



United Service Company Inc



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C	A	D	15-N	30-N	45-N	Vickers	Knoop	Brinell
68	85.6	76.9	93.2	84.4	75.4	940	920	-
67	85.0	76.1	92.9	83.6	74.2	900	895	-
66	84.5	75.4	92.5	82.8	73.3	865	870	-
65	83.9	74.5	92.2	81.9	72.0	832	846	(739)
64	83.4	73.8	91.8	81.1	71.0	800	822	(722)
63	82.8	73.0	91.4	80.1	69.9	772	799	(705)
62	82.3	72.2	91.1	79.3	68.8	746	776	(688)
61	81.8	71.5	90.7	78.4	67.7	720	754	(670)
60	81.2	70.7	90.2	77.5	66.6	697	732	(654)
59	80.7	69.9	89.8	76.6	65.5	674	710	(634)
58	80.1	69.2	89.3	75.7	64.3	653	690	615
57	79.6	68.5	88.9	74.8	63.2	633	670	595
56	79.0	67.7	88.3	73.9	62.0	613	650	577
55	78.5	66.9	87.9	73.0	60.9	595	630	560
54	78.0	66.1	87.4	72.0	59.8	577	612	543
53	77.4	65.4	86.9	71.2	58.6	560	594	525
52	76.8	64.6	86.4	70.2	57.4	544	576	512
51	76.3	63.8	85.9	69.4	56.1	528	558	496
50	75.9	63.1	85.5	68.5	55.0	513	543	481
49	75.2	62.1	85.0	67.6	53.8	498	526	469
48	74.7	61.4	84.5	66.7	52.5	484	510	455
47	74.1	60.8	83.9	65.8	51.4	471	495	443
46	73.6	60.0	83.5	64.8	50.3	458	480	432
45	73.1	59.2	83.0	64.0	49.0	446	466	421
44	72.5	58.5	82.5	63.1	47.8	434	452	409
43	72.0	57.7	82.0	62.2	46.7	423	438	400
42	71.5	56.9	81.5	61.3	45.5	412	426	390
41	70.9	56.2	80.9	60.4	44.3	402	414	381
40	70.4	55.4	80.4	59.5	43.1	392	402	371
39	69.9	54.6	79.9	58.6	41.9	382	391	362
38	69.4	53.8	79.4	57.7	40.8	372	380	353
37	68.9	53.1	78.8	56.8	39.6	363	370	344
36	68.4	52.3	78.3	55.9	38.4	354	360	366
35	67.9	51.5	77.7	55.0	37.2	345	351	327

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B	A	F	15T	30T	45T	Vickers	Knoop	Brinell
100	61.5	-	93.1	83.1	72.9	240	251	240
99	60.9	-	92.8	82.5	71.9	234	246	234
98	60.2	-	92.5	81.8	70.9	228	241	228
97	59.5	-	92.1	81.1	69.9	222	236	222
96	58.9	-	91.8	80.4	68.9	216	231	216
95	58.3	-	91.5	79.8	67.9	210	226	210
94	57.6	-	91.2	79.1	66.9	205	221	205
93	57.0	-	90.8	78.4	65.9	200	216	200
92	56.4	-	90.5	77.8	64.8	195	211	195
91	55.8	-	90.2	77.1	63.8	190	206	190
90	55.2	-	89.9	76.4	62.8	185	201	185
89	54.6	-	89.5	75.8	61.8	180	196	180
88	54.0	-	89.2	75.1	60.8	176	192	176
87	53.4	-	88.9	74.4	59.8	172	188	172
86	52.8	-	88.6	73.8	58.8	169	184	169
85	52.3	-	88.2	73.1	57.8	165	180	165
84	51.7	-	87.9	72.4	56.8	162	176	162
83	51.1	-	87.6	71.8	55.8	159	173	159
82	50.6	-	87.3	71.1	54.8	156	170	156
81	50.0	-	86.9	70.4	53.8	153	167	153
80	49.5	-	86.6	69.7	52.8	150	164	150
79	48.9	-	86.3	69.1	51.8	147	161	147
78	48.4	-	86.0	68.4	50.8	144	158	144
77	47.9	-	85.6	67.7	49.8	141	155	141
76	47.3	-	85.3	67.1	48.8	139	152	139
75	46.8	99.6	85.0	66.4	47.8	137	150	137
74	46.3	99.1	84.7	65.7	46.8	135	147	135
73	45.8	98.5	84.3	65.1	45.8	132	145	132
72	45.3	98.0	84.0	64.4	44.8	130	143	130
71	44.8	97.4	83.7	63.7	43.8	127	141	127
70	44.3	96.8	83.4	63.1	42.8	125	139	125
69	43.8	96.5	83.0	62.4	41.8	123	137	123
68	43.3	95.6	82.7	61.7	40.8	121	135	121
67	42.8	95.1	82.4	61.0	39.8	119	133	119

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This chart available for download at www.unitedservice.us

C	A	D	15-N	30-N	45-N	Vickers	Knoop	Brinell
34	67.4	50.8	77.2	54.2	36.1	336	342	319
33	66.8	50.0	76.6	53.3	34.9	327	334	311
32	66.3	49.2	76.1	52.1	33.7	318	326	301
31	65.8	48.4	75.6	51.3	32.5	310	318	294
30	65.3	47.7	75.0	50.4	31.3	302	311	286
29	64.8	47.0	74.5	49.5	30.1	294	304	279
28	64.3	46.1	73.9	48.6	29.0	286	297	271
27	63.8	45.2	73.3	47.7	27.8	279	290	264
26	63.3	44.6	72.8	46.8	26.7	272	284	258
25	62.8	43.8	72.2	45.9	25.5	266	278	253
24	62.4	43.1	71.6	45.0	24.3	260	272	247
23	62.0	42.1	71.0	44.0	23.1	254	266	243
22	61.5	41.6	70.5	43.2	22.0	248	261	237
21	61.0	40.9	69.9	42.3	20.7	243	256	231
20	60.5	40.1	69.4	41.5	19.6	238	251	226

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B	A	F	15T	30T	45T	Vickers	Knoop	Brinell
66	42.3	94.5	82.1	60.4	38.7	117	131	117
65	41.8	93.9	81.8	59.7	37.7	116	129	116
64	41.4	93.4	81.4	59.0	36.7	114	127	114
63	40.9	92.8	81.1	58.4	35.7	112	125	112
62	40.4	92.2	80.8	57.7	34.7	110	124	110
61	40.0	91.7	80.5	57.0	33.7	108	122	108
60	39.5	91.1	80.1	56.4	32.7	107	120	107
59	39.0	90.5	79.8	55.7	31.7	106	118	106
58	38.6	90.0	79.5	55.0	30.7	104	117	104
57	38.1	89.4	79.2	54.4	29.7	103	115	103
56	37.7	88.8	77.9	53.7	28.7	101	114	101
55	37.2	88.2	78.5	53.0	27.7	100	112	100
54	36.8	87.7	78.2	52.4	26.7	-	111	-
53	36.3	87.1	77.9	51.7	25.7	-	110	-
52	35.9	86.5	77.5	51.0	24.7	-	109	-
51	35.5	86.0	77.2	50.3	23.7	-	108	-
50	35.0	85.4	76.9	49.7	22.7	-	107	-
49	34.6	84.8	76.6	49.0	21.7	-	106	-
48	34.1	84.3	76.2	48.3	20.7	-	105	-
47	33.7	83.7	75.9	47.7	19.7	-	104	-
46	33.3	83.1	75.6	47.0	18.7	-	103	-
45	32.9	82.6	75.3	46.3	17.7	-	102	-
44	32.4	82.0	74.9	45.7	16.7	-	101	-
43	32.0	81.4	74.6	45.0	15.7	-	100	-
42	31.6	80.8	74.3	44.3	14.7	-	99	-
41	31.2	80.3	74.0	43.7	13.6	-	98	-
40	30.7	79.7	73.6	43.0	12.6	-	97	-
39	30.3	79.1	73.3	42.3	11.6	-	96	-
38	29.9	78.6	73.0	41.6	10.6	-	95	-
37	29.5	78.0	72.7	41.0	9.6	-	94	-
36	29.1	77.4	72.3	40.3	8.6	-	93	-
35	28.7	76.9	72.0	39.6	7.6	-	92	-
34	28.2	76.3	71.7	39.0	6.6	-	91	-
33	27.8	75.7	71.4	38.3	5.6	-	90	-
32	27.4	75.2	71.0	37.6	4.6	-	89	-
31	27.0	74.6	70.7	37.0	3.6	-	88	-
30	26.6	74.0	70.4	36.3	2.6	-	87	-

Minimum Thickness Requirements										
Specimen		Standard			Superficial					
Inches	Millimeters	C	A	B	15N	30N	45N	15T	30T	45T
0.006	0.15	-	-	-	92	-	-	-	-	-
0.008	0.20	-	-	-	90	-	-	-	-	-
0.010	0.25	-	-	-	88	-	-	91	-	-
0.012	0.30	-	-	-	83	82	77	86	-	-
0.014	0.36	-	-	-	76	78.5	74	81	80	-
0.016	0.41	-	86	-	68	74	72	75	72	71
0.018	0.46	-	84	-	66	68	68	64	62	63
0.020	0.51	-	82	-	57	63	-	55	53	52
0.022	0.56	69	79	-	47	58	-	45	43	43
0.024	0.61	67	76	94	-	-	51	-	34	31
0.026	0.66	65	71	87	-	-	37	-	-	18
0.028	0.71	62	67	80	-	-	20	-	-	4
0.030	0.76	57	60	71	-	-	-	-	-	-
0.032	0.81	52	-	62	-	-	-	-	-	-
0.034	0.86	45	-	52	-	-	-	-	-	-
0.036	0.91	37	-	40	-	-	-	-	-	-
0.038	0.96	28	-	28	-	-	-	-	-	-
0.040	1.02	20	-	-	-	-	-	-	-	-



Round Correction for 15T, 30T, and 45T Scales							
Hardness Value	1/8 in. 3.2 mm	1/4 in. 6.4 mm	3/8 in. 10 mm	1/2 in. 13 mm	5/8 in. 16 mm	3/4 in. 19 mm	1 in. 25 mm
20	13.0	9.0	6.0	4.5	4.5	3.0	2.0
30	11.5	7.5	5.0	3.5	3.5	2.5	2.0
40	10.0	6.5	4.5	3.5	3.0	2.5	2.0
50	8.5	5.5	4.0	3.0	2.5	2.0	1.5
60	6.5	4.5	3.0	2.5	2.0	1.5	1.5
70	5.0	3.5	2.5	2.0	1.5	1.0	1.0
80	3.0	2.0	1.5	1.5	1.0	1.0	0.5
90	1.5	1.0	1.0	0.5	0.5	0.5	0.5



Round Correction for C, A and D Scales									
Hardness Value	1/4 in. 6.4 mm	3/8 in. 10 mm	1/2 in. 13 mm	5/8 in. 16 mm	3/4 in. 19 mm	7/8 in. 22 mm	1 in. 25 mm	1-1/4 in. 32 mm	1-1/2 in. 38 mm
20	6.0	4.5	3.5	2.5	2.0	1.5	1.5	1.0	1.0
25	5.5	4.0	3.0	2.5	2.0	1.5	1.0	1.0	1.0
30	5.0	3.5	2.5	2.0	1.5	1.5	1.0	1.0	0.5
35	4.0	3.0	2.0	1.5	1.5	1.0	1.0	0.5	0.5
40	3.5	2.5	2.0	1.5	1.0	1.0	1.0	0.5	0.5
45	3.0	2.0	1.5	1.0	1.0	1.0	0.5	0.5	0.5
50	2.5	2.0	1.5	1.0	1.0	0.5	0.5	0.5	0.5
55	2.0	1.5	1.0	1.0	0.5	0.5	0.5	0.5	0.0
60	1.5	1.0	1.0	0.5	0.5	0.5	0.5	0.0	0.0
65	1.5	1.0	1.0	0.5	0.5	0.5	0.5	0.0	0.0
70	1.0	1.0	0.5	0.5	0.5	0.5	0.5	0.0	0.0
75	1.0	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0
80	0.5	0.5	0.5	0.5	0.5	0.0	0.0	0.0	0.0
85	0.5	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0
90	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Round Correction for B, F and G Scales							
Hardness Value	1/4 in. 6.4 mm	3/8 in. 10 mm	1/2 in. 13 mm	5/8 in. 16 mm	3/4 in. 19 mm	7/8 in. 22 mm	1 in. 25 mm
0	12.5	8.5	6.5	5.5	4.5	3.5	3.0
10	12.0	8.0	6.0	5.0	4.0	3.5	3.0
20	11.0	7.5	5.5	4.5	4.0	3.5	3.0
30	10.0	6.5	5.0	4.5	3.5	3.0	2.5
40	9.0	6.0	4.5	4.0	3.0	2.5	2.5
50	8.0	5.5	4.0	3.5	3.0	2.5	2.0
60	4.0	5.0	3.5	3.0	2.5	2.0	2.0
70	6.0	4.0	3.0	2.5	2.0	2.0	1.5
80	5.0	3.5	2.5	2.0	1.5	1.5	1.5
90	4.0	3.0	2.0	1.5	1.5	1.5	1.0
100	3.5	2.5	1.5	1.5	1.0	1.0	0.5

Round Correction for 15N, 30N, and 45N Scales						
Hardness Value	1/8 in. 3.2 mm	1/4 in. 6.4 mm	3/8 in. 10 mm	1/2 in. 13 mm	3/4 in. 19 mm	1 in. 25 mm
20	6.0	3.0	2.0	1.5	1.5	1.5
25	5.5	3.0	2.0	1.5	1.5	1.0
30	5.5	3.0	2.0	1.5	1.0	1.0
35	5.0	2.5	2.0	1.5	1.0	1.0
40	4.5	2.5	1.5	1.5	1.0	1.0
45	4.0	2.0	1.5	1.0	1.0	1.0
50	3.5	2.0	1.5	1.0	1.0	0.5
55	3.5	2.0	1.5	1.0	0.5	0.5
60	3.0	1.5	1.0	1.0	0.5	0.5
65	2.5	1.5	1.0	0.5	0.5	0.5
70	2.0	1.0	1.0	0.5	0.5	0.5
75	1.5	1.0	0.5	0.5	0.5	0.0
80	1.0	0.5	0.5	0.5	0.0	0.0
85	0.5	0.5	0.5	0.5	0.0	0.0
90	0.0	0.0	0.0	0.0	0.0	0.0