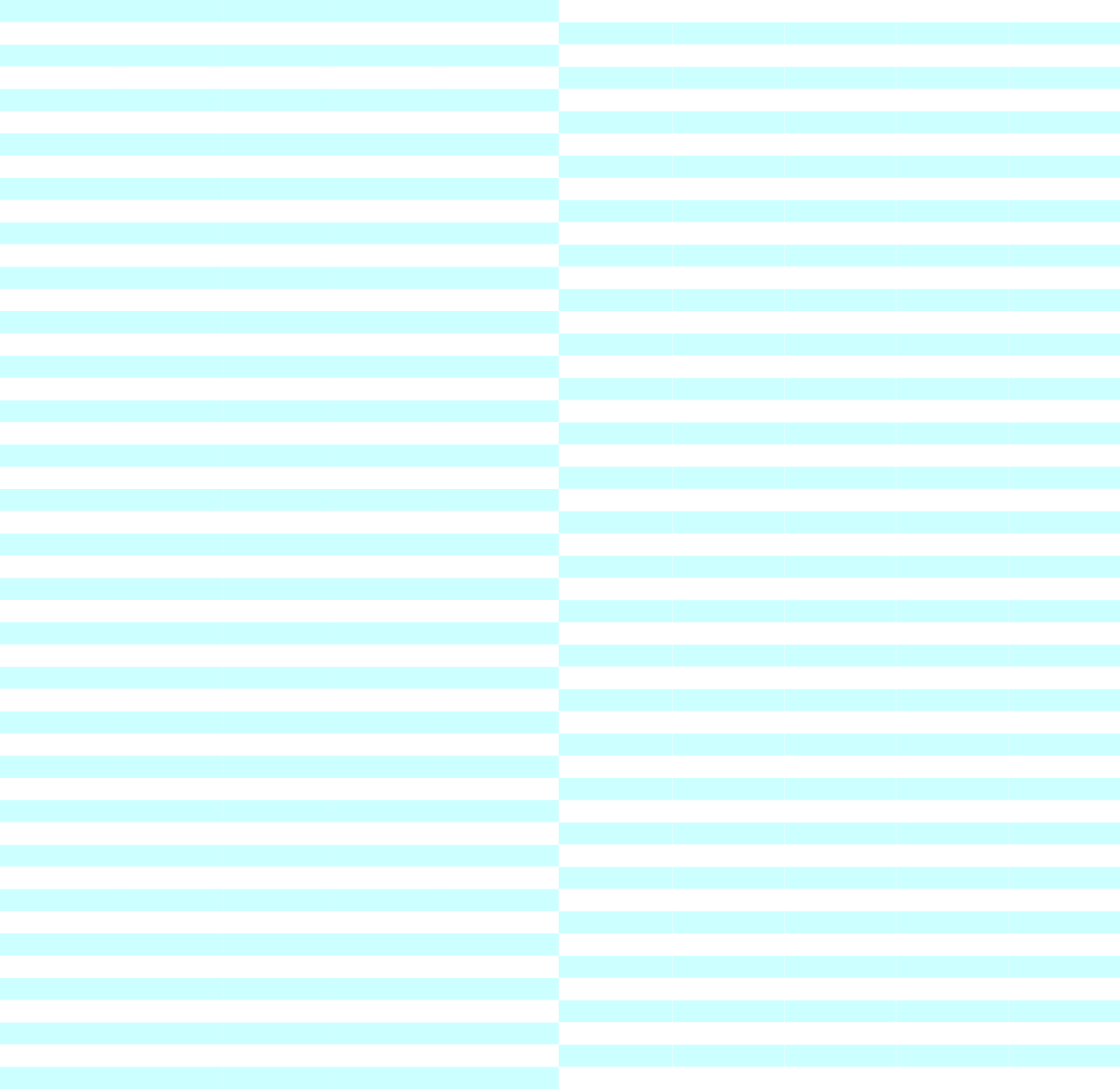
# Hardness Conversion Table approx. HV – HRC and HRC-HV-HB-HRA-HRB-Rm for carbon/alloy steels

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***HV*** | ***HRC*** | ***HV*** | ***HRC*** | ***HV*** | ***HRC*** | ***HV*** | ***HRC*** | ***HV*** | ***HRC*** |
| *2270* | *85* | *1950* | *81* | *1633* | *77* | *1323* | *73* | *1004* | *69* |
| *2190* | *84* | *1865* | *80* | *1556* | *76* | *1245* | *72* | *940* | *68* |
| *2110* | *83* | *1787* | *79* | *1478* | *75* | *1160* | *71* | *920* | *67,5* |
| *2030* | *82* | *1710* | *78* | *1400* | *74* | *1076* | *70* | *900* | *67* |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **HRC**  Diamond penetrator | **HV**  Vickers 30 | **HB**  Brinell 3000 Kgf | **HRA**  Diamond penetrator | **Rm** N/mm2 MPa | **HRB**  Ball 1/16’’ | **HV**  Vickers 30 | **HB**  Brinell 3000 Kgf | **HRA**  Diamond penetrator | **Rm** N/mm2 MPa |
|  | | | | |  | | | | |
| 68 | 940 | -- | 85.6 | -- | 100 | 240 | *240* | *61.5* | *800* |
| 67 | 900 | -- | 85.0 | -- | 99 | 234 | *234* | *60.9* | *785* |
| 66 | 865 | -- | 84.5 | -- | 98 | 228 | *228* | *60.2* | *750* |
| 65 | 832 | 739 | 83.9 | -- | 97 | 222 | 222 | 59.5 | 715 |
| 64 | 800 | 722 | 83.4 | -- | 96 | 216 | 216 | 58.9 | 705 |
| 63 | 772 | 706 | 82.8 | -- | 95 | 210 | 210 | 58.3 | 690 |
| 62 | 746 | 688 | 82.3 | -- | 94 | 205 | 205 | 57.6 | 675 |
| 61 | 720 | 670 | 81.8 | -- | 93 | 200 | 200 | 57.0 | 650 |
| 60 | 697 | 654 | 81.2 | -- | 92 | 195 | 195 | 56.4 | 635 |
| 59 | 674 | 634 | 80.7 | 2420 | 91 | 190 | 190 | 55.8 | 620 |
| 58 | 653 | 615 | 80.1 | 2330 | 90 | 185 | 185 | 55.2 | 615 |
| 57 | 633 | 595 | 79.6 | 2240 | 89 | 180 | 180 | 54.6 | 605 |
| 56 | 613 | 577 | 79.0 | 2160 | 88 | 176 | 176 | 54.0 | 590 |
| 55 | 595 | 560 | 78.5 | 2070 | 87 | 172 | 172 | 53.4 | 580 |
| 54 | 577 | 543 | 78.0 | 2010 | 86 | 169 | 169 | 52.8 | 570 |
| 53 | 560 | 525 | 77.4 | 1950 | 85 | 165 | 165 | 52.3 | 565 |
| 52 | 544 | 512 | 76.8 | 1880 | 84 | 162 | 162 | 51.7 | 560 |
| 51 | 528 | 496 | 76.3 | 1820 | 83 | 159 | 159 | 51.1 | 550 |
| 50 | 513 | 482 | 75.9 | 1760 | 82 | 156 | 156 | 50.6 | 530 |
| 49 | 498 | 468 | 75.2 | 1700 | 81 | 153 | 153 | 50.0 | 505 |
| 48 | 484 | 455 | 74.7 | 1640 | 80 | 150 | 150 | 49.5 | 495 |
| 47 | 471 | 442 | 74.1 | 1580 | 79 | 147 | 147 | 48.9 | 485 |
| 46 | 458 | 432 | 73.6 | 1520 | 78 | 144 | 144 | 48.4 | 475 |
| 45 | 446 | 421 | 73.1 | 1480 | 77 | 141 | 141 | 47.9 | 470 |
| 44 | 434 | 409 | 72.5 | 1430 | 76 | 139 | 139 | 47.3 | 460 |
| 43 | 423 | 400 | 72.0 | 1390 | 75 | 137 | 137 | 46.8 | 455 |
| 42 | 412 | 390 | 71.5 | 1340 | 74 | 135 | 135 | 46.3 | 450 |
| 41 | 402 | 381 | 70.9 | 1300 | 73 | 132 | 132 | 45.8 | 440 |
| 40 | 392 | 371 | 70.4 | 1250 | 72 | 130 | 130 | 45.3 | 435 |
| 39 | 382 | 362 | 69.9 | 1220 | 71 | 127 | 127 | 44.8 | 425 |
| 38 | 372 | 353 | 69.4 | 1180 | 70 | 125 | 125 | 44.3 | 420 |
| 37 | 363 | 344 | 68.9 | 1140 | 69 | 123 | 123 | 43.8 | 415 |
| 36 | 354 | 336 | 68.4 | 1110 | 68 | 121 | 121 | 43.3 | 405 |
| 35 | 345 | 327 | 67.9 | 1080 | 67 | 119 | 119 | 42.8 | 400 |
| 34 | 336 | 319 | 67.4 | 1050 | 66 | 117 | 117 | 42.3 | 395 |
| 33 | 327 | 311 | 66.8 | 1030 | 65 | 116 | 116 | 41.8 | 385 |
| 32 | 318 | 301 | 66.3 | 1010 | 64 | 114 | 114 | 41.4 | -- |
| 31 | 310 | 294 | 65.8 | 970 | 63 | 112 | 112 | 40.9 | -- |
| 30 | 302 | 286 | 65.3 | 950 | 62 | 110 | 110 | 40.4 | **370** |
| 29 | 294 | 279 | 64.6 | 930 | 61 | 108 | 108 | 40.0 | **--** |
| 28 | 286 | 271 | 64.3 | 900 | 60 | 107 | 107 | 39.5 | **--** |
| 27 | 279 | 264 | 63.8 | 880 | 59 | 106 | 106 | 39.0 | **360** |
| 26 | 272 | 258 | 63.3 | 860 | 58 | 104 | 104 | 38.6 | **--** |
| 25 | 266 | 253 | 62.8 | 850 | 57 | 103 | 103 | 38.1 | **350** |
| 24 | 260 | 247 | 62.4 | 820 | 56 | 101 | 101 | 37.7 | **--** |
| 23 | 254 | 243 | 62.0 | 810 | 55 | 100 | 100 | 37.2 | **340** |
| 22 | 248 | *237* | *61.5* | *790* | 54 | -- | -- | 36.8 | -- |
| 21 | 243 | *231* | *61.0* | *770* | 51 | -- | **94** | 35.5 | **330** |
| 20 | 238 | *226* | *60.5* | *760* | 49 | -- | **92** | 34.6 | **320** |

Values shown in bold fall outside the ASTM table but they are still reliable Values shown in italics are due to passage from table 2 to table 3 of ASTM A 370



Rockwell Hardness Vickers

Hardness

Brinell Hardness

**HRC** diamond penetrator 120°

load 1470 N (150 kgf) duration 30 seconds

**HV** diamond penetrator 136°

load 294 N (30 kgf) duration 15 seconds’

**HB** ball 10 mm

load 29,400N (3000 kgf) durata 15 seconds

Rockwell Hardness Rockwell

Hardness

Tensile strength

**HRA** diamond penetrator load 588 N (60 kgf) duration 30 seconds

**HRB** ball 1/16’’

load 980 N (100 kgf) duration 30 seconds

**Rm** N/mm2 (Mpa)