

TECHNICAL DEPARTMENT (Aircraft)

REPORT No. GEN/TD/32

SHEET No. 1 of 4

AIRCRAFT:

PREPARED BY

DATE

E. Kosko

July 1952

CHECKED BY

DATE

HARDNESS CONVERSION TABLE

For Carbon and Constructional Alloy Steels

Reference: U.S. Federal Specification QQ-M-151a, Amd. 3.
"Metals; General Specification for Inspection of"

NOTE: The relationship between hardness and tensile strength is shown for information only. The inclusion of this relationship shall not be considered authority to substitute hardness tests for tension tests in the inspection or acceptance of material.

Rockwell Hardness		Vickers diamond pyramid hardness ¹	Brinell Hardness ²		Tensile strength, 1,000 pounds per square inch
C - 150 kg load diamond	B - 100 kg load 1/16 ball		Tungsten carbide ball	Steel ball	
67		918	820		
66		884	796		
65		852	774		
64		822	753		
63		793	732		
62		765	711		
61		740	693		
60		717	675		
59		694	657		
58		672	639		
57		650	621		
56		630	604		
55		611	588		
54		592	571		
53		573	554		283
52		556	538		273
51		539	523	500	264
50		523	508	488	256
49		508	494	476	246
48		493	479	464	237

continued on sht. 2

5560

AC.2000.14.4

TECHNICAL DEPARTMENT (Aircraft)

REPORT NO. GEN/TD/32

SHEET NO. 2 of 4

AIRCRAFT:

PREPARED BY

DATE

E. Kosko

July 1952

CHECKED BY

DATE

Rockwell Hardness		Vickers diamond pyramid hardness ¹	Brinell Hardness ²		Tensile strength, 1,000 pounds per square inch
C - 150 kg load diamond	B - 100 kg load 1/16 ball		Tungsten carbide ball	Steel Bal	
47		479	465	453	231
46		465	452	442	221
45		452	440	430	215
44		440	427	419	208
43		428	415	408	201
42		417	405	398	194
41		406	394	387	188
40		396	385	377	181
39		386	375	367	176
38		376	365	357	170
37		367	356	347	165
36		357	346	337	160
35		348	337	327	155
34		339	329	318	150
33		330	319	309	147
32		321	310	301	142
31		312	302	294	139
30		304	293	286	136
29		296	286	279	132
28		288	278	272	129
27		281	271	265	126
26		274	264	259	123
25		267	258	253	120
24		261	252	247	118
23		255	246	241	115
22	100.2	250	241	235	112
21	99.5	245	236	230	110
20	98.9	240	231	225	107
19 ³	98.1	235	226	220	104

1 Vickers hardness values obtained with following loads:

	Kilograms
918 to 171, inclusive	50
167 to 95, inclusive	30
91 to 62, inclusive	10

Continued on sht. 3

TECHNICAL DEPARTMENT (Aircraft)

REPORT No. GEN/TD/32

SHEET No. 3 of 4

AIRCRAFT:

PREPARED BY

DATE

E. Kosko

July 1952

CHECKED BY

DATE

2 Brinell hardness values obtained with 3,000 kg load except tungsten 159 to 86, inclusive, obtained with 1,500 kg load and from 83 to 54, inclusive, with 500 kg. load.

3 Rockwell C values below 20 are not recommended for correlation; however, these values are sufficiently accurate to indicate the trend of relationship.

Rockwell Hardness		Vickers diamond pyramid hardness ¹	Brinell Hardness ²		Tensile strength, 1,000 pounds per square inch
C - 150 kg load diamond	B - 100 kg load 1/16 ball		Tungsten carbide ball	Steel Bal	
18	97.5	231	222	215	103
17	96.9	227	218	210	102
16	96.2	223	214	206	100
15	95.5	219	210	201	99
14	94.9	215	206	197	97
13	94.1	211	202	193	95
12	93.4	207	199	190	93
11	92.6	203	195	186	91
10	91.8	199	191	183	90
9	91.2	196	187	180	89
8	90.3	192	184	177	88
7	89.7	189	180	174	87
6	89	186	177	171	85
5	88.3	183	174	168	84
4	87.5	179	171	165	83
3	87	177	169	162	82
2	86	173	165	160	81
1	85.5	171	163	158	80
0	84.5	167	159	154	78
	83.2	162	153	150	76
	82	157	148	145	74
	80.5	153	144	140	72
	79	149	140	136	70
	77.5	143	134	131	68
	76	139	130	127	66
	74	135	126	122	64

Continued on sht. 4

TECHNICAL DEPARTMENT (Aircraft)

REPORT No. GEN/TD/32

SHEET No. 4 of 4

AIRCRAFT:

PREPARED BY

DATE

E. Kosko

July 1952

CHECKED BY

DATE

Rockwell Hardness		Vickers diamond pyramid hardness ¹	Brinell Hardness ²		Tensile strength, 1,000 pounds per square inch
C - 150 kg load diamond	B - 100 kg load 1/16 ball		Tungsten carbide ball	Steel Bal	
	72	129	120	117	62
	70	125	116	113	60
	68	120	111	108	58
	66	116	107	104	56
	64	112	104	100	54
	61	108	100	96	52
	58	104	95	92	50
	55	99	91	87	48
	51	95	86	83	46
	47	91	83	79	44
	44	88	80	76	42
	39	84	76	72	40
	35	80	72	68	38
	30	76	67	64	36
	24	72	64	60	34
	20	69	61	57	32
	11	65	57	53	30
	0	62	54	50	28

1 Vickers hardness values obtained with following loads:

	Kilograms
918 to 171, inclusive	50
167 to 95, inclusive	30
91 to 62, inclusive	10

2 Brinell hardness values obtained with 3,000 kg. load except tungsten carbide ball values 159 to 86, inclusive, obtained with 1,500 kg. load and from 83 to 54, inclusive, with 500 kg. load.