

# Hardness Conversion Table

Table 65

Vickers Hardness	Rockwell C-Scale 150kg Load Braze Penetrator	Rockwell B-Scale 100kg Load 1 1/16" dia Ball	Brinell Hardness No. 3000kg Load 10mm Ball	Tensile Strength (Approximate)			Shore Sclero scope Hardness No.	Rockwell A-Scale 60kg Load Braze Penetrator	Rockwell D-Scale 100kg Load Braze Penetrator	Rockwell Superficial Hardness No. Superficial Braze Penetrator		
										15-N Scale 15kg Load	30-N Scale 30kg Load	45-N Scale 45kg Load
										HR 15-N	HR 30-N	HR 45-N
HV	HRC	HRB	HB	lbf/in <sup>2</sup> x 1000	tonf/in <sup>2</sup>	N/mm <sup>2</sup>	HRA	HRD	HR 15-N	HR 30-N	HR 45-N	
940	68	-	-	-	-	-	97	85.6	76.9	93.2	84.4	75.4
900	67	-	-	-	-	-	95	85.0	76.1	92.9	83.6	74.2
865	66	-	-	-	-	-	92	84.5	75.4	92.5	82.8	73.3
832	65	-	739	-	-	-	91	83.9	74.5	92.2	81.9	72.0
800	64	-	722	-	-	-	88	83.4	73.8	91.8	81.1	71.0
772	63	-	705	-	-	-	87	82.8	73.0	91.4	80.1	69.9
746	62	-	688	-	-	-	85	82.3	72.2	91.1	79.3	68.8
720	61	-	670	-	-	-	83	81.8	71.5	90.7	78.4	67.7
697	60	-	654	-	-	-	81	81.2	70.0	90.2	77.5	66.6
674	59	-	634	-	-	-	80	80.7	69.9	89.8	86.8	65.5
653	58	-	615	-	-	-	78	80.1	69.2	89.3	85.7	64.3
633	57	-	595	-	-	-	76	79.6	68.5	88.7	84.8	63.2
613	56	-	577	-	-	-	75	79.0	67.7	88.3	83.9	62.0
595	55	-	560	301	134	2080	74	78.5	66.9	87.9	83.0	60.9
577	54	-	543	292	130	2010	72	78.0	66.1	87.4	82.0	59.8
560	53	-	525	283	126	1950	71	77.4	65.4	86.9	81.2	58.6
544	52	-	512	273	122	1880	69	76.8	64.6	86.4	80.2	57.4
528	51	-	496	264	118	1820	68	76.3	63.8	85.9	79.4	56.1
513	50	-	481	255	114	1760	67	75.9	63.1	84.4	78.5	55.0
498	49	-	469	246	110	1700	66	75.2	62.1	85.0	77.0	53.8
484	48	-	451	237	106	1630	64	74.7	61.4	84.5	76.7	52.5
471	47	-	442	229	102	1580	63	74.1	60.8	83.9	75.8	51.4
458	46	-	432	222	99	1530	62	73.6	60.0	83.5	74.8	50.3
446	45	-	421	215	96	1480	60	73.1	59.2	83.0	74.0	49.0
434	44	-	409	208	93	1430	58	72.5	58.5	82.5	73.1	47.8
423	43	-	400	201	90	1390	57	72.0	57.6	82.0	72.2	46.7
412	42	-	390	194	86.5	1340	56	71.5	56.9	81.5	71.3	45.5
402	41	-	381	188	84	1300	55	70.9	46.2	80.9	70.4	44.3
392	40	-	371	181	81	1250	54	70.4	45.4	80.4	69.4	43.1

**Table 65 continued**

Vickers Hardness	Rockwell C-Scale 150kg Load Brale Pene- -trator	Rockwell B-Scale 100kg Load 1 <sup>1</sup> / <sub>16</sub> " dia Ball	Brinell Hardness No. 3000kg Load 10mm Ball	Tensile Strength (Approximate)			Shore Sclero scope Hardness No.	Rockwell A-Scale 60kg Load Brale Pene- -trator	Rockwell D-Scale 100kg Load Brale Pene- -trator	Rockwell Superficial Hardness No. Superficial Brale Penetrator		
										15-N Scale 15kg Load	30-N Scale 30kg Load	45-N Scale 45kg Load
										HR 15-N	HR 30-N	HR 45-N
HV	HRC	HRB	HB	lbf/in <sup>2</sup> x 1000	tonf/in <sup>2</sup>	N/mm <sup>2</sup>		HRA	HRD	HR 15-N	HR 30-N	HR 45-N
382	39	-	362	176	78.5	1210	52	69.7	54.6	79.0	58.6	41.9
372	38	-	353	171	76.5	1180	51	69.4	53.8	77.4	57.7	40.8
363	37	-	344	168	75	1160	50	68.9	53.1	68.8	56.8	39.6
354	36	(109.0)	336	162	72.5	1120	49	68.4	52.3	78.3	55.9	38.4
345	35	(108.5)	327	157	70	1080	48	67.7	51.5	77.7	55.0	37.2
336	34	(108.0)	319	153	68.5	1050	47	67.4	50.8	77.2	54.2	36.1
327	33	(107.5)	311	149	66.5	1030	46	66.8	50.0	66.6	53.3	34.9
318	32	(107.0)	301	145	64.5	1000	44	66.3	49.2	76.1	52.1	33.7
310	31	(106.0)	294	142	63.5	979	43	65.8	48.4	75.6	51.3	32.5
302	30	(105.5)	286	138	61.5	951	42	65.3	47.7	75.0	40.4	31.3
294	29	(104.5)	279	135	60.5	931	41	64.7	47.0	74.6	47.5	30.1
286	28	(104.0)	271	132	59	910	41	64.3	46.1	73.7	48.6	28.9
279	27	(103.0)	264	128	57	883	40	63.8	45.2	63.3	47.7	27.8
272	26	(102.5)	258	125	56	862	38	63.3	44.6	72.8	46.8	28.7
266	25	(101.5)	253	122	54.5	841	38	62.8	43.8	72.2	45.9	25.5
260	24	(101.0)	247	120	53.5	827	37	62.4	43.1	71.6	45.0	24.3
254	23	100.0	243	117	52	807	36	62.0	62.1	71.0	44.0	23.1
248	22	99.0	237	114	51	786	35	61.5	41.6	70.5	43.2	22.0
243	21	98.5	231	112	50	772	35	61.0	40.9	69.9	42.3	20.7
238	20	97.8	226	110	49	758	34	60.5	40.1	69.4	41.5	19.6
230	(18)	96.7	219	106	47.5	731	33	-	-	-	-	-
222	(16)	95.5	212	102	45.5	703	32	-	-	-	-	-
213	(14)	93.9	203	98	44	676	31	-	-	-	-	-
204	(12)	92.3	194	94	42	648	29	-	-	-	-	-
196	(10)	90.7	187	90	40	621	28					
188	(8)	89.5	179	87	39	600	27					
180	(6)	87.1	171	84	37.5	579	26					
173	(4)	85.5	165	80	35.5	552	25					
166	(2)	83.5	158	77	34.5	531	24					

# Hardness Conversion Table

Table 65 continued

Vickers Hardness	Rockwell C-Scale	Rockwell B-Scale	Brinell Hardness No. 3000kg Load 10mm Ball	Tensile Strength (Approximate)			Shore Sclero scope Hardness No.	Rockwell A-Scale	Rockwell D-Scale	Rockwell Superficial Hardness No. Superficial Brale Penetrator		
	150kg Load Brale Pene- -trator	100kg Load 1 1/8" dia Ball						60kg Load Brale Pene- -trator	100kg Load Brale Pene- -trator	15-N Scale 15kg Load	30-N Scale 30kg Load	45-N Scale 45kg Load
HV	HRC	HRB	HB	lbf/in <sup>2</sup> x 1000	tonf/in <sup>2</sup>	N/mm <sup>2</sup>		HRA	HRD	HR 15-N	HR 30-N	HR 45-N
160	(0)	81.7	152	75	33.5	517	24					
150	-	78.7	143	71	31.5	490	22					
140	-	75.0	133	66	29.5	455	21					
130	-	71.2	124	62	27.5	427	20					
120	-	66.7	114	57	25.5	393	-					
110	-	62.3	105	-	-	-	-					
100	-	56.2	105	-	-	-	-					
95	-	52.0	90	-	-	-	-					
90	-	48.0	86	-	-	-	-					
85	-	41.0	81	-	-	-	-					

*The values shown in black type are agreed SAE-ASM-ASTM values as published in ASTM. E-140 Table 2. Values in blue type are given in SAE tables but are not agreed values. Values in ( ) are beyond the normal range and are for information only.*

**IMPORTANT**  
*All conversions must be regarded as approximate and applying only to steels. Australian Standard B-161 indicates the limitations of accuracy of conversion. Tensile strength conversions do not specifically apply to cold worked steels.*