Opteon™

Suction, Discharge, and Liquid Line Capacities in Kilowatts for

Opteon™ XL41 Refrigerant R-454B

(Single- or High-Stage Applications)

Line Size	Suction Lines, Δt = 0.04 K/m						Discharge Lines, Δt = 0.02 K/m, Δp = 1114.75 Pa						Liquid Lines		
	Saturated Suction Temperature, °C						Saturated Suction Temperature, °C							Δt = 0.02	Δt = 0.05
Type L Copper, OD,	-50	-40	-30	-20	-5	5	-50	-40	-30	-20	-5	5	Velocity =	K/ 1 m Drop	K/ 1 m Drop
			Corresponding Δp, Pa/ 1 m						Corresponding Δp, Pa/ 1 m						
mm	198.25	289.04	405.08	549.54	825.27	1052.47	1114.75	1114.75	1114.75	1114.75	1114.75	1114.75	0.5 m/s	Δp = 1107.67	Δp = 2768.4
12	0.33	0.54	0.84	1.24	2.12	2.92	3.32	3.56	3.79	4.05	4.40	4.63	7.09	16.43	27.05
15	0.63	1.02	1.58	2.35	3.99	5.49	6.24	6.68	7.12	7.60	8.25	8.68	11.40	36.14	50.77
18	1.08	1.75	2.71	4.02	6.83	9.38	10.66	11.42	12.17	12.99	14.10	14.82	17.09	61.42	86.75
22	1.93	3.13	4.83	7.15	12.12	16.64	18.91	20.24	21.68	23.01	24.98	26.26	26.37	107.32	153.71
28	3.82	6.18	9.53	14.09	23.84	32.68	37.15	39.75	42.56	45.16	49.01	51.51	44.00	208.55	301.63
35	7.15	11.54	17.75	26.21	44.28	60.62	68.92	73.73	78.93	83.74	90.84	95.45	70.37	383.41	558.51
42	11.85	19.11	29.36	43.31	73.05	99.93	113.62	121.53	130.08	137.98	149.65	157.23	102.97	627.21	920.35
54	23.53	37.80	58.00	85.57	143.85	196.55	223.80	239.31	256.09	271.58	294.47	309.34	172.68	1224.98	1811.76
67	42.25	67.79	103.88	153.06	257.12	350.74	399.35	426.94	456.78	484.34	525.03	551.46	268.78	2170.03	3231.42
79	65.71	105.46	161.47	237.68	398.82	543.72	619.05	661.72	707.04	749.60	812.46	857.54	375.90	3345.96	5003.65
105	140.98	225.86	345.27	507.49	848.88	1156.65	1323.04	1413.90	1504.69	1594.87	1728.15	1814.68	670.73	7067.06	10649.73
130	250.33	400.51	611.57	897.95	1500.11	2042.80	2336.28	2496.16	2656.02	2814.95	3049.60	3201.93	1037.71	12419.07	18779.32
156	400.58	640.24	976.74	1431.18	2391.43	3255.09	3722.07	3976.42	4230.54	4483.10	4856.00	5098.07	1484.25	19696.52	29915.98
206	837.68	1335.35	2034.52	2977.74	4964.25	6757.08	7723.85	8249.68	8775.09	9297.43	10068.82	10569.36	2603.10	40649.12	62076.28
257	1492.71	2379.62	3621.58	5296.04	8820.25	11996.97	13710.09	14641.21	15571.56	16496.46	17861.86	18748.00	4050.74	71824.78	110171.37
Steel															
mm	**SCH**														
10	80	0.32	0.51	0.78	1.13	1.87	2.52	2.89	3.08	3.27	3.46	3.75	3.92	7.83	14.55	23.16
15	80	0.64	1.01	1.53	2.23	3.68	4.98	5.69	6.06	6.44	6.82	7.37	7.73	13.06	28.67	45.44
20	80	1.45	2.29	3.47	5.03	8.31	11.22	12.80	13.65	14.51	15.36	16.61	17.43	24.12	64.66	102.70
25	80	2.86	4.51	6.79	9.86	16.19	21.86	25.07	26.74	28.41	30.07	32.52	34.11	40.11	126.72	201.16
32	80	7.53	11.87	17.85	25.88	42.62	57.34	65.75	70.13	74.38	78.72	85.13	89.29	83.38	330.95	525.00
40	80	11.32	17.83	26.80	38.84	63.94	86.01	98.45	105.01	111.57	118.08	127.69	133.97	113.48	496.50	787.43
50	40	21.89	34.45	51.76	74.95	122.72	166.40	189.86	202.56	215.19	227.74	246.26	258.27	187.07	960.94	1523.34
65	40	34.97	54.98	82.58	119.53	195.64	263.98	302.73	322.86	342.97	362.96	392.47	411.61	266.91	1532.41	2416.81
80	40	61.93	97.13	145.86	210.27	345.77	466.55	534.96	570.51	605.06	640.34	692.66	726.43	412.19	2695.18	4270.84
100	40	126.39	198.10	297.26	428.31	706.54	949.85	1087.63	1159.94	1232.82	1304.62	1410.58	1479.31	709.74	5488.90	8725.50
125	40	228.57	358.12	537.04	776.30	1275.90	1721.01	1964.76	2095.22	2225.58	2363.34	2542.52	2666.57	1115.48	9946.93	15684.19
150	40	369.68	578.99	867.94	1254.39	2051.31	2767.18	3173.60	3379.19	3589.90	3799.07	4107.02	4307.27	1610.69	15994.77	25334.42
200	40	757.44	1183.97	1767.63	2554.38	4196.94	5661.52	6483.67	6914.19	7344.33	7771.74	8402.48	8820.65	2788.65	32727.74	52016.85
250	40	1369.97	2143.44	3198.95	4622.15	7620.84	10279.93	11738.87	12516.64	13296.07	14070.51	15213.38	15954.42	4396.05	59425.59	94068.16
300	ID[a]	2192.61	3429.15	5135.27	7392.13	12128.79	16360.62	18778.35	20020.00	21261.00	22494.73	24315.64	25496.80	6305.47	94618.33	149749.86
350	30	2837.51	4436.76	6643.74	9562.48	15689.60	21163.19	24275.60	25880.70	27484.95	29117.64	31481.41	33014.17	7685.24	122392.92	193807.05
400	30	4095.01	6401.44	9584.32	13844.04	22630.05	30523.66	35034.67	37360.81	39739.45	42049.97	45459.89	47671.27	10186.07	176528.06	279601.84

[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.

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

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