

Hardness comparison table

according to ISO 18265

The comparison table below is valid only for carbon steels, low alloy steels and cast steels in the hot formed and heat treated condition acc. to ISO 18365.

| Tensile strength | Vickers hardness HV | Brinell hardness ¹⁾ | Rockwell hardness | | |
|----------------------|---------------------|--------------------------------|-------------------|------|------|
| | | | HRB | HRC | HRA |
| [N/mm ²] | [F ≥ 98 N] | HB | | | |
| 255 | 80 | 76 | – | – | – |
| 270 | 85 | 80,7 | 41 | – | – |
| 285 | 90 | 85,5 | 48 | – | – |
| 305 | 95 | 90,2 | 52 | – | – |
| 320 | 100 | 95 | 56,2 | – | – |
| 335 | 105 | 99,8 | – | – | – |
| 350 | 110 | 105 | 62,3 | – | – |
| 370 | 115 | 109 | – | – | – |
| 385 | 120 | 114 | 66,7 | – | – |
| 400 | 125 | 119 | – | – | – |
| 415 | 130 | 124 | 71,2 | – | – |
| 430 | 135 | 128 | – | – | – |
| 450 | 140 | 133 | 75 | – | – |
| 465 | 145 | 138 | – | – | – |
| 480 | 150 | 143 | 78,7 | – | – |
| 495 | 155 | 147 | – | – | – |
| 510 | 160 | 152 | 81,7 | – | – |
| 530 | 165 | 156 | – | – | – |
| 545 | 170 | 162 | 85 | – | – |
| 560 | 175 | 166 | – | – | – |
| 575 | 180 | 171 | 87,1 | – | – |
| 595 | 185 | 176 | – | – | – |
| 610 | 190 | 181 | 89,5 | – | – |
| 625 | 195 | 185 | – | – | – |
| 640 | 200 | 190 | 91,5 | – | – |
| 660 | 205 | 195 | 92,5 | – | – |
| 675 | 210 | 199 | 93,5 | – | – |
| 690 | 215 | 204 | 94 | – | – |
| 705 | 220 | 209 | 95 | – | – |
| 720 | 225 | 214 | 96 | – | – |
| 740 | 230 | 219 | 96,7 | – | – |
| 755 | 235 | 223 | – | – | – |
| 770 | 240 | 228 | 98,1 | 20,3 | 60,7 |
| 785 | 245 | 233 | – | 21,3 | 61,2 |
| 800 | 250 | 238 | 99,5 | 22,2 | 61,6 |
| 820 | 255 | 242 | (101) | 23,1 | 62 |
| 835 | 260 | 247 | – | 24 | 62,4 |
| 850 | 265 | 252 | (102) | 24,8 | 62,7 |
| 865 | 270 | 257 | – | 25,6 | 63,1 |
| 880 | 275 | 261 | (104) | 26,4 | 63,5 |
| 900 | 280 | 266 | – | 27,1 | 63,8 |
| 915 | 285 | 271 | (105) | 27,8 | 64,2 |
| 930 | 290 | 276 | – | 28,5 | 64,5 |
| 950 | 295 | 280 | – | 29,2 | 64,8 |
| 965 | 300 | 285 | – | 29,8 | 65,2 |
| 995 | 310 | 295 | – | 31 | 65,8 |
| 1030 | 320 | 304 | – | 32,2 | 66,4 |
| 1060 | 330 | 314 | – | 33,3 | 67 |
| 1095 | 340 | 323 | – | 34,3 | 67,6 |
| 1125 | 350 | 333 | – | 35,5 | 68,1 |

For high alloyed and / or cold treated steels (eg. 6.8, A2, A4) there are considerable differences to be expected.

| Tensile strength | Vickers hardness HV | Brinell hardness ¹⁾ | Rockwell hardness | | |
|----------------------|---------------------|--------------------------------|-------------------|------|------|
| | | | HRB | HRC | HRA |
| [N/mm ²] | [F ≥ 98 N] | HB | | | |
| 1155 | 360 | 342 | – | 36,6 | 68,7 |
| 1190 | 370 | 352 | – | 37,7 | 69,2 |
| 1220 | 380 | 361 | – | 38,8 | 69,8 |
| 1255 | 390 | 371 | – | 39,8 | 70,3 |
| 1290 | 400 | 380 | – | 40,8 | 70,8 |
| 1320 | 410 | 390 | – | 41,8 | 71,4 |
| 1350 | 420 | 399 | – | 42,7 | 71,8 |
| 1385 | 430 | 409 | – | 43,6 | 72,3 |
| 1420 | 440 | 418 | – | 44,5 | 72,8 |
| 1455 | 450 | 428 | – | 45,3 | 73,3 |
| 1485 | 460 | 437 | – | 46,1 | 73,6 |
| 1520 | 470 | 447 | – | 46,9 | 74,1 |
| 1555 | 480 | (465) | – | 47,7 | 74,5 |
| 1595 | 490 | (466) | – | 48,4 | 74,9 |
| 1630 | 500 | (475) | – | 49,1 | 75,3 |
| 1665 | 510 | (485) | – | 49,8 | 75,7 |
| 1700 | 520 | (494) | – | 50,5 | 76,1 |
| 1740 | 530 | (504) | – | 51,1 | 76,4 |
| 1775 | 540 | (513) | – | 51,7 | 76,7 |
| 1810 | 550 | (523) | – | 52,3 | 77 |
| 1845 | 560 | (532) | – | 53 | 77,4 |
| 1880 | 570 | (542) | – | 53,6 | 77,8 |
| 1920 | 580 | (551) | – | 54,1 | 78 |
| 1955 | 590 | (561) | – | 54,7 | 78,4 |
| 1995 | 600 | (570) | – | 55,2 | 78,6 |
| 2030 | 610 | (580) | – | 55,7 | 78,9 |
| 2070 | 620 | (589) | – | 56,3 | 79,2 |
| 2105 | 630 | (599) | – | 56,8 | 79,5 |
| 2145 | 640 | (608) | – | 57,3 | 79,8 |
| 2180 | 650 | (618) | – | 57,8 | 80 |
| – | 660 | – | – | 58,3 | 80,3 |
| – | 670 | – | – | 58,8 | 80,6 |
| – | 680 | – | – | 59,2 | 80,8 |
| – | 690 | – | – | 59,7 | 81,1 |
| – | 700 | – | – | 60,1 | 81,3 |
| – | 720 | – | – | 61 | 81,8 |
| – | 740 | – | – | 61,8 | 82,2 |
| – | 760 | – | – | 62,5 | 82,6 |
| – | 780 | – | – | 63,3 | 83 |
| – | 800 | – | – | 64 | 83,4 |
| – | 820 | – | – | 64,7 | 83,8 |
| – | 840 | – | – | 65,3 | 84,1 |
| – | 860 | – | – | 65,9 | 84,4 |
| – | 880 | – | – | 66,4 | 84,7 |
| – | 900 | – | – | 67 | 85 |
| – | 920 | – | – | 67,5 | 85,3 |
| – | 940 | – | – | 68 | 85,6 |

The figures in brackets represent hardness values beyond the defined scope of the standardised hardness test but which are frequently used as approximate values in practice. Furthermore the Brinell hardness values in brackets are only valid if the test was carried out with a hard metal ball.

¹⁾ Calculated with: HB = 0,95 · HV