

Conversion Table of Hardness

(SAE J 417) revised in 1983

Approximate conversion value for steel Rockwell C hardness*1

(HRC) Rockwell C scale hardness	(HV) Vickers hardness	Brinell hardness (HB) 10mm ball load 3000kgf		Rockwell hardness*3			Rockwell superficial hardness; diamond conical indenter			(HS) Shore hardness	Tensile strength*2 (approximate value) MPa	(HRC)*3 Rockwell C scale hardness
		Standard ball	Tungsten carbide ball	(HRA) A scale load 60kgf diamond conical indenter	(HRB) B scale load 100kgf diameter 1.6mm (1/16in) ball	(HRD) D scale load 100kgf diamond conical indenter	15-N scale load 15kgf	30-N scale load 30kgf	45-N scale load 45kgf			
68	940	-	-	85.6	-	76.9	93.2	84.4	75.4	97	-	68
67	900	-	-	85.0	-	76.1	92.9	83.6	74.2	95	-	67
66	865	-	-	84.5	-	75.4	92.5	82.8	73.3	92	-	66
65	832	-	(739)	83.9	-	74.5	92.2	81.9	72.0	91	-	65
64	800	-	(722)	83.4	-	73.8	91.8	81.1	71.0	88	-	64
63	772	-	(705)	82.8	-	73.0	91.4	80.1	69.9	87	-	63
62	746	-	(688)	82.3	-	72.2	91.1	79.3	68.8	85	-	62
61	720	-	(670)	81.8	-	71.5	90.7	78.4	67.7	83	-	61
60	697	-	(654)	81.2	-	70.7	90.2	77.5	66.6	81	-	60
59	674	-	(634)	80.7	-	69.9	89.8	76.6	65.5	80	-	59
58	653	-	615	80.1	-	69.2	89.3	75.7	64.3	78	-	58
57	633	-	595	79.6	-	68.5	88.9	74.8	63.2	76	-	57
56	613	-	577	79.0	-	67.7	88.3	73.9	62.0	75	-	56
55	595	-	560	78.5	-	66.9	87.9	73.0	60.9	74	2075	55
54	577	-	543	78.0	-	66.1	87.4	72.0	59.8	72	2015	54
53	560	-	525	77.4	-	65.4	86.9	71.2	58.6	71	1950	53
52	544	(500)	512	76.8	-	64.6	86.4	70.2	57.4	69	1880	52
51	528	(487)	496	76.3	-	63.8	85.9	69.4	56.1	68	1820	51
50	513	(475)	481	75.9	-	63.1	85.5	68.5	55.0	67	1760	50
49	498	(464)	469	75.2	-	62.1	85.0	67.6	53.8	66	1695	49
48	484	451	455	74.7	-	61.4	84.5	66.7	52.5	64	1635	48
47	471	442	443	74.1	-	60.8	83.9	65.8	51.4	63	1580	47
46	458	432	432	73.6	-	60.0	83.5	64.8	50.3	62	1530	46
45	446	421	421	73.1	-	59.2	83.0	64.0	49.0	60	1480	45
44	434	409	409	72.5	-	58.5	82.5	63.1	47.8	58	1435	44
43	423	400	400	72.0	-	57.7	82.0	62.2	46.7	57	1385	43
42	412	390	390	71.5	-	56.9	81.5	61.3	45.5	56	1340	42
41	402	381	381	70.9	-	56.2	80.9	60.4	44.3	55	1295	41
40	392	371	371	70.4	-	55.4	80.4	59.5	43.1	54	1250	40
39	382	362	362	69.9	-	54.6	79.9	58.6	41.9	52	1215	39
38	372	353	353	69.4	-	53.8	79.4	57.7	40.8	51	1180	38
37	363	344	344	68.9	-	53.1	78.8	56.8	39.6	50	1160	37
36	354	336	336	68.4	(109.0)	52.3	78.3	55.9	38.4	49	1115	36
35	345	327	327	67.9	(108.5)	51.5	77.7	55.0	37.2	48	1080	35
34	336	319	319	67.4	(108.0)	50.8	77.2	54.2	36.1	47	1055	34
33	327	311	311	66.8	(107.5)	50.0	76.6	53.3	34.9	46	1025	33
32	318	301	301	66.3	(107.0)	49.2	76.1	52.1	33.7	44	1000	32
31	310	294	294	65.8	(106.0)	48.4	75.6	51.3	32.5	43	980	31
30	302	286	286	65.3	(105.5)	47.7	75.0	50.4	31.3	42	950	30
29	294	279	279	64.7	(104.5)	47.0	74.5	49.5	30.1	41	930	29
28	286	271	271	64.3	(104.0)	46.1	73.9	48.6	28.9	41	910	28
27	279	264	264	63.8	(103.0)	45.2	73.3	47.7	27.8	40	880	27
26	272	258	258	63.3	(102.5)	44.6	72.8	46.8	26.7	38	860	26
25	266	253	253	62.8	(101.5)	43.8	72.2	45.9	25.5	38	840	25
24	260	247	247	62.4	(101.0)	43.1	71.6	45.0	24.3	37	825	24
23	254	243	243	62.0	100.0	42.1	71.0	44.0	23.1	36	805	23
22	248	237	237	61.5	99.0	41.6	70.5	43.2	22.0	35	785	22
21	243	231	231	61.0	98.5	40.9	69.9	42.3	20.7	35	770	21
20	238	226	226	60.5	97.8	40.1	69.4	41.5	19.6	34	760	20
(18)	230	219	219	-	96.7	-	-	-	-	33	730	(18)
(16)	222	212	212	-	95.5	-	-	-	-	32	705	(16)
(14)	213	203	203	-	93.9	-	-	-	-	31	675	(14)
(12)	204	194	194	-	92.3	-	-	-	-	29	650	(12)
(10)	196	187	187	-	90.7	-	-	-	-	28	620	(10)
(8)	188	179	179	-	89.5	-	-	-	-	27	600	(8)
(6)	180	171	171	-	87.1	-	-	-	-	26	580	(6)
(4)	173	165	165	-	85.5	-	-	-	-	25	550	(4)
(2)	166	158	158	-	83.5	-	-	-	-	24	530	(2)
(0)	160	152	152	-	81.7	-	-	-	-	24	515	(0)

*1 Bold numbers are according to ASTM E 140 Table 1 (arranged jointly by SAE, ASM and ASTM).

*2 1MPa = 1N/mm²

*3 The value in parentheses in the table are for ranges rarely used and indicated for reference.