

Approximate Conversion Values for Rockwell C Hardness Values of Steel ⁽¹⁾

(HRC) Rockwell C scale hardness	(HV) Vickers hardness	Brinell hardness (HB) 10 mm ball Load 3000 kgf			Rockwell Hardness ⁽²⁾			Rockwell superficial hardness Diamond conical indenter			(Hs) Shore hardness	Tensile strength (approximate value) MPA (kgf/mm ²)	Rockwell C scale hardness ⁽³⁾
		Standard ball	Tungsten carbide ball	(HRA) A scale Load 60kgf Diamond conical indenter	(HRB) B scale Load 100kgf Dia. 1.58mm (1/16 in.) ball	(HRD) D scale Load 100kgf Diamond conical indenter	15—N scale Load 15kgf	30—N scale Load 30kgf	45—N scale Load 45kgf				
68	940	—	—	85.6	—	76.9	93.2	84.4	75.4	97	—	68	
67	900	—	—	85.0	—	76.1	92.9	83.6	74.2	95	—	67	
66	865	—	—	84.5	—	75.4	92.5	82.8	73.3	92	—	66	
65	832	—	(739)	83.9	—	74.5	92.2	81.9	72.0	91	—	65	
64	800	—	(722)	83.4	—	73.8	91.8	81.1	71.0	88	—	64	
63	772	—	(705)	82.8	—	73.0	91.4	80.1	69.9	87	—	63	
62	746	—	(688)	82.3	—	72.2	91.1	79.3	68.8	85	—	62	
61	720	—	(670)	81.8	—	71.5	90.7	78.4	67.7	83	—	61	
60	697	—	(654)	81.2	—	70.7	90.2	77.5	66.6	81	—	60	
59	674	—	(634)	80.7	—	69.9	89.8	76.6	65.5	80	—	59	
58	653	—	615	80.1	—	69.2	89.3	75.7	64.3	78	—	58	
57	633	—	595	79.6	—	68.5	88.9	74.8	63.2	76	—	57	
56	613	—	577	79.0	—	67.7	88.3	73.9	62.0	75	—	56	
55	595	—	560	78.5	—	66.9	87.9	73.0	60.9	74	2075 (212)	55	
54	577	—	543	78.0	—	66.1	87.4	72.0	59.8	72	2015 (205)	54	
53	560	—	525	77.4	—	65.4	86.9	71.2	58.6	71	1950 (199)	53	
52	544	(500)	512	76.8	—	64.6	86.4	70.2	57.4	69	1880 (192)	52	
51	528	(487)	496	76.3	—	63.8	85.9	69.4	56.1	68	1820 (186)	51	
50	513	(475)	481	75.9	—	63.1	85.5	68.5	55.0	67	1760 (179)	50	
49	498	(464)	469	75.2	—	62.1	85.0	67.6	53.8	66	1695 (173)	49	
48	484	451	455	74.7	—	61.4	84.5	66.7	52.5	64	1635 (167)	48	
47	471	442	443	74.1	—	60.8	83.9	65.8	51.4	63	1580 (161)	47	
46	458	432	432	73.6	—	60.0	83.5	64.8	50.3	62	1530 (156)	46	
45	446	421	421	73.1	—	59.2	83.0	64.0	49.0	60	1480 (151)	45	
44	434	409	409	72.5	—	58.5	82.5	63.1	47.8	58	1435 (146)	44	
43	423	400	400	72.0	—	57.7	82.0	62.2	46.7	57	1385 (141)	43	
42	412	390	390	71.5	—	56.9	81.5	61.3	45.5	56	1340 (136)	42	
41	402	381	381	70.9	—	56.2	80.9	60.4	44.3	55	1295 (132)	41	
40	392	371	371	70.4	—	55.4	80.4	59.5	43.1	54	1250 (127)	40	
39	382	362	362	69.9	—	54.6	79.9	58.6	41.9	52	1215 (124)	39	
38	372	353	353	69.4	—	53.8	79.4	57.7	40.8	51	1180 (120)	38	
37	363	344	344	68.9	—	53.1	78.8	56.8	39.6	50	1160 (118)	37	
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115 (114)	36	
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080 (110)	35	
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055 (108)	34	
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025 (105)	33	
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000 (102)	32	
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.7	43	980 (100)	31	
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950 (97)	30	
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930 (95)	29	
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910 (93)	28	
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880 (90)	27	
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860 (88)	26	
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840 (86)	25	
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825 (84)	24	
23	254	243	243	62.0	—	42.1	71.0	44.0	23.1	36	805 (82)	23	
22	248	237	237	61.5	—	41.6	70.5	43.2	22.0	35	785 (80)	22	
21	243	231	231	61.0	—	40.9	69.9	42.3	20.7	35	770 (79)	21	
20	238	226	226	60.5	—	40.1	69.4	41.5	19.6	34	760 (77)	20	
(18)	230	219	219	—	—	—	—	—	—	33	730 (75)	(18)	
(16)	222	212	212	—	—	95.5	—	—	—	32	705 (72)	(16)	
(14)	213	203	203	—	—	93.9	—	—	—	31	675 (69)	(14)	
(12)	204	194	194	—	—	92.3	—	—	—	29	650 (66)	(12)	
(10)	196	187	187	—	—	90.7	—	—	—	28	620 (63)	(10)	
(8)	188	179	179	—	—	89.5	—	—	—	27	600 (61)	(8)	
(6)	180	171	171	—	—	87.1	—	—	—	26	580 (59)	(6)	
(4)	173	165	165	—	—	85.5	—	—	—	25	550 (56)	(4)	
(2)	166	158	158	—	—	83.5	—	—	—	24	530 (54)	(2)	
(0)	160	152	152	—	—	81.7	—	—	—	24	515 (53)	(0)	

Note ⁽¹⁾ : Figures in blue are based on ASTM E 140, Table 1 (Jointly prepared by SAE, ASM and ASTM.)
⁽²⁾ : The units and figures shown in parentheses () following the listed value are the results of conversion from PSI figures by reference to JIS Z 8413 and Z8438 conversion tables.
 1MPa = 1N/mm²
⁽³⁾ : The figures in parentheses () are in ranges not frequently used. They are given as reference data.