

| Temp.<br>(°C) | Pressure<br>(bar A) | Volume<br>(m <sup>3</sup> /kg) |         | Density<br>(kg/m <sup>3</sup> ) |        | Enthalpy<br>(kJ/kg) |        |        | Entropy<br>(kJ/kg-K) |        | Int. Energy<br>(kJ/kg) |        | Cp/Cv  |        | Sound Speed<br>(m/s) |        |
|---------------|---------------------|--------------------------------|---------|---------------------------------|--------|---------------------|--------|--------|----------------------|--------|------------------------|--------|--------|--------|----------------------|--------|
|               |                     | Liquid                         | Vapor   | Liquid                          | Vapor  | Liquid              | Latent | Vapor  | Liquid               | Vapor  | Liquid                 | Vapor  | Liquid | Vapor  | Liquid               | Vapor  |
| -60           | 0,427               | 0,00166                        | 0,9225  | 601,08                          | 1,0840 | -44,31              | 443,62 | 399,31 | -0,1981              | 1,8832 | -44,38                 | 359,93 | 1,5445 | 1,1812 | 1278,40              | 213,46 |
| -59           | 0,450               | 0,00167                        | 0,87858 | 599,97                          | 1,1382 | -42,14              | 442,66 | 400,52 | -0,1880              | 1,8791 | -42,21                 | 360,98 | 1,5449 | 1,1811 | 1271,80              | 213,78 |
| -58           | 0,474               | 0,00167                        | 0,83719 | 598,86                          | 1,1945 | -39,96              | 441,68 | 401,72 | -0,1778              | 1,8751 | -40,04                 | 362,03 | 1,5454 | 1,1811 | 1265,20              | 214,10 |
| -57           | 0,499               | 0,00167                        | 0,79814 | 597,75                          | 1,2529 | -37,77              | 440,70 | 402,93 | -0,1677              | 1,8711 | -37,86                 | 363,09 | 1,5459 | 1,1812 | 1258,60              | 214,42 |
| -56           | 0,525               | 0,00168                        | 0,7613  | 596,64                          | 1,3135 | -35,58              | 439,71 | 404,13 | -0,1576              | 1,8673 | -35,67                 | 364,14 | 1,5463 | 1,1812 | 1252,00              | 214,72 |
| -55           | 0,552               | 0,00168                        | 0,72651 | 595,52                          | 1,3764 | -33,39              | 438,73 | 405,34 | -0,1476              | 1,8635 | -33,49                 | 365,20 | 1,5468 | 1,1812 | 1245,40              | 215,03 |
| -54           | 0,581               | 0,00168                        | 0,69364 | 594,4                           | 1,4417 | -31,20              | 437,74 | 406,54 | -0,1376              | 1,8599 | -31,29                 | 366,25 | 1,5472 | 1,1813 | 1238,80              | 215,32 |
| -53           | 0,610               | 0,00169                        | 0,66257 | 593,28                          | 1,5093 | -29,00              | 436,74 | 407,74 | -0,1276              | 1,8563 | -29,10                 | 367,31 | 1,5477 | 1,1814 | 1232,20              | 215,61 |
| -52           | 0,641               | 0,00169                        | 0,63318 | 592,15                          | 1,5793 | -26,79              | 435,74 | 408,95 | -0,1176              | 1,8527 | -26,90                 | 368,37 | 1,5482 | 1,1815 | 1225,70              | 215,90 |
| -51           | 0,673               | 0,00169                        | 0,60538 | 591,03                          | 1,6519 | -24,58              | 434,73 | 410,15 | -0,1077              | 1,8493 | -24,70                 | 369,43 | 1,5486 | 1,1816 | 1219,10              | 216,18 |
| -50           | 0,706               | 0,00170                        | 0,57905 | 589,9                           | 1,7270 | -22,37              | 433,72 | 411,35 | -0,0978              | 1,8459 | -22,49                 | 370,49 | 1,5491 | 1,1817 | 1212,50              | 216,45 |
| -49           | 0,740               | 0,00170                        | 0,55412 | 588,76                          | 1,8047 | -20,15              | 432,71 | 412,56 | -0,0879              | 1,8426 | -20,28                 | 371,55 | 1,5496 | 1,1818 | 1206,00              | 216,72 |
| -48           | 0,776               | 0,00170                        | 0,53048 | 587,63                          | 1,8851 | -17,93              | 431,69 | 413,76 | -0,0780              | 1,8393 | -18,07                 | 372,62 | 1,5501 | 1,1820 | 1199,40              | 216,98 |
| -47           | 0,813               | 0,00171                        | 0,50807 | 586,49                          | 1,9682 | -15,71              | 430,67 | 414,96 | -0,0682              | 1,8362 | -15,85                 | 373,68 | 1,5505 | 1,1822 | 1192,80              | 217,24 |
| -46           | 0,851               | 0,00171                        | 0,48681 | 585,35                          | 2,0542 | -13,48              | 429,64 | 416,16 | -0,0584              | 1,8331 | -13,62                 | 374,74 | 1,5510 | 1,1824 | 1186,30              | 217,49 |
| -45           | 0,891               | 0,00171                        | 0,46663 | 584,2                           | 2,1430 | -11,24              | 428,60 | 417,36 | -0,0486              | 1,8300 | -11,40                 | 375,81 | 1,5515 | 1,1826 | 1179,70              | 217,73 |
| -44           | 0,932               | 0,00172                        | 0,44747 | 583,06                          | 2,2348 | -9,00               | 427,56 | 418,56 | -0,0388              | 1,8271 | -9,16                  | 376,88 | 1,5520 | 1,1828 | 1173,20              | 217,97 |
| -43           | 0,974               | 0,00172                        | 0,42926 | 581,91                          | 2,3296 | -6,76               | 426,52 | 419,76 | -0,0291              | 1,8242 | -6,93                  | 377,94 | 1,5525 | 1,1831 | 1166,60              | 218,20 |
| -42           | 1,018               | 0,00172                        | 0,41196 | 580,75                          | 2,4274 | -4,51               | 425,47 | 420,96 | -0,0194              | 1,8213 | -4,69                  | 379,01 | 1,5530 | 1,1834 | 1160,10              | 218,42 |
| -41           | 1,064               | 0,00173                        | 0,3955  | 579,59                          | 2,5284 | -2,26               | 424,42 | 422,16 | -0,0097              | 1,8185 | -2,44                  | 380,08 | 1,5536 | 1,1836 | 1153,60              | 218,64 |
| -40           | 1,111               | 0,00173                        | 0,37985 | 578,43                          | 2,6326 | 0,00                | 423,36 | 423,36 | 0,0000               | 1,8158 | -0,19                  | 381,15 | 1,5541 | 1,1840 | 1147,00              | 218,85 |
| -39           | 1,160               | 0,00173                        | 0,36495 | 577,27                          | 2,7401 | 2,26                | 422,29 | 424,55 | 0,0096               | 1,8131 | 2,06                   | 382,22 | 1,5546 | 1,1843 | 1140,50              | 219,06 |
| -38           | 1,211               | 0,00174                        | 0,35076 | 576,1                           | 2,8509 | 4,53                | 421,22 | 425,75 | 0,0193               | 1,8105 | 4,32                   | 383,28 | 1,5552 | 1,1846 | 1134,00              | 219,26 |
| -37           | 1,263               | 0,00174                        | 0,33725 | 574,93                          | 2,9652 | 6,80                | 420,14 | 426,94 | 0,0289               | 1,8080 | 6,58                   | 384,36 | 1,5557 | 1,1850 | 1127,40              | 219,45 |
| -36           | 1,317               | 0,00174                        | 0,32437 | 573,76                          | 3,0829 | 9,08                | 419,05 | 428,13 | 0,0385               | 1,8055 | 8,85                   | 385,43 | 1,5563 | 1,1854 | 1120,90              | 219,63 |
| -35           | 1,372               | 0,00175                        | 0,31209 | 572,58                          | 3,2042 | 11,36               | 417,96 | 429,32 | 0,0480               | 1,8031 | 11,12                  | 386,50 | 1,5569 | 1,1858 | 1114,40              | 219,81 |
| -34           | 1,430               | 0,00175                        | 0,30037 | 571,4                           | 3,3292 | 13,65               | 416,86 | 430,51 | 0,0576               | 1,8007 | 13,40                  | 387,57 | 1,5575 | 1,1863 | 1107,80              | 219,98 |
| -33           | 1,489               | 0,00175                        | 0,2892  | 570,22                          | 3,4578 | 15,94               | 415,76 | 431,70 | 0,0671               | 1,7983 | 15,68                  | 388,64 | 1,5580 | 1,1867 | 1101,30              | 220,15 |
| -32           | 1,550               | 0,00176                        | 0,27853 | 569,03                          | 3,5903 | 18,24               | 414,65 | 432,89 | 0,0766               | 1,7961 | 17,97                  | 389,71 | 1,5586 | 1,1872 | 1094,80              | 220,31 |
| -31           | 1,613               | 0,00176                        | 0,26834 | 567,84                          | 3,7266 | 20,54               | 413,54 | 434,08 | 0,0861               | 1,7938 | 20,26                  | 390,79 | 1,5593 | 1,1877 | 1088,30              | 220,46 |
| -30           | 1,678               | 0,00176                        | 0,25861 | 566,64                          | 3,8669 | 22,85               | 412,41 | 435,26 | 0,0955               | 1,7917 | 22,56                  | 391,86 | 1,5599 | 1,1882 | 1081,70              | 220,60 |
| -29           | 1,745               | 0,00177                        | 0,2493  | 565,44                          | 4,0112 | 25,17               | 411,28 | 436,44 | 0,1050               | 1,7895 | 24,86                  | 392,93 | 1,5605 | 1,1888 | 1075,20              | 220,74 |
| -28           | 1,814               | 0,00177                        | 0,24041 | 564,23                          | 4,1596 | 27,48               | 410,14 | 437,62 | 0,1144               | 1,7874 | 27,16                  | 394,00 | 1,5612 | 1,1894 | 1068,70              | 220,87 |
| -27           | 1,886               | 0,00178                        | 0,2319  | 563,03                          | 4,3122 | 29,81               | 408,99 | 438,80 | 0,1238               | 1,7854 | 29,47                  | 395,08 | 1,5618 | 1,1900 | 1062,20              | 220,99 |
| -26           | 1,959               | 0,00178                        | 0,22376 | 561,81                          | 4,4690 | 32,14               | 407,84 | 439,98 | 0,1332               | 1,7834 | 31,79                  | 396,15 | 1,5625 | 1,1906 | 1055,60              | 221,10 |
| -25           | 2,034               | 0,00178                        | 0,21597 | 560,6                           | 4,6302 | 34,48               | 406,69 | 441,16 | 0,1426               | 1,7815 | 34,11                  | 397,22 | 1,5632 | 1,1912 | 1049,10              | 221,21 |
| -24           | 2,112               | 0,00179                        | 0,20851 | 559,38                          | 4,7959 | 36,82               | 405,51 | 442,33 | 0,1520               | 1,7796 | 36,44                  | 398,30 | 1,5639 | 1,1919 | 1042,60              | 221,31 |
| -23           | 2,192               | 0,00179                        | 0,20137 | 558,15                          | 4,9661 | 39,16               | 404,34 | 443,50 | 0,1613               | 1,7777 | 38,77                  | 399,37 | 1,5646 | 1,1926 | 1036,10              | 221,40 |
| -22           | 2,274               | 0,00180                        | 0,19452 | 556,92                          | 5,1409 | 41,52               | 403,15 | 444,67 | 0,1706               | 1,7759 | 41,11                  | 400,44 | 1,5653 | 1,1934 | 1029,50              | 221,49 |
| -21           | 2,358               | 0,00180                        | 0,18796 | 555,69                          | 5,3203 | 43,88               | 401,97 | 445,84 | 0,1800               | 1,7741 | 43,45                  | 401,52 | 1,5661 | 1,1941 | 1023,00              | 221,57 |



| Temp.<br>(°C) | Pressure<br>(bar A) | Volume<br>(m <sup>3</sup> /kg) |         | Density<br>(kg/m <sup>3</sup> ) |         | Enthalpy<br>(kJ/kg) |        |        | Entropy<br>(kJ/kg-K) |        | Int. Energy<br>(kJ/kg) |        | Cp/Cv  |        | Sound Speed<br>(m/s) |        |
|---------------|---------------------|--------------------------------|---------|---------------------------------|---------|---------------------|--------|--------|----------------------|--------|------------------------|--------|--------|--------|----------------------|--------|
|               |                     | Liquid                         | Vapor   | Liquid                          | Vapor   | Liquid              | Latent | Vapor  | Liquid               | Vapor  | Liquid                 | Vapor  | Liquid | Vapor  | Liquid               | Vapor  |
| -20           | 2,445               | 0,00180                        | 0,18167 | 554,45                          | 5,5046  | 46,24               | 400,77 | 447,01 | 0,1893               | 1,7724 | 45,80                  | 402,59 | 1,5668 | 1,1949 | 1016,50              | 221,64 |
| -19           | 2,534               | 0,00181                        | 0,17563 | 553,21                          | 5,6938  | 48,61               | 399,56 | 448,17 | 0,1985               | 1,7707 | 48,15                  | 403,66 | 1,5676 | 1,1957 | 1010,00              | 221,70 |
| -18           | 2,626               | 0,00181                        | 0,16984 | 551,96                          | 5,8879  | 50,99               | 398,34 | 449,33 | 0,2078               | 1,7690 | 50,51                  | 404,73 | 1,5684 | 1,1966 | 1003,40              | 221,75 |
| -17           | 2,720               | 0,00182                        | 0,16428 | 550,71                          | 6,0872  | 53,37               | 397,12 | 450,49 | 0,2171               | 1,7674 | 52,88                  | 405,80 | 1,5692 | 1,1975 | 996,89               | 221,80 |
| -16           | 2,817               | 0,00182                        | 0,15894 | 549,45                          | 6,2916  | 55,76               | 395,89 | 451,65 | 0,2263               | 1,7658 | 55,25                  | 406,88 | 1,5700 | 1,1984 | 990,36               | 221,84 |
| -15           | 2,916               | 0,00182                        | 0,15382 | 548,19                          | 6,5012  | 58,15               | 394,65 | 452,80 | 0,2355               | 1,7643 | 57,62                  | 407,95 | 1,5708 | 1,1993 | 983,82               | 221,87 |
| -14           | 3,018               | 0,00183                        | 0,14889 | 546,92                          | 6,7162  | 60,56               | 393,40 | 453,95 | 0,2447               | 1,7628 | 60,00                  | 409,02 | 1,5717 | 1,2003 | 977,29               | 221,89 |
| -13           | 3,123               | 0,00183                        | 0,14416 | 545,65                          | 6,9367  | 62,96               | 392,14 | 455,10 | 0,2539               | 1,7613 | 62,39                  | 410,09 | 1,5726 | 1,2013 | 970,75               | 221,90 |
| -12           | 3,230               | 0,00184                        | 0,13961 | 544,37                          | 7,1628  | 65,38               | 390,87 | 456,25 | 0,2631               | 1,7598 | 64,78                  | 411,15 | 1,5735 | 1,2024 | 964,20               | 221,91 |
| -11           | 3,340               | 0,00184                        | 0,13523 | 543,09                          | 7,3945  | 67,80               | 389,59 | 457,39 | 0,2723               | 1,7584 | 67,18                  | 412,22 | 1,5744 | 1,2035 | 957,66               | 221,90 |
| -10           | 3,453               | 0,00185                        | 0,13103 | 541,8                           | 7,6321  | 70,23               | 388,31 | 458,53 | 0,2815               | 1,7571 | 69,59                  | 413,29 | 1,5753 | 1,2046 | 951,11               | 221,89 |
| -9            | 3,569               | 0,00185                        | 0,12698 | 540,5                           | 7,8755  | 72,66               | 387,01 | 459,67 | 0,2906               | 1,7557 | 72,00                  | 414,36 | 1,5763 | 1,2058 | 944,56               | 221,87 |
| -8            | 3,687               | 0,00185                        | 0,12308 | 539,2                           | 8,1249  | 75,10               | 385,70 | 460,80 | 0,2997               | 1,7544 | 74,42                  | 415,42 | 1,5773 | 1,2070 | 938,01               | 221,84 |
| -7            | 3,809               | 0,00186                        | 0,11933 | 537,9                           | 8,3804  | 77,55               | 384,38 | 461,93 | 0,3089               | 1,7531 | 76,84                  | 416,49 | 1,5783 | 1,2082 | 931,45               | 221,81 |
| -6            | 3,933               | 0,00186                        | 0,11571 | 536,59                          | 8,6422  | 80,00               | 383,06 | 463,06 | 0,3180               | 1,7518 | 79,27                  | 417,55 | 1,5793 | 1,2095 | 924,89               | 221,76 |
| -5            | 4,060               | 0,00187                        | 0,11223 | 535,27                          | 8,9103  | 82,46               | 381,72 | 464,18 | 0,3271               | 1,7506 | 81,70                  | 418,61 | 1,5804 | 1,2108 | 918,33               | 221,71 |
| -4            | 4,191               | 0,00187                        | 0,10887 | 533,95                          | 9,1849  | 84,93               | 380,37 | 465,30 | 0,3362               | 1,7494 | 84,15                  | 419,67 | 1,5815 | 1,2122 | 911,77               | 221,64 |
| -3            | 4,325               | 0,00188                        | 0,10564 | 532,62                          | 9,4661  | 87,41               | 379,01 | 466,42 | 0,3453               | 1,7482 | 86,60                  | 420,73 | 1,5826 | 1,2136 | 905,20               | 221,57 |
| -2            | 4,461               | 0,00188                        | 0,10252 | 531,28                          | 9,7540  | 89,89               | 377,64 | 467,53 | 0,3544               | 1,7471 | 89,05                  | 421,79 | 1,5838 | 1,2150 | 898,63               | 221,49 |
| -1            | 4,601               | 0,00189                        | 0,09951 | 529,94                          | 10,0490 | 92,38               | 376,26 | 468,64 | 0,3634               | 1,7460 | 91,51                  | 422,85 | 1,5849 | 1,2165 | 892,05               | 221,40 |
| 0             | 4,745               | 0,00189                        | 0,09661 | 528,59                          | 10,3510 | 94,88               | 374,86 | 469,74 | 0,3725               | 1,7449 | 93,98                  | 423,90 | 1,5862 | 1,2181 | 885,47               | 221,30 |
| 1             | 4,891               | 0,00190                        | 0,09381 | 527,24                          | 10,6590 | 97,38               | 373,46 | 470,84 | 0,3815               | 1,7438 | 96,45                  | 424,96 | 1,5874 | 1,2197 | 878,89               | 221,19 |
| 2             | 5,041               | 0,00190                        | 0,09111 | 525,88                          | 10,9750 | 99,89               | 372,05 | 471,94 | 0,3906               | 1,7427 | 98,94                  | 426,01 | 1,5887 | 1,2213 | 872,30               | 221,07 |
| 3             | 5,194               | 0,00191                        | 0,0885  | 524,51                          | 11,2990 | 102,41              | 370,62 | 473,03 | 0,3996               | 1,7417 | 101,42                 | 427,06 | 1,5900 | 1,2231 | 865,71               | 220,94 |
| 4             | 5,351               | 0,00191                        | 0,08599 | 523,13                          | 11,6300 | 104,94              | 369,18 | 474,12 | 0,4087               | 1,7407 | 103,92                 | 428,11 | 1,5913 | 1,2248 | 859,11               | 220,80 |
| 5             | 5,511               | 0,00192                        | 0,08355 | 521,75                          | 11,9690 | 107,48              | 367,72 | 475,20 | 0,4177               | 1,7397 | 106,42                 | 429,16 | 1,5927 | 1,2266 | 852,51               | 220,65 |
| 6             | 5,675               | 0,00192                        | 0,0812  | 520,36                          | 12,3150 | 110,02              | 366,26 | 476,28 | 0,4267               | 1,7387 | 108,93                 | 430,20 | 1,5941 | 1,2285 | 845,91               | 220,50 |
| 7             | 5,842               | 0,00193                        | 0,07893 | 518,96                          | 12,6700 | 112,57              | 364,79 | 477,36 | 0,4357               | 1,7378 | 111,45                 | 431,25 | 1,5956 | 1,2305 | 839,30               | 220,33 |
| 8             | 6,013               | 0,00193                        | 0,07673 | 517,56                          | 13,0320 | 115,13              | 363,30 | 478,43 | 0,4447               | 1,7369 | 113,97                 | 432,29 | 1,5971 | 1,2325 | 832,69               | 220,15 |
| 9             | 6,188               | 0,00194                        | 0,07461 | 516,15                          | 13,4030 | 117,70              | 361,79 | 479,49 | 0,4537               | 1,7360 | 116,50                 | 433,32 | 1,5986 | 1,2345 | 826,07               | 219,97 |
| 10            | 6,366               | 0,00194                        | 0,07256 | 514,73                          | 13,7830 | 120,27              | 360,28 | 480,55 | 0,4627               | 1,7351 | 119,04                 | 434,36 | 1,6002 | 1,2367 | 819,44               | 219,77 |
| 11            | 6,548               | 0,00195                        | 0,07057 | 513,3                           | 14,1710 | 122,86              | 358,74 | 481,60 | 0,4717               | 1,7342 | 121,58                 | 435,39 | 1,6019 | 1,2389 | 812,81               | 219,56 |
| 12            | 6,734               | 0,00195                        | 0,06865 | 511,86                          | 14,5680 | 125,45              | 357,20 | 482,65 | 0,4807               | 1,7333 | 124,14                 | 436,43 | 1,6036 | 1,2411 | 806,18               | 219,34 |
| 13            | 6,924               | 0,00196                        | 0,06679 | 510,42                          | 14,9730 | 128,05              | 355,64 | 483,69 | 0,4896               | 1,7325 | 126,70                 | 437,45 | 1,6053 | 1,2435 | 799,53               | 219,12 |
| 14            | 7,118               | 0,00196                        | 0,06498 | 508,97                          | 15,3880 | 130,66              | 354,07 | 484,73 | 0,4986               | 1,7316 | 129,26                 | 438,48 | 1,6071 | 1,2459 | 792,89               | 218,88 |
| 15            | 7,315               | 0,00197                        | 0,06324 | 507,5                           | 15,8130 | 133,28              | 352,48 | 485,76 | 0,5076               | 1,7308 | 131,84                 | 439,50 | 1,6089 | 1,2484 | 786,23               | 218,63 |
| 16            | 7,517               | 0,00198                        | 0,06155 | 506,03                          | 16,2470 | 135,91              | 350,88 | 486,79 | 0,5165               | 1,7300 | 134,42                 | 440,52 | 1,6108 | 1,2510 | 779,57               | 218,37 |
| 17            | 7,723               | 0,00198                        | 0,05991 | 504,55                          | 16,6910 | 138,55              | 349,26 | 487,81 | 0,5255               | 1,7292 | 137,02                 | 441,54 | 1,6128 | 1,2537 | 772,90               | 218,10 |
| 18            | 7,932               | 0,00199                        | 0,05833 | 503,06                          | 17,1440 | 141,19              | 347,63 | 488,82 | 0,5345               | 1,7284 | 139,62                 | 442,55 | 1,6148 | 1,2564 | 766,23               | 217,82 |
| 19            | 8,146               | 0,00199                        | 0,05679 | 501,57                          | 17,6080 | 143,85              | 345,98 | 489,83 | 0,5434               | 1,7277 | 142,22                 | 443,56 | 1,6169 | 1,2593 | 759,55               | 217,52 |



| Temp.<br>(°C) | Pressure<br>(bar A) | Volume<br>(m <sup>3</sup> /kg) |         | Density<br>(kg/m <sup>3</sup> ) |         | Enthalpy<br>(kJ/kg) |        |        | Entropy<br>(kJ/kg-K) |        | Int. Energy<br>(kJ/kg) |        | Cp/Cv  |        | Sound Speed<br>(m/s) |        |
|---------------|---------------------|--------------------------------|---------|---------------------------------|---------|---------------------|--------|--------|----------------------|--------|------------------------|--------|--------|--------|----------------------|--------|
|               |                     | Liquid                         | Vapor   | Liquid                          | Vapor   | Liquid              | Latent | Vapor  | Liquid               | Vapor  | Liquid                 | Vapor  | Liquid | Vapor  | Liquid               | Vapor  |
| 20            | 8,365               | 0,00200                        | 0,0553  | 500,06                          | 18,0820 | 146,51              | 344,32 | 490,83 | 0,5524               | 1,7269 | 144,84                 | 444,57 | 1,6191 | 1,2622 | 752,86               | 217,22 |
| 21            | 8,587               | 0,00201                        | 0,05386 | 498,54                          | 18,5670 | 149,19              | 342,63 | 491,82 | 0,5613               | 1,7262 | 147,46                 | 445,57 | 1,6213 | 1,2652 | 746,16               | 216,90 |
| 22            | 8,814               | 0,00201                        | 0,05246 | 497,01                          | 19,0630 | 151,87              | 340,94 | 492,81 | 0,5703               | 1,7254 | 150,10                 | 446,57 | 1,6236 | 1,2684 | 739,45               | 216,58 |
| 23            | 9,045               | 0,00202                        | 0,0511  | 495,47                          | 19,5700 | 154,56              | 339,22 | 493,78 | 0,5792               | 1,7247 | 152,74                 | 447,56 | 1,6259 | 1,2716 | 732,74               | 216,24 |
| 24            | 9,281               | 0,00202                        | 0,04978 | 493,92                          | 20,0880 | 157,27              | 337,48 | 494,75 | 0,5882               | 1,7239 | 155,39                 | 448,55 | 1,6284 | 1,2750 | 726,02               | 215,89 |
| 25            | 9,521               | 0,00203                        | 0,0485  | 492,36                          | 20,6180 | 159,98              | 335,74 | 495,72 | 0,5971               | 1,7232 | 158,05                 | 449,54 | 1,6309 | 1,2785 | 719,29               | 215,53 |
| 26            | 9,765               | 0,00204                        | 0,04726 | 490,79                          | 21,1600 | 162,71              | 333,96 | 496,67 | 0,6061               | 1,7225 | 160,72                 | 450,52 | 1,6335 | 1,2821 | 712,54               | 215,15 |
| 27            | 10,014              | 0,00204                        | 0,04606 | 489,21                          | 21,7130 | 165,44              | 332,18 | 497,62 | 0,6151               | 1,7218 | 163,39                 | 451,50 | 1,6362 | 1,2858 | 705,79               | 214,77 |
| 28            | 10,268              | 0,00205                        | 0,04488 | 487,62                          | 22,2800 | 168,19              | 330,37 | 498,56 | 0,6240               | 1,7211 | 166,08                 | 452,47 | 1,6390 | 1,2897 | 699,03               | 214,37 |
| 29            | 10,527              | 0,00206                        | 0,04375 | 486,01                          | 22,8590 | 170,94              | 328,55 | 499,49 | 0,6330               | 1,7203 | 168,78                 | 453,44 | 1,6419 | 1,2937 | 692,26               | 213,96 |
| 30            | 10,790              | 0,00206                        | 0,04264 | 484,39                          | 23,4510 | 173,71              | 326,70 | 500,41 | 0,6419               | 1,7196 | 171,48                 | 454,40 | 1,6449 | 1,2978 | 685,48               | 213,53 |
| 31            | 11,058              | 0,00207                        | 0,04157 | 482,76                          | 24,0560 | 176,49              | 324,84 | 501,33 | 0,6509               | 1,7189 | 174,20                 | 455,36 | 1,6480 | 1,3021 | 678,69               | 213,10 |
| 32            | 11,331              | 0,00208                        | 0,04053 | 481,12                          | 24,6750 | 179,28              | 322,95 | 502,23 | 0,6599               | 1,7182 | 176,92                 | 456,31 | 1,6512 | 1,3066 | 671,88               | 212,65 |
| 33            | 11,608              | 0,00209                        | 0,03951 | 479,46                          | 25,3080 | 182,08              | 321,04 | 503,12 | 0,6689               | 1,7175 | 179,66                 | 457,26 | 1,6545 | 1,3112 | 665,06               | 212,19 |
| 34            | 11,891              | 0,00209                        | 0,03853 | 477,79                          | 25,9560 | 184,89              | 319,12 | 504,01 | 0,6778               | 1,7168 | 182,40                 | 458,20 | 1,6580 | 1,3160 | 658,23               | 211,71 |
| 35            | 12,179              | 0,00210                        | 0,03757 | 476,1                           | 26,6180 | 187,72              | 317,16 | 504,88 | 0,6868               | 1,7161 | 185,16                 | 459,13 | 1,6615 | 1,3209 | 651,39               | 211,22 |
| 36            | 12,472              | 0,00211                        | 0,03664 | 474,41                          | 27,2950 | 190,55              | 315,20 | 505,75 | 0,6958               | 1,7154 | 187,92                 | 460,06 | 1,6653 | 1,3261 | 644,53               | 210,72 |
| 37            | 12,769              | 0,00212                        | 0,03573 | 472,69                          | 27,9880 | 193,40              | 313,20 | 506,60 | 0,7048               | 1,7146 | 190,70                 | 460,98 | 1,6691 | 1,3314 | 637,66               | 210,21 |
| 38            | 13,072              | 0,00212                        | 0,03485 | 470,96                          | 28,6970 | 196,26              | 311,18 | 507,44 | 0,7138               | 1,7139 | 193,49                 | 461,89 | 1,6731 | 1,3370 | 630,78               | 209,68 |
| 39            | 13,381              | 0,00213                        | 0,03399 | 469,22                          | 29,4230 | 199,14              | 309,13 | 508,27 | 0,7228               | 1,7132 | 196,29                 | 462,79 | 1,6772 | 1,3428 | 623,88               | 209,13 |
| 40            | 13,694              | 0,00214                        | 0,03315 | 467,46                          | 30,1650 | 202,02              | 307,07 | 509,09 | 0,7318               | 1,7124 | 199,10                 | 463,69 | 1,6815 | 1,3488 | 616,96               | 208,57 |
| 41            | 14,013              | 0,00215                        | 0,03234 | 465,68                          | 30,9240 | 204,93              | 304,97 | 509,90 | 0,7409               | 1,7117 | 201,92                 | 464,58 | 1,6860 | 1,3551 | 610,03               | 208,00 |
| 42            | 14,337              | 0,00216                        | 0,03154 | 463,89                          | 31,7010 | 207,84              | 302,85 | 510,69 | 0,7499               | 1,7109 | 204,75                 | 465,47 | 1,6907 | 1,3616 | 603,08               | 207,42 |
| 43            | 14,667              | 0,00216                        | 0,03077 | 462,08                          | 32,4970 | 210,77              | 300,70 | 511,47 | 0,7590               | 1,7101 | 207,59                 | 466,34 | 1,6955 | 1,3684 | 596,12               | 206,81 |
| 44            | 15,002              | 0,00217                        | 0,03002 | 460,25                          | 33,3120 | 213,71              | 298,53 | 512,24 | 0,7680               | 1,7093 | 210,45                 | 467,20 | 1,7006 | 1,3755 | 589,13               | 206,20 |
| 45            | 15,343              | 0,00218                        | 0,02929 | 458,4                           | 34,1460 | 216,67              | 296,32 | 512,99 | 0,7771               | 1,7085 | 213,32                 | 468,06 | 1,7058 | 1,3829 | 582,13               | 205,57 |
| 46            | 15,690              | 0,00219                        | 0,02857 | 456,54                          | 35,0000 | 219,64              | 294,09 | 513,73 | 0,7862               | 1,7077 | 216,20                 | 468,91 | 1,7113 | 1,3906 | 575,10               | 204,92 |
| 47            | 16,042              | 0,00220                        | 0,02788 | 454,65                          | 35,8740 | 222,62              | 291,84 | 514,46 | 0,7953               | 1,7068 | 219,10                 | 469,74 | 1,7170 | 1,3986 | 568,06               | 204,25 |
| 48            | 16,400              | 0,00221                        | 0,0272  | 452,75                          | 36,7710 | 225,63              | 289,54 | 515,17 | 0,8044               | 1,7060 | 222,00                 | 470,57 | 1,7230 | 1,4070 | 561,00               | 203,57 |
| 49            | 16,763              | 0,00222                        | 0,02653 | 450,82                          | 37,6890 | 228,64              | 287,22 | 515,86 | 0,8135               | 1,7051 | 224,93                 | 471,38 | 1,7292 | 1,4158 | 553,91               | 202,88 |
| 50            | 17,133              | 0,00223                        | 0,02589 | 448,87                          | 38,6300 | 231,68              | 284,86 | 516,54 | 0,8227               | 1,7042 | 227,86                 | 472,19 | 1,7357 | 1,4250 | 546,80               | 202,17 |
| 51            | 17,509              | 0,00224                        | 0,02526 | 446,9                           | 39,5940 | 234,73              | 282,47 | 517,20 | 0,8319               | 1,7033 | 230,81                 | 472,98 | 1,7425 | 1,4347 | 539,67               | 201,44 |
| 52            | 17,890              | 0,00225                        | 0,02464 | 444,9                           | 40,5830 | 237,80              | 280,04 | 517,84 | 0,8410               | 1,7023 | 233,77                 | 473,76 | 1,7497 | 1,4448 | 532,51               | 200,69 |
| 53            | 18,278              | 0,00226                        | 0,02404 | 442,88                          | 41,5980 | 240,88              | 277,58 | 518,46 | 0,8502               | 1,7013 | 236,75                 | 474,52 | 1,7572 | 1,4554 | 525,32               | 199,93 |
| 54            | 18,672              | 0,00227                        | 0,02345 | 440,83                          | 42,6380 | 243,98              | 275,09 | 519,07 | 0,8595               | 1,7003 | 239,75                 | 475,27 | 1,7650 | 1,4666 | 518,11               | 199,14 |
| 55            | 19,072              | 0,00228                        | 0,02288 | 438,76                          | 43,7060 | 247,11              | 272,54 | 519,65 | 0,8687               | 1,6993 | 242,76                 | 476,01 | 1,7733 | 1,4784 | 510,87               | 198,35 |
| 56            | 19,478              | 0,00229                        | 0,02232 | 436,66                          | 44,8020 | 250,25              | 269,96 | 520,21 | 0,8780               | 1,6982 | 245,79                 | 476,74 | 1,7819 | 1,4907 | 503,61               | 197,53 |
| 57            | 19,891              | 0,00230                        | 0,02177 | 434,54                          | 45,9280 | 253,41              | 267,34 | 520,75 | 0,8873               | 1,6971 | 248,83                 | 477,45 | 1,7911 | 1,5038 | 496,31               | 196,69 |
| 58            | 20,310              | 0,00231                        | 0,02124 | 432,38                          | 47,0840 | 256,59              | 264,68 | 521,27 | 0,8966               | 1,6959 | 251,89                 | 478,14 | 1,8007 | 1,5176 | 488,98               | 195,84 |
| 59            | 20,735              | 0,00232                        | 0,02072 | 430,19                          | 48,2720 | 259,79              | 261,98 | 521,77 | 0,9060               | 1,6947 | 254,97                 | 478,81 | 1,8108 | 1,5322 | 481,61               | 194,97 |



| Temp.<br>(°C) | Pressure<br>(bar A) | Volume<br>(m <sup>3</sup> /kg) |         | Density<br>(kg/m <sup>3</sup> ) |         | Enthalpy<br>(kJ/kg) |        |        | Entropy<br>(kJ/kg-K) |        | Int. Energy<br>(kJ/kg) |        | Cp/Cv  |        | Sound Speed<br>(m/s) |        |
|---------------|---------------------|--------------------------------|---------|---------------------------------|---------|---------------------|--------|--------|----------------------|--------|------------------------|--------|--------|--------|----------------------|--------|
|               |                     | Liquid                         | Vapor   | Liquid                          | Vapor   | Liquid              | Latent | Vapor  | Liquid               | Vapor  | Liquid                 | Vapor  | Liquid | Vapor  | Liquid               | Vapor  |
| 60            | 21,168              | 0,00234                        | 0,02021 | 427,97                          | 49,4930 | 263,01              | 259,23 | 522,24 | 0,9154               | 1,6935 | 258,07                 | 479,47 | 1,8215 | 1,5477 | 474,22               | 194,07 |