



Suction, Discharge, and Liquid Line Capacities in Kilowatts for Opteon™ XP40 Refrigerant R-449A (Single- or High-Stage Applications)

Line Size		Suction Lines, $\Delta t = 0.04$ K/m						Discharge Lines, $\Delta t = 0.02$ K/m, $\Delta p = 924.29$ Pa						Liquid Lines		
		Saturated Suction Temperature, °C						Saturated Suction Temperature, °C						Liquid Lines		
Type L Copper, OD, mm	SCH	-50	-40	-30	-20	-5	5	-50	-40	-30	-20	-5	5	Velocity = 0.5 m/s	$\Delta t = 0.02$ K/1 m Drop $\Delta p = 891.99$	$\Delta t = 0.05$ K/1 m Drop $\Delta p = 2229.4$
		Corresponding Δp , Pa/1 m						Corresponding Δp , Pa/1 m								
12		0.16	0.27	0.45	0.69	1.26	1.79	2.27	2.45	2.65	2.85	3.13	3.32	5.69	10.99	18.12
15		0.30	0.51	0.84	1.31	2.36	3.36	4.26	4.61	4.98	5.34	5.88	6.23	9.16	24.60	34.03
18		0.51	0.88	1.45	2.25	4.05	5.75	7.26	7.88	8.51	9.13	10.04	10.64	13.73	41.60	58.18
22		0.92	1.58	2.58	4.00	7.19	10.19	12.87	13.97	15.07	16.17	17.79	18.84	21.18	73.06	103.15
28		1.83	3.13	5.09	7.89	14.14	20.03	25.27	27.43	29.59	31.74	34.91	36.96	35.33	141.96	202.55
35		3.42	5.84	9.50	14.69	26.28	37.18	46.89	50.88	54.88	58.85	64.71	68.49	56.52	260.99	377.59
42		5.68	9.68	15.72	24.29	43.38	61.32	77.31	83.87	90.44	96.97	106.60	112.82	82.69	426.95	622.38
54		11.28	19.19	31.13	48.01	85.57	120.82	152.27	165.15	178.05	190.87	209.76	221.97	138.68	833.86	1225.62
67		20.27	34.44	55.79	85.90	152.68	215.65	271.71	294.63	317.59	340.40	373.99	395.71	215.86	1477.17	2186.57
79		31.59	53.60	86.75	133.44	236.90	334.37	421.20	456.66	494.03	529.46	581.62	615.34	301.88	2277.64	3388.99
105		67.82	114.89	185.60	285.06	505.11	712.11	900.18	975.74	1051.38	1120.90	1231.00	1302.15	538.67	4810.65	7213.11
130		120.49	203.87	328.88	504.58	892.83	1257.68	1589.58	1714.06	1846.64	1978.38	2172.30	2297.59	833.39	8453.84	12719.31
156		192.90	326.06	525.42	805.42	1423.60	2004.05	2519.88	2730.53	2941.35	3150.78	3459.04	3658.20	1192.01	13407.70	20262.21
206		402.81	683.93	1094.97	1676.28	2957.97	4160.11	5229.13	5664.91	6101.03	6534.35	7172.25	7584.20	2090.56	27670.43	42044.52
257		719.10	1219.25	1949.83	2981.99	5255.58	7386.13	9281.87	10053.85	10826.39	11593.92	12723.40	13452.90	3253.17	48892.15	74619.51
Steel																
mm	SCH															
10	80	0.16	0.26	0.42	0.64	1.11	1.56	1.95	2.11	2.27	2.43	2.67	2.81	6.29	9.86	15.69
15	80	0.31	0.52	0.83	1.26	2.19	3.06	3.85	4.16	4.48	4.79	5.25	5.55	10.49	19.42	30.93
20	80	0.71	1.18	1.87	2.83	4.95	6.91	8.66	9.38	10.09	10.80	11.83	12.50	19.37	43.80	69.56
25	80	1.39	2.32	3.66	5.56	9.69	13.53	16.97	18.36	19.75	21.14	23.17	24.48	32.21	85.83	136.25
32	80	3.67	6.11	9.64	14.58	25.40	35.48	44.51	48.16	51.71	55.33	60.64	64.07	66.96	225.28	357.38
40	80	5.51	9.17	14.47	21.89	38.10	53.22	66.65	72.11	77.57	82.99	90.96	96.13	91.14	337.98	536.01
50	40	10.66	17.72	27.95	42.24	73.49	102.45	128.54	139.09	149.61	160.06	175.41	185.32	150.24	650.85	1031.77
65	40	17.03	28.28	44.59	67.36	117.16	163.34	204.95	221.70	238.46	255.10	279.57	295.35	214.36	1037.91	1645.16
80	40	30.16	49.97	78.75	119.09	207.07	288.69	362.17	391.76	420.68	450.04	493.39	521.26	331.03	1834.65	2907.23
100	40	61.55	101.91	160.49	242.59	420.99	587.74	736.34	796.51	857.14	916.90	1004.79	1061.50	570.00	3736.37	5909.82
125	40	111.31	184.22	289.95	437.48	760.25	1059.57	1330.16	1438.75	1547.37	1660.99	1811.10	1913.43	895.85	6737.08	10676.48
150	40	180.03	297.85	468.61	706.91	1228.44	1712.24	2148.56	2320.43	2495.94	2670.04	2925.52	3090.74	1293.55	10887.87	17245.55
200	40	368.86	609.06	959.16	1446.77	2513.36	3503.17	4389.51	4747.85	5106.27	5462.08	5985.28	6329.39	2239.58	22278.23	35231.22
250	40	667.16	1102.63	1735.83	2617.92	4540.91	6329.00	7947.34	8594.94	9244.32	9888.94	10836.83	11448.32	3530.50	40249.07	63712.75
300	ID ⁸	1067.78	1764.03	2772.56	4186.80	7263.40	10123.42	12713.13	13747.36	14782.07	15809.58	17320.58	18295.60	5063.96	64408.04	101937.15
350	30	1381.84	2282.37	3586.99	5416.05	9395.81	13095.10	16434.83	17771.80	19109.38	20464.26	22424.91	23689.80	6172.06	83314.60	131927.60
400	30	1994.23	3293.05	5174.62	7801.76	13552.14	18887.06	23718.83	25654.97	27629.53	29553.26	32382.10	34207.21	8180.49	120165.16	190329.50

¹ 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 Discharge pressure drop inlet conditions calculated 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 occurring 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.

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The line sizes are theoretical estimates based on best practices following industry guidelines.

