

## 铜合金硬度与强度换算 (GB 3771—83)

附 5-1 铜合金硬度与强度换算表(GB 3771—83)

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRB	HRC	HR 15T	HR 30T	HR 45T	板材 $\sigma_b$	棒材 $\sigma_b$	板 材		棒 材			
							$\sigma_b$	$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
90.0	90.5	53.7	87.1	77.2	50.8	26.7								
91.0	91.5	53.9	87.2	77.3	51.0	26.9								
92.0	92.6	54.2	87.4	77.4	51.2	27.2								
93.0	93.6	54.5	87.6	77.5	51.4	27.6								
94.0	94.7	54.8	87.7	77.6	51.6	27.7								
95.0	95.7	55.1	87.9	77.7	51.8	28.1								
96.0	96.8	55.5	88.1	77.8	52.0	28.4								
97.0	97.8	55.8	88.3	77.9	52.3	28.8								
98.0	98.9	56.2	88.5	78.0	52.5	29.1								
99.0	99.9	56.6	88.8	78.2	52.9	29.6								
100.0	101.0	57.1	89.1	78.3	53.2	30.1								
101.0	102.0	57.5	89.3	78.5	53.5	30.5								
102.0	103.1	58.0	89.6	78.6	53.8	31.0								
103.0	104.1	58.5	89.9	78.8	54.2	31.5								
104.0	105.1	58.9	90.1	78.9	54.5	31.9								
105.0	106.2	59.4	90.4	79.1	54.8	32.4								
106.0	107.2	60.0	90.7	79.2	55.1	32.9								
107.0	108.3	60.5	91.0	79.4	55.5	33.4								
108.0	109.3	61.0	91.3	79.6	55.8	33.9								
109.0	110.4	61.5	91.6	79.7	56.2	34.4								
110.0	111.4	62.1	91.9	79.9	56.5	35.0	372	384						
111.0	112.5	62.6	92.2	80.1	56.9	35.5	374	387						
112.0	113.5	63.2	92.6	80.3	57.4	36.2	375	389						
113.0	114.6	63.7	92.8	80.4	57.6	36.5	377	392						
114.0	115.6	64.3	93.2	80.6	58.1	37.2	379	395						

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRB	HRF	HR 15T	HR 30T	HR 45T	板材 $\sigma_b$	棒材 $\sigma_b$	板 材			棒 材		
									$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
115.0	116.7	64.9	93.5	80.8	58.4	37.7	380	398						
116.0	117.7	65.4	93.8	81.0	58.8	38.2	382	400						
117.0	118.8	66.0	94.2	81.2	59.3	38.9	384	403						
118.0	119.8	66.6	94.5	81.4	59.6	39.4	386	406						
119.0	120.9	67.1	94.8	81.5	60.0	40.0	388	409						
120.0	121.9	67.7	95.1	81.7	60.3	40.5	390	412						
121.0	122.9	68.2	95.4	81.9	60.7	41.0	392	414						
122.0	124.0	68.8	95.8	82.1	61.2	41.7	394	417						
123.0	125.0	69.4	96.1	82.3	61.5	42.2	396	420						
124.0	126.1	69.9	96.4	82.5	61.9	42.7	399	423						
125.0	127.1	70.5	96.7	82.6	62.2	43.2	401	426						
126.0	128.2	71.0	97.0	82.8	62.6	43.7	404	429						
127.0	129.2	71.5	97.3	83.0	63.0	44.3	406	431						
128.0	130.3	72.1	97.7	83.2	63.4	44.9	409	434						
129.0	131.3	72.6	97.9	83.3	63.7	45.3	411	437						
130.0	132.4	73.1	98.2	83.5	64.0	45.8	417	440						
131.0	133.4	73.6	98.5	83.6	64.4	46.3	417	443						
132.0	134.5	74.1	98.8	83.8	64.7	46.8	420	447						
133.0	135.5	74.7	99.2	84.0	65.2	47.5	423	450						
134.0	136.6	75.1	99.4	84.1	65.5	47.9	426	453						
135.0	137.6	75.6	99.7	84.3	65.8	48.4	429	456						
136.0	138.6	76.1	100.0	84.5	66.2	48.9	431	459						
137.0	139.7	76.6	100.2	84.6	66.4	49.2	434	463						
138.0	140.7	77.0	100.5	84.8	66.8	49.8	437	466						
139.0	141.8	77.5	100.8	84.9	67.1	50.3	440	469						
140.0	142.8	77.9	101.0	85.0	67.4	50.6	444	472						
141.0	143.9	78.4	101.3	85.2	67.7	51.1	447	476						
142.0	144.9	78.8	101.5	85.3	67.9	51.5	451	479						
143.0	146.0	79.2	101.7	85.4	68.2	51.8	454	482						
144.0	147.0	79.7	102.0	85.6	68.5	52.4	458	485						

续附5-1

		硬 度					抗 拉 性 能 /MPa							
布氏 HB 30D	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRB	HRC	HR	HR	HR	板材	棒材	板 材			棒 材		
				15T	30T	45T	$\sigma_b$	$\sigma_s$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
145.0	148.1	80.1	102.2	85.7	68.8	52.7	461	488						
146.0	149.1	80.5	102.5	85.8	69.1	53.2	465	492						
147.0	150.2	80.8	102.6	85.9	69.3	53.4	469	495						
148.0	151.2	81.2	102.9	86.1	69.6	53.9	473	499						
149.0	152.3	81.6	103.1	86.2	69.8	54.2	477	502						
150.0	153.3	82.0	103.3	86.3	70.1	54.6	480	506						
151.0	154.3	82.3	103.5	86.4	70.3	54.9	483	509						
152.0	155.4	82.7	103.7	86.6	70.6	55.3	488	513						
153.0	156.4	83.0	103.9	86.7	70.8	55.6	492	516						
154.0	157.5	83.3	104.1	86.8	71.0	56.0	496	520						
155.0	158.5	83.7	104.3	86.9	71.3	56.3	500	524						
156.0	159.6	84.0	104.5	87.0	71.5	56.6	504	527						
157.0	160.6	84.3	104.7	87.1	71.7	57.0	509	530						
158.0	161.7	84.6	104.8	87.2	71.9	57.2	513	534						
159.0	162.7	84.9	105.0	87.3	72.1	57.5	518	537						
160.0	163.8	85.2	105.2	87.4	72.3	57.9	522	541						
161.0	164.8	85.5	105.3	87.5	72.5	58.0	527	545						
162.0	165.9	85.8	105.5	87.6	72.7	58.4	531	549						
163.0	166.9	86.0	105.6	87.6	72.8	58.5	535	553						
164.0	168.0	86.3	105.8	87.7	73.1	58.9	540	556						
165.0	169.0	86.6	106.0	87.9	73.3	59.2	545	560						
166.0	170.1	86.8	106.1	87.9	73.4	59.4	550	564						
167.0	171.1	87.1	106.3	88.0	73.7	59.7	555	568						
168.0	172.1	87.4	106.4	88.1	73.8	59.9	560	572						
169.0	173.2	87.6	106.5	88.1	73.9	60.1	565	576						
170.0	174.2	87.9	106.7	88.2	74.1	60.4	570	580	545	467	326	649	367	285
171.0	175.3	88.1	106.8	88.3	74.2	60.6	575	583	548	470	329	652	371	288
172.0	176.3	88.4	107.0	88.4	74.5	61.0	580	587	551	473	330	654	375	291
173.0	177.4	88.6	107.1	88.5	74.6	61.1	585	591	555	477	333	657	379	294
174.0	178.4	88.8	107.2	88.5	74.7	61.3	590	595	558	480	335	660	382	297

续附 5-1

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRB	HRF	HR -15T	HR 30T	HR 45T	板材	棒材	板 材			棒 材		
							$\sigma_b$	$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
175.0	179.5	89.1	107.4	88.6	75.0	61.6	596	599	561	483	337	662	386	300
176.0	180.5	89.3	107.5	88.7	75.1	61.8	601	603	565	486	340	665	390	303
177.0	181.6	89.6	107.7	88.8	75.3	62.2	607	607	568	489	342	668	394	306
178.0	182.6	89.8	107.8	88.9	75.4	62.3	612	612	571	493	345	670	398	308
179.0	183.7	90.0	107.9	88.9	75.6	62.5	618	616	575	496	347	673	402	311
180.0	184.7	90.3	108.1	89.0	75.8	62.8	624	620	578	499	349	676	406	314
181.0	185.8	90.5	108.2	89.1	75.9	63.0	630	624	581	503	352	678	410	317
182.0	186.8	90.8	108.4	89.2	76.1	63.4	635	628	584	506	354	681	414	320
183.0	187.8	91.0	108.5	89.3	76.3	63.5	640	633	587	510	357	684	418	323
184.0	188.9	91.3	108.7	89.4	76.5	63.9	646	636	591	513	359	686	422	326
185.0	189.9	91.5	108.8	89.4	76.6	64.1	653	640	594	516	361	688	426	329
186.0	191.0	91.8	109.0	89.5	76.9	64.4	659	645	597	520	364	691	430	330
187.0	192.0	92.0	109.1	89.6	77.0	64.6	665	649	601	523	366	694	433	333
188.0	193.1	92.3	109.2	89.7	77.1	64.7	671	653	604	527	389	697	437	336
189.0	194.1	92.5	109.4	89.8	77.3	65.1	677	658	608	530	371	700	441	339
190.0	195.2	92.8	109.5	89.8	77.5	65.3	684	662	611	533	373	703	445	342
191.0	196.2	93.1	109.7	89.9	77.7	65.6	689	667	614	536	376	705	449	345
192.0	197.3	93.3	109.8	90.0	77.8	65.8	696	671	618	539	378	708	453	348
193.0	198.3	93.6	110.0	90.1	78.0	66.1	702	676	621	542	380	711	457	351
194.0	199.4	93.9	110.2	90.2	78.3	66.5	709	680	625	546	382	714	461	353
195.0	200.4	94.2	110.3	90.3	78.4	66.6	715	685	628	549	384	717	465	356
196.0	201.5	94.4	110.4	90.3	78.5	66.8	722	688	631	553	387	720	469	359
197.0	202.5	94.7	110.6	90.4	78.8	67.2	729	693	634	556	389	723	473	362
198.0	203.5	95.0	110.8	90.6	79.0	67.5	735	698	637	559	392	726	477	365
199.0	204.6	95.3	111.0	90.7	79.2	67.8	742	702	641	563	394	729	481	368
200.0	205.6	95.6	111.1	90.7	79.4	68.0	749	707	644	566	396	732	484	371
201.0	206.7	95.9	111.3	90.8	79.6	68.4			648	570	399	735	488	374
202.0	207.7	96.2	111.5	90.9	79.8	68.7			651	573	401	737	492	376
203.0	208.8	96.5	111.7	91.1	80.1	69.0			654	576	404	740	496	378
204.0	209.8	96.8	111.8	91.2	80.2	69.2			658	580	406	743	500	381

续附5-1

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRB	HRE	HR 15T	HR 30T	HR 45T	板材 $\sigma_b$	棒材 $\sigma_b$	板 材		棒 材			
							$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	
205.0	210.9	97.2	112.1	91.3	80.5	69.7			661	583	408	746	504	384
206.0	211.9	97.5	112.2	91.4	80.7	69.9			665	586	411	749	508	387
207.0	212.9	97.8	112.4	91.5	80.9	70.2			668	589	413	752	512	390
208.0	214.0	98.1	112.6	91.6	81.1	70.6			672	592	416	755	516	393
209.0	215.0	98.4	112.7	91.7	81.3	70.8			675	596	418	758	520	396
210.0	216.1	98.8	113.0	91.8	81.6	71.3			679	599	420	761	524	398

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRC	HRA	HR 15N	HR 30N	HR 45N	板材 $\sigma_b$	棒材 $\sigma_b$	板 材		棒 材			
							$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	
211.0	217.2	17.8	59.1	67.8	38.7	17.1			682	602	423	764	528	401
212.0	218.2	18.0	59.2	67.9	38.9	17.3			685	606	425	767	532	404
213.0	219.3	18.2	59.3	68.0	39.0	17.6			688	609	428	770	535	407
214.0	220.3	18.4	59.4	68.2	39.2	17.8			692	613	430	774	539	410
215.0	221.3	18.6	59.5	68.3	39.4	18.0			695	616	431	777	543	413
216.0	222.4	18.8	59.6	68.4	39.6	18.3			699	619	434	780	547	416
217.0	223.4	18.9	59.7	68.4	39.7	18.4			702	623	436	783	551	419
218.0	224.5	19.1	59.8	68.5	39.9	18.6			706	626	438	786	555	421
219.0	225.5	19.3	59.9	68.7	40.1	18.9			709	630	441	788	559	424
220.0	226.6	19.5	60.0	68.8	40.3	19.1			713	633	443	792	563	427
221.0	227.6	19.7	60.1	68.9	40.5	19.3			716	635	446	795	567	430
222.0	228.7	19.9	60.2	69.0	40.7	19.6			720	639	448	798	571	432
223.0	229.7	20.0	60.2	69.1	40.8	19.7			723	642	450	801	575	435
224.0	230.8	20.2	60.3	69.2	40.9	19.9			727	645	453	804	579	438
225.0	231.8	20.4	60.4	69.3	41.1	20.1			730	649	455	808	583	441
226.0	232.9	20.6	60.5	69.4	41.3	20.4			734	652	458	811	586	443
227.0	233.9	20.8	60.6	69.5	41.5	20.6			736	656	460	814	590	446
228.0	235.0	20.9	60.7	69.6	41.6	20.7			740	659	462	817	594	449
229.0	236.0	21.1	60.8	69.7	41.8	21.0			743	662	465	821	597	452



硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRC	HRA	HR 15N	HR 30N	HR 45N	板材 $\sigma_b$	棒材 $\sigma_b$	板 材			棒 材		
							$\sigma_b$	$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
230.0	237.0	21.3	60.9	69.8	42.0	21.2			747	666	467	824	601	455
231.0	238.1	21.5	61.0	69.9	42.2	21.4			750	669	470	827	605	458
232.0	239.1	21.7	61.1	70.0	42.4	21.6			754	673	472	831	609	461
233.0	240.2	21.8	61.2	70.1	42.5	21.8			757	676	474	834	613	464
234.0	241.2	22.0	61.3	70.2	42.6	22.0			761	679	477	837	617	466
235.0	242.3	22.2	61.4	70.3	42.8	22.2			764	683	479	840	621	469
236.0	243.3	22.4	61.5	70.4	43.0	22.5			768	685	482	843	625	472
237.0	244.4	22.5	61.5	70.5	43.1	22.6			772	689	483	846	629	475
238.0	245.4	22.7	61.6	70.6	43.3	22.8			775	692	485	850	633	478
239.0	246.5	22.9	61.7	70.7	43.5	23.0			779	695	488	853	636	481
240.0	247.5	23.0	61.8	70.8	43.6	23.2			782	699	490	857	640	483
241.0	248.6	23.2	61.9	70.9	43.8	23.4			786	702	493	860	644	486
242.0	249.6	23.4	62.0	71.0	44.0	23.7			788	705	495	863	648	488
243.0	250.7	23.6	62.1	71.1	44.2	23.9			792	709	497	867	652	491
244.0	251.7	23.7	62.1	71.1	44.3	24.0			796	712	500	870	656	494
245.0	252.7	23.9	62.2	71.2	44.4	24.2			799	716	502	874	660	497
246.0	253.8	24.1	62.3	71.3	44.6	24.4			803	719	505	877	664	500
247.0	254.8	24.2	62.4	71.4	44.7	24.6			806	722	507	881	668	503
248.0	255.9	24.4	62.5	71.5	44.9	24.8			810	726	509	884	672	506
249.0	256.9	24.6	62.6	71.6	45.1	25.0			814	729	512	888	676	509
250.0	258.0	24.7	62.6	71.7	45.2	25.1			817	733	514	890	680	510
251.0	259.0	24.9	62.7	71.8	45.4	25.4			821	735	517	894	684	514
252.0	260.1	25.1	62.8	71.9	45.6	25.6			824	738	519	897	687	517
253.0	261.1	25.2	62.9	72.0	45.7	25.7			828	742	521	901	691	520
254.0	262.2	25.4	63.0	72.1	45.9	26.0			832	745	524	904	695	523
255.0	263.2	25.6	63.1	72.2	46.1	26.2			836	748	526	908	699	526
256.0	264.3	25.7	63.1	72.3	46.2	26.3			838	752	529	911	703	529
257.0	265.3	25.9	63.2	72.4	46.3	26.5			842	755	531	915	707	532
258.0	266.4	26.0	63.3	72.4	46.4	26.7			845	759	533	918	711	533
259.0	267.4	26.2	63.4	72.5	46.6	26.9			849	762	535	922	715	536

续附 5-1

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRC	HRA	HR 15N	HR 30N	HR 45N	板材 $\sigma_b$	棒材 $\sigma_b$	板 材		棒 材			
							$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	
260.0	268.5	26.4	63.5	72.6	46.8	27.1			852	765	537	925	719	539
261.0	269.5	26.5	63.5	72.7	46.9	27.2			856	769	540	929	723	542
262.0	270.5	26.7	63.6	72.8	47.1	27.4			860	772	542	933	727	545
263.0	271.6	26.8	63.7	72.9	47.2	27.6			863	776	544	936	731	548
264.0	272.6	27.0	63.8	73.0	47.4	27.8			867	779	547	939	735	551
265.0	273.7	27.2	63.9	73.1	47.6	28.0			871	782	549	942	738	554
266.0	274.4	27.3	74.0	73.2	47.7	28.2			874	786	551	946	742	556
267.0	275.8	27.5	64.1	73.3	47.9	28.4			878	788	554	950	746	559
268.0	276.8	27.6	64.1	73.3	48.0	28.6			882	792	556	953	750	562
269.0	277.9	27.8	64.2	73.4	48.1	28.8			885	795	559	957	754	565
270.0	278.9	27.9	64.3	73.5	48.2	28.9			888	798	561	961	758	568
271.0	280.0	28.1	64.4	73.6	48.4	29.1			892	802	563	964	762	571
272.0	281.0	28.2	64.4	73.7	48.5	29.2			895	805	566	968	766	574
273.0	282.1	28.4	64.5	73.8	48.7	29.4			899	808	568	972	770	577
274.0	283.1	28.6	64.6	73.9	48.9	29.6			903	812	571	975	774	580
275.0	284.2	28.7	64.7	74.0	49.0	29.8			907	815	573	979	778	582
276.0	285.2	28.9	64.8	74.1	49.2	30.0			910	819	575	983	782	584
277.0	286.2	29.0	64.8	74.1	49.3	30.1			914	822	578	986	786	587
278.0	287.3	29.2	64.9	74.2	49.5	30.3			918	825	580	989	789	590
279.0	288.3	29.3	65.0	74.3	49.6	30.5			921	829	583	993	793	593
280.0	289.4	29.5	65.1	74.4	49.8	30.7			925	832	584	997	797	596
281.0	290.4	29.6	65.1	74.5	49.9	30.9			929	836	586	1000	801	599
282.0	291.5	29.8	65.2	74.6	50.0	31.1			932	838	589	1004	805	602
283.0	292.5	29.9	65.3	74.6	50.1	31.2			936	841	591	1008	809	604
284.0	293.6	30.1	65.4	74.7	50.3	31.4			939	845	594	1012	813	607
285.0	294.6	30.2	65.4	74.8	50.4	31.6			943	848	596	1015	817	610
286.0	295.7	30.4	65.5	74.9	50.6	31.8			946	851	598	1019	821	613
287.0	296.7	30.5	65.6	75.0	50.7	31.9			950	855	601	1023	825	616
288.0	297.8	30.7	65.7	75.1	50.9	32.1			954	858	603	1027	829	619
289.0	298.8	30.8	65.7	75.1	51.0	32.3			958	862	606	1030	832	622

续附 5-1

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRC	HRA	HR 15N	HR 30N	HR 45N	板材	棒材	板 材			棒 材		
							$\sigma_b$	$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
290.0	299.9	31.0	65.8	75.2	51.2	32.5			961	865	608	1034	836	625
291.0	300.9	31.1	65.9	75.3	51.3	32.6			965	868	610	1038	839	627
292.0	301.9	31.2	65.9	75.4	51.4	32.7			969	872	613	1041	843	630
293.0	303.0	31.4	66.0	75.5	51.6	32.9			973	875	615	1045	847	633
294.0	304.0	31.5	66.1	75.5	51.7	33.1			976	879	618	1049	851	635
295.0	305.1	31.7	66.2	75.6	51.8	33.3			980	882	620	1052	855	638
296.0	306.1	31.8	66.2	75.7	51.9	33.4			984	885	622	1056	859	642
297.0	307.2	32.0	66.3	75.8	52.1	33.6			988	888	625	1060	863	644
298.0	308.2	32.1	66.4	75.9	52.2	33.8			990	891	627	1064	867	647
299.0	309.3	32.3	66.5	76.0	52.4	34.0			994	895	630	1068	871	649
300.0	310.3	32.4	66.5	76.0	52.5	34.1			998	898	632	1072	875	652
301.0	311.4	32.5	66.6	76.1	52.6	34.2			1002	901	634	1075	879	657
302.0	312.4	32.7	66.7	76.2	52.8	34.4			1006	905	636	1079	883	658
303.0	313.5	32.8	66.8	76.3	52.9	34.6			1009	908	638	1083	887	661
304.0	314.5	33.0	66.9	76.4	53.1	34.8			1013	911	641	1087	890	664
305.0	315.6	33.1	66.9	76.4	53.2	34.9			1017	915	643	1090	894	667
306.0	316.6	33.2	67.0	76.5	53.3	35.0			1021	918	645	1094	898	670
307.0	317.7	33.4	67.1	76.6	53.5	35.2			1025	921	648	1098	902	672
308.0	318.7	33.5	67.1	76.7	53.6	35.4			1028	925	650	1102	906	675
309.0	319.7	33.7	67.2	76.8	53.7	35.6			1032	928	653	1105	910	678
310.0	320.8	33.8	67.3	76.8	53.8	35.7			1036	932	655	1109	914	681
311.0	321.8	33.9	67.3	76.9	53.9	35.9			1040	935	657	1113	918	684
312.0	322.9	34.1	67.4	77.0	54.1	36.1			1043	938	660	1117	922	686
313.0	323.9	34.2	67.5	77.0	54.2	36.2			1046	941	662	1121	926	689
314.0	325.0	34.3	67.5	77.1	54.3	36.3			1050	944	664	1125	930	692
315.0	326.0	34.5	67.6	77.2	54.5	36.5			1054	948	666	1129	934	694
316.0	327.1	34.6	67.7	77.3	54.6	36.7			1058	951	669	1133	938	697
317.0	328.1	34.8	67.8	77.4	54.8	36.9			1062	955	672	1137	941	700
318.0	329.2	34.9	67.8	77.4	54.9	37.0			1066	958	674	1140	945	703
319.0	330.2	35.0	67.9	77.5	55.0	37.2			1069	961	676	1144	949	706



续附5-1

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRC	HRA	HR 15N	HR 30N	HR 45N	板材 $\sigma_b$	棒材 $\sigma_b$	板 材		棒 材			
							$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	
320.0	331.3	35.2	68.0	77.6	55.2	37.4			1072	965	679	1148	953	709
321.0	332.3	35.3	68.0	77.6	55.3	37.5			1077	968	681	1152	957	712
322.0	333.4	35.4	68.1	77.7	55.4	37.6			1081	971	684	1156	961	715
323.0	334.4	35.6	68.2	77.8	55.5	37.8			1085	974	685	1160	965	717
324.0	335.4	35.7	68.2	77.9	55.6	38.0			1089	978	687	1164	969	720
325.0	336.5	35.8	68.3	78.0	55.7	38.1			1092	982	690	1168	973	723
326.0	337.5	36.0	68.4	78.1	55.9	38.3			1095	985	692	1173	977	726
327.0	338.6	36.1	68.4	78.1	56.0	38.4			1099	988	695	1176	981	729
328.0	339.6	36.2	68.5	78.2	56.1	38.5			1103	992	697	1180	985	732
329.0	340.7	36.4	68.6	78.3	56.3	38.8			1107	994	699	1183	989	735
330.0	341.7	36.5	68.6	78.3	56.4	38.9			1111	998	702	1187	992	737
331.0	342.8	36.6	68.7	78.4	56.5	39.0			1115	1001	704	1191	996	739
332.0	343.8	36.7	68.7	78.5	56.6	39.1			1119	1004	707	1194	1000	742
333.0	344.9	36.9	68.8	78.6	56.8	39.4			1123	1008	709	1199	1004	745
334.0	345.9	37.0	68.9	78.6	56.9	39.5			1127	1011	711	1203	1008	748
335.0	347.0	37.1	68.9	78.7	57.0	39.6			1130	1014	714	1207	1012	751
336.0	348.0	37.3	69.0	78.8	57.1	39.8			1134	1018	716	1211	1016	754
337.0	349.1	37.4	69.1	78.8	57.2	39.9			1138	1021	719	1215	1020	757
338.0	350.1	37.5	69.1	78.9	57.3	40.1			1141	1025	721	1219	1024	760
339.0	351.1	37.7	69.2	79.0	57.5	40.3			1145	1028	723	1223	1028	762
340.0	352.2	37.8	69.3	79.1	57.6	40.4			1149	1031	726	1227	1032	765
341.0	353.2	37.9	69.3	79.1	57.7	40.5			1153	1035	728	1231	1036	768
342.0	354.3	38.0	69.4	79.2	57.8	40.6			1157	1038	731	1235	1040	771
343.0	355.3	38.2	69.5	79.3	58.0	40.9			1161	1041	733	1239	1043	774
344.0	356.4	38.3	69.6	79.3	58.1	41.0			1165	1044	735	1243	1047	777
345.0	357.4	38.4	69.6	79.4	58.2	41.1			1169	1047	737	1246	1051	780
346.0	358.5	38.5	69.7	79.5	58.3	41.2			1173	1051	739	1250	1055	783
347.0	359.5	38.7	69.8	79.6	58.5	41.5			1177	1054	742	1254	1059	785
348.0	360.6	38.8	69.8	79.6	58.6	41.6			1181	1058	744	1258	1063	787
349.0	361.7	39.0	69.9	79.8	58.8	41.8			1184	1061	746	1262	1066	790

续附 5-1

硬 度							抗 拉 性 能 /MPa							
布氏	维氏	洛 氏		表面洛氏			黄 铜		铍 青 铜					
HB	HV	HRC	HRA	HR	HR	HR	板材	棒材	板 材			棒 材		
30D <sup>2</sup>				15N	30N	45N	$\sigma_b$	$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
350.0	362.7	39.0	69.9	709.8	58.8	41.8			1188	1064	749	1266	1070	793
351.0	363.7	39.2	70.0	79.9	58.9	42.0			1192	1068	751	1270	1074	796
352.0	364.8	39.3	70.1	79.9	59.0	42.2			1195	1071	754	1274	1078	799
353.0	365.8	39.4	70.1	80.0	59.1	42.3			1199	1074	756	1278	1082	802
354.0	366.9	39.5	70.2	80.1	59.2	42.4			1203	1078	758	1282	1086	805
355.0	367.9	39.8	70.3	80.2	59.5	42.7			1207	1081	761	1286	1090	807
356.0	368.9	39.9	70.4	80.2	59.6	42.9			1211	1085	763	1291	1093	810
357.0	370.0	40.0	70.4	80.3	59.7	43.0			1215	1088	766	1294	1097	813
358.0	371.0	40.2	70.5	80.4	59.9	43.2			1219	1090	768	1298	1101	816
359.0	372.1	40.3	70.6	80.5	60.0	43.3			1223	1094	770	1302	1105	819
360.0	373.1	40.4	70.6	80.5	60.1	43.4			1227	1097	773	1306	1109	822
361.0	374.2	40.5	70.7	80.6	60.2	43.5			1231	1101	775	1310	1113	825
362.0	375.2	40.6	70.7	80.7	60.3	43.7			1235	1104	777	1314	1117	828
363.0	376.3	40.8	70.8	80.8	60.5	43.9			1239	1107	780	1318	1121	830
364.0	377.3	40.9	70.9	80.8	60.6	44.0			1243	1111	782	1322	1125	833
365.0	378.4	41.0	70.9	80.9	60.7	44.1			1246	1114	785	1326	1129	836
366.0	379.4	41.1	71.0	80.9	60.8	44.2			1250	1117	786	1330	1133	838
367.0	380.5	41.2	71.0	81.0	60.8	44.4			1254	1121	788	1334	1137	841
368.0	381.5	41.3	71.1	81.0	60.9	44.5			1258	1124	791	1339	1141	844
369.0	382.6	41.4	71.1	81.1	61.0	44.6			1262	1128	793	1243	1144	847
370.0	383.6	41.5	71.2	81.1	61.1	44.7			1266	1131	796	1346	1148	850
371.0	384.6	41.6	71.2	81.2	61.2	44.8			1270	1134	798	1350	1152	852
372.0	385.7	41.7	71.3	81.3	61.3	44.9			1274	1138	800	1154	1156	855
373.0	386.7	41.9	71.4	81.4	61.5	45.2			1278	1141	803	1158	1160	858
374.0	387.8	42.0	71.4	81.4	61.6	45.3			1282	1144	805	1362	1164	861
375.0	388.8	42.1	71.5	81.5	61.7	45.4			1286	1147	808	1366	1168	864
376.0	389.9	42.2	71.5	81.5	61.9	45.5			1290	1150	810	1370	1172	867
377.0	390.9	42.3	71.6	81.6	62.0	45.6			1293	1154	812	1374	1176	870
378.0	392.0	42.4	71.6	81.7	62.0	45.8			1298	1157	815	1379	1180	872
379.0	393.0	42.6	71.7	81.8	62.2	46.0			1302	1161	817	1383	1184	875

续附 5-1

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRC	HRA	HR 15N	HR 30N	HR 45N	板材 $\sigma_b$	棒材 $\sigma_b$	板 材		棒 材			
							$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	
380.0	394.1	42.7	71.8	81.8	62.3	46.1			1306	1164	820	1387	1188	878
381.0	395.1	42.8	71.8	81.9	62.4	46.2			1310	1167	822	1391		
382.0	396.2	42.9	71.9	81.9	62.5	46.3			1314	1171	824	1395		
383.0	397.2	43.0	71.9	82.0	62.6	46.5			1318	1174	827	1398		
384.0	398.3	43.2	72.0	82.1	62.7	46.7			1322	1177	829	1402		
385.0	399.3	43.3	72.1	82.2	62.8	46.8			1326	1181	832	1406		
386.0	400.3	43.4	72.1	82.2	62.9	46.9			1330	1184	834	1410		
387.0	401.4	43.5	72.2	82.3	63.0	47.0			1334	1188	836	1415		
388.0	402.4	43.6	72.2	82.3	63.1	47.2			1338	1191	838	1419		
389.0	403.5	43.7	72.3	82.4	63.2	47.3			1342	1193	840	1423		
390.0	404.5	43.9	72.4	82.5	63.4	47.5			1345	1197	843	1427		
391.0	405.6	44.0	72.4	82.6	63.5	47.6			1349	1200	845	1431		
392.0	406.6	44.1	72.5	82.6	63.6	47.7			1354	1204	847	1435		
393.0	407.7	44.2	72.6	82.7	63.7	47.9			1358	1207	850	1439		
394.0	408.7	44.3	72.6	82.7	63.8	48.0			1362	1210	852	1443		
395.0	409.8	44.4	72.7	82.8	63.9	48.1			1366	1214	855	1446		
396.0	410.8	44.6	72.8	82.9	64.1	48.3			1370	1217	857	1451		
397.0	411.9	44.7	72.8	82.9	64.2	48.4			1374	1220	859	1455		
398.0	412.9	44.8	72.9	83.0	64.3	48.6			1378	1224	862	1459		
399.0	414.0	44.9	72.9	83.1	64.4	48.7			1382	1227	864	1463		
400.0	415.0	45.0	73.0	83.1	64.4	48.8			1386	1231	867	1467		
401.0	416.0	45.1	73.0	83.2	64.5	48.9			1391			1471		
402.0	417.1	45.3	73.1	83.3	64.7	49.1			1395			1475		
403.0	418.1	45.4	73.2	83.3	64.8	49.3			1398			1479		
404.0	419.2	45.5	73.2	83.4	64.9	49.4			1402			1483		
405.0	420.2	45.6	73.3	83.5	65.0	49.5			1406			1488		
406.0	421.3	45.7	73.3	83.5	65.1	49.6			1410			1492		
407.0	422.3	45.8	73.4	83.6	65.2	49.7			1414			1496		
408.0	423.4	45.9	73.4	83.6	65.3	49.8			1419			1499		
409.0	424.9	46.0	73.5	83.7	65.4	50.0			1423			1503		

续附 5-1

硬 度							抗 拉 性 能 /MPa							
布氏 HB 30D <sup>2</sup>	维氏 HV	洛 氏		表面洛氏			黄 铜		铍 青 铜					
		HRC	HRA	HR 15N	HR 30N	HR 45N	板 材	棒 材	板 材		棒 材			
							$\sigma_b$	$\sigma_b$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$	$\sigma_b$	$\sigma_{0.2}$	$\sigma_{0.01}$
410.0	425.5	46.2	73.6	83.8	65.6	50.2			1427			1507		
411.0	426.5	46.3	73.6	83.8	65.7	50.3			1431			1511		
412.0	427.6	46.4	73.7	83.9	65.8	50.4			1435			1515		
413.0	428.6	46.5	73.7	84.0	65.9	50.5			1439			1519		
414.0	429.7	46.6	73.8	84.0	66.0	50.7			1444			1523		
415.0	430.7	46.7	73.8	84.1	66.1	50.8			1447			1528		
416.0	431.8	46.8	73.9	84.1	66.2	50.9			1451			1532		
417.0	432.8	46.9	73.9	84.2	66.3	51.0			1455			1536		
418.0	433.8	47.0	74.0	84.3	66.4	51.1			1459			1540		
419.0	434.9	47.1	74.1	84.4	66.5	51.3			1464			1544		
420.0	435.9	47.3	74.1	84.4	66.6	51.5			1468			1547		

注：本表只适用于黄铜(H62、HPb59-1等)和铍青铜

## 附录 6 软钢及有色金属材料硬度对照表

附 6-1 软钢及有色金属材料硬度对照表

洛氏 硬度 HRB φ1.588 钢球	维氏 硬度 HV	努普硬 度 HK 4.903N	布氏硬度 HBS 29.42kN φ10 钢球	洛氏硬度 HR				表面洛氏硬度 HR			肖氏 硬度 HS	抗拉强 度 $\sigma_b$ /MPa
				F	G	E	K	15T	30T	45T		
				φ1.588 钢球	φ1.588 钢球	φ3.175 钢球	φ3.175 钢球	φ1.588 钢球	φ1.588 钢球	φ1.588 钢球		
100	240	251	240		82.5			93.1	83.1	72.9	36.0	820
99	234	246	234		81.0			92.8	82.5	71.9	35.0	800
98	228	241	228		79.0			92.5	81.8	70.9	34.2	776
97	222	236	222		77.5			92.1	81.1	69.9	33.4	756
96	216	231	216		76.0			91.8	80.4	68.9	32.5	733
95	210	226	210		74.0			91.5	79.8	67.9	31.7	710
94	205	221	205		72.5			91.2	79.1	66.9	31.0	696
93	200	216	200		71.0			90.8	78.4	65.9	30.2	677
92	195	211	195		69.0		100.0	90.5	77.8	64.8	29.5	660
91	190	206	190		67.5		99.5	90.2	77.1	63.8	28.8	644
90	185	201	185		66.0		98.5	89.9	76.4	62.8	28.2	630
89	180	196	180		64.0		98.0	89.5	75.8	61.8	27.6	614
88	176	192	176		62.5		97.0	89.2	75.1	60.8	27.0	600
87	172	188	172		61.0		96.5	88.9	74.4	59.8	26.4	588
86	169	184	169		59.0		95.5	88.6	73.8	58.8	25.9	575
85	165	180	165		57.5		94.5	88.2	73.1	57.8	25.4	564
84	162	176	162		56.0		94.0	87.9	72.4	56.8	24.8	562
83	159	173	159		54.0		93.0	87.6	71.8	55.8	24.4	531
82	156	170	156		52.5		92.0	87.3	71.1	54.8	23.9	520
81	153	167	153		51.0		91.0	86.0	70.4	53.8	23.4	510



续附 6-1

洛氏 硬度 HRB $\phi 1.588$ 钢球	维氏 硬度 HV	努普硬 度 HK 4.903N	布氏硬度 HBS 29.42kN $\phi 10$ 钢球	洛氏硬度 HR				表面洛氏硬度 HR			肖氏 硬度 HS	抗拉强 度 $\sigma_b$ /MPa
				F $\phi 1.588$ 钢球	G $\phi 1.588$ 钢球	E $\phi 3.175$ 钢球	K $\phi 3.175$ 钢球	15T $\phi 1.588$ 钢球	30T $\phi 1.588$ 钢球	45T $\phi 1.588$ 钢球		
80	150	164	150		49.0		90.5	86.6	69.7	52.8	23.0	500
79	147	161	147		47.5		89.5	86.3	69.1	51.8	22.6	490
78	144	158	144		46.0		88.5	86.0	68.4	50.8	22.2	481
77	141	155	141		44.0		88.0	85.6	67.7	49.8	21.8	472
76	139	152	139		42.5		87.0	85.3	67.1	48.8	21.4	462
75	137	150	137	99.6	41.0		86.0	85.0	66.4	47.8	21.0	454
74	135	147	135	99.1	39.0		85.0	84.7	65.7	46.8	20.8	445
73	132	145	132	98.5	37.5		84.5	84.3	65.1	45.8	20.5	437
72	130	143	130	98.0	36.0		83.5	84.0	64.4	44.8	20.3	429
71	127	141	127	97.4	34.5	100.0	82.5	83.7	63.7	43.8	20.0	422
70	125	139	125	96.8	32.5	99.5	81.5	83.4	63.1	42.8		415
69	123	137	123	96.2	31.0	99.0	81.0	83.0	62.4	41.8		408
68	121	135	121	95.6	29.5	98.0	80.0	82.7	61.7	40.8		400
67	119	133	119	95.1	28.0	97.5	79.0	82.4	61.0	39.8		
66	117	131	117	94.5	26.5	97.0	78.0	82.1	60.4	38.7		
65	116	129	116	93.9	25.0	96.0	77.5	81.8	59.7	37.7		
64	114	127	114	93.4	23.5	95.5	76.5	81.4	59.0	36.7		
63	112	125	112	92.8	22.0	95.0	75.5	81.1	58.4	35.7		
62	110	124	110	92.2	20.5	94.5	74.5	80.8	57.7	34.7		
61	108	122	108	91.7	19.0	93.5	74.0	80.5	57.0	33.7		
60	107	120	107	91.1	17.5	93.0	73.0	80.1	56.4	32.7		
59	106	118	106	90.5	16.0	92.5	72.0	79.8	55.7	31.7		
58	104	117	104	90.0	14.5	92.0	71.0	79.5	55.0	30.7		
57	103	115	103	89.4	13.0	91.0	70.5	79.2	54.4	29.7		
56	101	114	101	88.8	11.5	90.5	69.5	78.8	53.7	28.7		

续附6-1

洛氏 硬度 HRB $\phi 1.588$ 钢球	维氏 硬度 HV	努普硬 度 HK 4.903N $\phi 10$ 钢球	布氏硬度		洛氏硬度				表面洛氏硬度			肖氏 硬度 HS	抗拉强 度 $\sigma_b$ /MPa
			HBS	HR	HR				HR				
			29.42kN $\phi 10$ 钢球	F	G	E	K	15T	30T	45T			
			$\phi 1.588$ 钢球	$\phi 1.588$ 钢球	$\phi 3.175$ 钢球	$\phi 3.175$ 钢球	$\phi 1.588$ 钢球	$\phi 1.588$ 钢球	$\phi 1.588$ 钢球				
55	100	112		88.2	10.0	90.0	68.5	78.5	53.0	27.7			
54	99	111		87.7	8.5	89.5	68.0	78.2	52.4	26.7			
53	98	110		87.1	7.0	89.0	67.0	77.9	51.7	25.7			
52	96	109		86.5	5.5	88.0	66.0	77.5	51.0	24.7			
51	95	108		86.0	4.0	87.5	65.0	77.2	50.3	23.7			
50	94	107		85.4	2.5	87.0	64.5	76.9	49.7	22.7			
49	93	106		84.8		86.5	63.5	76.6	49.0	21.7			
48	92	105		84.3		85.5	62.5	76.2	48.3	20.7			
47	91	104		83.7		85.0	61.5	75.9	47.7	19.7			
46	90	103		83.1		84.5	61.0	75.6	47.0	18.7			
45	89	102		82.6		84.0	60.0	75.3	46.3	17.7			
44	88	101		82.0		83.5	59.0	74.9	45.7	16.7			
43	87	100		81.4		82.5	58.0	74.6	45.0	15.7			
42	86	99		80.8		82.0	57.5	74.3	44.3	14.7			
41	85	98		80.3		81.5	56.5	74.0	43.7	13.6			
40	84	97		79.7		81.0	55.5	73.6	43.0	12.6			
39	83	96		79.1		80.0	54.5	73.3	42.3	11.6			
38	82	95		78.6		79.5	54.0	73.0	41.6	10.6			
37	81	94		78.0		79.0	53.0	72.7	41.0	9.6			
36	80	93		77.4		78.5	52.0	72.3	40.3	8.6			
35	80	92		76.9		78.0	51.5	72.0	39.6	7.6			
34	80	91		76.3		77.0	50.5	71.7	39.0	6.6			
33	78	90		75.7		76.5	49.5	71.4	38.3	5.6			
32	78	89		75.2		76.0	48.5	71.0	37.6	4.6			
31	77	88		74.6		75.5	48.0	70.7	37.0	3.6			
30	77	87		74.0		75.0	47.0	70.3	36.3	2.6			