

# 硬さ換算表 (SAE J417) \* 1983 年改訂 (アメリカ自動車技術者協会)

## ■ 鋼のロックウェル C 硬さに対する近似的換算値 (1)

| (HRC)<br>ロック<br>ウェル<br>Cスケ<br>ール<br>硬 さ<br>(3) | (HV)<br>ビッカ<br>ース<br>硬 さ | ブリネル硬さ (HB)<br>10mm球<br>荷重3000kgf |                          | ロックウェル硬さ (3)                                |                                                    |                                              | 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 |                         |                         | (HS)<br>シヨ<br>ア<br>硬 さ | 引張強さ<br>(近似値)<br>MPa<br>(kgf/mm <sup>2</sup> )<br>(2) | ロック<br>ウェルC<br>スケール<br>硬 さ<br>(3) |
|------------------------------------------------|--------------------------|-----------------------------------|--------------------------|---------------------------------------------|----------------------------------------------------|----------------------------------------------|---------------------------------|-------------------------|-------------------------|------------------------|-------------------------------------------------------|-----------------------------------|
|                                                |                          | 標準球                               | タング<br>ステン<br>カーバ<br>イト球 | (HRA)<br>Aスケール<br>荷重60kgf<br>ダイヤモンド<br>円錐圧子 | (HRB)<br>Bスケール<br>荷重100kgf<br>径1.6mm<br>(1/16in) 球 | (HRD)<br>Dスケール<br>荷重100kgf<br>ダイヤモンド<br>円錐圧子 | 15-N<br>スケール<br>荷重15kgf         | 30-N<br>スケール<br>荷重30kgf | 45-N<br>スケール<br>荷重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 (212)                                            | 55                                |
| 54                                             | 577                      | —                                 | 543                      | 78.0                                        | —                                                  | 66.1                                         | 87.4                            | 72.0                    | 59.8                    | 72                     | 2015 (205)                                            | 54                                |
| 53                                             | 560                      | —                                 | 525                      | 77.4                                        | —                                                  | 65.4                                         | 86.9                            | 71.2                    | 58.6                    | 71                     | 1950 (199)                                            | 53                                |
| 52                                             | 544                      | (500)                             | 512                      | 76.8                                        | —                                                  | 64.6                                         | 86.4                            | 70.2                    | 57.4                    | 69                     | 1880 (192)                                            | 52                                |
| 51                                             | 528                      | (487)                             | 496                      | 76.3                                        | —                                                  | 63.8                                         | 85.9                            | 69.4                    | 56.1                    | 68                     | 1820 (186)                                            | 51                                |
| 50                                             | 513                      | (475)                             | 481                      | 75.9                                        | —                                                  | 63.1                                         | 85.5                            | 68.5                    | 55.0                    | 67                     | 1760 (179)                                            | 50                                |
| 49                                             | 498                      | (464)                             | 469                      | 75.2                                        | —                                                  | 62.1                                         | 85.0                            | 67.6                    | 53.8                    | 66                     | 1695 (173)                                            | 49                                |
| 48                                             | 484                      | 451                               | 455                      | 74.7                                        | —                                                  | 61.4                                         | 84.5                            | 66.7                    | 52.5                    | 64                     | 1635 (167)                                            | 48                                |
| 47                                             | 471                      | 442                               | 443                      | 74.1                                        | —                                                  | 60.8                                         | 83.9                            | 65.8                    | 51.4                    | 63                     | 1580 (161)                                            | 47                                |
| 46                                             | 458                      | 432                               | 432                      | 73.6                                        | —                                                  | 60.0                                         | 83.5                            | 64.8                    | 50.3                    | 62                     | 1530 (156)                                            | 46                                |
| 45                                             | 446                      | 421                               | 421                      | 73.1                                        | —                                                  | 59.2                                         | 83.0                            | 64.0                    | 49.0                    | 60                     | 1480 (151)                                            | 45                                |
| 44                                             | 434                      | 409                               | 409                      | 72.5                                        | —                                                  | 58.5                                         | 82.5                            | 63.1                    | 47.8                    | 58                     | 1435 (146)                                            | 44                                |
| 43                                             | 423                      | 400                               | 400                      | 72.0                                        | —                                                  | 57.7                                         | 82.0                            | 62.2                    | 46.7                    | 57                     | 1385 (141)                                            | 43                                |
| 42                                             | 412                      | 390                               | 390                      | 71.5                                        | —                                                  | 56.9                                         | 81.5                            | 61.3                    | 45.5                    | 56                     | 1340 (136)                                            | 42                                |
| 41                                             | 402                      | 381                               | 381                      | 70.9                                        | —                                                  | 56.2                                         | 80.9                            | 60.4                    | 44.3                    | 55                     | 1295 (132)                                            | 41                                |
| 40                                             | 392                      | 371                               | 371                      | 70.4                                        | —                                                  | 55.4                                         | 80.4                            | 59.5                    | 43.1                    | 54                     | 1250 (127)                                            | 40                                |
| 39                                             | 382                      | 362                               | 362                      | 69.9                                        | —                                                  | 54.6                                         | 79.9                            | 58.6                    | 41.9                    | 52                     | 1215 (124)                                            | 39                                |
| 38                                             | 372                      | 353                               | 353                      | 69.4                                        | —                                                  | 53.8                                         | 79.4                            | 57.7                    | 40.8                    | 51                     | 1180 (120)                                            | 38                                |
| 37                                             | 363                      | 344                               | 344                      | 68.9                                        | —                                                  | 53.1                                         | 78.8                            | 56.8                    | 39.6                    | 50                     | 1160 (118)                                            | 37                                |
| 36                                             | 354                      | 336                               | 336                      | 68.4                                        | (109.0)                                            | 52.3                                         | 78.3                            | 55.9                    | 38.4                    | 49                     | 1115 (114)                                            | 36                                |
| 35                                             | 345                      | 327                               | 327                      | 67.9                                        | (108.5)                                            | 51.5                                         | 77.7                            | 55.0                    | 37.2                    | 48                     | 1080 (110)                                            | 35                                |
| 34                                             | 336                      | 319                               | 319                      | 67.4                                        | (108.0)                                            | 50.8                                         | 77.2                            | 54.2                    | 36.1                    | 47                     | 1055 (108)                                            | 34                                |
| 33                                             | 327                      | 311                               | 311                      | 66.8                                        | (107.5)                                            | 50.0                                         | 76.6                            | 53.3                    | 34.9                    | 46                     | 1025 (105)                                            | 33                                |
| 32                                             | 318                      | 301                               | 301                      | 66.3                                        | (107.0)                                            | 49.2                                         | 76.1                            | 52.1                    | 33.7                    | 44                     | 1000 (102)                                            | 32                                |
| 31                                             | 310                      | 294                               | 294                      | 65.8                                        | (106.0)                                            | 48.4                                         | 75.6                            | 51.3                    | 32.5                    | 43                     | 980 (100)                                             | 31                                |
| 30                                             | 302                      | 286                               | 286                      | 65.3                                        | (105.5)                                            | 47.7                                         | 75.0                            | 50.4                    | 31.3                    | 42                     | 950 ( 97)                                             | 30                                |
| 29                                             | 294                      | 279                               | 279                      | 64.7                                        | (104.5)                                            | 47.0                                         | 74.5                            | 49.5                    | 30.1                    | 41                     | 930 ( 95)                                             | 29                                |
| 28                                             | 286                      | 271                               | 271                      | 64.3                                        | (104.0)                                            | 46.1                                         | 73.9                            | 48.6                    | 28.9                    | 41                     | 910 ( 93)                                             | 28                                |
| 27                                             | 279                      | 264                               | 264                      | 63.8                                        | (103.0)                                            | 45.2                                         | 73.3                            | 47.7                    | 27.8                    | 40                     | 880 ( 90)                                             | 27                                |
| 26                                             | 272                      | 258                               | 258                      | 63.3                                        | (102.5)                                            | 44.6                                         | 72.8                            | 46.8                    | 26.7                    | 38                     | 860 ( 88)                                             | 26                                |
| 25                                             | 266                      | 253                               | 253                      | 62.8                                        | (101.5)                                            | 43.8                                         | 72.2                            | 45.9                    | 25.5                    | 38                     | 840 ( 86)                                             | 25                                |
| 24                                             | 260                      | 247                               | 247                      | 62.4                                        | (101.0)                                            | 43.1                                         | 71.6                            | 45.0                    | 24.3                    | 37                     | 825 ( 84)                                             | 24                                |
| 23                                             | 254                      | 243                               | 243                      | 62.0                                        | 100.0                                              | 42.1                                         | 71.0                            | 44.0                    | 23.1                    | 36                     | 805 ( 82)                                             | 23                                |
| 22                                             | 248                      | 237                               | 237                      | 61.5                                        | 99.0                                               | 41.6                                         | 70.5                            | 43.2                    | 22.0                    | 35                     | 785 ( 80)                                             | 22                                |
| 21                                             | 243                      | 231                               | 231                      | 61.0                                        | 98.5                                               | 40.9                                         | 69.9                            | 42.3                    | 20.7                    | 35                     | 770 ( 79)                                             | 21                                |
| 20                                             | 238                      | 226                               | 226                      | 60.5                                        | 97.8                                               | 40.1                                         | 69.4                            | 41.5                    | 19.6                    | 34                     | 760 ( 77)                                             | 20                                |
| (18)                                           | 230                      | 219                               | 219                      | —                                           | 96.7                                               | —                                            | —                               | —                       | —                       | 33                     | 730 ( 75)                                             | (18)                              |
| (16)                                           | 222                      | 212                               | 212                      | —                                           | 95.5                                               | —                                            | —                               | —                       | —                       | 32                     | 705 ( 72)                                             | (16)                              |
| (14)                                           | 213                      | 203                               | 203                      | —                                           | 93.9                                               | —                                            | —                               | —                       | —                       | 31                     | 675 ( 69)                                             | (14)                              |
| (12)                                           | 204                      | 194                               | 194                      | —                                           | 92.3                                               | —                                            | —                               | —                       | —                       | 29                     | 650 ( 66)                                             | (12)                              |
| (10)                                           | 196                      | 187                               | 187                      | —                                           | 90.7                                               | —                                            | —                               | —                       | —                       | 28                     | 620 ( 63)                                             | (10)                              |
| (8)                                            | 188                      | 179                               | 179                      | —                                           | 89.5                                               | —                                            | —                               | —                       | —                       | 27                     | 600 ( 61)                                             | (8)                               |
| (6)                                            | 180                      | 171                               | 171                      | —                                           | 87.1                                               | —                                            | —                               | —                       | —                       | 26                     | 580 ( 59)                                             | (6)                               |
| (4)                                            | 173                      | 165                               | 165                      | —                                           | 85.5                                               | —                                            | —                               | —                       | —                       | 25                     | 550 ( 56)                                             | (4)                               |
| (2)                                            | 166                      | 158                               | 158                      | —                                           | 83.5                                               | —                                            | —                               | —                       | —                       | 24                     | 530 ( 54)                                             | (2)                               |
| (0)                                            | 160                      | 152                               | 152                      | —                                           | 81.7                                               | —                                            | —                               | —                       | —                       | 24                     | 515 ( 53)                                             | (0)                               |

注 (1) 青色の数字は、ASTM E 140 表 1 による (SAE・ASM・ASTM が合同で調整したものである)

(2) 1MPa = 1N/mm<sup>2</sup> = 1/9.80665kgf/mm<sup>2</sup>

(3) 表中括弧 ( ) 内の数字は、あまり用いられない範囲のものであり参考として示したものである。