

BENCH HARDNESS TESTERS

3814 ANALOG BENCH HARDNESS TESTER

The 3814 Hardness Tester provides reliable Rockwell Hardness values on all types of metal and alloys, hard or soft, and in many shapes. This reliable bench hardness tester has a high quality casting, is ergonomically designed for easy operation and is engineered to ensure accurate results. It is an ideal basic hardness solution, economically priced to suit a variety of lab, workshop, toolroom and inspection department applications. The 3814 conforms to ASTM E-18 standard. The tester is furnished with a diamond indenter, a 1/16" (1.6mm) ball indenter, three certified test blocks, four test tables – 5.87" (149mm) and 2.5" (63.5mm) flat anvils, 5/8" (15.9mm) spot anvil and a standard vee anvil – and an accessory case.

FEATURES

- Ability to handle Rockwell Scales A through H and K

3814 Hardness Testers

Description	Cat. No.	EDP
Analog Hardness Tester	3814	67754
Hardness Tester Stand	PT06145	72519

Specifications

Minor Load	10Kgf
Major Load	A: 60Kgf, B: 100Kgf, C: 150Kgf
Test Force Application	(Dead weight applies test force)
Test Force Control	Hydraulic Dashpot System
Results Display	Analog – Dial Gage
Throat Depth	6.6" (168mm)
Maximum Test Height	6.69" (169.9mm) *
Unit Height/Width/Depth	30" x 8.5" x 20" (762 x 216 x 508mm)
Unit Weight	261lb (118kg)

* Requires bench alteration.

- Stable cast iron construction
- Ideal basic hardness testing for many typical applications



BENCH HARDNESS TESTERS

3816 DIGITAL BENCH HARDNESS TESTER

The 3816 Bench Hardness Tester offers easy, fully automated testing procedures and provides highly sensitive and accurate readings. The 3816 measures the full regular Rockwell Scales according to ASTM and SAE guidelines and accommodates all types of hard or soft metals and alloys, in numerous configurations. The tester is furnished with a diamond indenter, a 1/16" (1.6mm) ball indenter, three certified test blocks, four test tables – 5.87" (149mm) and 2.5" (63.5mm) flat anvils, 5/8"(15.9mm) spot anvil and a standard vee anvil and an accessory case.

FEATURES

- Automated routines reduce operator involvement and speeds measurements
- Large, easy-to-view LED panel displays proper load setting
- Programmable scale conversions, dwell times and sample counter
- Sample averaging is automatically calculated
- RS232C output
- Convenient mini-printer for outputting readings
- Quality base or superstructure castings provide stability and a large working area

3816 Hardness Testers		
Description	Cat. No.	EDP
Digital Bench Hardness Tester	3816	67755
Hardness Tester Stand	PT06145	72519
Accessories* for 3816 Digital Bench Hardness Tester		
"C" Regular	PT05245	67944
1/16" (1.6mm) Ball Unit	PT05249	67948
RA Test Block (Rockwell A Scale 80)	PT05069	67897
RB Test Block (Rockwell B Scale 90)	PT05059	67888
RC Test Block (Rockwell C Scale 63)	PT05050	67879
Master Block Set, Rockwell C Scale	PT05272	67969

* For additional listings of test blocks and accessories, refer to the following pages in this section.

Specifications	
Minor Load	10Kgf
Major Load	A: 60Kgf, B: 100Kgf, C: 150Kgf
Test Force Application	(Dead weight applies test force)
Test Force Control	Motorized
Results Display	Digital Readout
Throat Depth	6.6" (168mm)
Maximum Test Height	6.69" (169.9mm) **
Unit Height/Width/Depth	28" x 8.9" x 19.6" (711 x 226 x 498mm)
Unit Weight	187 lb (85kg)

** Requires bench alteration.



HARDNESS TESTING

TEST BLOCKS AND ACCESSORIES FOR HARDNESS TESTERS

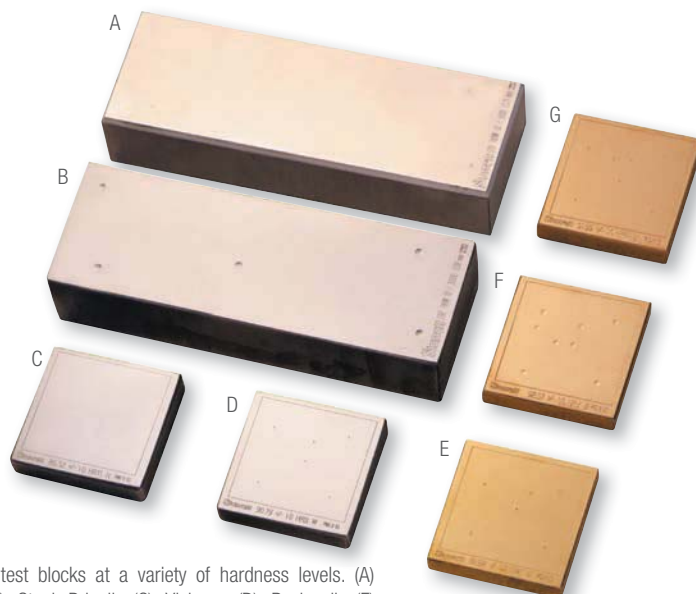
Starrett blocks can be used to test Rockwell, Brinell or Vickers scales. They are available in steel, brass and aluminum. Each block is serialized, with a certificate detailing the environmental conditions used to test the block.

Actual readings are given, with the averages of these readings: min. reading, max reading and a repeatability figure. The blocks are calibrated according to ASTM E-18 standards, ANSI (NCSL) Z540-1, (ISO) 10012-1, ISO/IEC 17025 and Mil-std 45662A.

Starrett hardness test blocks are manufactured from square steel or brass plates, as opposed to the more common round bar stock. The use of the plate gives a more accurate and consistent surface for inspection. Metallurgical tests have proven that during the production of round bar stock, suspended carbides in the mix migrate to the center of the rod. The scientific name for this condition is carbide segregation and results in different readings being found in the center of a rod rather than at its outer edges. Some manufacturers remedy this situation by removing the centers from their blocks.

Hardness test blocks are designed to be used only on one side and the indents should be more than .010" from the centers of two indents or no closer to the block's edge than .040".

Calibration kits are also available from Starrett. No facility with a hardness tester in use should be without a calibration kit. These kits come with from 3 to 20 calibrated test blocks and the serialized penetrator that was used to inspect each of the blocks in the set. When a discrepancy is detected in a tester, these kits allow you to determine the direction to proceed to resolve the issue.



Rockwell and Brinell test blocks at a variety of hardness levels. (A) Aluminum Brinell, (B) Steel Brinell, (C) Vickers, (D) Rockwell, (E) 187.5kg/2.5mm Brinell, (F) Extra-Soft Rockwell and (G) Brass Rockwell.

Rockwell Test Blocks			Rockwell Test Blocks		
Description †	Part No.	EDP	Description †	Part No.	EDP
RC63 Test Block	PT05050	67879	HR30N80 Test Block	PT05115	67912
RC60 Test Block	PT05051	67880	HG30N70 Test Block	PT05122	67913
RC55 Test Block	PT05052	67881	HR30N60 Test Block	PT05123	67914
RC50 Test Block	PT05053	67882	HR30N50 Test Block	PT05124	67915
RC45 Test Block	PT05054	67883	HR30N40 Test Block	PT05125	67916
RC40 Test Block	PT05055	67884	HR30T80 Test Block	PT05127	67917
RC35 Test Block	PT05056	67885	HR30T70 Test Block	PT05128	67918
RC30 Test Block	PT05057	67886	HR30T60 Test Block	PT05129	67919
RC25 Test Block	PT05058	67887	HR30T50 Test Block	PT05130	67920
RB90 Test Block	PT05059	67888	HR30T40 Test Block	PT05177	67921
RB80 Test Block	PT05060	67889	HR30T30 Test Block	PT05178	67922
RB70 Test Block	PT05061	67890	HR30T20 Test Block	PT05179	67923
RB60 Test Block	PT05062	67891	HR30T10 Test Block	PT05180	67924
RB50 Test Block	PT05063	67892	HR15N90 Test Block	PT05181	67925
RB40 Test Block	PT05064	67893	HR15N80 Test Block	PT05182	67926
RB30 Test Block	PT05065	67894	HR15N70 Test Block	PT05183	67927
RB20 Test Block	PT05067	67895	HR15T90 Test Block	PT05184	67928
RB10 Test Block	PT05068	67896	HR15T80 Test Block	PT05185	67929
RA80 Test Block	PT05069	67897	HR15T70 Test Block	PT05186	67930
RA70 Test Block	PT05091	67898	HR15T60 Test Block	PT05187	67931
RA60 Test Block	PT05092	67899	HR45T70 Test Block	PT05188	67932
RF100 Test Block	PT05100	67900	HR45T60 Test Block	PT05189	67933
RF90 Test Block	PT05101	67901	HR45T50 Test Block	PT05191	67934
RF80 Test Block	PT05102	67902	HR45T40 Test Block	PT05192	67935
RF70 Test Block	PT05103	67903	HR45T20 Test Block	PT05193	67936
RF60 Test Block	PT05104	67904	HR45T10 Test Block	PT05194	67937
RF50 Test Block	PT05105	67905	HRH90 Test Block	PT05195	67938
RE100 Test Block	PT05106	67906	HRH80 Test Block	PT05196	67939
RE90 Test Block	PT05107	67907	HRR120 Test Block	PT05197	67940
RE80 Test Block	PT05108	67908	HR30Y Test Block	PT05198	67941
RE70 Test Block	PT05112	67909	HRM Test Block	PT05199	67942
RE60 Test Block	PT05113	67910	HR15W Test Block	PT05200	67943
RE50 Test Block	PT05114	67911			

† Values expressed are not exact but will range within acceptable limits

HARDNESS TESTING

TEST BLOCKS AND ACCESSORIES FOR HARDNESS TESTERS

Brinell Test Blocks		
Description	Part No.	EDP
3000kg High Brinell Test Block	PT05257	67956
3000kg Low Brinell Test Block	PT05258	67957
500kg High Brinell Test Block	PT05259	67958
500kg Low Brinell Test Block	PT05260	67959



Standard and special anvils

Anvils and Table			
Letter	Description	Part No.	EDP
A	Pedestal Anvil	PT05267	67964
B	2-1/2" Flat Anvil	PT05268	67965
C	Small "V" Anvil	PT05269	67966
D	Large "V" Anvil	PT05270	67967
E	8" Anvil Testing Table	PT05271	67968



Penetrators - Contact Starrett for more information



PT05272 HRC 3-Block Master Calibration Kit

Master Calibration Kits		
Description	Part No.	EDP
HRC 3-Block Master Calibration Kit	PT05272	67969
HR30N 3-Block Master Calibration Kit	PT05273	67970
HRB 3-Block Master Calibration Kit	PT05276	67971
C&B Scale 20-Block Master Calibration Kit	PT05277	67972
C&30N Scale 6-Block Master Calibration Kit	PT05278	67973

Penetrators			
Letter	Description	Part No.	EDP
E	"C" Regular, No Thread	PT05245	67944
E	Indentron with Internal Thread	PT05246	67945
G	Versitron/New Age with External Thread	PT05247	67946
E	"N" Regular, No Thread	PT05248	67947
D	1/16" (1.6mm) Ball with Holder	PT05249	67948
C	1/8" (1.7mm) Ball Complete with Holder	PT05250	67949
B	1/4" (6.4mm) Ball Complete with Holder	PT05251	67950
A	1/2" (12.7mm) Ball Complete with Holder	PT05252	67951
	1/16" (1.6mm) Carbide Ball Only, with Certification	PT05253	67952
	1/8" (1.7mm) Carbide Ball, with Certification	PT05254	67953
	1/4" (6.4mm) Carbide Ball, with Certification	PT05255	67954
	1/2" (12.7mm) Carbide Ball, with Certification	PT05256	67955
	Heavy Load, Vickers 5kg Load	PT05261	67960
F	Heavy Load Indentor Vickers	PT05264	67961
	Min. Brinell 2 1/2mm Ball	PT05265	67962
	Min. Brinell Block 187 1/2kg, 2-1/2mm Ball	PT05266	67963





Includes base instrument, impact device D, calibrated test block, custom carry case, cleaning brush and operation manual

3811A COMPACT HARDNESS TESTER

The 3811A is a state of the art, digital portable hardness tester, designed to test the hardness of large, hard metal parts.

The 3811A combines fast test speeds with ample memory and output. It performs tests that easily convert to most popular hardness scales such as Rockwell, Brinell, Vickers and Shore.

This compact hardness tester is loaded with useful functions usually found only on high priced models.

3811A Hardness Tester & Accessories

Cat. No.	EDP	Description
3811A	69881	Digital portable hardness tester with impact device D, calibrated test block, cleaning brush and carry case
HT-1800-110	20940	D+15 Impact Device
HT-1800-115	20941	DL Impact Device
HT-1800-125	20942	G Impact Device
HT-1800-130	20943	C Impact Device
HT-1800-120	20944	DC Impact Device
HT-1800-100	20945	Replacement D Impact Device
HT-1800-102	20946	Replacement Cable For All Impact Devices
HT-2500-105	20947	Replacement Impact Body
HT-1300-01	20948	Leeb D Test Block
HT-1100G-01	20949	Leeb G Test Block
S38R	67285	Support Ring Set

3811A Portable Hardness Tester with Integrated, Multi-functional Features

Style	Applications
D+15	Very narrow contact area with a set backed measurement coil. Measures hardness in grooves and recesses. Weight: 80g
DC	Extremely short impact device. Used for very confined spaces such as, holes, cylinders and internal measurements
C	Reduced impact energy probe (2 ft-lb) for measuring hardness of coatings, surface hardened, thin wall or impact sensitive components. Applies superficial indentation. Weight: 75g
G	Enlarged test tip and increased impact energy range (72 ft-lb – approx. 9 times the D). For lower quality finishes measuring in the Brinell range only (max. 650 HB). Designed for components like heavy castings, forgings. Weight: 250g
DL	Needle front section with 4mm diameter and 50mm length. Ideal for testing in confined spaces, the base of grooves and special components like gear wheels. Steel/Cast steel

HARDNESS TESTERS

SPECIFICATIONS

- Accuracy: $\pm 0.5\%$ (referred to L=800)
- Repeatability accuracy: $\pm 4L$ units (L=Leeb)
- Measuring range: 200-960 HL
- For steel and cast steel, alloy tool steel, stainless steel, grey cast iron, spheroidal iron, cast aluminum, brass, bronze, wrought copper alloy
- Tool steel should be about 1" thick solid material or larger
- Operating temperature: 5-104 °F
- Dimensions: 5.96 x 2.938 x 1.270" (150 x 74 x 32mm)
- Weight: 8.6 oz. (245 grams)

FEATURES

- Leeb style tester designed for large, hard parts – load the impact body and place the impact device on your test piece
- Easy to use keypad operation – push the button to begin testing and obtain reading
- Auto identification of impact device
- Large LCD display with back light
- USB output
- Automatic conversions to Rockwell, Brinell, Vickers and Shore
- Automatic mean value as well as Min and Max values
- Uses two AA alkaline batteries with low power indicator
- Memory capacity (100 groups)
- Optional impact devices and special support rings



HARDNESS TESTERS

3810A Digital Portable Hardness Tester

The 3810A is a state-of-the-art digital instrument designed to test the hardness of large hard metal parts. Loaded with useful functions such as USB output and a built in printer, the 3810A is an ideal choice for fast, accurate hardness testing.

This versatile tester can perform tests that easily convert to the most popular hardness scales, including Rockwell, Brinell, Vickers and Shore.

The tester is easy to use. Simply load the impact body, place the impact body on your test piece, then push the button to begin testing.

The 3810A is designed to test large hard parts that cannot be brought to a bench top machine. For example, tool steel should be close to 1" thick of solid material. The 3810A comes with a D impact device, calibration block, cleaning brush, manual and a carrying case.

3810A Hardness Tester & Accessories

Cat. No.	EDP	Description
3810A	69871	Tester, D impact device, calibration block, cleaning brush, operation manual, custom carry case
HT-1800-110	20940	D+15 impact device. Very narrow contact area with set backed measurement coil. Measures hardness in grooves and recesses.
HT-1800-115	20941	DL impact device. Needle front section with 4mm diameter and 50mm length. For testing in confined spaces such as groove bases and special components such as gear wheels.
HT-1800-125	20942	G impact device. For components such as heavy castings and forgings. Enlarged test tip and increased impact energy range. For lower quality finishes measuring in the Brinell range only. G block required.
HT-1800-130	20943	C impact device. Reduced impact energy probe for measuring hardness of coatings and surface hardened, thin wall or impact- sensitive components. Applies superficial indentation.
HT-1800-120	20944	DC impact device. Very short for confined areas such as internal bores for various inside measurements.
HT-1800-100	20945	Replacement D impact device. Universal standard probe for a wide variety of applications.
HT-1800-102	20946	Replacement cable for all impact devices
HT-2500-105	20947	Replacement impact body D
HT-1300-01	20948	Leeb D test block
HT-1100G-01	20949	Leeb G test block
S38R	67285	Support ring set



SPECIFICATIONS

- Accuracy: $\pm 0.5\%$ (referred to L=800)
- Repeatability accuracy: $\pm 4L$ units (L=Leeb)
- Measuring range: 200-960 HL
- Materials: steel & cast steel, alloy tool steel, stainless steel, grey cast iron, spheroidal iron, cast aluminum, brass, bronze, wrought copper alloy
- Battery type: AA alkaline (4)
- Operating temperature: 5-104 °F
- Dimensions: 150 x 74 x 32mm
- Weight: 245 grams
- Includes 3810A tester, impact device D, calibration test block, cleaning brush, operation manual, custom carry case
- Available options include DC, D+15, DL, G, C impact devices, and special support rings

FUNCTIONS

- Easy to use keypad operation
- Auto identification of impact device
- Large LCD display with back light
- USB output
- Automatic conversions to: Brinell, Rockwell B & C, Vickers and Shore
- Automatic mean value as well as Min & Max values
- Battery indicator
- Memory capacity (100 groups)

NEW!

GAGE AMPS, HARDNESS AND SURFACE TESTERS



Check out our website for interactive features at starrett.com



HARDNESS TESTERS

TECHNICAL DATA FOR STARRETT HARDNESS IMPACT DEVICES

Technical Data for Impact Devices		D/DC/DL	D+15	C	G
Impact Energy		11 Nmm	11 Nmm	3 Nmm	90 Nmm
Mass of the Impact Body		5.5g	7.8g	3.0g	20g
Test Tip DL: 7.3 g	Hardness	1600 HV	1600 HV	1600 HV	1600 HV
	Diameter	3mm	3mm	3mm	5mm
	Material	Tungsten carbide	Tungsten carbide	Tungsten carbide	Tungsten carbide
Impact Device	Diameter	20mm	20mm	20mm	30mm
	Length	147/86mm	162mm	141mm	254mm
	Weight	75/50 g	80 g	75 g	250 g
Max. Hardness of Sample		940 HV	940 HV	1000 HV	650 HB
Preparation of Surface	Roughness class ISO	N7	N7	N5	N9
	Max. roughness depth Rt	10µm	10µm	2.5µm	30µm
	Average roughness Ra	2µm	2µm	0.4µm	7µm
Min. Weight of Sample	Of compact shape	5kg	5kg	1.5kg	15kg
	On solid support	2kg	2kg	0.5kg	5kg
	Coupled on plate	0.1kg	0.1kg	0.02kg	0.5kg
Min. Thickness of Sample	Coupled	3mm	3mm	1mm	10mm
	Min. thickness of layers	0.8mm	0.8mm	0.2mm	—
Indentation of Test Tip with 300 HV	Diameter	0.54mm	0.54mm	0.38mm	1.03mm
	Depth	24µm	24µm	12µm	53µm
Indentation of Test Tip with 600 HV	Diameter	0.45mm	0.45mm	0.32mm	0.90mm
	Depth	17µm	17µm	8µm	41µmC
Indentation of Test Tip with 800 HV	Diameter	0.35mm	0.35mm	0.30mm	—
	Depth	10µm	10µm	7µm	—

APPLICATION AND HARDNESS RANGES FOR STARRETT HARDNESS IMPACT DEVICES

Optional Impact Devices					
Material	HRC	HRB	HB	HV	HSD
Impact Device – D, DC Measuring Range 200-900†					
Steel	20.0-67.9	59.6-99.5	80-647	80-940	32.2-99.5
C.W. Tool Steel	20.4-67.1			80-898	
Gray Cast Iron			93-334		
Nodular Cast Iron			131-387		
Cast Aluminum			30-159		
Brass		13.5-95.3	40-173		
Bronze			60-290		
Copper			45-315		
Impact Device – D+15, Measuring Range 300-900† (not shown)					
Steel and Cast Steel	19.3-67.9		80-638	80-937	33.3-99.3
Impact Device – C, Measuring Range 350-950†					
Steel and Cast Steel	20.0-69.5		80-683	80-996	31.9-99.6
Impact Device – G, Measuring Range 300-750†					
Steel and Cast Steel		47.7-99.9	90-646		
Gray Cast Iron			92-326		
Nodular Cast Iron			127-364		
Impact Device – DL, Measuring Range 300-900†					
Steel and Cast Steel	20-68	37-100	80-650	80-940	30-97

† Leeb Measuring Range