Opteon™

## Suction, Discharge, and Liquid Line Capacities in Kilowatts for

# Opteon™ XL40 (Refrigerant R-454A)

### (Single- or High-Stage Applications)

| Line Size | Suction Lines, $\Delta t$ = 0.04 K/m | | | | | | Discharge Lines, $\Delta t$ = 0.02 K/m, $\Delta p$ = 958.37 Pa | | | | | | Liquid Lines | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Saturated Suction Temperature, °C | | | | | | Saturated Suction Temperature, °C | | | | | | | | |
| Type L Copper, OD, mm | -50 | -40 | -30 | -20 | -5 | 5 | -50 | -40 | -30 | -20 | -5 | 5 | $\Delta t$ = 0.02 | | $\Delta t$ = 0.05 |
| | | | Corresponding $\Delta p$ , Pa/ | | 1 m | | | | Corresponding $\Delta p$ , Pa/ | | 1 m | | Velocity = | K/ 1 m Drop | K/ 1 m Drop |
| | 143.22 | 212.81 | 303.24 | 417.08 | 637.16 | 820.40 | 958.37 | 958.37 | 958.37 | 958.37 | 958.37 | 958.37 | 0.5 m/s $\Delta p$ = | 923.88 | $\Delta p$ = 2309.1 |
| 12 | 0.18 | 0.30 | 0.49 | 0.75 | 1.34 | 1.89 | 2.38 | 2.59 | 2.79 | 3.00 | 3.30 | 3.49 | 5.54 | 11.35 | 18.71 |
| 15 | 0.34 | 0.57 | 0.92 | 1.41 | 2.52 | 3.55 | 4.48 | 4.86 | 5.24 | 5.62 | 6.18 | 6.55 | 8.91 | 25.28 | 35.14 |
| 18 | 0.58 | 0.98 | 1.58 | 2.43 | 4.31 | 6.08 | 7.66 | 8.31 | 8.96 | 9.61 | 10.57 | 11.19 | 13.36 | 42.75 | 60.09 |
| 22 | 1.04 | 1.76 | 2.82 | 4.32 | 7.66 | 10.78 | 13.58 | 14.73 | 15.88 | 17.03 | 18.72 | 19.81 | 20.60 | 75.07 | 106.52 |
| 28 | 2.06 | 3.48 | 5.56 | 8.52 | 15.06 | 21.18 | 26.68 | 28.92 | 31.17 | 33.42 | 36.72 | 38.86 | 34.37 | 145.88 | 209.18 |
| 35 | 3.87 | 6.50 | 10.38 | 15.86 | 27.99 | 39.31 | 49.50 | 53.65 | 57.81 | 61.95 | 68.07 | 72.02 | 54.98 | 268.19 | 388.00 |
| 42 | 6.42 | 10.76 | 17.17 | 26.22 | 46.20 | 64.82 | 81.60 | 88.43 | 95.28 | 102.09 | 112.13 | 118.63 | 80.45 | 438.73 | 639.55 |
| 54 | 12.75 | 21.35 | 34.00 | 51.83 | 91.13 | 127.73 | 160.74 | 174.14 | 187.57 | 200.93 | 220.64 | 233.40 | 134.91 | 856.86 | 1259.42 |
| 67 | 22.91 | 38.30 | 60.93 | 92.75 | 162.61 | 227.99 | 286.82 | 310.67 | 334.56 | 358.34 | 393.40 | 416.09 | 210.00 | 1517.92 | 2246.88 |
| 79 | 35.70 | 59.62 | 94.74 | 144.07 | 252.30 | 353.50 | 444.61 | 481.50 | 517.84 | 554.58 | 608.74 | 643.78 | 293.69 | 2340.46 | 3482.48 |
| 105 | 76.66 | 127.79 | 202.69 | 307.78 | 537.94 | 752.85 | 945.46 | 1023.67 | 1102.04 | 1179.99 | 1294.89 | 1369.20 | 524.05 | 4943.33 | 7412.08 |
| 130 | 136.20 | 226.75 | 359.16 | 544.78 | 950.87 | 1329.65 | 1669.54 | 1807.33 | 1945.37 | 2082.68 | 2285.05 | 2415.91 | 810.77 | 8687.01 | 13070.17 |
| 156 | 218.05 | 362.66 | 573.80 | 869.60 | 1516.14 | 2118.71 | 2659.97 | 2879.10 | 3098.60 | 3316.89 | 3638.57 | 3846.58 | 1159.66 | 13777.51 | 20821.14 |
| 206 | 455.32 | 756.94 | 1195.78 | 1809.85 | 3150.25 | 4398.14 | 5519.85 | 5973.14 | 6427.21 | 6878.83 | 7544.50 | 7974.76 | 2033.82 | 28433.63 | 43204.31 |
| 257 | 812.83 | 1349.40 | 2129.35 | 3219.61 | 5597.23 | 7808.75 | 9797.91 | 10600.89 | 11405.20 | 12205.14 | 13383.76 | 14145.68 | 3164.88 | 50240.67 | 76677.88 |
| **Steel** | | | | | | | | | | | | | | | |
| mm | SCH | | | | | | | | | | | | | | |
| 10 | 80 | 0.18 | 0.29 | 0.46 | 0.69 | 1.18 | 1.65 | 2.06 | 2.23 | 2.40 | 2.56 | 2.81 | 2.96 | 6.12 | 10.13 | 16.12 |
| 15 | 80 | 0.35 | 0.58 | 0.90 | 1.36 | 2.34 | 3.24 | 4.07 | 4.39 | 4.72 | 5.04 | 5.52 | 5.84 | 10.20 | 19.95 | 31.79 |
| 20 | 80 | 0.79 | 1.31 | 2.04 | 3.06 | 5.27 | 7.30 | 9.15 | 9.89 | 10.63 | 11.36 | 12.45 | 13.15 | 18.84 | 45.01 | 71.48 |
| 25 | 80 | 1.56 | 2.57 | 4.00 | 6.00 | 10.32 | 14.30 | 17.92 | 19.36 | 20.81 | 22.25 | 24.37 | 25.74 | 31.34 | 88.20 | 140.01 |
| 32 | 80 | 4.12 | 6.76 | 10.53 | 15.75 | 27.05 | 37.51 | 46.99 | 50.78 | 54.48 | 58.24 | 63.79 | 67.37 | 65.15 | 231.49 | 367.24 |
| 40 | 80 | 6.20 | 10.15 | 15.80 | 23.63 | 40.58 | 56.27 | 70.36 | 76.04 | 81.72 | 87.36 | 95.68 | 101.08 | 88.66 | 347.30 | 550.80 |
| 50 | 40 | 11.99 | 19.61 | 30.52 | 45.60 | 78.27 | 108.31 | 135.68 | 146.66 | 157.61 | 168.49 | 184.52 | 194.87 | 146.16 | 668.80 | 1060.23 |
| 65 | 40 | 19.15 | 31.30 | 48.69 | 72.73 | 124.77 | 172.69 | 216.34 | 233.76 | 251.21 | 268.54 | 294.07 | 310.56 | 208.54 | 1066.54 | 1690.55 |
| 80 | 40 | 33.92 | 55.30 | 86.00 | 128.58 | 220.53 | 305.20 | 382.31 | 413.07 | 443.17 | 473.77 | 519.00 | 548.10 | 322.05 | 1885.25 | 2987.43 |
| 100 | 40 | 69.23 | 112.79 | 175.27 | 261.92 | 448.36 | 621.37 | 777.28 | 839.85 | 902.96 | 965.24 | 1056.94 | 1116.16 | 554.53 | 3839.43 | 6072.84 |
| 125 | 40 | 125.19 | 203.89 | 316.65 | 472.34 | 809.67 | 1120.20 | 1404.11 | 1517.04 | 1630.10 | 1739.79 | 1905.10 | 2011.97 | 871.54 | 6922.90 | 10970.99 |
| 150 | 40 | 202.48 | 329.64 | 511.75 | 763.24 | 1308.30 | 1810.21 | 2268.01 | 2446.69 | 2629.38 | 2810.80 | 3077.36 | 3249.90 | 1258.44 | 11188.17 | 17721.26 |
| 200 | 40 | 414.87 | 674.08 | 1047.47 | 1562.05 | 2676.75 | 3703.61 | 4633.55 | 5006.18 | 5379.27 | 5750.03 | 6295.92 | 6655.33 | 2178.80 | 22892.70 | 36203.07 |
| 250 | 40 | 750.38 | 1220.33 | 1895.65 | 2826.52 | 4836.10 | 6691.14 | 8389.18 | 9062.60 | 9738.55 | 10410.27 | 11399.27 | 12037.87 | 3434.67 | 41359.21 | 65470.25 |
| 300 | ID[a] | 1200.97 | 1952.34 | 3027.82 | 4520.41 | 7735.57 | 10702.67 | 13419.94 | 14495.37 | 15572.36 | 16643.04 | 18219.54 | 19237.76 | 4926.52 | 66184.52 | 104749.07 |
| 350 | 30 | 1554.20 | 2526.01 | 3917.24 | 5847.62 | 10006.59 | 13844.38 | 17348.54 | 18738.78 | 20131.02 | 21543.10 | 23588.79 | 24909.74 | 6004.54 | 85612.55 | 135566.79 |
| 400 | 30 | 2242.98 | 3644.57 | 5651.04 | 8423.43 | 14433.11 | 19967.75 | 25037.51 | 27050.89 | 29106.68 | 31111.27 | 34062.77 | 35968.77 | 7958.46 | 123479.51 | 195579.70 |

[a] Pipe inside diameter is same as nominal pipe size

[1] Tons based on standard refrigerant cycle of 40 °C saturated liquid and saturated evaporator outlet temperature. Liquid tons based on -5 °C evaporator temperature. [2] Suction line pressure drop assuming half of the pressure drop occurs upstream of the reference temperature.

[3] Discharge line pressure drop calculations assume saturated vapor temperature drop.

[4] Dischage pressure drop inlet conditions calcualted assuming isentropic compressor efficiency of 0.7 and pressure corresponding to condenser saturated liquid outlet temperature.

[5] Liquid line pressure drop assuming reference temperature at inlet with temperature drop occuring downstream.

[6] Thermophysical properties and viscosity data based on calculations from NIST REFPROP program Version 10.

[7] Capacities based on conditions outside of these tables can be provided upon request.

[8] Cells highlighted in gray indicate the calculated velocity from the given saturated temperature drop is outside of the recommended gas line velocities per ASHRAE Refrigeration Handbook.


O-XL40LSC-SI (5/24)

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