



## CONVERSION CHART

### HARDENED STEEL AND HARD ALLOYS

Rockwell <sup>®</sup>	Superficial			Vickers	Knoop	Brinell	Tensile Strength	Microficial					
	C	A	D						15-N	30-N	45-N	HV	HK
150 kg Braille	60 kg	100 kg	150 kg	15 kg Braille	30 kg	45 kg	10 kg	500 gm	3000 kg	1000 lbs	1000 gm		
80	92.0	86.5	96.5	95.0	92.0	87.0	1865	100	100	100			
79	91.0	85.5	95.5	94.0	91.0	86.5	1787						
78	90.0	84.5	94.5	93.0	90.0	85.5	1710						
77	89.0	83.5	93.5	92.0	89.0	84.5	1633						
76	88.0	82.5	92.5	91.0	88.0	83.5	1556						
75	87.0	81.5	91.5	90.0	87.0	82.5	1478						
74	86.0	80.5	90.5	89.0	86.0	81.5	1400						
73	85.0	79.5	89.5	88.0	85.0	80.5	1323						
72	84.0	78.5	88.5	87.0	84.0	79.5	1245						
71	83.0	77.5	87.5	86.0	83.0	78.5	1169						
70	82.0	76.5	86.5	85.0	82.0	77.5	1094						
69	81.0	75.5	85.5	84.0	81.0	76.5	1019						
68	80.0	74.5	84.5	83.0	80.0	75.5	944						
67	79.0	73.5	83.5	82.0	79.0	74.5	868						
66	78.0	72.5	82.5	81.0	78.0	73.5	793						
65	77.0	71.5	81.5	80.0	77.0	72.5	717						
64	76.0	70.5	80.5	79.0	76.0	71.5	642						
63	75.0	69.5	79.5	78.0	75.0	70.5	566						
62	74.0	68.5	78.5	77.0	74.0	69.5	491						
61	73.0	67.5	77.5	76.0	73.0	68.5	415						
60	72.0	66.5	76.5	75.0	72.0	67.5	340						
59	71.0	65.5	75.5	74.0	71.0	66.5	264						
58	70.0	64.5	74.5	73.0	70.0	65.5	189						
57	69.0	63.5	73.5	72.0	69.0	64.5	113						
56	68.0	62.5	72.5	71.0	68.0	63.5	37						
55	67.0	61.5	71.5	70.0	67.0	62.5							
54	66.0	60.5	70.5	69.0	66.0	61.5							
53	65.0	59.5	69.5	68.0	65.0	60.5							
52	64.0	58.5	68.5	67.0	64.0	59.5							
51	63.0	57.5	67.5	66.0	63.0	58.5							
50	62.0	56.5	66.5	65.0	62.0	57.5							
49	61.0	55.5	65.5	64.0	61.0	56.5							
48	60.0	54.5	64.5	63.0	60.0	55.5							
47	59.0	53.5	63.5	62.0	59.0	54.5							
46	58.0	52.5	62.5	61.0	58.0	53.5							
45	57.0	51.5	61.5	60.0	57.0	52.5							
44	56.0	50.5	60.5	59.0	56.0	51.5							
43	55.0	49.5	59.5	58.0	55.0	50.5							
42	54.0	48.5	58.5	57.0	54.0	49.5							
41	53.0	47.5	57.5	56.0	53.0	48.5							
40	52.0	46.5	56.5	55.0	52.0	47.5							
39	51.0	45.5	55.5	54.0	51.0	46.5							
38	50.0	44.5	54.5	53.0	50.0	45.5							
37	49.0	43.5	53.5	52.0	49.0	44.5							
36	48.0	42.5	52.5	51.0	48.0	43.5							
35	47.0	41.5	51.5	50.0	47.0	42.5							
34	46.0	40.5	50.5	49.0	46.0	41.5							
33	45.0	39.5	49.5	48.0	45.0	40.5							
32	44.0	38.5	48.5	47.0	44.0	39.5							
31	43.0	37.5	47.5	46.0	43.0	38.5							
30	42.0	36.5	46.5	45.0	42.0	37.5							
29	41.0	35.5	45.5	44.0	41.0	36.5							
28	40.0	34.5	44.5	43.0	40.0	35.5							
27	39.0	33.5	43.5	42.0	39.0	34.5							
26	38.0	32.5	42.5	41.0	38.0	33.5							
25	37.0	31.5	41.5	40.0	37.0	32.5							
24	36.0	30.5	40.5	39.0	36.0	31.5							
23	35.0	29.5	39.5	38.0	35.0	30.5							
22	34.0	28.5	38.5	37.0	34.0	29.5							
21	33.0	27.5	37.5	36.0	33.0	28.5							
20	32.0	26.5	36.5	35.0	32.0	27.5							

Note 1: A 10 mm steel ball was used for 450 HBN and below. A 10 mm carbide ball was used above 450 HBN.  
 Note 2: The tensile strength relation to hardness is inexact, even for steel, unless it is determined for a specific material.

### HARDNESS VS MINIMUM THICKNESS CHART 55

Any greater thickness and hardness can be safely tested on indicated scale	Rockwell Superficial Hardness Scales			Rockwell Regular Hardness Scales		
	15N	30N	45N	A	D	C
Thickness (mm)	N Brale Indenter			Brale Indenter		
.006 (0.15)	92	-	-	-	-	-
.008 (0.20)	-	-	-	-	-	-
.010 (0.25)	88	-	-	-	-	-
.012 (0.30)	82	77	-	-	-	-
.014 (0.36)	76	78.5	74	-	-	-
.016 (0.41)	68	74	72	86	-	-
.018 (0.46)	X	66	68	84	-	-
.020 (0.51)	X	57	68	82	77	-
.022 (0.56)	X	47	58	79	75	69
.024 (0.61)	X	X	51	76	72	67
.026 (0.66)	X	X	37	71	68	65
.028 (0.71)	X	X	20	67	63	62
.030 (0.76)	X	X	X	60	58	57
.032 (0.81)	X	X	X	52	51	52
.034 (0.86)	X	X	X	X	43	45
.036 (0.91)	X	X	X	X	X	37
.038 (0.96)	X	X	X	X	X	28
.040 (1.02)	X	X	X	X	X	20
.010 (0.25)	91	-	-	-	-	-
.012 (0.30)	86	-	-	-	-	-
.014 (0.36)	81	80	-	-	-	-
.016 (0.41)	75	72	71	-	-	-
.018 (0.46)	68	64	62	-	-	-
.020 (0.51)	X	55	53	-	-	-
.022 (0.56)	X	X	45	-	-	-
.024 (0.61)	X	34	31	98	94	94
.026 (0.66)	X	X	18	91	87	87
.028 (0.71)	X	X	4	85	80	76
.030 (0.76)	X	X	X	77	71	68
.032 (0.81)	X	X	X	69	62	59
.034 (0.86)	X	X	X	X	52	50
.036 (0.91)	X	X	X	X	40	42
.038 (0.96)	X	X	X	X	28	31
.040 (1.02)	X	X	X	X	22	22

X = No minimum hardness. These are approximate numbers only.

### CYLINDRICAL CORRECTION CHART 53

Cylindrical work corrections to be added to observed Rockwell number for scales indicated

Scales C, D, A	Brake Diamond Indenter										
	Diameter of Specimen - inches (mm)										
	Observed Reading	1/8 (3.2)	1/4 (6.4)	3/8 (9.6)	1/2 (12.8)	5/8 (16)	3/4 (19.2)	7/8 (22.4)	1 (25.4)	1-1/4 (31.8)	1-1/2 (38.1)
90	NA	0.5	0	0	0	0	0	0	0	0	0
85	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
75	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0	0	0
65	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5
60	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.5	0.5	0.5
55	2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.0	1.0	1.0
50	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.5	1.5	1.5
45	3.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0
40	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5
35	4.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5
30	5.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0
25	5.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	3.5	3.5
20	6.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.0	4.0	4.0

Scales B, F, G	1/16 in Ball Indenter										
	Diameter of Specimen - inches (mm)										
	Observed Reading	1/8 (3.2)	1/4 (6.4)	3/8 (9.6)	1/2 (12.8)	5/8 (16)	3/4 (19.2)	7/8 (22.4)	1 (25.4)	1-1/4 (31.8)	1-1/2 (38.1)
100	NA	3.5	2.5	1.5	1.0	1.0	1.0	1.0	NA	NA	NA
90	4.0	3.0	2.0	1.5	1.5	1.5	1.5	1.5			
80	5.0	3.5	2.5	2.0	2.0	2.0	2.0	2.0			
70	6.0	4.0	3.0</								