Opteon™

Suction, Discharge, and Liquid Line Capacities in Tons for

Opteon™ XL40 (Refrigerant R-454A)

(Single- or High-Stage Applications)

Line Size		Suction Lines, Δt = 2 °F						Discharge Lines, Δt = 1 °F, Δp = 3.88 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 = 3.74	Δp = 18.3
		0.55	0.86	1.27	1.80	2.46	3.26	3.88	3.88	3.88	3.88	3.88	3.88			
1/2		0.05	0.10	0.16	0.26	0.40	0.59	0.76	0.84	0.91	0.98	1.06	1.13	1.80	3.62	8.59
5/8		0.10	0.18	0.31	0.50	0.76	1.12	1.43	1.57	1.71	1.84	1.98	2.11	2.89	6.81	16.08
3/4		0.17	0.31	0.53	0.84	1.29	1.90	2.43	2.66	2.90	3.13	3.36	3.58	4.32	11.60	27.30
7/8		0.27	0.49	0.82	1.31	2.00	2.93	3.76	4.11	4.47	4.83	5.18	5.53	6.00	17.94	42.10
1 1/8		0.55	0.99	1.66	2.65	4.04	5.93	7.59	8.31	9.04	9.75	10.46	11.15	10.23	36.33	84.91
1 3/8		0.97	1.73	2.91	4.63	7.05	10.32	13.21	14.46	15.71	16.96	18.19	19.38	15.58	63.32	147.50
1 5/8		1.54	2.75	4.61	7.33	11.14	16.30	20.85	22.82	24.79	26.76	28.69	30.57	22.05	100.08	232.54
2 1/8		3.21	5.72	9.58	15.20	23.07	33.70	43.11	47.16	51.22	55.26	59.24	63.12	38.36	207.30	479.76
2 5/8		5.71	10.14	16.95	26.86	40.72	59.44	76.00	83.12	90.27	97.37	104.36	111.17	59.15	366.03	844.63
3 1/8		9.14	16.22	27.08	42.86	64.83	94.67	121.01	132.33	143.68	154.78	165.87	176.67	84.43	583.53	1341.79
3 5/8		13.62	24.15	40.27	63.68	96.26	140.46	179.28	196.04	212.83	229.51	245.94	261.93	114.19	866.47	1988.71
4 1/8		19.25	34.11	56.82	89.79	135.64	197.81	252.45	276.01	299.62	323.07	346.16	368.64	148.44	1221.03	2798.21
5 1/8		34.54	61.11	101.66	160.45	242.14	352.78	450.12	492.02	534.02	575.73	616.79	656.75	231.35	2179.85	4983.10
6 1/8		55.67	98.40	163.49	257.78	388.71	565.91	721.94	789.02	856.24	923.00	988.70	1052.64	332.58	3499.64	7984.17
8 1/8		115.67	204.34	338.91	533.62	803.69	1168.78	1490.52	1628.57	1766.91	1904.36	2039.58	2171.17	580.92	7236.44	16460.04
Steel																
IPS	SCH															
3/8	80	0.04	0.08	0.13	0.20	0.30	0.44	0.56	0.61	0.66	0.71	0.76	0.81	1.74	2.72	6.09
1/2	80	0.09	0.16	0.26	0.40	0.59	0.86	1.09	1.19	1.29	1.39	1.49	1.58	2.90	5.35	11.98
3/4	80	0.20	0.35	0.58	0.90	1.34	1.94	2.46	2.69	2.91	3.14	3.36	3.57	5.36	12.08	26.99
1	80	0.40	0.69	1.13	1.76	2.63	3.79	4.82	5.26	5.70	6.14	6.57	6.99	8.92	23.67	52.83
1 1/4	80	1.05	1.82	2.97	4.62	6.91	9.95	12.66	13.81	14.96	16.11	17.20	18.30	18.54	62.16	138.34
1 1/2	80	1.57	2.73	4.47	6.94	10.34	14.93	18.99	20.68	22.41	24.13	25.81	27.45	25.23	93.27	207.49
2	40	3.05	5.28	8.62	13.39	19.95	28.78	36.56	39.88	43.21	46.52	49.77	52.92	41.59	179.58	400.05
2 1/2	40	4.87	8.43	13.75	21.35	31.81	45.80	58.28	63.57	68.88	74.14	79.32	84.35	59.34	286.38	636.72
3	40	8.62	14.90	24.29	37.74	56.21	80.94	102.98	112.32	121.69	130.77	139.95	148.85	91.63	506.14	1125.15
4	40	17.60	30.39	49.51	76.76	114.49	164.82	209.46	228.40	247.56	266.46	285.04	303.11	157.79	1030.94	2287.78
5	40	31.82	54.93	89.43	138.63	206.39	297.55	378.21	412.51	446.87	480.96	514.49	547.09	247.96	1858.65	4129.53
6	40	51.48	88.83	144.55	224.03	333.55	480.03	611.01	666.40	721.09	776.41	830.52	883.13	358.08	3003.97	6671.34
8	40	105.52	181.98	295.93	458.58	682.60	982.55	1248.58	1361.50	1474.90	1587.40	1698.05	1807.64	620.06	6149.15	13653.98
10	40	191.11	328.93	535.49	829.65	1234.87	1777.37	2259.99	2464.18	2668.82	2871.99	3071.77	3266.03	977.36	11121.99	24703.74
12	ID[a]	305.43	526.21	855.24	1326.69	1974.51	2837.85	3615.05	3941.83	4268.94	4593.90	4913.43	5224.13	1401.79	17762.96	39489.53
14	30	395.43	681.11	1106.89	1714.50	2552.30	3673.71	4675.22	5097.55	5520.83	5941.06	6354.28	6756.08	1709.04	22988.69	51024.37
16	30	570.30	981.98	1595.66	2471.80	3678.90	5295.22	6732.83	7340.94	7950.05	8554.79	9149.43	9727.65	2263.92	33152.50	73549.52

[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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