

003 Approximate Hardness Conversion Number for Nickel and High-Nickel Alloys															
Vickers	Brinell	Rockwell Hardness Number								Rockwell Superficial Hardness Number					
Indenter	10mm Ball	A Scale	B Scale	C Scale	D Scale	E Scale	F Scale	G Scale	K Scale	15N Scale	30N Scale	45N Scale	15T Scale	30T Scale	45T Scale
1,5,10,30 kgf (HV)	Standard Diamond 3000 kgf (HBS)	Diamond 60 kgf (HRA)	1/16" Ball 100 kgf (HRB)	Diamond 150 kgf (HRC)	Diamond 100 kgf (HRD)	1/8" Ball 100 kgf (HRE)	1/16" Ball 60 kgf (HRF)	1/6" Ball 150 kgf (HRG)	1/8" Ball 150 kgf (HRK)	Diamond 15 kgf (HR 15N)	Diamond 30 kgf (HR 30N)	Diamond 45 kgf (HR 45N)	1/16" Ball 45 kgf (HR 15T)	1/16" Ball 15 kgf (HR 30T)	1/16" Ball 45 kgf (HR 45T)
513	(479)	75.5	...	50.0	63.0	...	...	...	...	85.5	68.0	54.5	...	...	...
481	450	74.5	...	48.0	61.5	...	...	...	...	84.5	66.5	52.5	...	...	...
452	425	73.5	...	46.0	60.0	...	...	...	...	83.5	61.5	50.0	...	...	...
427	403	72.5	...	44.0	58.5	...	...	...	...	82.5	63.0	45.7	...	...	...
404	382	71.5	...	42.0	57.0	...	...	...	...	81.5	61.0	45.5	...	...	...
382	363	70.5	...	40.0	55.5	...	...	...	...	80.5	59.5	43.0	...	...	...
362	346	69.5	...	38.0	54.0	...	...	...	...	79.5	58.0	41.0	...	...	...
344	329	68.5	...	36.0	52.5	...	...	...	...	78.5	56.0	38.5	...	...	...
326	313	67.5	...	34.0	50.5	...	...	...	...	77.5	54.5	36.0	...	...	...
309	298	66.5	(106)	32.0	49.5	...	(116.5)	94.0	...	76.5	52.5	34.0	94.5	85.5	77.0
285	275	64.5	(104)	28.5	46.5	...	(115.5)	91.0	...	75.0	49.5	30.0	94.0	84.5	75.0
266	258	63.0	(102)	25.5	44.5	...	(114.5)	87.5	...	73.5	47.0	26.5	93.0	83.0	73.0
248	241	61.5	100	22.5	42.0	...	(113.5)	84.5	...	72.0	44.5	23.0	92.5	81.5	71.0
234	228	60.5	98	20.0	40.0	...	(112.0)	81.5	...	70.5	42.0	20.0	92.0	80.5	69.0
220	215	59.0	96	(17.5)	38.0	...	(111.0)	78.5	100.0	69.0	39.5	17.0	91.0	79.0	67.0
209	204	57.5	94	(14.5)	36.0	...	(110.0)	75.5	98.0	68.0	37.5	14.0	90.5	77.5	65.0
198	194	56.5	92	(12.0)	34.0	...	(108.5)	72.0	96.5	66.5	35.5	11.0	89.5	76.0	63.0
188	184	55.0	90	(9.0)	32.0	(108.5)	(107.5)	69.0	94.5	65.0	32.5	7.5	89.0	75.0	61.0
179	176	53.5	88	(6.5)	30.0	(107.0)	(106.5)	65.5	93.0	64.0	30.5	5.0	88.0	73.5	59.5
171	168	52.5	86	(4.0)	28.0	(106.0)	(105.0)	62.5	91.0	62.5	28.5	2.0	87.5	72.0	57.5
164	161	51.5	84	(2.0)	26.5	(104.5)	(104.0)	59.5	89.0	61.5	26.5	(0.5)	87.0	70.5	55.5
157	155	50.0	82	...	24.5	(103.0)	(103.0)	56.5	87.5	...	...	...	86.0	69.5	53.5
151	149	49.0	80	...	22.5	(102.0)	(101.0)	53.0	85.5	...	...	...	85.5	68.0	51.5
145	144	47.5	78	...	21.0	(100.5)	(100.5)	50.0	83.5	...	...	...	84.5	66.5	49.5
140	139	46.5	76	...	(19.0)	99.5	99.5	47.0	82.0	...	...	...	84.0	65.5	47.5
135	134	45.5	74	...	(17.5)	98.0	98.5	43.5	80.0	...	...	...	83.0	64.0	45.5
130	129	44.0	72	...	(16.0)	97.0	97.0	40.5	78.0	...	...	...	82.5	62.5	43.5
126	125	43.0	70	...	(14.5)	95.5	96.0	37.5	76.5	...	...	...	82.0	61.0	41.5
122	121	42.0	68	...	(13.0)	94.5	95.0	34.5	74.5	...	...	...	81.0	60.0	39.5
119	118	41.0	66	...	(11.5)	93.0	93.5	31.0	72.5	...	...	...	80.5	58.5	37.5
115	114	40.0	64	...	(10.0)	91.5	92.5	...	71.0	...	...	...	79.5	57.0	35.5
112	111	39.0	62	...	(8.0)	90.5	91.5	...	69.0	...	...	...	79.0	56.0	33.5
108	108	...	60	...	...	89.0	90.0	...	67.5	...	...	...	78.5	54.5	31.5
106	106	...	58	...	...	88.0	89.0	...	65.5	...	...	...	77.5	53.0	29.5
103	103	...	56	...	...	86.5	88.0	...	63.5	...	...	...	77.0	51.5	27.5
100	100	...	54	...	...	85.5	87.0	...	62.0	...	...	...	76.0	50.5	25.5
98	98	...	52	...	...	84.0	85.5	...	60.0	...	...	...	75.5	49.0	23.5
95	95	...	50	...	...	83.0	84.5	...	58.0	...	...	...	74.5	47.5	21.5
93	93	...	48	...	...	81.5	83.5	...	56.5	...	...	...	74.0	46.5	19.5

References:  
Hardness Testing ASM International, Metal Park OH 1897      ASTM Designation E-140-12b

**003 Approximate Hardness Conversion Numbers for Nickel and High-Nickel Alloys (continued)**

Vickers Indenter 1,5,10,30 kgf (HV)	Brinell 10mm Ball Standard 3000 kgf (HBS)	Rockwell Hardness Number								Rockwell Superficial Hardness Number					
		A Scale Diamond 60 kgf (HRA)	B Scale 1/16" Ball 100 kgf (HRB)	C Scale Diamond 150 kgf (HRC)	D Scale Diamond 100 kgf (HRD)	E Scale 1/8" Ball 100 kgf (HRE)	F Scale 1/16" Ball 60 kgf (HRF)	G Scale 1/6" Ball 150 kgf (HRG)	K Scale 1/8" Ball 150 kgf (HRK)	15N Scale Diamond 15 kgf (HR 15N)	30N Scale Diamond 30 kgf (HR 30N)	45N Scale Diamond 45 kgf (HR 45N)	15T Scale 1/16" Ball 45 kgf (HR 15T)	30T Scale 1/16" Ball 15 kgf (HR 30T)	45T Scale 1/16" Ball 45 kgf (HR 45T)
91	91	...	46	...	...	80.5	82.0	...	54.5	...	...	...	73.5	45.0	17.0
89	89	...	44	...	...	79.0	81.0	...	52.5	...	...	...	72.5	43.5	14.5
87	87	...	42	...	...	78.0	80.0	...	51.0	...	...	...	72.0	42.0	12.5
85	85	...	40	...	...	76.5	79.0	...	49.0	...	...	...	71.0	41.0	10.0
83	83	...	38	...	...	75.0	77.5	...	47.0	...	...	...	70.5	39.5	7.5
81	81	...	36	...	...	74.0	76.5	...	45.5	...	...	...	70.0	38.0	5.5
79	79	...	34	...	...	72.5	75.5	...	43.5	...	...	...	69.0	36.5	3.0
78	78	...	32	...	...	71.5	74.0	...	42.0	...	...	...	68.5	35.5	1.0
77	77	...	30	...	...	70.0	73.0	...	40.0	...	...	...	67.5	34.0	(1.5)

References:  
 Hardness Testing ASM International, Metal Park OH 1987  
 ASTM Designation E-140-12b

## 003 Approximate Hardness Conversion Numbers for Nickel and High-Nickel Alloys (continued)

VICKERS HARDNESS NUMBER	KNOOP HARDNESS NUMBER
Vickers Indenter 1,5,10,30 kgf (HV)	Knoop Indenter 1000 gf (HK)
382	436
362	413
344	392
326	372
309	352
285	325
266	304
248	283
234	267
220	251
209	239
198	226
188	215
179	204
171	195
164	187
157	179
151	173
145	166
140	160
135	154
130	149
126	144
122	140
119	136

## References:

Hardness Testing ASM International, Metals Park OH 1987

ASTM Designation E140-12b