



RS-52

(R428A)

THERMODYNAMIC TABLES

FAHRENHEIT

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RS-52 (R428A)
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| Temp °F | Pressure bubble point psia | Pressure dew point psia | Density bubble point lb/ft ³ | Density dew point lb/ft ³ | Volume bubble point ft ³ /lb | Volume dew point ft ³ /lb | Enthalpy bubble point Btu/lb | Enthalpy dew point Btu/lb | Entropy bubble point Btu/R-lb | Entropy dew point Btu/R-lb |
|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| -80 | 7.9440 | 6.9815 | 88.503 | 0.1878 | 0.011299 | 5.325 | -11.291 | 70.04 | -0.02818 | 0.18677 |
| -78 | 8.4317 | 7.4333 | 88.287 | 0.1991 | 0.011327 | 5.022 | -10.738 | 70.33 | -0.02673 | 0.18639 |
| -76 | 8.9431 | 7.9081 | 88.069 | 0.2110 | 0.011355 | 4.739 | -10.183 | 70.62 | -0.02529 | 0.18602 |
| -74 | 9.4793 | 8.4069 | 87.851 | 0.2234 | 0.011383 | 4.476 | -9.627 | 70.91 | -0.02384 | 0.18567 |
| -72 | 10.0410 | 8.9304 | 87.632 | 0.2364 | 0.011411 | 4.2295 | -9.070 | 71.19 | -0.02241 | 0.18532 |
| -70 | 10.6290 | 9.4797 | 87.413 | 0.2500 | 0.011440 | 3.9995 | -8.512 | 71.48 | -0.02097 | 0.18499 |
| -68 | 11.2440 | 10.0550 | 87.193 | 0.2642 | 0.011469 | 3.7846 | -7.953 | 71.77 | -0.01955 | 0.18466 |
| -66 | 11.8870 | 10.6590 | 86.972 | 0.2791 | 0.011498 | 3.5834 | -7.393 | 72.06 | -0.01812 | 0.18435 |
| -64 | 12.5600 | 11.2900 | 86.750 | 0.2945 | 0.011527 | 3.3951 | -6.832 | 72.35 | -0.01670 | 0.18404 |
| -62 | 13.2620 | 11.9510 | 86.527 | 0.3107 | 0.011557 | 3.2187 | -6.269 | 72.63 | -0.01529 | 0.18375 |
| -60 | 13.9950 | 12.6420 | 86.304 | 0.3275 | 0.011587 | 3.0533 | -5.706 | 72.92 | -0.01388 | 0.18346 |
| -58 | 14.7600 | 13.3640 | 86.080 | 0.3451 | 0.011617 | 2.8981 | -5.141 | 73.21 | -0.01247 | 0.18318 |
| -56 | 15.5580 | 14.1190 | 85.855 | 0.3633 | 0.011648 | 2.7523 | -4.574 | 73.49 | -0.01107 | 0.18291 |
| -54 | 16.3890 | 14.9060 | 85.630 | 0.3824 | 0.011678 | 2.6154 | -4.007 | 73.78 | -0.00967 | 0.18265 |
| -52 | 17.256 | 15.7280 | 85.403 | 0.4022 | 0.011709 | 2.4867 | -3.439 | 74.06 | -0.00828 | 0.18240 |
| -50 | 18.158 | 16.5840 | 85.175 | 0.4227 | 0.011740 | 2.3655 | -2.869 | 74.35 | -0.00689 | 0.18216 |
| -48 | 19.096 | 17.4770 | 84.947 | 0.4441 | 0.011772 | 2.2515 | -2.298 | 74.63 | -0.00551 | 0.18192 |
| -46 | 20.072 | 18.4070 | 84.718 | 0.4664 | 0.011804 | 2.1441 | -1.725 | 74.91 | -0.00412 | 0.18169 |
| -44 | 21.087 | 19.3750 | 84.488 | 0.4895 | 0.011836 | 2.0429 | -1.151 | 75.20 | -0.00275 | 0.18147 |
| -42 | 22.142 | 20.3820 | 84.257 | 0.5135 | 0.011869 | 1.9474 | -0.576 | 75.48 | -0.00137 | 0.18125 |
| -40 | 23.238 | 21.430 | 84.024 | 0.5384 | 0.011901 | 1.8573 | 0.000 | 75.76 | 0.00000 | 0.18105 |
| -38 | 24.375 | 22.519 | 83.791 | 0.5643 | 0.011934 | 1.7722 | 0.578 | 76.04 | 0.00137 | 0.18084 |
| -36 | 25.556 | 23.651 | 83.557 | 0.5911 | 0.011968 | 1.6918 | 1.157 | 76.32 | 0.00273 | 0.18065 |
| -34 | 26.781 | 24.826 | 83.322 | 0.6189 | 0.012002 | 1.6158 | 1.737 | 76.60 | 0.00409 | 0.18046 |
| -32 | 28.051 | 26.047 | 83.086 | 0.6477 | 0.012036 | 1.5439 | 2.319 | 76.88 | 0.00545 | 0.18028 |
| -30 | 29.367 | 27.312 | 82.849 | 0.6776 | 0.012070 | 1.4758 | 2.903 | 77.16 | 0.00680 | 0.18011 |
| -28 | 30.730 | 28.625 | 82.610 | 0.7085 | 0.012105 | 1.4114 | 3.487 | 77.44 | 0.00815 | 0.17994 |
| -26 | 32.142 | 29.986 | 82.371 | 0.7406 | 0.012140 | 1.3503 | 4.074 | 77.72 | 0.00950 | 0.17977 |

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| Temp °F | Pressure bubble point psia | Pressure dew point psia | Density bubble point lb/ft ³ | Density dew point lb/ft ³ | Volume bubble point ft ³ /lb | Volume dew point ft ³ /lb | Enthalpy bubble point Btu/lb | Enthalpy dew point Btu/lb | Entropy bubble point Btu/R-lb | Entropy dew point Btu/R-lb |
|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| -24 | 33.604 | 31.397 | 82.130 | 0.7737 | 0.012176 | 1.2924 | 4.661 | 77.99 | 0.01085 | 0.17962 |
| -22 | 35.116 | 32.858 | 81.888 | 0.8081 | 0.012212 | 1.2375 | 5.250 | 78.27 | 0.01219 | 0.17946 |
| -20 | 36.681 | 34.370 | 81.645 | 0.8436 | 0.012248 | 1.1854 | 5.841 | 78.54 | 0.01353 | 0.17932 |
| -18 | 38.299 | 35.936 | 81.401 | 0.8803 | 0.012285 | 1.1360 | 6.433 | 78.82 | 0.01486 | 0.17917 |
| -16 | 39.971 | 37.555 | 81.155 | 0.9183 | 0.012322 | 1.0890 | 7.027 | 79.09 | 0.01619 | 0.17904 |
| -14 | 41.698 | 39.230 | 80.908 | 0.9575 | 0.012360 | 1.0443 | 7.623 | 79.36 | 0.01752 | 0.17890 |
| -12 | 43.483 | 40.962 | 80.660 | 0.9981 | 0.012398 | 1.0019 | 8.220 | 79.63 | 0.01885 | 0.17878 |
| -10 | 45.325 | 42.751 | 80.410 | 1.0400 | 0.012436 | 0.9615 | 8.818 | 79.90 | 0.02018 | 0.17865 |
| -8 | 47.227 | 44.599 | 80.159 | 1.0834 | 0.012475 | 0.9231 | 9.419 | 80.17 | 0.02150 | 0.17853 |
| -6 | 49.188 | 46.507 | 79.907 | 1.1281 | 0.012515 | 0.8865 | 10.021 | 80.44 | 0.02282 | 0.17842 |
| -4 | 51.212 | 48.477 | 79.653 | 1.1743 | 0.012554 | 0.8516 | 10.624 | 80.71 | 0.02414 | 0.17831 |
| -2 | 53.298 | 50.510 | 79.398 | 1.2220 | 0.012595 | 0.8184 | 11.230 | 80.97 | 0.02545 | 0.17820 |
| 0 | 55.449 | 52.607 | 79.141 | 1.2712 | 0.012636 | 0.7867 | 11.837 | 81.24 | 0.02677 | 0.17810 |
| 2 | 57.665 | 54.769 | 78.882 | 1.3220 | 0.012677 | 0.7564 | 12.446 | 81.50 | 0.02808 | 0.17800 |
| 4 | 59.948 | 56.998 | 78.622 | 1.3744 | 0.012719 | 0.7276 | 13.057 | 81.76 | 0.02938 | 0.17790 |
| 6 | 62.298 | 59.294 | 78.360 | 1.4285 | 0.012762 | 0.7001 | 13.670 | 82.02 | 0.03069 | 0.17781 |
| 8 | 64.718 | 61.661 | 78.097 | 1.4842 | 0.012805 | 0.6738 | 14.284 | 82.28 | 0.03200 | 0.17772 |
| 10 | 67.209 | 64.097 | 77.831 | 1.5418 | 0.012848 | 0.6486 | 14.900 | 82.54 | 0.03330 | 0.17763 |
| 12 | 69.771 | 66.606 | 77.564 | 1.6011 | 0.012893 | 0.6246 | 15.519 | 82.79 | 0.03460 | 0.17755 |
| 14 | 72.407 | 69.188 | 77.295 | 1.6622 | 0.012937 | 0.6016 | 16.139 | 83.05 | 0.03590 | 0.17747 |
| 16 | 75.117 | 71.845 | 77.025 | 1.7252 | 0.012983 | 0.5796 | 16.761 | 83.30 | 0.03719 | 0.17739 |
| 18 | 77.904 | 74.578 | 76.752 | 1.7902 | 0.013029 | 0.5586 | 17.386 | 83.55 | 0.03849 | 0.17731 |
| 20 | 80.767 | 77.389 | 76.477 | 1.8572 | 0.013076 | 0.5385 | 18.012 | 83.80 | 0.03978 | 0.17724 |
| 22 | 83.709 | 80.278 | 76.200 | 1.9262 | 0.013123 | 0.5192 | 18.641 | 84.05 | 0.04108 | 0.17717 |
| 24 | 86.731 | 83.248 | 75.922 | 1.9973 | 0.013171 | 0.5007 | 19.271 | 84.30 | 0.04237 | 0.17710 |
| 26 | 89.835 | 86.299 | 75.641 | 2.0705 | 0.013220 | 0.4830 | 19.904 | 84.54 | 0.04366 | 0.17703 |
| 28 | 93.021 | 89.433 | 75.357 | 2.1460 | 0.013270 | 0.4660 | 20.539 | 84.79 | 0.04495 | 0.17696 |
| 30 | 96.291 | 92.652 | 75.072 | 2.2238 | 0.013321 | 0.4497 | 21.176 | 85.03 | 0.04624 | 0.17690 |
| 32 | 99.647 | 95.958 | 74.784 | 2.3039 | 0.013372 | 0.4340 | 21.816 | 85.27 | 0.04752 | 0.17683 |

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|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| 34 | 103.090 | 99.350 | 74.493 | 2.3864 | 0.013424 | 0.4190 | 22.458 | 85.50 | 0.04881 | 0.17677 |
| 36 | 106.620 | 102.830 | 74.201 | 2.4715 | 0.013477 | 0.4046 | 23.102 | 85.74 | 0.05009 | 0.17671 |
| 38 | 110.240 | 106.400 | 73.905 | 2.5590 | 0.013531 | 0.3908 | 23.749 | 85.97 | 0.05138 | 0.17665 |
| 40 | 113.960 | 110.070 | 73.607 | 2.6493 | 0.013586 | 0.3775 | 24.398 | 86.20 | 0.05266 | 0.17659 |
| 42 | 117.760 | 113.820 | 73.306 | 2.7422 | 0.013641 | 0.3647 | 25.050 | 86.43 | 0.05394 | 0.17653 |
| 44 | 121.660 | 117.680 | 73.003 | 2.8379 | 0.013698 | 0.3524 | 25.704 | 86.65 | 0.05522 | 0.17647 |
| 46 | 125.660 | 121.630 | 72.696 | 2.9365 | 0.013756 | 0.3405 | 26.361 | 86.88 | 0.05651 | 0.17641 |
| 48 | 129.750 | 125.670 | 72.387 | 3.0381 | 0.013815 | 0.3292 | 27.021 | 87.10 | 0.05779 | 0.17635 |
| 50 | 133.940 | 129.820 | 72.074 | 3.1427 | 0.013875 | 0.3182 | 27.683 | 87.32 | 0.05907 | 0.17629 |
| 52 | 138.240 | 134.070 | 71.758 | 3.2505 | 0.013936 | 0.3076 | 28.349 | 87.53 | 0.06035 | 0.17623 |
| 54 | 142.630 | 138.420 | 71.439 | 3.3616 | 0.013998 | 0.2975 | 29.017 | 87.74 | 0.061631 | 0.17617 |
| 56 | 147.13 | 142.870 | 71.117 | 3.4761 | 0.014061 | 0.2877 | 29.688 | 87.952 | 0.062912 | 0.17610 |
| 58 | 151.73 | 147.430 | 70.791 | 3.5941 | 0.014126 | 0.2782 | 30.363 | 88.158 | 0.064194 | 0.17604 |
| 60 | 156.44 | 152.100 | 70.461 | 3.7156 | 0.014192 | 0.2691 | 31.040 | 88.361 | 0.065476 | 0.17597 |
| 62 | 161.26 | 156.880 | 70.127 | 3.8410 | 0.014260 | 0.2604 | 31.721 | 88.56 | 0.066759 | 0.17591 |
| 64 | 166.19 | 161.77 | 69.790 | 3.9702 | 0.014329 | 0.2519 | 32.405 | 88.757 | 0.068043 | 0.17584 |
| 66 | 171.23 | 166.78 | 69.449 | 4.1034 | 0.014399 | 0.2437 | 33.092 | 88.95 | 0.06933 | 0.17577 |
| 68 | 176.38 | 171.89 | 69.103 | 4.2408 | 0.014471 | 0.2358 | 33.783 | 89.14 | 0.07061 | 0.17570 |
| 70 | 181.65 | 177.13 | 68.753 | 4.3825 | 0.014545 | 0.2282 | 34.477 | 89.32 | 0.07190 | 0.17562 |
| 72 | 187.04 | 182.48 | 68.398 | 4.5287 | 0.014620 | 0.2208 | 35.175 | 89.50 | 0.07319 | 0.17554 |
| 74 | 192.54 | 187.95 | 68.039 | 4.6796 | 0.014697 | 0.2137 | 35.877 | 89.68 | 0.07448 | 0.17546 |
| 76 | 198.16 | 193.54 | 67.675 | 4.8354 | 0.014777 | 0.2068 | 36.58 | 89.85 | 0.07577 | 0.17537 |
| 78 | 203.91 | 199.26 | 67.305 | 4.9962 | 0.014858 | 0.2002 | 37.29 | 90.02 | 0.07706 | 0.17529 |
| 80 | 209.78 | 205.10 | 66.931 | 5.1623 | 0.014941 | 0.1937 | 38.01 | 90.18 | 0.07836 | 0.17519 |
| 82 | 215.78 | 211.07 | 66.550 | 5.3340 | 0.015026 | 0.1875 | 38.73 | 90.34 | 0.07966 | 0.17509 |
| 84 | 221.90 | 217.17 | 66.164 | 5.5114 | 0.015114 | 0.1814 | 39.45 | 90.49 | 0.08096 | 0.17499 |
| 86 | 228.15 | 223.41 | 65.772 | 5.6948 | 0.015204 | 0.1756 | 40.18 | 90.64 | 0.08226 | 0.17488 |
| 88 | 234.54 | 229.77 | 65.373 | 5.8846 | 0.015297 | 0.1699 | 40.91 | 90.78 | 0.08357 | 0.17477 |
| 90 | 241.06 | 236.27 | 64.968 | 6.0809 | 0.015392 | 0.1645 | 41.65 | 90.91 | 0.08488 | 0.17464 |

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|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| 92 | 247.71 | 242.91 | 64.556 | 6.2843 | 0.015491 | 0.1591 | 42.39 | 91.04 | 0.08619 | 0.17452 |
| 94 | 254.50 | 249.69 | 64.136 | 6.4950 | 0.015592 | 0.1540 | 43.14 | 91.16 | 0.08751 | 0.17438 |
| 96 | 261.43 | 256.61 | 63.708 | 6.7133 | 0.015697 | 0.1490 | 43.89 | 91.28 | 0.08883 | 0.17424 |
| 98 | 268.51 | 263.68 | 63.273 | 6.9399 | 0.015805 | 0.1441 | 44.65 | 91.38 | 0.09016 | 0.17408 |
| 100 | 275.72 | 270.89 | 62.828 | 7.1751 | 0.015916 | 0.1394 | 45.41 | 91.48 | 0.09149 | 0.17392 |
| 102 | 283.09 | 278.25 | 62.374 | 7.4194 | 0.016032 | 0.1348 | 46.19 | 91.57 | 0.09283 | 0.17375 |
| 104 | 290.60 | 285.77 | 61.911 | 7.6733 | 0.016152 | 0.1303 | 46.97 | 91.65 | 0.09417 | 0.17356 |
| 106 | 298.27 | 293.43 | 61.437 | 7.9377 | 0.016277 | 0.1260 | 47.75 | 91.72 | 0.09553 | 0.17336 |
| 108 | 306.08 | 301.26 | 60.952 | 8.2130 | 0.016406 | 0.1218 | 48.55 | 91.78 | 0.09689 | 0.17315 |
| 110 | 314.06 | 309.25 | 60.455 | 8.5002 | 0.016541 | 0.1176 | 49.35 | 91.83 | 0.09825 | 0.17293 |
| 112 | 322.19 | 317.39 | 59.945 | 8.8000 | 0.016682 | 0.1136 | 50.16 | 91.87 | 0.09963 | 0.17269 |
| 114 | 330.48 | 325.71 | 59.422 | 9.1135 | 0.016829 | 0.1097 | 50.98 | 91.90 | 0.10102 | 0.17243 |
| 116 | 338.94 | 334.19 | 58.883 | 9.4417 | 0.016983 | 0.1059 | 51.81 | 91.91 | 0.10242 | 0.17216 |
| 118 | 347.57 | 342.85 | 58.328 | 9.7859 | 0.017144 | 0.1022 | 52.65 | 91.90 | 0.10383 | 0.17186 |
| 120 | 356.36 | 351.68 | 57.756 | 10.1480 | 0.017314 | 0.0985 | 53.50 | 91.88 | 0.10525 | 0.17154 |
| 122 | 365.33 | 360.69 | 57.164 | 10.5290 | 0.017494 | 0.0950 | 54.37 | 91.84 | 0.10669 | 0.17119 |
| 124 | 374.48 | 369.89 | 56.551 | 10.9310 | 0.017683 | 0.0915 | 55.25 | 91.78 | 0.10815 | 0.17082 |
| 126 | 383.81 | 379.27 | 55.913 | 11.3560 | 0.017885 | 0.0881 | 56.14 | 91.70 | 0.10963 | 0.17041 |
| 128 | 393.32 | 388.85 | 55.249 | 11.8080 | 0.018100 | 0.0847 | 57.06 | 91.59 | 0.11113 | 0.16997 |
| 130 | 403.02 | 398.62 | 54.555 | 12.2890 | 0.018330 | 0.0814 | 57.99 | 91.46 | 0.11266 | 0.16949 |
| 132 | 412.91 | 408.59 | 53.826 | 12.8040 | 0.018578 | 0.0781 | 58.94 | 91.30 | 0.11421 | 0.16896 |
| 134 | 423.00 | 418.77 | 53.058 | 13.3580 | 0.018847 | 0.0749 | 59.92 | 91.10 | 0.11580 | 0.16838 |
| 136 | 433.29 | 429.17 | 52.242 | 13.9570 | 0.019142 | 0.0717 | 60.92 | 90.85 | 0.11743 | 0.16774 |
| 138 | 443.78 | 439.79 | 51.371 | 14.6100 | 0.019466 | 0.0684 | 61.97 | 90.56 | 0.11912 | 0.16701 |
| 140 | 454.49 | 450.64 | 50.432 | 15.3290 | 0.019829 | 0.0652 | 63.05 | 90.21 | 0.12086 | 0.16620 |
| 142 | 465.42 | 461.74 | 49.408 | 16.1300 | 0.020240 | 0.0620 | 64.18 | 89.78 | 0.12268 | 0.16527 |
| 144 | 476.58 | 473.09 | 48.274 | 17.0370 | 0.020715 | 0.0587 | 65.39 | 89.26 | 0.12461 | 0.16420 |
| 146 | 487.97 | 484.71 | 46.989 | 18.0890 | 0.021281 | 0.0553 | 66.68 | 88.61 | 0.12668 | 0.16292 |
| 148 | 499.61 | 496.63 | 45.485 | 19.3520 | 0.021985 | 0.0517 | 68.11 | 87.78 | 0.12896 | 0.16135 |

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|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| 150 | 519.96 | 508.89 | 45.247 | 20.9600 | 0.022101 | 0.0477 | 68.83 | 86.65 | 0.12999 | 0.15931 |
| 152 | 532.37 | 534.36 | 43.637 | 32.865 | 0.022948 | 0.0350 | 70.34 | 78.45 | 0.1324 | 0.1457 |
| 154 | 544.77 | 559.83 | 42.027 | 44.770 | 0.023794 | 0.0223 | 71.86 | 70.25 | 0.13478 | 0.13206 |
| 156 | 557.19 | 572.62 | 40.103 | 43.638 | 0.024936 | 0.0229 | 73.60 | 71.49 | 0.13752 | 0.13398 |

RS-52 (R428A)
PSIG
FAHRENHEIT



| Temp °F | Pressure bubble point psig | Pressure dew point psig | Density bubble point lb/ft ³ | Density dew point lb/ft ³ | Volume bubble point ft ³ /lb | Volume dew point ft ³ /lb | Enthalpy bubble point Btu/lb | Enthalpy dew point Btu/lb | Entropy bubble point Btu/R-lb | Entropy dew point Btu/R-lb |
|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| -80 | -6.7520 | -7.7145 | 88.906 | 0.1259 | 0.011248 | 7.944 | -11.414 | 74.38 | -0.02851 | 0.19966 |
| -78 | -6.2643 | -7.2627 | 88.698 | 0.1341 | 0.011274 | 7.460 | -10.853 | 74.68 | -0.02704 | 0.19921 |
| -76 | -5.7529 | -6.7879 | 88.490 | 0.1426 | 0.011301 | 7.011 | -10.292 | 74.98 | -0.02557 | 0.19877 |
| -74 | -5.2167 | -6.2891 | 88.281 | 0.1516 | 0.011327 | 6.595 | -9.730 | 75.27 | -0.02411 | 0.19834 |
| -72 | -4.6550 | -5.7656 | 88.072 | 0.1611 | 0.011354 | 6.2074 | -9.166 | 75.57 | -0.02266 | 0.19793 |
| -70 | -4.0670 | -5.2163 | 87.861 | 0.1710 | 0.011382 | 5.8474 | -8.602 | 75.87 | -0.02121 | 0.19753 |
| -68 | -3.4520 | -4.6410 | 87.651 | 0.1814 | 0.011409 | 5.5123 | -8.036 | 76.16 | -0.01976 | 0.19714 |
| -66 | -2.8090 | -4.0370 | 87.439 | 0.1923 | 0.011436 | 5.2002 | -7.470 | 76.46 | -0.01832 | 0.19676 |
| -64 | -2.1360 | -3.4060 | 87.227 | 0.2037 | 0.011464 | 4.9092 | -6.902 | 76.75 | -0.01689 | 0.19639 |
| -62 | -1.4340 | -2.7450 | 87.015 | 0.2156 | 0.011492 | 4.6376 | -6.333 | 77.05 | -0.01546 | 0.19603 |
| -60 | -0.7010 | -2.0540 | 86.801 | 0.2281 | 0.011521 | 4.3841 | -5.763 | 77.34 | -0.01403 | 0.19568 |
| -58 | 0.0640 | -1.3320 | 86.587 | 0.2411 | 0.011549 | 4.1472 | -5.192 | 77.64 | -0.01261 | 0.19535 |
| -56 | 0.8620 | -0.5770 | 86.372 | 0.2547 | 0.011578 | 3.9256 | -4.620 | 77.93 | -0.01119 | 0.19502 |
| -54 | 1.6930 | 0.2100 | 86.157 | 0.2689 | 0.011607 | 3.7183 | -4.047 | 78.23 | -0.00978 | 0.19470 |
| -52 | 2.5600 | 1.0320 | 85.940 | 0.2838 | 0.011636 | 3.5241 | -3.472 | 78.52 | -0.00837 | 0.19439 |
| -50 | 3.4620 | 1.8880 | 85.723 | 0.2992 | 0.011665 | 3.3420 | -2.896 | 78.82 | -0.00696 | 0.19410 |
| -48 | 4.4000 | 2.7810 | 85.505 | 0.3153 | 0.011695 | 3.1713 | -2.320 | 79.11 | -0.00556 | 0.19381 |
| -46 | 5.3760 | 3.7110 | 85.287 | 0.3321 | 0.011725 | 3.0110 | -1.742 | 79.40 | -0.00417 | 0.19353 |
| -44 | 6.3910 | 4.6790 | 85.067 | 0.3496 | 0.011755 | 2.8605 | -1.162 | 79.70 | -0.00277 | 0.19325 |
| -42 | 7.4460 | 5.6860 | 84.847 | 0.3678 | 0.011786 | 2.7191 | -0.582 | 79.99 | -0.00139 | 0.19299 |
| -40 | 8.5420 | 6.7340 | 84.626 | 0.3867 | 0.011817 | 2.5860 | 0.000 | 80.28 | 0.00000 | 0.19274 |
| -38 | 9.6790 | 7.8230 | 84.404 | 0.4064 | 0.011848 | 2.4608 | 0.583 | 80.57 | 0.00138 | 0.19249 |
| -36 | 10.8600 | 8.9550 | 84.181 | 0.4268 | 0.011879 | 2.3429 | 1.167 | 80.86 | 0.00276 | 0.19225 |
| -34 | 12.0850 | 10.1300 | 83.958 | 0.4481 | 0.011911 | 2.2318 | 1.753 | 81.15 | 0.00413 | 0.19202 |
| -32 | 13.3550 | 11.3510 | 83.733 | 0.4701 | 0.011943 | 2.1271 | 2.340 | 81.44 | 0.00550 | 0.19180 |
| -30 | 14.6710 | 12.6160 | 83.508 | 0.4930 | 0.011975 | 2.0283 | 2.928 | 81.73 | 0.00687 | 0.19158 |
| -28 | 16.0340 | 13.9290 | 83.281 | 0.5168 | 0.012008 | 1.9350 | 3.517 | 82.02 | 0.00823 | 0.19137 |
| -26 | 17.4460 | 15.2900 | 83.054 | 0.5415 | 0.012040 | 1.8468 | 4.108 | 82.31 | 0.00959 | 0.19117 |

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| Temp °F | Pressure bubble point psig | Pressure dew point psig | Density bubble point lb/ft ³ | Density dew point lb/ft ³ | Volume bubble point ft ³ /lb | Volume dew point ft ³ /lb | Enthalpy bubble point Btu/lb | Enthalpy dew point Btu/lb | Entropy bubble point Btu/R-lb | Entropy dew point Btu/R-lb |
|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| -24 | 18.9080 | 16.7010 | 82.825 | 0.5670 | 0.012074 | 1.7635 | 4.701 | 82.60 | 0.01095 | 0.19097 |
| -22 | 20.4200 | 18.1620 | 82.596 | 0.5936 | 0.012107 | 1.6848 | 5.294 | 82.88 | 0.01230 | 0.19078 |
| -20 | 21.9850 | 19.6740 | 82.365 | 0.6210 | 0.012141 | 1.6102 | 5.889 | 83.17 | 0.01365 | 0.19060 |
| -18 | 23.6030 | 21.2400 | 82.134 | 0.6495 | 0.012175 | 1.5397 | 6.486 | 83.45 | 0.01500 | 0.19042 |
| -16 | 25.2750 | 22.8590 | 81.901 | 0.6790 | 0.012210 | 1.4729 | 7.083 | 83.74 | 0.01634 | 0.19025 |
| -14 | 27.0020 | 24.5340 | 81.668 | 0.7095 | 0.012245 | 1.4095 | 7.683 | 84.02 | 0.01768 | 0.19008 |
| -12 | 28.7870 | 26.2660 | 81.433 | 0.7411 | 0.012280 | 1.3494 | 8.284 | 84.30 | 0.01902 | 0.18992 |
| -10 | 30.6290 | 28.0550 | 81.197 | 0.7737 | 0.012316 | 1.2925 | 8.886 | 84.59 | 0.02035 | 0.18977 |
| -8 | 32.5310 | 29.9030 | 80.960 | 0.8075 | 0.012352 | 1.2384 | 9.490 | 84.87 | 0.02169 | 0.18962 |
| -6 | 34.4920 | 31.8110 | 80.721 | 0.8425 | 0.012388 | 1.1870 | 10.095 | 85.15 | 0.02301 | 0.18947 |
| -4 | 36.5160 | 33.7810 | 80.482 | 0.8786 | 0.012425 | 1.1382 | 10.702 | 85.43 | 0.02434 | 0.18933 |
| -2 | 38.6020 | 35.8140 | 80.241 | 0.9159 | 0.012462 | 1.0918 | 11.310 | 85.70 | 0.02566 | 0.18920 |
| 0 | 40.7530 | 37.9110 | 79.999 | 0.9545 | 0.012500 | 1.0477 | 11.921 | 85.98 | 0.02699 | 0.18907 |
| 2 | 42.9690 | 40.0730 | 79.755 | 0.9944 | 0.012538 | 1.0057 | 12.532 | 86.26 | 0.02830 | 0.18894 |
| 4 | 45.2520 | 42.3020 | 79.511 | 1.0355 | 0.012577 | 0.9657 | 13.146 | 86.53 | 0.02962 | 0.18882 |
| 6 | 47.6020 | 44.5980 | 79.264 | 1.0780 | 0.012616 | 0.9276 | 13.761 | 86.81 | 0.03093 | 0.18871 |
| 8 | 50.0220 | 46.9650 | 79.017 | 1.1219 | 0.012656 | 0.8913 | 14.377 | 87.08 | 0.03224 | 0.18859 |
| 10 | 52.5130 | 49.4010 | 78.768 | 1.1672 | 0.012696 | 0.8567 | 14.996 | 87.35 | 0.03355 | 0.18849 |
| 12 | 55.0750 | 51.9100 | 78.517 | 1.2140 | 0.012736 | 0.8238 | 15.616 | 87.62 | 0.03486 | 0.18838 |
| 14 | 57.7110 | 54.4920 | 78.265 | 1.2622 | 0.012777 | 0.7923 | 16.238 | 87.89 | 0.03616 | 0.18828 |
| 16 | 60.4210 | 57.1490 | 78.012 | 1.3119 | 0.012819 | 0.7622 | 16.862 | 88.16 | 0.03747 | 0.18818 |
| 18 | 63.2080 | 59.8820 | 77.756 | 1.3632 | 0.012861 | 0.7336 | 17.487 | 88.42 | 0.03877 | 0.18809 |
| 20 | 66.0710 | 62.6930 | 77.500 | 1.4161 | 0.012903 | 0.7062 | 18.114 | 88.69 | 0.04007 | 0.18799 |
| 22 | 69.0130 | 65.5820 | 77.241 | 1.4707 | 0.012946 | 0.6800 | 18.744 | 88.95 | 0.04136 | 0.18790 |
| 24 | 72.0350 | 68.5520 | 76.981 | 1.5269 | 0.012990 | 0.6549 | 19.375 | 89.22 | 0.04266 | 0.18782 |
| 26 | 75.1390 | 71.6030 | 76.719 | 1.5849 | 0.013035 | 0.6310 | 20.008 | 89.48 | 0.04395 | 0.18774 |
| 28 | 78.3250 | 74.7370 | 76.455 | 1.6446 | 0.013080 | 0.6080 | 20.643 | 89.74 | 0.04524 | 0.18765 |
| 30 | 81.5950 | 77.9560 | 76.189 | 1.7062 | 0.013125 | 0.5861 | 21.280 | 89.99 | 0.04653 | 0.18758 |
| 32 | 84.9510 | 81.2620 | 75.921 | 1.7696 | 0.013172 | 0.5651 | 21.919 | 90.25 | 0.04782 | 0.18750 |

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| Temp °F | Pressure bubble point psig | Pressure dew point psig | Density bubble point lb/ft ³ | Density dew point lb/ft ³ | Volume bubble point ft ³ /lb | Volume dew point ft ³ /lb | Enthalpy bubble point Btu/lb | Enthalpy dew point Btu/lb | Entropy bubble point Btu/R-lb | Entropy dew point Btu/R-lb |
|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| 34 | 88.3940 | 84.6540 | 75.652 | 1.8350 | 0.013218 | 0.5450 | 22.561 | 90.50 | 0.04911 | 0.18743 |
| 36 | 91.9240 | 88.1340 | 75.380 | 1.9023 | 0.013266 | 0.5257 | 23.204 | 90.76 | 0.05039 | 0.18735 |
| 38 | 95.5440 | 91.7040 | 75.106 | 1.9717 | 0.013314 | 0.5072 | 23.849 | 91.01 | 0.05168 | 0.18728 |
| 40 | 99.2640 | 95.3740 | 74.831 | 2.0431 | 0.013364 | 0.4895 | 24.497 | 91.26 | 0.05296 | 0.18722 |
| 42 | 103.0640 | 99.1240 | 74.553 | 2.1167 | 0.013413 | 0.4724 | 25.147 | 91.50 | 0.05424 | 0.18715 |
| 44 | 106.9640 | 102.9840 | 74.272 | 2.1925 | 0.013464 | 0.4561 | 25.799 | 91.75 | 0.05552 | 0.18708 |
| 46 | 110.9640 | 106.9340 | 73.990 | 2.2706 | 0.013515 | 0.4404 | 26.454 | 91.99 | 0.05680 | 0.18702 |
| 48 | 115.0540 | 110.9740 | 73.705 | 2.3510 | 0.013568 | 0.4254 | 27.111 | 92.23 | 0.05808 | 0.18696 |
| 50 | 119.2440 | 115.1240 | 73.417 | 2.4337 | 0.013621 | 0.4109 | 27.770 | 92.47 | 0.05936 | 0.18689 |
| 52 | 123.5440 | 119.3740 | 73.127 | 2.5190 | 0.013675 | 0.3970 | 28.432 | 92.71 | 0.06064 | 0.18683 |
| 54 | 127.9340 | 123.7240 | 72.834 | 2.6068 | 0.013730 | 0.3836 | 29.096 | 92.94 | 0.061914 | 0.18677 |
| 56 | 132.4340 | 128.1740 | 72.539 | 2.6972 | 0.013786 | 0.3708 | 29.763 | 93.172 | 0.06319 | 0.18671 |
| 58 | 137.0340 | 132.7340 | 72.241 | 2.7903 | 0.013843 | 0.3584 | 30.432 | 93.401 | 0.064466 | 0.18665 |
| 60 | 141.7440 | 137.4040 | 71.940 | 2.8862 | 0.013900 | 0.3465 | 31.104 | 93.628 | 0.065742 | 0.18659 |
| 62 | 146.5640 | 142.1840 | 71.636 | 2.9849 | 0.013959 | 0.3350 | 31.779 | 93.852 | 0.067017 | 0.18652 |
| 64 | 151.4940 | 147.0740 | 71.329 | 3.0866 | 0.014020 | 0.3240 | 32.457 | 94.073 | 0.068292 | 0.18646 |
| 66 | 156.5340 | 152.0840 | 71.019 | 3.1914 | 0.014081 | 0.3133 | 33.137 | 94.29 | 0.06957 | 0.18640 |
| 68 | 161.6840 | 157.1940 | 70.706 | 3.2993 | 0.014143 | 0.3031 | 33.821 | 94.51 | 0.07084 | 0.18634 |
| 70 | 166.9540 | 162.4340 | 70.389 | 3.4105 | 0.014207 | 0.2932 | 34.507 | 94.72 | 0.07212 | 0.18627 |
| 72 | 172.3440 | 167.7840 | 70.069 | 3.5250 | 0.014272 | 0.2837 | 35.197 | 94.93 | 0.07340 | 0.18621 |
| 74 | 177.8440 | 173.2540 | 69.745 | 3.6430 | 0.014338 | 0.2745 | 35.889 | 95.13 | 0.07467 | 0.18614 |
| 76 | 183.4640 | 178.8440 | 69.417 | 3.7647 | 0.014406 | 0.2656 | 36.59 | 95.34 | 0.07595 | 0.18607 |
| 78 | 189.2140 | 184.5640 | 69.086 | 3.8900 | 0.014475 | 0.2571 | 37.29 | 95.54 | 0.07723 | 0.18600 |
| 80 | 195.0840 | 190.4040 | 68.751 | 4.0193 | 0.014545 | 0.2488 | 37.99 | 95.73 | 0.07851 | 0.18593 |
| 82 | 201.0840 | 196.3740 | 68.411 | 4.1525 | 0.014618 | 0.2408 | 38.69 | 95.92 | 0.07979 | 0.18586 |
| 84 | 207.2040 | 202.4740 | 68.067 | 4.2899 | 0.014691 | 0.2331 | 39.40 | 96.11 | 0.08107 | 0.18578 |
| 86 | 213.4540 | 208.7140 | 67.719 | 4.4317 | 0.014767 | 0.2257 | 40.12 | 96.29 | 0.08235 | 0.18570 |
| 88 | 219.8440 | 215.0740 | 67.366 | 4.5779 | 0.014844 | 0.2184 | 40.83 | 96.47 | 0.08364 | 0.18561 |
| 90 | 226.3640 | 221.5740 | 67.008 | 4.7289 | 0.014924 | 0.2115 | 41.56 | 96.65 | 0.08492 | 0.18553 |

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| Temp °F | Pressure bubble point psig | Pressure dew point psig | Density bubble point lb/ft ³ | Density dew point lb/ft ³ | Volume bubble point ft ³ /lb | Volume dew point ft ³ /lb | Enthalpy bubble point Btu/lb | Enthalpy dew point Btu/lb | Entropy bubble point Btu/R-lb | Entropy dew point Btu/R-lb |
|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| 92 | 233.0140 | 228.2140 | 66.645 | 4.8847 | 0.015005 | 0.2047 | 42.28 | 96.82 | 0.08621 | 0.18543 |
| 94 | 239.8040 | 234.9940 | 66.277 | 5.0456 | 0.015088 | 0.1982 | 43.01 | 96.98 | 0.08750 | 0.18534 |
| 96 | 246.7340 | 241.9140 | 65.903 | 5.2118 | 0.015174 | 0.1919 | 43.75 | 97.14 | 0.08879 | 0.18524 |
| 98 | 253.8140 | 248.9840 | 65.524 | 5.3836 | 0.015262 | 0.1858 | 44.48 | 97.29 | 0.09009 | 0.18513 |
| 100 | 261.0240 | 256.1940 | 65.138 | 5.5611 | 0.015352 | 0.1798 | 45.23 | 97.44 | 0.09139 | 0.18502 |
| 102 | 268.3940 | 263.5540 | 64.746 | 5.7448 | 0.015445 | 0.1741 | 45.98 | 97.59 | 0.09269 | 0.18490 |
| 104 | 275.9040 | 271.0740 | 64.348 | 5.9348 | 0.015541 | 0.1685 | 46.73 | 97.72 | 0.09399 | 0.18478 |
| 106 | 283.5740 | 278.7340 | 63.943 | 6.1315 | 0.015639 | 0.1631 | 47.49 | 97.85 | 0.09530 | 0.18465 |
| 108 | 291.3840 | 286.5640 | 63.530 | 6.3352 | 0.015741 | 0.1579 | 48.25 | 97.97 | 0.09662 | 0.18451 |
| 110 | 299.3640 | 294.5540 | 63.110 | 6.5464 | 0.015845 | 0.1528 | 49.02 | 98.09 | 0.09793 | 0.18436 |
| 112 | 307.4940 | 302.6940 | 62.681 | 6.7654 | 0.015954 | 0.1478 | 49.80 | 98.20 | 0.09926 | 0.18421 |
| 114 | 315.7840 | 311.0140 | 62.244 | 6.9927 | 0.016066 | 0.1430 | 50.58 | 98.30 | 0.10059 | 0.18404 |
| 116 | 324.2440 | 319.4940 | 61.798 | 7.2288 | 0.016182 | 0.1383 | 51.37 | 98.39 | 0.10192 | 0.18387 |
| 118 | 332.8740 | 328.1540 | 61.342 | 7.4741 | 0.016302 | 0.1338 | 52.17 | 98.47 | 0.10326 | 0.18368 |
| 120 | 341.6640 | 336.9840 | 60.875 | 7.7294 | 0.016427 | 0.1294 | 52.97 | 98.54 | 0.10461 | 0.18348 |
| 122 | 350.6340 | 345.9940 | 60.398 | 7.9953 | 0.016557 | 0.1251 | 53.78 | 98.60 | 0.10596 | 0.18327 |
| 124 | 359.7840 | 355.1940 | 59.909 | 8.2724 | 0.016692 | 0.1209 | 54.60 | 98.65 | 0.10733 | 0.18304 |
| 126 | 369.1140 | 364.5740 | 59.407 | 8.5618 | 0.016833 | 0.1168 | 55.43 | 98.69 | 0.10870 | 0.18280 |
| 128 | 378.6240 | 374.1540 | 58.892 | 8.8641 | 0.016980 | 0.1128 | 56.27 | 98.71 | 0.11009 | 0.18254 |
| 130 | 388.3240 | 383.9240 | 58.362 | 9.1806 | 0.017135 | 0.1089 | 57.11 | 98.72 | 0.11148 | 0.18227 |
| 132 | 398.2140 | 393.8940 | 57.815 | 9.5125 | 0.017297 | 0.1051 | 57.97 | 98.72 | 0.11289 | 0.18197 |
| 134 | 408.3040 | 404.0740 | 57.251 | 9.8610 | 0.017467 | 0.1014 | 58.84 | 98.70 | 0.11431 | 0.18165 |
| 136 | 418.5940 | 414.4740 | 56.668 | 10.2280 | 0.017647 | 0.0978 | 59.73 | 98.66 | 0.11575 | 0.18130 |
| 138 | 429.0840 | 425.0940 | 56.063 | 10.6150 | 0.017837 | 0.0942 | 60.63 | 98.60 | 0.11720 | 0.18093 |
| 140 | 439.7940 | 435.9440 | 55.435 | 11.0240 | 0.018039 | 0.0907 | 61.54 | 98.52 | 0.11868 | 0.18052 |
| 142 | 450.7240 | 447.0440 | 54.780 | 11.4580 | 0.018255 | 0.0873 | 62.47 | 98.41 | 0.12018 | 0.18008 |
| 144 | 461.8840 | 458.3940 | 54.095 | 11.9200 | 0.018486 | 0.0839 | 63.42 | 98.28 | 0.12170 | 0.17961 |
| 146 | 473.2740 | 470.0140 | 53.376 | 12.4140 | 0.018735 | 0.0806 | 64.39 | 98.11 | 0.12325 | 0.17908 |
| 148 | 484.9140 | 481.9340 | 52.617 | 12.9450 | 0.019005 | 0.0772 | 65.39 | 97.91 | 0.12484 | 0.17851 |

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| Temp °F | Pressure bubble point psig | Pressure dew point psig | Density bubble point lb/ft ³ | Density dew point lb/ft ³ | Volume bubble point ft ³ /lb | Volume dew point ft ³ /lb | Enthalpy bubble point Btu/lb | Enthalpy dew point Btu/lb | Entropy bubble point Btu/R-lb | Entropy dew point Btu/R-lb |
|------------|----------------------------------|-------------------------------|---|--|---|--|------------------------------------|---------------------------------|-------------------------------------|----------------------------------|
| 150 | 505.2640 | 494.1940 | 51.811 | 13.5190 | 0.019301 | 0.0740 | 66.42 | 97.67 | 0.12647 | 0.17787 |
| 152 | 517.6690 | 519.6640 | 50.951 | 14.1430 | 0.019627 | 0.0707 | 67.48 | 97.38 | 0.12815 | 0.17716 |
| 154 | 530.0740 | 545.1340 | 50.023 | 14.828 | 0.019991 | 0.0674 | 68.59 | 97.03 | 0.12989 | 0.17636 |
| 156 | 542.4940 | 557.9240 | 49.010 | 15.589 | 0.020404 | 0.0641 | 69.75 | 96.61 | 0.13171 | 0.17545 |