Opteon™

Suction, Discharge, and Liquid Line Capacities in Tons for

Opteon™ XP40 Refrigerant R-449A

(Single- or High-Stage Applications)

Line Size		Suction Lines, Δt = 2 °F						Discharge Lines, Δt = 1 °F, Δp = 3.74 psi						Liquid Lines		
		Saturated Suction Temperature, °F						Saturated Suction Temperature, °F							Δt = 1 °F	Δt = 5 °F
Type L Copper, OD		-60	-40	-20	0	20	40	-60	-40	-20	0	20	40	Velocity =	Drop/ 100 ft	Drop/ 100 ft
		Corresponding Δp, psi/ 100 ft						Corresponding Δp, psi/ 100 ft						100 fpm	Δp = 3.61	Δp = 17.7
		0.50	0.80	1.19	1.71	2.35	3.15	3.74	3.74	3.74	3.74	3.74	3.74			
1/2		0.05	0.09	0.15	0.24	0.38	0.56	0.73	0.79	0.86	0.93	1.00	1.07	1.85	3.51	8.32
5/8		0.09	0.16	0.28	0.46	0.71	1.05	1.36	1.49	1.62	1.75	1.88	2.01	2.97	6.59	15.57
3/4		0.15	0.28	0.48	0.78	1.21	1.79	2.30	2.53	2.75	2.97	3.19	3.41	4.44	11.23	26.56
7/8		0.24	0.44	0.75	1.21	1.87	2.77	3.56	3.90	4.25	4.59	4.93	5.26	6.17	17.37	40.96
1 1/8		0.49	0.89	1.53	2.46	3.79	5.61	7.19	7.88	8.58	9.27	9.95	10.61	10.51	35.18	82.61
1 3/8		0.85	1.56	2.67	4.30	6.61	9.76	12.51	13.71	14.92	16.11	17.29	18.43	16.01	61.30	143.49
1 5/8		1.36	2.47	4.23	6.80	10.44	15.41	19.75	21.64	23.54	25.42	27.27	29.08	22.66	96.90	226.22
2 1/8		2.84	5.14	8.78	14.11	21.63	31.87	40.83	44.73	48.63	52.51	56.32	60.03	39.42	200.72	466.73
2 5/8		5.04	9.12	15.54	24.93	38.19	56.20	71.99	78.84	85.70	92.52	99.22	105.74	60.79	354.41	821.69
3 1/8		8.07	14.58	24.83	39.78	60.79	89.51	114.62	125.51	136.41	147.80	158.48	168.88	86.77	564.99	1305.35
3 5/8		12.02	21.71	36.93	59.11	90.26	132.81	170.68	186.87	203.08	219.17	234.99	249.12	117.37	838.94	1934.69
4 1/8		16.99	30.66	52.11	83.35	127.19	187.04	240.34	263.10	285.89	308.51	329.09	350.62	152.57	1188.14	2722.21
5 1/8		30.49	54.94	93.22	148.94	227.05	333.57	428.52	466.66	507.00	547.02	586.37	624.64	237.78	2121.12	4847.75
6 1/8		49.15	88.47	149.92	239.29	364.49	535.09	683.85	748.34	812.92	876.98	939.94	1001.18	341.82	3405.36	7767.31
8 1/8		102.13	183.70	310.79	495.35	753.62	1105.12	1411.87	1544.62	1677.51	1809.40	1939.00	2065.03	597.06	7041.49	16012.98
Steel																
IPS	SCH															
3/8	80	0.04	0.07	0.12	0.19	0.28	0.41	0.53	0.58	0.62	0.67	0.72	0.77	1.79	2.65	5.92
1/2	80	0.08	0.14	0.23	0.37	0.56	0.81	1.04	1.13	1.23	1.32	1.42	1.51	2.98	5.21	11.66
3/4	80	0.18	0.32	0.53	0.83	1.26	1.83	2.33	2.55	2.76	2.98	3.19	3.39	5.51	11.75	26.25
1	80	0.35	0.62	1.04	1.64	2.47	3.58	4.57	4.99	5.42	5.83	6.25	6.65	9.16	23.03	51.40
1 1/4	80	0.93	1.64	2.73	4.29	6.48	9.41	11.99	13.10	14.21	15.30	16.36	17.40	19.05	60.49	134.58
1 1/2	80	1.40	2.47	4.09	6.44	9.70	14.11	17.99	19.62	21.28	22.93	24.54	26.11	25.93	90.76	201.86
2	40	2.70	4.77	7.91	12.43	18.71	27.21	34.63	37.83	41.03	44.20	47.31	50.34	42.75	174.74	389.19
2 1/2	40	4.32	7.62	12.61	19.82	29.83	43.31	55.21	60.30	65.40	70.45	75.41	80.23	60.99	278.67	619.42
3	40	7.65	13.46	22.27	35.03	52.71	76.54	97.54	106.53	115.53	124.87	133.05	141.57	94.17	492.51	1094.59
4	40	15.61	27.46	45.40	71.26	107.36	155.85	198.41	216.62	235.04	253.17	270.99	288.29	162.17	1003.17	2225.65
5	40	28.24	49.63	82.01	128.69	193.53	281.35	358.25	391.25	424.26	456.98	489.12	520.35	254.85	1808.58	4017.37
6	40	45.68	80.26	132.56	207.96	312.77	453.88	578.77	632.05	684.61	737.69	789.56	839.95	368.03	2923.04	6490.14
8	40	93.63	164.42	271.37	425.69	640.07	929.03	1182.70	1291.32	1400.28	1508.24	1614.31	1719.27	637.29	5983.48	13283.13
10	40	169.57	297.19	491.05	770.15	1157.93	1680.56	2140.74	2337.15	2533.79	2728.78	2920.29	3106.37	1004.52	10822.36	24032.76
12	ID[a]	271.01	475.43	784.26	1231.55	1851.49	2683.28	3424.31	3738.64	4052.95	4364.82	4671.13	4968.74	1440.74	17284.41	38416.96
14	30	350.87	615.38	1015.03	1591.54	2393.28	3473.61	4428.53	4834.79	5241.50	5644.81	6040.93	6425.80	1756.53	22369.35	49638.51
16	30	506.02	887.22	1463.23	2294.54	3449.69	5006.80	6377.58	6962.53	7547.82	8128.20	8698.25	9252.10	2326.82	32259.35	71551.85

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

[1] Tons based on standard refrigerant cycle of 105 °F saturated liquid and saturated evaporator outlet temperature. Liquid tons based on 20 °F 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.

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

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