	*
	C422 (22Cr12NiWMoV)	Brinell	HBW	240-380	*	*	*	*
	20Cr13			280-310	*	*	*	*
	05Cr17Ni4Nb			265-333	*	*	*	*
	14Cr12NiBmo2VN			280-403	*	*	*	*
	22CR12NiWMov			256-320	*	*	*	*
	Grey Cast Iron (Lamellar)	Brinell	HB	90-664				
		Vickers	HV	90-698	*	*	*	*
		Rockwell	HRB	21-59				
	Nodular Cast Iron (Spheroidal)	Brinell	HB	95-686				
		Vickers	HV	96-724	*	*	326	*
		Rockwell	HRB	21-60				
	Aluminium alloys for foundry	Brinell	HB	19-164	20-187	20-184	23-176	19-168
		Vickers	HV	22-193	21-191	22-196	22-198	24-86
		Rockwell	HRB	24-85				23-85
	Copper/zinc alloys (brass)	Brinell	HB	40-173	*	*	*	*
		Rockwell	HRB	14-95				
	CuAl/CuSn-alloys (bronze)	Brinell	HB	60-290	*	*	*	*
	Low-alloy forged copper alloys							
		Brinell	HB	45-315	*	*	*	*

EQUOTIP 550 PORTABLE ROCKWELL

Measurement principle

The measurement principle of the Rockwell Equotip Portable Probe is inspired by the traditional Rockwell static measurement method:

- during the measurements, a diamond indentation depth is continuously measured part with a precisely controlled force.
- diamond indenter penetrates depth is continuously measured while a load is applied and then released.
- the difference between two indentation depths d_1 and d_2 recorded with two different loads is calculated: $\Delta = d_2 - d_1$. This is generally referred to as plastic deformation.

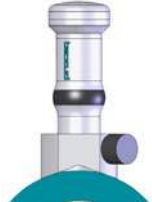


Suitable for: thin, polished parts sensitive to scratches or thin parts, profiles and pipes with a thickness of less than 2 mm.

Wide range of hardness scales: measurements in HRC and HV with integrated conversions to HB, HRA, HRB and many other common scales in accordance with ASTM E 140 and ISO 18265

Suitable for various geometries: A measuring clamp and support legs are available to perform the measurement on various geometries as well as on very small parts. Unlike the LEEB and UCI methods, the **ROCKWELL method is independent of the nature of the material tested.**

		Min sample weight		No special requirements					
		Min sample thickness		indentation					
		Sample surface roughness requirements		Roughness grade class ISO 1302		N7			
				peak-to-valley height		<2μm			
				Maximum particle size		P120			
Measurement range:		0-100 μm; 19-70 HRC; 35-1'000 HV		Diameter of indentation for a given hardness on steel		~570HLD, ~300HV, ~46HRC		53	
Resolution		0.1 μm; 0.1 HRC; 1 HV				~760 HLD, ~600HV, ~55HRC		26.2μm	
Measuring accuracy		± 0.8 μm; ±1.0 HRC over the entire range				~840HLD, ~800HV, ~63HRC		16	
Max Hardness:		70 HRC; approx. 1000 HV		Depth of indentation for a given hardness on steel		~570HLD, ~300HV, ~46HRC		5μm	
Test loads		Precharge 10 N /total charge 50 N				~760 HLD, ~600HV, ~55HRC		11μm	
Diamond indenter		Angle 100.0° ±0.5°, flat surface diameter 60 μm ±0.5 μm				~840HLD, ~800HV, ~63HRC		7μm	

		
Standard round foot (magnetic) Ideal for flat parts and measuring locations more than 10mm from an edge.	Tripod Stand Designed for tests that require precise positioning (welds, areas that have undergone thermal stresses).	Special feet RZ 18-70 and 70-∞ Designed for curved parts like cylindrical parts, tubes, pipes.

Equipment	Method	Unit	conversion range
Steel and cast steel	Leeb	HLD	290-890
	Vickers	HV	30-1080
	Brinell	HB	76-618
	Rockwell	HRA	37-87
		HRB	55-100
		HRC	19-70
		HR15N	69-70
		HMMRC	19-70
	Rm	MPa	255-2180

EQUOTIP PORTABLE ROCKWELL MEASURING CLAMP

The Rockwell probe measuring clamp makes it possible to carry out hardness measurements on light parts and on parts of very small diameters such as bars, rounds, wires, tubes, etc. Several accessories exist to be able to correctly center the part and hold it in position during the measurement.

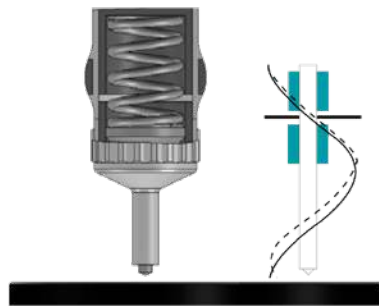


EQUOTIP 550 UCI

Measuring Principle

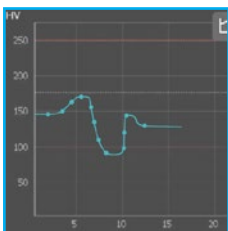
The UCI (Ultrasonic Contact Impedance) method uses the same pyramidal diamond as the conventional Vickers hardness tester. Unlike the Vickers test, no optical assessment of penetration is required, allowing for rapid, portable measurements.

- the UCI method excites a rod to produce an ultrasonic oscillation.
- the test load is applied by a spring and represents a force of 1 to 10 kg (HV1 - HV10).
- when the diamond penetrates the material, the oscillation frequency of the rod varies in response to the contact area between the diamond and the tested material.
- the instrument detects the frequency offset and converts it into a hardness value that is displayed immediately on the screen.



Fast, reliable measurements

Operation guidance allows reliable and accurate hardness measurements to be obtained quickly and easily.



Unique software features

Additional features like profile view and unique industry settings allow for a very smooth workflow.



Wide range of hardness scales

Measurements in HV with automatic built-in conversions to HB, HRA, HRB, HRC and many other common scales in accordance with ASTM E140 and ISO 18265.



EQUOTIP UCI PROBE & ACCESSORIES



Measurement range	20 to 2,000 HV
Resolution	1 HV (UCI); 0.1 HRC
Measuring accuracy	± 2% (150 950 HV)
Measurement loads	Selectable: HV1, HV2, HV3, HV4, HV5, H10
Diamond indenter	Vickers Diamond 136° compliant with ISO 6507-2
Dimensions	155 x Ø 40 mm without foot

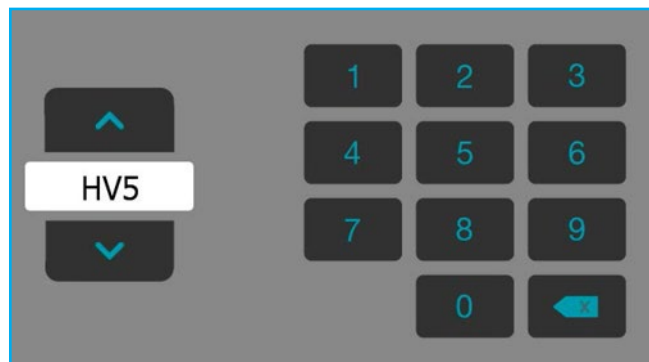
Adjustable Test Load

With this unique and patented feature, a wide range of applications can be covered. It is therefore no longer necessary to purchase multiple UCI probes.

The required test load can be selected by the user in the settings menu. **For each series of measurements, the force can be selected from five levels between HV1 and HV10 (~10 N and ~100 N).** The minimum mass required for reliable UCI measurements is 0.3 kg with a thickness of at least 5 mm.

For example

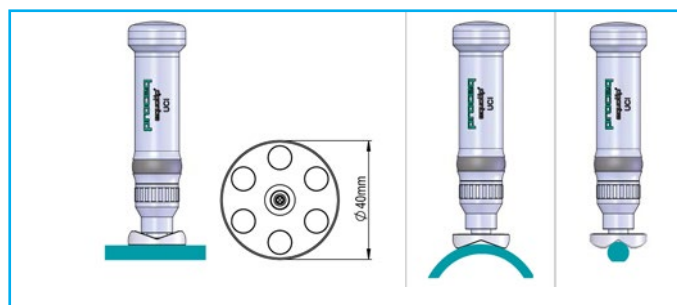
HV1	Precision parts, thin coatings, quenched layers
HV10	Large components, HAZ, forgings



Special Foot

The optional special foot increases the repeatability of measurements. It can be used for flat or curved surfaces.

For curved surfaces, there are two different openings, one for diameters from 5 to 25 mm and the other for larger diameters from 20 to 70 mm.



Equipment	Method	Unit	conversion range	Modulus of elasticity
Steel and cast steel	Leeb	HLD	290-890	210
	Brinell	HB	66-737	
	Rockwell	HRC	37-85	
		HRA	59-99	
		HRB	20-70	
		HR15N	69-94	
		HR15T	78-96	
	Rm	MPa	220-2264	
aluminum	Vickers	HB	30-200	75

Conversion curves with fast 1-point shift

Titanium Ti-6Al-4V	Vickers	HB	263-406*	115
Cast steel			141-193*	160
Incoloy 825 / 2.4858			32-197*	195
304L/1.4307			170-244*	200
/p91/			140-228*	218
Alloy 75/2.4630			140-225*	221

Recommended conversion range based on 1-point fast shift conversions. Measurements outside this range may be subject to larger errors.

EQUOTIP 550 MOTORISED UCI (MICRO-HARDNESS)

The measurement principle remains the same as that of the manual UCI method. The difference lies in the application of the load **made by the probe equipped with a motor instead of the operator, thus significantly reducing human bias and effort.**

- Access to micro-hardness thanks to lower available loads than those of the standard UCI probe (< 1 HV).
- Shorter and narrower indentation marks, almost invisible to the naked eye, on the surfaces tested.
- The measurement can be launched directly on the screen without having to press the button on the top of the probe. It is also possible to set the penetration time to get even closer to stationary tests, especially for soft materials (aluminum, etc.).
- Two types of probes are available: HV0.3 probe (300g load) and HV0.8 probe (800g load) with certified verification blocks on both loads.
- A magnetic foot for a flat surface and a V-shaped foot for a curved surface of 8 to 30 mm make it possible to adapt to different configurations for ever more precise and repeatable measurements.

Conforms to: ASTM A370 / A1058

DIN 50159

GB/T 17394



Motorized UCI probes and accessories



Measurement range:	100-1500 HV
Resolution	1 HV / 0.1 HRC
Accuracy	± 2% (150 – 950 HV)
Test Loads	2 separate probes HV0.3 and HV0.8
Indenter	Vickers Diamond 136° ISO 6507-2 compliant
Dimensions	Ø 40 mm
Mass	618 g



Flat surface magnetic foot (supplied with each probe)



V-leg for 8-30mm curved surface (optional)



Resonance rod protector for non-flat surface (supplied with each probe)

What test load (kgf) for what type of coating?	0.3	0.8
Thin coatings with highly polished surface	●	
Coatings with a thickness greater than 40 µm (chromium and copper)	●	
Case-hardened layer greater than 20 µm	●	○
Rotogravure cylinders	●	○
CNC-Precision parts	●	
Wheel Track		●
Bearing guide rail		●
Roller bearings		●
Crankshaft / Camshaft		●
Ionic nitriding	●	●
Precision Mold (Plastics)	●	●
Small Parts	●	●
Carburizing	●	●
Polished metals (steel, aluminum, titanium, etc.,) without visible surface damage	●	○

● Applicable

○ Possibly applicable depending on sample



Recommendations

Probe configuration		HV0.3 (2.9N)	HV0.8 (7.8N)	HV1 (9.8N)	HV5 (49 N)	HV10 (98N)
Minimum wall thickness required (DIN50159)		5 mm				
Minimum Wall Thickness Required (ASTM A1038)		2 MM				
Minimum required weight (ASTM A1038)		0.3 kg				
Minimum required weight (DIN 50159)		0.2 kg				
layer thickness		10 x depth of indentation				
Surface roughness	Roughness grade class	N6	N7	N8	N10	
	centre line average height	<0.8 μm	1.6 μm	3.2 um	12.5 μm	
Acceptable surface curvature		Radius > 3 mm				
Minimum indentation spacing	Between indentation and edge	5 mm				
	In between	3 mm				
Indentation size on test surface						
With 300 HV, 30 HRC	Depth	6.1 μm	10.0 μm	11.3 μm	25.3 μm	35.5 μm
	Diagonal	43 μm	70 μm	79.1 μm	177.1 μm	248 μm
600 HV, ~ 55 HRC	Depth	4.3 μm	7.1 μm	8 μm	17.9 μm	25.1 μm
	Diagonal	30.4 μm	49.7 μm	56 μm	125.3 μm	175 μm
800 HV, ~ 63 HRC	Depth	3.8 μm	6.1 μm	6.9 μm	15.5 μm	21.7 μm
	Diagonal	26.3 μm	43 μm	272 μm	108.5 μm	152 μm

PRE-PACKAGED

All kits feature an Equotip 550 platform with battery, power supply, USB cable, roughness comparator, CD with software, documentation, carrying strap and briefcase.

Equotip® 550 Leeb D



356 10 002
Includes Equotip Leeb D impact device, cable, ~775 HLD / ~56 HRC reference block, mating paste, cleaning brush.

Equotip® 550 Leeb G



356 10 003
Includes Equotip Leeb G impact device, cable, ~570 HLG / ~340 HB reference block, mating paste, cleaning brush.

Equotip® 550 Portable Rockwell



356 10 004
Includes Equotip Portable Rockwell 50 N Probe, Probe Cable, ~62 HRC Reference Block.

Equotip® 550 UCI



356 10 005
Includes Equotip UCI HV1-HV10 probe, UCI probe cable, reference block UCI~850 HV.

Equotip® 550 UCI MOTO-0.3



356 55 045
Includes HV0.3 motorized UCI probe, magnetic foot, rod guard, cable and UCI reference block HV0.3 & 0.8~850HV.

Equotip® 550 UCI MOTO-0.8



356 55 050
Includes HV0.8 motorized UCI probe, magnetic foot, rod guard, cable and UCI reference block HV0.3 & 0.8~850HV.

Equotip® 540 UCI



356 20 005
Includes a low-cost Equotip 540 platform with limited functionality compared to the 550 (no data backup, no custom conversion curve, no wizard), UCI HV1-HV10 probe and cable.

Equotip® 540 Leeb D



356 20 002
Includes Equotip 540 economy platform with limited functionality compared to 550 (no data backup, no custom conversion curve, no assistant), Leeb D impact device and cable.

Other kits available, please contact us.

Equotip Leeb impact devices

356 00 100	Equotip Leeb C impactor with cable
356 00 500	Equotip Live Leeb D Impact Device
356 00 110	Equotip Leeb DC impact device with cable
356 00 120	Equotip Leeb Impact Device DL
356 00 400	Equotip Leeb E impact device with cable
356 00 300	Equotip Leeb G impact device with cable
356 00 200	Equotip Leeb Impact Device S

Equotip Live UCI Probe

356 00 800	Equotip UCI Probe HV1-HV10
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Equotip motorised UCI probes

356 55 005	Equotip Motorized UCI Probe HV0.3
55 010 008	Equotip Motorized UCI Probe HV0.8

Equotip Portable Rockwell Probe 50N*

356 00 600	Equotip Portable Rockwell 50 N Probe
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Equotip Accessories	
354 01 200	Equotip Portable Rockwell Measuring Clamp
354 01 130	Equotip 550 Portable Rockwell
354 01 250	Equotip Portable Rockwell RZ 18 - 70 Special Feet
354 01 253	Rockwell RZ 70 Equotip Portable Special Feet - ∞
354 01 243	Equotip Portable Rockwell support Z2 for measuring clamp
354 01 229	Rockwell Z4 Equotip Portable Clamp Stand Up To 28mm Diameter
354 01 228	Equotip Rockwell Z4 + 28 Portable Holder for Clamp Diameter Over 28mm

Equotip Accessories	
356 00 720	Equotip UCI Special Foot

Equotip Motorized UCI Accessories	
356 50 030	V-Foot for 8-30mm Curved Surfaces

Equotip Accessories	
353 03 000	Set of support rings
356 00 080	Equotip 1.5m impact device cable
353 00 086	Equotip 5m impact device cable

Equotip UCI Reference Blocks (Dakks Certified)	
357 51 200	Equotip UCI Test Block ~850 HV, ISO 6507-3 HV5 Calibration (357 54 100)
357 52 200	Equotip UCI Test Block ~850 HV, ISO 6507-3 HV5 Calibration (357 54 100)
357 54 200	Equotip UCI Test Block ~850 HV, ISO 6507-3 HV5 Calibration (357 54 100)

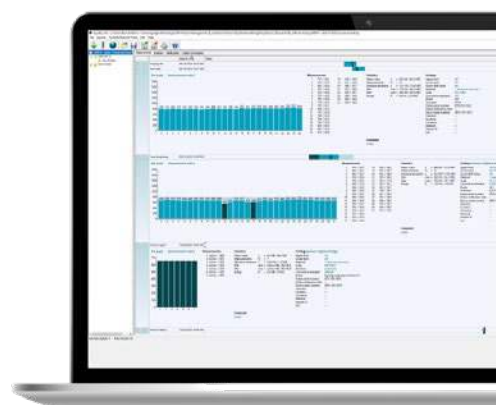
Equotip Leeb Reference Blocks (ISO 17025 certified)	
357 11 500	Equotip Test Block C, ~565 HLC / <220 HB
357 12 500	Equotip Test Block C, ~665 HLC / ~325 HB
357 13 500	Equotip Test Block C, ~835 HLC / ~56 HRC
357 11 100	Equotip D/DC reference block, <500 HLD / 220 HB
357 12 100	Equotip Test Block D/DC, ~600 HLD / ~325 HB
357 13 100	Equotip Test Block D/DC, ~775 HLD / ~56 HRC
357 11 120	Equotip DL reference block, <710 HLDL / <220 HB
357 12 120	Equotip Test Block DL, ~780 HLDL / ~325 HB
357 13 120	Equotip Test Block DL, ~890 HLDL / ~56 HRC
357 13 400	Equotip Test Block E, ~740 HLE / ~56 HRC
357 14 400	Equotip Test Block E, ~810 HLE / ~63 HRC
357 31 300	Equotip G reference block, <450 HLG / <200 HB
357 32 300	Equotip Test Block G, ~570 HLG / ~340 HB
357 13 200	Equotip Test Block S, ~815 HLS / ~56 HRC
357 14 200	Equotip Test Block S, ~875 HLS / ~63 HRC

Equotip Rockwell Portable Reference Blocks (UKAS Certified)	
357 41 100	Equotip Rockwell Portable Reference Block ~20 HRC, Calibration to HRC ISO 6508-3
357 42 100	Equotip Rockwell Portable Reference Block ~45 HRC, Calibration in HRC ISO 6508-3
357 44 100	Equotip Rockwell Portable Reference Block ~62 HRC, Calibration in HRC ISO 6508-3

Motorised Equotip UCI reference blocks (ISO 17025 certified)	
357 51 050	Equotip Motorized UCI Reference Block ~300 HV, Calibration to HV0.3 & HV0.8 (ISO 6507-3)
357 52 050	Equotip Motorized UCI Reference Block ~550 HV, Calibration to HV0.3 & HV0.8 (ISO 6507-3)
357 54 050	Equotip Motorized UCI Reference Block ~850 HV, Calibration to HV0.3 & HV0.8 (ISO 6507-3)

EQUOTIP LINK SOFTWARE

Equotip
Link Software
**FREE and WITHOUT
A SUBSCRIPTION!**



Backup and process your data efficiently

Equotip Link is the solution for your data: quick report, backup, processing and updates.

The PC software (Windows compatible from XP to Windows 11) allows you to:

- view and modify your measurement data thanks to the intuitive user interface (min and max value, measurement range, average, traceability of parts and calibration, etc.)
- secure your data on a local server
- download, view, process and export your custom measurements, calibrations and conversions to Excel or PNG file.
- modify your conversion units and standards directly in the software
- manage your hardware fleet, upload your custom conversion files to multiple devices within your company, download or upload device settings

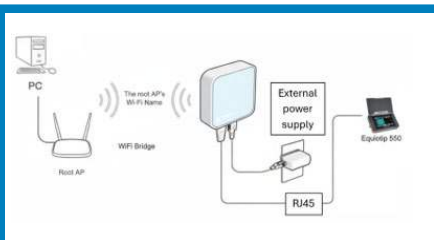
ADVANCED INDUSTRIAL USE

Extend the use of the Equotip 550 using different devices:



Scan

barcode scanner/QR codes for the designation of parts, batches ...



Wireless LAN

Wi-Fi bridge for wireless data transfer from the Equotip 550 to a computer



Customized solutions/Customer automation

Full automation and integration with production lines

EXECUTIVE SUMMARY

		Leeb	UCI (manual)	Portable Rockwell
		Heavy, cast or forged parts	Very universal. Widely used for heat treated surfaces, weld inspection	Can measure very fine and light samples
Oil & Gas 	Welds, Base Materials and TAZs		●	
	Pressure vessels	●	●	●
	Tube	●	●	●
	Flanges	●	●	●
	Wellhead equipment		●	●
Automotive 	Coring	●		
	Engine block	●		
	Shafts	●	●	●
	Gears	●	●	
	Vehicle body			●
Aerospace 	Brake systems			●
	Turbine blade	●	●	●
	Cartons / Fairings			●
	Wing			●
	Castings	●		
Manufacturing and machinery 	Landing Gear	●		
	Rolls	●		
	Spools	●	●	●
	Bars/tubes	●	●	●
	Heat treatment	●	●	
Energy Generation 	Cables			●
	Standard	●		
	Pipework	●	●	●
	Highly alloyed steels (including superalloys)	●		
	Stator Wedges	●		
	Turbine Outlet Bolts		●	
	Turbine stator		●	
	Wind turbine nacelle hub	●		