

The DuPont logo is located in the top left corner. It consists of the word "DUPONT" in white, uppercase letters inside a white oval, which is set against a red rectangular background. To the left of this red background is a vertical bar with a blue top section and a red bottom section.

DUPONT®

# Opteon® XP40

Thermodynamic Properties





***This bulletin presents thermodynamic data for Opteon® XP40 (R-449A), a non-flammable, low GWP hydrofluoro-olefin based refrigerant. Opteon® XP40 (R-449A) is a near azeotrope blend of HFC-32/HFC-125/HFO-1234yf/HFC-134a. This data is intended to help engineers and designers of refrigeration systems calculate system performance. For additional information on the transport properties of Opteon® XP40 please contact please contact your local DuPont representative.***

***The data presented in this bulletin is generated using REFPROP 9.1<sup>1</sup> and is based on extensive experimental measurements for both the pure components and the refrigerant blend.***

### Opteon® XP40 Properties

|  |   |
|--|---|
| ASHRAE Number                              | R-449A  |
| Composition<br>wt.-%                       | R-32/R-125/R-1234yf/R-134a<br>24.3/24.7/25.3/25.7 |
| Molecular Weight                           | 87.2 g/mol  |
| Boiling Point @ 1 atm (101.3 kPa)          | -46.0 °C  |
| Critical Pressure                          | 4447 kPa  |
| Critical Temp                              | 81.5 °C   |
| Liquid Density @ 21.1 °C                   | 1113.3 kg/m <sup>3</sup>                          |
| Ozone Depletion Potential (CFC-11 = 1.0)   | 0   |
| Global Warming Potential (AR4 & CO2 = 1.0) | 1397  |
| ASHRAE Safety Classification               | A1  |
| System Temperature Glide                   | app. 4 K  |

### Units and Factors

Pf = pressure of saturated liquid (bubble point) in kPa (abs)

Pg = pressure of saturated vapor (dew point) in kPa (abs)

Vf = volume of saturated liquid in m<sup>3</sup>/kg

Vg = volume of saturated vapor in m<sup>3</sup>/kg

V = volume of superheated vapor in m<sup>3</sup>/kg

df = 1/Vf = density of saturated liquid in kg/m<sup>3</sup>

dg = 1/Vg = density of saturated vapor in kg/m<sup>3</sup>

Hf = enthalpy of saturated liquid in kJ/kg

Hfg = enthalpy of vaporization in kJ/kg

Hg = enthalpy of saturated vapor in kJ/kg

Sf = entropy of saturated liquid in kJ/kg.K

Sg = entropy of saturated vapor in kJ/kg.K

S = entropy of superheated vapor in kJ/kg.K

<sup>1</sup>) REFPROP 9.1 refers to the NIST Reference Fluid Thermodynamic and Transport Properties Database.

## Reference State

The reference state for the data presented in this bulletin is that recommended by the International Institute of Refrigeration (IIR) where the enthalpy and entropy of the liquid at 0 °C is 200 kJ/kg and 1.0 kJ/(kg-K) respectively.

## Equation of State and Other Property Models

Details of the equations and models used in REFPROP can be found in the following location:  
<http://www.nist.gov/srd/nist23.cfm>

## Components

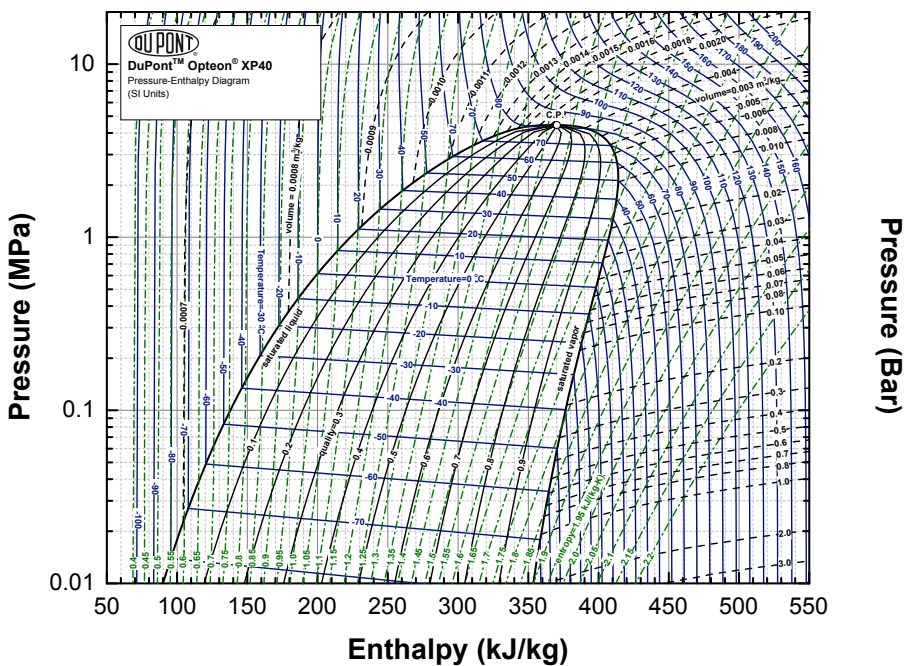
Opteon® XP40 (R-449A) is a near azeotrope blend of HFC-32/HFC-125/HFO-1234yf/HFC-134a in the mass fraction ratio 24.3/24.7/25.3/25.7. All components of this blend are found in the standard version of REFPROP 9.1 or later which is available from NIST.<sup>2</sup>

## Interaction Parameters

To generate the properties of the blended fluid there are a set of mixing rules implemented within REFPROP.<sup>3</sup> For each binary blend there is a set of propriety interaction parameters that are used in these mixing rules. For further information on these parameters and their use with REFPROP, please contact your local DuPont representative.

## Pressure Enthalpy Diagram

A pressure enthalpy diagram (s. below) is available to download from [www.opteon.com](http://www.opteon.com). Alternatively DUPREX, the DuPont Refrigerant Expert™ calculation software may also be downloaded from [www.opteon.com](http://www.opteon.com) and used to calculate thermodynamic cycle data, property data and pressure drop data.



2) National Institute of Standards and Technology, Gaithersburg, MD, USA.

3) More details of these mixing rules are given in <http://www.nist.gov/srd/upload/REFPROP9.PDF>





## Opteon® XP4o

### Saturation Properties – Temperature Table REFPROP

| Temp<br>°C | Pressure<br>[kPa]     |                       | Volume<br>[m <sup>3</sup> /kg] |                       | Density<br>[kg/m <sup>3</sup> ] |                       | Enthalpy<br>[kJ/kg]   |                        |                       | Entropy<br>[kJ/(kg.K)] |                       | Temp<br>°C |
|------------|-----------------------|-----------------------|--------------------------------|-----------------------|---------------------------------|-----------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------|
|            | Liquid p <sub>f</sub> | Vapour p <sub>g</sub> | Liquid v <sub>f</sub>          | Vapour v <sub>g</sub> | Liquid d <sub>f</sub>           | Vapour d <sub>g</sub> | Liquid H <sub>f</sub> | Latent H <sub>fg</sub> | Vapour H <sub>g</sub> | Liquid S <sub>f</sub>  | Vapour S <sub>g</sub> |            |
| -80        | 13.940                | 8.636                 | 0.000690                       | 2.1158                | 1448.8                          | 0.473                 | 95.6                  | 256.7                  | 352.3                 | 0.551                  | 1.907                 | -80        |
| -79        | 14.950                | 9.325                 | 0.000692                       | 1.9687                | 1446.0                          | 0.508                 | 96.8                  | 256.1                  | 352.9                 | 0.558                  | 1.902                 | -79        |
| -78        | 16.019                | 10.060                | 0.000693                       | 1.8335                | 1443.2                          | 0.545                 | 98.0                  | 255.5                  | 353.5                 | 0.564                  | 1.898                 | -78        |
| -77        | 17.151                | 10.842                | 0.000694                       | 1.7092                | 1440.3                          | 0.585                 | 99.3                  | 254.8                  | 354.1                 | 0.570                  | 1.895                 | -77        |
| -76        | 18.348                | 11.673                | 0.000696                       | 1.5947                | 1437.5                          | 0.627                 | 100.5                 | 254.2                  | 354.7                 | 0.577                  | 1.891                 | -76        |
| -75        | 19.613                | 12.558                | 0.000697                       | 1.4892                | 1434.6                          | 0.672                 | 101.7                 | 253.6                  | 355.3                 | 0.583                  | 1.887                 | -75        |
| -74        | 20.949                | 13.497                | 0.000698                       | 1.3918                | 1431.8                          | 0.718                 | 103.0                 | 253.0                  | 356.0                 | 0.589                  | 1.883                 | -74        |
| -73        | 22.359                | 14.493                | 0.000700                       | 1.3019                | 1428.9                          | 0.768                 | 104.2                 | 252.3                  | 356.6                 | 0.595                  | 1.879                 | -73        |
| -72        | 23.845                | 15.549                | 0.000701                       | 1.2189                | 1426.1                          | 0.820                 | 105.5                 | 251.7                  | 357.2                 | 0.601                  | 1.876                 | -72        |
| -71        | 25.412                | 16.669                | 0.000703                       | 1.1420                | 1423.2                          | 0.876                 | 106.7                 | 251.1                  | 357.8                 | 0.608                  | 1.872                 | -71        |
| -70        | 27.062                | 17.853                | 0.000704                       | 1.0708                | 1420.3                          | 0.934                 | 107.9                 | 250.5                  | 358.4                 | 0.614                  | 1.869                 | -70        |
| -69        | 28.799                | 19.106                | 0.000705                       | 1.0049                | 1417.4                          | 0.995                 | 109.2                 | 249.8                  | 359.0                 | 0.620                  | 1.866                 | -69        |
| -68        | 30.625                | 20.431                | 0.000707                       | 0.9438                | 1414.6                          | 1.060                 | 110.4                 | 249.2                  | 359.6                 | 0.626                  | 1.862                 | -68        |
| -67        | 32.545                | 21.830                | 0.000708                       | 0.8870                | 1411.7                          | 1.127                 | 111.7                 | 248.6                  | 360.2                 | 0.632                  | 1.859                 | -67        |
| -66        | 34.562                | 23.306                | 0.000710                       | 0.8342                | 1408.8                          | 1.199                 | 112.9                 | 247.9                  | 360.9                 | 0.638                  | 1.856                 | -66        |
| -65        | 36.679                | 24.863                | 0.000711                       | 0.7852                | 1405.9                          | 1.274                 | 114.2                 | 247.3                  | 361.5                 | 0.644                  | 1.853                 | -65        |
| -64        | 38.900                | 26.504                | 0.000713                       | 0.7396                | 1403.0                          | 1.352                 | 115.4                 | 246.6                  | 362.1                 | 0.650                  | 1.850                 | -64        |
| -63        | 41.228                | 28.233                | 0.000714                       | 0.6971                | 1400.1                          | 1.435                 | 116.7                 | 246.0                  | 362.7                 | 0.656                  | 1.847                 | -63        |
| -62        | 43.669                | 30.052                | 0.000716                       | 0.6575                | 1397.1                          | 1.521                 | 117.9                 | 245.3                  | 363.3                 | 0.662                  | 1.844                 | -62        |
| -61        | 46.225                | 31.965                | 0.000717                       | 0.6205                | 1394.2                          | 1.611                 | 119.2                 | 244.7                  | 363.9                 | 0.668                  | 1.841                 | -61        |
| -60        | 48.900                | 33.977                | 0.000719                       | 0.5861                | 1391.3                          | 1.706                 | 120.5                 | 244.1                  | 364.5                 | 0.674                  | 1.838                 | -60        |
| -59        | 51.698                | 36.090                | 0.000720                       | 0.5539                | 1388.4                          | 1.805                 | 121.7                 | 243.4                  | 365.1                 | 0.680                  | 1.835                 | -59        |
| -58        | 54.624                | 38.308                | 0.000722                       | 0.5238                | 1385.4                          | 1.909                 | 123.0                 | 242.7                  | 365.7                 | 0.686                  | 1.832                 | -58        |
| -57        | 57.682                | 40.635                | 0.000723                       | 0.4956                | 1382.5                          | 2.018                 | 124.2                 | 242.1                  | 366.3                 | 0.691                  | 1.830                 | -57        |
| -56        | 60.876                | 43.075                | 0.000725                       | 0.4693                | 1379.5                          | 2.131                 | 125.5                 | 241.4                  | 366.9                 | 0.697                  | 1.827                 | -56        |
| -55        | 64.210                | 45.632                | 0.000726                       | 0.4446                | 1376.6                          | 2.249                 | 126.8                 | 240.8                  | 367.5                 | 0.703                  | 1.825                 | -55        |
| -54        | 67.688                | 48.310                | 0.000728                       | 0.4214                | 1373.6                          | 2.373                 | 128.0                 | 240.1                  | 368.1                 | 0.709                  | 1.822                 | -54        |
| -53        | 71.315                | 51.112                | 0.000730                       | 0.3997                | 1370.6                          | 2.502                 | 129.3                 | 239.4                  | 368.8                 | 0.715                  | 1.820                 | -53        |
| -52        | 75.096                | 54.045                | 0.000731                       | 0.3794                | 1367.6                          | 2.636                 | 130.6                 | 238.8                  | 369.4                 | 0.720                  | 1.817                 | -52        |
| -51        | 79.035                | 57.110                | 0.000733                       | 0.3602                | 1364.6                          | 2.776                 | 131.9                 | 238.1                  | 370.0                 | 0.726                  | 1.815                 | -51        |
| -50        | 83.137                | 60.314                | 0.000734                       | 0.3422                | 1361.6                          | 2.922                 | 133.1                 | 237.4                  | 370.6                 | 0.732                  | 1.812                 | -50        |
| -49        | 87.406                | 63.660                | 0.000736                       | 0.3253                | 1358.6                          | 3.074                 | 134.4                 | 236.7                  | 371.2                 | 0.737                  | 1.810                 | -49        |
| -48        | 91.848                | 67.153                | 0.000738                       | 0.3094                | 1355.6                          | 3.232                 | 135.7                 | 236.1                  | 371.8                 | 0.743                  | 1.808                 | -48        |
| -47        | 96.466                | 70.797                | 0.000739                       | 0.2945                | 1352.6                          | 3.396                 | 137.0                 | 235.4                  | 372.4                 | 0.749                  | 1.806                 | -47        |
| -46        | 101.267               | 74.597                | 0.000741                       | 0.2803                | 1349.6                          | 3.567                 | 138.3                 | 234.7                  | 372.9                 | 0.754                  | 1.803                 | -46        |
| -45        | 106.254               | 78.558                | 0.000743                       | 0.2670                | 1346.5                          | 3.745                 | 139.5                 | 234.0                  | 373.5                 | 0.760                  | 1.801                 | -45        |
| -44        | 111.434               | 82.685                | 0.000744                       | 0.2545                | 1343.5                          | 3.929                 | 140.8                 | 233.3                  | 374.1                 | 0.766                  | 1.799                 | -44        |
| -43        | 116.810               | 86.982                | 0.000746                       | 0.2427                | 1340.4                          | 4.121                 | 142.1                 | 232.6                  | 374.7                 | 0.771                  | 1.797                 | -43        |
| -42        | 122.390               | 91.454                | 0.000748                       | 0.2315                | 1337.3                          | 4.320                 | 143.4                 | 231.9                  | 375.3                 | 0.777                  | 1.795                 | -42        |
| -41        | 128.176               | 96.107                | 0.000749                       | 0.2209                | 1334.3                          | 4.527                 | 144.7                 | 231.2                  | 375.9                 | 0.782                  | 1.793                 | -41        |
| -40        | 134.175               | 100.945               | 0.000751                       | 0.2109                | 1331.2                          | 4.741                 | 146.0                 | 230.5                  | 376.5                 | 0.788                  | 1.791                 | -40        |



## Opteon® XP4o

### Saturation Properties – Temperature Table REFPROP

| Temp<br>°C | Pressure<br>[kPa]     |                       | Volume<br>[m3/kg]     |                       | Density<br>[kg/m3]    |                       | Enthalpy<br>[kJ/kg]   |                        |                       | Entropy<br>[kJ/(kg.K)] |                       | Temp<br>°C |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------|
|            | Liquid p <sub>f</sub> | Vapour p <sub>g</sub> | Liquid v <sub>f</sub> | Vapour v <sub>g</sub> | Liquid d <sub>f</sub> | Vapour d <sub>g</sub> | Liquid H <sub>f</sub> | Latent H <sub>fg</sub> | Vapour H <sub>g</sub> | Liquid S <sub>f</sub>  | Vapour S <sub>g</sub> |            |
| -39        | 140.393               | 105.973               | 0.000753              | 0.2015                | 1328.1                | 4.963                 | 147.3                 | 229.8                  | 377.1                 | 0.793                  | 1.789                 | -39        |
| -38        | 146.834               | 111.198               | 0.000755              | 0.1926                | 1325.0                | 5.193                 | 148.6                 | 229.1                  | 377.7                 | 0.799                  | 1.787                 | -38        |
| -37        | 153.504               | 116.623               | 0.000757              | 0.1841                | 1321.8                | 5.432                 | 149.9                 | 228.4                  | 378.3                 | 0.805                  | 1.785                 | -37        |
| -36        | 160.409               | 122.255               | 0.000758              | 0.1761                | 1318.7                | 5.679                 | 151.2                 | 227.6                  | 378.8                 | 0.810                  | 1.784                 | -36        |
| -35        | 167.554               | 128.099               | 0.000760              | 0.1685                | 1315.6                | 5.935                 | 152.5                 | 226.9                  | 379.4                 | 0.815                  | 1.782                 | -35        |
| -34        | 174.944               | 134.160               | 0.000762              | 0.1613                | 1312.4                | 6.200                 | 153.8                 | 226.2                  | 380.0                 | 0.821                  | 1.780                 | -34        |
| -33        | 182.586               | 140.444               | 0.000764              | 0.1545                | 1309.3                | 6.474                 | 155.1                 | 225.4                  | 380.6                 | 0.826                  | 1.778                 | -33        |
| -32        | 190.485               | 146.956               | 0.000766              | 0.1480                | 1306.1                | 6.758                 | 156.4                 | 224.7                  | 381.1                 | 0.832                  | 1.777                 | -32        |
| -31        | 198.647               | 153.703               | 0.000768              | 0.1418                | 1302.9                | 7.051                 | 157.8                 | 224.0                  | 381.7                 | 0.837                  | 1.775                 | -31        |
| -30        | 207.078               | 160.690               | 0.000769              | 0.1360                | 1299.7                | 7.354                 | 159.1                 | 223.2                  | 382.3                 | 0.843                  | 1.773                 | -30        |
| -29        | 215.784               | 167.922               | 0.000771              | 0.1304                | 1296.5                | 7.668                 | 160.4                 | 222.5                  | 382.9                 | 0.848                  | 1.772                 | -29        |
| -28        | 224.770               | 175.406               | 0.000773              | 0.1251                | 1293.3                | 7.991                 | 161.7                 | 221.7                  | 383.4                 | 0.853                  | 1.770                 | -28        |
| -27        | 234.043               | 183.148               | 0.000775              | 0.1201                | 1290.1                | 8.326                 | 163.0                 | 220.9                  | 384.0                 | 0.859                  | 1.768                 | -27        |
| -26        | 243.609               | 191.154               | 0.000777              | 0.1153                | 1286.8                | 8.671                 | 164.4                 | 220.2                  | 384.5                 | 0.864                  | 1.767                 | -26        |
| -25        | 253.474               | 199.429               | 0.000779              | 0.1108                | 1283.6                | 9.028                 | 165.7                 | 219.4                  | 385.1                 | 0.870                  | 1.765                 | -25        |
| -24        | 263.643               | 207.980               | 0.000781              | 0.1064                | 1280.3                | 9.396                 | 167.0                 | 218.6                  | 385.7                 | 0.875                  | 1.764                 | -24        |
| -23        | 274.124               | 216.812               | 0.000783              | 0.1023                | 1277.0                | 9.776                 | 168.4                 | 217.8                  | 386.2                 | 0.880                  | 1.762                 | -23        |
| -22        | 284.922               | 225.934               | 0.000785              | 0.0983                | 1273.7                | 10.168                | 169.7                 | 217.1                  | 386.8                 | 0.885                  | 1.761                 | -22        |
| -21        | 296.044               | 235.350               | 0.000787              | 0.0946                | 1270.4                | 10.572                | 171.1                 | 216.3                  | 387.3                 | 0.891                  | 1.760                 | -21        |
| -20        | 307.495               | 245.066               | 0.000789              | 0.0910                | 1267.1                | 10.989                | 172.4                 | 215.5                  | 387.9                 | 0.896                  | 1.758                 | -20        |
| -19        | 319.283               | 255.091               | 0.000791              | 0.0876                | 1263.8                | 11.419                | 173.8                 | 214.7                  | 388.4                 | 0.901                  | 1.757                 | -19        |
| -18        | 331.414               | 265.429               | 0.000793              | 0.0843                | 1260.4                | 11.862                | 175.1                 | 213.9                  | 389.0                 | 0.907                  | 1.755                 | -18        |
| -17        | 343.894               | 276.088               | 0.000796              | 0.0812                | 1257.0                | 12.318                | 176.5                 | 213.0                  | 389.5                 | 0.912                  | 1.754                 | -17        |
| -16        | 356.730               | 287.073               | 0.000798              | 0.0782                | 1253.6                | 12.789                | 177.8                 | 212.2                  | 390.0                 | 0.917                  | 1.753                 | -16        |
| -15        | 369.928               | 298.393               | 0.000800              | 0.0753                | 1250.2                | 13.273                | 179.2                 | 211.4                  | 390.6                 | 0.922                  | 1.751                 | -15        |
| -14        | 383.495               | 310.053               | 0.000802              | 0.0726                | 1246.8                | 13.772                | 180.5                 | 210.6                  | 391.1                 | 0.928                  | 1.750                 | -14        |
| -13        | 397.437               | 322.061               | 0.000804              | 0.0700                | 1243.4                | 14.286                | 181.9                 | 209.7                  | 391.6                 | 0.933                  | 1.749                 | -13        |
| -12        | 411.761               | 334.423               | 0.000806              | 0.0675                | 1239.9                | 14.815                | 183.3                 | 208.9                  | 392.2                 | 0.938                  | 1.748                 | -12        |
| -11        | 426.475               | 347.146               | 0.000809              | 0.0651                | 1236.5                | 15.359                | 184.7                 | 208.0                  | 392.7                 | 0.943                  | 1.746                 | -11        |
| -10        | 441.584               | 360.238               | 0.000811              | 0.0628                | 1233.0                | 15.920                | 186.0                 | 207.2                  | 393.2                 | 0.948                  | 1.745                 | -10        |
| -9         | 457.095               | 373.704               | 0.000813              | 0.0606                | 1229.5                | 16.496                | 187.4                 | 206.3                  | 393.7                 | 0.954                  | 1.744                 | -9         |
| -8         | 473.015               | 387.553               | 0.000816              | 0.0585                | 1226.0                | 17.089                | 188.8                 | 205.4                  | 394.2                 | 0.959                  | 1.743                 | -8         |
| -7         | 489.352               | 401.792               | 0.000818              | 0.0565                | 1222.4                | 17.700                | 190.2                 | 204.6                  | 394.8                 | 0.964                  | 1.742                 | -7         |
| -6         | 506.112               | 416.427               | 0.000820              | 0.0546                | 1218.9                | 18.327                | 191.6                 | 203.7                  | 395.3                 | 0.969                  | 1.741                 | -6         |
| -5         | 523.301               | 431.467               | 0.000823              | 0.0527                | 1215.3                | 18.973                | 193.0                 | 202.8                  | 395.8                 | 0.974                  | 1.739                 | -5         |
| -4         | 540.927               | 446.918               | 0.000825              | 0.0509                | 1211.7                | 19.637                | 194.4                 | 201.9                  | 396.3                 | 0.979                  | 1.738                 | -4         |
| -3         | 558.997               | 462.788               | 0.000828              | 0.0492                | 1208.1                | 20.319                | 195.8                 | 201.0                  | 396.8                 | 0.985                  | 1.737                 | -3         |
| -2         | 577.519               | 479.084               | 0.000830              | 0.0476                | 1204.4                | 21.020                | 197.2                 | 200.1                  | 397.3                 | 0.990                  | 1.736                 | -2         |
| -1         | 596.498               | 495.814               | 0.000833              | 0.0460                | 1200.8                | 21.742                | 198.6                 | 199.2                  | 397.7                 | 0.995                  | 1.735                 | -1         |
| 0          | 615.942               | 512.986               | 0.000835              | 0.0445                | 1197.1                | 22.483                | 200.0                 | 198.2                  | 398.2                 | 1.000                  | 1.734                 | 0          |
| 1          | 635.859               | 530.607               | 0.000838              | 0.0430                | 1193.4                | 23.244                | 201.4                 | 197.3                  | 398.7                 | 1.005                  | 1.733                 | 1          |



## Opteon® XP40

### Saturation Properties – Temperature Table REFPROP

| Temp<br>°C | Pressure<br>[kPa]     |                       | Volume<br>[m <sup>3</sup> /kg] |                       | Density<br>[kg/m <sup>3</sup> ] |                       | Enthalpy<br>[kJ/kg]   |                        |                       | Entropy<br>[kJ/(kg.K)] |                       | Temp<br>°C |
|------------|-----------------------|-----------------------|--------------------------------|-----------------------|---------------------------------|-----------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------|
|            | Liquid p <sub>f</sub> | Vapour p <sub>g</sub> | Liquid v <sub>f</sub>          | Vapour v <sub>g</sub> | Liquid d <sub>f</sub>           | Vapour d <sub>g</sub> | Liquid H <sub>f</sub> | Latent H <sub>fg</sub> | Vapour H <sub>g</sub> | Liquid S <sub>f</sub>  | Vapour S <sub>g</sub> |            |
| 2          | 656.255               | 548.685               | 0.000841                       | 0.0416                | 1189.7                          | 24.027                | 202.8                 | 196.3                  | 399.2                 | 1.010                  | 1.732                 | 2          |
| 3          | 677.137               | 567.228               | 0.000843                       | 0.0403                | 1185.9                          | 24.831                | 204.3                 | 195.4                  | 399.7                 | 1.015                  | 1.731                 | 3          |
| 4          | 698.514               | 586.244               | 0.000846                       | 0.0390                | 1182.1                          | 25.657                | 205.7                 | 194.4                  | 400.1                 | 1.020                  | 1.730                 | 4          |
| 5          | 720.392               | 605.741               | 0.000849                       | 0.0377                | 1178.3                          | 26.506                | 207.1                 | 193.5                  | 400.6                 | 1.026                  | 1.729                 | 5          |
| 6          | 742.778               | 625.726               | 0.000851                       | 0.0365                | 1174.5                          | 27.378                | 208.6                 | 192.5                  | 401.0                 | 1.031                  | 1.728                 | 6          |
| 7          | 765.681               | 646.208               | 0.000854                       | 0.0354                | 1170.7                          | 28.274                | 210.0                 | 191.5                  | 401.5                 | 1.036                  | 1.727                 | 7          |
| 8          | 789.107               | 667.196               | 0.000857                       | 0.0343                | 1166.8                          | 29.193                | 211.5                 | 190.5                  | 402.0                 | 1.041                  | 1.726                 | 8          |
| 9          | 813.063               | 688.696               | 0.000860                       | 0.0332                | 1162.9                          | 30.138                | 212.9                 | 189.5                  | 402.4                 | 1.046                  | 1.725                 | 9          |
| 10         | 837.558               | 710.719               | 0.000863                       | 0.0321                | 1159.0                          | 31.109                | 214.4                 | 188.5                  | 402.8                 | 1.051                  | 1.724                 | 10         |
| 11         | 862.599               | 733.272               | 0.000866                       | 0.0311                | 1155.0                          | 32.105                | 215.8                 | 187.5                  | 403.3                 | 1.056                  | 1.723                 | 11         |
| 12         | 888.193               | 756.363               | 0.000869                       | 0.0302                | 1151.0                          | 33.128                | 217.3                 | 186.4                  | 403.7                 | 1.061                  | 1.722                 | 12         |
| 13         | 914.348               | 780.002               | 0.000872                       | 0.0293                | 1147.0                          | 34.179                | 218.8                 | 185.4                  | 404.1                 | 1.066                  | 1.721                 | 13         |
| 14         | 941.072               | 804.196               | 0.000875                       | 0.0284                | 1143.0                          | 35.259                | 220.2                 | 184.3                  | 404.5                 | 1.071                  | 1.720                 | 14         |
| 15         | 968.371               | 828.956               | 0.000878                       | 0.0275                | 1138.9                          | 36.367                | 221.7                 | 183.3                  | 405.0                 | 1.076                  | 1.719                 | 15         |
| 16         | 996.255               | 854.289               | 0.000881                       | 0.0267                | 1134.8                          | 37.505                | 223.2                 | 182.2                  | 405.4                 | 1.081                  | 1.718                 | 16         |
| 17         | 1024.730              | 880.204               | 0.000884                       | 0.0259                | 1130.6                          | 38.674                | 224.7                 | 181.1                  | 405.8                 | 1.086                  | 1.717                 | 17         |
| 18         | 1053.804              | 906.711               | 0.000888                       | 0.0251                | 1126.4                          | 39.874                | 226.2                 | 180.0                  | 406.2                 | 1.091                  | 1.716                 | 18         |
| 19         | 1083.486              | 933.819               | 0.000891                       | 0.0243                | 1122.2                          | 41.106                | 227.7                 | 178.9                  | 406.5                 | 1.096                  | 1.715                 | 19         |
| 20         | 1113.783              | 961.536               | 0.000894                       | 0.0236                | 1118.0                          | 42.372                | 229.2                 | 177.7                  | 406.9                 | 1.102                  | 1.714                 | 20         |
| 21         | 1144.702              | 989.873               | 0.000898                       | 0.0229                | 1113.7                          | 43.672                | 230.7                 | 176.6                  | 407.3                 | 1.107                  | 1.713                 | 21         |
| 22         | 1176.253              | 1018.839              | 0.000901                       | 0.0222                | 1109.4                          | 45.006                | 232.2                 | 175.5                  | 407.7                 | 1.112                  | 1.712                 | 22         |
| 23         | 1208.442              | 1048.443              | 0.000905                       | 0.0216                | 1105.0                          | 46.378                | 233.7                 | 174.3                  | 408.0                 | 1.117                  | 1.711                 | 23         |
| 24         | 1241.277              | 1078.695              | 0.000909                       | 0.0209                | 1100.6                          | 47.786                | 235.3                 | 173.1                  | 408.4                 | 1.122                  | 1.710                 | 24         |
| 25         | 1274.768              | 1109.605              | 0.000912                       | 0.0203                | 1096.2                          | 49.232                | 236.8                 | 171.9                  | 408.7                 | 1.127                  | 1.709                 | 25         |
| 26         | 1308.921              | 1141.183              | 0.000916                       | 0.0197                | 1091.7                          | 50.718                | 238.3                 | 170.7                  | 409.1                 | 1.132                  | 1.708                 | 26         |
| 27         | 1343.745              | 1173.438              | 0.000920                       | 0.0191                | 1087.2                          | 52.245                | 239.9                 | 169.5                  | 409.4                 | 1.137                  | 1.707                 | 27         |
| 28         | 1379.249              | 1206.382              | 0.000924                       | 0.0186                | 1082.6                          | 53.814                | 241.4                 | 168.3                  | 409.7                 | 1.142                  | 1.706                 | 28         |
| 29         | 1415.440              | 1240.024              | 0.000928                       | 0.0180                | 1078.0                          | 55.425                | 243.0                 | 167.0                  | 410.0                 | 1.147                  | 1.705                 | 29         |
| 30         | 1452.326              | 1274.375              | 0.000932                       | 0.0175                | 1073.3                          | 57.082                | 244.6                 | 165.8                  | 410.3                 | 1.152                  | 1.704                 | 30         |
| 31         | 1489.916              | 1309.445              | 0.000936                       | 0.0170                | 1068.6                          | 58.784                | 246.1                 | 164.5                  | 410.6                 | 1.157                  | 1.703                 | 31         |
| 32         | 1528.219              | 1345.246              | 0.000940                       | 0.0165                | 1063.9                          | 60.535                | 247.7                 | 163.2                  | 410.9                 | 1.162                  | 1.702                 | 32         |
| 33         | 1567.242              | 1381.788              | 0.000944                       | 0.0160                | 1059.0                          | 62.334                | 249.3                 | 161.9                  | 411.2                 | 1.167                  | 1.701                 | 33         |
| 34         | 1606.994              | 1419.082              | 0.000949                       | 0.0156                | 1054.2                          | 64.184                | 250.9                 | 160.5                  | 411.5                 | 1.172                  | 1.700                 | 34         |
| 35         | 1647.484              | 1457.141              | 0.000953                       | 0.0151                | 1049.3                          | 66.087                | 252.5                 | 159.2                  | 411.7                 | 1.178                  | 1.699                 | 35         |
| 36         | 1688.720              | 1495.975              | 0.000958                       | 0.0147                | 1044.3                          | 68.045                | 254.1                 | 157.8                  | 412.0                 | 1.183                  | 1.698                 | 36         |
| 37         | 1730.711              | 1535.596              | 0.000962                       | 0.0143                | 1039.2                          | 70.058                | 255.8                 | 156.4                  | 412.2                 | 1.188                  | 1.697                 | 37         |
| 38         | 1773.465              | 1576.016              | 0.000967                       | 0.0139                | 1034.1                          | 72.131                | 257.4                 | 155.0                  | 412.4                 | 1.193                  | 1.696                 | 38         |
| 39         | 1816.992              | 1617.247              | 0.000972                       | 0.0135                | 1029.0                          | 74.264                | 259.0                 | 153.6                  | 412.6                 | 1.198                  | 1.695                 | 39         |
| 40         | 1861.299              | 1659.303              | 0.000977                       | 0.0131                | 1023.7                          | 76.461                | 260.7                 | 152.1                  | 412.8                 | 1.203                  | 1.693                 | 40         |
| 41         | 1906.396              | 1702.195              | 0.000982                       | 0.0127                | 1018.4                          | 78.723                | 262.3                 | 150.7                  | 413.0                 | 1.208                  | 1.692                 | 41         |
| 42         | 1952.292              | 1745.936              | 0.000987                       | 0.0123                | 1013.1                          | 81.054                | 264.0                 | 149.2                  | 413.2                 | 1.213                  | 1.691                 | 42         |



**Opteon® XP4o**  
**Saturation Properties – Temperature Table**  
**REFPROP**

| Temp<br>°C | Pressure<br>[kPa]     |                       | Volume<br>[m3/kg]     |                       | Density<br>[kg/m3]    |                       | Enthalpy<br>[kJ/kg]   |                        |                       | Entropy<br>[kJ/(kg.K)] |                       | Temp<br>°C |
|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|-----------------------|------------------------|-----------------------|------------|
|            | Liquid p <sub>f</sub> | Vapour p <sub>g</sub> | Liquid v <sub>f</sub> | Vapour v <sub>g</sub> | Liquid d <sub>f</sub> | Vapour d <sub>g</sub> | Liquid H <sub>f</sub> | Latent H <sub>fg</sub> | Vapour H <sub>g</sub> | Liquid S <sub>f</sub>  | Vapour S <sub>g</sub> |            |
| 43         | 1998.995              | 1790.540              | 0.000992              | 0.0120                | 1007.6                | 83.456                | 265.7                 | 147.7                  | 413.3                 | 1.219                  | 1.690                 | 43         |
| 44         | 2046.515              | 1836.020              | 0.000998              | 0.0116                | 1002.1                | 85.931                | 267.4                 | 146.1                  | 413.5                 | 1.224                  | 1.689                 | 44         |
| 45         | 2094.860              | 1882.391              | 0.001004              | 0.0113                | 996.5                 | 88.485                | 269.1                 | 144.5                  | 413.6                 | 1.229                  | 1.687                 | 45         |
| 46         | 2144.041              | 1929.666              | 0.001009              | 0.0110                | 990.8                 | 91.119                | 270.8                 | 142.9                  | 413.7                 | 1.234                  | 1.686                 | 46         |
| 47         | 2194.065              | 1977.861              | 0.001015              | 0.0107                | 985.0                 | 93.837                | 272.5                 | 141.3                  | 413.8                 | 1.239                  | 1.685                 | 47         |
| 48         | 2244.943              | 2026.989              | 0.001021              | 0.0103                | 979.1                 | 96.644                | 274.2                 | 139.7                  | 413.9                 | 1.245                  | 1.683                 | 48         |
| 49         | 2296.684              | 2077.068              | 0.001028              | 0.0100                | 973.1                 | 99.544                | 276.0                 | 138.0                  | 414.0                 | 1.250                  | 1.682                 | 49         |
| 50         | 2349.297              | 2128.113              | 0.001034              | 0.0098                | 967.0                 | 102.541               | 277.7                 | 136.3                  | 414.0                 | 1.255                  | 1.681                 | 50         |
| 51         | 2402.791              | 2180.140              | 0.001041              | 0.0095                | 960.8                 | 105.641               | 279.5                 | 134.5                  | 414.0                 | 1.261                  | 1.679                 | 51         |
| 52         | 2457.176              | 2233.167              | 0.001048              | 0.0092                | 954.5                 | 108.848               | 281.3                 | 132.7                  | 414.0                 | 1.266                  | 1.678                 | 52         |
| 53         | 2512.465              | 2287.211              | 0.001055              | 0.0089                | 948.0                 | 112.169               | 283.1                 | 130.9                  | 414.0                 | 1.271                  | 1.676                 | 53         |
| 54         | 2568.662              | 2342.291              | 0.001062              | 0.0086                | 941.5                 | 115.610               | 284.9                 | 129.1                  | 414.0                 | 1.277                  | 1.674                 | 54         |
| 55         | 2625.779              | 2398.425              | 0.001070              | 0.0084                | 934.7                 | 119.179               | 286.8                 | 127.2                  | 413.9                 | 1.282                  | 1.673                 | 55         |
| 56         | 2683.826              | 2455.635              | 0.001078              | 0.0081                | 927.9                 | 122.882               | 288.6                 | 125.2                  | 413.8                 | 1.288                  | 1.671                 | 56         |
| 57         | 2742.812              | 2513.941              | 0.001086              | 0.0079                | 920.8                 | 126.729               | 290.5                 | 123.2                  | 413.7                 | 1.293                  | 1.669                 | 57         |
| 58         | 2802.748              | 2573.365              | 0.001095              | 0.0076                | 913.6                 | 130.729               | 292.4                 | 121.2                  | 413.6                 | 1.299                  | 1.668                 | 58         |
| 59         | 2863.643              | 2633.930              | 0.001103              | 0.0074                | 906.3                 | 134.893               | 294.3                 | 119.1                  | 413.4                 | 1.304                  | 1.666                 | 59         |
| 60         | 2925.507              | 2695.661              | 0.001113              | 0.0072                | 898.7                 | 139.232               | 296.3                 | 116.9                  | 413.2                 | 1.310                  | 1.664                 | 60         |
| 61         | 2988.349              | 2758.583              | 0.001122              | 0.0070                | 890.9                 | 143.759               | 298.2                 | 114.7                  | 413.0                 | 1.316                  | 1.662                 | 61         |
| 62         | 3052.179              | 2822.728              | 0.001133              | 0.0067                | 882.9                 | 148.490               | 300.2                 | 112.5                  | 412.7                 | 1.321                  | 1.659                 | 62         |
| 63         | 3117.006              | 2888.119              | 0.001143              | 0.0065                | 874.6                 | 153.441               | 302.3                 | 110.1                  | 412.4                 | 1.327                  | 1.657                 | 63         |
| 64         | 3182.838              | 2954.792              | 0.001155              | 0.0063                | 866.0                 | 158.632               | 304.3                 | 107.7                  | 412.0                 | 1.333                  | 1.655                 | 64         |
| 65         | 3249.685              | 3022.780              | 0.001167              | 0.0061                | 857.2                 | 164.084               | 306.4                 | 105.2                  | 411.6                 | 1.339                  | 1.652                 | 65         |
| 66         | 3317.553              | 3092.121              | 0.001179              | 0.0059                | 848.0                 | 169.824               | 308.5                 | 102.6                  | 411.2                 | 1.345                  | 1.650                 | 66         |
| 67         | 3386.449              | 3162.858              | 0.001193              | 0.0057                | 838.4                 | 175.881               | 310.7                 | 100.0                  | 410.7                 | 1.351                  | 1.647                 | 67         |
| 68         | 3456.379              | 3235.034              | 0.001207              | 0.0055                | 828.4                 | 182.291               | 312.9                 | 97.2                   | 410.1                 | 1.357                  | 1.644                 | 68         |
| 69         | 3527.346              | 3308.702              | 0.001223              | 0.0053                | 818.0                 | 189.098               | 315.2                 | 94.2                   | 409.4                 | 1.364                  | 1.641                 | 69         |
| 70         | 3599.350              | 3383.920              | 0.001239              | 0.0051                | 807.0                 | 196.352               | 317.5                 | 91.2                   | 408.7                 | 1.370                  | 1.638                 | 70         |
| 71         | 3672.390              | 3460.755              | 0.001257              | 0.0049                | 795.4                 | 204.117               | 319.9                 | 88.0                   | 407.9                 | 1.377                  | 1.635                 | 71         |
| 72         | 3746.456              | 3539.285              | 0.001277              | 0.0047                | 783.1                 | 212.473               | 322.4                 | 84.6                   | 407.0                 | 1.384                  | 1.631                 | 72         |
| 73         | 3821.535              | 3619.602              | 0.001299              | 0.0045                | 769.9                 | 221.522               | 325.0                 | 81.0                   | 405.9                 | 1.391                  | 1.627                 | 73         |
| 74         | 3897.595              | 3701.821              | 0.001323              | 0.0043                | 755.7                 | 231.400               | 327.7                 | 77.1                   | 404.8                 | 1.399                  | 1.622                 | 74         |
| 75         | 3974.589              | 3786.086              | 0.001351              | 0.0041                | 740.2                 | 242.290               | 330.5                 | 72.9                   | 403.4                 | 1.406                  | 1.617                 | 75         |
| 76         | 4052.434              | 3872.587              | 0.001383              | 0.0039                | 723.0                 | 254.453               | 333.5                 | 68.3                   | 401.8                 | 1.415                  | 1.612                 | 76         |
| 77         | 4130.986              | 3961.590              | 0.001421              | 0.0037                | 703.6                 | 268.283               | 336.8                 | 63.2                   | 400.0                 | 1.424                  | 1.605                 | 77         |
| 78         | 4209.967              | 4053.496              | 0.001468              | 0.0035                | 681.0                 | 284.419               | 340.4                 | 57.3                   | 397.7                 | 1.434                  | 1.598                 | 78         |
| 79         | 4288.774              | 4148.988              | 0.001531              | 0.0033                | 653.1                 | 304.039               | 344.6                 | 50.3                   | 394.9                 | 1.445                  | 1.589                 | 79         |
| 80         | 4365.740              | 4249.490              | 0.001626              | 0.0030                | 614.9                 | 329.798               | 350.0                 | 41.0                   | 391.1                 | 1.460                  | 1.577                 | 80         |



## Opteon® XP4o

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
| Temp<br>°C | 10     |                        |       | 20     |       |       | 30     |       |       | 40     |       |       | Temp<br>°C |  |  |
|            | -78.08 |                        |       | -68.32 |       |       | -62.03 |       |       | -57.27 |       |       |            |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 1.8438 | 353.5                  | 1.899 | 0.9628 | 359.4 | 1.863 | 0.0007 | 97.9  | 0.563 | 0.0007 | 97.9  | 0.563 |            |  |  |
| -75        | 1.8740 | 355.5                  | 1.909 |        |       |       |        |       |       |        |       |       | -75        |  |  |
| -70        | 1.9229 | 358.9                  | 1.926 |        |       |       |        |       |       |        |       |       | -70        |  |  |
| -65        | 1.9717 | 362.3                  | 1.943 | 0.9794 | 361.7 | 1.875 |        |       |       |        |       |       | -65        |  |  |
| -60        | 2.0203 | 365.8                  | 1.959 | 1.0042 | 365.2 | 1.891 | 0.6654 | 364.7 | 1.851 |        |       |       | -60        |  |  |
| -55        | 2.0688 | 369.2                  | 1.975 | 1.0289 | 368.8 | 1.908 | 0.6822 | 368.3 | 1.867 | 0.5088 | 367.8 | 1.838 | -55        |  |  |
| -50        | 2.1173 | 372.8                  | 1.991 | 1.0535 | 372.4 | 1.924 | 0.6989 | 371.9 | 1.884 | 0.5215 | 371.5 | 1.855 | -50        |  |  |
| -45        | 2.1656 | 376.3                  | 2.007 | 1.0780 | 376.0 | 1.940 | 0.7155 | 375.6 | 1.900 | 0.5342 | 375.2 | 1.871 | -45        |  |  |
| -40        | 2.2139 | 380.0                  | 2.023 | 1.1025 | 379.6 | 1.955 | 0.7320 | 379.2 | 1.916 | 0.5467 | 378.9 | 1.887 | -40        |  |  |
| -35        | 2.2621 | 383.6                  | 2.038 | 1.1269 | 383.3 | 1.971 | 0.7484 | 382.9 | 1.931 | 0.5592 | 382.6 | 1.903 | -35        |  |  |
| -30        | 2.3103 | 387.3                  | 2.054 | 1.1512 | 387.0 | 1.987 | 0.7648 | 386.7 | 1.947 | 0.5716 | 386.4 | 1.919 | -30        |  |  |
| -25        | 2.3584 | 391.0                  | 2.069 | 1.1755 | 390.7 | 2.002 | 0.7812 | 390.5 | 1.962 | 0.5840 | 390.2 | 1.934 | -25        |  |  |
| -20        | 2.4065 | 394.8                  | 2.084 | 1.1997 | 394.5 | 2.017 | 0.7975 | 394.3 | 1.978 | 0.5964 | 394.0 | 1.949 | -20        |  |  |
| -15        | 2.4545 | 398.6                  | 2.099 | 1.2240 | 398.4 | 2.032 | 0.8138 | 398.1 | 1.993 | 0.6087 | 397.9 | 1.964 | -15        |  |  |
| -10        | 2.5025 | 402.5                  | 2.114 | 1.2481 | 402.3 | 2.047 | 0.8300 | 402.0 | 2.008 | 0.6209 | 401.8 | 1.979 | -10        |  |  |
| -5         | 2.5505 | 406.4                  | 2.128 | 1.2723 | 406.2 | 2.062 | 0.8462 | 405.9 | 2.022 | 0.6332 | 405.7 | 1.994 | -5         |  |  |
| 0          | 2.5985 | 410.3                  | 2.143 | 1.2964 | 410.1 | 2.076 | 0.8624 | 409.9 | 2.037 | 0.6454 | 409.7 | 2.009 | 0          |  |  |
| 5          | 2.6464 | 414.3                  | 2.157 | 1.3205 | 414.1 | 2.091 | 0.8786 | 413.9 | 2.052 | 0.6576 | 413.7 | 2.024 | 5          |  |  |
| 10         | 2.6943 | 418.4                  | 2.172 | 1.3446 | 418.2 | 2.105 | 0.8947 | 418.0 | 2.066 | 0.6697 | 417.8 | 2.038 | 10         |  |  |
| 15         | 2.7422 | 422.4                  | 2.186 | 1.3687 | 422.3 | 2.119 | 0.9108 | 422.1 | 2.080 | 0.6819 | 421.9 | 2.052 | 15         |  |  |
| 20         | 2.7901 | 426.6                  | 2.200 | 1.3927 | 426.4 | 2.134 | 0.9269 | 426.2 | 2.095 | 0.6940 | 426.0 | 2.067 | 20         |  |  |
| 25         | 2.8380 | 430.7                  | 2.214 | 1.4168 | 430.6 | 2.148 | 0.9430 | 430.4 | 2.109 | 0.7062 | 430.2 | 2.081 | 25         |  |  |
| 30         | 2.8859 | 434.9                  | 2.228 | 1.4408 | 434.8 | 2.162 | 0.9591 | 434.6 | 2.123 | 0.7183 | 434.4 | 2.095 | 30         |  |  |
| 35         | 2.9337 | 439.2                  | 2.242 | 1.4648 | 439.0 | 2.176 | 0.9752 | 438.9 | 2.137 | 0.7304 | 438.7 | 2.109 | 35         |  |  |
| 40         | 2.9815 | 443.4                  | 2.256 | 1.4888 | 443.3 | 2.189 | 0.9912 | 443.2 | 2.150 | 0.7425 | 443.0 | 2.123 | 40         |  |  |
| 45         | 3.0294 | 447.8                  | 2.270 | 1.5128 | 447.6 | 2.203 | 1.0073 | 447.5 | 2.164 | 0.7545 | 447.4 | 2.136 | 45         |  |  |
| 50         | 3.0772 | 452.1                  | 2.283 | 1.5368 | 452.0 | 2.217 | 1.0233 | 451.9 | 2.178 | 0.7666 | 451.7 | 2.150 | 50         |  |  |
| 55         | 3.1250 | 456.5                  | 2.297 | 1.5608 | 456.4 | 2.230 | 1.0394 | 456.3 | 2.191 | 0.7787 | 456.2 | 2.164 | 55         |  |  |
| 60         | 3.1728 | 461.0                  | 2.310 | 1.5847 | 460.9 | 2.244 | 1.0554 | 460.7 | 2.205 | 0.7907 | 460.6 | 2.177 | 60         |  |  |
| 65         | 3.2206 | 465.5                  | 2.324 | 1.6087 | 465.4 | 2.257 | 1.0714 | 465.2 | 2.218 | 0.8027 | 465.1 | 2.191 | 65         |  |  |
| 70         | 3.2684 | 470.0                  | 2.337 | 1.6326 | 469.9 | 2.271 | 1.0874 | 469.8 | 2.232 | 0.8148 | 469.7 | 2.204 | 70         |  |  |





## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

| Absolute Pressure, kPa |        |       |       |        |       |       |        |       |       |        |       |       |            |
|------------------------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|
| Temp<br>°C             | 50     |       |       | 60     |       |       | 70     |       |       | 80     |       |       | Temp<br>°C |
|                        | -53.39 |       |       | -50.10 |       |       | -47.22 |       |       | -44.65 |       |       |            |
|                        | V      | H     | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |
|                        | 0.4081 | 368.5 | 1.820 | 0.3439 | 370.5 | 1.813 | 0.0007 | 128.8 | 0.712 | 0.0007 | 128.8 | 0.712 |            |
| -50                    | 0.4151 | 371.0 | 1.832 | 0.3441 | 370.6 | 1.813 |        |       |       |        |       |       | -50        |
| -45                    | 0.4254 | 374.8 | 1.848 | 0.3528 | 374.3 | 1.830 | 0.3009 | 373.9 | 1.813 |        |       |       | -45        |
| -40                    | 0.4355 | 378.5 | 1.865 | 0.3614 | 378.1 | 1.846 | 0.3084 | 377.7 | 1.830 | 0.2687 | 377.3 | 1.816 | -40        |
| -35                    | 0.4456 | 382.3 | 1.881 | 0.3699 | 381.9 | 1.862 | 0.3158 | 381.6 | 1.846 | 0.2753 | 381.2 | 1.832 | -35        |
| -30                    | 0.4557 | 386.0 | 1.896 | 0.3784 | 385.7 | 1.878 | 0.3232 | 385.4 | 1.862 | 0.2818 | 385.1 | 1.848 | -30        |
| -25                    | 0.4657 | 389.9 | 1.912 | 0.3868 | 389.6 | 1.894 | 0.3305 | 389.3 | 1.878 | 0.2882 | 389.0 | 1.864 | -25        |
| -20                    | 0.4757 | 393.7 | 1.927 | 0.3952 | 393.4 | 1.909 | 0.3377 | 393.2 | 1.893 | 0.2946 | 392.9 | 1.880 | -20        |
| -15                    | 0.4856 | 397.6 | 1.942 | 0.4035 | 397.4 | 1.924 | 0.3449 | 397.1 | 1.909 | 0.3010 | 396.8 | 1.895 | -15        |
| -10                    | 0.4955 | 401.5 | 1.957 | 0.4118 | 401.3 | 1.939 | 0.3521 | 401.1 | 1.924 | 0.3073 | 400.8 | 1.911 | -10        |
| -5                     | 0.5053 | 405.5 | 1.972 | 0.4201 | 405.3 | 1.954 | 0.3592 | 405.0 | 1.939 | 0.3136 | 404.8 | 1.926 | -5         |
| 0                      | 0.5152 | 409.5 | 1.987 | 0.4284 | 409.3 | 1.969 | 0.3663 | 409.1 | 1.954 | 0.3198 | 408.8 | 1.941 | 0          |
| 5                      | 0.5250 | 413.5 | 2.002 | 0.4366 | 413.3 | 1.984 | 0.3734 | 413.1 | 1.969 | 0.3261 | 412.9 | 1.955 | 5          |
| 10                     | 0.5348 | 417.6 | 2.016 | 0.4448 | 417.4 | 1.998 | 0.3805 | 417.2 | 1.983 | 0.3323 | 417.0 | 1.970 | 10         |
| 15                     | 0.5445 | 421.7 | 2.031 | 0.4530 | 421.5 | 2.013 | 0.3875 | 421.4 | 1.998 | 0.3385 | 421.2 | 1.985 | 15         |
| 20                     | 0.5543 | 425.9 | 2.045 | 0.4611 | 425.7 | 2.027 | 0.3946 | 425.5 | 2.012 | 0.3447 | 425.4 | 1.999 | 20         |
| 25                     | 0.5640 | 430.1 | 2.059 | 0.4693 | 429.9 | 2.041 | 0.4016 | 429.7 | 2.026 | 0.3508 | 429.6 | 2.013 | 25         |
| 30                     | 0.5738 | 434.3 | 2.073 | 0.4774 | 434.1 | 2.055 | 0.4086 | 434.0 | 2.040 | 0.3570 | 433.8 | 2.027 | 30         |
| 35                     | 0.5835 | 438.6 | 2.087 | 0.4855 | 438.4 | 2.069 | 0.4156 | 438.3 | 2.054 | 0.3631 | 438.1 | 2.041 | 35         |
| 40                     | 0.5932 | 442.9 | 2.101 | 0.4937 | 442.7 | 2.083 | 0.4226 | 442.6 | 2.068 | 0.3693 | 442.4 | 2.055 | 40         |
| 45                     | 0.6029 | 447.2 | 2.115 | 0.5018 | 447.1 | 2.097 | 0.4295 | 447.0 | 2.082 | 0.3754 | 446.8 | 2.069 | 45         |
| 50                     | 0.6126 | 451.6 | 2.129 | 0.5099 | 451.5 | 2.111 | 0.4365 | 451.4 | 2.096 | 0.3815 | 451.2 | 2.083 | 50         |
| 55                     | 0.6222 | 456.0 | 2.142 | 0.5179 | 455.9 | 2.125 | 0.4435 | 455.8 | 2.110 | 0.3876 | 455.7 | 2.097 | 55         |
| 60                     | 0.6319 | 460.5 | 2.156 | 0.5260 | 460.4 | 2.138 | 0.4504 | 460.3 | 2.123 | 0.3937 | 460.2 | 2.110 | 60         |
| 65                     | 0.6416 | 465.0 | 2.169 | 0.5341 | 464.9 | 2.151 | 0.4573 | 464.8 | 2.137 | 0.3998 | 464.7 | 2.124 | 65         |
| 70                     | 0.6512 | 469.6 | 2.182 | 0.5422 | 469.5 | 2.165 | 0.4643 | 469.3 | 2.150 | 0.4058 | 469.2 | 2.137 | 70         |
| 75                     | 0.6609 | 474.2 | 2.196 | 0.5502 | 474.0 | 2.178 | 0.4712 | 473.9 | 2.163 | 0.4119 | 473.8 | 2.150 | 75         |
| 80                     | 0.6705 | 478.8 | 2.209 | 0.5583 | 478.7 | 2.191 | 0.4781 | 478.6 | 2.176 | 0.4180 | 478.5 | 2.163 | 80         |
| 85                     | 0.6801 | 483.4 | 2.222 | 0.5663 | 483.3 | 2.204 | 0.4850 | 483.2 | 2.190 | 0.4240 | 483.1 | 2.177 | 85         |
| 90                     | 0.6898 | 488.2 | 2.235 | 0.5744 | 488.1 | 2.218 | 0.4919 | 488.0 | 2.203 | 0.4301 | 487.9 | 2.190 | 90         |
| 95                     | 0.6994 | 492.9 | 2.248 | 0.5824 | 492.8 | 2.231 | 0.4988 | 492.7 | 2.216 | 0.4362 | 492.6 | 2.203 | 95         |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |         |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|---------|-------|--------|-------|-------|------------|--|--|
|            |        | 90                     |       |        | 100   |       |        | 101.325 |       |        | 110   |       |            |  |  |
| Temp<br>°C | -42.32 |                        |       | -40.19 |       |       | -39.92 |         |       | -38.23 |       |       | Temp<br>°C |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H       | S     | V      | H     | S     |            |  |  |
|            | 0.2350 | 375.1                  | 1.796 | 0.2128 | 376.4 | 1.791 | 0.1382 | 294.6   | 1.438 | 0.0767 | 233.4 | 1.168 |            |  |  |
| -40        | 0.2378 | 376.9                  | 1.803 | 0.2130 | 376.5 | 1.792 |        |         |       |        |       |       | -40        |  |  |
| -35        | 0.2437 | 380.8                  | 1.820 | 0.2184 | 380.5 | 1.809 | 0.2154 | 380.4   | 1.807 | 0.1977 | 380.1 | 1.798 | -35        |  |  |
| -30        | 0.2495 | 384.7                  | 1.836 | 0.2237 | 384.4 | 1.825 | 0.2207 | 384.4   | 1.824 | 0.2026 | 384.1 | 1.815 | -30        |  |  |
| -25        | 0.2553 | 388.7                  | 1.852 | 0.2290 | 388.4 | 1.841 | 0.2259 | 388.3   | 1.840 | 0.2075 | 388.0 | 1.831 | -25        |  |  |
| -20        | 0.2611 | 392.6                  | 1.868 | 0.2342 | 392.3 | 1.857 | 0.2311 | 392.3   | 1.856 | 0.2123 | 392.0 | 1.847 | -20        |  |  |
| -15        | 0.2668 | 396.6                  | 1.883 | 0.2394 | 396.3 | 1.873 | 0.2362 | 396.3   | 1.871 | 0.2170 | 396.0 | 1.863 | -15        |  |  |
| -10        | 0.2724 | 400.6                  | 1.899 | 0.2445 | 400.3 | 1.888 | 0.2412 | 400.3   | 1.887 | 0.2217 | 400.1 | 1.878 | -10        |  |  |
| -5         | 0.2780 | 404.6                  | 1.914 | 0.2496 | 404.3 | 1.903 | 0.2463 | 404.3   | 1.902 | 0.2264 | 404.1 | 1.893 | -5         |  |  |
| 0          | 0.2837 | 408.6                  | 1.929 | 0.2547 | 408.4 | 1.918 | 0.2513 | 408.4   | 1.917 | 0.2310 | 408.2 | 1.908 | 0          |  |  |
| 5          | 0.2892 | 412.7                  | 1.944 | 0.2598 | 412.5 | 1.933 | 0.2563 | 412.5   | 1.932 | 0.2356 | 412.3 | 1.923 | 5          |  |  |
| 10         | 0.2948 | 416.8                  | 1.958 | 0.2648 | 416.6 | 1.948 | 0.2613 | 416.6   | 1.946 | 0.2402 | 416.4 | 1.938 | 10         |  |  |
| 15         | 0.3003 | 421.0                  | 1.973 | 0.2698 | 420.8 | 1.962 | 0.2662 | 420.8   | 1.961 | 0.2448 | 420.6 | 1.953 | 15         |  |  |
| 20         | 0.3058 | 425.2                  | 1.987 | 0.2748 | 425.0 | 1.977 | 0.2711 | 425.0   | 1.975 | 0.2494 | 424.8 | 1.967 | 20         |  |  |
| 25         | 0.3114 | 429.4                  | 2.002 | 0.2798 | 429.2 | 1.991 | 0.2760 | 429.2   | 1.990 | 0.2539 | 429.1 | 1.982 | 25         |  |  |
| 30         | 0.3168 | 433.7                  | 2.016 | 0.2847 | 433.5 | 2.005 | 0.2809 | 433.5   | 2.004 | 0.2584 | 433.4 | 1.996 | 30         |  |  |
| 35         | 0.3223 | 438.0                  | 2.030 | 0.2897 | 437.8 | 2.019 | 0.2858 | 437.8   | 2.018 | 0.2630 | 437.7 | 2.010 | 35         |  |  |
| 40         | 0.3278 | 442.3                  | 2.044 | 0.2946 | 442.2 | 2.033 | 0.2907 | 442.1   | 2.032 | 0.2675 | 442.0 | 2.024 | 40         |  |  |
| 45         | 0.3332 | 446.7                  | 2.058 | 0.2995 | 446.5 | 2.047 | 0.2956 | 446.5   | 2.046 | 0.2720 | 446.4 | 2.038 | 45         |  |  |
| 50         | 0.3387 | 451.1                  | 2.071 | 0.3045 | 451.0 | 2.061 | 0.3004 | 450.9   | 2.060 | 0.2765 | 450.8 | 2.052 | 50         |  |  |
| 55         | 0.3441 | 455.5                  | 2.085 | 0.3094 | 455.4 | 2.075 | 0.3053 | 455.4   | 2.073 | 0.2809 | 455.3 | 2.065 | 55         |  |  |
| 60         | 0.3496 | 460.0                  | 2.099 | 0.3143 | 459.9 | 2.088 | 0.3101 | 459.9   | 2.087 | 0.2854 | 459.8 | 2.079 | 60         |  |  |
| 65         | 0.3550 | 464.6                  | 2.112 | 0.3192 | 464.4 | 2.102 | 0.3150 | 464.4   | 2.101 | 0.2899 | 464.3 | 2.092 | 65         |  |  |
| 70         | 0.3604 | 469.1                  | 2.125 | 0.3241 | 469.0 | 2.115 | 0.3198 | 469.0   | 2.114 | 0.2943 | 468.9 | 2.106 | 70         |  |  |
| 75         | 0.3658 | 473.7                  | 2.139 | 0.3289 | 473.6 | 2.129 | 0.3246 | 473.6   | 2.127 | 0.2988 | 473.5 | 2.119 | 75         |  |  |
| 80         | 0.3712 | 478.4                  | 2.152 | 0.3338 | 478.3 | 2.142 | 0.3294 | 478.3   | 2.141 | 0.3032 | 478.2 | 2.132 | 80         |  |  |
| 85         | 0.3766 | 483.1                  | 2.165 | 0.3387 | 483.0 | 2.155 | 0.3342 | 482.9   | 2.154 | 0.3076 | 482.9 | 2.146 | 85         |  |  |
| 90         | 0.3820 | 487.8                  | 2.178 | 0.3435 | 487.7 | 2.168 | 0.3390 | 487.7   | 2.167 | 0.3121 | 487.6 | 2.159 | 90         |  |  |
| 95         | 0.3874 | 492.5                  | 2.191 | 0.3484 | 492.4 | 2.181 | 0.3438 | 492.4   | 2.180 | 0.3165 | 492.3 | 2.172 | 95         |  |  |
| 100        | 0.3928 | 497.3                  | 2.204 | 0.3533 | 497.2 | 2.194 | 0.3486 | 497.2   | 2.193 | 0.3209 | 497.1 | 2.185 | 100        |  |  |
| 105        | 0.3982 | 502.2                  | 2.217 | 0.3581 | 502.1 | 2.207 | 0.3534 | 502.1   | 2.206 | 0.3253 | 502.0 | 2.198 | 105        |  |  |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
| Temp<br>°C | 120    |                        |       | 130    |       |       | 140    |       |       | 150    |       |       | Temp<br>°C |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 0.1792 | 378.6                  | 1.784 | 0.1662 | 379.6 | 1.781 | 0.0790 | 265.6 | 1.296 | 0.0357 | 205.3 | 1.039 |            |  |  |
| -35        | 0.1805 | 379.7                  | 1.789 |        |       |       |        |       |       |        |       |       | -35        |  |  |
| -30        | 0.1850 | 383.7                  | 1.806 | 0.1701 | 383.4 | 1.797 | 0.1574 | 383.0 | 1.789 | 0.1463 | 382.7 | 1.781 | -30        |  |  |
| -25        | 0.1895 | 387.7                  | 1.822 | 0.1743 | 387.4 | 1.813 | 0.1613 | 387.1 | 1.805 | 0.1500 | 386.8 | 1.798 | -25        |  |  |
| -20        | 0.1940 | 391.7                  | 1.838 | 0.1785 | 391.4 | 1.829 | 0.1652 | 391.2 | 1.821 | 0.1537 | 390.9 | 1.814 | -20        |  |  |
| -15        | 0.1983 | 395.8                  | 1.854 | 0.1825 | 395.5 | 1.845 | 0.1690 | 395.2 | 1.837 | 0.1573 | 394.9 | 1.830 | -15        |  |  |
| -10        | 0.2027 | 399.8                  | 1.869 | 0.1866 | 399.6 | 1.861 | 0.1728 | 399.3 | 1.853 | 0.1608 | 399.0 | 1.846 | -10        |  |  |
| -5         | 0.2070 | 403.9                  | 1.884 | 0.1906 | 403.6 | 1.876 | 0.1765 | 403.4 | 1.868 | 0.1644 | 403.2 | 1.861 | -5         |  |  |
| 0          | 0.2113 | 408.0                  | 1.900 | 0.1946 | 407.8 | 1.891 | 0.1803 | 407.5 | 1.884 | 0.1678 | 407.3 | 1.876 | 0          |  |  |
| 5          | 0.2155 | 412.1                  | 1.915 | 0.1985 | 411.9 | 1.906 | 0.1840 | 411.7 | 1.899 | 0.1713 | 411.5 | 1.892 | 5          |  |  |
| 10         | 0.2198 | 416.3                  | 1.929 | 0.2025 | 416.1 | 1.921 | 0.1876 | 415.9 | 1.914 | 0.1748 | 415.7 | 1.907 | 10         |  |  |
| 15         | 0.2240 | 420.4                  | 1.944 | 0.2064 | 420.3 | 1.936 | 0.1913 | 420.1 | 1.928 | 0.1782 | 419.9 | 1.921 | 15         |  |  |
| 20         | 0.2282 | 424.7                  | 1.959 | 0.2103 | 424.5 | 1.950 | 0.1949 | 424.3 | 1.943 | 0.1816 | 424.1 | 1.936 | 20         |  |  |
| 25         | 0.2324 | 428.9                  | 1.973 | 0.2142 | 428.7 | 1.965 | 0.1985 | 428.6 | 1.957 | 0.1850 | 428.4 | 1.950 | 25         |  |  |
| 30         | 0.2366 | 433.2                  | 1.987 | 0.2180 | 433.0 | 1.979 | 0.2021 | 432.9 | 1.972 | 0.1884 | 432.7 | 1.965 | 30         |  |  |
| 35         | 0.2407 | 437.5                  | 2.001 | 0.2219 | 437.4 | 1.993 | 0.2057 | 437.2 | 1.986 | 0.1917 | 437.1 | 1.979 | 35         |  |  |
| 40         | 0.2449 | 441.9                  | 2.015 | 0.2257 | 441.7 | 2.007 | 0.2093 | 441.6 | 2.000 | 0.1951 | 441.4 | 1.993 | 40         |  |  |
| 45         | 0.2490 | 446.3                  | 2.029 | 0.2295 | 446.1 | 2.021 | 0.2129 | 446.0 | 2.014 | 0.1984 | 445.9 | 2.007 | 45         |  |  |
| 50         | 0.2531 | 450.7                  | 2.043 | 0.2334 | 450.6 | 2.035 | 0.2164 | 450.4 | 2.028 | 0.2018 | 450.3 | 2.021 | 50         |  |  |
| 55         | 0.2572 | 455.2                  | 2.057 | 0.2372 | 455.0 | 2.049 | 0.2200 | 454.9 | 2.042 | 0.2051 | 454.8 | 2.035 | 55         |  |  |
| 60         | 0.2613 | 459.7                  | 2.070 | 0.2410 | 459.5 | 2.062 | 0.2235 | 459.4 | 2.055 | 0.2084 | 459.3 | 2.048 | 60         |  |  |
| 65         | 0.2654 | 464.2                  | 2.084 | 0.2448 | 464.1 | 2.076 | 0.2271 | 464.0 | 2.069 | 0.2117 | 463.9 | 2.062 | 65         |  |  |
| 70         | 0.2695 | 468.8                  | 2.097 | 0.2486 | 468.7 | 2.089 | 0.2306 | 468.6 | 2.082 | 0.2150 | 468.5 | 2.075 | 70         |  |  |
| 75         | 0.2736 | 473.4                  | 2.111 | 0.2523 | 473.3 | 2.103 | 0.2341 | 473.2 | 2.096 | 0.2183 | 473.1 | 2.089 | 75         |  |  |
| 80         | 0.2777 | 478.1                  | 2.124 | 0.2561 | 478.0 | 2.116 | 0.2376 | 477.9 | 2.109 | 0.2216 | 477.7 | 2.102 | 80         |  |  |
| 85         | 0.2818 | 482.8                  | 2.137 | 0.2599 | 482.7 | 2.129 | 0.2411 | 482.6 | 2.122 | 0.2249 | 482.5 | 2.115 | 85         |  |  |
| 90         | 0.2858 | 487.5                  | 2.150 | 0.2636 | 487.4 | 2.142 | 0.2446 | 487.3 | 2.135 | 0.2281 | 487.2 | 2.128 | 90         |  |  |
| 95         | 0.2899 | 492.2                  | 2.163 | 0.2674 | 492.2 | 2.156 | 0.2481 | 492.1 | 2.148 | 0.2314 | 492.0 | 2.142 | 95         |  |  |
| 100        | 0.2940 | 497.1                  | 2.176 | 0.2712 | 497.0 | 2.168 | 0.2516 | 496.9 | 2.161 | 0.2347 | 496.8 | 2.154 | 100        |  |  |
| 105        | 0.2980 | 501.9                  | 2.189 | 0.2749 | 501.8 | 2.181 | 0.2551 | 501.7 | 2.174 | 0.2379 | 501.6 | 2.167 | 105        |  |  |
| 110        | 0.3021 | 506.8                  | 2.202 | 0.2787 | 506.7 | 2.194 | 0.2586 | 506.6 | 2.187 | 0.2412 | 506.5 | 2.180 | 110        |  |  |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|
| Temp<br>°C | 160    |                        |       | 170    |       |       | 180    |       |       | 190    |       |       | Temp<br>°C |
|            | -30.10 |                        |       | -28.72 |       |       | -27.40 |       |       | -26.14 |       |       |            |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |
|            | 0.1365 | 382.2                  | 1.773 | 0.1289 | 383.0 | 1.771 | 0.0732 | 291.4 | 1.391 | 0.0459 | 245.8 | 1.201 |            |
| -30        | 0.1366 | 382.3                  | 1.774 |        |       |       |        |       |       |        |       |       | -30        |
| -25        | 0.1401 | 386.4                  | 1.790 | 0.1314 | 386.1 | 1.784 | 0.1236 | 385.8 | 1.777 | 0.1167 | 385.4 | 1.771 | -25        |
| -20        | 0.1436 | 390.6                  | 1.807 | 0.1347 | 390.3 | 1.800 | 0.1268 | 389.9 | 1.794 | 0.1197 | 389.6 | 1.788 | -20        |
| -15        | 0.1470 | 394.7                  | 1.823 | 0.1379 | 394.4 | 1.816 | 0.1299 | 394.1 | 1.810 | 0.1226 | 393.8 | 1.804 | -15        |
| -10        | 0.1504 | 398.8                  | 1.839 | 0.1411 | 398.5 | 1.832 | 0.1329 | 398.3 | 1.826 | 0.1255 | 398.0 | 1.820 | -10        |
| -5         | 0.1537 | 402.9                  | 1.854 | 0.1443 | 402.7 | 1.848 | 0.1359 | 402.4 | 1.842 | 0.1284 | 402.2 | 1.836 | -5         |
| 0          | 0.1570 | 407.1                  | 1.870 | 0.1474 | 406.9 | 1.863 | 0.1389 | 406.6 | 1.857 | 0.1313 | 406.4 | 1.851 | 0          |
| 5          | 0.1603 | 411.3                  | 1.885 | 0.1505 | 411.0 | 1.879 | 0.1418 | 410.8 | 1.873 | 0.1341 | 410.6 | 1.867 | 5          |
| 10         | 0.1635 | 415.5                  | 1.900 | 0.1536 | 415.3 | 1.894 | 0.1447 | 415.1 | 1.888 | 0.1368 | 414.9 | 1.882 | 10         |
| 15         | 0.1667 | 419.7                  | 1.915 | 0.1566 | 419.5 | 1.908 | 0.1476 | 419.3 | 1.902 | 0.1396 | 419.1 | 1.897 | 15         |
| 20         | 0.1699 | 423.9                  | 1.929 | 0.1597 | 423.8 | 1.923 | 0.1505 | 423.6 | 1.917 | 0.1423 | 423.4 | 1.912 | 20         |
| 25         | 0.1731 | 428.2                  | 1.944 | 0.1627 | 428.1 | 1.938 | 0.1534 | 427.9 | 1.932 | 0.1451 | 427.7 | 1.926 | 25         |
| 30         | 0.1763 | 432.6                  | 1.958 | 0.1657 | 432.4 | 1.952 | 0.1562 | 432.2 | 1.946 | 0.1478 | 432.1 | 1.941 | 30         |
| 35         | 0.1795 | 436.9                  | 1.972 | 0.1687 | 436.8 | 1.966 | 0.1591 | 436.6 | 1.960 | 0.1505 | 436.4 | 1.955 | 35         |
| 40         | 0.1826 | 441.3                  | 1.987 | 0.1717 | 441.1 | 1.980 | 0.1619 | 441.0 | 1.975 | 0.1532 | 440.9 | 1.969 | 40         |
| 45         | 0.1858 | 445.7                  | 2.001 | 0.1746 | 445.6 | 1.994 | 0.1647 | 445.4 | 1.989 | 0.1558 | 445.3 | 1.983 | 45         |
| 50         | 0.1889 | 450.2                  | 2.014 | 0.1776 | 450.0 | 2.008 | 0.1675 | 449.9 | 2.003 | 0.1585 | 449.8 | 1.997 | 50         |
| 55         | 0.1920 | 454.7                  | 2.028 | 0.1805 | 454.5 | 2.022 | 0.1703 | 454.4 | 2.016 | 0.1612 | 454.3 | 2.011 | 55         |
| 60         | 0.1952 | 459.2                  | 2.042 | 0.1835 | 459.1 | 2.036 | 0.1731 | 458.9 | 2.030 | 0.1638 | 458.8 | 2.025 | 60         |
| 65         | 0.1983 | 463.7                  | 2.055 | 0.1864 | 463.6 | 2.049 | 0.1759 | 463.5 | 2.044 | 0.1664 | 463.4 | 2.038 | 65         |
| 70         | 0.2014 | 468.3                  | 2.069 | 0.1893 | 468.2 | 2.063 | 0.1786 | 468.1 | 2.057 | 0.1691 | 468.0 | 2.052 | 70         |
| 75         | 0.2045 | 473.0                  | 2.082 | 0.1923 | 472.9 | 2.076 | 0.1814 | 472.8 | 2.071 | 0.1717 | 472.6 | 2.065 | 75         |
| 80         | 0.2075 | 477.6                  | 2.096 | 0.1952 | 477.5 | 2.090 | 0.1842 | 477.4 | 2.084 | 0.1743 | 477.3 | 2.079 | 80         |
| 85         | 0.2106 | 482.4                  | 2.109 | 0.1981 | 482.2 | 2.103 | 0.1869 | 482.1 | 2.097 | 0.1769 | 482.0 | 2.092 | 85         |
| 90         | 0.2137 | 487.1                  | 2.122 | 0.2010 | 487.0 | 2.116 | 0.1897 | 486.9 | 2.110 | 0.1795 | 486.8 | 2.105 | 90         |
| 95         | 0.2168 | 491.9                  | 2.135 | 0.2039 | 491.8 | 2.129 | 0.1924 | 491.7 | 2.124 | 0.1821 | 491.6 | 2.118 | 95         |
| 100        | 0.2199 | 496.7                  | 2.148 | 0.2068 | 496.6 | 2.142 | 0.1951 | 496.5 | 2.137 | 0.1847 | 496.4 | 2.131 | 100        |
| 105        | 0.2229 | 501.5                  | 2.161 | 0.2097 | 501.5 | 2.155 | 0.1979 | 501.4 | 2.150 | 0.1873 | 501.3 | 2.144 | 105        |
| 110        | 0.2260 | 506.4                  | 2.174 | 0.2125 | 506.3 | 2.168 | 0.2006 | 506.3 | 2.162 | 0.1899 | 506.2 | 2.157 | 110        |
| 115        | 0.2290 | 511.4                  | 2.187 | 0.2154 | 511.3 | 2.181 | 0.2033 | 511.2 | 2.175 | 0.1925 | 511.1 | 2.170 | 115        |





## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

| Absolute Pressure, kPa |        |       |       |        |       |       |        |       |       |        |       |       |            |
|------------------------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|
| Temp<br>°C             | 200    |       |       | 210    |       |       | 220    |       |       | 230    |       |       | Temp<br>°C |
|                        | -24.93 |       |       | -23.77 |       |       | -22.65 |       |       | -21.56 |       |       |            |
|                        | V      | H     | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |
|                        | 0.1105 | 385.1 | 1.765 | 0.1054 | 385.8 | 1.764 | 0.0662 | 308.4 | 1.449 | 0.0470 | 270.7 | 1.295 |            |
| -20                    | 0.1133 | 389.3 | 1.782 | 0.1075 | 389.0 | 1.776 | 0.1023 | 388.7 | 1.771 | 0.0975 | 388.4 | 1.766 | -20        |
| -15                    | 0.1161 | 393.5 | 1.798 | 0.1103 | 393.3 | 1.793 | 0.1049 | 393.0 | 1.788 | 0.1000 | 392.7 | 1.783 | -15        |
| -10                    | 0.1189 | 397.7 | 1.815 | 0.1129 | 397.5 | 1.809 | 0.1075 | 397.2 | 1.804 | 0.1025 | 396.9 | 1.799 | -10        |
| -5                     | 0.1217 | 402.0 | 1.830 | 0.1156 | 401.7 | 1.825 | 0.1100 | 401.5 | 1.820 | 0.1050 | 401.2 | 1.815 | -5         |
| 0                      | 0.1244 | 406.2 | 1.846 | 0.1182 | 405.9 | 1.841 | 0.1125 | 405.7 | 1.836 | 0.1074 | 405.5 | 1.831 | 0          |
| 5                      | 0.1271 | 410.4 | 1.861 | 0.1207 | 410.2 | 1.856 | 0.1150 | 410.0 | 1.851 | 0.1097 | 409.8 | 1.846 | 5          |
| 10                     | 0.1297 | 414.7 | 1.876 | 0.1233 | 414.5 | 1.871 | 0.1174 | 414.3 | 1.866 | 0.1121 | 414.0 | 1.862 | 10         |
| 15                     | 0.1324 | 418.9 | 1.891 | 0.1258 | 418.7 | 1.886 | 0.1199 | 418.5 | 1.881 | 0.1144 | 418.4 | 1.877 | 15         |
| 20                     | 0.1350 | 423.2 | 1.906 | 0.1283 | 423.1 | 1.901 | 0.1223 | 422.9 | 1.896 | 0.1167 | 422.7 | 1.892 | 20         |
| 25                     | 0.1376 | 427.6 | 1.921 | 0.1308 | 427.4 | 1.916 | 0.1247 | 427.2 | 1.911 | 0.1190 | 427.0 | 1.906 | 25         |
| 30                     | 0.1402 | 431.9 | 1.935 | 0.1333 | 431.7 | 1.930 | 0.1270 | 431.6 | 1.925 | 0.1213 | 431.4 | 1.921 | 30         |
| 35                     | 0.1427 | 436.3 | 1.950 | 0.1357 | 436.1 | 1.945 | 0.1294 | 436.0 | 1.940 | 0.1236 | 435.8 | 1.935 | 35         |
| 40                     | 0.1453 | 440.7 | 1.964 | 0.1382 | 440.6 | 1.959 | 0.1317 | 440.4 | 1.954 | 0.1258 | 440.3 | 1.950 | 40         |
| 45                     | 0.1479 | 445.2 | 1.978 | 0.1406 | 445.0 | 1.973 | 0.1341 | 444.9 | 1.968 | 0.1281 | 444.7 | 1.964 | 45         |
| 50                     | 0.1504 | 449.6 | 1.992 | 0.1431 | 449.5 | 1.987 | 0.1364 | 449.4 | 1.982 | 0.1303 | 449.2 | 1.978 | 50         |
| 55                     | 0.1529 | 454.1 | 2.006 | 0.1455 | 454.0 | 2.001 | 0.1387 | 453.9 | 1.996 | 0.1325 | 453.8 | 1.992 | 55         |
| 60                     | 0.1554 | 458.7 | 2.020 | 0.1479 | 458.6 | 2.015 | 0.1410 | 458.4 | 2.010 | 0.1347 | 458.3 | 2.005 | 60         |
| 65                     | 0.1580 | 463.3 | 2.033 | 0.1503 | 463.2 | 2.028 | 0.1433 | 463.0 | 2.024 | 0.1369 | 462.9 | 2.019 | 65         |
| 70                     | 0.1605 | 467.9 | 2.047 | 0.1527 | 467.8 | 2.042 | 0.1456 | 467.7 | 2.037 | 0.1391 | 467.5 | 2.033 | 70         |
| 75                     | 0.1630 | 472.5 | 2.060 | 0.1551 | 472.4 | 2.055 | 0.1479 | 472.3 | 2.051 | 0.1413 | 472.2 | 2.046 | 75         |
| 80                     | 0.1655 | 477.2 | 2.074 | 0.1574 | 477.1 | 2.069 | 0.1502 | 477.0 | 2.064 | 0.1435 | 476.9 | 2.060 | 80         |
| 85                     | 0.1679 | 481.9 | 2.087 | 0.1598 | 481.8 | 2.082 | 0.1524 | 481.7 | 2.077 | 0.1457 | 481.6 | 2.073 | 85         |
| 90                     | 0.1704 | 486.7 | 2.100 | 0.1622 | 486.6 | 2.095 | 0.1547 | 486.5 | 2.091 | 0.1478 | 486.4 | 2.086 | 90         |
| 95                     | 0.1729 | 491.5 | 2.113 | 0.1646 | 491.4 | 2.108 | 0.1570 | 491.3 | 2.104 | 0.1500 | 491.2 | 2.099 | 95         |
| 100                    | 0.1754 | 496.3 | 2.126 | 0.1669 | 496.2 | 2.121 | 0.1592 | 496.1 | 2.117 | 0.1522 | 496.1 | 2.112 | 100        |
| 105                    | 0.1779 | 501.2 | 2.139 | 0.1693 | 501.1 | 2.134 | 0.1615 | 501.0 | 2.130 | 0.1543 | 500.9 | 2.125 | 105        |
| 110                    | 0.1803 | 506.1 | 2.152 | 0.1716 | 506.0 | 2.147 | 0.1637 | 505.9 | 2.143 | 0.1565 | 505.8 | 2.138 | 110        |
| 115                    | 0.1828 | 511.0 | 2.165 | 0.1740 | 510.9 | 2.160 | 0.1660 | 510.9 | 2.155 | 0.1586 | 510.8 | 2.151 | 115        |
| 120                    | 0.1852 | 516.0 | 2.178 | 0.1763 | 515.9 | 2.173 | 0.1682 | 515.8 | 2.168 | 0.1608 | 515.8 | 2.164 | 120        |
| 125                    | 0.1877 | 521.0 | 2.190 | 0.1787 | 520.9 | 2.185 | 0.1704 | 520.9 | 2.181 | 0.1629 | 520.8 | 2.176 | 125        |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

| Absolute Pressure, kPa |        |       |       |        |       |       |        |       |       |        |       |       |            |
|------------------------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|
| Temp<br>°C             | 240    |       |       | 250    |       |       | 260    |       |       | 270    |       |       | Temp<br>°C |
|                        | -20.52 |       |       | -19.50 |       |       | -18.52 |       |       | -17.57 |       |       |            |
|                        | V      | H     | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |
|                        | 0.0928 | 387.6 | 1.759 | 0.0893 | 388.1 | 1.757 | 0.0599 | 320.7 | 1.488 | 0.0454 | 288.1 | 1.357 |            |
| -20                    | 0.0931 | 388.0 | 1.761 |        |       |       |        |       |       |        |       |       | -20        |
| -15                    | 0.0955 | 392.4 | 1.778 | 0.0914 | 392.1 | 1.773 | 0.0876 | 391.8 | 1.768 | 0.0841 | 391.5 | 1.764 | -15        |
| -10                    | 0.0980 | 396.7 | 1.794 | 0.0938 | 396.4 | 1.789 | 0.0899 | 396.1 | 1.785 | 0.0863 | 395.8 | 1.780 | -10        |
| -5                     | 0.1003 | 401.0 | 1.810 | 0.0960 | 400.7 | 1.806 | 0.0921 | 400.5 | 1.801 | 0.0884 | 400.2 | 1.797 | -5         |
| 0                      | 0.1026 | 405.2 | 1.826 | 0.0983 | 405.0 | 1.822 | 0.0943 | 404.8 | 1.817 | 0.0905 | 404.5 | 1.813 | 0          |
| 5                      | 0.1049 | 409.5 | 1.842 | 0.1005 | 409.3 | 1.837 | 0.0964 | 409.1 | 1.833 | 0.0926 | 408.9 | 1.829 | 5          |
| 10                     | 0.1072 | 413.8 | 1.857 | 0.1027 | 413.6 | 1.853 | 0.0985 | 413.4 | 1.848 | 0.0947 | 413.2 | 1.844 | 10         |
| 15                     | 0.1094 | 418.2 | 1.872 | 0.1049 | 418.0 | 1.868 | 0.1006 | 417.8 | 1.863 | 0.0967 | 417.6 | 1.859 | 15         |
| 20                     | 0.1117 | 422.5 | 1.887 | 0.1070 | 422.3 | 1.883 | 0.1027 | 422.1 | 1.878 | 0.0987 | 422.0 | 1.874 | 20         |
| 25                     | 0.1139 | 426.9 | 1.902 | 0.1091 | 426.7 | 1.897 | 0.1048 | 426.5 | 1.893 | 0.1007 | 426.3 | 1.889 | 25         |
| 30                     | 0.1161 | 431.3 | 1.916 | 0.1112 | 431.1 | 1.912 | 0.1068 | 430.9 | 1.908 | 0.1027 | 430.8 | 1.904 | 30         |
| 35                     | 0.1182 | 435.7 | 1.931 | 0.1133 | 435.5 | 1.927 | 0.1088 | 435.4 | 1.922 | 0.1046 | 435.2 | 1.918 | 35         |
| 40                     | 0.1204 | 440.1 | 1.945 | 0.1154 | 440.0 | 1.941 | 0.1108 | 439.8 | 1.937 | 0.1066 | 439.7 | 1.933 | 40         |
| 45                     | 0.1226 | 444.6 | 1.959 | 0.1175 | 444.5 | 1.955 | 0.1128 | 444.3 | 1.951 | 0.1085 | 444.2 | 1.947 | 45         |
| 50                     | 0.1247 | 449.1 | 1.973 | 0.1196 | 449.0 | 1.969 | 0.1148 | 448.8 | 1.965 | 0.1104 | 448.7 | 1.961 | 50         |
| 55                     | 0.1268 | 453.6 | 1.987 | 0.1216 | 453.5 | 1.983 | 0.1168 | 453.4 | 1.979 | 0.1124 | 453.2 | 1.975 | 55         |
| 60                     | 0.1290 | 458.2 | 2.001 | 0.1237 | 458.1 | 1.997 | 0.1188 | 458.0 | 1.993 | 0.1143 | 457.8 | 1.989 | 60         |
| 65                     | 0.1311 | 462.8 | 2.015 | 0.1257 | 462.7 | 2.011 | 0.1207 | 462.6 | 2.007 | 0.1162 | 462.4 | 2.003 | 65         |
| 70                     | 0.1332 | 467.4 | 2.028 | 0.1277 | 467.3 | 2.024 | 0.1227 | 467.2 | 2.020 | 0.1180 | 467.1 | 2.016 | 70         |
| 75                     | 0.1353 | 472.1 | 2.042 | 0.1298 | 472.0 | 2.038 | 0.1247 | 471.9 | 2.034 | 0.1199 | 471.8 | 2.030 | 75         |
| 80                     | 0.1374 | 476.8 | 2.055 | 0.1318 | 476.7 | 2.051 | 0.1266 | 476.6 | 2.047 | 0.1218 | 476.5 | 2.043 | 80         |
| 85                     | 0.1395 | 481.5 | 2.069 | 0.1338 | 481.4 | 2.065 | 0.1285 | 481.3 | 2.061 | 0.1237 | 481.2 | 2.057 | 85         |
| 90                     | 0.1416 | 486.3 | 2.082 | 0.1358 | 486.2 | 2.078 | 0.1305 | 486.1 | 2.074 | 0.1255 | 486.0 | 2.070 | 90         |
| 95                     | 0.1437 | 491.1 | 2.095 | 0.1378 | 491.0 | 2.091 | 0.1324 | 490.9 | 2.087 | 0.1274 | 490.8 | 2.083 | 95         |
| 100                    | 0.1457 | 496.0 | 2.108 | 0.1398 | 495.9 | 2.104 | 0.1343 | 495.8 | 2.100 | 0.1293 | 495.7 | 2.096 | 100        |
| 105                    | 0.1478 | 500.8 | 2.121 | 0.1418 | 500.8 | 2.117 | 0.1362 | 500.7 | 2.113 | 0.1311 | 500.6 | 2.109 | 105        |
| 110                    | 0.1499 | 505.8 | 2.134 | 0.1438 | 505.7 | 2.130 | 0.1382 | 505.6 | 2.126 | 0.1330 | 505.5 | 2.122 | 110        |
| 115                    | 0.1519 | 510.7 | 2.147 | 0.1458 | 510.6 | 2.143 | 0.1401 | 510.5 | 2.139 | 0.1348 | 510.5 | 2.135 | 115        |
| 120                    | 0.1540 | 515.7 | 2.160 | 0.1478 | 515.6 | 2.156 | 0.1420 | 515.5 | 2.152 | 0.1366 | 515.4 | 2.148 | 120        |
| 125                    | 0.1561 | 520.7 | 2.172 | 0.1497 | 520.6 | 2.168 | 0.1439 | 520.5 | 2.164 | 0.1385 | 520.5 | 2.161 | 125        |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

| Absolute Pressure, kPa |        |       |       |        |       |       |        |       |       |        |       |       |            |
|------------------------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|
| Temp<br>°C             | 280    |       |       | 290    |       |       | 300    |       |       | 310    |       |       | Temp<br>°C |
|                        | -16.64 |       |       | -15.74 |       |       | -14.86 |       |       | -14.00 |       |       |            |
|                        | V      | H     | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |
|                        | 0.0801 | 389.7 | 1.754 | 0.0774 | 390.2 | 1.752 | 0.0545 | 330.1 | 1.516 | 0.0430 | 301.2 | 1.402 |            |
| -15                    | 0.0808 | 391.2 | 1.759 | 0.0777 | 390.8 | 1.755 |        |       |       |        |       |       | -15        |
| -10                    | 0.0829 | 395.6 | 1.776 | 0.0798 | 395.3 | 1.772 | 0.0769 | 395.0 | 1.768 | 0.0742 | 394.7 | 1.764 | -10        |
| -5                     | 0.0850 | 399.9 | 1.793 | 0.0819 | 399.7 | 1.789 | 0.0789 | 399.4 | 1.785 | 0.0761 | 399.1 | 1.781 | -5         |
| 0                      | 0.0871 | 404.3 | 1.809 | 0.0839 | 404.1 | 1.805 | 0.0809 | 403.8 | 1.801 | 0.0780 | 403.6 | 1.797 | 0          |
| 5                      | 0.0891 | 408.7 | 1.825 | 0.0858 | 408.4 | 1.821 | 0.0828 | 408.2 | 1.817 | 0.0799 | 408.0 | 1.813 | 5          |
| 10                     | 0.0911 | 413.0 | 1.840 | 0.0878 | 412.8 | 1.836 | 0.0846 | 412.6 | 1.832 | 0.0817 | 412.4 | 1.829 | 10         |
| 15                     | 0.0931 | 417.4 | 1.855 | 0.0897 | 417.2 | 1.852 | 0.0865 | 417.0 | 1.848 | 0.0835 | 416.8 | 1.844 | 15         |
| 20                     | 0.0950 | 421.8 | 1.870 | 0.0916 | 421.6 | 1.867 | 0.0883 | 421.4 | 1.863 | 0.0853 | 421.2 | 1.859 | 20         |
| 25                     | 0.0969 | 426.2 | 1.885 | 0.0934 | 426.0 | 1.882 | 0.0902 | 425.8 | 1.878 | 0.0871 | 425.6 | 1.874 | 25         |
| 30                     | 0.0988 | 430.6 | 1.900 | 0.0953 | 430.4 | 1.896 | 0.0920 | 430.3 | 1.893 | 0.0888 | 430.1 | 1.889 | 30         |
| 35                     | 0.1007 | 435.0 | 1.915 | 0.0971 | 434.9 | 1.911 | 0.0937 | 434.7 | 1.907 | 0.0906 | 434.6 | 1.904 | 35         |
| 40                     | 0.1026 | 439.5 | 1.929 | 0.0989 | 439.4 | 1.925 | 0.0955 | 439.2 | 1.922 | 0.0923 | 439.1 | 1.918 | 40         |
| 45                     | 0.1045 | 444.0 | 1.943 | 0.1008 | 443.9 | 1.940 | 0.0973 | 443.7 | 1.936 | 0.0940 | 443.6 | 1.933 | 45         |
| 50                     | 0.1064 | 448.6 | 1.957 | 0.1026 | 448.4 | 1.954 | 0.0990 | 448.3 | 1.950 | 0.0957 | 448.1 | 1.947 | 50         |
| 55                     | 0.1082 | 453.1 | 1.971 | 0.1044 | 453.0 | 1.968 | 0.1008 | 452.9 | 1.964 | 0.0974 | 452.7 | 1.961 | 55         |
| 60                     | 0.1101 | 457.7 | 1.985 | 0.1061 | 457.6 | 1.982 | 0.1025 | 457.5 | 1.978 | 0.0991 | 457.3 | 1.975 | 60         |
| 65                     | 0.1119 | 462.3 | 1.999 | 0.1079 | 462.2 | 1.995 | 0.1042 | 462.1 | 1.992 | 0.1007 | 462.0 | 1.989 | 65         |
| 70                     | 0.1137 | 467.0 | 2.013 | 0.1097 | 466.9 | 2.009 | 0.1059 | 466.7 | 2.006 | 0.1024 | 466.6 | 2.002 | 70         |
| 75                     | 0.1155 | 471.7 | 2.026 | 0.1114 | 471.6 | 2.023 | 0.1076 | 471.4 | 2.019 | 0.1041 | 471.3 | 2.016 | 75         |
| 80                     | 0.1174 | 476.4 | 2.040 | 0.1132 | 476.3 | 2.036 | 0.1093 | 476.2 | 2.033 | 0.1057 | 476.1 | 2.029 | 80         |
| 85                     | 0.1192 | 481.1 | 2.053 | 0.1150 | 481.0 | 2.050 | 0.1110 | 480.9 | 2.046 | 0.1074 | 480.8 | 2.043 | 85         |
| 90                     | 0.1210 | 485.9 | 2.066 | 0.1167 | 485.8 | 2.063 | 0.1127 | 485.7 | 2.059 | 0.1090 | 485.6 | 2.056 | 90         |
| 95                     | 0.1228 | 490.7 | 2.080 | 0.1184 | 490.6 | 2.076 | 0.1144 | 490.6 | 2.073 | 0.1106 | 490.5 | 2.069 | 95         |
| 100                    | 0.1246 | 495.6 | 2.093 | 0.1202 | 495.5 | 2.089 | 0.1161 | 495.4 | 2.086 | 0.1123 | 495.3 | 2.082 | 100        |
| 105                    | 0.1263 | 500.5 | 2.106 | 0.1219 | 500.4 | 2.102 | 0.1178 | 500.3 | 2.099 | 0.1139 | 500.2 | 2.095 | 105        |
| 110                    | 0.1281 | 505.4 | 2.119 | 0.1236 | 505.3 | 2.115 | 0.1194 | 505.2 | 2.112 | 0.1155 | 505.2 | 2.108 | 110        |
| 115                    | 0.1299 | 510.4 | 2.131 | 0.1254 | 510.3 | 2.128 | 0.1211 | 510.2 | 2.125 | 0.1171 | 510.1 | 2.121 | 115        |
| 120                    | 0.1317 | 515.4 | 2.144 | 0.1271 | 515.3 | 2.141 | 0.1228 | 515.2 | 2.137 | 0.1187 | 515.1 | 2.134 | 120        |
| 125                    | 0.1335 | 520.4 | 2.157 | 0.1288 | 520.3 | 2.153 | 0.1244 | 520.2 | 2.150 | 0.1203 | 520.2 | 2.147 | 125        |
| 130                    | 0.1352 | 525.5 | 2.170 | 0.1305 | 525.4 | 2.166 | 0.1261 | 525.3 | 2.163 | 0.1220 | 525.2 | 2.160 | 130        |



## Opteon® XP4o

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
|            |        | 320                    |       |        | 330   |       |        | 340   |       |        | 350   |       |            |  |  |
| Temp<br>°C | -13.17 |                        |       | -12.35 |       |       | -11.56 |       |       | -10.78 |       |       | Temp<br>°C |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 0.0704 | 391.6                  | 1.749 | 0.0684 | 392.0 | 1.748 | 0.0498 | 337.7 | 1.537 | 0.0406 | 311.6 | 1.435 |            |  |  |
| -10        | 0.0717 | 394.4                  | 1.760 | 0.0693 | 394.1 | 1.756 | 0.0670 | 393.8 | 1.753 | 0.0649 | 393.5 | 1.749 | -10        |  |  |
| -5         | 0.0736 | 398.9                  | 1.777 | 0.0711 | 398.6 | 1.773 | 0.0688 | 398.3 | 1.770 | 0.0667 | 398.1 | 1.766 | -5         |  |  |
| 0          | 0.0754 | 403.3                  | 1.793 | 0.0729 | 403.1 | 1.790 | 0.0706 | 402.8 | 1.786 | 0.0684 | 402.6 | 1.783 | 0          |  |  |
| 5          | 0.0772 | 407.7                  | 1.809 | 0.0747 | 407.5 | 1.806 | 0.0723 | 407.3 | 1.802 | 0.0701 | 407.1 | 1.799 | 5          |  |  |
| 10         | 0.0790 | 412.2                  | 1.825 | 0.0764 | 412.0 | 1.822 | 0.0740 | 411.7 | 1.818 | 0.0717 | 411.5 | 1.815 | 10         |  |  |
| 15         | 0.0808 | 416.6                  | 1.841 | 0.0782 | 416.4 | 1.837 | 0.0757 | 416.2 | 1.834 | 0.0734 | 416.0 | 1.830 | 15         |  |  |
| 20         | 0.0825 | 421.0                  | 1.856 | 0.0798 | 420.8 | 1.852 | 0.0773 | 420.6 | 1.849 | 0.0750 | 420.5 | 1.846 | 20         |  |  |
| 25         | 0.0842 | 425.5                  | 1.871 | 0.0815 | 425.3 | 1.868 | 0.0790 | 425.1 | 1.864 | 0.0766 | 424.9 | 1.861 | 25         |  |  |
| 30         | 0.0859 | 429.9                  | 1.886 | 0.0832 | 429.8 | 1.882 | 0.0806 | 429.6 | 1.879 | 0.0782 | 429.4 | 1.876 | 30         |  |  |
| 35         | 0.0876 | 434.4                  | 1.900 | 0.0848 | 434.3 | 1.897 | 0.0822 | 434.1 | 1.894 | 0.0797 | 433.9 | 1.891 | 35         |  |  |
| 40         | 0.0893 | 438.9                  | 1.915 | 0.0865 | 438.8 | 1.912 | 0.0838 | 438.6 | 1.908 | 0.0813 | 438.5 | 1.905 | 40         |  |  |
| 45         | 0.0909 | 443.5                  | 1.929 | 0.0881 | 443.3 | 1.926 | 0.0854 | 443.2 | 1.923 | 0.0828 | 443.0 | 1.920 | 45         |  |  |
| 50         | 0.0926 | 448.0                  | 1.943 | 0.0897 | 447.9 | 1.940 | 0.0869 | 447.7 | 1.937 | 0.0843 | 447.6 | 1.934 | 50         |  |  |
| 55         | 0.0942 | 452.6                  | 1.958 | 0.0913 | 452.5 | 1.954 | 0.0885 | 452.3 | 1.951 | 0.0858 | 452.2 | 1.948 | 55         |  |  |
| 60         | 0.0959 | 457.2                  | 1.972 | 0.0929 | 457.1 | 1.968 | 0.0900 | 457.0 | 1.965 | 0.0873 | 456.8 | 1.962 | 60         |  |  |
| 65         | 0.0975 | 461.8                  | 1.985 | 0.0944 | 461.7 | 1.982 | 0.0916 | 461.6 | 1.979 | 0.0888 | 461.5 | 1.976 | 65         |  |  |
| 70         | 0.0991 | 466.5                  | 1.999 | 0.0960 | 466.4 | 1.996 | 0.0931 | 466.3 | 1.993 | 0.0903 | 466.2 | 1.990 | 70         |  |  |
| 75         | 0.1007 | 471.2                  | 2.013 | 0.0976 | 471.1 | 2.009 | 0.0946 | 471.0 | 2.006 | 0.0918 | 470.9 | 2.003 | 75         |  |  |
| 80         | 0.1023 | 476.0                  | 2.026 | 0.0991 | 475.9 | 2.023 | 0.0961 | 475.7 | 2.020 | 0.0933 | 475.6 | 2.017 | 80         |  |  |
| 85         | 0.1039 | 480.7                  | 2.040 | 0.1007 | 480.6 | 2.036 | 0.0976 | 480.5 | 2.033 | 0.0948 | 480.4 | 2.030 | 85         |  |  |
| 90         | 0.1055 | 485.5                  | 2.053 | 0.1022 | 485.4 | 2.050 | 0.0991 | 485.3 | 2.047 | 0.0962 | 485.2 | 2.044 | 90         |  |  |
| 95         | 0.1071 | 490.4                  | 2.066 | 0.1038 | 490.3 | 2.063 | 0.1006 | 490.2 | 2.060 | 0.0977 | 490.1 | 2.057 | 95         |  |  |
| 100        | 0.1087 | 495.2                  | 2.079 | 0.1053 | 495.1 | 2.076 | 0.1021 | 495.0 | 2.073 | 0.0991 | 495.0 | 2.070 | 100        |  |  |
| 105        | 0.1102 | 500.1                  | 2.092 | 0.1068 | 500.0 | 2.089 | 0.1036 | 500.0 | 2.086 | 0.1006 | 499.9 | 2.083 | 105        |  |  |
| 110        | 0.1118 | 505.1                  | 2.105 | 0.1084 | 505.0 | 2.102 | 0.1051 | 504.9 | 2.099 | 0.1020 | 504.8 | 2.096 | 110        |  |  |
| 115        | 0.1134 | 510.0                  | 2.118 | 0.1099 | 510.0 | 2.115 | 0.1066 | 509.9 | 2.112 | 0.1035 | 509.8 | 2.109 | 115        |  |  |
| 120        | 0.1150 | 515.0                  | 2.131 | 0.1114 | 515.0 | 2.128 | 0.1081 | 514.9 | 2.125 | 0.1049 | 514.8 | 2.122 | 120        |  |  |
| 125        | 0.1165 | 520.1                  | 2.144 | 0.1129 | 520.0 | 2.141 | 0.1095 | 519.9 | 2.138 | 0.1063 | 519.8 | 2.135 | 125        |  |  |
| 130        | 0.1181 | 525.2                  | 2.156 | 0.1144 | 525.1 | 2.153 | 0.1110 | 525.0 | 2.150 | 0.1078 | 524.9 | 2.147 | 130        |  |  |
| 135        | 0.1196 | 530.3                  | 2.169 | 0.1159 | 530.2 | 2.166 | 0.1125 | 530.1 | 2.163 | 0.1092 | 530.0 | 2.160 | 135        |  |  |





## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
|            |        | 360                    |       |        | 370   |       |        | 380   |       |        | 390   |       |            |  |  |
| Temp<br>°C | -10.02 |                        |       | -9.27  |       |       | -8.54  |       |       | -7.83  |       |       | Temp<br>°C |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 0.0629 | 393.2                  | 1.745 | 0.0612 | 393.6 | 1.744 | 0.0459 | 343.9 | 1.554 | 0.0382 | 320.1 | 1.462 |            |  |  |
| -10        | 0.0629 | 393.2                  | 1.745 |        |       |       |        |       |       |        |       |       | -10        |  |  |
| -5         | 0.0646 | 397.8                  | 1.763 | 0.0627 | 397.5 | 1.759 | 0.0608 | 397.2 | 1.756 | 0.0591 | 397.0 | 1.753 | -5         |  |  |
| 0          | 0.0663 | 402.3                  | 1.779 | 0.0643 | 402.1 | 1.776 | 0.0625 | 401.8 | 1.773 | 0.0607 | 401.6 | 1.770 | 0          |  |  |
| 5          | 0.0680 | 406.8                  | 1.796 | 0.0660 | 406.6 | 1.792 | 0.0641 | 406.4 | 1.789 | 0.0623 | 406.1 | 1.786 | 5          |  |  |
| 10         | 0.0696 | 411.3                  | 1.812 | 0.0676 | 411.1 | 1.808 | 0.0656 | 410.9 | 1.805 | 0.0638 | 410.6 | 1.802 | 10         |  |  |
| 15         | 0.0712 | 415.8                  | 1.827 | 0.0691 | 415.6 | 1.824 | 0.0672 | 415.4 | 1.821 | 0.0653 | 415.2 | 1.818 | 15         |  |  |
| 20         | 0.0728 | 420.3                  | 1.843 | 0.0707 | 420.1 | 1.840 | 0.0687 | 419.9 | 1.837 | 0.0668 | 419.7 | 1.834 | 20         |  |  |
| 25         | 0.0743 | 424.8                  | 1.858 | 0.0722 | 424.6 | 1.855 | 0.0702 | 424.4 | 1.852 | 0.0682 | 424.2 | 1.849 | 25         |  |  |
| 30         | 0.0759 | 429.3                  | 1.873 | 0.0737 | 429.1 | 1.870 | 0.0716 | 428.9 | 1.867 | 0.0697 | 428.7 | 1.864 | 30         |  |  |
| 35         | 0.0774 | 433.8                  | 1.888 | 0.0752 | 433.6 | 1.885 | 0.0731 | 433.5 | 1.882 | 0.0711 | 433.3 | 1.879 | 35         |  |  |
| 40         | 0.0789 | 438.3                  | 1.902 | 0.0767 | 438.2 | 1.899 | 0.0745 | 438.0 | 1.896 | 0.0725 | 437.9 | 1.894 | 40         |  |  |
| 45         | 0.0804 | 442.9                  | 1.917 | 0.0781 | 442.7 | 1.914 | 0.0760 | 442.6 | 1.911 | 0.0739 | 442.4 | 1.908 | 45         |  |  |
| 50         | 0.0819 | 447.5                  | 1.931 | 0.0796 | 447.3 | 1.928 | 0.0774 | 447.2 | 1.925 | 0.0753 | 447.0 | 1.922 | 50         |  |  |
| 55         | 0.0834 | 452.1                  | 1.945 | 0.0810 | 451.9 | 1.942 | 0.0788 | 451.8 | 1.939 | 0.0767 | 451.7 | 1.937 | 55         |  |  |
| 60         | 0.0848 | 456.7                  | 1.959 | 0.0824 | 456.6 | 1.956 | 0.0802 | 456.4 | 1.953 | 0.0780 | 456.3 | 1.951 | 60         |  |  |
| 65         | 0.0863 | 461.4                  | 1.973 | 0.0839 | 461.2 | 1.970 | 0.0816 | 461.1 | 1.967 | 0.0794 | 461.0 | 1.965 | 65         |  |  |
| 70         | 0.0877 | 466.1                  | 1.987 | 0.0853 | 465.9 | 1.984 | 0.0829 | 465.8 | 1.981 | 0.0807 | 465.7 | 1.978 | 70         |  |  |
| 75         | 0.0892 | 470.8                  | 2.001 | 0.0867 | 470.7 | 1.998 | 0.0843 | 470.6 | 1.995 | 0.0821 | 470.4 | 1.992 | 75         |  |  |
| 80         | 0.0906 | 475.5                  | 2.014 | 0.0881 | 475.4 | 2.011 | 0.0857 | 475.3 | 2.008 | 0.0834 | 475.2 | 2.006 | 80         |  |  |
| 85         | 0.0920 | 480.3                  | 2.028 | 0.0895 | 480.2 | 2.025 | 0.0871 | 480.1 | 2.022 | 0.0847 | 480.0 | 2.019 | 85         |  |  |
| 90         | 0.0935 | 485.1                  | 2.041 | 0.0909 | 485.0 | 2.038 | 0.0884 | 484.9 | 2.035 | 0.0861 | 484.8 | 2.033 | 90         |  |  |
| 95         | 0.0949 | 490.0                  | 2.054 | 0.0923 | 489.9 | 2.051 | 0.0898 | 489.8 | 2.049 | 0.0874 | 489.7 | 2.046 | 95         |  |  |
| 100        | 0.0963 | 494.9                  | 2.067 | 0.0936 | 494.8 | 2.065 | 0.0911 | 494.7 | 2.062 | 0.0887 | 494.6 | 2.059 | 100        |  |  |
| 105        | 0.0977 | 499.8                  | 2.080 | 0.0950 | 499.7 | 2.078 | 0.0925 | 499.6 | 2.075 | 0.0900 | 499.5 | 2.072 | 105        |  |  |
| 110        | 0.0991 | 504.7                  | 2.093 | 0.0964 | 504.6 | 2.091 | 0.0938 | 504.6 | 2.088 | 0.0913 | 504.5 | 2.085 | 110        |  |  |
| 115        | 0.1005 | 509.7                  | 2.106 | 0.0978 | 509.6 | 2.104 | 0.0951 | 509.5 | 2.101 | 0.0926 | 509.5 | 2.098 | 115        |  |  |
| 120        | 0.1019 | 514.7                  | 2.119 | 0.0991 | 514.6 | 2.116 | 0.0965 | 514.6 | 2.114 | 0.0939 | 514.5 | 2.111 | 120        |  |  |
| 125        | 0.1033 | 519.8                  | 2.132 | 0.1005 | 519.7 | 2.129 | 0.0978 | 519.6 | 2.126 | 0.0952 | 519.5 | 2.124 | 125        |  |  |
| 130        | 0.1047 | 524.8                  | 2.145 | 0.1018 | 524.8 | 2.142 | 0.0991 | 524.7 | 2.139 | 0.0965 | 524.6 | 2.137 | 130        |  |  |
| 135        | 0.1061 | 530.0                  | 2.157 | 0.1032 | 529.9 | 2.154 | 0.1004 | 529.8 | 2.152 | 0.0978 | 529.7 | 2.149 | 135        |  |  |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

| Absolute Pressure, kPa |        |       |       |        |       |       |        |       |       |        |       |       |            |
|------------------------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|
| Temp<br>°C             | 400    |       |       | 425    |       |       | 450    |       |       | 475    |       |       | Temp<br>°C |
|                        | -7.12  |       |       | -5.43  |       |       | -3.80  |       |       | -2.25  |       |       |            |
|                        | V      | H     | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |
|                        | 0.0567 | 394.7 | 1.742 | 0.0535 | 395.5 | 1.740 | 0.0236 | 282.8 | 1.314 | 0.0085 | 223.0 | 1.088 |            |
| -5                     | 0.0574 | 396.7 | 1.749 | 0.0536 | 396.0 | 1.741 |        |       |       |        |       |       | -5         |
| 0                      | 0.0590 | 401.3 | 1.766 | 0.0551 | 400.6 | 1.759 | 0.0517 | 400.0 | 1.751 | 0.0486 | 399.3 | 1.744 | 0          |
| 5                      | 0.0605 | 405.9 | 1.783 | 0.0566 | 405.3 | 1.776 | 0.0531 | 404.7 | 1.768 | 0.0500 | 404.0 | 1.762 | 5          |
| 10                     | 0.0620 | 410.4 | 1.799 | 0.0581 | 409.9 | 1.792 | 0.0545 | 409.3 | 1.785 | 0.0513 | 408.7 | 1.778 | 10         |
| 15                     | 0.0635 | 415.0 | 1.815 | 0.0595 | 414.4 | 1.808 | 0.0558 | 413.9 | 1.801 | 0.0526 | 413.4 | 1.795 | 15         |
| 20                     | 0.0650 | 419.5 | 1.831 | 0.0608 | 419.0 | 1.824 | 0.0572 | 418.5 | 1.817 | 0.0539 | 418.0 | 1.811 | 20         |
| 25                     | 0.0664 | 424.0 | 1.846 | 0.0622 | 423.6 | 1.839 | 0.0585 | 423.1 | 1.832 | 0.0551 | 422.6 | 1.826 | 25         |
| 30                     | 0.0678 | 428.6 | 1.861 | 0.0635 | 428.1 | 1.854 | 0.0598 | 427.7 | 1.848 | 0.0564 | 427.3 | 1.842 | 30         |
| 35                     | 0.0692 | 433.1 | 1.876 | 0.0649 | 432.7 | 1.869 | 0.0610 | 432.3 | 1.863 | 0.0576 | 431.9 | 1.857 | 35         |
| 40                     | 0.0706 | 437.7 | 1.891 | 0.0662 | 437.3 | 1.884 | 0.0623 | 436.9 | 1.878 | 0.0588 | 436.5 | 1.872 | 40         |
| 45                     | 0.0720 | 442.3 | 1.905 | 0.0675 | 441.9 | 1.899 | 0.0635 | 441.5 | 1.892 | 0.0600 | 441.2 | 1.886 | 45         |
| 50                     | 0.0733 | 446.9 | 1.920 | 0.0688 | 446.5 | 1.913 | 0.0647 | 446.2 | 1.907 | 0.0611 | 445.8 | 1.901 | 50         |
| 55                     | 0.0747 | 451.5 | 1.934 | 0.0700 | 451.2 | 1.927 | 0.0660 | 450.9 | 1.921 | 0.0623 | 450.5 | 1.915 | 55         |
| 60                     | 0.0760 | 456.2 | 1.948 | 0.0713 | 455.9 | 1.942 | 0.0672 | 455.6 | 1.935 | 0.0634 | 455.2 | 1.930 | 60         |
| 65                     | 0.0773 | 460.9 | 1.962 | 0.0726 | 460.6 | 1.956 | 0.0684 | 460.3 | 1.949 | 0.0646 | 460.0 | 1.944 | 65         |
| 70                     | 0.0786 | 465.6 | 1.976 | 0.0738 | 465.3 | 1.969 | 0.0695 | 465.0 | 1.963 | 0.0657 | 464.7 | 1.958 | 70         |
| 75                     | 0.0800 | 470.3 | 1.990 | 0.0751 | 470.1 | 1.983 | 0.0707 | 469.8 | 1.977 | 0.0668 | 469.5 | 1.971 | 75         |
| 80                     | 0.0813 | 475.1 | 2.003 | 0.0763 | 474.8 | 1.997 | 0.0719 | 474.6 | 1.991 | 0.0680 | 474.3 | 1.985 | 80         |
| 85                     | 0.0826 | 479.9 | 2.017 | 0.0775 | 479.6 | 2.010 | 0.0731 | 479.4 | 2.004 | 0.0691 | 479.1 | 1.999 | 85         |
| 90                     | 0.0839 | 484.7 | 2.030 | 0.0788 | 484.5 | 2.024 | 0.0742 | 484.2 | 2.018 | 0.0702 | 484.0 | 2.012 | 90         |
| 95                     | 0.0851 | 489.6 | 2.043 | 0.0800 | 489.4 | 2.037 | 0.0754 | 489.1 | 2.031 | 0.0713 | 488.9 | 2.026 | 95         |
| 100                    | 0.0864 | 494.5 | 2.057 | 0.0812 | 494.3 | 2.050 | 0.0765 | 494.0 | 2.044 | 0.0724 | 493.8 | 2.039 | 100        |
| 105                    | 0.0877 | 499.4 | 2.070 | 0.0824 | 499.2 | 2.063 | 0.0777 | 499.0 | 2.058 | 0.0735 | 498.7 | 2.052 | 105        |
| 110                    | 0.0890 | 504.4 | 2.083 | 0.0836 | 504.2 | 2.076 | 0.0788 | 503.9 | 2.071 | 0.0746 | 503.7 | 2.065 | 110        |
| 115                    | 0.0903 | 509.4 | 2.096 | 0.0848 | 509.2 | 2.089 | 0.0800 | 509.0 | 2.084 | 0.0756 | 508.7 | 2.078 | 115        |
| 120                    | 0.0915 | 514.4 | 2.108 | 0.0860 | 514.2 | 2.102 | 0.0811 | 514.0 | 2.096 | 0.0767 | 513.8 | 2.091 | 120        |
| 125                    | 0.0928 | 519.5 | 2.121 | 0.0872 | 519.3 | 2.115 | 0.0822 | 519.1 | 2.109 | 0.0778 | 518.9 | 2.104 | 125        |
| 130                    | 0.0941 | 524.5 | 2.134 | 0.0884 | 524.4 | 2.128 | 0.0834 | 524.2 | 2.122 | 0.0789 | 524.0 | 2.117 | 130        |
| 135                    | 0.0953 | 529.7 | 2.147 | 0.0896 | 529.5 | 2.140 | 0.0845 | 529.3 | 2.135 | 0.0799 | 529.1 | 2.129 | 135        |
| 140                    | 0.0966 | 534.8 | 2.159 | 0.0908 | 534.6 | 2.153 | 0.0856 | 534.5 | 2.147 | 0.0810 | 534.3 | 2.142 | 140        |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
| Temp<br>°C | 500    |                        |       | 525    |       |       | 550    |       |       | 575    |       |       | Temp<br>°C |  |  |
|            | -0.75  |                        |       | 0.68   |       |       | 2.07   |       |       | 3.41   |       |       |            |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 0.0456 | 397.9                  | 1.735 | 0.0435 | 398.6 | 1.733 | 0.0225 | 303.8 | 1.383 | 0.0120 | 255.5 | 1.204 |            |  |  |
| 0          | 0.0458 | 398.6                  | 1.737 |        |       |       |        |       |       |        |       |       | 0          |  |  |
| 5          | 0.0472 | 403.4                  | 1.755 | 0.0446 | 402.8 | 1.748 | 0.0423 | 402.1 | 1.742 | 0.0401 | 401.4 | 1.736 | 5          |  |  |
| 10         | 0.0484 | 408.1                  | 1.772 | 0.0458 | 407.6 | 1.766 | 0.0435 | 407.0 | 1.760 | 0.0413 | 406.3 | 1.754 | 10         |  |  |
| 15         | 0.0497 | 412.8                  | 1.788 | 0.0471 | 412.3 | 1.782 | 0.0446 | 411.7 | 1.776 | 0.0424 | 411.2 | 1.771 | 15         |  |  |
| 20         | 0.0509 | 417.5                  | 1.804 | 0.0482 | 417.0 | 1.798 | 0.0458 | 416.5 | 1.793 | 0.0436 | 416.0 | 1.787 | 20         |  |  |
| 25         | 0.0521 | 422.2                  | 1.820 | 0.0494 | 421.7 | 1.814 | 0.0469 | 421.2 | 1.809 | 0.0447 | 420.7 | 1.803 | 25         |  |  |
| 30         | 0.0533 | 426.8                  | 1.836 | 0.0505 | 426.4 | 1.830 | 0.0480 | 425.9 | 1.824 | 0.0457 | 425.5 | 1.819 | 30         |  |  |
| 35         | 0.0545 | 431.5                  | 1.851 | 0.0517 | 431.1 | 1.845 | 0.0491 | 430.6 | 1.840 | 0.0468 | 430.2 | 1.834 | 35         |  |  |
| 40         | 0.0556 | 436.1                  | 1.866 | 0.0528 | 435.7 | 1.860 | 0.0502 | 435.3 | 1.855 | 0.0478 | 434.9 | 1.850 | 40         |  |  |
| 45         | 0.0568 | 440.8                  | 1.881 | 0.0539 | 440.4 | 1.875 | 0.0512 | 440.0 | 1.870 | 0.0488 | 439.7 | 1.865 | 45         |  |  |
| 50         | 0.0579 | 445.5                  | 1.895 | 0.0549 | 445.1 | 1.890 | 0.0523 | 444.8 | 1.884 | 0.0498 | 444.4 | 1.879 | 50         |  |  |
| 55         | 0.0590 | 450.2                  | 1.910 | 0.0560 | 449.8 | 1.904 | 0.0533 | 449.5 | 1.899 | 0.0508 | 449.2 | 1.894 | 55         |  |  |
| 60         | 0.0601 | 454.9                  | 1.924 | 0.0571 | 454.6 | 1.919 | 0.0543 | 454.3 | 1.913 | 0.0518 | 453.9 | 1.908 | 60         |  |  |
| 65         | 0.0612 | 459.6                  | 1.938 | 0.0581 | 459.3 | 1.933 | 0.0553 | 459.0 | 1.928 | 0.0528 | 458.7 | 1.923 | 65         |  |  |
| 70         | 0.0623 | 464.4                  | 1.952 | 0.0591 | 464.1 | 1.947 | 0.0563 | 463.8 | 1.942 | 0.0537 | 463.5 | 1.937 | 70         |  |  |
| 75         | 0.0633 | 469.2                  | 1.966 | 0.0602 | 468.9 | 1.961 | 0.0573 | 468.6 | 1.956 | 0.0547 | 468.3 | 1.951 | 75         |  |  |
| 80         | 0.0644 | 474.0                  | 1.980 | 0.0612 | 473.7 | 1.974 | 0.0583 | 473.5 | 1.969 | 0.0556 | 473.2 | 1.965 | 80         |  |  |
| 85         | 0.0655 | 478.9                  | 1.993 | 0.0622 | 478.6 | 1.988 | 0.0593 | 478.3 | 1.983 | 0.0566 | 478.1 | 1.978 | 85         |  |  |
| 90         | 0.0665 | 483.7                  | 2.007 | 0.0632 | 483.5 | 2.002 | 0.0602 | 483.2 | 1.997 | 0.0575 | 483.0 | 1.992 | 90         |  |  |
| 95         | 0.0676 | 488.6                  | 2.020 | 0.0642 | 488.4 | 2.015 | 0.0612 | 488.1 | 2.010 | 0.0584 | 487.9 | 2.005 | 95         |  |  |
| 100        | 0.0686 | 493.6                  | 2.033 | 0.0652 | 493.3 | 2.028 | 0.0622 | 493.1 | 2.023 | 0.0593 | 492.9 | 2.019 | 100        |  |  |
| 105        | 0.0697 | 498.5                  | 2.047 | 0.0662 | 498.3 | 2.042 | 0.0631 | 498.1 | 2.037 | 0.0603 | 497.8 | 2.032 | 105        |  |  |
| 110        | 0.0707 | 503.5                  | 2.060 | 0.0672 | 503.3 | 2.055 | 0.0641 | 503.1 | 2.050 | 0.0612 | 502.9 | 2.045 | 110        |  |  |
| 115        | 0.0717 | 508.5                  | 2.073 | 0.0682 | 508.3 | 2.068 | 0.0650 | 508.1 | 2.063 | 0.0621 | 507.9 | 2.058 | 115        |  |  |
| 120        | 0.0728 | 513.6                  | 2.086 | 0.0692 | 513.4 | 2.081 | 0.0660 | 513.2 | 2.076 | 0.0630 | 513.0 | 2.071 | 120        |  |  |
| 125        | 0.0738 | 518.7                  | 2.099 | 0.0702 | 518.5 | 2.094 | 0.0669 | 518.3 | 2.089 | 0.0639 | 518.1 | 2.084 | 125        |  |  |
| 130        | 0.0748 | 523.8                  | 2.111 | 0.0712 | 523.6 | 2.106 | 0.0678 | 523.4 | 2.102 | 0.0648 | 523.2 | 2.097 | 130        |  |  |
| 135        | 0.0759 | 528.9                  | 2.124 | 0.0721 | 528.7 | 2.119 | 0.0688 | 528.6 | 2.114 | 0.0657 | 528.4 | 2.110 | 135        |  |  |
| 140        | 0.0769 | 534.1                  | 2.137 | 0.0731 | 533.9 | 2.132 | 0.0697 | 533.7 | 2.127 | 0.0666 | 533.6 | 2.122 | 140        |  |  |
| 145        | 0.0779 | 539.3                  | 2.149 | 0.0741 | 539.1 | 2.144 | 0.0706 | 539.0 | 2.139 | 0.0675 | 538.8 | 2.135 | 145        |  |  |



## Opteon® XP4o

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
| Temp<br>°C | 600    |                        |       | 625    |       |       | 650    |       |       | 675    |       |       | Temp<br>°C |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 0.0381 | 400.5                  | 1.729 | 0.0366 | 401.0 | 1.728 | 0.0209 | 318.7 | 1.430 | 0.0131 | 277.5 | 1.280 |            |  |  |
| 5          | 0.0382 | 400.7                  | 1.730 |        |       |       |        |       |       |        |       |       | 5          |  |  |
| 10         | 0.0393 | 405.7                  | 1.748 | 0.0375 | 405.1 | 1.742 | 0.0358 | 404.4 | 1.737 | 0.0342 | 403.8 | 1.731 | 10         |  |  |
| 15         | 0.0404 | 410.6                  | 1.765 | 0.0386 | 410.0 | 1.760 | 0.0369 | 409.4 | 1.754 | 0.0353 | 408.8 | 1.749 | 15         |  |  |
| 20         | 0.0415 | 415.4                  | 1.782 | 0.0396 | 414.9 | 1.776 | 0.0379 | 414.4 | 1.771 | 0.0363 | 413.8 | 1.766 | 20         |  |  |
| 25         | 0.0426 | 420.2                  | 1.798 | 0.0407 | 419.7 | 1.793 | 0.0389 | 419.2 | 1.788 | 0.0372 | 418.7 | 1.783 | 25         |  |  |
| 30         | 0.0436 | 425.0                  | 1.814 | 0.0417 | 424.5 | 1.809 | 0.0399 | 424.1 | 1.804 | 0.0382 | 423.6 | 1.799 | 30         |  |  |
| 35         | 0.0446 | 429.8                  | 1.829 | 0.0426 | 429.3 | 1.824 | 0.0408 | 428.9 | 1.820 | 0.0391 | 428.4 | 1.815 | 35         |  |  |
| 40         | 0.0456 | 434.5                  | 1.845 | 0.0436 | 434.1 | 1.840 | 0.0418 | 433.7 | 1.835 | 0.0401 | 433.3 | 1.830 | 40         |  |  |
| 45         | 0.0466 | 439.3                  | 1.860 | 0.0446 | 438.9 | 1.855 | 0.0427 | 438.5 | 1.850 | 0.0410 | 438.1 | 1.846 | 45         |  |  |
| 50         | 0.0476 | 444.0                  | 1.874 | 0.0455 | 443.7 | 1.870 | 0.0436 | 443.3 | 1.865 | 0.0418 | 442.9 | 1.861 | 50         |  |  |
| 55         | 0.0485 | 448.8                  | 1.889 | 0.0464 | 448.5 | 1.884 | 0.0445 | 448.1 | 1.880 | 0.0427 | 447.8 | 1.876 | 55         |  |  |
| 60         | 0.0495 | 453.6                  | 1.904 | 0.0473 | 453.3 | 1.899 | 0.0454 | 452.9 | 1.895 | 0.0436 | 452.6 | 1.890 | 60         |  |  |
| 65         | 0.0504 | 458.4                  | 1.918 | 0.0483 | 458.1 | 1.913 | 0.0463 | 457.8 | 1.909 | 0.0444 | 457.4 | 1.905 | 65         |  |  |
| 70         | 0.0513 | 463.2                  | 1.932 | 0.0492 | 462.9 | 1.928 | 0.0471 | 462.6 | 1.923 | 0.0453 | 462.3 | 1.919 | 70         |  |  |
| 75         | 0.0523 | 468.1                  | 1.946 | 0.0500 | 467.8 | 1.942 | 0.0480 | 467.5 | 1.937 | 0.0461 | 467.2 | 1.933 | 75         |  |  |
| 80         | 0.0532 | 472.9                  | 1.960 | 0.0509 | 472.6 | 1.955 | 0.0488 | 472.4 | 1.951 | 0.0469 | 472.1 | 1.947 | 80         |  |  |
| 85         | 0.0541 | 477.8                  | 1.974 | 0.0518 | 477.5 | 1.969 | 0.0497 | 477.3 | 1.965 | 0.0477 | 477.0 | 1.961 | 85         |  |  |
| 90         | 0.0550 | 482.7                  | 1.987 | 0.0527 | 482.5 | 1.983 | 0.0505 | 482.2 | 1.979 | 0.0486 | 481.9 | 1.975 | 90         |  |  |
| 95         | 0.0559 | 487.7                  | 2.001 | 0.0535 | 487.4 | 1.996 | 0.0514 | 487.2 | 1.992 | 0.0494 | 486.9 | 1.988 | 95         |  |  |
| 100        | 0.0568 | 492.6                  | 2.014 | 0.0544 | 492.4 | 2.010 | 0.0522 | 492.1 | 2.006 | 0.0502 | 491.9 | 2.002 | 100        |  |  |
| 105        | 0.0576 | 497.6                  | 2.027 | 0.0552 | 497.4 | 2.023 | 0.0530 | 497.2 | 2.019 | 0.0510 | 496.9 | 2.015 | 105        |  |  |
| 110        | 0.0585 | 502.6                  | 2.041 | 0.0561 | 502.4 | 2.036 | 0.0538 | 502.2 | 2.032 | 0.0518 | 502.0 | 2.028 | 110        |  |  |
| 115        | 0.0594 | 507.7                  | 2.054 | 0.0569 | 507.5 | 2.049 | 0.0547 | 507.3 | 2.045 | 0.0525 | 507.0 | 2.041 | 115        |  |  |
| 120        | 0.0603 | 512.8                  | 2.067 | 0.0578 | 512.6 | 2.063 | 0.0555 | 512.4 | 2.058 | 0.0533 | 512.1 | 2.054 | 120        |  |  |
| 125        | 0.0611 | 517.9                  | 2.080 | 0.0586 | 517.7 | 2.075 | 0.0563 | 517.5 | 2.071 | 0.0541 | 517.3 | 2.067 | 125        |  |  |
| 130        | 0.0620 | 523.0                  | 2.093 | 0.0595 | 522.8 | 2.088 | 0.0571 | 522.6 | 2.084 | 0.0549 | 522.4 | 2.080 | 130        |  |  |
| 135        | 0.0629 | 528.2                  | 2.105 | 0.0603 | 528.0 | 2.101 | 0.0579 | 527.8 | 2.097 | 0.0557 | 527.6 | 2.093 | 135        |  |  |
| 140        | 0.0637 | 533.4                  | 2.118 | 0.0611 | 533.2 | 2.114 | 0.0587 | 533.0 | 2.110 | 0.0564 | 532.8 | 2.106 | 140        |  |  |
| 145        | 0.0646 | 538.6                  | 2.131 | 0.0619 | 538.4 | 2.126 | 0.0595 | 538.3 | 2.122 | 0.0572 | 538.1 | 2.118 | 145        |  |  |
| 150        | 0.0655 | 543.9                  | 2.143 | 0.0628 | 543.7 | 2.139 | 0.0603 | 543.5 | 2.135 | 0.0580 | 543.4 | 2.131 | 150        |  |  |





## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

| Absolute Pressure, kPa |        |       |       |        |       |       |        |       |       |        |       |       |            |
|------------------------|--------|-------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|
| Temp<br>°C             | 700    |       |       | 725    |       |       | 750    |       |       | 775    |       |       | Temp<br>°C |
|                        | 9.52   |       |       | 10.64  |       |       | 11.73  |       |       | 12.79  |       |       |            |
|                        | V      | H     | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |
|                        | 0.0326 | 402.6 | 1.724 | 0.0315 | 403.1 | 1.723 | 0.0192 | 330.0 | 1.463 | 0.0131 | 293.8 | 1.333 |            |
| 10                     | 0.0327 | 403.1 | 1.726 |        |       |       |        |       |       |        |       |       | 10         |
| 15                     | 0.0338 | 408.2 | 1.744 | 0.0324 | 407.6 | 1.739 | 0.0311 | 407.0 | 1.734 | 0.0299 | 406.4 | 1.729 | 15         |
| 20                     | 0.0348 | 413.3 | 1.761 | 0.0334 | 412.7 | 1.756 | 0.0321 | 412.1 | 1.752 | 0.0308 | 411.6 | 1.747 | 20         |
| 25                     | 0.0357 | 418.2 | 1.778 | 0.0343 | 417.7 | 1.773 | 0.0330 | 417.2 | 1.769 | 0.0317 | 416.6 | 1.764 | 25         |
| 30                     | 0.0367 | 423.1 | 1.794 | 0.0352 | 422.6 | 1.790 | 0.0339 | 422.2 | 1.785 | 0.0326 | 421.7 | 1.781 | 30         |
| 35                     | 0.0376 | 428.0 | 1.810 | 0.0361 | 427.5 | 1.806 | 0.0347 | 427.1 | 1.801 | 0.0335 | 426.6 | 1.797 | 35         |
| 40                     | 0.0385 | 432.9 | 1.826 | 0.0370 | 432.4 | 1.822 | 0.0356 | 432.0 | 1.817 | 0.0343 | 431.6 | 1.813 | 40         |
| 45                     | 0.0393 | 437.7 | 1.841 | 0.0378 | 437.3 | 1.837 | 0.0364 | 436.9 | 1.833 | 0.0351 | 436.5 | 1.829 | 45         |
| 50                     | 0.0402 | 442.6 | 1.856 | 0.0387 | 442.2 | 1.852 | 0.0372 | 441.8 | 1.848 | 0.0359 | 441.4 | 1.844 | 50         |
| 55                     | 0.0410 | 447.4 | 1.871 | 0.0395 | 447.0 | 1.867 | 0.0380 | 446.7 | 1.863 | 0.0367 | 446.3 | 1.859 | 55         |
| 60                     | 0.0419 | 452.3 | 1.886 | 0.0403 | 451.9 | 1.882 | 0.0388 | 451.6 | 1.878 | 0.0375 | 451.2 | 1.874 | 60         |
| 65                     | 0.0427 | 457.1 | 1.900 | 0.0411 | 456.8 | 1.896 | 0.0396 | 456.5 | 1.892 | 0.0382 | 456.1 | 1.889 | 65         |
| 70                     | 0.0435 | 462.0 | 1.915 | 0.0419 | 461.7 | 1.911 | 0.0404 | 461.4 | 1.907 | 0.0390 | 461.1 | 1.903 | 70         |
| 75                     | 0.0443 | 466.9 | 1.929 | 0.0427 | 466.6 | 1.925 | 0.0412 | 466.3 | 1.921 | 0.0397 | 466.0 | 1.917 | 75         |
| 80                     | 0.0451 | 471.8 | 1.943 | 0.0435 | 471.5 | 1.939 | 0.0419 | 471.2 | 1.935 | 0.0405 | 471.0 | 1.931 | 80         |
| 85                     | 0.0459 | 476.7 | 1.957 | 0.0442 | 476.5 | 1.953 | 0.0427 | 476.2 | 1.949 | 0.0412 | 475.9 | 1.945 | 85         |
| 90                     | 0.0467 | 481.7 | 1.971 | 0.0450 | 481.4 | 1.967 | 0.0434 | 481.2 | 1.963 | 0.0419 | 480.9 | 1.959 | 90         |
| 95                     | 0.0475 | 486.7 | 1.984 | 0.0458 | 486.4 | 1.980 | 0.0442 | 486.2 | 1.977 | 0.0426 | 485.9 | 1.973 | 95         |
| 100                    | 0.0483 | 491.7 | 1.998 | 0.0465 | 491.4 | 1.994 | 0.0449 | 491.2 | 1.990 | 0.0434 | 490.9 | 1.987 | 100        |
| 105                    | 0.0491 | 496.7 | 2.011 | 0.0473 | 496.5 | 2.007 | 0.0456 | 496.2 | 2.004 | 0.0441 | 496.0 | 2.000 | 105        |
| 110                    | 0.0498 | 501.7 | 2.024 | 0.0480 | 501.5 | 2.021 | 0.0463 | 501.3 | 2.017 | 0.0448 | 501.1 | 2.013 | 110        |
| 115                    | 0.0506 | 506.8 | 2.037 | 0.0488 | 506.6 | 2.034 | 0.0471 | 506.4 | 2.030 | 0.0455 | 506.2 | 2.027 | 115        |
| 120                    | 0.0513 | 511.9 | 2.051 | 0.0495 | 511.7 | 2.047 | 0.0478 | 511.5 | 2.043 | 0.0462 | 511.3 | 2.040 | 120        |
| 125                    | 0.0521 | 517.1 | 2.064 | 0.0502 | 516.9 | 2.060 | 0.0485 | 516.7 | 2.056 | 0.0469 | 516.5 | 2.053 | 125        |
| 130                    | 0.0529 | 522.2 | 2.076 | 0.0510 | 522.0 | 2.073 | 0.0492 | 521.8 | 2.069 | 0.0475 | 521.7 | 2.066 | 130        |
| 135                    | 0.0536 | 527.4 | 2.089 | 0.0517 | 527.2 | 2.086 | 0.0499 | 527.1 | 2.082 | 0.0482 | 526.9 | 2.078 | 135        |
| 140                    | 0.0544 | 532.7 | 2.102 | 0.0524 | 532.5 | 2.098 | 0.0506 | 532.3 | 2.095 | 0.0489 | 532.1 | 2.091 | 140        |
| 145                    | 0.0551 | 537.9 | 2.115 | 0.0531 | 537.7 | 2.111 | 0.0513 | 537.6 | 2.107 | 0.0496 | 537.4 | 2.104 | 145        |
| 150                    | 0.0558 | 543.2 | 2.127 | 0.0539 | 543.0 | 2.123 | 0.0520 | 542.9 | 2.120 | 0.0503 | 542.7 | 2.117 | 150        |
| 155                    | 0.0566 | 548.5 | 2.140 | 0.0546 | 548.3 | 2.136 | 0.0527 | 548.2 | 2.132 | 0.0509 | 548.0 | 2.129 | 155        |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
|            |        | 800                    |       |        | 900   |       |        | 1000  |       |        | 1100  |       |            |  |  |
| Temp<br>°C | 13.83  |                        |       | 17.75  |       |       | 21.35  |       |       | 24.69  |       |       | Temp<br>°C |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 0.0285 | 404.5                  | 1.720 | 0.0253 | 406.1 | 1.716 | 0.0009 | 220.0 | 1.070 | 0.0009 | 220.0 | 1.070 |            |  |  |
| 15         | 0.0287 | 405.7                  | 1.724 |        |       |       |        |       |       |        |       |       | 15         |  |  |
| 20         | 0.0297 | 411.0                  | 1.742 | 0.0257 | 408.5 | 1.725 |        |       |       |        |       |       | 20         |  |  |
| 25         | 0.0306 | 416.1                  | 1.760 | 0.0265 | 413.9 | 1.743 | 0.0233 | 411.5 | 1.727 | 0.0205 | 409.0 | 1.711 | 25         |  |  |
| 30         | 0.0314 | 421.2                  | 1.777 | 0.0273 | 419.1 | 1.760 | 0.0240 | 417.0 | 1.745 | 0.0213 | 414.7 | 1.730 | 30         |  |  |
| 35         | 0.0323 | 426.2                  | 1.793 | 0.0281 | 424.3 | 1.777 | 0.0248 | 422.3 | 1.762 | 0.0220 | 420.2 | 1.748 | 35         |  |  |
| 40         | 0.0331 | 431.1                  | 1.809 | 0.0289 | 429.4 | 1.794 | 0.0255 | 427.5 | 1.779 | 0.0227 | 425.6 | 1.765 | 40         |  |  |
| 45         | 0.0339 | 436.1                  | 1.825 | 0.0296 | 434.4 | 1.810 | 0.0262 | 432.7 | 1.795 | 0.0234 | 430.9 | 1.782 | 45         |  |  |
| 50         | 0.0347 | 441.0                  | 1.840 | 0.0303 | 439.5 | 1.825 | 0.0269 | 437.9 | 1.811 | 0.0240 | 436.2 | 1.798 | 50         |  |  |
| 55         | 0.0354 | 446.0                  | 1.855 | 0.0310 | 444.5 | 1.841 | 0.0275 | 443.0 | 1.827 | 0.0246 | 441.4 | 1.814 | 55         |  |  |
| 60         | 0.0362 | 450.9                  | 1.870 | 0.0317 | 449.5 | 1.856 | 0.0282 | 448.1 | 1.843 | 0.0253 | 446.6 | 1.830 | 60         |  |  |
| 65         | 0.0369 | 455.8                  | 1.885 | 0.0324 | 454.5 | 1.871 | 0.0288 | 453.1 | 1.858 | 0.0259 | 451.7 | 1.845 | 65         |  |  |
| 70         | 0.0377 | 460.8                  | 1.899 | 0.0331 | 459.5 | 1.885 | 0.0294 | 458.2 | 1.873 | 0.0264 | 456.9 | 1.861 | 70         |  |  |
| 75         | 0.0384 | 465.7                  | 1.914 | 0.0338 | 464.5 | 1.900 | 0.0301 | 463.3 | 1.887 | 0.0270 | 462.0 | 1.875 | 75         |  |  |
| 80         | 0.0391 | 470.7                  | 1.928 | 0.0344 | 469.5 | 1.914 | 0.0307 | 468.3 | 1.902 | 0.0276 | 467.2 | 1.890 | 80         |  |  |
| 85         | 0.0398 | 475.6                  | 1.942 | 0.0351 | 474.5 | 1.928 | 0.0313 | 473.4 | 1.916 | 0.0281 | 472.3 | 1.905 | 85         |  |  |
| 90         | 0.0405 | 480.6                  | 1.956 | 0.0357 | 479.6 | 1.942 | 0.0318 | 478.5 | 1.930 | 0.0287 | 477.4 | 1.919 | 90         |  |  |
| 95         | 0.0412 | 485.7                  | 1.969 | 0.0363 | 484.7 | 1.956 | 0.0324 | 483.6 | 1.944 | 0.0292 | 482.6 | 1.933 | 95         |  |  |
| 100        | 0.0419 | 490.7                  | 1.983 | 0.0370 | 489.7 | 1.970 | 0.0330 | 488.7 | 1.958 | 0.0298 | 487.7 | 1.947 | 100        |  |  |
| 105        | 0.0426 | 495.8                  | 1.996 | 0.0376 | 494.8 | 1.983 | 0.0336 | 493.9 | 1.972 | 0.0303 | 492.9 | 1.961 | 105        |  |  |
| 110        | 0.0433 | 500.9                  | 2.010 | 0.0382 | 500.0 | 1.997 | 0.0341 | 499.0 | 1.985 | 0.0308 | 498.1 | 1.974 | 110        |  |  |
| 115        | 0.0440 | 506.0                  | 2.023 | 0.0388 | 505.1 | 2.010 | 0.0347 | 504.2 | 1.998 | 0.0313 | 503.3 | 1.988 | 115        |  |  |
| 120        | 0.0447 | 511.1                  | 2.036 | 0.0394 | 510.3 | 2.023 | 0.0353 | 509.4 | 2.012 | 0.0319 | 508.6 | 2.001 | 120        |  |  |
| 125        | 0.0453 | 516.3                  | 2.049 | 0.0400 | 515.5 | 2.037 | 0.0358 | 514.6 | 2.025 | 0.0324 | 513.8 | 2.014 | 125        |  |  |
| 130        | 0.0460 | 521.5                  | 2.062 | 0.0406 | 520.7 | 2.050 | 0.0364 | 519.9 | 2.038 | 0.0329 | 519.1 | 2.028 | 130        |  |  |
| 135        | 0.0467 | 526.7                  | 2.075 | 0.0412 | 525.9 | 2.063 | 0.0369 | 525.2 | 2.051 | 0.0334 | 524.4 | 2.041 | 135        |  |  |
| 140        | 0.0473 | 531.9                  | 2.088 | 0.0418 | 531.2 | 2.075 | 0.0375 | 530.4 | 2.064 | 0.0339 | 529.7 | 2.054 | 140        |  |  |
| 145        | 0.0480 | 537.2                  | 2.101 | 0.0424 | 536.5 | 2.088 | 0.0380 | 535.8 | 2.077 | 0.0344 | 535.0 | 2.066 | 145        |  |  |
| 150        | 0.0486 | 542.5                  | 2.113 | 0.0430 | 541.8 | 2.101 | 0.0385 | 541.1 | 2.090 | 0.0349 | 540.4 | 2.079 | 150        |  |  |
| 155        | 0.0493 | 547.8                  | 2.126 | 0.0436 | 547.2 | 2.113 | 0.0391 | 546.5 | 2.102 | 0.0354 | 545.8 | 2.092 | 155        |  |  |
| 160        | 0.0499 | 553.2                  | 2.138 | 0.0442 | 552.6 | 2.126 | 0.0396 | 551.9 | 2.115 | 0.0359 | 551.2 | 2.104 | 160        |  |  |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |        |       |        |        |       |        |        |       |       |            |  |
|------------|--------|------------------------|-------|--------|--------|-------|--------|--------|-------|--------|--------|-------|-------|------------|--|
|            |        | 1200                   |       |        | 1300   |       |        | 1400   |       |        | 1500   |       |       |            |  |
| Temp<br>°C |        | 27.81                  |       |        | 30.73  |       |        | 33.49  |       |        | 36.10  |       |       | Temp<br>°C |  |
|            | V      | H                      | S     | V      | H      | S     | V      | H      | S     | V      | H      | S     |       |            |  |
|            | 30     | 409.7                  | 1.706 | 1.715  | 0.0171 | 410.5 | 1.703  | 0.0009 | 241.1 | 1.141  | 0.0009 | 241.1 | 1.140 |            |  |
| 30         | 35     | 412.2                  | 1.715 |        |        |       |        |        |       |        |        |       |       | 30         |  |
| 35         | 40     | 418.0                  | 1.734 | 0.0177 | 415.7  | 1.720 | 0.0160 | 413.2  | 1.707 |        |        |       |       | 35         |  |
| 40         | 45     | 423.6                  | 1.752 | 0.0184 | 421.5  | 1.739 | 0.0167 | 419.3  | 1.726 | 0.0152 | 416.9  | 1.714 | 1.714 | 40         |  |
| 45         | 50     | 429.1                  | 1.769 | 0.0190 | 427.1  | 1.757 | 0.0173 | 425.1  | 1.745 | 0.0158 | 423.0  | 1.733 | 1.733 | 45         |  |
| 50         | 55     | 434.5                  | 1.786 | 0.0196 | 432.7  | 1.774 | 0.0179 | 430.8  | 1.763 | 0.0163 | 428.9  | 1.751 | 1.751 | 50         |  |
| 55         | 60     | 439.8                  | 1.802 | 0.0202 | 438.1  | 1.791 | 0.0184 | 436.4  | 1.780 | 0.0169 | 434.6  | 1.769 | 1.769 | 55         |  |
| 60         | 65     | 445.1                  | 1.818 | 0.0207 | 443.5  | 1.807 | 0.0190 | 441.9  | 1.796 | 0.0174 | 440.3  | 1.786 | 1.786 | 60         |  |
| 65         | 70     | 450.3                  | 1.834 | 0.0213 | 448.9  | 1.823 | 0.0195 | 447.4  | 1.813 | 0.0179 | 445.8  | 1.803 | 1.803 | 65         |  |
| 70         | 75     | 455.5                  | 1.849 | 0.0218 | 454.2  | 1.839 | 0.0200 | 452.8  | 1.828 | 0.0184 | 451.3  | 1.819 | 1.819 | 70         |  |
| 75         | 80     | 460.7                  | 1.864 | 0.0223 | 459.4  | 1.854 | 0.0205 | 458.1  | 1.844 | 0.0189 | 456.8  | 1.834 | 1.834 | 75         |  |
| 80         | 85     | 465.9                  | 1.879 | 0.0228 | 464.7  | 1.869 | 0.0210 | 463.5  | 1.859 | 0.0193 | 462.2  | 1.850 | 1.850 | 80         |  |
| 85         | 90     | 471.1                  | 1.894 | 0.0233 | 470.0  | 1.884 | 0.0214 | 468.8  | 1.874 | 0.0198 | 467.6  | 1.865 | 1.865 | 85         |  |
| 90         | 95     | 476.3                  | 1.908 | 0.0238 | 475.2  | 1.898 | 0.0219 | 474.1  | 1.889 | 0.0202 | 472.9  | 1.880 | 1.880 | 90         |  |
| 95         | 100    | 481.5                  | 1.922 | 0.0243 | 480.5  | 1.913 | 0.0224 | 479.4  | 1.903 | 0.0207 | 478.3  | 1.895 | 1.895 | 95         |  |
| 100        | 105    | 486.7                  | 1.936 | 0.0248 | 485.7  | 1.927 | 0.0228 | 484.7  | 1.918 | 0.0211 | 483.6  | 1.909 | 1.909 | 100        |  |
| 105        | 110    | 492.0                  | 1.950 | 0.0252 | 491.0  | 1.941 | 0.0232 | 490.0  | 1.932 | 0.0215 | 489.0  | 1.923 | 1.923 | 105        |  |
| 110        | 115    | 497.2                  | 1.964 | 0.0257 | 496.2  | 1.955 | 0.0237 | 495.3  | 1.946 | 0.0219 | 494.3  | 1.937 | 1.937 | 110        |  |
| 115        | 120    | 502.4                  | 1.978 | 0.0261 | 501.5  | 1.968 | 0.0241 | 500.6  | 1.960 | 0.0223 | 499.7  | 1.951 | 1.951 | 115        |  |
| 120        | 125    | 507.7                  | 1.991 | 0.0266 | 506.8  | 1.982 | 0.0245 | 505.9  | 1.973 | 0.0227 | 505.1  | 1.965 | 1.965 | 120        |  |
| 125        | 130    | 513.0                  | 2.005 | 0.0270 | 512.1  | 1.995 | 0.0250 | 511.3  | 1.987 | 0.0231 | 510.4  | 1.979 | 1.979 | 125        |  |
| 130        | 135    | 518.3                  | 2.018 | 0.0275 | 517.5  | 2.009 | 0.0254 | 516.7  | 2.000 | 0.0235 | 515.8  | 1.992 | 1.992 | 130        |  |
| 135        | 140    | 523.6                  | 2.031 | 0.0279 | 522.8  | 2.022 | 0.0258 | 522.0  | 2.013 | 0.0239 | 521.2  | 2.005 | 2.005 | 135        |  |
| 140        | 145    | 529.0                  | 2.044 | 0.0284 | 528.2  | 2.035 | 0.0262 | 527.4  | 2.026 | 0.0243 | 526.7  | 2.019 | 2.019 | 140        |  |
| 145        | 150    | 534.3                  | 2.057 | 0.0288 | 533.6  | 2.048 | 0.0266 | 532.9  | 2.040 | 0.0247 | 532.1  | 2.032 | 2.032 | 145        |  |
| 150        | 155    | 539.7                  | 2.070 | 0.0292 | 539.0  | 2.061 | 0.0270 | 538.3  | 2.052 | 0.0251 | 537.6  | 2.045 | 2.045 | 150        |  |
| 155        | 160    | 545.1                  | 2.082 | 0.0297 | 544.4  | 2.074 | 0.0274 | 543.8  | 2.065 | 0.0255 | 543.1  | 2.057 | 2.057 | 155        |  |
| 160        | 165    | 550.6                  | 2.095 | 0.0301 | 549.9  | 2.086 | 0.0278 | 549.2  | 2.078 | 0.0258 | 548.6  | 2.070 | 2.070 | 160        |  |
| 165        | 170    | 556.0                  | 2.108 | 0.0305 | 555.4  | 2.099 | 0.0282 | 554.8  | 2.091 | 0.0262 | 554.1  | 2.083 | 2.083 | 165        |  |
| 170        | 175    | 561.5                  | 2.120 | 0.0309 | 560.9  | 2.111 | 0.0286 | 560.3  | 2.103 | 0.0266 | 559.7  | 2.096 | 2.096 | 170        |  |
| 175        | 0.0341 | 567.1                  | 2.132 | 0.0313 | 566.4  | 2.124 | 0.0290 | 565.8  | 2.116 | 0.0270 | 565.2  | 2.108 | 2.108 | 175        |  |



## Opteon® XP4o

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|
| Temp<br>°C | 1600   |                        |       | 1700   |       |       | 1800   |       |       | 2000   |       |       | Temp<br>°C |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |
|            | 0.0136 | 412.5                  | 1.695 | 0.0127 | 413.0 | 1.692 | 0.0010 | 258.3 | 1.196 | 0.0010 | 258.2 | 1.195 |            |  |
| 40         | 0.0138 | 414.4                  | 1.701 |        |       |       |        |       |       |        |       |       | 40         |  |
| 45         | 0.0144 | 420.8                  | 1.721 | 0.0132 | 418.4 | 1.709 | 0.0121 | 415.9 | 1.697 |        |       |       | 45         |  |
| 50         | 0.0150 | 426.9                  | 1.740 | 0.0138 | 424.8 | 1.729 | 0.0127 | 422.5 | 1.718 | 0.0108 | 417.6 | 1.696 | 50         |  |
| 55         | 0.0155 | 432.8                  | 1.758 | 0.0143 | 430.9 | 1.748 | 0.0132 | 428.9 | 1.738 | 0.0114 | 424.5 | 1.717 | 55         |  |
| 60         | 0.0160 | 438.6                  | 1.776 | 0.0148 | 436.8 | 1.766 | 0.0137 | 435.0 | 1.756 | 0.0119 | 431.1 | 1.737 | 60         |  |
| 65         | 0.0165 | 444.3                  | 1.793 | 0.0153 | 442.6 | 1.783 | 0.0142 | 440.9 | 1.774 | 0.0123 | 437.4 | 1.756 | 65         |  |
| 70         | 0.0170 | 449.8                  | 1.809 | 0.0158 | 448.3 | 1.800 | 0.0147 | 446.8 | 1.791 | 0.0128 | 443.5 | 1.774 | 70         |  |
| 75         | 0.0175 | 455.4                  | 1.825 | 0.0162 | 454.0 | 1.816 | 0.0151 | 452.5 | 1.808 | 0.0132 | 449.5 | 1.791 | 75         |  |
| 80         | 0.0179 | 460.9                  | 1.841 | 0.0167 | 459.5 | 1.832 | 0.0155 | 458.2 | 1.824 | 0.0136 | 455.3 | 1.808 | 80         |  |
| 85         | 0.0183 | 466.3                  | 1.856 | 0.0171 | 465.1 | 1.848 | 0.0159 | 463.8 | 1.840 | 0.0140 | 461.1 | 1.824 | 85         |  |
| 90         | 0.0188 | 471.8                  | 1.871 | 0.0175 | 470.6 | 1.863 | 0.0163 | 469.3 | 1.855 | 0.0144 | 466.9 | 1.840 | 90         |  |
| 95         | 0.0192 | 477.2                  | 1.886 | 0.0179 | 476.0 | 1.878 | 0.0167 | 474.9 | 1.870 | 0.0147 | 472.5 | 1.855 | 95         |  |
| 100        | 0.0196 | 482.6                  | 1.901 | 0.0183 | 481.5 | 1.893 | 0.0171 | 480.4 | 1.885 | 0.0151 | 478.2 | 1.870 | 100        |  |
| 105        | 0.0200 | 488.0                  | 1.915 | 0.0187 | 486.9 | 1.907 | 0.0175 | 485.9 | 1.900 | 0.0155 | 483.8 | 1.885 | 105        |  |
| 110        | 0.0204 | 493.4                  | 1.929 | 0.0190 | 492.4 | 1.922 | 0.0178 | 491.4 | 1.914 | 0.0158 | 489.4 | 1.900 | 110        |  |
| 115        | 0.0208 | 498.8                  | 1.943 | 0.0194 | 497.8 | 1.936 | 0.0182 | 496.9 | 1.928 | 0.0161 | 494.9 | 1.915 | 115        |  |
| 120        | 0.0212 | 504.2                  | 1.957 | 0.0198 | 503.3 | 1.950 | 0.0186 | 502.4 | 1.942 | 0.0165 | 500.5 | 1.929 | 120        |  |
| 125        | 0.0216 | 509.6                  | 1.971 | 0.0202 | 508.7 | 1.963 | 0.0189 | 507.8 | 1.956 | 0.0168 | 506.1 | 1.943 | 125        |  |
| 130        | 0.0219 | 515.0                  | 1.984 | 0.0205 | 514.2 | 1.977 | 0.0193 | 513.3 | 1.970 | 0.0171 | 511.6 | 1.957 | 130        |  |
| 135        | 0.0223 | 520.4                  | 1.998 | 0.0209 | 519.6 | 1.990 | 0.0196 | 518.8 | 1.983 | 0.0174 | 517.2 | 1.970 | 135        |  |
| 140        | 0.0227 | 525.9                  | 2.011 | 0.0212 | 525.1 | 2.004 | 0.0199 | 524.3 | 1.997 | 0.0177 | 522.8 | 1.984 | 140        |  |
| 145        | 0.0230 | 531.4                  | 2.024 | 0.0216 | 530.6 | 2.017 | 0.0203 | 529.9 | 2.010 | 0.0180 | 528.3 | 1.997 | 145        |  |
| 150        | 0.0234 | 536.9                  | 2.037 | 0.0219 | 536.1 | 2.030 | 0.0206 | 535.4 | 2.023 | 0.0184 | 533.9 | 2.011 | 150        |  |
| 155        | 0.0238 | 542.4                  | 2.050 | 0.0223 | 541.7 | 2.043 | 0.0209 | 541.0 | 2.036 | 0.0187 | 539.5 | 2.024 | 155        |  |
| 160        | 0.0241 | 547.9                  | 2.063 | 0.0226 | 547.2 | 2.056 | 0.0213 | 546.5 | 2.049 | 0.0190 | 545.2 | 2.037 | 160        |  |
| 165        | 0.0245 | 553.4                  | 2.076 | 0.0229 | 552.8 | 2.069 | 0.0216 | 552.1 | 2.062 | 0.0193 | 550.8 | 2.050 | 165        |  |
| 170        | 0.0248 | 559.0                  | 2.088 | 0.0233 | 558.4 | 2.081 | 0.0219 | 557.7 | 2.075 | 0.0195 | 556.5 | 2.063 | 170        |  |
| 175        | 0.0252 | 564.6                  | 2.101 | 0.0236 | 564.0 | 2.094 | 0.0222 | 563.4 | 2.088 | 0.0198 | 562.1 | 2.075 | 175        |  |
| 180        | 0.0255 | 570.2                  | 2.113 | 0.0239 | 569.6 | 2.107 | 0.0225 | 569.0 | 2.100 | 0.0201 | 567.8 | 2.088 | 180        |  |
| 185        | 0.0259 | 575.9                  | 2.126 | 0.0243 | 575.3 | 2.119 | 0.0228 | 574.7 | 2.113 | 0.0204 | 573.5 | 2.101 | 185        |  |





## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|--|
| Temp<br>°C | 2100   |                        |       | 2200   |       |       | 2300   |       |       | 2400   |       |       | Temp<br>°C |  |  |
|            | 49.45  |                        |       | 51.38  |       |       | 53.23  |       |       | 55.03  |       |       |            |  |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |  |
|            | 0.0099 | 414.0                  | 1.681 | 0.0094 | 414.0 | 1.679 | 0.0018 | 290.2 | 1.294 | 0.0010 | 276.7 | 1.252 |            |  |  |
| 50         | 0.0100 | 414.8                  | 1.684 |        |       |       |        |       |       |        |       |       | 50         |  |  |
| 55         | 0.0105 | 422.2                  | 1.706 | 0.0098 | 419.6 | 1.696 | 0.0091 | 416.9 | 1.684 |        |       |       | 55         |  |  |
| 60         | 0.0111 | 429.0                  | 1.727 | 0.0103 | 426.8 | 1.717 | 0.0096 | 424.5 | 1.707 | 0.0089 | 422.0 | 1.697 | 60         |  |  |
| 65         | 0.0115 | 435.5                  | 1.747 | 0.0108 | 433.6 | 1.737 | 0.0101 | 431.5 | 1.728 | 0.0094 | 429.4 | 1.719 | 65         |  |  |
| 70         | 0.0120 | 441.8                  | 1.765 | 0.0112 | 440.0 | 1.756 | 0.0105 | 438.2 | 1.748 | 0.0099 | 436.3 | 1.739 | 70         |  |  |
| 75         | 0.0124 | 447.9                  | 1.783 | 0.0116 | 446.3 | 1.775 | 0.0109 | 444.6 | 1.766 | 0.0103 | 442.9 | 1.758 | 75         |  |  |
| 80         | 0.0128 | 453.9                  | 1.800 | 0.0120 | 452.4 | 1.792 | 0.0113 | 450.8 | 1.784 | 0.0107 | 449.3 | 1.777 | 80         |  |  |
| 85         | 0.0132 | 459.8                  | 1.816 | 0.0124 | 458.4 | 1.809 | 0.0117 | 456.9 | 1.801 | 0.0111 | 455.5 | 1.794 | 85         |  |  |
| 90         | 0.0135 | 465.6                  | 1.832 | 0.0128 | 464.3 | 1.825 | 0.0121 | 462.9 | 1.818 | 0.0114 | 461.6 | 1.811 | 90         |  |  |
| 95         | 0.0139 | 471.3                  | 1.848 | 0.0131 | 470.1 | 1.841 | 0.0124 | 468.8 | 1.834 | 0.0118 | 467.6 | 1.827 | 95         |  |  |
| 100        | 0.0142 | 477.0                  | 1.863 | 0.0135 | 475.9 | 1.857 | 0.0127 | 474.7 | 1.850 | 0.0121 | 473.5 | 1.843 | 100        |  |  |
| 105        | 0.0146 | 482.7                  | 1.879 | 0.0138 | 481.6 | 1.872 | 0.0131 | 480.5 | 1.865 | 0.0124 | 479.3 | 1.859 | 105        |  |  |
| 110        | 0.0149 | 488.3                  | 1.893 | 0.0141 | 487.3 | 1.887 | 0.0134 | 486.2 | 1.880 | 0.0127 | 485.1 | 1.874 | 110        |  |  |
| 115        | 0.0152 | 493.9                  | 1.908 | 0.0144 | 493.0 | 1.902 | 0.0137 | 491.9 | 1.895 | 0.0130 | 490.9 | 1.889 | 115        |  |  |
| 120        | 0.0156 | 499.6                  | 1.922 | 0.0147 | 498.6 | 1.916 | 0.0140 | 497.6 | 1.910 | 0.0133 | 496.7 | 1.904 | 120        |  |  |
| 125        | 0.0159 | 505.2                  | 1.936 | 0.0151 | 504.3 | 1.930 | 0.0143 | 503.3 | 1.924 | 0.0136 | 502.4 | 1.918 | 125        |  |  |
| 130        | 0.0162 | 510.8                  | 1.950 | 0.0154 | 509.9 | 1.944 | 0.0146 | 509.0 | 1.938 | 0.0139 | 508.1 | 1.933 | 130        |  |  |
| 135        | 0.0165 | 516.4                  | 1.964 | 0.0156 | 515.5 | 1.958 | 0.0149 | 514.7 | 1.952 | 0.0142 | 513.8 | 1.947 | 135        |  |  |
| 140        | 0.0168 | 522.0                  | 1.978 | 0.0159 | 521.2 | 1.972 | 0.0152 | 520.4 | 1.966 | 0.0144 | 519.5 | 1.961 | 140        |  |  |
| 145        | 0.0171 | 527.6                  | 1.991 | 0.0162 | 526.8 | 1.986 | 0.0154 | 526.0 | 1.980 | 0.0147 | 525.2 | 1.974 | 145        |  |  |
| 150        | 0.0174 | 533.2                  | 2.005 | 0.0165 | 532.5 | 1.999 | 0.0157 | 531.7 | 1.993 | 0.0150 | 531.0 | 1.988 | 150        |  |  |
| 155        | 0.0177 | 538.8                  | 2.018 | 0.0168 | 538.1 | 2.012 | 0.0160 | 537.4 | 2.007 | 0.0152 | 536.7 | 2.001 | 155        |  |  |
| 160        | 0.0180 | 544.5                  | 2.031 | 0.0171 | 543.8 | 2.025 | 0.0163 | 543.1 | 2.020 | 0.0155 | 542.4 | 2.015 | 160        |  |  |
| 165        | 0.0183 | 550.1                  | 2.044 | 0.0174 | 549.5 | 2.038 | 0.0165 | 548.8 | 2.033 | 0.0158 | 548.1 | 2.028 | 165        |  |  |
| 170        | 0.0185 | 555.8                  | 2.057 | 0.0176 | 555.2 | 2.051 | 0.0168 | 554.5 | 2.046 | 0.0160 | 553.9 | 2.041 | 170        |  |  |
| 175        | 0.0188 | 561.5                  | 2.070 | 0.0179 | 560.9 | 2.064 | 0.0171 | 560.2 | 2.059 | 0.0163 | 559.6 | 2.054 | 175        |  |  |
| 180        | 0.0191 | 567.2                  | 2.082 | 0.0182 | 566.6 | 2.077 | 0.0173 | 566.0 | 2.072 | 0.0165 | 565.4 | 2.067 | 180        |  |  |
| 185        | 0.0194 | 572.9                  | 2.095 | 0.0184 | 572.3 | 2.090 | 0.0176 | 571.7 | 2.084 | 0.0168 | 571.2 | 2.079 | 185        |  |  |
| 190        | 0.0197 | 578.7                  | 2.107 | 0.0187 | 578.1 | 2.102 | 0.0178 | 577.5 | 2.097 | 0.0170 | 577.0 | 2.092 | 190        |  |  |
| 195        | 0.0199 | 584.4                  | 2.120 | 0.0190 | 583.9 | 2.114 | 0.0181 | 583.3 | 2.109 | 0.0173 | 582.8 | 2.104 | 195        |  |  |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

|            |        | Absolute Pressure, kPa |       |        |       |       |        |       |       |        |       |       |            |  |
|------------|--------|------------------------|-------|--------|-------|-------|--------|-------|-------|--------|-------|-------|------------|--|
| Temp<br>°C | 2500   |                        |       | 3000   |       |       | 3500   |       |       | 4000   |       |       | Temp<br>°C |  |
|            | V      | H                      | S     | V      | H     | S     | V      | H     | S     | V      | H     | S     |            |  |
|            | 56.76  |                        |       | 64.67  |       |       | 71.50  |       |       | 77.42  |       |       |            |  |
|            | 0.0079 | 413.8                  | 1.670 | 0.0062 | 411.8 | 1.653 | 0.0011 | 288.5 | 1.285 | 0.0010 | 287.8 | 1.281 |            |  |
| 60         | 0.0083 | 419.3                  | 1.686 |        |       |       |        |       |       |        |       |       | 60         |  |
| 65         | 0.0088 | 427.1                  | 1.710 | 0.0062 | 412.5 | 1.656 |        |       |       |        |       |       | 65         |  |
| 70         | 0.0093 | 434.3                  | 1.731 | 0.0068 | 422.4 | 1.684 |        |       |       |        |       |       | 70         |  |
| 75         | 0.0097 | 441.1                  | 1.750 | 0.0072 | 430.8 | 1.709 | 0.0053 | 416.7 | 1.659 |        |       |       | 75         |  |
| 80         | 0.0101 | 447.6                  | 1.769 | 0.0077 | 438.5 | 1.731 | 0.0058 | 427.1 | 1.689 | 0.0041 | 409.8 | 1.633 | 80         |  |
| 85         | 0.0105 | 454.0                  | 1.787 | 0.0080 | 445.8 | 1.751 | 0.0062 | 435.9 | 1.714 | 0.0047 | 423.1 | 1.671 | 85         |  |
| 90         | 0.0108 | 460.2                  | 1.804 | 0.0084 | 452.7 | 1.770 | 0.0066 | 444.0 | 1.736 | 0.0052 | 433.4 | 1.699 | 90         |  |
| 95         | 0.0112 | 466.3                  | 1.821 | 0.0087 | 459.3 | 1.789 | 0.0069 | 451.5 | 1.757 | 0.0055 | 442.4 | 1.724 | 95         |  |
| 100        | 0.0115 | 472.3                  | 1.837 | 0.0090 | 465.8 | 1.806 | 0.0072 | 458.7 | 1.776 | 0.0059 | 450.6 | 1.746 | 100        |  |
| 105        | 0.0118 | 478.2                  | 1.853 | 0.0093 | 472.2 | 1.823 | 0.0075 | 465.6 | 1.794 | 0.0062 | 458.2 | 1.766 | 105        |  |
| 110        | 0.0121 | 484.1                  | 1.868 | 0.0096 | 478.4 | 1.839 | 0.0078 | 472.3 | 1.812 | 0.0064 | 465.6 | 1.785 | 110        |  |
| 115        | 0.0124 | 489.9                  | 1.883 | 0.0099 | 484.5 | 1.855 | 0.0081 | 478.8 | 1.829 | 0.0067 | 472.6 | 1.804 | 115        |  |
| 120        | 0.0127 | 495.7                  | 1.898 | 0.0101 | 490.6 | 1.871 | 0.0083 | 485.2 | 1.845 | 0.0069 | 479.5 | 1.821 | 120        |  |
| 125        | 0.0130 | 501.5                  | 1.913 | 0.0104 | 496.7 | 1.886 | 0.0086 | 491.6 | 1.861 | 0.0072 | 486.2 | 1.838 | 125        |  |
| 130        | 0.0132 | 507.2                  | 1.927 | 0.0107 | 502.6 | 1.901 | 0.0088 | 497.8 | 1.877 | 0.0074 | 492.7 | 1.854 | 130        |  |
| 135        | 0.0135 | 513.0                  | 1.941 | 0.0109 | 508.6 | 1.916 | 0.0090 | 504.0 | 1.892 | 0.0076 | 499.2 | 1.870 | 135        |  |
| 140        | 0.0138 | 518.7                  | 1.955 | 0.0111 | 514.5 | 1.930 | 0.0092 | 510.2 | 1.907 | 0.0078 | 505.6 | 1.886 | 140        |  |
| 145        | 0.0140 | 524.5                  | 1.969 | 0.0114 | 520.4 | 1.944 | 0.0095 | 516.3 | 1.922 | 0.0080 | 511.9 | 1.901 | 145        |  |
| 150        | 0.0143 | 530.2                  | 1.983 | 0.0116 | 526.3 | 1.958 | 0.0097 | 522.3 | 1.936 | 0.0082 | 518.2 | 1.916 | 150        |  |
| 155        | 0.0146 | 535.9                  | 1.996 | 0.0118 | 532.2 | 1.972 | 0.0099 | 528.4 | 1.951 | 0.0084 | 524.5 | 1.931 | 155        |  |
| 160        | 0.0148 | 541.7                  | 2.010 | 0.0121 | 538.1 | 1.986 | 0.0101 | 534.4 | 1.965 | 0.0086 | 530.7 | 1.945 | 160        |  |
| 165        | 0.0151 | 547.4                  | 2.023 | 0.0123 | 544.0 | 1.999 | 0.0103 | 540.4 | 1.979 | 0.0088 | 536.8 | 1.959 | 165        |  |
| 170        | 0.0153 | 553.2                  | 2.036 | 0.0125 | 549.9 | 2.013 | 0.0105 | 546.5 | 1.992 | 0.0090 | 543.0 | 1.973 | 170        |  |
| 175        | 0.0156 | 559.0                  | 2.049 | 0.0127 | 555.7 | 2.026 | 0.0107 | 552.5 | 2.006 | 0.0092 | 549.1 | 1.987 | 175        |  |
| 180        | 0.0158 | 564.8                  | 2.062 | 0.0129 | 561.6 | 2.039 | 0.0109 | 558.5 | 2.019 | 0.0093 | 555.3 | 2.001 | 180        |  |
| 185        | 0.0161 | 570.6                  | 2.074 | 0.0131 | 567.5 | 2.052 | 0.0111 | 564.5 | 2.032 | 0.0095 | 561.4 | 2.014 | 185        |  |
| 190        | 0.0163 | 576.4                  | 2.087 | 0.0133 | 573.5 | 2.065 | 0.0112 | 570.5 | 2.045 | 0.0097 | 567.5 | 2.027 | 190        |  |
| 195        | 0.0165 | 582.2                  | 2.100 | 0.0136 | 579.4 | 2.078 | 0.0114 | 576.5 | 2.058 | 0.0098 | 573.6 | 2.041 | 195        |  |
| 200        | 0.0168 | 588.1                  | 2.112 | 0.0138 | 585.3 | 2.090 | 0.0116 | 582.5 | 2.071 | 0.0100 | 579.7 | 2.054 | 200        |  |
| 205        | 0.0170 | 593.9                  | 2.124 | 0.0140 | 591.3 | 2.103 | 0.0118 | 588.6 | 2.084 | 0.0102 | 585.8 | 2.066 | 205        |  |



## Opteon® XP40

### Superheated Vapor – Constant Pressure Tables

Saturation Properties in Light Green

V = volume in m<sup>3</sup>/kg, H = enthalpy in kJ/kg, S = entropy in kJ/(kg.K)

| Absolute Pressure, kPa |        |       |       |   |   |   |   |   |   |   |   |   |            |
|------------------------|--------|-------|-------|---|---|---|---|---|---|---|---|---|------------|
| Temp<br>°C             | 4500   |       |       |   |   |   |   |   |   |   |   |   | Temp<br>°C |
|                        | 34.22  |       |       |   |   |   |   |   |   |   |   |   |            |
|                        | V      | H     | S     | V | H | S | V | H | S | V | H | S |            |
|                        | 0.0009 | 250.2 | 1.161 |   |   |   |   |   |   |   |   |   |            |
| 35                     | 0.0009 | 251.4 | 1.165 |   |   |   |   |   |   |   |   |   | 35         |
| 40                     | 0.0009 | 259.2 | 1.190 |   |   |   |   |   |   |   |   |   | 40         |
| 45                     | 0.0010 | 267.2 | 1.216 |   |   |   |   |   |   |   |   |   | 45         |
| 50                     | 0.0010 | 275.4 | 1.241 |   |   |   |   |   |   |   |   |   | 50         |
| 55                     | 0.0010 | 284.0 | 1.268 |   |   |   |   |   |   |   |   |   | 55         |
| 60                     | 0.0011 | 292.9 | 1.295 |   |   |   |   |   |   |   |   |   | 60         |
| 65                     | 0.0011 | 302.5 | 1.323 |   |   |   |   |   |   |   |   |   | 65         |
| 70                     | 0.0012 | 312.9 | 1.354 |   |   |   |   |   |   |   |   |   | 70         |
| 75                     | 0.0013 | 325.0 | 1.389 |   |   |   |   |   |   |   |   |   | 75         |
| 80                     | 0.0015 | 342.8 | 1.440 |   |   |   |   |   |   |   |   |   | 80         |
| 85                     | 0.0032 | 401.8 | 1.605 |   |   |   |   |   |   |   |   |   | 85         |
| 90                     | 0.0039 | 419.3 | 1.654 |   |   |   |   |   |   |   |   |   | 90         |
| 95                     | 0.0044 | 431.2 | 1.687 |   |   |   |   |   |   |   |   |   | 95         |
| 100                    | 0.0047 | 441.1 | 1.713 |   |   |   |   |   |   |   |   |   | 100        |
| 105                    | 0.0050 | 450.0 | 1.737 |   |   |   |   |   |   |   |   |   | 105        |
| 110                    | 0.0053 | 458.2 | 1.758 |   |   |   |   |   |   |   |   |   | 110        |
| 115                    | 0.0056 | 465.9 | 1.778 |   |   |   |   |   |   |   |   |   | 115        |
| 120                    | 0.0058 | 473.3 | 1.797 |   |   |   |   |   |   |   |   |   | 120        |
| 125                    | 0.0061 | 480.4 | 1.815 |   |   |   |   |   |   |   |   |   | 125        |
| 130                    | 0.0063 | 487.4 | 1.833 |   |   |   |   |   |   |   |   |   | 130        |
| 135                    | 0.0065 | 494.2 | 1.850 |   |   |   |   |   |   |   |   |   | 135        |
| 140                    | 0.0067 | 500.9 | 1.866 |   |   |   |   |   |   |   |   |   | 140        |
| 145                    | 0.0069 | 507.5 | 1.882 |   |   |   |   |   |   |   |   |   | 145        |
| 150                    | 0.0071 | 514.0 | 1.897 |   |   |   |   |   |   |   |   |   | 150        |
| 155                    | 0.0073 | 520.4 | 1.912 |   |   |   |   |   |   |   |   |   | 155        |
| 160                    | 0.0075 | 526.8 | 1.927 |   |   |   |   |   |   |   |   |   | 160        |
| 165                    | 0.0076 | 533.1 | 1.942 |   |   |   |   |   |   |   |   |   | 165        |
| 170                    | 0.0078 | 539.4 | 1.956 |   |   |   |   |   |   |   |   |   | 170        |
| 175                    | 0.0080 | 545.7 | 1.970 |   |   |   |   |   |   |   |   |   | 175        |
| 180                    | 0.0081 | 552.0 | 1.984 |   |   |   |   |   |   |   |   |   | 180        |



For more information on the Opteon® range of refrigerants or other DuPont Refrigerants products visit [opteon.com](http://opteon.com)

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable. It is intended for use by persons having technical skill, at their own discretion and risk. The handling precaution information contained herein is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards. Because conditions of product use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any material, evaluation of any compound under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate under or a recommendation to infringe any patents.

Copyright © 2014 DuPont. All rights reserved. The DuPont Oval Logo, DuPont™, Opteon® and all products denoted with ® or ™ are registered trademarks or trademarks of E.I. du Pont de Nemours and Company or its affiliates. The GWP logo is registered copyright of E. I. Du Pont de Nemours and Company.