

TABLE 5. APPROXIMATE CONVERSION OF HARDNESS VALUES—continued

Vickers or Firth diamond hardness No. (V.P.N.)	Brinell * 3000 kg load, 10 mm ball	Rockwell hardness No.			Scleroscope hardness No.	Approx. tensile strength (tons/in ²)
		C scale 150 kg load diamond cone	A scale 60 kg load diamond cone	Superficial 30-N 30 kg load diamond cone		
220	215	—	60	—	31	47.5
210	205	—	59	—	—	45.5
200	195	—	58	—	30	44.0
190	185	—	57	—	—	42.0
180	175	—	56	—	27	40.0
170	165	—	54	—	26	38.0
160	155	—	53	—	24	36.0
150	145	—	52	—	—	33.5
140	135	—	50	—	21	31.5
130	125	—	48	—	—	29.0
120	115	—	46	—	—	27.5
110	105	—	45	—	—	25.5
100	95	—	43	—	—	23.0

* Brinell figures higher than 480 are determined with a carbide ball.

TABLE 6. APPROXIMATE CONVERSION OF HARDNESS VALUES
ALUMINIUM AND ITS ALLOYS

V.P.N. 10kg	Brinell *	Rockwell superficial			V.P.N. 10kg	Brinell *	Rockwell superficial		
		15T	30T	45T			15T	30T	45T
20	19.4	2.3	—	—	110	102.2	82.2	60.2	—
22	21.3	11.1	—	—	112	104.1	82.5	60.9	—
24	23.1	18.1	—	—	114	105.9	82.8	61.7	—
26	25.0	24.4	—	—	116	107.8	83.1	62.4	—
28	26.8	29.5	—	—	118	109.6	83.4	63.1	—
30	28.6	34.0	—	—	120	111.4	83.7	63.8	39.0
32	30.5	38.2	—	—	122	113.3	84.0	64.4	40.2
34	32.3	41.7	—	—	124	115.1	84.3	65.0	41.2
36	34.2	45.0	—	—	126	117.0	84.5	65.7	42.3
38	36.0	47.7	—	—	128	118.8	84.8	66.2	43.3
40	37.8	50.3	—	—	130	120.6	85.0	66.8	44.3
42	39.7	52.7	—	—	132	122.5	85.3	67.4	45.2
44	41.5	54.8	—	—	134	124.3	85.5	67.9	46.2
46	43.4	56.6	1.1	—	136	126.2	85.7	68.5	47.1
48	45.2	58.6	5.2	—	138	128.0	85.9	69.0	47.9
50	47.0	60.2	9.0	—	140	129.8	86.2	69.4	48.8
52	48.9	61.8	12.6	—	142	131.7	86.4	69.9	49.6
54	50.7	63.2	15.9	—	144	133.5	86.6	70.4	50.4
56	52.6	64.5	19.1	—	146	135.4	86.8	70.9	51.2
58	54.4	65.7	21.9	—	148	137.2	86.9	71.3	51.9
60	56.2	66.9	24.5	—	150	139.0	87.1	71.7	52.6
62	58.1	68.0	27.1	—	152	140.9	87.3	72.1	53.3
64	59.9	69.0	29.4	—	154	142.7	87.5	72.5	54.0
66	61.8	69.9	31.7	—	156	144.6	87.6	72.9	54.7
68	63.6	70.8	33.7	—	158	146.4	87.8	73.3	55.4
70	65.4	71.6	35.6	—	160	148.2	88.0	73.7	56.0
72	67.3	72.5	37.6	—	162	150.1	88.1	74.1	56.7
74	69.1	73.2	39.3	—	164	151.9	88.3	74.4	57.3
76	71.0	74.0	41.0	—	166	153.8	88.4	74.8	57.9
78	72.8	74.6	42.5	—	168	155.6	88.6	75.1	58.4
80	74.6	75.3	44.1	—	170	157.4	88.7	75.5	59.0
82	76.5	75.9	45.5	—	172	159.3	88.8	75.8	59.6
84	78.3	76.5	46.9	—	174	161.1	89.0	76.1	60.1
86	80.2	77.0	48.2	—	176	163.0	89.2	76.4	60.7
88	82.0	77.6	49.4	—	178	164.8	89.3	76.7	61.2
90	83.8	78.1	50.6	—	180	166.6	89.4	77.0	61.7
92	85.7	78.6	51.8	—	182	168.5	89.5	77.3	62.2
94	87.5	79.0	52.8	—	184	170.3	89.7	77.6	62.7
96	89.4	79.5	54.0	—	186	172.2	89.8	77.9	63.1
98	91.2	79.9	54.9	—	188	174.0	89.9	78.1	63.6
100	93.0	80.3	55.9	—	190	175.8	90.0	78.4	64.0
102	94.9	80.7	56.8	—	192	177.7	90.1	78.7	64.5
104	96.7	81.1	57.7	—	194	179.5	90.2	78.9	65.0
106	98.6	81.5	58.6	—	196	181.4	90.3	79.2	65.4
108	100.4	81.8	59.4	—	198	183.2	90.4	79.4	65.8
					200	185.0	90.6	79.7	66.2

* The ratio $\frac{\text{Load}}{(\text{Dia. of ball})^2}$ for the Brinell tests was 5 for Brinell hardnesses from 20-60 and 10 for hardnesses above 60

HARDNESS CONVERSION TABLES

TABLE 5 only applies to steel of uniform chemical composition and uniform heat treatment, and is not recommended for nonferrous metals or for case hardened steels.

TABLE 5. APPROXIMATE CONVERSION OF HARDNESS VALUES
STEELS

Vickers or Firth diamond hardness No. (V.P.N.)	Brinell * 3000 kg load, 10 mm ball	Rockwell hardness No.			Scleroscope hardness No.	Approx. tensile strength (tons/in ²)
		C scale 150 kg load diamond cone	A scale 60 kg load diamond cone	Superficial 30-N 30 kg load diamond cone		
940	—	68.0	85.6	84.4	97	—
920	—	67.5	85.3	84.0	96	—
900	—	67.0	85.0	83.6	95	—
880	—	66.4	84.7	83.1	93	—
860	—	65.9	84.4	82.7	92	—
840	745	65.3	84.1	82.2	91	—
820	733	64.7	83.8	81.7	90	—
800	722	64.0	83.4	81.1	88	—
780	710	63.3	83.0	80.4	87	—
760	698	62.5	82.6	79.7	86	—
740	684	61.8	82.2	79.1	84	—
720	670	61.0	81.8	78.4	83	—
700	656	60.1	81.3	77.6	81	—
690	647	59.7	81.1	77.2	—	—
680	638	59.2	80.8	76.8	80	147
670	630	58.8	80.6	76.4	—	145
660	620	58.3	80.3	75.9	79	142
650	611	57.8	80.0	75.5	—	140
640	601	57.3	79.8	75.1	77	138
630	591	56.8	79.5	74.6	—	136
620	582	56.3	79.2	74.2	75	133
610	573	55.7	78.9	73.6	—	131
600	564	55.2	78.6	73.2	74	129
590	554	54.7	78.4	72.7	—	127
580	545	54.1	78.0	72.1	72	125
570	535	53.6	77.8	71.7	—	122
560	525	53.0	77.4	71.2	71	120
550	517	52.3	77.0	70.5	—	118
540	507	51.7	76.7	70.0	69	116
530	497	51.1	76.4	69.5	—	113
520	487	50.5	76.1	69.0	67	112
510	479	49.8	75.7	68.3	—	109
500	471	49.1	75.3	67.7	66	107
490	460	48.4	74.9	67.1	—	104
480	452	47.7	74.5	66.4	64	103
470	441	46.9	74.1	65.7	—	100
460	433	46.1	73.6	64.9	62	98.0
450	425	45.3	73.3	64.3	—	95.5
440	415	44.5	72.8	63.5	59	93.5
430	405	43.6	72.3	62.7	—	91.0
420	397	42.7	71.8	61.9	57	89.0
410	388	41.8	71.4	61.1	—	87.0
400	379	40.8	70.8	60.2	55	85.0
390	369	39.8	70.3	59.3	—	82.5
380	360	38.8	69.8	58.4	52	80.5
370	353	37.7	69.2	57.4	—	78.0
360	345	36.6	68.7	56.4	50	76.0
350	335	35.5	68.1	55.4	—	74.0
340	328	34.4	67.6	54.4	47	72.0
330	320	33.3	67.0	53.3	—	69.5
320	311	32.2	66.4	52.3	45	67.5
310	303	31.0	65.8	51.3	—	65.0
300	295	29.8	65.2	50.2	42	63.0
290	285	28.5	64.5	49.0	41	60.5
280	275	27.1	63.8	47.8	40	58.5
270	265	25.6	63.1	46.4	38	57.0
260	255	24.0	62.4	45.0	37	55.0
250	245	22.2	61.6	43.4	36	53.0
240	235	20.3	60.7	41.7	34	51.0
230	225	—	60	—	33	49.5

* Brinell figures higher than 480 are determined with a carbide ball.

METALS

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M.C., D.Sc., F.I.M.

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