

equotip[®] 3



PORTABLE HARDNESS TESTER

- Large, easy to read display with backlight
- Highly accurate ± 4 HL
- Automatic correction for impact direction
- Converts to all common hardness scales (HV, HB, HRC, HRB, HS, Rm)
- Light weight and easy to use
- Fast testing for a wide range of applications
- Large memory with on-screen review of data
- Download to PC or print directly via USB, Ethernet, or RS-232
- User profiles for fast change of all settings
- Rugged sealed membrane keypad
- Internal rechargeable batteries or standard "C" cells
- Custom conversions for uncommon alloys



Standardized according to ASTM A956 - DIN 50156
EQUOTIP3, a high quality Swiss product

proceq

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Application Range

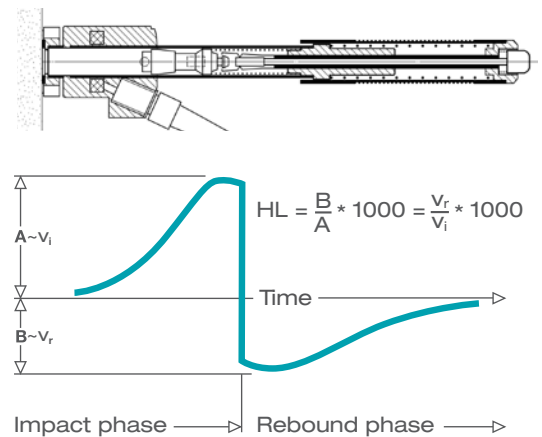
- Good for all metals
- Ideal for production level testing
- Best suited for on-site testing of heavy, big or already installed parts
- Handy for difficult to access or confined test locations
- Automatic compensation for impact direction
- Excellent for material selection and acceptance tests
- Easy to use and accurate on curved test surfaces (R > 10 mm)

Primary Industries

- Metal production & processing
- Automotive & transportation
- Machinery & power plants
- Petro-chemical, refineries
- Aerospace & shipyard
- Metal constructions
- Testing services & laboratories

The EQUOTIP measuring principle

The EQUOTIP measuring principle is physically a rather simple, dynamic hardness test. 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 will result in loss of kinetic energy. This energy loss is calculated by velocity measurements when the impact body is at a precise distance from the surface for both the impact and rebound phase of the test. The permanent magnet in the impact body generates an induction voltage in the single coil of the impact device. The voltage of the signal is proportional to the velocity of the impact body, and signal processing by the electronics provides the hardness reading for display and storage.



Performing the Hardness Test

Easy to use – simple operating elements allow for accurate measurements even by occasional users.



1. Load
Simply load the impact device by sliding the loading tube forward.



2. Place
Then place and hold the impact device on the surface of the test piece at the desired test point.



3. Measure
Trigger the impact by pressing the trigger button. The hardness value will be instantaneously displayed.



Display of all information on a large clear display.

Modern electronics with power saving features provide for long operating life. The large LCD display always shows how the EQUOTIP is configured to test. Variable function keys allow for quick change of common test parameters, and the on screen hint line shows the other active control keys. The context sensitive help files give the operator quick access to the operating instructions with the press of a single button.

No subjective measuring errors are possible, giving highly repeatable results. Internal self diagnostics with error messages assure reliable test results. Readings can be stored automatically in the internal memory or sent directly to a printer. PC evaluation software allows for data analysis.

Impact devices



Impact device D
Part No 353 00 100

EQUOTIP® 3 basic impact device D with impact body, support rings, cleaning brush, cable (4-pole)

Application

For the majority of your hardness testing requirements.
Probe weight 75g



Impact device G
Part No 353 00 300

EQUOTIP® 3 basic impact device G with impact body, support rings, cleaning brush, cable (4-pole)

Application

Solid components. e.g. heavy castings and forgings.
Probe weight 250g



Impact device DL
Part No 353 00 120

EQUOTIP® 3 basic impact device DL with impact body, support rings DL, cleaningbrush, cable (4-pole)

Application

For measurements in extremely confined spaces or at the base of grooves.
Probe weight 100g

Note: The impact device DL can only be used with manual correction for impact direction.



Impact device E
Part No 353 00 400

EQUOTIP® 3 basic impact device E with impact body, support rings, cleaning brush, cable (4-pole)

Application

For measurements in the extremely high hardness range (always in excess of 50 HRC/650 HV): Tool steels with high carbide content inclusions.
Probe weight 80g



Impact device S
Part No 353 00 200

EQUOTIP® 3 basic impact device S with impact body, support rings, cleaning brush, cable (4-pole)

Application

For measurements in the extremely high hardness range (always in excess of 50 HRC/650 HV): Tool steels with high carbide content inclusions.

Probe weight 80 g



Impact device C
Part No 353 00 500

EQUOTIP® 3 basic impact device C with impact body, support rings, cleaning brush, cable (4-pole)

Application

Surface hardened components, coatings, thin walled or impact sensitive components (small measuring indentation).

Probe weight 75g



Impact device DC
Part No 353 00 110

EQUOTIP® 3 basic impact device DC with impact body, support rings, cleaning brush, cable (4-pole)

Application

Use in very confined spaces, e.g. in holes, cylinders or for internal measurements on assembled machines.

Probe weight 50g

EQUOTIP 3 measuring range

Fields of application			D/DC	DL	S	E	G	C
1 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	90-646	81-694
	Rockwell	HRB	38-100	37-100			48-100	
		HRC	20-68	21-68	22-70	20-72		20-70
		HRA			61-88	61-88		
	Shore Rm N/mm ²	HS	30-99	31-97	28-104	29-103		30-102
σ 1		275-2194	275-2297	340-2194	283-2195	305-2194	275-2194	
σ 2		616-1480	614-1485	615-1480	616-1479	618-1478	615-1479	
σ 3		449-847	449-849	450-846	448-849	450-847	450-846	
2 Cold work tool steel	Vickers	HV	80-900	80-905	104-924	82-1009		98-942
	Rockwell C	HRC	21-67	21-67	22-68	23-70		20-67
3 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		
4 Cast iron lamellar graphite GG	Brinell	HB	90-664				92-326	
	Vickers	HV	90-698					
	Rockwell	HRC	21-59					
5 Cast iron, nodular graphite GGG	Brinell	HB	95-686				127-364	
	Vickers	HV	96-724					
	Rockwell	HRC	21-60					
6 Cast aluminium alloys	Brinell	HB	19-164	20-187	20-184	23-176	19-168	21-167
	Vickers	HV	22-193	21-191	22-196	22-198		
	Rockwell	HRB	24-85				24-86	23-85
7 Copper/zinc-alloys (brass)	Brinell	HB	40-173					
	Rockwell	HRB	14-95					
8 CuAl/CuSn-alloys (bronze)	Brinell	HB	60-290					
9 Wrought copper alloys, low alloyed	Brinell	HB	45-315					

Test piece requirements

	Impact devices D, DC DL, E, S			C	G
Preparation of the surface					
Roughness class ISO	N7	N5	N9		
Max. roughness depth Rt	10 µm/400 µinch	2.5 µm/100 µinch	30 µm/1200 µinch		
Centre line average CLA, AA, Ra	2 µm/80 µinch	0.4 µm/16 µinch	7 µm/275 µinch		
Min. weight of samples					
of compact shape	5 kg/11 lbs	1.5 kg/3.3 lbs	15 kg/33 lbs		
on solid support	2 kg/4.5 lbs	0.5 kg/1.1 lbs	5 kg/11 lbs		
coupled on plate	0.05 kg/0.2 lbs	0.02 kg/0.045 lbs	0.5 kg/1.1 lbs		
Min. thickness of sample					
uncoupled	25 mm/0.98 inch	15 mm/0.59 inch	70 mm/2.73 inch		
coupled	3 mm/0.12 inch	1 mm/0.04 inch	10 mm/0.4 inch		
surface layer thickness	0.8 mm/0.03 inch	0.2 mm/0.008 inch			

	Impact devices D, DC, DL, E, S			C	G
Indentation size on test surface					
with 300 HV, 30 HRC					
diameter	0.54 mm/0.21 inch	0.38 mm/0.015 inch	1.03 mm/0.04 inch		
depth	24 µm/960 µinch	12 µm/480 µinch	53 µm/2120 µinch		
with 600 HV, 55 HRC					
diameter	0.45 mm/0.017 inch	0.32 mm/0.012 inch	0.9 mm/0.035		
depth	17 µm/680 µinch	8 µm/2560 µinch	41 µm/1640 µinch		
with 800 HV, 63 HRC					
diameter	0.35 mm/0.013	0.30 mm/0.011 inch			
depth	10 µm/400 µinch	7 µm/280 µinch			

Test Blocks

EQUOTIP[®] Test Blocks with MPA-Certificate

Test Blocks D/MPA, G/MPA, E/MPA and S/MPA are calibrated in accordance with the dynamic hardness value L by Proceq SA and to the static hardness value of Rockwell (HRC) or Brinell (HB) by an independent traceable laboratory. These test blocks are supplied with 2 separate certificates - a certificate to the EQUOTIP-L-value (Proceq SA) and a certificate to Brinell or Rockwell C (MPA). Type, identification, reference values etc. are engraved on the test blocks see examples below.

Test Block	Impact device calibrated with	Also suitable for use with	Other scales on test block
D MPA calibrated ca. 765 LD /55 HRC Part no. 350 01 139	D/ DC	DL C E S	HRC
G MPA calibrated ca. 572 LG / 340 HB Part No. 350 08 009	G	D	HBW 5/750 (F=30D ²)
E Only available as MPA calibrated ca. 813 LE / 64 HRC Part No. 350 01 135	E	Not applicable	HRC
S Only available as MPA calibrated ca. 876 LS / 64 HRC Part. No. 350 01 125	S	Not applicable	HRC



EQUOTIP[®] Test Blocks calibrated by Proceq

Test Block	Impact device calibrated with	Also suitable for use with	Other scales marked on test block
D Proceq calibrated ca. 765 LD /55 HRC Part No. 350 01 140	D/ DC	DL C E S	HRC
G Proceq calibrated ca. 572 LG / 340 HB Part No. 350 08 008	G	D	HBW 5/750 (F=30D ²)



Technical Information

DISPLAY UNIT

DIMENSIONS: 170 x 200 x 45 mm (6.7 x 7.9 x 1.8 inches)

WEIGHT: 780g plus approx. 120g battery pack

UNIT MATERIAL: Shock resistant ABS plastic

UNIT DISPLAY: large, QVGA LCD with adjustable contrast and backlight

RESOLUTION: 1 HL; 1 HV; 1 HB; 0.1 HRC; 0.1 HRB; 0.1 HS; 1 N/mm²; Rm

INTERNAL DATA STORAGE: ~ 100'000 measured values

BATTERY TYPE: rechargeable Li-Ion (pn 35300029), or 3 standard size "C" cells

OPERATING TEMPERATURE: 0 to +50°C (32 to 122°F)

STORAGE TEMPERATURE: -10 to +60°C (14 to 140°F)

HUMIDITY: 90 % max.

INPUT-SOCKETS IMPACT DEVICES: 20-pole

COMMUNICATION: Ethernet, USB & RS232. Bi-directional with PC

APPLICATION PROGRAM: EQUOLINK 3

ACCURACY: ±4 HL

Ordering Information

UNITS

353 10 100 EQUOTIP3 Hardness Tester, unit D

Includes EQUOTIP3 indicating device, AC adapter, EQUOTIP3 impact device D with cable, test block D, USB-cable, USB-memory stick, cleaning brush, coupling paste, carrying case, support ring D6 and D6a, operating instructions, quick reference guide, calibration certificate

353 10 300 EQUOTIP3 Hardness Tester, unit G

Includes EQUOTIP3 indicating device, AC adapter, EQUOTIP3 impact device G with cable, test block G, support ring G6 and G6a, carrying case, USB-cable, USB-memory stick, cleaning brush, operating instructions, quick reference guide, calibration certificate

353 10 050 EQUOTIP3 Hardness Tester, basic unit

Includes EQUOTIP3 indicating device, AC adapter, carrying case, USB-cable, USB-memory stick, operating instructions and quick reference guide. The customer needs to buy the appropriate impact device and test block in addition to the EQUOTIP 3 basic unit

The Equotip3 (Part No 353 10 050) basic unit is combined with impact devices and test blocks to create an Equotip3 Hardness Tester unit that meets specific measuring requirements.



353 10 100 unit D



353 10 300 unit G



353 10 050 basic unit

ACCESSORIES

353 00 080	EQUOTIP3 impact device cable 1.5 m 4-pole
353 00 086	EQUOTIP3 impact device extension cable 5 m 4-pole
350 00 083	Impact device cable existing EQUOTIP2 impact device to new EQUOTIP3 display device
353 00 084	Impact device cable new EQUOTIP3 impact device to existing EQUOTIP2 display device
351 90 018	USB cable, 1.8m
350 00 082	EQUOTIP3 RS232 adapter cable for connection to printer
353 00 029	Rechargeable EQUOTIP3 battery
353 00 085	AC-adapter
353 99 011	Equotip3 carrying case with cut-out for test block (except G) and accessories
353 00 037	Equotip3 neck / wrist strap
350 01 009	Support ring D6
350 01 010	Support ring D6a
350 08 004	Support ring G6
350 08 005	Support ring G6a
350 03 000	Set of support rings (12 pcs.)
350 01 015	Coupling paste
350 01 008	Cleaning brush D
350 01 006	Cleaning brush G

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