

# METROLOGY®

## *Hardness Testing Equipment*

*The metal material hardness test method of this product is in full compliance with the American Society for Testing and Materials ASTM E18-15 Rockwell, ASTM E10-15 Brinell, ASTM E384 Vickers Test standards*



***HTE***

*Perfect for checking the hardness of metal material*

***SAVE***

*Time & Cost*

*Improved efficiency & accuracy*

APPLICATION

*Rockwell Hardness Tester*

**Rockwell Hardness Tester**

Chilled steel hardened and tempered steel, annealed steel, casting, malleable cast, hard alloy, hardened thin steel plate, aluminum alloy, bearings steel.

**Superficial Rockwell Hardness Tester**

Surface hardening steel, copper, aluminum alloy thin plate; strip steel, hard alloy steel, galvanization, chroming, and tin plating, heat treatment of the material surface and chemical surface treatment of different kind of material.

FEATURE



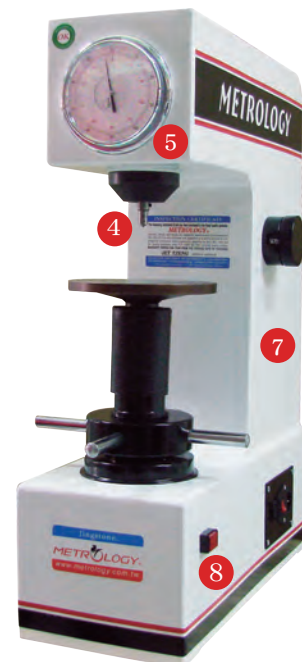
Test Structure Design

Precision Cast Iron Body

Assembly & Inspection

Innovation Design R&D  
Patented Technology Award

- 1 The machine shell is formed by cast iron, stable structure and it is not easy to be out of shape.
- 2 The dial reads the hardness value directly, indicator responses sensitively, show the hardness value accurately, which is superior than national standard.
- 3 Rotate the loading wheel, it can easy to adjust the three loading test force to choose the hardness unit.
- 4 Model RHT-9000M does not require electric power, which can use in different conditions & jobsites; it is economic and practical Rockwell hardness tester.
- 5 Model RHT-9000E is high automaticity, operate concisely and it is adapted to continually use.



1. Loading Test Force Handle
2. Roller
3. Test Table
4. Indenter
5. Dial indicator
6. Change Loading Handle
7. Machine Body
8. Electric Knob

【RHT-9000M】 Manual

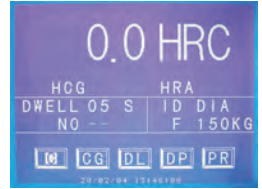
Electric 【RHT-9000E】

【RHT-S9000M】 Manual Superficial

Electric Superficial 【RHT-S9000E】

**Digital Rockwell hardness tester 【RHT-9000D】**

**Digital Superficial Rockwell hardness tester 【RHT-S9000D】**



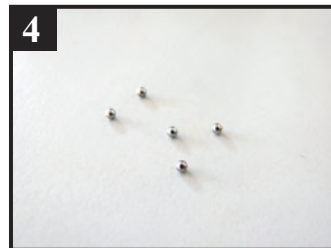
**FEATURE**

- 1** It adopts big LCD screen, indicating the hardness value directly, conversion hardness value, test force, dwell time, room temperature, maximum & minimum value, mean, test date and time, it can supply all analysis data.
- 2** It is automatic to test when the working platform lifting up to some height, then indicate the test result directly
- 3** Operation panel adopts menu structure concise, Chinese and English window, easy to shift
- 4** Built-in printer, it can print out the test data directly
- 5** The machine shell is formed by cast iron, stable structure and it is not easy to be out of shape
- 6** Rotate the loading wheel, it can easy to adjust the three loading test force to choose the hardness unit
- 7** Application & other feature same dial type Rockwell hardness tester



**Standard equipment**

1.Main machine 2.Diamond rockwell indenter 3. 1.588mm diameter hard alloy steel ball indenter 4.1.588 mm diameter steel ball 5 pieces 5.Large testing table 6.Medium testing table 7.V-shaped testing table 8.Standard hardness blocks 3 pieces 9.Accessory case 10.Dust-proof cover 11.Instruction manual



**Optional accessories**

- Standard hardness blocks : RHT-60~70HRC RHT-35~55HRC RHT-20~30HRC RHT-85~95HRB RHT-70~85HRA
- Superficial hardness blocks : RHT-88~92HR15N RHT-45~55HR30N RHT-85~91HR15T
- 1.588mm Steel ball indenter RHT-SI1.588      ■ 3.18mm Steel ball indenter RHT-SI3.18
- Diamond rockwell indenter RHT-DI      ■ Special testing table      ■ RS232 data output interface and software

## Rockwell Hardness Tester

## Specification

Model	RHT-9000M	RHT-9000E	RHT-9000D
<b>Testing method</b>	Manual	Electric	Auto
<b>Rockwell scale</b>	HRA , HRB , HRC , HRD , HRE , HRF HRG , HRH , HRK		HRA , HRB , HRC , HRD , HRE , HRF HRG , HRH , HRK , HRL , HRM , HRP HRR , HRS , HRV
<b>Hardness value range</b>	HRA:20~88 HRB:20~100 HRC:20~70		
<b>Minimum measuring unit</b>	0.5HR		0.1HR
<b>Hardness data read</b>	Dial		Digital LCD
<b>Conversion scale</b>	Look up table		HRA , HRB , HRC , HRD , HRF HV , HK , HBW , HR15N , HR30N HR45N , HR15T , HR30T , HR45T ( Direct Digital Conversion )
<b>Preliminary test force</b>	10KG (98N)		
<b>Total test force</b>	60Kg(588N), 100Kg (980N), 150Kg (1471N)		
<b>Dwell time</b>	1~60S		
<b>Specimen maximum height allowed</b>	170mm(Higher type : 400mm)		
<b>Throat depth</b>	140mm		
<b>Instrument size</b>	460x180x650mm (LxWxH)		
<b>Instrument weight</b>	85KG(Higher type : 95kg)		
<b>Power supply</b>	none	AC110 or 220V + 5% , 50~60 Hz	

Remarks: The increased height Rockwell hardness tester only provides two models of electric Rockwell hardness tester (RHT-H9000E) and digital Rockwell hardness tester (RHT-H9000D).

## Technic Application

Scale	Indenter	Primary test force(N)	Total test force (N)	Application range
A	Diamond cone angle 120° The top sphere radius 0.2mm	98 (10kg)	588 (60kg)	Carbide, Hardened steel
D			980 (100kg)	Thin steel, Surface hardened layer
C			1471 (150kg)	Hardened steel, Quenched and Tempered steel, Hard cast iron
F	Steel ball diameter 1.588mm ( 1/16inch )		588 (60kg)	Annealed copper alloys, Thin soft steel
B			980 (100kg)	Mild steel, Aluminum alloy, Copper alloy, Malleable iron
G			1471 (150kg)	Pearlier iron, Copper, Nickel, Zinc, Nickel alloy
H	Steel ball diameter 3.175mm ( 1/8 inch )		588 (60kg)	Harden plastic
E			980 (100kg)	Harden plastic
K			1471 (150kg)	Harden plastic

## Superficial Rockwell Hardness Tester

### Specification

Model	RHT-S9000M	RHT-S9000E	RHT-S9000D
Testing method	Manual	Electric	Auto
Rockwell scale	HR15N、HR30N、HR45N、HR15T、HR30T、HR45T		
Hardness value range	70-91HR15N、42-80HR30N、20-70HR45N、73-93HR15T、43-82HR30T、12-72HR45T		
Minimum measuring unit	0.5HR		0.1HR
Hardness data read	Dial		Digital LCD
Conversion scale	Look up table		HRA、HRB、HRC、HRD、HRF HV、HK、HBW、HR15N、HR30N HR45N、HR15T、HR30T、HR45T (Direct Digital Conversion)
Preliminary test force	3KG (29.42N)		
Total test force	15KG (147.1N)、30KG(294.2N)、45KG(441.3N)		
Dwell time	1~60S		
Specimen maximum height allowed	170mm		
Throat depth	140mm		
Instrument size	460x180x650mm (LxWxH)		
Instrument weight	85KG		
Power supply	none	AC110 or 220V + 5%, 50~60 Hz	

Remark: Use steel ball scale, add "S" after the hardness symbol

Use tungsten steel ball indenter scale, add "W" after the hardness symbol

### Technic Application

Scale	Primary test force(N)	Total test force (N)	Indenter	Application range
HR-15N	29.42 (3 kg)	147.1 (15 kg)	Diamond cone angle 120° The top sphere radius 0.2mm	Carburization, Nitration, Chrome plate and Chemical treatment thin plate
HR-30N		294.2 (30 kg)		
HR-45N		441.3 (45 kg)		
HR-15T		147.1 (15 kg)	Steel ball diameter 1.588mm ( 1/16inch )	Steel, Brass, Bronze and without treatment thin plate
HR-30T		294.2 (30 kg)		
HR-45T		441.3 (45 kg)		

# Double Rockwell Hardness Tester

## FEATURE

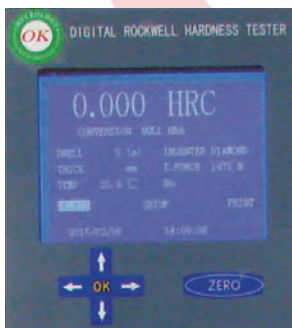
The machine can meet the metal rockwell and superficial rockwell hardness test requirements; high test precision ; good repeatability and economical



**Manual**  
**[RHT-D9000M]**



**Electric**  
**[RHT-D9000E]**



**Digital**  
**[RHT-D9000D]**



Innovation Design R&D  
 Patented Technology Award

# Double Rockwell Hardness Tester

## APPLICATION

### Rockwell Hardness Tester

Chilled steel hardened and tempered steel, annealed steel, casting, malleable cast, hard alloy, hardened thing steel plate, aluminum alloy, bearings steel.

### Superficial Rockwell Hardness Tester

Surface hardening steel, copper, aluminum alloy thin plate; strip steel, hard alloy steel, galvanization, chroming, and tin plating, heat treatment of the material surface and chemical surface treatment of different kind of material.

## Specification

Test standard : ASTM 、 ISO 、 JIS 、 DIN

Model	RHT-D9000M	RHT-D9000E	RHT-D9000D
Testing method	Manual	Electric	Auto
Rockwell scale	HRA , HRB , HRC , HRD , HRE , HRF HRG , HRH , HRK HR15N , HR30N , HR45N HR15T , HR30T , HR45T		HRA , HRB , HRC , HRD , HRE , HRF HRG , HRH , HRK , HRL , HRM , HRP HRR , HRS , HRV HR15N , HR30N , HR45N HR15T , HR30T , HR45T
Hardness value range	HRA:20~88 HRB:20~100 HRC:20~70 70-91HR15N , 42-80HR30N , 20-70HR45N , 73-93HR15T , 43-82HR30T , 12-72HR45T		
Minimum measuring unit	0.5HR		0.1HR
Hardness data read	Dial		Digital LCD
Conversion scale	Look up table		HRA , HRB , HRC , HRD , HRF HV , HK , HBW , HR15N , HR30N HR45N , HR15T , HR30T , HR45T ( Direct Digital Conversion )
Preliminary test force	10KG (98N)		3KG (29.42N)
Total test force	60Kg(588N), 100Kg (980N), 150Kg (1471N) 15KG (147.1N) , 30KG(294.2N) , 45KG(441.3N)		
Dwell time	1~60S		
Executive standard	ASTM、 ISO、 JIS、 DIN		
Specimen maximum height allowed	170mm		
Throat depth	140mm		
Instrument size	460x180x650mm (LxWxH)		
Instrument weight	85KG		
Power supply	none	AC110 or 220V + 5% , 50~60 Hz	

# Hardness Conversion Table E140 – 07

**TABLE 1 Approximate Hardness Conversion Numbers for Non-Austenitic Steels (Rockwell C Hardness Range)<sup>A, B</sup>**

Rockwell C Hardness Number 150 kgf (HRC)	Vickers Hardness Number (HV)	Brinell Hardness Number <sup>C</sup>		Knoop Hardness, Number 500-gf and Over (HK)	Rockwell Hardness Number		Rockwell Superficial Hardness Number			Scleroscope Hardness Number <sup>D</sup>	Rockwell C Hardness Number 150 kgf (HRC)
		10-mm Standard Ball, 3000-kgf (HBS)	10-mm Carbide Ball, 3000-kgf (HBW)		A Scale, 60-kgf (HRA)	D Scale, 100-kgf (HRD)	15-N Scale, 15-kgf (HR 15-N)	30-N Scale, 30-kgf (HR 30-N)	45-N Scale, 45-kgf (HR 45-N)		
68	940	...	...	920	85.6	76.9	93.2	84.4	75.4	97.3	68
67	900	...	...	895	85.0	76.1	92.9	83.6	74.2	95.0	67
66	865	...	...	870	84.5	75.4	92.5	82.8	73.3	92.7	66
65	832	...	(739)	846	83.9	74.5	92.2	81.9	72.0	90.6	65
64	800	...	(722)	822	83.4	73.8	91.8	81.1	71.0	88.5	64
63	772	...	(705)	799	82.8	73.0	91.4	80.1	69.9	86.5	63
62	746	...	(688)	776	82.3	72.2	91.1	79.3	68.8	84.5	62
61	720	...	(670)	754	81.8	71.5	90.7	78.4	67.7	82.6	61
60	697	...	(654)	732	81.2	70.7	90.2	77.5	66.6	80.8	60
59	674	...	634	710	80.7	69.9	89.8	76.6	65.5	79.0	59
58	653	...	615	690	80.1	69.2	89.3	75.7	64.3	77.3	58
57	633	...	595	670	79.6	68.5	88.9	74.8	63.2	75.6	57
56	613	...	577	650	79.0	67.7	88.3	73.9	62.0	74.0	56
55	595	...	560	630	78.5	66.9	87.9	73.0	60.9	72.4	55
54	577	...	543	612	78.0	66.1	87.4	72.0	59.8	70.9	54
53	560	...	525	594	77.4	65.4	86.9	71.2	58.6	69.4	53
52	544	(500)	512	576	76.8	64.6	86.4	70.2	57.4	67.9	52
51	528	(487)	496	558	76.3	63.8	85.9	69.4	56.1	66.5	51
50	513	(475)	481	542	75.9	63.1	85.5	68.5	55.0	65.1	50
49	498	(464)	469	526	75.2	62.1	85.0	67.6	53.8	63.7	49
48	484	451	455	510	74.7	61.4	84.5	66.7	52.5	62.4	48
47	471	442	443	495	74.1	60.8	83.9	65.8	51.4	61.1	47
46	458	432	432	480	73.6	60.0	83.5	64.8	50.3	59.8	46
45	446	421	421	466	73.1	59.2	83.0	64.0	49.0	58.5	45
44	434	409	409	452	72.5	58.5	82.5	63.1	47.8	57.3	44
43	423	400	400	438	72.0	57.7	82.0	62.2	46.7	56.1	43
42	412	390	390	426	71.5	56.9	81.5	61.3	45.5	54.9	42
41	402	381	381	414	70.9	56.2	80.9	60.4	44.3	53.7	41
40	392	371	371	402	70.4	55.4	80.4	59.5	43.1	52.6	40
39	382	362	362	391	69.9	54.6	79.9	58.6	41.9	51.5	39
38	372	353	353	380	69.4	53.8	79.4	57.7	40.8	50.4	38
37	363	344	344	370	68.9	53.1	78.8	56.8	39.6	49.3	37
36	354	336	336	360	68.4	52.3	78.3	55.9	38.4	48.2	36
35	345	327	327	351	67.9	51.5	77.7	55.0	37.2	47.1	35
34	336	319	319	342	67.4	50.8	77.2	54.2	36.1	46.1	34
33	327	311	311	334	66.8	50.0	76.6	53.3	34.9	45.1	33
32	318	301	301	326	66.3	49.2	76.1	52.1	33.7	44.1	32
31	310	294	294	318	65.8	48.4	75.6	51.3	32.5	43.1	31
30	302	286	286	311	65.3	47.7	75.0	50.4	31.3	42.2	30
29	294	279	279	304	64.8	47.0	74.5	49.5	30.1	41.3	29
28	286	271	271	297	64.3	46.1	73.9	48.6	28.9	40.4	28
27	279	264	264	290	63.8	45.2	73.3	47.7	27.8	39.5	27
26	272	258	258	284	63.3	44.6	72.8	46.8	26.7	38.7	26
25	266	253	253	278	62.8	43.8	72.2	45.9	25.5	37.8	25
24	260	247	247	272	62.4	43.1	71.6	45.0	24.3	37.0	24
23	254	243	243	266	62.0	42.1	71.0	44.0	23.1	36.3	23
22	248	237	237	261	61.5	41.6	70.5	43.2	22.0	35.5	22
21	243	231	231	256	61.0	40.9	69.9	42.3	20.7	34.8	21
20	238	226	226	251	60.5	40.1	69.4	41.5	19.6	34.2	20

<sup>A</sup> In the table headings, *force* refers to total test forces.

<sup>B</sup> Appendix X1 contains equations converting determined hardness scale numbers to Rockwell C hardness numbers for non-austenitic steels. Refer to 1.11 before using conversion equations.

<sup>C</sup> The Brinell hardness numbers in parentheses are outside the range recommended for Brinell hardness testing in 8.1 of Test Method E10.

<sup>D</sup> These Scleroscope hardness conversions are based on Vickers—Scleroscope hardness relationships developed from Vickers hardness data provided by the National Bureau of Standards for 13 steel reference blocks, Scleroscope hardness values obtained on these blocks by the Shore Instrument and Mfg. Co., Inc., the Roll Manufacturers Institute, and members of this institute, and also on hardness conversions previously published by the American Society for Metals and the Roll Manufacturers Institute.



# Hardness Conversion Table E140 - 07

TABLE 2 Approximate Hardness Conversion Numbers for Non-Austenitic Steels (Rockwell B Hardness Range)<sup>A, B</sup>

Rockwell B Hardness Number, 100-kgf (HRB)	Vickers Hardness Number (HV)	Brinell Hard- ness Number, 3000-kgf, (HBS)	Knoop Hard- ness Number, 500-gf, and Over (HK)	Rockwell A Hardness Number, 60-kgf, (HRA)	Rockwell F Hardness Number, 60-kgf, (HRF)	Rockwell Superficial Hardness Number			Rockwell B Hardness Number, 100-kgf, (HRB)
						15-T Scale, 15-kgf, (HR 15-T)	30-T Scale, 30-kgf, (HR 30-T)	45-T Scale, 45-kgf, (HR 45-T)	
100	240	240	251	61.5	...	93.1	83.1	72.9	100
99	234	234	246	60.9	...	92.8	82.5	71.9	99
98	228	228	241	60.2	...	92.5	81.8	70.9	98
97	222	222	236	59.5	...	92.1	81.1	69.9	97
96	216	216	231	58.9	...	91.8	80.4	68.9	96
95	210	210	226	58.3	...	91.5	79.8	67.9	95
94	205	205	221	57.6	...	91.2	79.1	66.9	94
93	200	200	216	57.0	...	90.8	78.4	65.9	93
92	195	195	211	56.4	...	90.5	77.8	64.8	92
91	190	190	206	55.8	...	90.2	77.1	63.8	91
90	185	185	201	55.2	...	89.9	76.4	62.8	90
89	180	180	196	54.6	...	89.5	75.8	61.8	89
88	176	176	192	54.0	...	89.2	75.1	60.8	88
87	172	172	188	53.4	...	88.9	74.4	59.8	87
86	169	169	184	52.8	...	88.6	73.8	58.8	86
85	165	165	180	52.3	...	88.2	73.1	57.8	85
84	162	162	176	51.7	...	87.9	72.4	56.8	84
83	159	159	173	51.1	...	87.6	71.8	55.8	83
82	156	156	170	50.6	...	87.3	71.1	54.8	82
81	153	153	167	50.0	...	86.9	70.4	53.8	81
80	150	150	164	49.5	...	86.6	69.7	52.8	80
79	147	147	161	48.9	...	86.3	69.1	51.8	79
78	144	144	158	48.4	...	86.0	68.4	50.8	78
77	141	141	155	47.9	...	85.6	67.7	49.8	77
76	139	139	152	47.3	...	85.3	67.1	48.8	76
75	137	137	150	46.8	99.6	85.0	66.4	47.8	75
74	135	135	147	46.3	99.1	84.7	65.7	46.8	74
73	132	132	145	45.8	98.5	84.3	65.1	45.8	73
72	130	130	143	45.3	98.0	84.0	64.4	44.8	72
71	127	127	141	44.8	97.4	83.7	63.7	43.8	71
70	125	125	139	44.3	96.8	83.4	63.1	42.8	70
69	123	123	137	43.8	96.2	83.0	62.4	41.8	69
68	121	121	135	43.3	95.6	82.7	61.7	40.8	68
67	119	119	133	42.8	95.1	82.4	61.0	39.8	67
66	117	117	131	42.3	94.5	82.1	60.4	38.7	66
65	116	116	129	41.8	93.9	81.8	59.7	37.7	65
64	114	114	127	41.4	93.4	81.4	59.0	36.7	64
63	112	112	125	40.9	92.8	81.1	58.4	35.7	63
62	110	110	124	40.4	92.2	80.8	57.7	34.7	62
61	108	108	122	40.0	91.7	80.5	57.0	33.7	61
60	107	107	120	39.5	91.1	80.1	56.4	32.7	60
59	106	106	118	39.0	90.5	79.8	55.7	31.7	59
58	104	104	117	38.6	90.0	79.5	55.0	30.7	58
57	103	103	115	38.1	89.4	79.2	54.4	29.7	57
56	101	101	114	37.7	88.8	78.8	53.7	28.7	56
55	100	100	112	37.2	88.2	78.5	53.0	27.7	55
54	...	...	111	36.8	87.7	78.2	52.4	26.7	54
53	...	...	110	36.3	87.1	77.9	51.7	25.7	53
52	...	...	109	35.9	86.5	77.5	51.0	24.7	52
51	...	...	108	35.5	86.0	77.2	50.3	23.7	51
50	...	...	107	35.0	85.4	76.9	49.7	22.7	50
49	...	...	106	34.6	84.8	76.6	49.0	21.7	49
48	...	...	105	34.1	84.3	76.2	48.3	20.7	48
47	...	...	104	33.7	83.7	75.9	47.7	19.7	47
46	...	...	103	33.3	83.1	75.6	47.0	18.7	46
45	...	...	102	32.9	82.6	75.3	46.3	17.7	45
44	...	...	101	32.4	82.0	74.9	45.7	16.7	44
43	...	...	100	32.0	81.4	74.6	45.0	15.7	43
42	...	...	99	31.6	80.8	74.3	44.3	14.7	42
41	...	...	98	31.2	80.3	74.0	43.7	13.6	41
40	...	...	97	30.7	79.7	73.6	43.0	12.6	40
39	...	...	96	30.3	79.1	73.3	42.3	11.6	39
38	...	...	95	29.9	78.6	73.0	41.6	10.6	38
37	...	...	94	29.5	78.0	72.7	41.0	9.6	37
36	...	...	93	29.1	77.4	72.3	40.3	8.6	36
35	...	...	92	28.7	76.9	72.0	39.6	7.6	35
34	...	...	91	28.2	76.3	71.7	39.0	6.6	34
33	...	...	90	27.8	75.7	71.4	38.3	5.6	33
32	...	...	89	27.4	75.2	71.0	37.6	4.6	32
31	...	...	88	27.0	74.6	70.7	37.0	3.6	31
30	...	...	87	26.6	74.0	70.4	36.3	2.6	30

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