

Tables thermodynamiques

de l'eau, de l'ammoniaque, du Fréon 12, de l'azote et du méthane.

Source : Van Wylen, Sonntag et Desrochers

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Vapeur saturée: table de la température

| Temp. °C T | Pres. kPa P | Volume massique m^3/kg | | Énergie interne kJ/kg | | | Enthalpie kJ/kg | | | Entropie $kJ/kg\cdot K$ | | |
|--------------------|---------------------|-----------------------------|-------------------------|----------------------------|-------------------|-------------------------|--------------------------|-------------------|-------------------------|----------------------------|-------------------|-------------------------|
| | | Liquide sat. v_f | Vapeur sat. v_g | Liquide sat. u_f | Évap. u_{fg} | Vapeur sat. u_g | Liquide sat. h_f | Évap. h_{fg} | Vapeur sat. h_g | Liquide sat. s_f | Évap. s_{fg} | Vapeur sat. s_g |
| 0.01 | 0.6113 | 0.001 000 | 206.14 | .00 | 2375.3 | 2375.3 | .01 | 2501.3 | 2501.4 | .0000 | 9.1562 | 9.1562 |
| 5 | 0.8721 | 0.001 000 | 147.12 | 20.97 | 2361.3 | 2382.3 | 20.98 | 2489.6 | 2510.6 | .0761 | 8.9496 | 9.0257 |
| 10 | 1.2276 | 0.001 000 | 106.38 | 42.00 | 2347.2 | 2389.2 | 42.01 | 2477.7 | 2519.8 | .1510 | 8.7498 | 8.9008 |
| 15 | 1.7051 | 0.001 001 | 77.93 | 62.99 | 2333.1 | 2396.1 | 62.99 | 2465.9 | 2528.9 | .2245 | 8.5569 | 8.7814 |
| 20 | 2.339 | 0.001 002 | 57.79 | 83.95 | 2319.0 | 2402.9 | 83.96 | 2454.1 | 2538.1 | .2966 | 8.3706 | 8.6672 |
| 25 | 3.169 | 0.001 003 | 43.36 | 104.88 | 2304.9 | 2409.8 | 104.89 | 2442.3 | 2547.2 | .3674 | 8.1905 | 8.5580 |
| 30 | 4.246 | 0.001 004 | 32.89 | 125.78 | 2290.8 | 2416.6 | 125.79 | 2430.5 | 2556.3 | .4369 | 8.0164 | 8.4533 |
| 35 | 5.628 | 0.001 006 | 25.22 | 146.67 | 2276.7 | 2423.4 | 146.68 | 2418.6 | 2565.3 | .5053 | 7.8478 | 8.3531 |
| 40 | 7.384 | 0.001 008 | 19.52 | 167.56 | 2262.6 | 2430.1 | 167.57 | 2406.7 | 2574.3 | .5725 | 7.6845 | 8.2570 |
| 45 | 9.593 | 0.001 010 | 15.26 | 188.44 | 2248.4 | 2436.8 | 188.45 | 2394.8 | 2583.2 | .6387 | 7.5261 | 8.1648 |
| 50 | 12.349 | 0.001 012 | 12.03 | 209.32 | 2234.2 | 2443.5 | 209.33 | 2382.7 | 2592.1 | .7038 | 7.3725 | 8.0763 |
| 55 | 15.758 | 0.001 015 | 9.568 | 230.21 | 2219.9 | 2450.1 | 230.23 | 2370.7 | 2600.9 | .7679 | 7.2234 | 7.9913 |
| 60 | 19.940 | 0.001 017 | 7.671 | 251.11 | 2205.5 | 2456.6 | 251.13 | 2358.5 | 2609.6 | .8312 | 7.0784 | 7.9096 |
| 65 | 25.03 | 0.001 020 | 6.197 | 272.02 | 2191.1 | 2463.1 | 272.06 | 2346.2 | 2618.3 | .8935 | 6.9375 | 7.8310 |
| 70 | 31.19 | 0.001 023 | 5.042 | 292.95 | 2176.6 | 2469.6 | 292.98 | 2333.8 | 2626.8 | .9549 | 6.8004 | 7.7553 |
| 75 | 38.58 | 0.001 026 | 4.131 | 313.90 | 2162.0 | 2475.9 | 313.93 | 2321.4 | 2635.3 | 1.0155 | 6.6669 | 7.6824 |
| 80 | 47.39 | 0.001 029 | 3.407 | 334.86 | 2147.4 | 2482.2 | 334.91 | 2308.8 | 2643.7 | 1.0753 | 6.5369 | 7.6122 |
| 85 | 57.83 | 0.001 033 | 2.828 | 355.84 | 2132.6 | 2488.4 | 355.90 | 2296.0 | 2651.9 | 1.1343 | 6.4102 | 7.5445 |
| 90 | 70.14 | 0.001 036 | 2.361 | 376.85 | 2117.7 | 2494.5 | 376.92 | 2283.2 | 2660.1 | 1.1925 | 6.2866 | 7.4791 |
| 95 | 84.55 | 0.001 040 | 1.982 | 397.88 | 2102.7 | 2500.6 | 397.96 | 2270.2 | 2668.1 | 1.2500 | 6.1659 | 7.4159 |
| 100 | Mpa 0.101 35 | 0.001 044 | 1.6729 | 418.94 | 2087.6 | 2506.5 | 419.04 | 2257.0 | 2676.1 | 1.3069 | 6.0480 | 7.3549 |
| 105 | 0.120 82 | 0.001 048 | 1.4194 | 440.02 | 2072.3 | 2512.4 | 440.15 | 2243.7 | 2683.8 | 1.3630 | 5.9328 | 7.2958 |
| 110 | 0.143 27 | 0.001 052 | 1.2102 | 461.14 | 2057.0 | 2518.1 | 461.30 | 2230.2 | 2691.5 | 1.4185 | 5.8202 | 7.2387 |
| 115 | 0.169 06 | 0.001 056 | 1.0366 | 482.30 | 2041.4 | 2523.7 | 482.48 | 2216.5 | 2699.0 | 1.4734 | 5.7100 | 7.1833 |
| 120 | 0.198 53 | 0.001 060 | 0.8919 | 503.50 | 2025.8 | 2529.3 | 503.71 | 2202.6 | 2706.3 | 1.5276 | 5.6020 | 7.1296 |
| 125 | 0.2321 | 0.001 065 | 0.7706 | 524.74 | 2009.9 | 2534.6 | 524.99 | 2188.5 | 2713.5 | 1.5813 | 5.4962 | 7.0775 |
| 130 | 0.2701 | 0.001 070 | 0.6685 | 546.02 | 1993.9 | 2539.9 | 546.31 | 2174.2 | 2720.5 | 1.6344 | 5.3925 | 7.0269 |
| 135 | 0.3130 | 0.001 075 | 0.5822 | 567.35 | 1977.7 | 2545.0 | 567.69 | 2159.6 | 2727.3 | 1.6870 | 5.2907 | 6.9777 |
| 140 | 0.3613 | 0.001 080 | 0.5089 | 588.74 | 1961.3 | 2550.0 | 589.13 | 2144.7 | 2733.9 | 1.7391 | 5.1908 | 6.9299 |
| 145 | 0.4154 | 0.001 085 | 0.4463 | 610.18 | 1944.7 | 2554.9 | 610.63 | 2129.6 | 2740.3 | 1.7907 | 5.0926 | 6.8833 |
| 150 | 0.4758 | 0.001 091 | 0.3928 | 631.68 | 1927.9 | 2559.5 | 632.20 | 2114.3 | 2746.5 | 1.8418 | 4.9960 | 6.8379 |
| 155 | 0.5431 | 0.001 096 | 0.3468 | 653.24 | 1910.8 | 2564.1 | 653.84 | 2098.6 | 2752.4 | 1.8925 | 4.9010 | 6.7935 |
| 160 | 0.6178 | 0.001 102 | 0.3071 | 674.87 | 1893.5 | 2568.4 | 675.55 | 2082.6 | 2758.1 | 1.9427 | 4.8075 | 6.7502 |
| 165 | 0.7005 | 0.001 108 | 0.2727 | 696.56 | 1876.0 | 2572.5 | 697.34 | 2066.2 | 2763.5 | 1.9925 | 4.7153 | 6.7078 |
| 170 | 0.7917 | 0.001 114 | 0.2428 | 718.33 | 1858.1 | 2576.5 | 719.21 | 2049.5 | 2768.7 | 2.0419 | 4.6244 | 6.6663 |
| 175 | 0.8920 | 0.001 121 | 0.2168 | 740.17 | 1840.0 | 2580.2 | 741.17 | 2032.4 | 2773.6 | 2.0909 | 4.5347 | 6.6256 |
| 180 | 1.0021 | 0.001 127 | 0.194 05 | 762.09 | 1821.6 | 2583.7 | 763.22 | 2015.0 | 2778.2 | 2.1396 | 4.4461 | 6.5857 |
| 185 | 1.1227 | 0.001 134 | 0.174 09 | 784.10 | 1802.9 | 2587.0 | 785.37 | 1997.1 | 2782.4 | 2.1879 | 4.3586 | 6.5465 |
| 190 | 1.2544 | 0.001 141 | 0.156 54 | 806.19 | 1783.8 | 2590.0 | 807.62 | 1978.8 | 2786.4 | 2.2359 | 4.2720 | 6.5079 |
| 195 | 1.3978 | 0.001 149 | 0.141 05 | 828.37 | 1764.4 | 2592.8 | 829.98 | 1960.0 | 2790.0 | 2.2835 | 4.1863 | 6.4698 |
| 200 | 1.5538 | 0.001 157 | 0.127 36 | 850.65 | 1744.7 | 2595.3 | 852.45 | 1940.7 | 2793.2 | 2.3309 | 4.1014 | 6.4323 |
| 205 | 1.7230 | 0.001 164 | 0.115 21 | 873.04 | 1724.5 | 2597.5 | 875.04 | 1921.0 | 2796.0 | 2.3780 | 4.0172 | 6.3952 |
| 210 | 1.9062 | 0.001 173 | 0.104 41 | 895.53 | 1703.9 | 2599.5 | 897.76 | 1900.7 | 2798.5 | 2.4248 | 3.9337 | 6.3585 |
| 215 | 2.104 | 0.001 181 | 0.094 79 | 918.14 | 1682.9 | 2601.1 | 920.62 | 1879.9 | 2800.5 | 2.4714 | 3.8507 | 6.3221 |
| 220 | 2.318 | 0.001 190 | 0.086 19 | 940.87 | 1661.5 | 2602.4 | 943.62 | 1858.5 | 2802.1 | 2.5178 | 3.7683 | 6.2861 |
| 225 | 2.548 | 0.001 199 | 0.078 49 | 963.73 | 1639.6 | 2603.3 | 966.78 | 1836.5 | 2803.3 | 2.5639 | 3.6863 | 6.2503 |
| 230 | 2.795 | 0.001 209 | 0.071 58 | 986.74 | 1617.2 | 2603.9 | 990.12 | 1813.8 | 2804.0 | 2.6099 | 3.6047 | 6.2146 |
| 235 | 3.060 | 0.001 219 | 0.065 37 | 1009.89 | 1594.2 | 2604.1 | 1013.62 | 1790.5 | 2804.2 | 2.6558 | 3.5233 | 6.1791 |
| 240 | 3.344 | 0.001 229 | 0.059 76 | 1033.21 | 1570.8 | 2604.0 | 1037.32 | 1766.5 | 2803.8 | 2.7015 | 3.4422 | 6.1437 |
| 245 | 3.648 | 0.001 240 | 0.054 71 | 1056.71 | 1546.7 | 2603.4 | 1061.23 | 1741.7 | 2803.0 | 2.7472 | 3.3612 | 6.1083 |
| 250 | 3.973 | 0.001 251 | 0.050 13 | 1080.39 | 1522.0 | 2602.4 | 1085.36 | 1716.2 | 2801.5 | 2.7927 | 3.2802 | 6.0730 |
| 255 | 4.319 | 0.001 263 | 0.045 98 | 1104.28 | 1496.7 | 2600.9 | 1109.73 | 1689.8 | 2799.5 | 2.8383 | 3.1992 | 6.0375 |
| 260 | 4.688 | 0.001 276 | 0.042 21 | 1128.39 | 1470.6 | 2599.0 | 1134.37 | 1662.5 | 2796.9 | 2.8838 | 3.1181 | 6.0019 |
| 265 | 5.081 | 0.001 289 | 0.038 77 | 1152.74 | 1443.9 | 2596.6 | 1159.28 | 1634.4 | 2793.6 | 2.9294 | 3.0368 | 5.9662 |
| 270 | 5.499 | 0.001 302 | 0.035 64 | 1177.36 | 1416.3 | 2593.7 | 1184.51 | 1605.2 | 2789.7 | 2.9751 | 2.9551 | 5.9301 |
| 275 | 5.942 | 0.001 317 | 0.032 79 | 1202.25 | 1387.9 | 2590.2 | 1210.07 | 1574.9 | 2785.0 | 3.0208 | 2.8730 | 5.8938 |
| 280 | 6.412 | 0.001 332 | 0.030 17 | 1227.46 | 1358.7 | 2586.1 | 1235.99 | 1543.6 | 2779.6 | 3.0668 | 2.7903 | 5.8571 |
| 285 | 6.909 | 0.001 348 | 0.027 77 | 1253.00 | 1328.4 | 2581.4 | 1262.31 | 1511.0 | 2773.3 | 3.1130 | 2.7070 | 5.8199 |
| 290 | 7.436 | 0.001 366 | 0.025 57 | 1278.92 | 1297.1 | 2576.0 | 1289.07 | 1477.1 | 2766.2 | 3.1594 | 2.6227 | 5.7821 |
| 295 | 7.993 | 0.001 384 | 0.023 54 | 1305.2 | 1264.7 | 2569.9 | 1316.3 | 1441.8 | 2758.1 | 3.2062 | 2.5375 | 5.7437 |
| 300 | 8.581 | 0.001 404 | 0.021 67 | 1332.0 | 1231.0 | 2563.0 | 1344.0 | 1404.9 | 2749.0 | 3.2534 | 2.4511 | 5.7045 |
| 305 | 9.202 | 0.001 425 | 0.019 948 | 1359.3 | 1195.9 | 2555.2 | 1372.4 | 1366.4 | 2738.7 | 3.3010 | 2.3633 | 5.6643 |
| 310 | 9.856 | 0.001 447 | 0.018 350 | 1387.1 | 1159.4 | 2546.4 | 1401.3 | 1326.0 | 2727.3 | 3.3493 | 2.2737 | 5.6230 |
| 315 | 10.547 | 0.001 472 | 0.016 867 | 1415.5 | 1121.1 | 2536.6 | 1431.0 | 1283.5 | 2714.5 | 3.3982 | 2.1821 | 5.5804 |
| 320 | 11.274 | 0.001 499 | 0.015 488 | 1444.6 | 1080.9 | 2525.5 | 1461.5 | 1238.6 | 2700.1 | 3.4480 | 2.0882 | 5.5362 |
| 330 | 12.845 | 0.001 561 | 0.012 996 | 1505.3 | 993.7 | 2498.9 | 1525.3 | 1140.6 | 2665.9 | 3.5507 | 1.8909 | 5.4417 |
| 340 | 14.586 | 0.001 638 | 0.010 797 | 1570.3 | 894.3 | 2464.6 | 1594.2 | 1027.9 | 2622.0 | 3.6594 | 1.6763 | 5.3357 |
| 350 | 16.513 | 0.001 740 | 0.008 813 | 1641.9 | 776.6 | 2418.4 | 1670.6 | 893.4 | 2563.9 | 3.7777 | 1.4335 | 5.2112 |
| 360 | 18.651 | 0.001 893 | 0.006 945 | 1725.2 | 626.3 | 2351.5 | 1760.5 | 720.5 | 2481.0 | 3.9147 | 1.1379 | 5.0526 |
| 370 | 21.03 | 0.002 213 | 0.004 925 | 1844.0 | 384.5 | 2228.5 | 1890.5 | 441.6 | 2332.1 | 4.1106 | .6865 | 4.7971 |
| 374.14 | 22.09 | 0.003 155 | 0.003 155 | 2029.6 | 0 | 2029.6 | 2099.3 | 0 | 2099.3 | 4.4298 | 0 | 4.4298 |

Solide et vapeur saturés

| Temp. °C <i>T</i> | Volume massique m ³ /kg | | | Énergie interne kJ/kg | | | Enthalpie kJ/kg | | | Entropie kJ/kg·K | | |
|-------------------------|---------------------------------------|--|--|--|--------------------------------|--|--|--------------------------------|--|--|--------------------------------|--|
| | Pres. kPa <i>P</i> | Solide sat. <i>v_i</i> × 10 ³ | Vapeur sat. <i>v_g</i> | Solide sat. <i>u_i</i> | Subl. <i>u_{ig}</i> | Vapeur sat. <i>u_g</i> | Solide sat. <i>h_i</i> | Subl. <i>h_{ig}</i> | Vapeur sat. <i>h_g</i> | Solide sat. <i>s_i</i> | Subl. <i>s_{ig}</i> | Vapeur sat. <i>s_g</i> |
| .01 | .6113 | 1.0908 | 206.1 | -333.40 | 2708.7 | 2375.3 | -333.40 | 2834.8 | 2501.4 | -1.221 | 10.378 | 9.156 |
| 0 | .6108 | 1.0908 | 206.3 | -333.43 | 2708.8 | 2375.3 | -333.43 | 2834.8 | 2501.3 | -1.221 | 10.378 | 9.157 |
| -2 | .5176 | 1.0904 | 241.7 | -337.62 | 2710.2 | 2372.6 | -337.62 | 2835.3 | 2497.7 | -1.237 | 10.456 | 9.219 |
| -4 | .4375 | 1.0901 | 283.8 | -341.78 | 2711.6 | 2369.8 | -341.78 | 2835.7 | 2494.0 | -1.253 | 10.536 | 9.283 |
| -6 | .3689 | 1.0898 | 334.2 | -345.91 | 2712.9 | 2367.0 | -345.91 | 2836.2 | 2490.3 | -1.268 | 10.616 | 9.348 |
| -8 | .3102 | 1.0894 | 394.4 | -350.02 | 2714.2 | 2364.2 | -350.02 | 2836.6 | 2486.6 | -1.284 | 10.698 | 9.414 |
| -10 | .2602 | 1.0891 | 466.7 | -354.09 | 2715.5 | 2361.4 | -354.09 | 2837.0 | 2482.9 | -1.299 | 10.781 | 9.481 |
| -12 | .2176 | 1.0888 | 553.7 | -358.14 | 2716.8 | 2358.7 | -358.14 | 2837.3 | 2479.2 | -1.315 | 10.865 | 9.550 |
| -14 | .1815 | 1.0884 | 658.8 | -362.15 | 2718.0 | 2355.9 | -362.15 | 2837.6 | 2475.5 | -1.331 | 10.950 | 9.619 |
| -16 | .1510 | 1.0881 | 786.0 | -366.14 | 2719.2 | 2353.1 | -366.14 | 2837.9 | 2471.8 | -1.346 | 11.036 | 9.690 |
| -18 | .1252 | 1.0878 | 940.5 | -370.10 | 2720.4 | 2350.3 | -370.10 | 2838.2 | 2468.1 | -1.362 | 11.123 | 9.762 |
| -20 | .1035 | 1.0874 | 1128.6 | -374.03 | 2721.6 | 2347.5 | -374.03 | 2838.4 | 2464.3 | -1.377 | 11.212 | 9.835 |
| -22 | .0853 | 1.0871 | 1358.4 | -377.93 | 2722.7 | 2344.7 | -377.93 | 2838.6 | 2460.6 | -1.393 | 11.302 | 9.909 |
| -24 | .0701 | 1.0868 | 1640.1 | -381.80 | 2723.7 | 2342.0 | -381.80 | 2838.7 | 2456.9 | -1.408 | 11.394 | 9.985 |
| -26 | .0574 | 1.0864 | 1986.4 | -385.64 | 2724.8 | 2339.2 | -385.64 | 2838.9 | 2453.2 | -1.424 | 11.486 | 10.062 |
| -28 | .0469 | 1.0861 | 2413.7 | -389.45 | 2725.8 | 2336.4 | -389.45 | 2839.0 | 2449.5 | -1.439 | 11.580 | 10.141 |
| -30 | .0381 | 1.0858 | 2943 | -393.23 | 2726.8 | 2333.6 | -393.23 | 2839.0 | 2445.8 | -1.455 | 11.676 | 10.221 |
| -32 | .0309 | 1.0854 | 3600 | -396.98 | 2727.8 | 2330.8 | -396.98 | 2839.1 | 2442.1 | -1.471 | 11.773 | 10.303 |
| -34 | .0250 | 1.0851 | 4419 | -400.71 | 2728.7 | 2328.0 | -400.71 | 2839.1 | 2438.4 | -1.486 | 11.872 | 10.386 |
| -36 | .0201 | 1.0848 | 5444 | -404.40 | 2729.6 | 2325.2 | -404.40 | 2839.1 | 2434.7 | -1.501 | 11.972 | 10.470 |
| -38 | .0161 | 1.0844 | 6731 | -408.06 | 2730.5 | 2322.4 | -408.06 | 2839.0 | 2430.9 | -1.517 | 12.073 | 10.556 |
| -40 | .0129 | 1.0841 | 8354 | -411.70 | 2731.3 | 2319.6 | -411.70 | 2838.9 | 2427.2 | -1.532 | 12.176 | 10.644 |

Chaleur massique à pression constante de différents gaz parfaits^a

$$\bar{C}_{po} = \text{kJ/kmol}\cdot\text{K}$$

$$\theta = T(\text{kelvin})/100$$

| Gaz | \bar{C}_{po} | Erreur | |
|--------------------------------|--|------------|----------|
| | | Plage K | max % |
| N ₂ | $\bar{C}_{po} = 39.060 - 512.79\theta^{-1.5} + 1072.7\theta^{-2} - 820.40\theta^{-3}$ | 300-3500 | 0.43 |
| O ₂ | $\bar{C}_{po} = 37.432 + 0.020 102\theta^{1.5} - 178.57\theta^{-1.5} + 236.88\theta^{-2}$ | 300-3500 | 0.30 |
| H ₂ | $\bar{C}_{po} = 56.505 - 702.74\theta^{-0.75} + 1165.0\theta^{-1} - 560.70\theta^{-1.5}$ | 300-3500 | 0.60 |
| CO | $\bar{C}_{po} = 69.145 - 0.704 63\theta^{0.75} - 200.77\theta^{-0.5} + 176.76\theta^{-0.75}$ | 300-3500 | 0.42 |
| OH | $\bar{C}_{po} = 81.546 - 59.350\theta^{0.25} + 17.329\theta^{0.75} - 4.2660\theta$ | 300-3500 | 0.43 |
| NO | $\bar{C}_{po} = 59.283 - 1.7096\theta^{0.5} - 70.613\theta^{-0.5} + 74.889\theta^{-1.5}$ | 300-3500 | 0.34 |
| H ₂ O | $\bar{C}_{po} = 143.05 - 183.54\theta^{0.25} + 82.751\theta^{0.5} - 3.6989\theta$ | 300-3500 | 0.43 |
| CO ₂ | $\bar{C}_{po} = -3.7357 + 30.529\theta^{0.5} - 4.1034\theta + 0.024 198\theta^2$ | 300-3500 | 0.19 |
| NO ₂ | $\bar{C}_{po} = 46.045 + 216.10\theta^{-0.5} - 363.66\theta^{-0.75} + 232.550\theta^{-2}$ | 300-3500 | 0.26 |
| CH ₄ | $\bar{C}_{po} = -672.87 + 439.74\theta^{0.25} - 24.875\theta^{0.75} + 323.88\theta^{-0.5}$ | 300-2000 | 0.15 |
| C ₂ H ₄ | $\bar{C}_{po} = -95.395 + 123.15\theta^{0.5} - 35.641\theta^{0.75} + 182.77\theta^{-3}$ | 300-2000 | 0.07 |
| C ₂ H ₆ | $\bar{C}_{po} = 6.895 + 17.26\theta - 0.6402\theta^2 + 0.007 28\theta^3$ | 300-1500 | 0.83 |
| C ₃ H ₈ | $\bar{C}_{po} = -4.042 + 30.46\theta - 1.571\theta^2 + 0.031 71\theta^3$ | 300-1500 | 0.40 |
| C ₄ H ₁₀ | $\bar{C}_{po} = 3.954 + 37.12\theta - 1.833\theta^2 + 0.034 98\theta^3$ | 300-1500 | 0.54 |

Ammoniac saturé

| Temp. °C | Pres. abs. kPa P | Volume massique m ³ /kg | | | Enthalpie kJ/kg | | | Entropie kJ/kg-K | | |
|----------|------------------|------------------------------------|-----------------------|----------------------------|-----------------------------|-----------------------|----------------------------|-----------------------------|-----------------------|----------------------------|
| | | Liquide sat. v _f | Évap. v _{fg} | Vapeur sat. v _g | Liquide sat. h _f | Évap. h _{fg} | Vapeur sat. h _g | Liquide sat. s _f | Évap. s _{fg} | Vapeur sat. s _g |
| -50 | 40.88 | 0.001 424 | 2.6239 | 2.6254 | -44.3 | 1416.7 | 1372.4 | -0.1942 | 6.3502 | 6.1561 |
| -48 | 45.96 | 0.001 429 | 2.3518 | 2.3533 | -35.5 | 1411.3 | 1375.8 | -0.1547 | 6.2696 | 6.1149 |
| -46 | 51.55 | 0.001 434 | 2.1126 | 2.1140 | -26.6 | 1405.8 | 1379.2 | -0.1156 | 6.1902 | 6.0746 |
| -44 | 57.69 | 0.001 439 | 1.9018 | 1.9032 | -17.8 | 1400.3 | 1382.5 | -0.0768 | 6.1120 | 6.0352 |
| -42 | 64.42 | 0.001 444 | 1.7155 | 1.7170 | -8.9 | 1394.7 | 1385.8 | -0.0382 | 6.0349 | 5.9967 |
| -40 | 71.77 | 0.001 449 | 1.5506 | 1.5521 | 0.0 | 1389.0 | 1389.0 | 0.0000 | 5.9589 | 5.9589 |
| -38 | 79.80 | 0.001 454 | 1.4043 | 1.4058 | 8.9 | 1383.3 | 1392.2 | 0.0380 | 5.8840 | 5.9220 |
| -36 | 88.54 | 0.001 460 | 1.2742 | 1.2757 | 17.8 | 1377.6 | 1395.4 | 0.0757 | 5.8101 | 5.8858 |
| -34 | 98.05 | 0.001 465 | 1.1582 | 1.1597 | 26.8 | 1371.8 | 1398.5 | 0.1132 | 5.7372 | 5.8504 |
| -32 | 108.37 | 0.001 470 | 1.0547 | 1.0562 | 35.7 | 1365.9 | 1401.6 | 0.1504 | 5.6652 | 5.8156 |
| -30 | 119.55 | 0.001 476 | 0.9621 | 0.9635 | 44.7 | 1360.0 | 1404.6 | 0.1873 | 5.5942 | 5.7815 |
| -28 | 131.64 | 0.001 481 | 0.8790 | 0.8805 | 53.6 | 1354.0 | 1407.6 | 0.2240 | 5.5241 | 5.7481 |
| -26 | 144.70 | 0.001 487 | 0.8044 | 0.8059 | 62.6 | 1347.9 | 1410.5 | 0.2605 | 5.4548 | 5.7153 |
| -24 | 158.78 | 0.001 492 | 0.7373 | 0.7388 | 71.6 | 1341.8 | 1413.4 | 0.2967 | 5.3864 | 5.6831 |
| -22 | 173.93 | 0.001 498 | 0.6768 | 0.6783 | 80.7 | 1335.6 | 1416.2 | 0.3327 | 5.3188 | 5.6515 |
| -20 | 190.22 | 0.001 504 | 0.6222 | 0.6237 | 89.7 | 1329.3 | 1419.0 | 0.3684 | 5.2520 | 5.6205 |
| -18 | 207.71 | 0.001 510 | 0.5728 | 0.5743 | 98.8 | 1322.9 | 1421.7 | 0.4040 | 5.1860 | 5.5900 |
| -16 | 226.45 | 0.001 515 | 0.5280 | 0.5296 | 107.8 | 1316.5 | 1424.4 | 0.4393 | 5.1207 | 5.5600 |
| -14 | 246.51 | 0.001 521 | 0.4874 | 0.4889 | 116.9 | 1310.0 | 1427.0 | 0.4744 | 5.0561 | 5.5305 |
| -12 | 267.95 | 0.001 528 | 0.4505 | 0.4520 | 126.0 | 1303.5 | 1429.5 | 0.5093 | 4.9922 | 5.5015 |
| -10 | 290.85 | 0.001 534 | 0.4169 | 0.4185 | 135.2 | 1296.8 | 1432.0 | 0.5440 | 4.9290 | 5.4730 |
| -8 | 315.25 | 0.001 540 | 0.3863 | 0.3878 | 144.3 | 1290.1 | 1434.4 | 0.5785 | 4.8664 | 5.4449 |
| -6 | 341.25 | 0.001 546 | 0.3583 | 0.3599 | 153.5 | 1283.3 | 1436.8 | 0.6128 | 4.8045 | 5.4173 |
| -4 | 368.90 | 0.001 553 | 0.3328 | 0.3343 | 162.7 | 1276.4 | 1439.1 | 0.6469 | 4.7432 | 5.3901 |
| -2 | 398.27 | 0.001 559 | 0.3094 | 0.3109 | 171.9 | 1269.4 | 1441.3 | 0.6808 | 4.6825 | 5.3633 |
| 0 | 429.44 | 0.001 566 | 0.2879 | 0.2895 | 181.1 | 1262.4 | 1443.5 | 0.7145 | 4.6223 | 5.3369 |
| 2 | 462.49 | 0.001 573 | 0.2683 | 0.2698 | 190.4 | 1255.2 | 1445.6 | 0.7481 | 4.5627 | 5.3108 |
| 4 | 497.49 | 0.001 580 | 0.2502 | 0.2517 | 199.6 | 1248.0 | 1447.6 | 0.7815 | 4.5037 | 5.2852 |
| 6 | 534.51 | 0.001 587 | 0.2335 | 0.2351 | 208.9 | 1240.6 | 1449.6 | 0.8148 | 4.4451 | 5.2599 |
| 8 | 573.64 | 0.001 594 | 0.2182 | 0.2198 | 218.3 | 1233.2 | 1451.5 | 0.8479 | 4.3871 | 5.2350 |
| 10 | 614.95 | 0.001 601 | 0.2040 | 0.2056 | 227.6 | 1225.7 | 1453.3 | 0.8808 | 4.3295 | 5.2104 |
| 12 | 658.52 | 0.001 608 | 0.1910 | 0.1926 | 237.0 | 1218.1 | 1455.1 | 0.9136 | 4.2725 | 5.1861 |
| 14 | 704.44 | 0.001 616 | 0.1789 | 0.1805 | 246.4 | 1210.4 | 1456.8 | 0.9463 | 4.2159 | 5.1621 |
| 16 | 752.79 | 0.001 623 | 0.1677 | 0.1693 | 255.9 | 1202.6 | 1458.5 | 0.9788 | 4.1597 | 5.1385 |
| 18 | 803.66 | 0.001 631 | 0.1574 | 0.1590 | 265.4 | 1194.7 | 1460.0 | 1.0112 | 4.1039 | 5.1151 |
| 20 | 857.12 | 0.001 639 | 0.1477 | 0.1494 | 274.9 | 1186.7 | 1461.5 | 1.0434 | 4.0486 | 5.0920 |
| 22 | 913.27 | 0.001 647 | 0.1388 | 0.1405 | 284.4 | 1178.5 | 1462.9 | 1.0755 | 3.9937 | 5.0692 |
| 24 | 972.19 | 0.001 655 | 0.1305 | 0.1322 | 294.0 | 1170.3 | 1464.3 | 1.1075 | 3.9392 | 5.0467 |
| 26 | 1033.97 | 0.001 663 | 0.1228 | 0.1245 | 303.6 | 1162.0 | 1465.6 | 1.1394 | 3.8850 | 5.0244 |
| 28 | 1098.71 | 0.001 671 | 0.1156 | 0.1173 | 313.2 | 1153.6 | 1466.8 | 1.1711 | 3.8312 | 5.0023 |
| 30 | 1166.49 | 0.001 680 | 0.1089 | 0.1106 | 322.9 | 1145.0 | 1467.9 | 1.2028 | 3.7777 | 4.9805 |
| 32 | 1237.41 | 0.001 689 | 0.1027 | 0.1044 | 332.6 | 1136.4 | 1469.0 | 1.2343 | 3.7246 | 4.9589 |
| 34 | 1311.55 | 0.001 698 | 0.0969 | 0.0986 | 342.3 | 1127.6 | 1469.9 | 1.2656 | 3.6718 | 4.9374 |
| 36 | 1389.03 | 0.001 707 | 0.0914 | 0.0931 | 352.1 | 1118.7 | 1470.8 | 1.2969 | 3.6192 | 4.9161 |
| 38 | 1469.92 | 0.001 716 | 0.0863 | 0.0880 | 361.9 | 1109.7 | 1471.5 | 1.3281 | 3.5669 | 4.8950 |
| 40 | 1554.33 | 0.001 726 | 0.0815 | 0.0833 | 371.7 | 1100.5 | 1472.2 | 1.3591 | 3.5148 | 4.8740 |
| 42 | 1642.35 | 0.001 735 | 0.0771 | 0.0788 | 381.6 | 1091.2 | 1472.8 | 1.3901 | 3.4630 | 4.8530 |
| 44 | 1734.09 | 0.001 745 | 0.0728 | 0.0746 | 391.5 | 1081.7 | 1473.2 | 1.4209 | 3.4112 | 4.8322 |
| 46 | 1829.65 | 0.001 756 | 0.0689 | 0.0707 | 401.5 | 1072.0 | 1473.5 | 1.4518 | 3.3595 | 4.8113 |
| 48 | 1929.13 | 0.001 766 | 0.0652 | 0.0669 | 411.5 | 1062.2 | 1473.7 | 1.4826 | 3.3079 | 4.7905 |
| 50 | 2032.62 | 0.001 777 | 0.0617 | 0.0635 | 421.7 | 1052.0 | 1473.7 | 1.5135 | 3.2561 | 4.7696 |

Ammoniac surchauffé

| Temp. de sat. °C | Pres. abs. kPa | Température, °C | | | | | | | | | | | |
|------------------|----------------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | -20 | -10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 100 |
| 50 (-46.54) | v | 2.4474 | 2.5481 | 2.6482 | 2.7479 | 2.8473 | 2.9464 | 3.0453 | 3.1441 | 3.2427 | 3.3413 | 3.4397 | |
| | h | 1435.8 | 1457.0 | 1478.1 | 1499.2 | 1520.4 | 1541.7 | 1563.0 | 1584.5 | 1606.1 | 1627.8 | 1649.7 | |
| | s | 6.3256 | 6.4077 | 6.4865 | 6.5625 | 6.6360 | 6.7073 | 6.7766 | 6.8441 | 6.9099 | 6.9743 | 7.0372 | |
| 75 (-39.18) | v | 1.6233 | 1.6915 | 1.7591 | 1.8263 | 1.8932 | 1.9597 | 2.0261 | 2.0923 | 2.1584 | 2.2244 | 2.2903 | |
| | h | 1433.0 | 1454.7 | 1476.1 | 1497.5 | 1518.9 | 1540.3 | 1561.8 | 1583.4 | 1605.1 | 1626.9 | 1648.9 | |
| | s | 6.1190 | 6.2028 | 6.2828 | 6.3597 | 6.4339 | 6.5058 | 6.5756 | 6.6434 | 6.7096 | 6.7742 | 6.8373 | |
| 100 (-33.61) | v | 1.2110 | 1.2631 | 1.3145 | 1.3654 | 1.4160 | 1.4664 | 1.5165 | 1.5664 | 1.6163 | 1.6659 | 1.7155 | 1.8145 |
| | h | 1430.1 | 1452.2 | 1474.1 | 1495.7 | 1517.3 | 1538.9 | 1560.5 | 1582.2 | 1604.1 | 1626.0 | 1648.0 | 1692.6 |
| | s | 5.9695 | 6.0552 | 6.1366 | 6.2144 | 6.2894 | 6.3618 | 6.4321 | 6.5003 | 6.5668 | 6.6316 | 6.6950 | 6.8177 |
| 125 (-29.08) | v | 0.9635 | 1.0059 | 1.0476 | 1.0889 | 1.1297 | 1.1703 | 1.2107 | 1.2509 | 1.2909 | 1.3309 | 1.3707 | 1.4501 |
| | h | 1427.2 | 1449.8 | 1472.0 | 1493.9 | 1515.7 | 1537.5 | 1559.3 | 1581.1 | 1603.0 | 1625.0 | 1647.2 | 1691.8 |
| | s | 5.8512 | 5.9389 | 6.0217 | 6.1006 | 6.1763 | 6.2494 | 6.3201 | 6.3887 | 6.4555 | 6.5206 | 6.5842 | 6.7072 |
| 150 (-25.23) | v | 0.7984 | 0.8344 | 0.8697 | 0.9045 | 0.9388 | 0.9729 | 1.0068 | 1.0405 | 1.0740 | 1.1074 | 1.1408 | 1.2072 |
| | h | 1424.1 | 1447.3 | 1469.8 | 1492.1 | 1514.1 | 1536.1 | 1558.0 | 1580.0 | 1602.0 | 1624.1 | 1646.3 | 1691.1 |
| | s | 5.7526 | 5.8424 | 5.9266 | 6.0066 | 6.0831 | 6.1568 | 6.2280 | 6.2970 | 6.3641 | 6.4295 | 6.4933 | 6.6167 |

Ammoniac surchauffé

| Pres. abs. kPa (Temp. de sat.) °C | | Température, °C | | | | | | | | | | | |
|--|---|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | -20 | -10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 100 |
| 200 (-18.86) | v | | 0.6199 | 0.6471 | 0.6738 | 0.7001 | 0.7261 | 0.7519 | 0.7774 | 0.8029 | 0.8282 | 0.8533 | 0.9035 |
| | h | | 1442.0 | 1465.5 | 1488.4 | 1510.9 | 1533.2 | 1555.5 | 1577.7 | 1599.9 | 1622.2 | 1644.6 | 1689.6 |
| | s | | 5.6863 | 5.7737 | 5.8559 | 5.9342 | 6.0091 | 6.0813 | 6.1512 | 6.2189 | 6.2849 | 6.3491 | 6.4732 |
| 250 (-13.67) | v | | 0.4910 | 0.5135 | 0.5354 | 0.5568 | 0.5780 | 0.5989 | 0.6196 | 0.6401 | 0.6605 | 0.6809 | 0.7212 |
| | h | | 1436.6 | 1461.0 | 1484.5 | 1507.6 | 1530.3 | 1552.9 | 1575.4 | 1597.8 | 1620.3 | 1642.8 | 1688.2 |
| | s | | 5.5609 | 5.6517 | 5.7365 | 5.8165 | 5.8928 | 5.9661 | 6.0368 | 6.1052 | 6.1717 | 6.2365 | 6.3613 |
| 300 (-9.23) | v | | | 0.4243 | 0.4430 | 0.4613 | 0.4792 | 0.4968 | 0.5143 | 0.5316 | 0.5488 | 0.5658 | 0.5997 |
| | h | | | 1456.3 | 1480.6 | 1504.2 | 1527.4 | 1550.3 | 1573.0 | 1595.7 | 1618.4 | 1641.1 | 1686.7 |
| | s | | | 5.5493 | 5.6366 | 5.7186 | 5.7963 | 5.8707 | 5.9423 | 6.0114 | 6.0785 | 6.1437 | 6.2693 |
| 350 (-5.35) | v | | | 0.3605 | 0.3770 | 0.3929 | 0.4086 | 0.4239 | 0.4391 | 0.4541 | 0.4689 | 0.4837 | 0.5129 |
| | h | | | 1451.5 | 1476.5 | 1500.7 | 1524.4 | 1547.6 | 1570.7 | 1593.6 | 1616.5 | 1639.3 | 1685.2 |
| | s | | | 5.4600 | 5.5502 | 5.6342 | 5.7135 | 5.7890 | 5.8615 | 5.9314 | 5.9990 | 6.0647 | 6.1910 |
| 400 (-1.89) | v | | | 0.3125 | 0.3274 | 0.3417 | 0.3556 | 0.3692 | 0.3826 | 0.3959 | 0.4090 | 0.4220 | 0.4478 |
| | h | | | 1446.5 | 1472.4 | 1497.2 | 1521.3 | 1544.9 | 1568.3 | 1591.5 | 1614.5 | 1637.6 | 1683.7 |
| | s | | | 5.3803 | 5.4735 | 5.5597 | 5.6405 | 5.7173 | 5.7907 | 5.8613 | 5.9296 | 5.9957 | 6.1228 |
| 450 (1.26) | v | | | 0.2752 | 0.2887 | 0.3017 | 0.3143 | 0.3266 | 0.3387 | 0.3506 | 0.3624 | 0.3740 | 0.3971 |
| | h | | | 1441.3 | 1468.1 | 1493.6 | 1518.2 | 1542.2 | 1565.9 | 1589.3 | 1612.6 | 1635.8 | 1682.2 |
| | s | | | 5.3078 | 5.4042 | 5.4926 | 5.5752 | 5.6532 | 5.7275 | 5.7989 | 5.8678 | 5.9345 | 6.0623 |

Ammoniac surchauffé

| Pres. abs. kPa (Temp. de sat.) °C | | Température, °C | | | | | | | | | | | |
|--|---|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 100 | 120 | 140 | 160 | 180 |
| 500 (4.14) | v | 0.2698 | 0.2813 | 0.2926 | 0.3036 | 0.3144 | 0.3251 | 0.3357 | 0.3565 | 0.3771 | 0.3975 | | |
| | h | 1489.9 | 1515.0 | 1539.5 | 1563.4 | 1587.1 | 1610.6 | 1634.0 | 1680.7 | 1727.5 | 1774.7 | | |
| | s | 5.4314 | 5.5157 | 5.5950 | 5.6704 | 5.7425 | 5.8120 | 5.8793 | 6.0079 | 6.1301 | 6.2472 | | |
| 600 (9.29) | v | 0.2217 | 0.2317 | 0.2414 | 0.2508 | 0.2600 | 0.2691 | 0.2781 | 0.2957 | 0.3130 | 0.3302 | | |
| | h | 1482.4 | 1508.6 | 1533.8 | 1558.5 | 1582.7 | 1606.6 | 1630.4 | 1677.7 | 1724.9 | 1772.4 | | |
| | s | 5.3222 | 5.4102 | 5.4923 | 5.5697 | 5.6436 | 5.7144 | 5.7826 | 5.9129 | 6.0363 | 6.1541 | | |
| 700 (13.81) | v | 0.1874 | 0.1963 | 0.2048 | 0.2131 | 0.2212 | 0.2291 | 0.2369 | 0.2522 | 0.2672 | 0.2821 | | |
| | h | 1474.5 | 1501.9 | 1528.1 | 1553.4 | 1578.2 | 1602.6 | 1626.8 | 1674.6 | 1722.4 | 1770.2 | | |
| | s | 5.2259 | 5.3179 | 5.4029 | 5.4826 | 5.5582 | 5.6303 | 5.6997 | 5.8316 | 5.9562 | 6.0749 | | |
| 800 (17.86) | v | 0.1615 | 0.1696 | 0.1773 | 0.1848 | 0.1920 | 0.1991 | 0.2060 | 0.2196 | 0.2329 | 0.2459 | 0.2589 | |
| | h | 1466.3 | 1495.0 | 1522.2 | 1548.3 | 1573.7 | 1598.6 | 1623.1 | 1671.6 | 1719.8 | 1768.0 | 1816.4 | |
| | s | 5.1387 | 5.2351 | 5.3232 | 5.4053 | 5.4827 | 5.5562 | 5.6268 | 5.7603 | 5.8861 | 6.0057 | 6.1202 | |
| 900 (21.54) | v | | 0.1488 | 0.1559 | 0.1627 | 0.1693 | 0.1757 | 0.1820 | 0.1942 | 0.2061 | 0.2178 | 0.2294 | |
| | h | | 1488.0 | 1516.2 | 1543.0 | 1569.1 | 1594.4 | 1619.4 | 1668.5 | 1717.1 | 1765.7 | 1814.4 | |
| | s | | 5.1593 | 5.2508 | 5.3354 | 5.4147 | 5.4897 | 5.5614 | 5.6968 | 5.8237 | 5.9442 | 6.0594 | |
| 1000 (24.91) | v | | 0.1321 | 0.1388 | 0.1450 | 0.1511 | 0.1570 | 0.1627 | 0.1739 | 0.1847 | 0.1954 | 0.2058 | 0.2162 |
| | h | | 1480.6 | 1510.0 | 1537.7 | 1564.4 | 1590.3 | 1615.6 | 1665.4 | 1714.5 | 1763.4 | 1812.4 | 1861.7 |
| | s | | 5.0889 | 5.1840 | 5.2713 | 5.3525 | 5.4299 | 5.5021 | 5.6392 | 5.7674 | 5.8888 | 6.0047 | 6.1159 |
| 1200 (30.96) | v | | | 0.1129 | 0.1185 | 0.1238 | 0.1289 | 0.1338 | 0.1434 | 0.1526 | 0.1616 | 0.1705 | 0.1792 |
| | h | | | 1497.1 | 1526.6 | 1554.7 | 1581.7 | 1608.0 | 1659.2 | 1709.2 | 1758.9 | 1808.5 | 1858.2 |
| | s | | | 5.0629 | 5.1560 | 5.2416 | 5.3215 | 5.3970 | 5.5379 | 5.6687 | 5.7919 | 5.9091 | 6.0214 |
| 1400 (36.28) | v | | | 0.0944 | 0.0995 | 0.1042 | 0.1088 | 0.1132 | 0.1216 | 0.1297 | 0.1376 | 0.1452 | 0.1528 |
| | h | | | 1483.4 | 1515.1 | 1544.7 | 1573.0 | 1600.2 | 1652.8 | 1703.9 | 1754.3 | 1804.5 | 1854.7 |
| | s | | | 4.9534 | 5.0530 | 5.1434 | 5.2270 | 5.3053 | 5.4501 | 5.5836 | 5.7087 | 5.8273 | 5.9406 |
| 1600 (41.05) | v | | | | 0.0851 | 0.0895 | 0.0937 | 0.0977 | 0.1053 | 0.1125 | 0.1195 | 0.1263 | 0.1330 |
| | h | | | | 1502.9 | 1534.4 | 1564.0 | 1592.3 | 1646.4 | 1698.5 | 1749.7 | 1800.5 | 1851.2 |
| | s | | | | 4.9584 | 5.0543 | 5.1419 | 5.2232 | 5.3722 | 5.5084 | 5.6355 | 5.7555 | 5.8699 |
| 1800 (45.39) | v | | | | 0.0739 | 0.0781 | 0.0820 | 0.0856 | 0.0926 | 0.0992 | 0.1055 | 0.1116 | 0.1177 |
| | h | | | | 1490.0 | 1523.5 | 1554.6 | 1584.1 | 1639.8 | 1693.1 | 1745.1 | 1796.5 | 1847.7 |
| | s | | | | 4.8693 | 4.9715 | 5.0635 | 5.1482 | 5.3018 | 5.4409 | 5.5699 | 5.6914 | 5.8069 |
| 2000 (49.38) | v | | | | 0.0648 | 0.0688 | 0.0725 | 0.0760 | 0.0824 | 0.0885 | 0.0943 | 0.0999 | 0.1054 |
| | h | | | | 1476.1 | 1512.0 | 1544.9 | 1575.6 | 1633.2 | 1687.6 | 1740.4 | 1792.4 | 1844.1 |
| | s | | | | 4.7834 | 4.8930 | 4.9902 | 5.0786 | 5.2371 | 5.3793 | 5.5104 | 5.6333 | 5.7499 |

Fréon 12 saturé

| Temp. °C | Pres. abs. MPa P | Volume massique m³/kg | | | Enthalpie kJ/kg | | | Entropie kJ/kg·K | | |
|-------------|------------------------|--------------------------------|--------------------------|-------------------------------|--------------------------------|--------------------------|-------------------------------|--------------------------------|--------------------------|-------------------------------|
| | | Liquide sat. v _f | Évap. v _{fg} | Vapeur sat. v _g | Liquide sat. h _f | Évap. h _{fg} | Vapeur sat. h _g | Liquide sat. s _f | Évap. s _{fg} | Vapeur sat. s _g |
| -90 | 0.0028 | 0.000 608 | 4.414 937 | 4.415 545 | -43.243 | 189.618 | 146.375 | -0.2084 | 1.0352 | 0.8268 |
| -85 | 0.0042 | 0.000 612 | 3.036 704 | 3.037 316 | -38.968 | 187.608 | 148.640 | -0.1854 | 0.9970 | 0.8116 |
| -80 | 0.0062 | 0.000 617 | 2.137 728 | 2.138 345 | -34.688 | 185.612 | 150.924 | -0.1630 | 0.9609 | 0.7979 |
| -75 | 0.0088 | 0.000 622 | 1.537 030 | 1.537 651 | -30.401 | 183.625 | 153.224 | -0.1411 | 0.9266 | 0.7855 |
| -70 | 0.0123 | 0.000 627 | 1.126 654 | 1.127 280 | -26.103 | 181.640 | 155.536 | -0.1197 | 0.8940 | 0.7744 |
| -65 | 0.0168 | 0.000 632 | 0.840 534 | 0.841 166 | -21.793 | 179.651 | 157.857 | -0.0987 | 0.8630 | 0.7643 |
| -60 | 0.0226 | 0.000 637 | 0.637 274 | 0.637 910 | -17.469 | 177.653 | 160.184 | -0.0782 | 0.8334 | 0.7552 |
| -55 | 0.0300 | 0.000 642 | 0.490 358 | 0.491 000 | -13.129 | 175.641 | 162.512 | -0.0581 | 0.8051 | 0.7470 |
| -50 | 0.0391 | 0.000 648 | 0.382 457 | 0.383 105 | -8.772 | 173.611 | 164.840 | -0.0384 | 0.7779 | 0.7396 |
| -45 | 0.0504 | 0.000 654 | 0.302 029 | 0.302 682 | -4.396 | 171.558 | 167.163 | -0.0190 | 0.7519 | 0.7329 |
| -40 | 0.0642 | 0.000 659 | 0.241 251 | 0.241 910 | -0.000 | 169.479 | 169.479 | -0.0000 | 0.7269 | 0.7269 |
| -35 | 0.0807 | 0.000 666 | 0.194 732 | 0.195 398 | 4.416 | 167.368 | 171.784 | 0.0187 | 0.7027 | 0.7214 |
| -30 | 0.1004 | 0.000 672 | 0.158 703 | 0.159 375 | 8.854 | 165.222 | 174.076 | 0.0371 | 0.6795 | 0.7165 |
| -25 | 0.1237 | 0.000 679 | 0.130 487 | 0.131 166 | 13.315 | 163.037 | 176.352 | 0.0552 | 0.6570 | 0.7121 |
| -20 | 0.1509 | 0.000 685 | 0.108 162 | 0.108 847 | 17.800 | 160.810 | 178.610 | 0.0730 | 0.6352 | 0.7082 |
| -15 | 0.1826 | 0.000 693 | 0.090 326 | 0.091 018 | 22.312 | 158.534 | 180.846 | 0.0906 | 0.6141 | 0.7046 |
| -10 | 0.2191 | 0.000 700 | 0.075 946 | 0.076 646 | 26.851 | 156.207 | 183.058 | 0.1079 | 0.5936 | 0.7014 |
| -5 | 0.2610 | 0.000 708 | 0.064 255 | 0.064 963 | 31.420 | 153.823 | 185.243 | 0.1250 | 0.5736 | 0.6986 |
| 0 | 0.3086 | 0.000 716 | 0.054 673 | 0.055 389 | 36.022 | 151.376 | 187.397 | 0.1418 | 0.5542 | 0.6960 |
| 5 | 0.3626 | 0.000 724 | 0.046 761 | 0.047 485 | 40.659 | 148.859 | 189.518 | 0.1585 | 0.5351 | 0.6937 |
| 10 | 0.4233 | 0.000 733 | 0.040 180 | 0.040 914 | 45.337 | 146.265 | 191.602 | 0.1750 | 0.5165 | 0.6916 |
| 15 | 0.4914 | 0.000 743 | 0.034 671 | 0.035 413 | 50.058 | 143.586 | 193.644 | 0.1914 | 0.4983 | 0.6897 |
| 20 | 0.5673 | 0.000 752 | 0.030 028 | 0.030 780 | 54.828 | 140.812 | 195.641 | 0.2076 | 0.4803 | 0.6879 |
| 25 | 0.6516 | 0.000 763 | 0.026 091 | 0.026 854 | 59.653 | 137.933 | 197.586 | 0.2237 | 0.4626 | 0.6863 |
| 30 | 0.7449 | 0.000 774 | 0.022 734 | 0.023 508 | 64.539 | 134.936 | 199.475 | 0.2397 | 0.4451 | 0.6848 |
| 35 | 0.8477 | 0.000 786 | 0.019 855 | 0.020 641 | 69.494 | 131.805 | 201.299 | 0.2557 | 0.4277 | 0.6834 |
| 40 | 0.9607 | 0.000 798 | 0.017 373 | 0.018 171 | 74.527 | 128.525 | 203.051 | 0.2716 | 0.4104 | 0.6820 |
| 45 | 1.0843 | 0.000 811 | 0.015 220 | 0.016 032 | 79.647 | 125.074 | 204.722 | 0.2875 | 0.3931 | 0.6806 |
| 50 | 1.2193 | 0.000 826 | 0.013 344 | 0.014 170 | 84.868 | 121.430 | 206.298 | 0.3034 | 0.3758 | 0.6792 |
| 55 | 1.3663 | 0.000 841 | 0.011 701 | 0.012 542 | 90.201 | 117.565 | 207.766 | 0.3194 | 0.3582 | 0.6777 |
| 60 | 1.5259 | 0.000 858 | 0.010 253 | 0.011 111 | 95.665 | 113.443 | 209.109 | 0.3355 | 0.3405 | 0.6760 |
| 65 | 1.6988 | 0.000 877 | 0.008 971 | 0.009 847 | 101.279 | 109.024 | 210.303 | 0.3518 | 0.3224 | 0.6742 |
| 70 | 1.8858 | 0.000 897 | 0.007 828 | 0.008 725 | 107.067 | 104.255 | 211.321 | 0.3683 | 0.3038 | 0.6721 |
| 75 | 2.0874 | 0.000 920 | 0.006 802 | 0.007 723 | 113.058 | 99.068 | 212.126 | 0.3851 | 0.2845 | 0.6697 |
| 80 | 2.3046 | 0.000 946 | 0.005 875 | 0.006 821 | 119.291 | 93.373 | 212.665 | 0.4023 | 0.2644 | 0.6667 |
| 85 | 2.5380 | 0.000 976 | 0.005 029 | 0.006 005 | 125.818 | 87.047 | 212.865 | 0.4201 | 0.2430 | 0.6631 |
| 90 | 2.7885 | 0.001 012 | 0.004 246 | 0.005 258 | 132.708 | 79.907 | 212.614 | 0.4385 | 0.2200 | 0.6585 |
| 95 | 3.0569 | 0.001 056 | 0.003 508 | 0.004 563 | 140.068 | 71.658 | 211.726 | 0.4579 | 0.1946 | 0.6526 |
| 100 | 3.3440 | 0.001 113 | 0.002 790 | 0.003 903 | 148.076 | 61.768 | 209.843 | 0.4788 | 0.1655 | 0.6444 |
| 105 | 3.6509 | 0.001 197 | 0.002 045 | 0.003 242 | 157.085 | 49.014 | 206.099 | 0.5023 | 0.1296 | 0.6319 |
| 110 | 3.9784 | 0.001 364 | 0.001 098 | 0.002 462 | 168.059 | 28.425 | 196.484 | 0.5322 | 0.0742 | 0.6064 |
| 112 | 4.1155 | 0.001 792 | 0.000 005 | 0.001 797 | 174.920 | 0.151 | 175.071 | 0.5651 | 0.0004 | 0.5655 |

Fréon 12 surchauffé

| Temp. °C | 0.05 MPa | | | 0.10 MPa | | | 0.15 MPa | | |
|-----------------|------------|------------|--------------|------------|------------|--------------|------------|------------|--------------|
| | v m³/kg | h kJ/kg | s kJ/kg·K | v m³/kg | h kJ/kg | s kJ/kg·K | v m³/kg | h kJ/kg | s kJ/kg·K |
| -20.0 | 0.341 857 | 181.042 | 0.7912 | 0.167 701 | 179.861 | 0.7401 | | | |
| -10.0 | 0.356 227 | 186.757 | 0.8133 | 0.175 222 | 185.707 | 0.7628 | 0.114 716 | 184.619 | 0.7318 |
| 0.0 | 0.370 508 | 192.567 | 0.8350 | 0.182 647 | 191.628 | 0.7849 | 0.119 866 | 190.660 | 0.7543 |
| 10.0 | 0.384 716 | 198.471 | 0.8562 | 0.189 994 | 197.628 | 0.8064 | 0.124 932 | 196.762 | 0.7763 |
| 20.0 | 0.398 863 | 204.469 | 0.8770 | 0.197 277 | 203.707 | 0.8275 | 0.129 930 | 202.927 | 0.7977 |
| 30.0 | 0.412 959 | 210.557 | 0.8974 | 0.204 506 | 209.866 | 0.8482 | 0.134 873 | 209.160 | 0.8186 |
| 40.0 | 0.427 012 | 216.733 | 0.9175 | 0.211 691 | 216.104 | 0.8684 | 0.139 768 | 215.463 | 0.8390 |
| 50.0 | 0.441 030 | 222.997 | 0.9372 | 0.218 839 | 222.421 | 0.8883 | 0.144 625 | 221.835 | 0.8591 |
| 60.0 | 0.455 017 | 229.344 | 0.9565 | 0.225 955 | 228.815 | 0.9078 | 0.149 450 | 228.277 | 0.8787 |
| 70.0 | 0.468 978 | 235.774 | 0.9755 | 0.233 044 | 235.285 | 0.9269 | 0.154 247 | 234.789 | 0.8980 |
| 80.0 | 0.482 917 | 242.282 | 0.9942 | 0.240 111 | 241.829 | 0.9457 | 0.159 020 | 241.371 | 0.9169 |
| 90.0 | 0.496 838 | 248.868 | 1.0126 | 0.247 159 | 248.446 | 0.9642 | 0.163 774 | 248.020 | 0.9354 |
| <hr/> | | | | | | | | | |
| 0.20 MPa | | | | | | | | | |
| 0.0 | 0.088 608 | 189.669 | 0.7320 | 0.069 752 | 188.644 | 0.7139 | 0.057 150 | 187.583 | 0.6984 |
| 10.0 | 0.092 550 | 195.878 | 0.7543 | 0.073 024 | 194.969 | 0.7366 | 0.059 984 | 194.034 | 0.7216 |
| 20.0 | 0.096 418 | 202.135 | 0.7760 | 0.076 218 | 201.322 | 0.7587 | 0.062 734 | 200.490 | 0.7440 |
| 30.0 | 0.100 228 | 208.446 | 0.7972 | 0.079 350 | 207.715 | 0.7801 | 0.065 418 | 206.969 | 0.7658 |
| 40.0 | 0.103 989 | 214.814 | 0.8178 | 0.082 431 | 214.153 | 0.8010 | 0.068 049 | 213.480 | 0.7869 |
| 50.0 | 0.107 710 | 221.243 | 0.8381 | 0.085 470 | 220.642 | 0.8214 | 0.070 635 | 220.030 | 0.8075 |
| 60.0 | 0.111 397 | 227.735 | 0.8578 | 0.088 474 | 227.185 | 0.8413 | 0.073 185 | 226.627 | 0.8276 |
| 70.0 | 0.115 055 | 234.291 | 0.8772 | 0.091 449 | 233.785 | 0.8608 | 0.075 705 | 233.273 | 0.8473 |
| 80.0 | 0.118 690 | 240.910 | 0.8962 | 0.094 398 | 240.443 | 0.8800 | 0.078 200 | 239.971 | 0.8665 |
| 90.0 | 0.122 304 | 247.593 | 0.9149 | 0.097 327 | 247.160 | 0.8987 | 0.080 673 | 246.723 | 0.8853 |
| 100.0 | 0.125 901 | 254.339 | 0.9332 | 0.100 238 | 253.936 | 0.9171 | 0.083 127 | 253.530 | 0.9038 |
| 110.0 | 0.129 483 | 261.147 | 0.9512 | 0.103 134 | 260.770 | 0.9352 | 0.085 566 | 260.391 | 0.9220 |

Fréon 12 surchauffé

| Temp. °C | v m ³ /kg | h kJ/kg | s kJ/kg·K | v m ³ /kg | h kJ/kg | s kJ/kg·K | v m ³ /kg | h kJ/kg | s kJ/kg·K |
|-----------------|---------------------------|--------------|-----------------|---------------------------|--------------|-----------------|---------------------------|--------------|----------------|
| 0.40 MPa | | | 0.50 MPa | | | 0.60 MPa | | | |
| 20.0 | 0.045 836 | 198.762 | 0.7199 | 0.035 646 | 196.935 | 0.6999 | | | |
| 30.0 | 0.047 971 | 205.428 | 0.7423 | 0.037 464 | 203.814 | 0.7230 | 0.030 422 | 202.116 | 0.7063 |
| 40.0 | 0.050 046 | 212.095 | 0.7639 | 0.039 214 | 210.656 | 0.7452 | 0.031 966 | 209.154 | 0.7291 |
| 50.0 | 0.052 072 | 218.779 | 0.7849 | 0.040 911 | 217.484 | 0.7667 | 0.033 450 | 216.141 | 0.7511 |
| 60.0 | 0.054 059 | 225.488 | 0.8054 | 0.042 565 | 224.315 | 0.7875 | 0.034 887 | 223.104 | 0.7723 |
| 70.0 | 0.056 014 | 232.230 | 0.8253 | 0.044 184 | 231.161 | 0.8077 | 0.036 285 | 230.062 | 0.7929 |
| 80.0 | 0.057 941 | 239.012 | 0.8448 | 0.045 774 | 238.031 | 0.8275 | 0.037 653 | 237.027 | 0.8129 |
| 90.0 | 0.059 846 | 245.837 | 0.8638 | 0.047 340 | 244.932 | 0.8467 | 0.038 995 | 244.009 | 0.8324 |
| 100.0 | 0.061 731 | 252.707 | 0.8825 | 0.048 886 | 251.869 | 0.8656 | 0.040 316 | 251.016 | 0.8514 |
| 110.0 | 0.063 600 | 259.624 | 0.9008 | 0.050 415 | 258.845 | 0.8840 | 0.041 619 | 258.053 | 0.8700 |
| 120.0 | 0.065 455 | 266.590 | 0.9187 | 0.051 929 | 265.862 | 0.9021 | 0.042 907 | 265.124 | 0.8882 |
| 130.0 | 0.067 298 | 273.605 | 0.9364 | 0.053 430 | 272.923 | 0.9198 | 0.044 181 | 272.231 | 0.9061 |
| 0.70 MPa | | | 0.80 MPa | | | 0.90 MPa | | | |
| 40.0 | 0.026 761 | 207.580 | 0.7148 | 0.022 830 | 205.924 | 0.7016 | 0.019 744 | 204.170 | 0.6982 |
| 50.0 | 0.028 100 | 214.745 | 0.7373 | 0.024 068 | 213.290 | 0.7248 | 0.020 912 | 211.765 | 0.7131 |
| 60.0 | 0.029 387 | 221.854 | 0.7590 | 0.025 247 | 220.558 | 0.7469 | 0.022 012 | 219.212 | 0.7358 |
| 70.0 | 0.030 632 | 228.931 | 0.7799 | 0.026 380 | 227.766 | 0.7682 | 0.023 062 | 226.564 | 0.7575 |
| 80.0 | 0.031 843 | 235.997 | 0.8002 | 0.027 477 | 234.941 | 0.7888 | 0.024 072 | 233.856 | 0.7785 |
| 90.0 | 0.033 027 | 243.066 | 0.8199 | 0.028 545 | 242.101 | 0.8088 | 0.025 051 | 241.113 | 0.7987 |
| 100.0 | 0.034 189 | 250.146 | 0.8392 | 0.029 588 | 249.260 | 0.8283 | 0.026 005 | 248.355 | 0.8184 |
| 110.0 | 0.035 332 | 257.247 | 0.8579 | 0.030 612 | 256.428 | 0.8472 | 0.026 937 | 255.593 | 0.8376 |
| 120.0 | 0.036 458 | 264.374 | 0.8763 | 0.031 619 | 263.613 | 0.8657 | 0.027 851 | 262.839 | 0.8562 |
| 130.0 | 0.037 572 | 271.531 | 0.8943 | 0.032 612 | 270.820 | 0.8838 | 0.028 751 | 270.100 | 0.8745 |
| 140.0 | 0.038 673 | 278.720 | 0.9119 | 0.033 592 | 278.055 | 0.9016 | 0.029 639 | 277.381 | 0.8923 |
| 150.0 | 0.039 764 | 285.946 | 0.9292 | 0.034 563 | 285.320 | 0.9189 | 0.030 515 | 284.687 | 0.9098 |
| 1.00 MPa | | | 1.20 MPa | | | 1.40 MPa | | | |
| 50.0 | 0.018 366 | 210.162 | 0.7021 | 0.014 483 | 206.661 | 0.6812 | | | |
| 60.0 | 0.019 410 | 217.810 | 0.7254 | 0.015 463 | 214.805 | 0.7060 | 0.012 579 | 211.457 | 0.6876 |
| 70.0 | 0.020 397 | 225.319 | 0.7476 | 0.016 368 | 222.687 | 0.7293 | 0.013 448 | 219.822 | 0.7123 |
| 80.0 | 0.021 341 | 232.739 | 0.7689 | 0.017 221 | 230.398 | 0.7514 | 0.014 247 | 227.891 | 0.7355 |
| 90.0 | 0.022 251 | 240.101 | 0.7895 | 0.018 032 | 237.995 | 0.7727 | 0.014 997 | 235.766 | 0.7575 |
| 100.0 | 0.023 133 | 247.430 | 0.8094 | 0.018 812 | 245.518 | 0.7931 | 0.015 710 | 243.512 | 0.7785 |
| 110.0 | 0.023 993 | 254.743 | 0.8287 | 0.019 567 | 252.993 | 0.8129 | 0.016 393 | 251.170 | 0.7988 |
| 120.0 | 0.024 835 | 262.053 | 0.8475 | 0.020 301 | 260.441 | 0.8320 | 0.017 053 | 258.770 | 0.8183 |
| 130.0 | 0.025 661 | 269.369 | 0.8659 | 0.021 018 | 267.875 | 0.8507 | 0.017 695 | 266.334 | 0.8373 |
| 140.0 | 0.026 474 | 276.699 | 0.8839 | 0.021 721 | 275.307 | 0.8689 | 0.018 321 | 273.877 | 0.8558 |
| 150.0 | 0.027 275 | 284.047 | 0.9015 | 0.022 412 | 282.745 | 0.8867 | 0.018 934 | 281.411 | 0.8738 |
| 160.0 | 0.028 068 | 291.419 | 0.9187 | 0.023 093 | 290.195 | 0.9041 | 0.019 535 | 288.946 | 0.8914 |
| 1.60 MPa | | | 1.80 MPa | | | 2.00 MPa | | | |
| 70.0 | 0.011 208 | 216.650 | 0.6959 | 0.009 406 | 213.049 | 0.6794 | | | |
| 80.0 | 0.011 984 | 225.177 | 0.7204 | 0.010 187 | 222.198 | 0.7057 | 0.008 704 | 218.859 | 0.6909 |
| 90.0 | 0.012 698 | 233.390 | 0.7433 | 0.010 884 | 230.835 | 0.7298 | 0.009 406 | 228.056 | 0.7166 |
| 100.0 | 0.013 366 | 241.397 | 0.7651 | 0.011 526 | 239.155 | 0.7524 | 0.010 035 | 236.760 | 0.7402 |
| 110.0 | 0.014 000 | 249.264 | 0.7859 | 0.012 126 | 247.264 | 0.7739 | 0.010 615 | 245.154 | 0.7624 |
| 120.0 | 0.014 608 | 257.035 | 0.8059 | 0.012 697 | 255.228 | 0.7944 | 0.011 159 | 253.341 | 0.7835 |
| 130.0 | 0.015 195 | 264.742 | 0.8253 | 0.013 244 | 263.094 | 0.8141 | 0.011 676 | 261.384 | 0.8037 |
| 140.0 | 0.015 765 | 272.406 | 0.8440 | 0.013 772 | 270.891 | 0.8332 | 0.012 172 | 269.327 | 0.8232 |
| 150.0 | 0.016 320 | 280.044 | 0.8623 | 0.014 284 | 278.642 | 0.8518 | 0.012 651 | 277.201 | 0.8420 |
| 160.0 | 0.016 864 | 287.669 | 0.8801 | 0.014 784 | 286.364 | 0.8698 | 0.013 116 | 285.027 | 0.8603 |
| 170.9 | 0.017 398 | 295.290 | 0.8975 | 0.015 272 | 294.069 | 0.8874 | 0.013 570 | 292.822 | 0.8781 |
| 180.0 | 0.017 923 | 302.914 | 0.9145 | 0.015 752 | 301.767 | 0.9046 | 0.014 013 | 300.598 | 0.8955 |
| 2.50 MPa | | | 3.00 MPa | | | 3.50 MPa | | | |
| 90.0 | 0.006 595 | 219.562 | 0.6823 | | | | | | |
| 100.0 | 0.007 264 | 229.852 | 0.7103 | 0.005 231 | 220.529 | 0.6770 | | | |
| 110.0 | 0.007 837 | 239.271 | 0.7352 | 0.005 886 | 232.068 | 0.7075 | 0.004 324 | 222.121 | 0.6750 |
| 120.0 | 0.008 351 | 248.192 | 0.7582 | 0.006 419 | 242.208 | 0.7336 | 0.004 959 | 234.875 | 0.7078 |
| 130.0 | 0.008 827 | 256.794 | 0.7798 | 0.006 887 | 251.632 | 0.7573 | 0.005 456 | 245.661 | 0.7349 |
| 140.0 | 0.009 273 | 265.180 | 0.8003 | 0.007 313 | 260.620 | 0.7793 | 0.005 884 | 255.524 | 0.7591 |
| 150.0 | 0.009 697 | 273.414 | 0.8200 | 0.007 709 | 269.319 | 0.8001 | 0.006 270 | 264.846 | 0.7814 |
| 160.0 | 0.010 104 | 281.540 | 0.8390 | 0.008 083 | 277.817 | 0.8200 | 0.006 626 | 273.817 | 0.8023 |
| 170.0 | 0.010 497 | 289.589 | 0.8574 | 0.008 439 | 286.171 | 0.8391 | 0.006 961 | 282.545 | 0.8222 |
| 180.0 | 0.010 879 | 297.583 | 0.8752 | 0.008 782 | 294.422 | 0.8575 | 0.007 279 | 291.100 | 0.8413 |
| 190.0 | 0.011 250 | 305.540 | 0.8926 | 0.009 114 | 302.597 | 0.8753 | 0.007 584 | 299.528 | 0.8597 |
| 200.0 | 0.011 614 | 313.472 | 0.9095 | 0.009 436 | 310.718 | 0.8927 | 0.007 878 | 307.864 | 0.8775 |
| 4.00 MPa | | | | | | | | | |
| 120.0 | 0.003 736 | 224.863 | 0.6771 | | | | | | |
| 130.0 | 0.004 325 | 238.443 | 0.7111 | | | | | | |
| 140.0 | 0.004 781 | 249.703 | 0.7386 | | | | | | |
| 150.0 | 0.005 172 | 259.904 | 0.7630 | | | | | | |
| 160.0 | 0.005 522 | 269.492 | 0.7854 | | | | | | |
| 170.0 | 0.005 845 | 278.684 | 0.8063 | | | | | | |
| 180.0 | 0.006 147 | 287.602 | 0.8262 | | | | | | |
| 190.0 | 0.006 434 | 296.326 | 0.8453 | | | | | | |
| 200.0 | 0.006 708 | 304.906 | 0.8636 | | | | | | |
| 210.0 | 0.006 972 | 313.380 | 0.8813 | | | | | | |
| 220.0 | 0.007 228 | 321.774 | 0.8985 | | | | | | |
| 230.0 | 0.007 477 | 330.108 | 0.9152 | | | | | | |

Azote saturé

| Temp. K | Pres. MPa P | Volume massique m ³ /kg | | | Enthalpie kJ/kg | | | Entropie kJ/kg·K | | |
|------------|-------------------|---------------------------------------|-----------|----------------|--------------------|----------|----------------|---------------------|----------|----------------|
| | | Liquide sat. | Évap. | Vapeur sat. | Liquide sat. | Évap. | Vapeur sat. | Liquide sat. | Évap. | Vapeur sat. |
| | | v_f | v_{fg} | v_g | h_f | h_{fg} | h_g | s_f | s_{fg} | s_g |
| 63.143 | 0.01253 | 0.001 152 | 1.480 060 | 1.481 212 | -150.348 | 215.188 | 64.840 | 2.4310 | 3.4076 | 5.8386 |
| 65 | 0.01742 | 0.001 162 | 1.093 173 | 1.094 335 | -146.691 | 213.291 | 66.600 | 2.4845 | 3.2849 | 5.7694 |
| 70 | 0.03858 | 0.001 189 | 0.525 785 | 0.526 974 | -136.569 | 207.727 | 71.158 | 2.6345 | 2.9703 | 5.6048 |
| 75 | 0.07612 | 0.001 221 | 0.280 970 | 0.282 191 | -126.287 | 201.662 | 75.375 | 2.7755 | 2.6915 | 5.4670 |
| 77.347 | 0.101325 | 0.001 237 | 0.215 504 | 0.216 741 | -121.433 | 198.645 | 77.212 | 2.8390 | 2.5706 | 5.4096 |
| 80 | 0.1370 | 0.001 256 | 0.162 794 | 0.164 050 | -115.926 | 195.089 | 79.163 | 2.9083 | 2.4409 | 5.3492 |
| 85 | 0.2291 | 0.001 296 | 0.100 434 | 0.101 730 | -105.461 | 187.892 | 82.431 | 3.0339 | 2.2122 | 5.2461 |
| 90 | 0.3608 | 0.001 340 | 0.064 950 | 0.066 290 | -94.817 | 179.894 | 85.077 | 3.1535 | 2.0001 | 5.1536 |
| 95 | 0.5411 | 0.001 392 | 0.043 504 | 0.044 896 | -83.895 | 170.877 | 86.982 | 3.2688 | 1.7995 | 5.0683 |
| 100 | 0.7790 | 0.001 452 | 0.029 861 | 0.031 313 | -72.571 | 160.562 | 87.991 | 3.3816 | 1.6060 | 4.9876 |
| 105 | 1.0843 | 0.001 524 | 0.020 745 | 0.022 269 | -60.691 | 148.573 | 87.882 | 3.4930 | 1.4150 | 4.9080 |
| 110 | 1.4673 | 0.001 613 | 0.014 402 | 0.016 015 | -48.027 | 134.319 | 86.292 | 3.6054 | 1.2209 | 4.8263 |
| 115 | 1.9395 | 0.001 797 | 0.009 696 | 0.011 493 | -34.157 | 116.701 | 82.544 | 3.7214 | 1.0145 | 4.7359 |
| 120 | 2.5135 | 0.001 904 | 0.006 130 | 0.008 034 | -18.017 | 93.092 | 75.075 | 3.8450 | 0.7803 | 4.6253 |
| 125 | 3.2079 | 0.002 323 | 0.002 568 | 0.004 891 | +6.202 | 50.114 | 56.316 | 4.0356 | 0.3989 | 4.4345 |
| 126.1 | 3.4000 | 0.003 184 | 0.000 000 | 0.003 184 | +30.791 | 0.000 | 30.791 | 4.2269 | 0.0000 | 4.2269 |

Azote surchauffé

| Temp. K | 0.1 MPa | | | 0.2 MPa | | | 0.5 MPa | | |
|-----------------|---------------------------|--------------|----------------|---------------------------|--------------|----------------|---------------------------|--------------|----------------|
| | v m ³ /kg | h kJ/kg | s kJ/kg·K | v m ³ /kg | h kJ/kg | s kJ/kg·K | v m ³ /kg | h kJ/kg | s kJ/kg·K |
| 100 | 0.290 978 | 101.965 | 5.6944 | 0.142 475 | 100.209 | 5.4767 | 0.055 520 | 94.345 | 5.1706 |
| 125 | 0.367 217 | 128.505 | 5.9313 | 0.181 711 | 127.371 | 5.7194 | 0.073 422 | 123.824 | 5.4343 |
| 150 | 0.442 619 | 154.779 | 6.1228 | 0.220 014 | 153.962 | 5.9132 | 0.090 150 | 151.470 | 5.6361 |
| 175 | 0.517 576 | 180.935 | 6.2841 | 0.257 890 | 180.314 | 6.0760 | 0.106 394 | 178.434 | 5.8025 |
| 200 | 0.592 288 | 207.029 | 6.4234 | 0.295 531 | 206.537 | 6.2160 | 0.122 394 | 205.063 | 5.9447 |
| 225 | 0.666 552 | 233.085 | 6.5460 | 0.332 841 | 232.690 | 6.3388 | 0.138 173 | 231.459 | 6.0690 |
| 250 | 0.741 375 | 259.122 | 6.6561 | 0.370 418 | 258.796 | 6.4491 | 0.154 006 | 257.828 | 6.1801 |
| 275 | 0.815 563 | 285.144 | 6.7550 | 0.407 619 | 284.876 | 6.5485 | 0.169 642 | 284.076 | 6.2800 |
| 300 | 0.890 205 | 311.158 | 6.8457 | 0.445 047 | 310.937 | 6.6393 | 0.185 346 | 310.273 | 6.3715 |
| 1.0 MPa | | | | | | | | | |
| 125 | 0.033 065 | 117.422 | 5.1872 | 0.014 021 | 101.489 | 4.8878 | | | |
| 150 | 0.041 884 | 147.176 | 5.4042 | 0.019 546 | 137.916 | 5.1547 | 0.008 234 | 115.716 | 4.8384 |
| 175 | 0.050 125 | 175.255 | 5.5779 | 0.024 155 | 168.709 | 5.3449 | 0.011 186 | 154.851 | 5.0804 |
| 200 | 0.058 096 | 202.596 | 5.7237 | 0.028 436 | 197.609 | 5.4992 | 0.013 648 | 187.521 | 5.2553 |
| 225 | 0.065 875 | 229.526 | 5.8502 | 0.032 697 | 225.578 | 5.6309 | 0.015 894 | 217.757 | 5.3976 |
| 250 | 0.073 634 | 256.220 | 5.9632 | 0.036 557 | 253.032 | 5.7469 | 0.018 060 | 246.793 | 5.5202 |
| 275 | 0.081 260 | 282.720 | 6.0639 | 0.040 485 | 280.132 | 5.8501 | 0.020 133 | 275.056 | 5.6277 |
| 300 | 0.088 899 | 309.173 | 6.1563 | 0.044 398 | 307.014 | 5.9436 | 0.022 178 | 302.848 | 5.7248 |
| 2.0 MPa | | | | | | | | | |
| 4.0 MPa | | | | | | | | | |
| 6.0 MPa | | | | | | | | | |
| 150 | 0.004 413 | 87.090 | 4.5667 | 0.002 917 | 61.903 | 4.3518 | 0.002 388 | 48.687 | 4.2287 |
| 175 | 0.006 913 | 140.183 | 4.8966 | 0.004 863 | 125.536 | 4.7470 | 0.003 750 | 112.489 | 4.6239 |
| 200 | 0.008 772 | 177.447 | 5.0961 | 0.006 390 | 167.680 | 4.9726 | 0.005 016 | 158.578 | 4.8709 |
| 225 | 0.010 396 | 210.139 | 5.2410 | 0.007 691 | 202.867 | 5.1384 | 0.006 104 | 196.079 | 5.0474 |
| 250 | 0.011 934 | 240.806 | 5.3796 | 0.008 903 | 235.141 | 5.2750 | 0.007 112 | 229.861 | 5.1900 |
| 275 | 0.013 383 | 270.222 | 5.4917 | 0.010 034 | 265.676 | 5.3910 | 0.008 046 | 261.450 | 5.3103 |
| 300 | 0.014 800 | 298.907 | 5.5916 | 0.011 133 | 295.219 | 5.4942 | 0.008 950 | 291.800 | 5.4163 |
| 10.0 MPa | | | | | | | | | |
| 15.0 MPa | | | | | | | | | |
| 150 | 0.001 956 | 36.922 | 4.0798 | 0.001 781 | 33.637 | 3.9956 | | | |
| 175 | 0.002 603 | 92.284 | 4.4213 | 0.002 186 | 83.453 | 4.3029 | | | |
| 200 | 0.003 369 | 140.886 | 4.6813 | 0.002 685 | 130.291 | 4.5535 | | | |
| 225 | 0.004 106 | 182.034 | 4.8752 | 0.003 208 | 172.307 | 4.7511 | | | |
| 250 | 0.004 808 | 218.710 | 5.0303 | 0.003 728 | 210.456 | 4.9127 | | | |
| 275 | 0.005 461 | 252.465 | 5.1845 | 0.004 223 | 245.640 | 5.0467 | | | |
| 300 | 0.006 091 | 284.523 | 5.2707 | 0.004 704 | 278.942 | 5.1629 | | | |
| 20.0 MPa | | | | | | | | | |

Variables thermodynamiques du méthane saturé et surchauffé

| Temp. K | \bar{v} | \bar{h} | \bar{s} | \bar{v} | \bar{h} | \bar{s} | \bar{v} | \bar{h} | \bar{s} |
|------------|----------------------|-----------|-----------|----------------------|-----------|-----------|----------------------|-----------|-----------|
| | m ³ /kmol | kJ/kmol | kJ/kmol·K | m ³ /kmol | kJ/kmol | kJ/kmol·K | m ³ /kmol | kJ/kmol | kJ/kmol·K |
| | 0.05 MPa | | | 0.10 MPa | | | 0.50 MPa | | |
| f 103.70 | 0.036 97 | 4 148.8 | 75.064 | | | | | | |
| g 103.70 | 16.895 | 12 563.9 | 156.261 | | | | | | |
| f 114.47 | | | | 0.037 94 | 4 575.7 | 79.060 | | | |
| g 114.47 | | | | 8.953 | 12 781.6 | 152.697 | | | |
| f 135.32 | | | | | | | 0.041 53 | 5 961.6 | 90.212 |
| g 135.32 | | | | | | | 2.007 | 13 319.4 | 144.585 |
| 150 | 24.763 | 14 130.3 | 168.736 | 12.290 | 14 101.2 | 162.865 | 2.301 | 13 867.8 | 148.498 |
| 175 | 28.964 | 14 970.3 | 173.908 | 14.414 | 14 946.5 | 168.073 | 2.769 | 14 780.3 | 154.072 |
| 200 | 33.151 | 15 811.1 | 178.392 | 16.523 | 15 790.5 | 172.578 | 3.218 | 15 659.3 | 158.768 |
| 225 | 37.330 | 16 656.2 | 182.368 | 18.624 | 16 637.8 | 176.567 | 3.657 | 16 530.1 | 162.871 |
| 250 | 41.501 | 17 509.9 | 185.960 | 20.719 | 17 493.1 | 180.168 | 4.090 | 17 402.2 | 166.546 |
| 275 | 45.675 | 18 377.2 | 189.262 | 22.811 | 18 361.4 | 183.475 | 4.520 | 18 283.4 | 169.905 |
| 300 | 49.843 | 19 253.0 | 192.340 | 24.900 | 19 247.9 | 186.558 | 4.946 | 19 179.9 | 173.024 |
| 350 | 58.174 | 21 108.2 | 198.018 | 29.073 | 21 094.0 | 192.241 | 5.793 | 21 040.5 | 178.757 |
| 400 | 66.500 | 23 074.8 | 203.260 | 33.241 | 23 061.0 | 197.488 | 6.636 | 23 017.7 | 184.033 |
| | 1.0 MPa | | | 1.5 MPa | | | 2.0 MPa | | |
| f 149.11 | 0.044 57 | 6 830.9 | 96.174 | | | | | | |
| g 149.11 | 1.021 | 13 493.9 | 140.859 | | | | | | |
| f 158.46 | | | | 0.047 18 | 7 465.9 | 100.150 | | | |
| g 158.46 | | | | 0.675 | 13 525.2 | 138.401 | | | |
| f 165.84 | | | | | | | 0.049 79 | 8 000.1 | 103.298 |
| g 165.84 | | | | | | | 0.489 36 | 13 485.5 | 136.374 |
| 175 | 1.307 | 14 553.7 | 147.426 | 0.818 | 14 293.5 | 143.021 | 0.560 35 | 13 938.2 | 139.327 |
| 200 | 1.553 | 15 489.6 | 152.428 | 1.001 | 15 307.1 | 148.442 | 0.714 98 | 15 110.8 | 145.336 |
| 225 | 1.786 | 16 395.5 | 156.697 | 1.167 | 16 255.1 | 152.910 | 0.848 13 | 16 108.7 | 150.041 |
| 250 | 2.012 | 17 232.0 | 160.475 | 1.325 | 17 178.8 | 156.434 | 0.971 92 | 17 062.7 | 154.062 |
| 275 | 2.234 | 18 191.0 | 163.902 | 1.478 | 18 097.2 | 160.304 | 1.090 42 | 18 001.9 | 157.643 |
| 300 | 2.452 | 19 101.3 | 167.070 | 1.629 | 19 022.2 | 163.523 | 1.205 56 | 18 942.3 | 160.916 |
| 350 | 2.884 | 20 982.0 | 172.864 | 1.923 | 20 923.9 | 169.383 | 1.429 52 | 20 865.6 | 166.842 |
| 400 | 3.310 | 22 973.0 | 178.178 | 2.182 | 22 929.2 | 174.735 | 1.648 29 | 22 885.5 | 172.233 |

Méthane saturé et surchauffé

| Temp. K | \bar{v} | \bar{h} | \bar{s} | \bar{v} | \bar{h} | \bar{s} | \bar{v} | \bar{h} | \bar{s} |
|------------|----------------------|-----------|-----------|----------------------|-----------|-----------|----------------------|-----------|-----------|
| | m ³ /kmol | kJ/kmol | kJ/kmol·K | m ³ /kmol | kJ/kmol | kJ/kmol·K | m ³ /kmol | kJ/kmol | kJ/kmol·K |
| | 3.0 MPa | | | 4.0 MPa | | | 5.0 MPa | | |
| f 177.25 | 0.055 86 | 8 930.4 | 108.408 | | | | | | |
| g 177.25 | 0.296 41 | 13 238.8 | 132.719 | | | | | | |
| f 186.09 | | | | 0.065 58 | 9 883.5 | 113.317 | | | |
| g 186.09 | | | | 0.185 41 | 12 691.7 | 128.411 | | | |
| 200 | 0.430 43 | 14 664.3 | 140.333 | 0.232 02 | 14 107.0 | 135.797 | 0.182 63 | 13 288.3 | 130.563 |
| 225 | 0.533 97 | 15 796.9 | 145.677 | 0.375 96 | 15 457.7 | 142.181 | 0.280 82 | 15 084.0 | 139.084 |
| 250 | 0.624 74 | 16 822.0 | 149.999 | 0.451 17 | 16 571.3 | 146.878 | 0.347 79 | 16 310.6 | 144.261 |
| 275 | 0.709 26 | 17 807.2 | 153.756 | 0.518 94 | 17 608.5 | 150.833 | 0.405 82 | 17 401.7 | 148.442 |
| 300 | 0.790 05 | 18 780.5 | 157.144 | 0.852 62 | 18 617.2 | 154.345 | 0.459 32 | 18 453.4 | 152.086 |
| 350 | 0.944 93 | 20 748.6 | 163.209 | 0.702 91 | 20 631.9 | 160.555 | 0.558 96 | 20 516.2 | 158.445 |
| 400 | 1.094 45 | 22 798.3 | 168.680 | 0.817 75 | 22 711.7 | 166.106 | 0.653 03 | 22 626.4 | 164.078 |
| 450 | 1.240 73 | 24 965.9 | 173.772 | 0.934 33 | 24 900.6 | 171.249 | 0.743 87 | 24 836.4 | 169.270 |
| | 6.0 MPa | | | 8.0 MPa | | | 10.0 MPa | | |
| 200 | 0.098 54 | 11 775.7 | 122.296 | 0.065 92 | 10 596.5 | 115.648 | 0.060 16 | 10 339.5 | 113.737 |
| 225 | 0.215 54 | 14 669.9 | 136.143 | 0.135 02 | 13 719.8 | 130.400 | 0.085 35 | 12 847.8 | 125.525 |
| 250 | 0.277 85 | 16 040.2 | 141.931 | 0.191 91 | 15 471.5 | 137.811 | 0.142 47 | 14 896.1 | 134.189 |
| 275 | 0.329 46 | 17 202.4 | 146.365 | 0.235 69 | 16 787.8 | 142.836 | 0.180 64 | 16 374.3 | 139.834 |
| 300 | 0.376 11 | 18 289.5 | 150.150 | 0.273 85 | 17 963.1 | 146.929 | 0.213 42 | 17 641.7 | 144.249 |
| 350 | 0.461 71 | 20 401.8 | 156.663 | 0.341 97 | 20 177.8 | 153.760 | 0.270 80 | 19 961.1 | 151.406 |
| 400 | 0.541 67 | 22 542.3 | 162.377 | 0.404 34 | 22 379.2 | 159.638 | 0.322 48 | 22 222.9 | 157.446 |
| 450 | 0.618 41 | 24 773.4 | 167.619 | 0.463 51 | 24 651.7 | 164.978 | 0.371 02 | 24 536.0 | 162.881 |
| 500 | 0.693 20 | 27 113.1 | 172.558 | 0.520 79 | 27 022.3 | 169.982 | 0.417 70 | 26 936.6 | 167.949 |

Propriétés de différents solides et liquides^a

| Solide | C_p , kJ/kg·K | ρ , kg/m ³ | Liquide | C_p , kJ/kg·K | ρ , kg/m ³ |
|-------------------|-----------------|----------------------------|----------------|-----------------|----------------------------|
| Aluminium | 0.900 | 2700 | Ammoniac | 4.800 | 602 |
| Argent | 0.235 | 10 470 | Eau | 4.184 | 997 |
| Bois (la plupart) | 1.760 | 350-700 | Éthanol | 2.456 | 783 |
| Caoutchouc (mou) | 1.840 | 1100 | Fréon-12 | 0.977 | 1310 |
| Cuivre | 0.386 | 8900 | Huile (légère) | 1.800 | 910 |
| Étain | 0.217 | 5730 | Mercure | 0.139 | 13 560 |
| Fer | 0.450 | 7840 | Méthanol | 2.550 | 787 |
| Granite | 1.017 | 2700 | | | |
| Graphite | 0.711 | 2500 | | | |
| Plomb | 0.128 | 11 310 | | | |

^a Valeurs à 25 °C.

TABLE A.8

Propriétés de différents gaz parfaits^a

| Gaz | Formule chimique | Masse molaire | r , kJ/kg·K | C_p , kJ/kg·K | C_v , kJ/kg·K | γ |
|---------------------|--------------------------------|---------------|---------------|-----------------|-----------------|----------|
| Air | — | 28.97 | 0.287 00 | 1.0035 | 0.7165 | 1.400 |
| Argon | Ar | 39.948 | 0.208 13 | 0.5203 | 0.3122 | 1.667 |
| Azote | N ₂ | 28.013 | 0.296 80 | 1.0416 | 0.7448 | 1.400 |
| Butane | C ₄ H ₁₀ | 58.124 | 0.143 04 | 1.7164 | 1.5734 | 1.091 |
| Dioxyde de carbone | CO ₂ | 44.01 | 0.188 92 | 0.8418 | 0.6529 | 1.289 |
| Éthane | C ₂ H ₆ | 30.07 | 0.276 50 | 1.7662 | 1.4897 | 1.186 |
| Éthylène | C ₂ H ₄ | 28.054 | 0.296 37 | 1.5482 | 1.2518 | 1.237 |
| Hélium | He | 4.003 | 2.077 03 | 5.1926 | 3.1156 | 1.667 |
| Hydrogène | H ₂ | 2.016 | 4.124 18 | 14.2091 | 10.0849 | 1.409 |
| Méthane | CH ₄ | 16.04 | 0.518 35 | 2.2537 | 1.7354 | 1.299 |
| Monoxyde de carbone | CO | 28.01 | 0.296 83 | 1.0413 | 0.7445 | 1.400 |
| Néon | Ne | 20.183 | 0.411 95 | 1.0299 | 0.6179 | 1.667 |
| Octane | C ₈ H ₁₈ | 114.23 | 0.072 79 | 1.7113 | 1.6385 | 1.044 |
| Oxygène | O ₂ | 31.999 | 0.259 83 | 0.9216 | 0.6618 | 1.393 |
| Propane | C ₃ H ₈ | 44.097 | 0.188 55 | 1.6794 | 1.4909 | 1.126 |
| Vapeur d'eau | H ₂ O | 18.015 | 0.461 52 | 1.8723 | 1.4108 | 1.327 |

Constantes critiques^a

| Substance | Formule | Masse molaire | Temp. K | Pression MPa | Volume m ³ /kmol |
|--------------------------|----------------------------------|---------------|---------|--------------|-----------------------------|
| Ammoniac | NH ₃ | 17.03 | 405.5 | 11.28 | .0724 |
| Argon | Ar | 39.948 | 151 | 4.86 | .0749 |
| Azote | N ₂ | 28.013 | 126.2 | 3.39 | .0899 |
| Brome | Br ₂ | 159.808 | 584 | 10.34 | .1355 |
| Chlore | Cl ₂ | 70.906 | 417 | 7.71 | .1242 |
| Deutérium (normal) | D ₂ | 4.00 | 38.4 | 1.66 | — |
| Dioxyde de carbone | CO ₂ | 44.01 | 304.2 | 7.39 | .0943 |
| Dioxyde de soufre | SO ₂ | 64.063 | 430.7 | 7.88 | .1217 |
| Eau | H ₂ O | 18.015 | 647.3 | 22.09 | .0568 |
| Hélium | He | 4.003 | 5.3 | 0.23 | .0578 |
| Hélium 3 | He | 3.00 | 3.3 | 0.12 | — |
| Hydrogène (normal) | H ₂ | 2.016 | 33.3 | 1.30 | .0649 |
| Krypton | Kr | 83.80 | 209.4 | 5.50 | .0924 |
| Monoxyde de carbone | CO | 28.011 | 133 | 3.50 | .0930 |
| Néon | Ne | 20.183 | 44.5 | 2.73 | .0417 |
| Oxyde nitreux | N ₂ O | 44.013 | 309.7 | 7.27 | .0961 |
| Oxygène | O ₂ | 31.999 | 154.8 | 5.08 | .0780 |
| Xénon | Xe | 131.30 | 289.8 | 5.88 | .1186 |
| Alcool éthylique | C ₂ H ₅ OH | 46.07 | 516 | 6.38 | .1673 |
| Alcool méthylique | CH ₃ OH | 32.042 | 513.2 | 7.95 | .1180 |
| Benzène | C ₆ H ₆ | 78.115 | 562 | 4.92 | .2603 |
| n-Butane | C ₄ H ₁₀ | 58.124 | 425.2 | 3.80 | .2547 |
| Chloroforme | CHCl ₃ | 119.38 | 536.6 | 5.47 | .2403 |
| Chlorure de méthyle | CH ₃ Cl | 50.488 | 416.3 | 6.68 | .1430 |
| Dichlorodifluorométhane | CCl ₂ F ₂ | 120.91 | 384.7 | 4.01 | .2179 |
| Dichlorofluorométhane | CHCl ₂ F | 102.92 | 451.7 | 5.17 | .1973 |
| Éthane | C ₂ H ₆ | 30.070 | 305.5 | 4.88 | .1480 |
| Éthylène | C ₂ H ₄ | 28.054 | 282.4 | 5.12 | .1242 |
| n-Hexane | C ₆ H ₁₄ | 86.178 | 507.9 | 3.03 | .3677 |
| Méthane | CH ₄ | 16.043 | 191.1 | 4.64 | .0993 |
| Propane | C ₃ H ₈ | 44.097 | 370 | 4.26 | .1998 |
| Propène | C ₃ H ₆ | 42.081 | 365 | 4.62 | .1810 |
| Propyne | C ₃ H ₄ | 40.065 | 401 | 5.35 | — |
| Tétrachlorure de carbone | CCl ₄ | 153.82 | 556.4 | 4.56 | .2759 |
| Trichlorofluorométhane | CCl ₃ F | 137.37 | 471.2 | 4.38 | .2478 |