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Tensile Strength and Hardness Conversions for Steels

Brinell Dia. of Impression mm.	Brinell Hardness Number HB	Vickers Hardness Number HV	Rockwell C Scale Hardness No. HRC	Equiv. Rm tonf/in ²	Equiv. Rm kgf/mm ²	Equiv. Rm N/mm ² Mpa
-	-	832	65	-	-	-
-	-	800	64	-	-	-
-	-	772	63	-	-	-
-	-	746	62	-	-	-
-	-	720	61	-	-	-
-	-	697	60	-	-	-
-	-	674	59	-	-	-
-	-	653	58	-	-	-
2.50	(601)	633	57	(140)	-	-
2.55	(578)	615	56	(129)	-	-
2.60	(555)	591	54.5	(126)	-	-
2.65	(534)	569	53.5	(120)	-	-
2.70	(514)	547	52	(117)	-	-
2.75	(495)	528	51	(114)	-	-
2.80	(477)	508	49.5	(105)	-	-
2.85	(461)	491	48.5	101	160	1569
2.90	444	474	47	98	155	1520
2.95	429	455	45.5	95	150	1471
3.00	415	440	44.5	92	145	1422
3.05	401	425	43	88	139	1363
3.10	388	410	42	85	134	1314
3.15	375	396	40.5	82	129	1265
3.20	363	383	39	80	126	1236
3.25	352	372	38	77	121	1187
3.30	341	360	36.5	75	118	1157
3.35	331	350	35.5	73	114	1118
3.40	321	339	34.5	71	111	1089
3.45	311	328	33	68	107	1049
3.50	302	319	32	66	104	1020
3.55	293	309	31	64	101	990
3.60	285	301	30	63	99	971
3.65	277	292	29	61	96	941
3.70	269	284	27.5	59	93	912
3.75	262	276	26.5	58	91	892
3.80	255	269	25.5	56	89	873
3.85	248	261	24	55	87	853
3.90	241	253	23	53	84	824
3.95	235	247	22	51	81	794
4.00	229	241	20.5	50	79	775
4.05	223	235	(20)	49	77	755
4.10	217	228	(19)	48	76	745
4.15	212	223	(18)	46	73	716
4.20	207	218	(17)	45	71	696
4.30	197	208	(14)	43	68	667
4.40	187	197	(12)	41	65	637
4.50	179	189	(10)	39	62	608
4.60	170	179	-	36	57	559
4.70	163	172	-	35	55	539
4.80	156	165	-	34	54	530
4.90	149	157	-	32	51	500
5.00	143	150	-	31	49	481
5.10	137	144	-	31	49	481
5.20	131	138	-	30	47	461
5.30	126	133	-	29	46	451
5.40	121	127	-	28	44	431
5.50	116	122	-	27	43	422
5.60	111	117	-	26	41	402
5.70	107	113	-	25	39	382
5.80	103	108	-	24	38	373

The Brinell figures in brackets (over 450) require a Tungsten Carbide ball (BS240 - 1986).
 HB to HV and HV to HRC conversions are based on A.S.T.M.E. 140.
 Rockwell C. scale and tonf/in² figures in brackets - are for guidance only.

Ref	TENSILE STRENGTH RANGES					
	Tonf/in ²		N/mm ²		HBN	
	min	max	min	max	min	max
P	35	45	550	700	163	207
Q	40	50	625	775	187	229
R	45	55	700	850	207	248
S	50	60	774	925	229	277
T	55	65	850	1000	248	302
U	60	70	925	1075	277	321
V	65	75	1000	1150	302	341
W	70	80	1075	1225	321	363
X	75	85	1150	1300	341	388
Y	80	90	1225	1375	363	401
Z	100		1550		461	

FASTENER TENSILE RANGES		
Based on ISO 898-1 (1999)		
Class	Min Strength	Brinell Hardness
3.6 ²	= 300 N/mm	90 - 209
4.6	= 400	114 - 209
4.8	= 420	124 - 209
5.6	= 500	147 - 209
5.8	= 520	152 - 209
6.8	= 600	181 - 238
8.8 <16 mm	= 800	238 - 304
8.8 >16 mm	= 830	242 - 318
9.8	= 900	276 - 342
10.9	= 1040	304 - 361
12.9	= 1220	366 - 414

NOTE: The Brinell Hardness numbers are approximations to the tensile figures