

# 硬さ換算表 COMPARISON CHART SCALE FOR HARDNESS

## 鋼のロックウェルC硬さに対する近似的換算表 Approximate relationship between various hardness scales

| (HRC)<br>ロックウェル<br>Cスケール<br>硬さ <sup>(注1)</sup><br>Rockwell<br>hardness<br>C scale<br>150kg<br>Brale | (HV)<br>ピッカース<br>硬さ<br>Diamond<br>Pyramid<br>hardness<br>number,<br>Vickers | ブリネル硬さ(HB)<br>10mm球・荷重29.42kN<br>Brinell hardness 29.42kN |                                    |                                                 | ロックウェル硬さ <sup>(注1)</sup><br>Rockwell hardness                         |                                                                    |                                                                        | ロックウェルスーパーフィシャル硬さ<br>ダイヤモンド円錐圧子<br>Rockwell hardness |                                               |                                               | (Hs)<br>ショア<br>硬さ<br>Shore<br>scleroscope<br>hardness<br>number | 引張強さ<br>N/mm <sup>2</sup><br>Approx.<br>tensile<br>strength<br>N/mm <sup>2</sup> | ロックウェル<br>Cスケール<br>硬さ <sup>(注1)</sup><br>Rockwell<br>hardness<br>C scale<br>150kg<br>Brale |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------|-------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                                                                                                     |                                                                             | 標準球<br>Standard<br>10mm ball                              | Hultgren球<br>Hultgren<br>10mm ball | タングステン<br>カーバイト球<br>Tungsten<br>carbide<br>10mm | (HRA)<br>Aスケール<br>荷重558.4N<br>ダイヤモンド<br>円錐圧子<br>A scale<br>60Kg Brale | (HRB)<br>Bスケール<br>荷重980.7N<br>径1/16in球<br>B scale<br>100Kg 1/16-in | (HRD)<br>Dスケール<br>荷重980.7N<br>ダイヤモンド<br>円錐圧子<br>D scale<br>100Kg Brale | 15N<br>スケール<br>荷重147.1N<br>Superficial<br>15N        | 30N<br>スケール<br>荷重294.2N<br>Superficial<br>30N | 45N<br>スケール<br>荷重441.3N<br>Superficial<br>45N |                                                                 |                                                                                  |                                                                                            |
| 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                                                                         | —                                                         | 613                                | 654                                             | 81.2                                                                  | —                                                                  | 70.7                                                                   | 90.2                                                 | 77.5                                          | 66.6                                          | 81                                                              | —                                                                                | 60                                                                                         |
| 59                                                                                                  | 674                                                                         | —                                                         | 599                                | 634                                             | 80.7                                                                  | —                                                                  | 69.9                                                                   | 89.8                                                 | 76.6                                          | 65.5                                          | 80                                                              | —                                                                                | 59                                                                                         |
| 58                                                                                                  | 653                                                                         | —                                                         | 587                                | 615                                             | 80.1                                                                  | —                                                                  | 69.2                                                                   | 89.3                                                 | 75.7                                          | 64.3                                          | 78                                                              | —                                                                                | 58                                                                                         |
| 57                                                                                                  | 633                                                                         | —                                                         | 575                                | 595                                             | 79.6                                                                  | —                                                                  | 68.5                                                                   | 88.9                                                 | 74.8                                          | 63.2                                          | 76                                                              | —                                                                                | 57                                                                                         |
| 56                                                                                                  | 613                                                                         | —                                                         | 561                                | 577                                             | 79.0                                                                  | —                                                                  | 67.7                                                                   | 88.3                                                 | 73.9                                          | 62.0                                          | 75                                                              | —                                                                                | 56                                                                                         |
| 55                                                                                                  | 595                                                                         | —                                                         | 546                                | 560                                             | 78.5                                                                  | —                                                                  | 66.9                                                                   | 87.9                                                 | 73.0                                          | 60.9                                          | 74                                                              | 2079                                                                             | 55                                                                                         |
| 54                                                                                                  | 577                                                                         | —                                                         | 534                                | 543                                             | 78.0                                                                  | —                                                                  | 66.1                                                                   | 87.4                                                 | 72.0                                          | 59.8                                          | 72                                                              | 2010                                                                             | 54                                                                                         |
| 53                                                                                                  | 560                                                                         | —                                                         | 519                                | 525                                             | 77.4                                                                  | —                                                                  | 65.4                                                                   | 86.9                                                 | 71.2                                          | 58.6                                          | 71                                                              | 1952                                                                             | 53                                                                                         |
| 52                                                                                                  | 544                                                                         | 500                                                       | 508                                | 512                                             | 76.8                                                                  | —                                                                  | 64.6                                                                   | 86.4                                                 | 70.2                                          | 57.4                                          | 69                                                              | 1883                                                                             | 52                                                                                         |
| 51                                                                                                  | 528                                                                         | 487                                                       | 494                                | 496                                             | 76.3                                                                  | —                                                                  | 63.8                                                                   | 85.9                                                 | 69.4                                          | 56.1                                          | 68                                                              | 1824                                                                             | 51                                                                                         |
| 50                                                                                                  | 513                                                                         | 475                                                       | 481                                | 481                                             | 75.9                                                                  | —                                                                  | 63.1                                                                   | 85.5                                                 | 68.5                                          | 55.0                                          | 67                                                              | 1755                                                                             | 50                                                                                         |
| 49                                                                                                  | 498                                                                         | 464                                                       | 469                                | 469                                             | 75.2                                                                  | —                                                                  | 62.1                                                                   | 85.0                                                 | 67.6                                          | 53.8                                          | 66                                                              | 1687                                                                             | 49                                                                                         |
| 48                                                                                                  | 484                                                                         | 451                                                       | 455                                | 455                                             | 74.7                                                                  | —                                                                  | 61.4                                                                   | 84.5                                                 | 66.7                                          | 52.5                                          | 64                                                              | 1638                                                                             | 48                                                                                         |
| 47                                                                                                  | 471                                                                         | 442                                                       | 443                                | 443                                             | 74.1                                                                  | —                                                                  | 60.8                                                                   | 83.9                                                 | 65.8                                          | 51.4                                          | 63                                                              | 1579                                                                             | 47                                                                                         |
| 46                                                                                                  | 458                                                                         | 432                                                       | 432                                | 432                                             | 73.6                                                                  | —                                                                  | 60.0                                                                   | 83.5                                                 | 64.8                                          | 50.3                                          | 62                                                              | 1530                                                                             | 46                                                                                         |
| 45                                                                                                  | 446                                                                         | 421                                                       | 421                                | 421                                             | 73.1                                                                  | —                                                                  | 59.2                                                                   | 83.0                                                 | 64.0                                          | 49.0                                          | 60                                                              | 1481                                                                             | 45                                                                                         |
| 44                                                                                                  | 434                                                                         | 409                                                       | 409                                | 409                                             | 72.5                                                                  | —                                                                  | 58.5                                                                   | 82.5                                                 | 63.1                                          | 47.8                                          | 58                                                              | 1432                                                                             | 44                                                                                         |
| 43                                                                                                  | 423                                                                         | 400                                                       | 400                                | 400                                             | 72.0                                                                  | —                                                                  | 57.7                                                                   | 82.0                                                 | 62.2                                          | 46.7                                          | 57                                                              | 1383                                                                             | 43                                                                                         |
| 42                                                                                                  | 412                                                                         | 390                                                       | 390                                | 390                                             | 71.5                                                                  | —                                                                  | 56.9                                                                   | 81.5                                                 | 61.3                                          | 45.5                                          | 56                                                              | 1334                                                                             | 42                                                                                         |
| 41                                                                                                  | 402                                                                         | 381                                                       | 381                                | 381                                             | 70.9                                                                  | —                                                                  | 56.2                                                                   | 80.9                                                 | 60.4                                          | 44.3                                          | 55                                                              | 1294                                                                             | 41                                                                                         |
| 40                                                                                                  | 392                                                                         | 371                                                       | 371                                | 371                                             | 70.4                                                                  | —                                                                  | 55.4                                                                   | 80.4                                                 | 59.5                                          | 43.1                                          | 54                                                              | 1245                                                                             | 40                                                                                         |
| 39                                                                                                  | 382                                                                         | 362                                                       | 362                                | 362                                             | 69.9                                                                  | —                                                                  | 54.6                                                                   | 79.9                                                 | 58.6                                          | 41.9                                          | 52                                                              | 1216                                                                             | 39                                                                                         |
| 38                                                                                                  | 372                                                                         | 353                                                       | 353                                | 353                                             | 69.4                                                                  | —                                                                  | 53.8                                                                   | 79.4                                                 | 57.7                                          | 40.8                                          | 51                                                              | 1177                                                                             | 38                                                                                         |
| 37                                                                                                  | 363                                                                         | 344                                                       | 344                                | 344                                             | 68.9                                                                  | —                                                                  | 53.1                                                                   | 78.8                                                 | 56.8                                          | 39.6                                          | 50                                                              | 1157                                                                             | 37                                                                                         |
| 36                                                                                                  | 354                                                                         | 336                                                       | 336                                | 336                                             | 68.4                                                                  | (109.0)                                                            | 52.3                                                                   | 78.3                                                 | 55.9                                          | 38.4                                          | 49                                                              | 1118                                                                             | 36                                                                                         |
| 35                                                                                                  | 345                                                                         | 327                                                       | 327                                | 327                                             | 67.9                                                                  | (108.5)                                                            | 51.5                                                                   | 77.7                                                 | 55.0                                          | 37.2                                          | 48                                                              | 1079                                                                             | 35                                                                                         |
| 34                                                                                                  | 336                                                                         | 319                                                       | 319                                | 319                                             | 67.4                                                                  | (108.0)                                                            | 50.8                                                                   | 77.2                                                 | 54.2                                          | 36.1                                          | 47                                                              | 1059                                                                             | 34                                                                                         |
| 33                                                                                                  | 327                                                                         | 311                                                       | 311                                | 311                                             | 66.8                                                                  | (107.5)                                                            | 50.0                                                                   | 76.6                                                 | 53.3                                          | 34.9                                          | 46                                                              | 1030                                                                             | 33                                                                                         |
| 32                                                                                                  | 318                                                                         | 301                                                       | 301                                | 301                                             | 66.3                                                                  | (107.0)                                                            | 49.2                                                                   | 76.1                                                 | 52.1                                          | 33.7                                          | 44                                                              | 1000                                                                             | 32                                                                                         |
| 31                                                                                                  | 310                                                                         | 294                                                       | 294                                | 294                                             | 65.8                                                                  | (106.0)                                                            | 48.4                                                                   | 75.6                                                 | 51.3                                          | 32.5                                          | 43                                                              | 981                                                                              | 31                                                                                         |
| 30                                                                                                  | 302                                                                         | 286                                                       | 286                                | 286                                             | 65.3                                                                  | (105.5)                                                            | 47.7                                                                   | 75.0                                                 | 50.4                                          | 31.3                                          | 42                                                              | 951                                                                              | 30                                                                                         |
| 29                                                                                                  | 294                                                                         | 279                                                       | 279                                | 279                                             | 64.7                                                                  | (104.5)                                                            | 47.0                                                                   | 74.5                                                 | 49.5                                          | 30.1                                          | 41                                                              | 932                                                                              | 29                                                                                         |
| 28                                                                                                  | 286                                                                         | 271                                                       | 271                                | 271                                             | 64.3                                                                  | (104.0)                                                            | 46.1                                                                   | 73.9                                                 | 48.6                                          | 28.9                                          | 41                                                              | 912                                                                              | 28                                                                                         |
| 27                                                                                                  | 279                                                                         | 264                                                       | 264                                | 264                                             | 63.8                                                                  | (103.0)                                                            | 45.2                                                                   | 73.3                                                 | 47.7                                          | 27.8                                          | 40                                                              | 883                                                                              | 27                                                                                         |
| 26                                                                                                  | 272                                                                         | 258                                                       | 258                                | 258                                             | 63.3                                                                  | (102.5)                                                            | 44.6                                                                   | 72.8                                                 | 46.8                                          | 26.7                                          | 38                                                              | 863                                                                              | 26                                                                                         |
| 25                                                                                                  | 266                                                                         | 253                                                       | 253                                | 253                                             | 62.8                                                                  | (101.5)                                                            | 43.8                                                                   | 72.2                                                 | 45.9                                          | 25.5                                          | 38                                                              | 843                                                                              | 25                                                                                         |
| 24                                                                                                  | 260                                                                         | 247                                                       | 247                                | 247                                             | 62.4                                                                  | (101.0)                                                            | 43.1                                                                   | 71.6                                                 | 45.0                                          | 24.3                                          | 37                                                              | 824                                                                              | 24                                                                                         |
| 23                                                                                                  | 254                                                                         | 243                                                       | 243                                | 243                                             | 62.0                                                                  | 100.0                                                              | 42.1                                                                   | 71.0                                                 | 44.0                                          | 23.1                                          | 36                                                              | 804                                                                              | 23                                                                                         |
| 22                                                                                                  | 248                                                                         | 237                                                       | 237                                | 237                                             | 61.5                                                                  | 99.0                                                               | 41.6                                                                   | 70.5                                                 | 43.2                                          | 22.0                                          | 35                                                              | 785                                                                              | 22                                                                                         |
| 21                                                                                                  | 243                                                                         | 231                                                       | 231                                | 231                                             | 61.0                                                                  | 98.5                                                               | 40.9                                                                   | 69.9                                                 | 42.3                                          | 20.7                                          | 35                                                              | 775                                                                              | 21                                                                                         |
| 20                                                                                                  | 238                                                                         | 226                                                       | 226                                | 226                                             | 60.5                                                                  | 97.8                                                               | 40.1                                                                   | 69.4                                                 | 41.5                                          | 19.6                                          | 34                                                              | 755                                                                              | 20                                                                                         |
| (18)                                                                                                | 230                                                                         | 219                                                       | 219                                | 219                                             | —                                                                     | 96.7                                                               | —                                                                      | —                                                    | —                                             | —                                             | 33                                                              | 736                                                                              | (18)                                                                                       |
| (16)                                                                                                | 222                                                                         | 212                                                       | 212                                | 212                                             | —                                                                     | 95.5                                                               | —                                                                      | —                                                    | —                                             | —                                             | 32                                                              | 706                                                                              | (16)                                                                                       |
| (14)                                                                                                | 213                                                                         | 203                                                       | 203                                | 203                                             | —                                                                     | 93.9                                                               | —                                                                      | —                                                    | —                                             | —                                             | 31                                                              | 677                                                                              | (14)                                                                                       |
| (12)                                                                                                | 204                                                                         | 194                                                       | 194                                | 194                                             | —                                                                     | 92.3                                                               | —                                                                      | —                                                    | —                                             | —                                             | 29                                                              | 647                                                                              | (12)                                                                                       |
| (10)                                                                                                | 196                                                                         | 187                                                       | 187                                | 187                                             | —                                                                     | 90.7                                                               | —                                                                      | —                                                    | —                                             | —                                             | 28                                                              | 618                                                                              | (10)                                                                                       |
| (8)                                                                                                 | 188                                                                         | 179                                                       | 179                                | 179                                             | —                                                                     | 89.5                                                               | —                                                                      | —                                                    | —                                             | —                                             | 27                                                              | 598                                                                              | (8)                                                                                        |
| (6)                                                                                                 | 180                                                                         | 171                                                       | 171                                | 171                                             | —                                                                     | 87.1                                                               | —                                                                      | —                                                    | —                                             | —                                             | 26                                                              | 579                                                                              | (6)                                                                                        |
| (4)                                                                                                 | 173                                                                         | 165                                                       | 165                                | 165                                             | —                                                                     | 85.5                                                               | —                                                                      | —                                                    | —                                             | —                                             | 25                                                              | 549                                                                              | (4)                                                                                        |
| (2)                                                                                                 | 166                                                                         | 158                                                       | 158                                | 158                                             | —                                                                     | 83.5                                                               | —                                                                      | —                                                    | —                                             | —                                             | 24                                                              | 530                                                                              | (2)                                                                                        |
| (0)                                                                                                 | 160                                                                         | 152                                                       | 152                                | 152                                             | —                                                                     | 81.7                                                               | —                                                                      | —                                                    | —                                             | —                                             | 24                                                              | 520                                                                              | (0)                                                                                        |

太字体の数字はASTM E 140表2による(SAE-ASM-ASTMが合同で調整したものです。)

注1) 表中括弧( )内の数字はあまり用いられない範囲のものです。

In above chart, figures with ( ) are not commonly used.

Rockwell scale A, C and D are scaled with diamond brale.