WORKSHOP REFERENCE · 11

Hardness Conversion

Rockwell, Vickers and Brinell equivalents for steel, with approximate tensile strength.

Hardened steel · HRC 68–45

ASTM E140

HRC	HV	HB	Tensile MPa ≈
68	940	—	—
67	900	—	—
66	865	—	—
65	832	739	—
64	800	722	—
63	772	706	—
62	746	688	—
61	720	670	—
60	697	654	—
59	674	634	—
58	653	615	—
57	633	595	—
56	613	577	—
55	595	560	—
54	577	543	—
53	560	525	—
52	544	512	—
51	528	496	—
50	513	481	—
49	498	469	—
48	484	455	1530
47	471	443	1510
46	458	432	1480
45	446	421	1440
44	434	409	1400

Hardened steel · HRC 44–20

ASTM E140

HRC	HV	HB	Tensile MPa ≈
43	423	400	1360
42	412	390	1320
41	402	381	1290
40	392	371	1260
39	382	362	1230
38	372	353	1190
37	363	344	1160
36	354	336	1130
35	345	327	1100
34	336	319	1080
33	327	311	1050
32	318	301	1020
31	310	294	990
30	302	286	970
29	294	279	950
28	286	271	920
27	279	264	900
26	272	258	880
25	266	253	870
24	260	247	850
23	254	243	830
22	248	237	800
21	243	231	780
20	238	226	760

Softer steel · HRB

BS 860 · ASTM E140

HRB	HV	HB	Tensile MPa ≈
100	269	255	873
99	261	248	853
98	253	241	824
97	247	235	794
96	241	229	775
95	228	217	745
94	223	212	716
93	218	207	696
91	208	197	667
89	197	187	637
87	189	179	608
85	179	170	559
83	172	163	539
81	165	156	530
79	157	149	500
77	150	143	481
74	144	137	471
72	138	131	461
69	133	126	451
67	127	121	431
64	122	116	422
61	117	111	402

Which scale?

HRC (Rockwell C, diamond cone, 150 kgf): hardened steel, about 20–70 HRC.
HRB (Rockwell B, ball, 100 kgf): soft steel, brass, aluminium, below 20 HRC.
HB (Brinell, 10 mm ball): castings, forgings and bar stock up to about 650 HB.
HV (Vickers, diamond pyramid): any hardness, thin parts and case depth.

Rules of thumb

Steel tensile ≈ 3.4 × HB MPa
Above 45 HRC use CBN or ceramic
HSS tools reach 62–67 HRC

Conversions between scales are approximate and apply to carbon and alloy steels. They do not apply to austenitic stainless or non-ferrous metals.

HRC table per ASTM E140 Table 1 (non-austenitic steels); HB with tungsten carbide ball. HRB table per BS 860 / ASTM E140 approximations. Tensile strengths are approximate and for guidance only.

A guide only. Always check against the tool maker's data and your machine and set-up, and talk to your Teravin sales engineer before relying on it. Terms: teravin.tools/terms