

# LINE SIZE - R134a

SUCTION LINE																										LIQUID LINE										
Total Ref Duty (Kw)	-10°C Sat. Evap. Temp						-5°C Sat. Evap. Temp					0°C Sat. Evap. Temp					5°C Sat. Evap. Temp					10°C Sat. Evap. Temp					Receiver to T.X valve					Total Ref Duty (Kw)				
	Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)										
		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80	10		25	30	50	80
0.5	1/3	1/2	1/2	1/2	5/8	5/8	1/4	1/2	1/2	1/2	1/2	5/8	1/4	3/8	1/2	1/2	1/2	1/2	1/5	3/8	1/2	1/2	1/2	1/2	1/5	3/8	1/2	1/2	1/2	1/2	1/4	1/4	1/4	3/8	3/8	0.5
1	1/2	1/2	5/8	5/8	3/4	3/4	1/2	1/2	5/8	5/8	5/8	3/4	3/8	1/2	5/8	5/8	5/8	5/8	3/8	1/2	1/2	1/2	5/8	5/8	1/3	3/8	1/2	1/2	5/8	5/8	1/4	1/4	1/4	3/8	3/8	1
2	1-1/2	5/8	3/4	7/8	7/8	7/8	1	5/8	3/4	3/4	7/8	7/8	3/4	5/8	3/4	3/4	3/4	7/8	3/4	5/8	5/8	5/8	3/4	3/4	1/2	1/2	5/8	5/8	3/4	3/4	3/8	3/8	3/8	3/8	3/8	2
3	2	3/4	7/8	7/8	1-1/8	1-1/8	1-3/4	3/4	7/8	7/8	7/8	1-1/8	1-1/2	3/4	3/4	3/4	7/8	1-1/8	1	5/8	3/4	3/4	7/8	7/8	1	5/8	3/4	3/4	3/4	7/8	3/8	3/8	3/8	3/8	1/2	3
4	3-1/2	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3	3/4	7/8	7/8	1-1/8	1-1/8	1-3/4	3/4	7/8	7/8	1-1/8	1-1/8	1-1/2	3/4	7/8	7/8	7/8	1-1/8	1-3/4	5/8	3/4	3/4	7/8	7/8	3/8	3/8	3/8	1/2	1/2	4
5	4	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3-1/2	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3	3/4	7/8	1-1/8	1-1/8	1-1/8	3	3/4	7/8	7/8	1-1/8	1-1/8	3	3/4	7/8	7/8	7/8	1-1/8	3/8	3/8	1/2	1/2	1/2	5
6	5	7/8	1-1/8	1-1/8	1-3/8	1-3/8	4	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3-1/2	3/4	1-1/8	1-1/8	1-1/8	1-3/8	3-1/2	3/4	7/8	7/8	1-1/8	1-1/8	2-1/4	3/4	7/8	7/8	1-1/8	1-1/8	3/8	1/2	1/2	1/2	1/2	6
7.5	6	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	5	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	5	7/8	1-1/8	1-1/8	1-3/8	1-3/8	5	7/8	1-1/8	1-1/8	1-1/8	1-3/8	2-3/4	3/4	7/8	1-1/8	1-1/8	1-1/8	3/8	1/2	1/2	1/2	5/8	7.5
10	7	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	6	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	6	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	6	7/8	1-1/8	1-1/8	1-3/8	1-3/8	3	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1/2	1/2	1/2	5/8	5/8	10
12.5	7-1/2	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	7-1/2	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8		1-1/8	1-3/8	1-3/8	1-3/8	1-5/8		1-1/8	1-1/8	1-3/8	1-3/8	1-3/8		7/8	1-1/8	1-1/8	1-3/8	1-3/8	1/2	1/2	5/8	5/8	5/8	12.5
15		1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	10	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8		1-1/8	1-3/8	1-3/8	1-5/8	1-5/8		1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	4	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1/2	5/8	5/8	5/8	7/8	15
17.5		1-3/8	1-5/8	1-5/8	2-1/8	2-1/8		1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	7-1/2	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8		1-1/8	1-3/8	1-3/8	1-5/8	1-5/8		1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	1/2	5/8	5/8	7/8	7/8	17.5
20		1-3/8	1-5/8	1-5/8	2-1/8	2-1/8		1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	10	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	7-1/2	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8		1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	1/2	5/8	5/8	7/8	7/8	20
30	30	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	30	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8		1-3/8	1-5/8	2-1/8	2-1/8	2-1/8		1-3/8	1-5/8	1-5/8	2-1/8	2-1/8		1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	5/8	7/8	7/8	7/8	7/8	30
40	40	2-1/8	2-1/8	2-1/8	2-5/8	2-5/8	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8		1-5/8	2-1/8	2-1/8	2-1/8	2-5/8		1-5/8	2-1/8	2-1/8	2-1/8	2-5/8		1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	5/8	7/8	7/8	7/8	1-1/8	40
50	50	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	40	2-1/8	2-1/8	2-5/8	2-5/8	2-5/8		1-5/8	2-1/8	2-1/8	2-5/8	2-5/8		1-5/8	2-1/8	2-1/8	2-1/8	2-5/8		1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	7/8	7/8	7/8	7/8	1-1/8	50
60	60	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	50	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8		2-1/8	2-1/8	2-5/8	2-5/8	2-5/8		1-5/8	2-1/8	2-1/8	2-5/8	2-5/8		1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	7/8	7/8	7/8	1-1/8	1-1/8	60
75		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8	60	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8		2-1/8	2-5/8	2-5/8	2-5/8	3-1/8		2-1/8	2-1/8	2-5/8	2-5/8	3-1/8		1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	7/8	1-1/8	1-1/8	1-1/8	1-1/8	75
90		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8		2-1/8	2-5/8	2-5/8	2-5/8	3-1/8		2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	90
105		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8		2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	105
120		2-5/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	120
140		3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	4-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	140
160		3-1/8	4-1/8	4-1/8	4-1/8			3-1/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	160
180		3-1/8	4-1/8	4-1/8	4-1/8			3-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	180
200		3-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8			3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	200
240		4-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8			3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	4-1/8	4-1/8	4-1/8	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8	240
260		4-1/8	4-1/8					4-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8			3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		2-5/8	4-1/8	4-1/8	4-1/8	4-1/8	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	260
280		4-1/8						4-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		3-1/8	4-1/8	4-1/8	4-1/8	4-1/8	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	280
300		4-1/8						4-1/8	4-1/8					3-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		3-1/8	4-1/8	4-1/8	4-1/8	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	300	

Notes:

- (1) This chart has been based on ASHRAE (1998) for type "L" refrigeration grade copper tube.
- (2) Lengths are "Total Equivalent" including valves and fittings. Refer to TABLE 5 for estimates of "Equivalent Lengths" of the more common valves and fittings used today.
- (3) This chart has been formulated to assist the reader and is not intended to be a substitute for good pipe work system design and practice.
- (4) Duties are based on 40°C cond. temp. Multiply **required duty** by the following factors for other cond. temps : 20°C = 0.85, 30°C = 0.91, 40°C = 1.00, 45°C = 1.05, 50°C = 1.10.
- (5) Nom. HP's are to assist obtaining a "rough" unit size at each evaporating point (@ 40° C condensing temperature). HP's are based on current Hermetic Units up to 1-3/4 HP, Scroll Units up to 15 HP and Semi- Hermetic Units above this point.

Table 1

# LINE SIZE - R404A - R507

SUCTION LINE																										LIQUID LINE											
Total Ref Duty (Kw)	-40°C Sat. Evap. Temp						-30°C Sat. Evap. Temp						-20°C Sat. Evap. Temp						-5°C Sat. Evap. Temp						5°C Sat. Evap. Temp						Receiver to T.X valve						Total Ref Duty (Kw)
	Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)											
		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80	10	25	30	50	80		
0.5	1-1/4	1/2	1/2	1/2	5/8	5/8	3/4	1/2	1/2	1/2	5/8	5/8	1/3	3/8	1/2	1/2	5/8	5/8	1/4	3/8	3/8	3/8	1/2	1/2	3/8	3/8	3/8	3/8	3/8	1/4	1/4	1/4	3/8	3/8	0.5		
1		5/8	5/8	3/4	7/8	7/8	1-1/2	5/8	5/8	5/8	3/4	7/8	3/4	1/2	5/8	5/8	3/4	3/4	3/8	1/2	1/2	1/2	5/8	5/8	1/3	3/8	3/8	1/2	1/2	1/2	3/8	3/8	3/8	3/8	3/8	1	
2	3-1/2	3/4	3/4	7/8	7/8	1-1/8	3	3/4	3/4	7/8	7/8	7/8	1-1/2	5/8	3/4	3/4	7/8	7/8	3/4	5/8	5/8	5/8	3/4	3/4	5/8	1/2	5/8	5/8	5/8	3/4	3/4	3/8	3/8	3/8	3/8	2	
3	5	7/8	7/8	7/8	1-1/8	1-1/8	4	7/8	7/8	7/8	1-1/8	1-1/8		3/4	7/8	7/8	7/8	1-1/8	1-1/2	5/8	5/8	3/4	3/4	7/8	1-1/4	5/8	5/8	5/8	3/4	3/4	3/8	3/8	3/8	3/8	1/2	3	
4	7-1/2	7/8	7/8	1-1/8	1-1/8	1-3/8	5	7/8	7/8	1-1/8	1-1/8	1-3/8	3	7/8	7/8	7/8	1-1/8	1-1/8		5/8	3/4	3/4	7/8	7/8	1-1/2	5/8	3/4	3/4	3/4	7/8	3/8	3/8	3/8	1/2	1/2	4	
5	10	7/8	1-1/8	1-1/8	1-3/8	1-3/8	6	7/8	1-1/8	1-1/8	1-3/8	1-3/8	3-1/2	7/8	7/8	1-1/8	1-1/8	1-1/8		3/4	3/4	7/8	7/8	1-1/8		5/8	3/4	3/4	7/8	7/8	3/8	1/2	1/2	1/2	1/2	5	
6		1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	7-1/2	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	4	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3	3/4	7/8	7/8	1-1/8	1-1/8		3/4	3/4	7/8	7/8	1-1/8	3/8	1/2	1/2	1/2	1/2	6	
7.5	13	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8		1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	6	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	3-1/2	7/8	7/8	1-1/8	1-1/8	1-1/8	3	3/4	7/8	7/8	7/8	1-1/8	3/8	1/2	1/2	1/2	5/8	7.5	
10	15	1-3/8	1-3/8	1-3/8	1-5/8	1-5/8	10	1-3/8	1-3/8	1-3/8	1-5/8	1-5/8	7-1/2	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	5	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3-1/2	7/8	7/8	7/8	1-1/8	1-1/8	1/2	1/2	1/2	5/8	5/8	10	
12.5	22	1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	13	1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	10	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	6	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	5	7/8	7/8	1-1/8	1-1/8	1-3/8	1/2	5/8	5/8	5/8	5/8	12.5	
15	27	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8		1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	13	1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	7-1/2	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	6	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1/2	5/8	5/8	5/8	5/8	15	
17.5	30	1-5/8	1-5/8	1-5/8	2-1/8	2-1/8	15	1-5/8	1-5/8	1-5/8	2-1/8	2-1/8	15	1-3/8	1-5/8	1-5/8	1-5/8	1-5/8		1-1/8	1-3/8	1-3/8	1-3/8	1-5/8		1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1/2	5/8	5/8	5/8	5/8	17.5	
20	37	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	22	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	20	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	10	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7-1/2	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	5/8	5/8	5/8	5/8	7/8	20	
30	45	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	30	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	30	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	15	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	13	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	5/8	5/8	7/8	7/8	7/8	30	
40		2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	37	2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	25	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	15	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7/8	7/8	7/8	7/8	1-1/8	40	
50		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	45	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	40	2-1/8	2-1/8	2-5/8	2-5/8	2-5/8	30	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	20	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	7/8	7/8	7/8	1-1/8	1-1/8	50	
60		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8	50	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	25	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	7/8	7/8	1-1/8	1-1/8	1-1/8	60	
75		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8	60	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	40	1-5/8	2-1/8	2-5/8	2-5/8	2-5/8	30	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	75	
90		3-1/8	3-1/8	4-1/8	4-1/8			3-1/8	3-1/8	4-1/8	4-1/8		50	2-5/8	2-5/8	3-1/8	3-1/8	3-1/8	50	2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	90	
105		3-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8			60	2-5/8	3-1/8	3-1/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	40	1-5/8	2-1/8	2-5/8	2-5/8	2-5/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	105	
120		4-1/8	4-1/8	4-1/8				4-1/8	4-1/8	4-1/8				2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-1/8	2-5/8	3-1/8	3-1/8	3-1/8	50	2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	120	
140		4-1/8	4-1/8					4-1/8	4-1/8					3-1/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	140	
160		4-1/8	4-1/8					4-1/8	4-1/8					3-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	3-1/8	3-1/8	4-1/8	60	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	160	
180		4-1/8	4-1/8					4-1/8	4-1/8					3-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	3-1/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	180	
200		4-1/8						4-1/8						3-1/8	4-1/8	4-1/8				3-1/8	3-1/8	4-1/8	4-1/8			2-5/8	3-1/8	3-1/8	3-1/8	4-1/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	200	
240														4-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	3-1/8	3-1/8	4-1/8	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	240	
260														4-1/8	4-1/8					3-1/8	4-1/8	4-1/8	4-1/8			3-1/8	3-1/8	3-1/8	4-1/8	4-1/8	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	260	
280														4-1/8	4-1/8					3-1/8	4-1/8	4-1/8	4-1/8			3-1/8	3-1/8	4-1/8	4-1/8	4-1/8	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	280	
300														4-1/8						4-1/8	4-1/8	4-1/8	4-1/8			3-1/8	4-1/8	4-1/8	4-1/8	4-1/8	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	300	

Notes:

- (1) This chart has been based on ASHRAE (1998) for type "L" refrigeration grade copper tube.
- (2) Lengths are "Total Equivalent" including valves and fittings. Refer to TABLE 5 for estimates of "Equivalent Lengths" of the more common valves and fittings used today.
- (3) This chart has been formulated to assist the reader and is not intended to be a substitute for good pipe work system design and practice.
- (4) Duties are based on 40°C cond. temp. Multiply **required duty** by the following factors for other cond. temps : 20°C = 0.85, 30°C = 0.91, 40°C = 1.00, 45°C = 1.05, 50°C = 1.10.
- (5) Nom. HP's are to assist obtaining a "rough" unit size at each evaporating point (@ 40° C condensing temperature). HP's are based on current Hermetic Units up to 1-3/4 HP, Scroll Units up to 15 HP and Semi- Hermetic Units above this point.

Table 2

# LINE SIZE - R22 - R407F

SUCTION LINE																										LIQUID LINE											
Total Ref Duty (Kw)	-30°C Sat. Evap. Temp						-20°C Sat. Evap. Temp						-5°C Sat. Evap. Temp						5°C Sat. Evap. Temp						10°C Sat. Evap. Temp						Receiver to T.X valve						Total Ref Duty (Kw)
	Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Nom. HP (5)	Equivalent length (m)					Equivalent length (m)						
		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80		10	25	30	50	80	10	25	30	50	80		
0.5	3/4	1/2	1/2	1/2	5/8	5/8	3/8	3/8	1/2	1/2	1/2	5/8	5/8	1/4	3/8	3/8	3/8	1/2	1/2	1/5	3/8	3/8	3/8	3/8	1/2	1/2	1/4	1/4	1/4	3/8	3/8	0.5					
1	1-1/4	5/8	5/8	5/8	3/4	3/4	1	1/2	5/8	5/8	5/8	3/4	3/4	3/8	1/2	1/2	1/2	5/8	5/8	1/3	1/2	1/2	1/2	1/2	1/2	1/4	3/8	3/8	3/8	3/8	3/8	1					
2	2	3/4	3/4	7/8	7/8	7/8	1-1/2	5/8	3/4	3/4	7/8	7/8	1	1	1/2	5/8	5/8	3/4	3/4	5/8	1/2	5/8	5/8	5/8	3/4	1/2	1/2	5/8	5/8	5/8	3/8	3/8	2				
3	3-1/2	7/8	7/8	7/8	1-1/8	1-1/8	3	3/4	7/8	7/8	7/8	7/8	1-1/2	1-1/2	5/8	3/4	3/4	3/4	7/8	1	1/2	5/8	5/8	3/4	3/4	3/4	3/4	3/8	3/8	3/8	3/8	1/2	3				
4	5	7/8	7/8	1-1/8	1-1/8	1-1/8	3-1/2	3/4	7/8	7/8	1-1/8	1-1/8	2	2	5/8	3/4	3/4	7/8	7/8	1-1/4	5/8	3/4	3/4	3/4	7/8	1-1/4	5/8	5/8	3/4	3/4	7/8	3/8	3/8	4			
5	6	7/8	1-1/8	1-1/8	1-1/8	1-3/8	4	7/8	7/8	1-1/8	1-1/8	1-3/8	4	4	3/4	3/4	7/8	7/8	1-1/8	1-3/4	5/8	3/4	3/4	7/8	7/8	1-1/2	5/8	3/4	3/4	7/8	7/8	3/8	3/8	5			
6	7-1/2	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	5	7/8	1-1/8	1-1/8	1-1/8	1-3/8	5	5	3/4	7/8	7/8	1-1/8	1-1/8	2	3/4	3/4	7/8	7/8	1-1/8	2	5/8	3/4	3/4	7/8	7/8	3/8	3/8	6			
7.5	10	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	6	7/8	1-1/8	1-1/8	1-3/8	1-3/8	6	6	3/4	7/8	7/8	1-1/8	1-1/8	3	3/4	7/8	7/8	7/8	1-1/8	2	3/4	7/8	7/8	7/8	1-1/8	3/8	1/2	7.5			
10	13	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7-1/2	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	7-1/2	7-1/2	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3-1/2	3/4	7/8	7/8	1-1/8	1-1/8	3	3/4	7/8	7/8	1-1/8	1-1/8	3/8	1/2	10			
12.5		1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	10	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	10	10	7/8	1-1/8	1-1/8	1-3/8	1-3/8	4	7/8	7/8	1-1/8	1-1/8	1-3/8	3	7/8	7/8	1-1/8	1-1/8	1-1/8	1/2	1/2	12.5			
15	15	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	13	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8	13	13	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	5	7/8	1-1/8	1-1/8	1-1/8	1-3/8	5	7/8	1-1/8	1-1/8	1-1/8	1-3/8	1/2	1/2	15			
17.5		1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	15	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	15	15	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	6	7/8	1-1/8	1-1/8	1-3/8	1-3/8	4	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1/2	5/8	17.5			
20	22	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	20	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	20	20	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7-1/2	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	4-1/2	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1/2	5/8	20			
30	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	30	1-5/8	1-5/8	2-1/8	2-1/8	2-5/8	30	30	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	10	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7-1/2	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	5/8	5/8	30			
40	40	2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	35	35	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	15	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	10	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	5/8	7/8	40			
50	50	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	50	2-1/8	2-1/8	2-5/8	2-5/8	2-5/8	50	50	1-5/8	1-5/8	2-1/8	2-1/8	2-1/8	20	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	15	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	7/8	7/8	50			
60	60	2-5/8	2-5/8	3-1/8	3-1/8	3-1/8	60	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	60	60	1-5/8	2-1/8	2-1/8	2-1/8	2-1/8	25	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	20	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	7/8	7/8	60			
75		2-5/8	3-1/8	3-1/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8		40	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	30	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	25	1-5/8	1-5/8	2-1/8	2-1/8	7/8	7/8	75				
90		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	3-1/8		50	2-1/8	2-1/8	2-5/8	2-5/8	2-5/8	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	30	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	7/8	7/8	90			
105		2-5/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	3-1/8	4-1/8		60	2-1/8	2-5/8	2-5/8	2-5/8	2-5/8	40	2-1/8	2-1/8	2-1/8	2-5/8	2-5/8	35	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	7/8	1-1/8	105			
120		3-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		50	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	50	2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	40	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	7/8	1-1/8	120			
140		3-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	4-1/8	4-1/8	4-1/8		60	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	50	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	50	2-1/8	2-1/8	2-5/8	2-5/8	2-5/8	7/8	1-1/8	140			
160		3-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8	4-1/8			2-5/8	2-5/8	3-1/8	3-1/8	3-1/8	60	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	60	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	7/8	1-1/8	160			
180		4-1/8	4-1/8	4-1/8				3-1/8	4-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8		2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	1-1/8	1-1/8	180			
200		4-1/8	4-1/8					3-1/8	4-1/8	4-1/8	4-1/8	4-1/8			2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-1/8	2-5/8	3-1/8	3-1/8	3-1/8		2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	1-1/8	1-3/8	200			
240		4-1/8						3-1/8	4-1/8	4-1/8					2-5/8	3-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	3-1/8	4-1/8		2-1/8	2-5/8	2-5/8	3-1/8	4-1/8	1-1/8	1-3/8	240			
260		4-1/8						4-1/8	4-1/8	4-1/8					2-5/8	4-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	2-5/8	3-1/8	3-1/8	4-1/8	1-1/8	1-3/8	260			
280		4-1/8						4-1/8	4-1/8	4-1/8					3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8	1-1/8	1-3/8	280			
300		4-1/8						4-1/8	4-1/8						3-1/8	4-1/8	4-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8		2-5/8	3-1/8	3-1/8	4-1/8	4-1/8	1-1/8	1-3/8	300			

Notes:

- (1) This chart has been based on ASHRAE (1998) for type "L" refrigeration grade copper tube.
- (2) Lengths are "Total Equivalent" including valves and fittings. Refer to TABLE 5 for estimates of "Equivalent Lengths" of the more common valves and fittings used today.
- (3) This chart has been formulated to assist the reader and is not intended to be a substitute for good pipe work system design and practice.
- (4) Duties are based on 40°C cond. temp. Multiply **required duty** by the following factors for other cond. temps : 20°C = 0.85, 30°C = 0.91, 40°C = 1.00, 45°C = 1.05, 50°C = 1.10.
- (5) Nom. HP's are to assist obtaining a "rough" unit size at each evaporating point (@ 40° C condensing temperature). HP's are based on current Hermetic Units up to 1-3/4 HP, Scroll Units up to 15 HP and Semi- Hermetic Units above this point.

Table 3

# REMOTE CONDENSER LINE SIZE

Total Ref Duty (Kw)	R134a							R404A - R507							R22 - R407F							Total Ref Duty (Kw)
	DISCHARGE LINE					DRAIN LINE		DISCHARGE LINE					DRAIN LINE		DISCHARGE LINE					DRAIN LINE		
	Equivalent length (m)					Cond to Receiver (4)	Cond to Receiver (5)	Equivalent length (m)					Cond to Receiver (4)	Cond to Receiver (5)	Equivalent length (m)					Cond to Receiver (4)	Cond to Receiver (5)	
	10	25	30	50	80			10	25	30	50	80			10	25	30	50	80			
0.5	3/8	3/8	1/2	1/2	1/2	1/4	1/4	3/8	3/8	3/8	1/2	1/2	1/4	1/4	3/8	3/8	3/8	3/8	3/8	1/4	1/4	0.5
1	3/8	1/2	1/2	1/2	1/2	1/4	3/8	3/8	1/2	1/2	1/2	1/2	3/8	3/8	3/8	3/8	3/8	3/8	1/2	3/8	3/8	1
2	1/2	1/2	1/2	5/8	5/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8	3/8	3/8	3/8	1/2	1/2	1/2	1/2	3/8	3/8	2
3	1/2	5/8	5/8	5/8	3/4	3/8	3/8	1/2	5/8	5/8	5/8	3/4	3/8	3/8	1/2	1/2	1/2	5/8	5/8	3/8	3/8	3
4	1/2	5/8	5/8	3/4	3/4	3/8	3/8	1/2	5/8	5/8	3/4	3/4	3/8	1/2	1/2	1/2	5/8	5/8	5/8	3/8	3/8	4
5	5/8	5/8	3/4	3/4	7/8	1/2	1/2	5/8	5/8	5/8	3/4	7/8	1/2	5/8	1/2	5/8	5/8	5/8	3/4	3/8	3/8	5
6	5/8	3/4	3/4	7/8	7/8	1/2	1/2	5/8	3/4	3/4	3/4	7/8	1/2	5/8	1/2	5/8	5/8	3/4	3/4	1/2	3/8	6
7.5	5/8	3/4	3/4	7/8	7/8	1/2	1/2	5/8	3/4	3/4	7/8	7/8	1/2	5/8	5/8	3/4	3/4	3/4	7/8	1/2	1/2	7.5
10	3/4	7/8	7/8	7/8	1-1/8	5/8	5/8	3/4	7/8	7/8	7/8	1-1/8	5/8	5/8	5/8	3/4	3/4	7/8	7/8	1/2	5/8	10
12.5	3/4	7/8	7/8	1-1/8	1-1/8	5/8	3/4	3/4	7/8	7/8	1-1/8	1-1/8	5/8	3/4	3/4	3/4	7/8	7/8	1-1/8	5/8	5/8	12.5
15	7/8	7/8	1-1/8	1-1/8	1-1/8	5/8	3/4	3/4	7/8	1-1/8	1-1/8	1-1/8	3/4	7/8	3/4	7/8	7/8	7/8	1-1/8	5/8	3/4	15
17.5	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3/4	7/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3/4	7/8	3/4	7/8	7/8	1-1/8	1-1/8	5/8	3/4	17.5
20	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3/4	7/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3/4	7/8	3/4	7/8	7/8	1-1/8	1-1/8	5/8	3/4	20
30	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-3/8	7/8	1-1/8	7/8	1-1/8	1-1/8	1-1/8	1-3/8	3/4	7/8	30
40	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7/8	1-1/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7/8	1-3/8	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	7/8	1-1/8	40
50	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	7/8	1-3/8	1-1/8	1-3/8	1-3/8	1-5/8	2-1/8	1-1/8	1-3/8	1-1/8	1-3/8	1-3/8	1-3/8	1-5/8	7/8	1-1/8	50
60	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	1-1/8	1-5/8	1-1/8	1-3/8	1-3/8	1-5/8	1-5/8	7/8	1-3/8	60
75	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	1-1/8	1-5/8	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	1-1/8	1-5/8	1-3/8	1-3/8	1-5/8	1-5/8	2-1/8	1-1/8	1-3/8	75
90	1-5/8	2-1/8	2-1/8	2-1/8	2-1/8	1-1/8	1-5/8	1-3/8	1-5/8	2-1/8	2-1/8	2-1/8	1-3/8	1-5/8	1-3/8	1-5/8	1-5/8	1-5/8	2-1/8	1-1/8	1-5/8	90
105	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	1-3/8	2-1/8	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	1-3/8	2-1/8	1-3/8	1-5/8	1-5/8	2-1/8	2-1/8	1-3/8	2-1/8	105
120	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	1-3/8	2-1/8	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	1-3/8	2-1/8	1-3/8	1-5/8	2-1/8	2-1/8	2-1/8	1-3/8	2-1/8	120
140	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	1-3/8	2-1/8	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	1-3/8	2-1/8	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	1-3/8	2-1/8	140
160	2-1/8	2-1/8	2-1/8	2-5/8	2-5/8	1-3/8	2-1/8	2-1/8	2-1/8	2-1/8	2-5/8	2-5/8	1-5/8	2-5/8	1-5/8	2-1/8	2-1/8	2-1/8	2-5/8	1-3/8	2-1/8	160
180	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	1-3/8	2-5/8	2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	1-5/8	2-5/8	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	1-3/8	2-1/8	180
200	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	1-5/8	2-5/8	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	1-5/8	3-1/8	1-5/8	2-1/8	2-1/8	2-5/8	2-5/8	1-3/8	2-5/8	200
240	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	1-5/8	2-5/8	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	1-5/8	3-1/8	2-1/8	2-1/8	2-5/8	2-5/8	2-5/8	1-3/8	2-5/8	240
260	2-1/8	2-5/8	2-5/8	3-1/8	4-1/8	1-5/8	3-1/8	2-1/8	2-5/8	2-5/8	3-1/8	3-1/8	1-5/8	3-1/8	2-1/8	2-1/8	2-5/8	2-5/8	3-1/8	1-5/8	2-5/8	260
280	2-1/8	2-5/8	2-5/8	3-1/8	4-1/8	1-5/8	3-1/8	2-1/8	2-5/8	2-5/8	3-1/8	4-1/8	2-1/8	3-1/8	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	1-5/8	3-1/8	280
300	2-5/8	2-5/8	3-1/8	3-1/8	4-1/8	1-5/8	3-1/8	2-1/8	2-5/8	3-1/8	3-1/8	4-1/8	2-1/8	3-1/8	2-1/8	2-5/8	2-5/8	2-5/8	3-1/8	1-5/8	3-1/8	300

- Notes:
- (1) This chart has been based on ASHRAE (1998) for type "L" refrigeration grade copper tube.
  - (2) Lengths are "Total Equivalent" including valves and fittings. Refer to TABLE 5 for estimates of "Equivalent Lengths" of the more common valves and fittings used today.
  - (3) This chart has been formulated to assist the reader and is not intended to be a substitute for good pipe work system design and practice.
  - (4) Use these sizes for condenser to receiver drain lines when additional gas balance lines are installed (to avoid "liquid hang-up" in the condenser). These are based on 0.02K/m of pipe run.
  - (5) Use these sizes for condenser to receiver drain lines which are "self venting" (no additional gas balance line req'd).

Table 4

# EQUIVALENT LENGTHS - VALVES & FITTINGS

Table 5

Valves	Fitting Size													
	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1-1/8"	1-3/8"	1-5/8"	2-1/8"	2-5/8"	3-1/8"	3-5/8"	4-1/8"
<b>Valves</b>	<b>Equivalent length (m)</b>													
Ball Valve	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.6	0.8		
Rotolock Valve	1.3	1.5	2.6	3.3	3.7	4.5	5.6	6.7	7.8	10.4	12.6	15.6		
Angle Receiver Valve	1.1	1.2	2.1	2.7	3.1	3.7	4.6	5.5	6.4	8.5	10.4	12.8	14.9	17.4
Flanged Service Valve		2.3	4.0	4.6	5.7	6.9	8.6	10.3	12.0	16.0	19.4	24.0	28.0	32.6
Check Valve		1.9	1.4	1.4	3.4	7.0	9.4	24.4	51.6					
<b>Fittings (Copper Sweat)</b>														
45° Elbow	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.4	1.7
90° Elbow	0.2	0.2	0.3	0.6	0.7	0.8	0.9	1.2	1.4	1.5	2.1	2.4	3.1	3.7
180° Return Bend	0.4	0.5	0.6	0.8	1.1	1.2	1.5	1.8	2.1	3.4	4.0	4.9	5.5	6.4
Tee (from side branch)	0.5	0.6	0.9	1.2	1.4	1.5	1.8	2.4	2.7	3.7	4.3	5.2	6.1	6.7
P Trap	0.6	0.7	0.9	1.4	1.7	2.0	2.4	3.1	3.5	4.9	6.1	7.3	8.5	10.1
<b>Change Fittings - Reducers (Eg: 1/2" to 3/8" = one size or 1-3/8" to 7/8" = two sizes)</b>														
One size change		0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8
Two size changes			0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.9	0.9
Three size changes				0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.9	0.9	1.0

Notes:

- This chart has been produced to assist refrigeration pipe system design using the "equivalent pipe length" method.  
Add the total equivalent length for each fitting to each particular line type and then combine with line lengths. Then enter in at the applicable point of the "LINE SIZE" tables.

## COMPENSATION REQUIRED (By Subcooling) FOR VERTICAL LIFT IN LIQUID LINES.

Table 6

Deg K @ Lift Shown.

Liquid Temp (°C)	R134a		R404A - R507		R22 - R407F	
	Lift (m)		Lift (m)		Lift (m)	
	3.0	6.0	3.0	6.0	3.0	6.0
20°	2.0	3.9	1.2	2.3	1.4	2.7
30°	1.6	3.1	0.9	1.9	1.1	2.2
40°	1.3	2.5	0.8	1.6	0.9	1.8
50°	1.0	2.1	0.7	1.5	0.8	1.5
60°	0.9	1.8	0.6	1.1	0.7	1.3

Notes:

- This chart is to assist in allowance for vertical lift in liquid line runs. Figures show the degree of subcooling required (K) in order to compensate for the effect of lift. (Compensation can be achieved through the installation of a 'suction to liquid' heat exchanger.)
- For lifts other than listed proportion figures accordingly.
- Figures are "net effects", meaning a net loss thru vertical rise may be offset by a nett gain through vertical fall in liquid line.

# REFRIGERANT PIPE HOLDING CAPACITIES. (Kg/m)

Table 7

		Temp (°C)	Pipe Size													
			1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1-1/8"	1-3/8"	1-5/8"	2-1/8"	2-5/8"	3-1/8"	3-5/8"	4-1/8"
R134a	SUCTION	-10°	0.0002	0.0005	0.0010	0.0016	0.0024	0.0032	0.0055	0.0084	0.0119	0.0208	0.0320	0.0457	0.0618	0.0804
		-5°	0.0002	0.0006	0.0012	0.0019	0.0028	0.0038	0.0064	0.0098	0.0138	0.0241	0.0371	0.0530	0.0717	0.0932
		0°	0.0003	0.0007	0.0014	0.0023	0.0034	0.0045	0.0077	0.0117	0.0166	0.0288	0.0444	0.0634	0.0857	0.1114
		5°	0.0003	0.0009	0.0017	0.0027	0.0040	0.0053	0.0091	0.0139	0.0196	0.0342	0.0527	0.0752	0.1017	0.1322
		10°	0.0004	0.0010	0.0020	0.0032	0.0047	0.0063	0.0108	0.0164	0.0232	0.0404	0.0622	0.0888	0.1201	0.1562
	DISCHARGE	60°	0.0017	0.0045	0.0087	0.0136	0.0205	0.0273	0.0465	0.0708	0.1002	0.1743	0.2688	0.3837	0.5190	0.6746
	LIQUID	35°	0.0223	0.0602	0.1167	0.1822	0.2735	0.3648	0.6215	0.9463	1.3405	2.3309	3.5944	5.1306	6.9393	9.0207
R404A - R507	SUCTION	-40°	0.0001	0.0004	0.0007	0.0011	0.0016	0.0022	0.0037	0.0056	0.0079	0.0138	0.0212	0.0303	0.0410	0.0532
		-30°	0.0002	0.0006	0.0011	0.0017	0.0026	0.0034	0.0058	0.0088	0.0125	0.0218	0.0336	0.0479	0.0648	0.0842
		-20°	0.0003	0.0008	0.0015	0.0024	0.0036	0.0048	0.0082	0.0125	0.0177	0.0308	0.0474	0.0680	0.0915	0.1190
		-5°	0.0005	0.0013	0.0026	0.0040	0.0060	0.0080	0.0137	0.0208	0.0294	0.0512	0.0790	0.1127	0.1524	0.1981
		5°	0.0007	0.0018	0.0036	0.0056	0.0084	0.0112	0.0190	0.0289	0.0410	0.0713	0.1100	0.1570	0.2123	0.2760
	DISCHARGE	60°	0.0037	0.0101	0.0196	0.0305	0.0458	0.0612	0.1042	0.1586	0.2247	0.3908	0.6026	0.8602	1.1634	1.5123
	LIQUID	35°	0.0190	0.0515	0.0997	0.1557	0.2337	0.3117	0.5311	0.8086	1.1455	1.9918	3.0716	4.3843	5.9299	7.7085
R22 - R407F	SUCTION	-40°	0.0001	0.0003	0.0005	0.0008	0.0011	0.0015	0.0026	0.0039	0.0056	0.0097	0.0150	0.0214	0.0290	0.0376
		-30°	0.0001	0.0004	0.0007	0.0012	0.0017	0.0023	0.0039	0.0060	0.0085	0.0147	0.0227	0.0324	0.0439	0.0570
		-20°	0.0002	0.0006	0.0011	0.0017	0.0025	0.0034	0.0057	0.0088	0.0124	0.0216	0.0332	0.0475	0.0642	0.0834
		-5°	0.0003	0.0009	0.0018	0.0028	0.0043	0.0057	0.0097	0.0147	0.0209	0.0363	0.0560	0.0799	0.1081	0.1405
		5°	0.0005	0.0013	0.0025	0.0039	0.0059	0.0078	0.0133	0.0203	0.0287	0.0499	0.0770	0.1099	0.1486	0.1932
	DISCHARGE	60°	0.0021	0.0058	0.0112	0.0174	0.0262	0.0349	0.0595	0.0906	0.1283	0.2231	0.3440	0.4911	0.6642	0.8634
	LIQUID	35°	0.0220	0.0593	0.1149	0.1795	0.2694	0.3593	0.6123	0.9322	1.3205	2.2962	3.5410	5.0543	6.8362	8.8866

## CORRECTION FACTORS FOR LIQUID & DISCHARGE LINES

Table 8

	DISCHARGE GAS TEMPERATURE (°C)							LIQUID TEMPERATURE (°C)						
	30°	35°	40°	45°	50°	65°	70°	20°	25°	30°	40°	45°	50°	55°
R134a	0.43	0.50	0.57	0.66	0.76	1.15	1.32	1.05	1.03	1.02	0.98	0.96	0.94	0.92
R404A - R507	0.38	0.44	0.51	0.60	0.70	1.21	1.89	1.07	1.04	1.02	0.97	0.94	0.90	0.86
R22 - R407F	0.45	0.52	0.59	0.68	0.77	1.14	1.31	1.05	1.04	1.02	0.98	0.96	0.94	0.92

Note:

1. Use these charts to estimate system refrigerant charge by adding these pipe holding capacities to the estimated holding capacities of all evaporator(s) & condenser(s) in the system.