Opteon™

Suction, Discharge, and Liquid Line Capacities in Tons for

Opteon™ XL20 Refrigerant R-454C

(Single- or High-Stage Applications)

Line Size		Suction Lines, Δt = 2 °F						Discharge Lines, Δt = 1 °F, Δp = 3.43 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			
				Corresponding Δp, psi/ 100 ft						Corresponding Δp, psi/ 100 ft				Velocity =	Drop/ 100 ft	Drop/ 100 ft
		0.45	0.70	1.05	1.50	2.06	2.75	3.43	3.43	3.43	3.43	3.43	3.43		100 fpm	Δp = 3.28	Δp = 16.1
1/2		0.04	0.07	0.12	0.20	0.31	0.47	0.62	0.69	0.76	0.82	0.89	0.95		1.63	3.01	7.15
5/8		0.07	0.13	0.23	0.38	0.58	0.87	1.17	1.29	1.42	1.54	1.66	1.78		2.63	5.66	13.39
3/4		0.12	0.23	0.39	0.64	1.00	1.49	1.99	2.20	2.41	2.62	2.83	3.03		3.92	9.64	22.74
7/8		0.19	0.36	0.61	0.99	1.54	2.30	3.07	3.40	3.72	4.04	4.36	4.67		5.45	14.91	35.08
1 1/8		0.39	0.72	1.24	2.01	3.12	4.65	6.21	6.86	7.51	8.17	8.81	9.44		9.29	30.22	70.84
1 3/8		0.69	1.27	2.17	3.52	5.44	8.10	10.80	11.93	13.06	14.20	15.32	16.40		14.15	52.67	123.04
1 5/8		1.10	2.01	3.44	5.57	8.61	12.79	17.05	18.83	20.61	22.39	24.13	25.87		20.02	83.29	194.04
2 1/8		2.30	4.18	7.15	11.55	17.82	26.48	35.25	38.90	42.59	46.25	49.86	53.36		34.83	172.63	400.37
2 5/8		4.08	7.42	12.66	20.43	31.47	46.73	62.15	68.58	75.05	81.49	87.85	94.04		53.72	304.95	705.17
3 1/8		6.54	11.87	20.22	32.61	50.19	74.45	98.95	109.18	119.36	129.70	139.79	149.64		76.68	486.32	1121.97
3 5/8		9.75	17.68	30.09	48.41	74.56	110.50	146.79	161.94	177.03	192.34	207.28	221.84		103.71	722.32	1662.01
4 1/8		13.79	24.98	42.47	68.28	105.09	155.66	206.58	227.88	249.22	270.74	291.75	312.24		134.81	1018.74	2338.90
5 1/8		24.76	44.78	76.01	122.08	187.69	277.40	368.02	405.87	444.21	481.85	519.53	556.02		210.10	1817.28	4166.17
6 1/8		39.92	72.16	122.29	196.31	301.42	445.20	590.34	650.90	712.22	772.92	832.25	890.68		302.03	2920.59	6677.25
8 1/8		82.99	149.91	253.36	406.59	622.83	919.94	1219.43	1344.48	1468.96	1594.35	1717.94	1837.89		527.57	6041.46	13773.23
Steel																	
IPS	SCH																
3/8	80	0.03	0.06	0.10	0.15	0.23	0.34	0.45	0.50	0.55	0.59	0.64	0.68		1.58	2.28	5.12
1/2	80	0.06	0.11	0.19	0.30	0.46	0.68	0.89	0.98	1.08	1.17	1.26	1.34		2.64	4.48	10.07
3/4	80	0.14	0.26	0.43	0.69	1.04	1.53	2.01	2.22	2.42	2.63	2.83	3.02		4.87	10.11	22.67
1	80	0.29	0.51	0.85	1.35	2.05	3.00	3.94	4.34	4.74	5.14	5.53	5.93		8.10	19.91	44.42
1 1/4	80	0.76	1.34	2.24	3.54	5.38	7.85	10.34	11.38	12.42	13.47	14.53	15.53		16.84	52.21	116.60
1 1/2	80	1.14	2.01	3.36	5.31	8.07	11.79	15.49	17.08	18.64	20.22	21.81	23.32		22.92	78.34	174.91
2	40	2.20	3.89	6.48	10.25	15.57	22.72	29.88	32.87	35.92	39.02	42.00	44.89		37.77	150.93	337.07
2 1/2	40	3.52	6.22	10.34	16.36	24.87	36.32	47.63	52.37	57.33	62.14	66.88	71.49		53.89	240.45	534.65
3	40	6.22	11.00	18.30	28.92	43.75	64.14	84.02	92.53	101.20	109.69	117.89	126.19		83.21	425.18	946.17
4	40	12.71	22.44	37.25	59.04	89.12	130.16	171.12	188.76	206.13	223.42	240.44	257.02		143.30	866.77	1928.28
5	40	22.99	40.52	67.32	106.55	161.32	235.63	309.22	340.40	371.73	402.90	433.58	463.49		225.19	1565.90	3476.06
6	40	37.15	65.56	108.88	172.24	259.71	379.95	499.20	549.52	599.29	650.37	699.93	748.21		325.20	2519.71	5611.76
8	40	76.21	134.33	223.08	352.71	531.42	776.99	1021.56	1124.53	1227.98	1330.86	1432.26	1531.05		563.12	5180.24	11473.57
10	40	138.06	242.94	403.89	637.07	963.20	1406.29	1845.83	2031.75	2218.64	2404.62	2587.81	2766.28		887.61	9325.90	20731.42
12	ID[a]	220.98	388.72	645.83	1017.52	1538.20	2245.86	2952.57	3250.11	3548.86	3846.31	4139.32	4424.77		1273.06	14937.73	33139.68
14	30	286.10	503.35	836.66	1314.81	1987.83	2902.41	3818.45	4203.02	4589.58	4974.24	5353.17	5722.31		1552.09	19331.82	42819.74
16	30	412.15	726.13	1206.46	1895.60	2865.77	4183.94	5499.00	6052.72	6609.05	7162.63	7707.95	8239.19		2056.01	27866.22	61722.89

[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.

O-XL20LSC-ENG (12/23)

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