KASPERCALC

HARDNESS CONVERSION CHART

Rockwell · superficial Rockwell · Vickers · Knoop · Brinell · Shore · approximate tensile strength

ASTM E140-02, Tables 1 to 9
2026-11-06

Read across a row to compare scales. Shaded column: the chart's key scale. – = not printed for that hardness ( ) = outside the recommended range of that test

Conversions are approximate and only for the material named: test with the scale the drawing specifies.

Non-Austenitic Steels, Rockwell C Range · ASTM E140 Table 1

HRC Diamond (Brale), 150 kg	HV 136° diamond pyramid	HBS 10 mm standard ball, 3000 kg	HBW 10 mm tungsten carbide ball, 3000 kg	HK Knoop diamond, 500 g and over	HRA Diamond (Brale), 60 kg	HRD Diamond (Brale), 100 kg	HR15N Diamond (N Brale), 15 kg	HR30N Diamond (N Brale), 30 kg	HR45N Diamond (N Brale), 45 kg	HSc Diamond-tipped hammer, rebound
68	940	–	–	920	85.6	76.9	93.2	84.4	75.4	97.3
67	900	–	–	895	85.0	76.1	92.9	83.6	74.2	95.0
66	865	–	–	870	84.5	75.4	92.5	82.8	73.3	92.7
65	832	–	(739)	846	83.9	74.5	92.2	81.9	72.0	90.6
64	800	–	(722)	822	83.4	73.8	91.8	81.1	71.0	88.5
63	772	–	(705)	799	82.8	73.0	91.4	80.1	69.9	86.5
62	746	–	(688)	776	82.3	72.2	91.1	79.3	68.8	84.5
61	720	–	(670)	754	81.8	71.5	90.7	78.4	67.7	82.6
60	697	–	(654)	732	81.2	70.7	90.2	77.5	66.6	80.8
59	674	–	634	710	80.7	69.9	89.8	76.6	65.5	79.0
58	653	–	615	690	80.1	69.2	89.3	75.7	64.3	77.3
57	633	–	595	670	79.6	68.5	88.9	74.8	63.2	75.6
56	613	–	577	650	79.0	67.7	88.3	73.9	62.0	74.0
55	595	–	560	630	78.5	66.9	87.9	73.0	60.9	72.4
54	577	–	543	612	78.0	66.1	87.4	72.0	59.8	70.9
53	560	–	525	594	77.4	65.4	86.9	71.2	58.6	69.4
52	544	(500)	512	576	76.8	64.6	86.4	70.2	57.4	67.9
51	528	(487)	496	558	76.3	63.8	85.9	69.4	56.1	66.5
50	513	(475)	481	542	75.9	63.1	85.5	68.5	55.0	65.1
49	498	(464)	469	526	75.2	62.1	85.0	67.6	53.8	63.7
48	484	451	455	510	74.7	61.4	84.5	66.7	52.5	62.4
47	471	442	443	495	74.1	60.8	83.9	65.8	51.4	61.1
46	458	432	432	480	73.6	60.0	83.5	64.8	50.3	59.8
45	446	421	421	466	73.1	59.2	83.0	64.0	49.0	58.5
44	434	409	409	452	72.5	58.5	82.5	63.1	47.8	57.3
43	423	400	400	438	72.0	57.7	82.0	62.2	46.7	56.1
42	412	390	390	426	71.5	56.9	81.5	61.3	45.5	54.9
41	402	381	381	414	70.9	56.2	80.9	60.4	44.3	53.7
40	392	371	371	402	70.4	55.4	80.4	59.5	43.1	52.6
39	382	362	362	391	69.9	54.6	79.9	58.6	41.9	51.5
38	372	353	353	380	69.4	53.8	79.4	57.7	40.8	50.4
37	363	344	344	370	68.9	53.1	78.8	56.8	39.6	49.3
36	354	336	336	360	68.4	52.3	78.3	55.9	38.4	48.2
35	345	327	327	351	67.9	51.5	77.7	55.0	37.2	47.1
34	336	319	319	342	67.4	50.8	77.2	54.2	36.1	46.1
33	327	311	311	334	66.8	50.0	76.6	53.3	34.9	45.1
32	318	301	301	326	66.3	49.2	76.1	52.1	33.7	44.1
31	310	294	294	318	65.8	48.4	75.6	51.3	32.5	43.1
30	302	286	286	311	65.3	47.7	75.0	50.4	31.3	42.2
29	294	279	279	304	64.8	47.0	74.5	49.5	30.1	41.3
28	286	271	271	297	64.3	46.1	73.9	48.6	28.9	40.4
27	279	264	264	290	63.8	45.2	73.3	47.7	27.8	39.5
26	272	258	258	284	63.3	44.6	72.8	46.8	26.7	38.7
25	266	253	253	278	62.8	43.8	72.2	45.9	25.5	37.8
24	260	247	247	272	62.4	43.1	71.6	45.0	24.3	37.0
23	254	243	243	266	62.0	42.1	71.0	44.0	23.1	36.3
22	248	237	237	261	61.5	41.6	70.5	43.2	22.0	35.5
21	243	231	231	256	61.0	40.9	69.9	42.3	20.7	34.8
20	238	226	226	251	60.5	40.1	69.4	41.5	19.6	34.2

Carbon, alloy and tool steels, as-forged, annealed, normalized or quenched and tempered, provided they are homogeneous. Brinell numbers in parentheses are outside the range recommended for Brinell testing (E10). Scleroscope values are based on Vickers-Scleroscope relationships from NBS reference blocks.

Values exactly as printed in the sources named on each chart. Tensile strength: plain carbon and low alloy steels only, a guide (TO 1-1A-9 para 2.8.3). Rockwell: 10 kg minor load, then the major load shown. Brinell: 10 mm ball. Vickers: 136° diamond pyramid.