SUPPLEMENTARY MATERIAL

Table S-I: Calculated derived volumetric properties of *n*-hexane at different temperatures (288.15-413.15 K) and pressures (0.1-60 MPa)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **288.15 K** | | | | **293.15 K** | | | |
| **0.1** | 1.5076 | 1.2820 | 0.4731 | 244.9 | 1.5748 | 1.3124 | 0.4861 | 244.2 |
| **1** | 1.4865 | 1.2705 | 0.4706 | 245.3 | 1.5518 | 1.3000 | 0.4833 | 244.6 |
| **5** | 1.4000 | 1.2234 | 0.4606 | 246.8 | 1.4573 | 1.2493 | 0.4725 | 246.3 |
| **10** | 1.3057 | 1.1720 | 0.4502 | 248.6 | 1.3550 | 1.1943 | 0.4612 | 248.4 |
| **15** | 1.2238 | 1.1275 | 0.4417 | 250.5 | 1.2666 | 1.1470 | 0.4520 | 250.5 |
| **20** | 1.1521 | 1.0885 | 0.4348 | 252.3 | 1.1896 | 1.1057 | 0.4445 | 252.5 |
| **25** | 1.0887 | 1.0541 | 0.4292 | 254.0 | 1.1219 | 1.0694 | 0.4384 | 254.4 |
| **30** | 1.0322 | 1.0236 | 0.4246 | 255.8 | 1.0618 | 1.0372 | 0.4334 | 256.4 |
| **35** | 0.9815 | 0.9962 | 0.4208 | 257.5 | 1.0081 | 1.0084 | 0.4293 | 258.2 |
| **40** | 0.9359 | 0.9716 | 0.4179 | 259.2 | 0.9598 | 0.9826 | 0.4261 | 260.1 |
| **45** | 0.8945 | 0.9493 | 0.4155 | 260.8 | 0.9162 | 0.9592 | 0.4234 | 261.9 |
| **50** | 0.8568 | 0.9291 | 0.4137 | 262.5 | 0.8766 | 0.9380 | 0.4214 | 263.7 |
| **55** | 0.8223 | 0.9106 | 0.4123 | 264.1 | 0.8404 | 0.9187 | 0.4198 | 265.5 |
| **60** | 0.7906 | 0.8936 | 0.4113 | 265.7 | 0.8072 | 0.9010 | 0.4185 | 267.2 |
|  | **298.15 K** | | | | **303.15 K** | | | |
| **0.1** | 1.6475 | 1.3433 | 0.4985 | 243.0 | 1.7259 | 1.3749 | 0.5104 | 241.4 |
| **1** | 1.6221 | 1.3300 | 0.4956 | 243.4 | 1.6981 | 1.3605 | 0.5072 | 241.9 |
| **5** | 1.5188 | 1.2754 | 0.4837 | 245.4 | 1.5847 | 1.3018 | 0.4943 | 244.0 |
| **10** | 1.4075 | 1.2166 | 0.4715 | 247.7 | 1.4636 | 1.2389 | 0.4811 | 246.6 |
| **15** | 1.3121 | 1.1662 | 0.4616 | 250.0 | 1.3604 | 1.1852 | 0.4703 | 249.1 |
| **20** | 1.2294 | 1.1225 | 0.4535 | 252.2 | 1.2714 | 1.1388 | 0.4615 | 251.5 |
| **25** | 1.1569 | 1.0841 | 0.4468 | 254.4 | 1.1939 | 1.0983 | 0.4544 | 253.9 |
| **30** | 1.0930 | 1.0502 | 0.4414 | 256.5 | 1.1257 | 1.0626 | 0.4485 | 256.1 |
| **35** | 1.0360 | 1.0200 | 0.4370 | 258.5 | 1.0653 | 1.0309 | 0.4436 | 258.4 |
| **40** | 0.9849 | 0.9929 | 0.4333 | 260.6 | 1.0112 | 1.0025 | 0.4397 | 260.5 |
| **45** | 0.9389 | 0.9684 | 0.4304 | 262.5 | 0.9627 | 0.9769 | 0.4364 | 262.6 |
| **50** | 0.8972 | 0.9463 | 0.4281 | 264.4 | 0.9188 | 0.9537 | 0.4338 | 264.6 |
| **55** | 0.8593 | 0.9261 | 0.4262 | 266.3 | 0.8790 | 0.9326 | 0.4316 | 266.6 |
| **60** | 0.8245 | 0.9076 | 0.4248 | 268.2 | 0.8426 | 0.9133 | 0.4299 | 268.6 |

Table S-I continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **308.15 K** | | | | **313.15 K** | | | |
| **0.1** | 1.8108 | 1.4072 | 0.5217 | 239.4 | 1.9028 | 1.4401 | 0.5323 | 236.9 |
| **1** | 1.7801 | 1.3916 | 0.5182 | 239.9 | 1.8687 | 1.4232 | 0.5284 | 237.5 |
| **5** | 1.6555 | 1.3283 | 0.5042 | 242.2 | 1.7316 | 1.3551 | 0.5132 | 240.1 |
| **10** | 1.5234 | 1.2610 | 0.4898 | 245.1 | 1.5873 | 1.2829 | 0.4977 | 243.1 |
| **15** | 1.4117 | 1.2038 | 0.4782 | 247.8 | 1.4661 | 1.2221 | 0.4852 | 246.0 |
| **20** | 1.3159 | 1.1547 | 0.4687 | 250.4 | 1.3629 | 1.1700 | 0.4750 | 248.8 |
| **25** | 1.2329 | 1.1119 | 0.4610 | 252.9 | 1.2740 | 1.1249 | 0.4666 | 251.5 |
| **30** | 1.1602 | 1.0743 | 0.4546 | 255.3 | 1.1964 | 1.0854 | 0.4597 | 254.1 |
| **35** | 1.0960 | 1.0410 | 0.4493 | 257.7 | 1.1281 | 1.0504 | 0.4540 | 256.6 |
| **40** | 1.0388 | 1.0113 | 0.4450 | 260.0 | 1.0676 | 1.0193 | 0.4493 | 259.0 |
| **45** | 0.9876 | 0.9845 | 0.4414 | 262.2 | 1.0136 | 0.9913 | 0.4453 | 261.3 |
| **50** | 0.9414 | 0.9603 | 0.4384 | 264.3 | 0.9650 | 0.9660 | 0.4420 | 263.5 |
| **55** | 0.8996 | 0.9383 | 0.4360 | 266.4 | 0.9211 | 0.9431 | 0.4392 | 265.6 |
| **60** | 0.8615 | 0.9182 | 0.4340 | 268.4 | 0.8811 | 0.9221 | 0.4369 | 267.7 |
|  | **318.15 K** | | | | **323.15 K** | | | |
| **0.1** | 2.0024 | 1.4738 | 0.5422 | 234.1 | 2.1105 | 1.5083 | 0.5513 | 230.8 |
| **1** | 1.9646 | 1.4555 | 0.5380 | 234.7 | 2.0685 | 1.4885 | 0.5468 | 231.5 |
| **5** | 1.8134 | 1.3820 | 0.5215 | 237.5 | 1.9013 | 1.4091 | 0.5289 | 234.5 |
| **10** | 1.6555 | 1.3047 | 0.5047 | 240.7 | 1.7282 | 1.3263 | 0.5108 | 238.0 |
| **15** | 1.5239 | 1.2400 | 0.4913 | 243.9 | 1.5853 | 1.2574 | 0.4963 | 241.3 |
| **20** | 1.4127 | 1.1848 | 0.4803 | 246.8 | 1.4652 | 1.1991 | 0.4846 | 244.5 |
| **25** | 1.3172 | 1.1372 | 0.4713 | 249.7 | 1.3627 | 1.1489 | 0.4749 | 247.4 |
| **30** | 1.2344 | 1.0957 | 0.4639 | 252.4 | 1.2743 | 1.1052 | 0.4669 | 250.3 |
| **35** | 1.1619 | 1.0590 | 0.4577 | 255.0 | 1.1972 | 1.0668 | 0.4602 | 253.0 |
| **40** | 1.0978 | 1.0264 | 0.4525 | 257.5 | 1.1293 | 1.0327 | 0.4546 | 255.5 |
| **45** | 1.0407 | 0.9972 | 0.4481 | 259.9 | 1.0690 | 1.0022 | 0.4498 | 258.0 |
| **50** | 0.9895 | 0.9708 | 0.4444 | 262.1 | 1.0151 | 0.9747 | 0.4457 | 260.3 |
| **55** | 0.9434 | 0.9469 | 0.4413 | 264.3 | 0.9667 | 0.9498 | 0.4421 | 262.5 |
| **60** | 0.9016 | 0.9251 | 0.4386 | 266.4 | 0.9229 | 0.9271 | 0.4391 | 264.6 |

Table S-I continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **328.15 K** | | | | **333.15 K** | | | |
| **0.1** | 2.2279 | 1.5436 | 0.5597 | 227.3 | 2.3555 | 1.5797 | 0.5672 | 223.3 |
| **1** | 2.1811 | 1.5220 | 0.5547 | 228.0 | 2.3032 | 1.5563 | 0.5618 | 224.1 |
| **5** | 1.9958 | 1.4363 | 0.5354 | 231.2 | 2.0974 | 1.4637 | 0.5410 | 227.5 |
| **10** | 1.8059 | 1.3477 | 0.5160 | 234.9 | 1.8887 | 1.3688 | 0.5201 | 231.4 |
| **15** | 1.6504 | 1.2744 | 0.5005 | 238.4 | 1.7194 | 1.2909 | 0.5035 | 235.1 |
| **20** | 1.5206 | 1.2126 | 0.4879 | 241.7 | 1.5791 | 1.2256 | 0.4901 | 238.6 |
| **25** | 1.4106 | 1.1598 | 0.4775 | 244.8 | 1.4610 | 1.1699 | 0.4791 | 241.8 |
| **30** | 1.3162 | 1.1139 | 0.4689 | 247.7 | 1.3600 | 1.1218 | 0.4698 | 244.8 |
| **35** | 1.2341 | 1.0737 | 0.4617 | 250.5 | 1.2727 | 1.0798 | 0.4621 | 247.6 |
| **40** | 1.1622 | 1.0381 | 0.4556 | 253.1 | 1.1965 | 1.0426 | 0.4555 | 250.3 |
| **45** | 1.0985 | 1.0063 | 0.4503 | 255.6 | 1.1293 | 1.0094 | 0.4498 | 252.8 |
| **50** | 1.0418 | 0.9776 | 0.4458 | 257.9 | 1.0696 | 0.9796 | 0.4448 | 255.1 |
| **55** | 0.9909 | 0.9517 | 0.4419 | 260.2 | 1.0161 | 0.9527 | 0.4404 | 257.3 |
| **60** | 0.9451 | 0.9281 | 0.4384 | 262.3 | 0.9681 | 0.9281 | 0.4365 | 259.4 |
|  | **343.15 K** | | | | **353.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 2.5795 | 1.6270 | 0.5737 | 215.4 | 2.9053 | 1.7008 | 0.5824 | 205.7 |
| **5** | 2.3243 | 1.5189 | 0.5496 | 219.2 | 2.5865 | 1.5747 | 0.5547 | 210.0 |
| **10** | 2.0712 | 1.4102 | 0.5258 | 223.6 | 2.2780 | 1.4504 | 0.5279 | 214.8 |
| **15** | 1.8698 | 1.3223 | 0.5070 | 227.7 | 2.0380 | 1.3517 | 0.5069 | 219.2 |
| **20** | 1.7057 | 1.2495 | 0.4918 | 231.4 | 1.8457 | 1.2710 | 0.4901 | 223.2 |
| **25** | 1.5692 | 1.1881 | 0.4793 | 234.8 | 1.6880 | 1.2035 | 0.4762 | 226.8 |
| **30** | 1.4539 | 1.1353 | 0.4689 | 238.0 | 1.5563 | 1.1460 | 0.4646 | 230.0 |
| **35** | 1.3551 | 1.0894 | 0.4600 | 240.9 | 1.4445 | 1.0962 | 0.4546 | 233.0 |
| **40** | 1.2695 | 1.0491 | 0.4523 | 243.6 | 1.3485 | 1.0526 | 0.4460 | 235.7 |
| **45** | 1.1945 | 1.0132 | 0.4457 | 246.0 | 1.2649 | 1.0139 | 0.4383 | 238.1 |
| **50** | 1.1284 | 0.9810 | 0.4397 | 248.3 | 1.1917 | 0.9794 | 0.4314 | 240.2 |
| **55** | 1.0695 | 0.9519 | 0.4344 | 250.4 | 1.1268 | 0.9482 | 0.4250 | 242.2 |
| **60** | 1.0167 | 0.9255 | 0.4296 | 252.4 | 1.0690 | 0.9199 | 0.4191 | 243.9 |

Table S-I continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **363.15 K** | | | | **373.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 3.2895 | 1.7780 | 0.5880 | 195.3 | 3.7416 | 1.8588 | 0.5908 | 184.4 |
| **5** | 2.8887 | 1.6312 | 0.5569 | 200.1 | 3.2350 | 1.6889 | 0.5567 | 189.8 |
| **10** | 2.5115 | 1.4899 | 0.5272 | 205.4 | 2.7730 | 1.5294 | 0.5248 | 195.8 |
| **15** | 2.2250 | 1.3797 | 0.5043 | 210.2 | 2.4311 | 1.4075 | 0.5004 | 201.0 |
| **20** | 1.9996 | 1.2908 | 0.4860 | 214.4 | 2.1674 | 1.3106 | 0.4810 | 205.6 |
| **25** | 1.8175 | 1.2172 | 0.4709 | 218.2 | 1.9576 | 1.2310 | 0.4650 | 209.6 |
| **30** | 1.6672 | 1.1549 | 0.4581 | 221.6 | 1.7866 | 1.1641 | 0.4515 | 213.1 |
| **35** | 1.5410 | 1.1013 | 0.4472 | 224.5 | 1.6443 | 1.1068 | 0.4397 | 216.2 |
| **40** | 1.4333 | 1.0544 | 0.4376 | 227.2 | 1.5240 | 1.0569 | 0.4293 | 218.8 |
| **45** | 1.3405 | 1.0131 | 0.4289 | 229.5 | 1.4209 | 1.0129 | 0.4199 | 221.0 |
| **50** | 1.2594 | 0.9761 | 0.4211 | 231.5 | 1.3316 | 0.9737 | 0.4112 | 222.9 |
| **55** | 1.1881 | 0.9428 | 0.4139 | 233.2 | 1.2534 | 0.9384 | 0.4031 | 224.4 |
| **60** | 1.1249 | 0.9126 | 0.4070 | 234.6 | 1.1843 | 0.9064 | 0.3954 | 225.6 |
|  | **393.15 K** | | | | **413.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 4.8826 | 2.0327 | 0.5933 | 162.7 | 6.3497 | 2.2256 | 0.6007 | 143.8 |
| **5** | 4.0695 | 1.8125 | 0.5565 | 170.1 | 5.0723 | 1.9659 | 0.5741 | 155.1 |
| **10** | 3.3798 | 1.6174 | 0.5238 | 178.1 | 4.0732 | 1.7491 | 0.5529 | 167.4 |
| **15** | 2.8978 | 1.4744 | 0.4995 | 185.0 | 3.4155 | 1.5959 | 0.5382 | 178.0 |
| **20** | 2.5412 | 1.3635 | 0.4805 | 190.9 | 2.9484 | 1.4795 | 0.5270 | 187.3 |
| **25** | 2.2662 | 1.2740 | 0.4648 | 196.0 | 2.5988 | 1.3866 | 0.5177 | 195.4 |
| **30** | 2.0474 | 1.1997 | 0.4514 | 200.4 | 2.3269 | 1.3097 | 0.5097 | 202.6 |
| **35** | 1.8690 | 1.1365 | 0.4395 | 204.1 | 2.1090 | 1.2445 | 0.5023 | 208.8 |
| **40** | 1.7206 | 1.0816 | 0.4288 | 207.2 | 1.9304 | 1.1878 | 0.4953 | 214.2 |
| **45** | 1.5951 | 1.0334 | 0.4189 | 209.7 | 1.7811 | 1.1379 | 0.4883 | 219.0 |
| **50** | 1.4876 | 0.9905 | 0.4094 | 211.8 | 1.6545 | 1.0933 | 0.4812 | 223.0 |
| **55** | 1.3944 | 0.9518 | 0.4003 | 213.3 | 1.5456 | 1.0530 | 0.4738 | 226.5 |
| **60** | 1.3128 | 0.9166 | 0.3914 | 214.5 | 1.4509 | 1.0163 | 0.4660 | 229.4 |

Table S-II: Calculated derived volumetric properties of toluene at different temperatures (288.15-413.15 K) and pressures (0.1-60 MPa)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **288.15 K** | | | | **293.15 K** | | | |
| **0.1** | 0.8424 | 1.0426 | 0.4267 | 356.5 | 0.8715 | 1.0553 | 0.4321 | 354.9 |
| **1** | 0.8359 | 1.0375 | 0.4255 | 356.7 | 0.8645 | 1.0499 | 0.4309 | 355.0 |
| **5** | 0.8084 | 1.0161 | 0.4206 | 357.2 | 0.8350 | 1.0272 | 0.4256 | 355.6 |
| **10** | 0.7766 | 0.9913 | 0.4151 | 357.8 | 0.8010 | 1.0011 | 0.4197 | 356.4 |
| **15** | 0.7473 | 0.9685 | 0.4102 | 358.4 | 0.7697 | 0.9771 | 0.4145 | 357.1 |
| **20** | 0.7203 | 0.9474 | 0.4058 | 359.0 | 0.7410 | 0.9551 | 0.4098 | 357.9 |
| **25** | 0.6952 | 0.9280 | 0.4019 | 359.6 | 0.7144 | 0.9347 | 0.4056 | 358.6 |
| **30** | 0.6719 | 0.9099 | 0.3985 | 360.2 | 0.6897 | 0.9158 | 0.4019 | 359.3 |
| **35** | 0.6502 | 0.8931 | 0.3954 | 360.8 | 0.6668 | 0.8983 | 0.3986 | 359.9 |
| **40** | 0.6300 | 0.8775 | 0.3927 | 361.4 | 0.6454 | 0.8820 | 0.3957 | 360.6 |
| **45** | 0.6110 | 0.8628 | 0.3902 | 361.9 | 0.6254 | 0.8667 | 0.3931 | 361.3 |
| **50** | 0.5932 | 0.8491 | 0.3881 | 362.5 | 0.6067 | 0.8525 | 0.3908 | 361.9 |
| **55** | 0.5764 | 0.8362 | 0.3863 | 363.0 | 0.5891 | 0.8391 | 0.3887 | 362.5 |
| **60** | 0.5606 | 0.8241 | 0.3846 | 363.6 | 0.5726 | 0.8265 | 0.3870 | 363.1 |
|  | **298.15 K** | | | | **303.15 K** | | | |
| **0.1** | 0.9023 | 1.0681 | 0.4373 | 352.9 | 0.9349 | 1.0812 | 0.4420 | 350.5 |
| **1** | 0.8948 | 1.0625 | 0.4359 | 353.0 | 0.9268 | 1.0752 | 0.4406 | 350.7 |
| **5** | 0.8631 | 1.0385 | 0.4303 | 353.7 | 0.8927 | 1.0498 | 0.4346 | 351.5 |
| **10** | 0.8266 | 1.0109 | 0.4240 | 354.6 | 0.8537 | 1.0208 | 0.4278 | 352.5 |
| **15** | 0.7933 | 0.9857 | 0.4183 | 355.5 | 0.8180 | 0.9943 | 0.4218 | 353.5 |
| **20** | 0.7626 | 0.9626 | 0.4133 | 356.3 | 0.7854 | 0.9700 | 0.4164 | 354.4 |
| **25** | 0.7344 | 0.9413 | 0.4089 | 357.1 | 0.7554 | 0.9477 | 0.4117 | 355.3 |
| **30** | 0.7083 | 0.9216 | 0.4049 | 357.9 | 0.7277 | 0.9271 | 0.4074 | 356.2 |
| **35** | 0.6840 | 0.9033 | 0.4014 | 358.7 | 0.7020 | 0.9080 | 0.4037 | 357.1 |
| **40** | 0.6615 | 0.8863 | 0.3982 | 359.5 | 0.6782 | 0.8903 | 0.4003 | 358.0 |
| **45** | 0.6405 | 0.8704 | 0.3954 | 360.2 | 0.6561 | 0.8738 | 0.3973 | 358.8 |
| **50** | 0.6208 | 0.8556 | 0.3930 | 360.9 | 0.6354 | 0.8585 | 0.3947 | 359.6 |
| **55** | 0.6023 | 0.8417 | 0.3908 | 361.6 | 0.6160 | 0.8441 | 0.3923 | 360.4 |
| **60** | 0.5850 | 0.8287 | 0.3889 | 362.3 | 0.5979 | 0.8305 | 0.3903 | 361.1 |

Table S-II continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **308.15 K** | | | | **313.15 K** | | | |
| **0.1** | 0.9694 | 1.0944 | 0.4464 | 347.8 | 1.0060 | 1.1079 | 0.4505 | 344.8 |
| **1** | 0.9607 | 1.0881 | 0.4449 | 348.0 | 0.9966 | 1.1012 | 0.4488 | 345.0 |
| **5** | 0.9240 | 1.0613 | 0.4384 | 348.9 | 0.9571 | 1.0728 | 0.4419 | 346.0 |
| **10** | 0.8821 | 1.0307 | 0.4312 | 350.1 | 0.9120 | 1.0405 | 0.4342 | 347.3 |
| **15** | 0.8440 | 1.0028 | 0.4248 | 351.1 | 0.8712 | 1.0112 | 0.4274 | 348.5 |
| **20** | 0.8092 | 0.9773 | 0.4191 | 352.2 | 0.8341 | 0.9846 | 0.4214 | 349.6 |
| **25** | 0.7773 | 0.9540 | 0.4141 | 353.2 | 0.8002 | 0.9601 | 0.4160 | 350.8 |
| **30** | 0.7479 | 0.9325 | 0.4096 | 354.2 | 0.7690 | 0.9377 | 0.4112 | 351.8 |
| **35** | 0.7208 | 0.9126 | 0.4055 | 355.2 | 0.7403 | 0.9170 | 0.4070 | 352.9 |
| **40** | 0.6956 | 0.8942 | 0.4020 | 356.1 | 0.7137 | 0.8978 | 0.4031 | 353.9 |
| **45** | 0.6723 | 0.8770 | 0.3988 | 357.0 | 0.6891 | 0.8800 | 0.3997 | 354.9 |
| **50** | 0.6505 | 0.8611 | 0.3959 | 357.9 | 0.6663 | 0.8634 | 0.3967 | 355.8 |
| **55** | 0.6302 | 0.8461 | 0.3934 | 358.7 | 0.6449 | 0.8480 | 0.3940 | 356.7 |
| **60** | 0.6112 | 0.8322 | 0.3912 | 359.5 | 0.6250 | 0.8335 | 0.3916 | 357.6 |
|  | **318.15 K** | | | | **323.15 K** | | | |
| **0.1** | 1.0448 | 1.1215 | 0.4541 | 341.4 | 1.0859 | 1.1354 | 0.4574 | 337.8 |
| **1** | 1.0347 | 1.1144 | 0.4524 | 341.7 | 1.0749 | 1.1279 | 0.4556 | 338.1 |
| **5** | 0.9920 | 1.0845 | 0.4451 | 342.8 | 1.0288 | 1.0962 | 0.4478 | 339.3 |
| **10** | 0.9436 | 1.0504 | 0.4369 | 344.2 | 0.9767 | 1.0603 | 0.4391 | 340.8 |
| **15** | 0.8999 | 1.0196 | 0.4296 | 345.5 | 0.9299 | 1.0280 | 0.4314 | 342.2 |
| **20** | 0.8602 | 0.9917 | 0.4232 | 346.8 | 0.8875 | 0.9986 | 0.4247 | 343.6 |
| **25** | 0.8241 | 0.9661 | 0.4175 | 348.0 | 0.8490 | 0.9719 | 0.4186 | 344.9 |
| **30** | 0.7910 | 0.9427 | 0.4125 | 349.2 | 0.8139 | 0.9475 | 0.4133 | 346.2 |
| **35** | 0.7606 | 0.9211 | 0.4079 | 350.3 | 0.7817 | 0.9251 | 0.4085 | 347.4 |
| **40** | 0.7326 | 0.9012 | 0.4039 | 351.4 | 0.7521 | 0.9043 | 0.4042 | 348.6 |
| **45** | 0.7066 | 0.8827 | 0.4003 | 352.4 | 0.7248 | 0.8852 | 0.4004 | 349.7 |
| **50** | 0.6825 | 0.8655 | 0.3971 | 353.4 | 0.6994 | 0.8674 | 0.3970 | 350.8 |
| **55** | 0.6601 | 0.8495 | 0.3942 | 354.4 | 0.6759 | 0.8508 | 0.3939 | 351.8 |
| **60** | 0.6392 | 0.8345 | 0.3916 | 355.4 | 0.6540 | 0.8353 | 0.3912 | 352.8 |

Table S-II continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **328.15 K** | | | | **333.15 K** | | | |
| **0.1** | 1.1295 | 1.1495 | 0.4604 | 333.9 | 1.1757 | 1.1638 | 0.4629 | 329.7 |
| **1** | 1.1176 | 1.1415 | 0.4584 | 334.2 | 1.1628 | 1.1554 | 0.4608 | 330.0 |
| **5** | 1.0677 | 1.1080 | 0.4501 | 335.5 | 1.1088 | 1.1199 | 0.4521 | 331.5 |
| **10** | 1.0116 | 1.0702 | 0.4409 | 337.1 | 1.0483 | 1.0801 | 0.4424 | 333.2 |
| **15** | 0.9614 | 1.0362 | 0.4328 | 338.7 | 0.9944 | 1.0444 | 0.4338 | 334.9 |
| **20** | 0.9161 | 1.0055 | 0.4257 | 340.2 | 0.9460 | 1.0123 | 0.4263 | 336.5 |
| **25** | 0.8751 | 0.9776 | 0.4193 | 341.6 | 0.9023 | 0.9832 | 0.4196 | 338.0 |
| **30** | 0.8378 | 0.9522 | 0.4137 | 342.9 | 0.8627 | 0.9566 | 0.4137 | 339.4 |
| **35** | 0.8037 | 0.9288 | 0.4086 | 344.2 | 0.8265 | 0.9324 | 0.4084 | 340.8 |
| **40** | 0.7724 | 0.9073 | 0.4041 | 345.5 | 0.7934 | 0.9101 | 0.4037 | 342.1 |
| **45** | 0.7435 | 0.8874 | 0.4001 | 346.7 | 0.7630 | 0.8895 | 0.3994 | 343.4 |
| **50** | 0.7169 | 0.8690 | 0.3965 | 347.8 | 0.7349 | 0.8704 | 0.3956 | 344.6 |
| **55** | 0.6922 | 0.8519 | 0.3932 | 348.9 | 0.7090 | 0.8527 | 0.3922 | 345.7 |
| **60** | 0.6692 | 0.8359 | 0.3904 | 349.9 | 0.6849 | 0.8362 | 0.3892 | 346.8 |
|  | **343.15 K** | | | | **353.15 K** | | | |
| **0.1** | 1.2766 | 1.1932 | 0.4671 | 320.6 | 1.3897 | 1.2235 | 0.4698 | 310.8 |
| **1** | 1.2613 | 1.1837 | 0.4647 | 321.0 | 1.3716 | 1.2128 | 0.4672 | 311.3 |
| **5** | 1.1979 | 1.1441 | 0.4549 | 322.7 | 1.2969 | 1.1687 | 0.4564 | 313.2 |
| **10** | 1.1275 | 1.0999 | 0.4441 | 324.8 | 1.2147 | 1.1199 | 0.4446 | 315.6 |
| **15** | 1.0652 | 1.0607 | 0.4347 | 326.7 | 1.1428 | 1.0769 | 0.4344 | 317.8 |
| **20** | 1.0098 | 1.0256 | 0.4265 | 328.5 | 1.0793 | 1.0386 | 0.4255 | 319.8 |
| **25** | 0.9601 | 0.9939 | 0.4192 | 330.2 | 1.0228 | 1.0043 | 0.4177 | 321.8 |
| **30** | 0.9154 | 0.9652 | 0.4127 | 331.8 | 0.9721 | 0.9734 | 0.4107 | 323.6 |
| **35** | 0.8748 | 0.9390 | 0.4070 | 333.4 | 0.9265 | 0.9453 | 0.4045 | 325.3 |
| **40** | 0.8378 | 0.9151 | 0.4018 | 334.8 | 0.8852 | 0.9197 | 0.3990 | 326.9 |
| **45** | 0.8039 | 0.8931 | 0.3972 | 336.2 | 0.8476 | 0.8962 | 0.3940 | 328.4 |
| **50** | 0.7729 | 0.8727 | 0.3930 | 337.5 | 0.8132 | 0.8746 | 0.3895 | 329.8 |
| **55** | 0.7442 | 0.8539 | 0.3892 | 338.7 | 0.7816 | 0.8547 | 0.3854 | 331.2 |
| **60** | 0.7177 | 0.8363 | 0.3857 | 339.9 | 0.7525 | 0.8361 | 0.3816 | 332.4 |

Table S-II continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **363.15 K** | | | | **373.15 K** | | | |
| **0.1** | 1.5165 | 1.2548 | 0.4715 | 300.4 | 1.6579 | 1.2871 | 0.4724 | 289.6 |
| **1** | 1.4950 | 1.2429 | 0.4686 | 300.9 | 1.6323 | 1.2739 | 0.4691 | 290.2 |
| **5** | 1.4067 | 1.1939 | 0.4569 | 303.2 | 1.5278 | 1.2197 | 0.4566 | 292.9 |
| **10** | 1.3106 | 1.1401 | 0.4442 | 305.9 | 1.4153 | 1.1608 | 0.4432 | 296.1 |
| **15** | 1.2273 | 1.0931 | 0.4333 | 308.4 | 1.3190 | 1.1099 | 0.4317 | 299.0 |
| **20** | 1.1545 | 1.0517 | 0.4238 | 310.8 | 1.2355 | 1.0652 | 0.4219 | 301.7 |
| **25** | 1.0902 | 1.0147 | 0.4155 | 313.0 | 1.1624 | 1.0257 | 0.4132 | 304.2 |
| **30** | 1.0330 | 0.9816 | 0.4082 | 315.1 | 1.0979 | 0.9904 | 0.4057 | 306.6 |
| **35** | 0.9818 | 0.9516 | 0.4016 | 317.0 | 1.0405 | 0.9586 | 0.3989 | 308.8 |
| **40** | 0.9357 | 0.9244 | 0.3958 | 318.8 | 0.9891 | 0.9299 | 0.3929 | 310.8 |
| **45** | 0.8939 | 0.8995 | 0.3905 | 320.4 | 0.9428 | 0.9037 | 0.3875 | 312.7 |
| **50** | 0.8559 | 0.8767 | 0.3857 | 322.0 | 0.9008 | 0.8797 | 0.3825 | 314.4 |
| **55** | 0.8211 | 0.8557 | 0.3814 | 323.4 | 0.8625 | 0.8577 | 0.3780 | 316.0 |
| **60** | 0.7892 | 0.8362 | 0.3773 | 324.8 | 0.8276 | 0.8373 | 0.3738 | 317.5 |
|  | **393.15 K** | | | | **413.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 1.9514 | 1.3389 | 0.4688 | 268.8 | 2.3272 | 1.4084 | 0.4700 | 249.0 |
| **5** | 1.8049 | 1.2743 | 0.4557 | 272.6 | 2.1243 | 1.3352 | 0.4587 | 254.7 |
| **10** | 1.6513 | 1.2055 | 0.4419 | 277.0 | 1.9175 | 1.2589 | 0.4472 | 261.2 |
| **15** | 1.5229 | 1.1470 | 0.4304 | 281.1 | 1.7491 | 1.1954 | 0.4379 | 267.4 |
| **20** | 1.4139 | 1.0965 | 0.4206 | 284.9 | 1.6090 | 1.1413 | 0.4303 | 273.1 |
| **25** | 1.3201 | 1.0524 | 0.4122 | 288.4 | 1.4907 | 1.0947 | 0.4239 | 278.4 |
| **30** | 1.2385 | 1.0135 | 0.4048 | 291.7 | 1.3894 | 1.0538 | 0.4185 | 283.3 |
| **35** | 1.1669 | 0.9788 | 0.3983 | 294.8 | 1.3017 | 1.0176 | 0.4138 | 288.0 |
| **40** | 1.1035 | 0.9475 | 0.3926 | 297.6 | 1.2248 | 0.9852 | 0.4096 | 292.3 |
| **45** | 1.0470 | 0.9192 | 0.3874 | 300.2 | 1.1570 | 0.9560 | 0.4059 | 296.4 |
| **50** | 0.9963 | 0.8935 | 0.3826 | 302.6 | 1.0967 | 0.9295 | 0.4025 | 300.2 |
| **55** | 0.9505 | 0.8698 | 0.3783 | 304.8 | 1.0426 | 0.9052 | 0.3994 | 303.7 |
| **60** | 0.9089 | 0.8481 | 0.3742 | 306.8 | 0.9939 | 0.8829 | 0.3965 | 307.0 |

Table S-III: Calculated derived volumetric properties of dichloromethane at different temperatures (288.15-413.15 K) and pressures (0.1-60 MPa)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **288.15 K** | | | | **293.15 K** | | | |
| **0.1** | 0.9766 | 1.3065 | 0.3774 | 385.4 | 1.0154 | 1.3370 | 0.3894 | 385.9 |
| **1** | 0.9690 | 1.2999 | 0.3762 | 385.5 | 1.0071 | 1.3298 | 0.3881 | 386.1 |
| **5** | 0.9368 | 1.2717 | 0.3711 | 386.2 | 0.9720 | 1.2993 | 0.3824 | 386.9 |
| **10** | 0.8996 | 1.2394 | 0.3654 | 387.0 | 0.9316 | 1.2645 | 0.3761 | 387.9 |
| **15** | 0.8654 | 1.2099 | 0.3604 | 387.9 | 0.8945 | 1.2329 | 0.3706 | 389.0 |
| **20** | 0.8339 | 1.1830 | 0.3561 | 388.8 | 0.8605 | 1.2040 | 0.3659 | 390.2 |
| **25** | 0.8047 | 1.1583 | 0.3523 | 389.8 | 0.8291 | 1.1776 | 0.3617 | 391.4 |
| **30** | 0.7776 | 1.1356 | 0.3491 | 390.9 | 0.8001 | 1.1534 | 0.3581 | 392.6 |
| **35** | 0.7523 | 1.1147 | 0.3463 | 391.9 | 0.7731 | 1.1311 | 0.3550 | 393.9 |
| **40** | 0.7288 | 1.0954 | 0.3439 | 393.1 | 0.7480 | 1.1105 | 0.3523 | 395.2 |
| **45** | 0.7068 | 1.0774 | 0.3419 | 394.3 | 0.7246 | 1.0914 | 0.3501 | 396.6 |
| **50** | 0.6861 | 1.0608 | 0.3402 | 395.5 | 0.7027 | 1.0737 | 0.3482 | 398.0 |
| **55** | 0.6667 | 1.0453 | 0.3389 | 396.8 | 0.6821 | 1.0573 | 0.3466 | 399.4 |
| **60** | 0.6484 | 1.0308 | 0.3378 | 398.1 | 0.6628 | 1.0420 | 0.3453 | 400.9 |
|  | **298.15 K** | | | | **303.15 K** | | | |
| **0.1** | 1.0575 | 1.3681 | 0.4010 | 385.6 | 1.1033 | 1.3999 | 0.4121 | 384.6 |
| **1** | 1.0485 | 1.3603 | 0.3995 | 385.8 | 1.0933 | 1.3914 | 0.4104 | 384.8 |
| **5** | 1.0100 | 1.3273 | 0.3932 | 386.8 | 1.0511 | 1.3557 | 0.4035 | 386.0 |
| **10** | 0.9660 | 1.2898 | 0.3863 | 388.1 | 1.0031 | 1.3151 | 0.3959 | 387.5 |
| **15** | 0.9258 | 1.2557 | 0.3803 | 389.4 | 0.9594 | 1.2785 | 0.3893 | 389.0 |
| **20** | 0.8890 | 1.2248 | 0.3750 | 390.7 | 0.9196 | 1.2453 | 0.3835 | 390.5 |
| **25** | 0.8552 | 1.1965 | 0.3704 | 392.1 | 0.8832 | 1.2151 | 0.3784 | 392.1 |
| **30** | 0.8241 | 1.1707 | 0.3664 | 393.6 | 0.8497 | 1.1875 | 0.3741 | 393.7 |
| **35** | 0.7952 | 1.1469 | 0.3630 | 395.0 | 0.8187 | 1.1621 | 0.3702 | 395.3 |
| **40** | 0.7684 | 1.1250 | 0.3600 | 396.5 | 0.7901 | 1.1388 | 0.3669 | 396.9 |
| **45** | 0.7435 | 1.1047 | 0.3575 | 398.0 | 0.7635 | 1.1173 | 0.3641 | 398.6 |
| **50** | 0.7202 | 1.0860 | 0.3553 | 399.6 | 0.7388 | 1.0974 | 0.3616 | 400.3 |
| **55** | 0.6984 | 1.0685 | 0.3535 | 401.2 | 0.7157 | 1.0790 | 0.3596 | 402.0 |
| **60** | 0.6780 | 1.0523 | 0.3520 | 402.8 | 0.6941 | 1.0618 | 0.3579 | 403.8 |

Table S-III continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **308.15 K** | | | | **313.15 K** | | | |
| **0.1** | 1.1529 | 1.4323 | 0.4226 | 382.7 | 1.2069 | 1.4654 | 0.4326 | 380.1 |
| **1** | 1.1419 | 1.4231 | 0.4208 | 383.0 | 1.1948 | 1.4553 | 0.4306 | 380.4 |
| **5** | 1.0956 | 1.3843 | 0.4132 | 384.4 | 1.1437 | 1.4133 | 0.4222 | 382.0 |
| **10** | 1.0430 | 1.3405 | 0.4049 | 386.0 | 1.0861 | 1.3660 | 0.4131 | 383.9 |
| **15** | 0.9955 | 1.3011 | 0.3976 | 387.8 | 1.0343 | 1.3236 | 0.4051 | 385.8 |
| **20** | 0.9524 | 1.2655 | 0.3912 | 389.5 | 0.9874 | 1.2855 | 0.3981 | 387.7 |
| **25** | 0.9130 | 1.2332 | 0.3857 | 391.2 | 0.9449 | 1.2509 | 0.3921 | 389.6 |
| **30** | 0.8770 | 1.2038 | 0.3808 | 393.0 | 0.9060 | 1.2194 | 0.3868 | 391.5 |
| **35** | 0.8438 | 1.1768 | 0.3766 | 394.8 | 0.8704 | 1.1907 | 0.3822 | 393.4 |
| **40** | 0.8132 | 1.1520 | 0.3730 | 396.5 | 0.8377 | 1.1644 | 0.3781 | 395.3 |
| **45** | 0.7848 | 1.1292 | 0.3698 | 398.3 | 0.8074 | 1.1402 | 0.3746 | 397.2 |
| **50** | 0.7585 | 1.1081 | 0.3670 | 400.2 | 0.7794 | 1.1178 | 0.3715 | 399.1 |
| **55** | 0.7340 | 1.0885 | 0.3647 | 402.0 | 0.7534 | 1.0972 | 0.3688 | 401.0 |
| **60** | 0.7111 | 1.0704 | 0.3627 | 403.8 | 0.7291 | 1.0780 | 0.3665 | 403.0 |
|  | **318.15 K** | | | | **323.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 1.2522 | 1.4882 | 0.4398 | 377.1 | 1.3147 | 1.5218 | 0.4482 | 373.1 |
| **5** | 1.1959 | 1.4427 | 0.4306 | 378.8 | 1.2523 | 1.4723 | 0.4382 | 374.9 |
| **10** | 1.1325 | 1.3915 | 0.4205 | 380.9 | 1.1826 | 1.4171 | 0.4272 | 377.2 |
| **15** | 1.0759 | 1.3459 | 0.4118 | 383.0 | 1.1206 | 1.3680 | 0.4177 | 379.5 |
| **20** | 1.0250 | 1.3050 | 0.4042 | 385.1 | 1.0652 | 1.3241 | 0.4094 | 381.7 |
| **25** | 0.9789 | 1.2680 | 0.3976 | 387.1 | 1.0152 | 1.2846 | 0.4022 | 383.9 |
| **30** | 0.9370 | 1.2345 | 0.3918 | 389.2 | 0.9700 | 1.2489 | 0.3959 | 386.1 |
| **35** | 0.8988 | 1.2040 | 0.3868 | 391.2 | 0.9288 | 1.2164 | 0.3904 | 388.2 |
| **40** | 0.8637 | 1.1760 | 0.3823 | 393.2 | 0.8912 | 1.1868 | 0.3855 | 390.3 |
| **45** | 0.8314 | 1.1503 | 0.3784 | 395.2 | 0.8567 | 1.1596 | 0.3812 | 392.4 |
| **50** | 0.8015 | 1.1267 | 0.3750 | 397.2 | 0.8249 | 1.1346 | 0.3774 | 394.5 |
| **55** | 0.7739 | 1.1048 | 0.3719 | 399.2 | 0.7955 | 1.1115 | 0.3740 | 396.5 |
| **60** | 0.7482 | 1.0845 | 0.3693 | 401.2 | 0.7682 | 1.0901 | 0.3710 | 398.5 |

Table S-III continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **328.15 K** | | | | **333.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 1.3827 | 1.5561 | 0.4559 | 368.3 | 1.4567 | 1.5910 | 0.4629 | 362.9 |
| **5** | 1.3135 | 1.5023 | 0.4450 | 370.3 | 1.3797 | 1.5327 | 0.4510 | 365.1 |
| **10** | 1.2366 | 1.4426 | 0.4330 | 372.8 | 1.2948 | 1.4681 | 0.4380 | 367.8 |
| **15** | 1.1687 | 1.3898 | 0.4227 | 375.3 | 1.2202 | 1.4114 | 0.4268 | 370.4 |
| **20** | 1.1082 | 1.3428 | 0.4137 | 377.6 | 1.1542 | 1.3610 | 0.4171 | 372.9 |
| **25** | 1.0540 | 1.3006 | 0.4059 | 379.9 | 1.0953 | 1.3160 | 0.4086 | 375.3 |
| **30** | 1.0051 | 1.2626 | 0.3990 | 382.2 | 1.0424 | 1.2756 | 0.4012 | 377.7 |
| **35** | 0.9608 | 1.2281 | 0.3930 | 384.5 | 0.9947 | 1.2390 | 0.3947 | 380.0 |
| **40** | 0.9204 | 1.1967 | 0.3877 | 386.6 | 0.9513 | 1.2057 | 0.3888 | 382.2 |
| **45** | 0.8835 | 1.1679 | 0.3829 | 388.8 | 0.9118 | 1.1753 | 0.3837 | 384.4 |
| **50** | 0.8496 | 1.1415 | 0.3787 | 390.9 | 0.8756 | 1.1474 | 0.3791 | 386.5 |
| **55** | 0.8183 | 1.1171 | 0.3750 | 393.0 | 0.8424 | 1.1217 | 0.3749 | 388.6 |
| **60** | 0.7894 | 1.0945 | 0.3716 | 395.0 | 0.8117 | 1.0979 | 0.3712 | 390.6 |
|  | **343.15 K** | | | | **353.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 1.6251 | 1.6632 | 0.4746 | 350.2 | 1.8248 | 1.7386 | 0.4834 | 335.5 |
| **5** | 1.5292 | 1.5944 | 0.4606 | 352.8 | 1.7044 | 1.6576 | 0.4671 | 338.4 |
| **10** | 1.4250 | 1.5191 | 0.4454 | 355.8 | 1.5756 | 1.5701 | 0.4497 | 341.9 |
| **15** | 1.3347 | 1.4537 | 0.4325 | 358.7 | 1.4657 | 1.4950 | 0.4349 | 345.2 |
| **20** | 1.2557 | 1.3961 | 0.4212 | 361.5 | 1.3710 | 1.4295 | 0.4221 | 348.2 |
| **25** | 1.1860 | 1.3450 | 0.4114 | 364.2 | 1.2883 | 1.3719 | 0.4110 | 351.1 |
| **30** | 1.1240 | 1.2994 | 0.4028 | 366.7 | 1.2155 | 1.3208 | 0.4013 | 353.7 |
| **35** | 1.0685 | 1.2583 | 0.3952 | 369.1 | 1.1509 | 1.2750 | 0.3926 | 356.2 |
| **40** | 1.0185 | 1.2212 | 0.3884 | 371.4 | 1.0932 | 1.2338 | 0.3849 | 358.6 |
| **45** | 0.9732 | 1.1873 | 0.3823 | 373.6 | 1.0413 | 1.1963 | 0.3779 | 360.7 |
| **50** | 0.9320 | 1.1564 | 0.3769 | 375.7 | 0.9943 | 1.1622 | 0.3716 | 362.8 |
| **55** | 0.8944 | 1.1279 | 0.3719 | 377.8 | 0.9517 | 1.1309 | 0.3658 | 364.7 |
| **60** | 0.8598 | 1.1016 | 0.3674 | 379.7 | 0.9127 | 1.1021 | 0.3605 | 366.4 |

Table S-III continued:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***p* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp*-*cv*/**  **kJ kg-1K-1** | ***pint* / MPa** | ***κT*/ GPa-1** | ***αp* / 10-3K-1** | ***cp-cv* /**  **kJ kg-1K-1** | ***pint* / MPa** |
| **363.15 K** | | | | **373.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 2.0610 | 1.8176 | 0.4894 | 319.2 | 2.3389 | 1.9003 | 0.4935 | 302.2 |
| **5** | 1.9088 | 1.7226 | 0.4710 | 322.7 | 2.1456 | 1.7899 | 0.4731 | 306.3 |
| **10** | 1.7489 | 1.6216 | 0.4515 | 326.7 | 1.9466 | 1.6745 | 0.4518 | 311.0 |
| **15** | 1.6149 | 1.5359 | 0.4350 | 330.4 | 1.7830 | 1.5779 | 0.4340 | 315.2 |
| **20** | 1.5009 | 1.4621 | 0.4208 | 333.8 | 1.6460 | 1.4956 | 0.4187 | 319.1 |
| **25** | 1.4028 | 1.3977 | 0.4085 | 336.8 | 1.5296 | 1.4244 | 0.4055 | 322.5 |
| **30** | 1.3173 | 1.3409 | 0.3977 | 339.7 | 1.4293 | 1.3621 | 0.3939 | 325.6 |
| **35** | 1.2421 | 1.2903 | 0.3880 | 342.2 | 1.3421 | 1.3069 | 0.3836 | 328.4 |
| **40** | 1.1755 | 1.2449 | 0.3794 | 344.6 | 1.2654 | 1.2575 | 0.3743 | 330.8 |
| **45** | 1.1160 | 1.2039 | 0.3716 | 346.7 | 1.1974 | 1.2130 | 0.3658 | 333.0 |
| **50** | 1.0626 | 1.1666 | 0.3645 | 348.7 | 1.1368 | 1.1726 | 0.3580 | 334.9 |
| **55** | 1.0144 | 1.1325 | 0.3579 | 350.4 | 1.0824 | 1.1358 | 0.3508 | 336.6 |
| **60** | 0.9705 | 1.1011 | 0.3519 | 352.0 | 1.0332 | 1.1019 | 0.3440 | 338.0 |
|  | **393.15 K** | | | | **413.15 K** | | | |
| **0.1** | - | - | - | - | - | - | - | - |
| **1** | 3.0323 | 2.0785 | 0.4989 | 268.5 | 3.8848 | 2.2767 | 0.5141 | 241.1 |
| **5** | 2.7208 | 1.9369 | 0.4776 | 274.9 | 3.4026 | 2.1181 | 0.5007 | 252.2 |
| **10** | 2.4148 | 1.7940 | 0.4559 | 282.1 | 2.9522 | 1.9630 | 0.4877 | 264.7 |
| **15** | 2.1736 | 1.6778 | 0.4380 | 288.5 | 2.6121 | 1.8400 | 0.4774 | 276.0 |
| **20** | 1.9784 | 1.5810 | 0.4229 | 294.2 | 2.3458 | 1.7389 | 0.4687 | 286.3 |
| **25** | 1.8170 | 1.4985 | 0.4098 | 299.2 | 2.1313 | 1.6536 | 0.4613 | 295.6 |
| **30** | 1.6812 | 1.4271 | 0.3982 | 303.7 | 1.9547 | 1.5802 | 0.4545 | 304.0 |
| **35** | 1.5653 | 1.3644 | 0.3878 | 307.7 | 1.8066 | 1.5159 | 0.4484 | 311.7 |
| **40** | 1.4652 | 1.3087 | 0.3784 | 311.1 | 1.6806 | 1.4588 | 0.4426 | 318.6 |
| **45** | 1.3778 | 1.2587 | 0.3697 | 314.2 | 1.5720 | 1.4075 | 0.4370 | 324.9 |
| **50** | 1.3008 | 1.2135 | 0.3615 | 316.8 | 1.4773 | 1.3610 | 0.4315 | 330.6 |
| **55** | 1.2324 | 1.1722 | 0.3538 | 318.9 | 1.3941 | 1.3185 | 0.4261 | 335.7 |
| **60** | 1.1713 | 1.1344 | 0.3465 | 320.8 | 1.3203 | 1.2794 | 0.4205 | 340.3 |