KLEA® 407A

Engineers' Tables
British Units

Mexichem
FLUOR

1. Introduction

This is the first edition of the Mexichem Fluor Engineers' Tables for KLEA®407C. In these tables you'll find practical information to help you design or set up refrigeration systems using KLEA®407C. We've tried to make the layout as easy as possible to use; where possible we've followed the existing conventions used in standard reference works. These tables are supplementary to the Physical Property Data Sheet for KLEA®407C and the booklets of Thermodynamic Property Data for KLEA®407C.

2. Temperature-Pressure Tables For KLEA®407C

2.1 Evaporator and Condenser Tables

The temperature glide need cause no problems so long as you know the correct relationship between pressure and temperature for the evaporator and the condenser. If you are unsure about the basic behavior of blended refrigerants, refer to the Mexichem Fluor technical note entitled "Introduction to Refrigerant Blends: Azeotropes and Zeotropes" for further guidance. Bear in mind:

- When specifying the evaporating and condensing temperatures we set *mean* temperatures in these heat exchangers.
- When setting evaporator superheat we determine it from the saturated vapor or *dew point* temperature in the evaporator.
- When setting subcool we determine it from the saturated liquid or *bubble point* temperature in the condenser.

The following simple guidelines explain which tables to use to obtain the relationships between the saturated liquid and vapor pressures and temperatures. We have tabulated the following data for you:

Table 1: Evaporator pressure from condenser liquid temperature and evaporator mean temperature.
Table 2: Evaporator temperature from condenser liquid temperature and evaporator pressure.
Table 3: Evaporator saturated vapor temperature from pressure (dew point).
Table 4: Condenser pressure from mean temperature.
Tables 5-7: Maximum recommended suction line capacities for varying suction gas conditions.
Table 8: Discharge line capacities.
Table 9: Liquid line capacities.
Table 10: Recommended minimum capacities for oil entrainment in suction lines.
Table 11: Correction factors for use with the capacity tables at other conditions.
Refrigerant Flowrate: A graphical correlation of refrigerant flowrate per unit capacity.

2.2 Using the Tables

- In setting up a system to give a specified mean evaporating temperature, you simply look up the pressure you need in the evaporator using the temperature of liquid at the expansion valve and the mean temperature you want in Table 1.
- The liquid temperature at the valve has only a slight effect on the mean temperature, but we have tabulated it nonetheless. For practical purposes, the evaporator pressure will not vary significantly even if the liquid temperature at the valve changes.
- To set the mean temperature for the condenser, just look up the mean condensing pressure in Table 2.
- To determine the superheat for a given pressure, use the table of saturated vapor temperatures *(dew points)* to give you the saturation temperature for the vapor leaving the evaporator.
- To determine the subcooling for a given pressure, use the table of saturated liquid temperature *(bubble point)* as a function of pressure.
- You can also readily estimate the mean temperatures from pressure readings using these tables.
- The capacity tables follow the standard layouts used in other reference sources.

2.3 Worked Examples for Mean Pressure/Temp. Tables:

(i) **Setting the evaporator pressure**

Problem:

Liquid temperature at valve: 105°F.
Desired evaporating temperature: -20°F.
What is the evaporator pressure to use?
What is the effect of a liquid temp of 85°F?

Solution:

For KLEA®407C, with a liquid temperature at the valve of 105°F and a desired mean evaporating temperature of -20°F, read Table 1 to get an evaporator pressure of 23.2 psia. A liquid temperature of 85°F gives an evaporator pressure of 23.5 psia... a change of 1%.

(ii) **Finding the evaporator temperature from a gauge reading**

Problem:

Evaporator pressure gauge reads 34 psia.
Measured exit temperature (from thermometer) is 10°F.
What is the mean evaporator temperature?
What is the superheat in the evaporator?

Solution:

For KLEA®407C, we have a measured evaporator pressure of 34 psia and a measured exit temperature of 10°F; we want to check superheat and evaporating temperature. The liquid temperature is 105°F. Table 2 shows that the mean evaporating temperature is -4.0°F. The superheat is determined from the dew point, given in Table 3 as -0.4°F; hence, we have a working superheat of 10.4°F, obtained by subtracting

the dew point temperature from the measured exit temperature.

(iii) Setting up the condenser pressure and subcool

Problem:

Target mean condenser temperature is 110°F.
The liquid temp, at the valve will be 85 °F.
What is the condensing pressure?
What degree of subcooling will be required?

Solution:

Table 3 supplies the condenser pressure of 260 psia for a mean condenser of 110°F. Then the subcooling is obtained by subtracting the liquid temperature of 85°F from the bubble point of 105.5°F, giving a subcool of 20.5°F.

3. Refrigerant Line Capacity Tables

3.1 Methods Used to Generate Tables

The tables presented here have been developed using the methodology described in the ASHRAE Handbook: Refrigeration Systems and Applications (1994). The physical property data used to generate these tables are correlated in the Mexichem Fluor data sheets and thermodynamic tables (date of issue January 1994). Pressure drop has been estimated using the Colebrook equation to obtain friction factors and the Darcy-Weisbach equation for pressure drop.

Gas Compressibility Effects

In calculating the maximum capacity (flowrate) it has been assumed that the gas is incompressible. This is in line with the tables published in the ASHRAE handbook and for most systems this is perfectly adequate.

The assumption of incompressibility may, however, overpredict capacity if the total pressure drop is appreciable compared to the static pressure. The likely overprediction will be in the region of 5-10% depending on the evaporator pressure and total line loss (including fittings loss).

Mexichem Fluor recommends that the pressure drop obtained for a line using these tables should be compared to the total pressure available; if it is greater than 5% of the static pressure then the compressibility may have some effect, and sizing should be made on that basis.

3.2 Suction Line Capacity Tables

These tables give capacities for cycles operating under the following conditions:

- Condenser mean temperature 110°F.
- Zero subcooling (i.e. liquid at bubble point).
- Vapor leaving evaporator (i) saturated i.e. at dew point or (ii) superheated (superheat quoted in the table).
- Evaporator temperatures quoted are true mean values.

The capacity for other liquid temperatures may be found using the tabulated correction factors given in Table 11.

Note that the tables are referenced to a mean condenser of 110°F; the liquid temperature (bubble point) corresponding to this condition is quoted in the tables.

The tables quote capacity for pressure drops in the mean evaporating pressure equivalent to a drop in saturation temperature of 0.5, 1 and 2°F in 100 feet pipe length. Data are presented for copper tubing, Type L, and Schedule 40 steel pipe with dimensions as given in the ASHRAE Handbook HVAC Systems and Equipment (1992).

The mass flowrate of refrigerant is also presented graphically as the flow in lb/hr required for a duty of 1 ton refrigeration over a range of evaporating temperatures and liquid temperatures.

3.3 Discharge Line Capacity Tables

These have been calculated on the following basis:

- Condenser mean temperature of 110°F.
- Zero subcooling i.e. liquid at bubble point.
- Vapor leaves evaporator at dew point i.e. zero useful superheat
- Superheat at compressor discharge is (i) 80 or (ii) 110°F.
- Evaporator temperatures are true mean values.

3.4 Liquid Line Capacity Tables

These are quoted for conditions of (i) 1.5 fps maximum velocity or (ii) 1 Fahrenheit drop in saturation temperature in 100 feet of pipe run. Use the velocity criterion for sizing self-venting lines.

3.5 Correcting for Other Temperature Drops or Line Lengths

The suction capacity tables reference according to saturation temperature losses of 0.5, 1, and 2°F in 100 feet pipe length. In order to correct the capacities for different values of temperature drop or line length, use the following equation:

$$\text{Capacity} = \text{Table Capacity} \times \left(\frac{\text{Required } \Delta T_e}{\text{Table } \Delta T_e} \times \frac{\text{Table } L_e}{\text{Required } L_e}\right)^{0.54}$$

where:

ΔT_e is the change in evaporating temperature
L_e is the length of suction line

To evaluate the change in saturation temperature for differing capacities or line lengths, use the equation :

$$\text{Actual } \Delta T_e = \text{Table } \Delta T_e \times \left(\frac{\text{Actual Le}}{\text{Table Le}}\right) \times \left[\frac{\text{Actual Capacity}}{\text{Table Capacity}}\right]^{1.8}$$

Table 1: Evaporator pressure from liquid temperature and mean evaporating temperature

KLEA 407C Pressure in psia

T mean °F	T liquid °F		
	85	105	125
40	84.6	83.8	83.0
38	81.5	80.8	80.0
36	78.5	77.8	77.0
34	75.6	74.9	74.2
32	72.8	72.1	71.4
30	70.1	69.4	68.7
28	67.4	66.8	66.1
26	64.8	64.2	63.5
24	62.3	61.7	61.0
22	59.9	59.3	58.7
20	57.5	56.9	56.3
18	55.2	54.7	54.1
16	53.0	52.5	51.9
14	50.8	50.3	49.8
12	48.8	48.3	47.7
10	46.7	46.3	45.8
8	44.8	44.3	43.8
6	42.9	42.5	42.0
4	41.1	40.7	40.2
2	39.3	38.9	38.5
0	37.6	37.2	36.8
-2	36.0	35.6	35.2
-4	34.4	34.0	33.6
-6	32.8	32.5	32.1
-8	31.3	31.0	30.6
-10	29.9	29.6	29.2
-12	28.5	28.2	27.9
-14	27.2	26.9	26.6
-16	25.9	25.6	25.3
-18	24.7	24.4	24.1
-20	23.5	23.2	22.9
-22	22.4	22.1	21.8
-24	21.3	21.0	20.7
-26	20.2	20.0	19.7
-28	19.2	19.0	18.7
-30	18.2	18.0	17.8
-32	17.3	17.1	16.8
-34	16.4	16.2	16.0
-36	15.5	15.3	15.1
-38	14.7	14.5	14.3
-40	13.9	13.7	13.5

Table 2: Mean EvaporatorTemperature from Pressure and Liquid Temperature - KLEA 407C

Pressure	T liquid °F			Tdew
psia	85	105	125	°F
14	-39.8	-39.3	-38.7	-36.1
16	-34.9	-34.4	-33.8	-31.1
18	-30.5	-30.0	-29.3	-26.7
20	-26.4	-25.9	-25.3	-22.6
22	-22.7	-22.2	-21.5	-18.8
24	-19.2	-18.7	-18.0	-15.2
26	-15.9	-15.4	-14.8	-11.9
28	-12.8	-12.3	-11.7	-8.8
30	-9.9	-9.4	-8.8	-5.9
32	-7.1	-6.6	-6.0	-3.1
34	-4.5	-4.0	-3.3	-0.4
36	-2.0	-1.5	-0.8	2.1
38	0.5	0.9	1.6	4.6
40	2.8	3.3	3.9	6.9
42	5.0	5.5	6.2	9.2
44	7.2	7.6	8.3	11.4
46	9.2	9.7	10.4	13.5
48	11.3	11.7	12.4	15.5
50	13.2	13.7	14.3	17.5
52	15.1	15.6	16.2	19.4
54	16.9	17.4	18.1	21.2
56	18.7	19.2	19.8	23.0
58	20.4	20.9	21.6	24.8
60	22.1	22.6	23.3	26.5
62	23.8	24.2	24.9	28.2
64	25.4	25.9	26.5	29.8
66	26.9	27.4	28.1	31.4
68	28.5	29.0	29.6	32.9
70	30.0	30.4	31.1	34.4
72	31.4	31.9	32.6	35.9
74	32.9	33.3	34.0	37.4
76	34.3	34.8	35.4	38.8
78	35.6	36.1	36.8	40.2
80	37.0	37.5	38.2	41.5
82	38.3	38.8	39.5	42.9
84	39.6	40.1	40.8	44.2
86	40.9	41.4	42.1	45.5
88	42.1	42.6	43.3	46.7
90	43.4	43.9	44.5	48.0
92	44.6	45.1	45.8	49.2
94	45.8	46.3	46.9	50.4
96	46.9	47.4	48.1	51.6
98	48.1	48.6	49.3	52.8
100	49.2	49.7	50.4	53.9
102	50.4	50.8	51.5	55.0
104	51.5	51.9	52.6	56.1
106	52.5	53.0	53.7	57.2
108	53.6	54.1	54.8	58.3
110	54.7	55.2	55.8	59.4
112	55.7	56.2	56.9	60.4
114	56.7	57.2	57.9	61.5

NOTE: Superheat should be set from the dew point

Pressure	T liquid °F			T dew
psia	85	105	125	°F
116	57.7	58.2	58.9	62.5
118	58.7	59.2	59.9	63.5
120	59.7	60.2	60.9	64.5
122	60.7	61.2	61.9	65.5
124	61.7	62.2	62.8	66.4
126	62.6	63.1	63.8	67.4
128	63.6	64.1	64.7	68.3
130	64.5	65.0	65.7	69.3
132	65.4	65.9	66.6	70.2
134	66.3	66.8	67.5	71.1
136	67.2	67.7	68.4	72.0
138	68.1	68.6	69.3	72.9
140	69.0	69.5	70.1	73.8
142	69.8	70.3	71.0	74.7
144	70.7	71.2	71.9	75.5
146	71.5	72.0	72.7	76.4
148	72.4	72.9	73.6	77.2
150	73.2	73.7	74.4	78.1
152	74.0	74.5	75.2	78.9
154	74.8	75.3	76.0	79.7
156	75.7	76.1	76.8	80.6
158	76.5	76.9	77.6	81.3
160	77.2	77.7	78.4	82.1
162	78.0	78.5	79.2	82.9
164	78.8	79.3	80.0	84.0
166	79.6	80.1	80.7	84.5
168	80.3	80.8	81.5	85.2
170	81.1	81.6	82.3	86.0
172	81.8	82.3	83.0	86.7
174	82.6	83.1	83.7	87.5
176	83.3	83.8	84.5	88.2
178	84.0	84.5	85.2	88.9
180	84.8	85.3	85.9	89.7
182	85.5	86.0	86.6	90.4
184	86.2	86.7	87.4	91.1
186	86.9	87.4	88.1	91.8
188	87.6	88.1	88.8	92.5
190	88.3	88.8	89.5	93.2
192	89.0	89.5	90.1	93.9
194	89.7	90.1	90.8	94.6

NOTE: Superheat should be set from the dew point

Table 3: Condenser Pressure, Dew and Bubble Points from Mean Condenser Temperature - KLEA 407C

Mean temp. °F	Pressure psia	Bubble/ liquid temp. °F	Dew temp. °F
50	103.0	44.4	55.6
52	106.6	46.4	57.5
54	110.3	48.5	59.5
56	114.1	50.5	61.5
58	118.0	52.5	63.5
60	122.0	54.5	65.4
62	126.0	56.6	67.4
64	130.2	58.6	69.4
66	134.5	60.6	71.3
68	138.9	62.7	73.3
70	143.5	64.7	75.3
72	148.1	66.7	77.3
74	152.8	68.8	79.2
76	157.7	70.8	81.2
78	162.6	72.8	83.1
80	167.7	74.9	85.1
82	172.9	76.9	87.1
84	178.3	79.0	89.0
86	183.7	81.0	91.0
88	189.3	83.0	93.0
90	195.0	85.1	94.9
92	200.8	87.1	96.9
94	206.8	89.2	98.8
96	212.9	91.2	100.8
98	219.2	93.2	102.7
100	225.5	95.3	104.7
102	232.1	97.3	106.6
104	238.7	99.4	108.6
106	245.5	101.4	110.6
108	252.5	103.5	112.5
110	259.6	105.5	114.5
112	266.8	107.6	116.4
114	274.2	109.6	118.4
116	281.8	111.7	120.3
118	289.5	113.7	122.3
120	297.4	115.8	124.2
122	305.5	117.8	126.1
124	313.7	119.9	128.1
126	322.1	121.9	130.0
128	330.6	124.0	132.0
130	339.3	126.0	133.9
132	348.2	128.1	135.9
134	357.3	130.1	137.8
136	366.6	132.2	139.8
138	376.0	134.3	141.7
140	385.7	136.3	143.6

NOTE: Subcool is measured from bubble point

Table 4: Condenser Bubble, Dew and Mean Temperatures from Condenser Pressure - KLEA 407C

Pressure	Temperatures °F		
psia	Bubble/liquid	Mean	Dew
145	65.4	70.7	75.9
148	66.7	72.0	77.2
151	68.0	73.2	78.5
154	69.3	74.5	79.7
157	70.5	75.7	80.9
160	71.8	76.9	82.1
163	73.0	78.1	83.3
166	74.2	79.3	84.4
169	75.4	80.5	85.6
172	76.6	81.6	86.7
175	77.7	82.8	87.8
178	78.9	83.9	88.9
181	80.0	85.0	90.0
184	81.1	86.1	91.1
187	82.2	87.2	92.2
190	83.3	88.2	93.2
193	84.4	89.3	94.2
196	85.4	90.3	95.2
199	86.5	91.4	96.3
202	87.5	92.4	97.3
205	88.5	93.4	98.2
208	89.6	94.4	99.2
211	90.6	95.4	100.2
214	91.6	96.3	101.1
217	92.5	97.3	102.0
220	93.5	98.3	103.0
223	94.5	99.2	103.9
226	95.4	100.1	104.8
229	96.4	101.1	105.7
232	97.3	102.0	106.6
235	98.2	102.9	107.5
238	99.2	103.8	108.4
241	100.1	104.7	109.3
244	101.0	105.5	110.1
247	101.9	106.4	111.0
250	102.7	107.3	111.8
253	103.6	108.1	112.7
256	104.5	109.0	113.5
259	105.3	109.8	114.3
262	106.2	110.7	115.1
265	107.0	111.5	115.9
268	107.9	112.3	116.7
271	108.7	113.1	117.5
274	109.5	113.9	118.3
277	110.4	114.7	119.1
280	111.2	115.5	119.8
283	112.0	116.3	120.6
286	112.8	117.1	121.4
289	113.6	117.8	122.1
292	114.4	118.6	122.9

Pressure	Temperatures °F		
psia	Bubble/liquid	Mean	Dew
298	115.9	120.1	124.3
301	116.7	120.9	125.1
304	117.4	121.6	125.8
307	118.2	122.4	126.5
310	119.0	123.1	127.2
313	119.7	123.8	127.9
316	120.4	124.5	128.6
319	121.2	125.3	129.3
322	121.9	126.0	130.0
325	122.6	126.7	130.7
328	123.3	127.4	131.4
331	124.1	128.1	132.1
334	124.8	128.8	132.7
337	125.5	129.4	133.4
340	126.2	130.1	134.1
343	126.9	130.8	134.7
346	127.6	131.5	135.4
349	128.3	132.1	136.0
352	128.9	132.8	136.7
355	129.6	133.5	137.3
358	130.3	134.1	138.0
361	131.0	134.8	138.6
364	131.6	135.4	139.2
367	132.3	136.1	139.8
370	132.9	136.7	140.5
373	133.6	137.3	141.1
376	134.2	138.0	141.7
379	134.9	138.6	142.3
382	135.5	139.2	142.9
385	136.2	139.8	143.5
388	136.8	140.5	144.1
391	137.4	141.1	144.7
394	138.1	141.7	145.3
397	138.7	142.3	145.9
400	139.3	142.9	146.5
403	139.9	143.5	147.0
406	140.5	144.1	147.6
409	141.1	144.7	148.2
412	141.8	145.3	148.8
415	142.4	145.8	149.3
418	143.0	146.4	149.9
421	143.6	147.0	150.5
424	144.1	147.6	151.0
427	144.7	148.1	151.6
430	145.3	148.7	152.1
433	145.9	149.3	152.7
436	146.5	149.8	153.2
439	147.1	150.4	153.7
442	147.6	151.0	154.3
445	148.2	151.5	154.8

Table 5a: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Saturated Vapor Leaving Evaporator

Nominal line size inch	**Saturation temperature change 0.5°F in 100 ft Mean evaporating temperature °F at corresponding dPpsi/100ft**									
T	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
dP/dL	**0.19**	**0.24**	**0.29**	**0.35**	**0.42**	**0.49**	**0.58**	**0.67**	**0.78**	**0.89**
	Type L Copper									
1/4	0.017	0.023	0.030	0.039	0.049	0.062	0.078	0.096	0.118	0.143
3/8	0.040	0.053	0.070	0.090	0.115	0.145	0.180	0.222	0.271	0.329
1/2	0.076	0.101	0.132	0.171	0.217	0.273	0.340	0.419	0.512	0.62
5/8	0.131	0.174	0.227	0.293	0.373	0.468	0.582	0.717	0.875	1.06
3/4	0.204	0.270	0.353	0.455	0.579	0.727	0.903	1.11	1.36	1.64
1	0.417	0.554	0.723	0.93	1.18	1.48	1.84	2.26	2.76	3.33
1-1/4	0.733	0.971	1.27	1.63	2.07	2.59	3.21	3.95	4.81	5.81
1-1/2	1.17	1.55	2.01	2.59	3.28	4.11	5.1	6.26	7.62	9.2
2	2.44	3.23	4.20	5.39	6.83	8.56	10.6	13.0	15.8	19.1
2-1/2	4.34	5.74	7.47	9.58	12.1	15.2	18.8	23.0	28.0	33.8
3	6.97	9.2	12.0	15.3	19.4	24.2	30.0	36.8	44.7	53.9
3-1/2	10.4	13.7	17.8	22.8	28.9	36.1	44.7	54.7	66.5	80.2
4	14.7	19.4	25.2	32.3	40.8	51.0	63.1	77.2	93.8	113
	Schedule 40 Steel									
3/8	0.052	0.069	0.089	0.113	0.142	0.177	0.218	0.265	0.321	0.385
1/2	0.098	0.128	0.166	0.211	0.265	0.329	0.405	0.493	0.596	0.714
3/4	0.208	0.272	0.351	0.447	0.561	0.696	0.855	1.04	1.26	1.5
1	0.396	0.518	0.668	0.848	1.06	1.32	1.62	1.97	2.38	2.85
1-1/4	0.821	1.07	1.38	1.76	2.20	2.73	3.34	4.07	4.9	5.87
1-1/2	1.24	1.62	2.08	2.64	3.31	4.10	5.02	6.1	7.4	8.8
2	2.40	3.13	4.02	5.10	6.39	7.91	9.7	11.8	14.2	17.0
2-1/2	3.83	5.00	6.43	8.15	10.2	12.6	15.5	18.8	22.7	27.1
3	6.80	8.87	11.4	14.4	18.1	22.3	27.4	33.2	40.1	47.9
4	13.9	18.1	23.3	29.4	36.8	45.5	55.8	67.7	81.6	97.6

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 5b: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Saturated Vapor Leaving Evaporator

Nominal line size inch	**Saturation temperature change 1.0°F in 100 ft Mean evaporating temperature °F at corresponding dPpsi/100ft**									
T	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
dP/dL	**0.39**	**0.48**	**0.58**	**0.7**	**0.83**	**0.99**	**1.15**	**1.34**	**1.55**	**1.79**
	Type L Copper									
1/4	0.025	0.034	0.044	0.057	0.073	0.092	0.115	0.142	0.173	0.210
3/8	0.059	0.079	0.103	0.133	0.169	0.213	0.265	0.326	0.398	0.482
1/2	0.112	0.149	0.195	0.252	0.32	0.402	0.499	0.614	0.75	0.907
5/8	0.193	0.256	0.335	0.431	0.548	0.687	0.854	1.05	1.28	1.55
3/4	0.300	0.398	0.52	0.669	0.849	1.06	1.32	1.62	1.98	2.39
1	0.614	0.814	1.06	1.36	1.73	2.17	2.69	3.3	4.02	4.85
1-1/4	1.08	1.43	1.86	2.38	3.02	3.78	4.69	5.75	7.0	8.45
1-1/2	1.71	2.26	2.95	3.78	4.79	5.99	7.42	9.11	11.1	13.4
2	3.58	4.72	6.14	7.87	10.0	12.5	15.4	18.9	23.0	27.7
2-1/2	6.35	8.38	10.9	14.0	17.6	22.0	27.3	33.4	40.6	48.9
3	10.2	13.4	17.4	22.3	28.2	35.2	43.5	53.3	64.7	78.0
3-1/2	15.2	20.0	26.0	33.2	42.0	52.4	64.7	79.2	96.1	116
4	21.5	28.3	36.7	46.9	59.2	73.9	91.3	112	136	163
	Schedule 40 Steel									
3/8	0.08	0.10	0.13	0.16	0.20	0.25	0.31	0.38	0.46	0.55
1/2	0.14	0.18	0.24	0.30	0.38	0.47	0.58	0.70	0.85	1.02
3/4	0.30	0.39	0.50	0.64	0.80	0.99	1.22	1.48	1.79	2.14
1	0.57	0.74	0.96	1.21	1.52	1.88	2.31	2.81	3.38	4.05
1-1/4	1.18	1.54	1.98	2.51	3.14	3.88	4.76	5.78	6.97	8.34
1-1/2	1.77	2.31	2.97	3.76	4.71	5.83	7.15	8.68	10.5	12.5
2	3.43	4.47	5.74	7.27	9.1	11.3	13.8	16.7	20.2	24.1
2-1/2	5.48	7.14	9.17	11.6	14.5	18.0	22.0	26.7	32.2	38.5
3	9.72	12.7	16.2	20.5	25.7	31.7	38.9	47.2	56.8	68.0
4	19.8	25.8	33.1	41.9	52.3	64.7	79.2	96.1	116	138

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 5c: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Saturated Vapor Leaving Evaporator

Nominal line size inch	**Saturation temperature change 2.0°F in 100 ft Mean evaporating temperature °F at corresponding dPpsi/100ft**									
T	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
dP/dL	**0.77**	**0.96**	**1.16**	**1.4**	**1.67**	**1.97**	**2.31**	**2.68**	**3.1**	**3.57**
	Type L Copper									
1/4	0.038	0.050	0.066	0.085	0.108	0.136	0.169	0.208	0.254	0.308
3/8	0.088	0.116	0.152	0.196	0.249	0.313	0.389	0.478	0.583	0.705
1/2	0.166	0.220	0.287	0.370	0.470	0.589	0.731	0.899	1.09	1.32
5/8	0.285	0.377	0.492	0.633	0.803	1.01	1.25	1.53	1.87	2.25
3/4	0.442	0.585	0.763	0.98	1.24	1.56	1.93	2.37	2.88	3.48
1	0.902	1.19	1.55	1.99	2.52	3.16	3.91	4.80	5.84	7.04
1-1/4	1.58	2.09	2.72	3.48	4.41	5.51	6.82	8.36	10.2	12.3
1-1/2	2.51	3.31	4.30	5.52	6.98	8.72	10.8	13.2	16.1	19.4
2	5.23	6.89	8.95	11.5	14.5	18.1	22.4	27.4	33.2	40.0
2-1/2	9.27	12.2	15.9	20.3	25.6	32.0	39.5	48.3	58.6	70.6
3	14.8	19.5	25.3	32.4	40.9	51.0	63.0	77.0	93.4	112
3-1/2	22.1	29.1	37.7	48.2	60.8	75.8	93.6	114	139	167
4	31.2	41.1	53.2	68.0	85.8	107	132	161	195	235
	Schedule 40 Steel									
3/8	0.109	0.143	0.184	0.233	0.292	0.362	0.444	0.54	0.652	0.78
1/2	0.203	0.266	0.342	0.433	0.543	0.672	0.824	1.00	1.21	1.45
3/4	0.430	0.561	0.721	0.914	1.14	1.42	1.74	2.11	2.54	3.04
1	0.816	1.06	1.37	1.73	2.17	2.68	3.28	3.99	4.80	5.75
1-1/4	1.69	2.20	2.82	3.57	4.47	5.52	6.77	8.21	9.89	11.8
1-1/2	2.53	3.30	4.24	5.36	6.70	8.29	10.1	12.3	14.8	17.7
2	4.90	6.38	8.18	10.3	12.9	16.0	19.6	23.8	28.6	34.2
2-1/2	7.82	10.2	13.0	16.5	20.6	25.5	31.2	37.9	45.6	54.5
3	13.8	18.0	23.1	29.2	36.5	45.0	55.1	66.9	80.5	96.3
4	28.2	36.7	47.0	59.4	74.2	91.7	112	136	164	196

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 6: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Suction Line Vapor with 10.0°F of Superheat

Nominal	**Saturation temperature change 0.5 °F in 100ft**									
line size	**Mean evaporating temperature °F at corresponding dP psi/100ft**									
inch	**T -40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
	dP/dL 0.19	**0.24**	**0.29**	**0.35**	**0.42**	**0.49**	**0.58**	**0.67**	**0.78**	**0.89**
	Type L Copper									
1/4	0.017	0.023	0.030	0.039	0.050	0.063	0.079	0.097	0.119	0.145
3/8	0.040	0.054	0.071	0.091	0.116	0.146	0.182	0.225	0.275	0.333
1/2	0.077	0.102	0.134	0.173	0.220	0.277	0.345	0.425	0.518	0.628
5/8	0.132	0.176	0.230	0.297	0.378	0.475	0.590	0.727	0.887	1.07
3/4	0.206	0.274	0.358	0.461	0.586	0.737	0.915	1.13	1.37	1.66
1	0.423	0.561	0.732	0.942	1.20	1.50	1.86	2.29	2.79	3.38
1-1/4	0.742	0.984	1.28	1.65	2.10	2.63	3.26	4.00	4.88	5.89
1-1/2	1.18	1.57	2.04	2.62	3.33	4.17	5.17	6.35	7.72	9.33
2	2.47	3.27	4.26	5.47	6.93	8.68	10.8	13.2	16.0	19.4
2-1/2	4.40	5.82	7.57	9.71	12.3	15.4	19.0	23.4	28.4	34.3
3	7.06	9.33	12.1	15.6	19.7	24.6	30.4	37.3	45.3	54.7
3-1/2	10.5	13.9	18.1	23.2	29.3	36.6	45.3	55.5	67.5	81.3
4	14.9	19.7	25.6	32.8	41.4	51.8	64.0	78.4	95.2	115
	Schedule 40 Steel									
3/8	0.053	0.070	0.090	0.115	0.145	0.180	0.221	0.270	0.326	0.391
1/2	0.099	0.130	0.168	0.214	0.270	0.335	0.412	0.501	0.605	0.725
3/4	0.211	0.277	0.357	0.454	0.570	0.707	0.869	1.06	1.28	1.53
1	0.402	0.526	0.679	0.862	1.08	1.34	1.65	2.00	2.42	2.89
1-1/4	0.834	1.09	1.41	1.78	2.24	2.77	3.40	4.13	4.99	5.97
1-1/2	1.26	1.64	2.11	2.68	3.36	4.16	5.11	6.21	7.48	8.96
2	2.44	3.18	4.09	5.19	6.50	8.05	9.86	12.0	14.4	17.3
2-1/2	3.9	5.09	6.54	8.29	10.4	12.8	15.7	19.1	23.0	27.6
3	6.92	9.02	11.6	14.7	18.4	22.7	27.8	33.8	40.7	48.7
4	14.1	18.4	23.7	30.0	37.5	46.3	56.7	68.9	83.0	99.2

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 6b: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Suction line Vapor with 10.0°F of Superheat

Nominal	**Saturation temperature change 1.0 °F in 100ft**									
line size	**Mean evaporating temperature °F at corresponding dP psi/100ft**									
inch	**T -40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
	dP/dL 0.39	**0.48**	**0.58**	**0.7**	**0.83**	**0.99**	**1.15**	**1.34**	**1.55**	**1.79**
	Type L Copper									
1/4	0.026	0.034	0.045	0.058	0.074	0.093	0.116	0.143	0.175	0.213
3/8	0.060	0.080	0.104	0.135	0.172	0.216	0.268	0.331	0.404	0.489
1/2	0.114	0.151	0.198	0.255	0.324	0.407	0.506	0.623	0.760	0.919
5/8	0.196	0.260	0.339	0.437	0.555	0.697	0.865	1.06	1.30	1.57
3/4	0.304	0.404	0.527	0.678	0.861	1.08	1.34	1.65	2.01	2.43
1	0.622	0.825	1.08	1.38	1.75	2.20	2.72	3.34	4.07	4.92
1-1/4	1.09	1.45	1.88	2.42	3.06	3.84	4.76	5.84	7.10	8.57
1-1/2	1.74	2.30	2.99	3.84	4.86	6.08	7.53	9.24	11.2	13.6
2	3.62	4.79	6.23	7.99	10.1	12.6	15.6	19.2	23.3	28.1
2-1/2	6.44	8.50	11.1	14.2	17.9	22.4	27.7	33.9	41.2	49.6
3	10.3	13.6	17.7	22.6	28.6	35.7	44.2	54.1	65.7	79.1
3-1/2	15.4	20.3	26.3	33.7	42.6	53.2	65.7	80.4	97.6	117
4	21.8	28.7	37.2	47.6	60.1	75.1	92.7	113	138	166
	Schedule 40 Steel									
3/8	0.077	0.101	0.130	0.165	0.208	0.258	0.317	0.385	0.465	0.557
1/2	0.143	0.188	0.242	0.308	0.386	0.479	0.588	0.715	0.863	1.03
3/4	0.304	0.398	0.512	0.651	0.816	1.01	1.24	1.51	1.82	2.18
1	0.578	0.756	0.973	1.23	1.55	1.91	2.35	2.85	3.44	4.11
1-1/4	1.20	1.56	2.01	2.55	3.19	3.95	4.84	5.88	7.09	8.48
1-1/2	1.80	2.35	3.02	3.83	4.79	5.93	7.27	8.82	10.6	12.7
2	3.49	4.55	5.84	7.40	9.25	11.4	14.0	17.0	20.5	24.5
2-1/2	5.58	7.27	9.33	11.8	14.8	18.3	22.4	27.1	32.7	39.1
3	9.88	12.9	16.5	20.9	26.1	32.3	39.5	48.0	57.8	69.1
4	20.2	26.3	33.7	42.6	53.2	65.8	80.5	97.7	118	141

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 6c: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Suction line Vapor with 10.0°F of Superheat

Nominal line size inch	**Saturation temperature change 2.0 °F in 100ft Mean evaporating temperature °F at corresponding dP psi/100ft**									
T	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
dP/dL	**0.77**	**0.96**	**1.16**	**1.4**	**1.67**	**1.97**	**2.31**	**2.68**	**3.1**	**3.57**
	Type L Copper									
1/4	0.038	0.051	0.067	0.086	0.109	0.138	0.171	0.211	0.257	0.312
3/8	0.089	0.118	0.154	0.199	0.253	0.317	0.394	0.485	0.591	0.715
1/2	0.168	0.223	0.291	0.375	0.476	0.597	0.741	0.911	1.11	1.34
5/8	0.288	0.382	0.499	0.641	0.814	1.02	1.27	1.55	1.89	2.29
3/4	0.448	0.593	0.774	0.994	1.26	1.58	1.96	2.40	2.92	3.53
1	0.914	1.21	1.58	2.02	2.56	3.21	3.97	4.87	5.92	7.14
1-1/4	1.60	2.12	2.75	3.53	4.47	5.59	6.92	8.48	10.3	12.4
1-1/2	2.54	3.36	4.37	5.60	7.08	8.85	10.9	13.4	16.3	19.6
2	5.30	6.99	9.08	11.6	14.7	18.4	22.7	27.8	33.7	40.6
2-1/2	9.40	12.4	16.1	20.6	26.0	32.5	40.1	49.0	59.5	71.6
3	15.0	19.8	25.7	32.9	41.5	51.8	63.9	78.2	94.8	114
3-1/2	22.4	29.5	38.3	48.9	61.7	77.0	95.0	116	141	169
4	31.7	41.7	54.1	69.1	87.1	109	134	164	198	238
	Schedule 40 Steel									
3/8	0.111	0.145	0.187	0.237	0.297	0.368	0.452	0.549	0.662	0.793
1/2	0.206	0.270	0.347	0.441	0.552	0.684	0.838	1.02	1.23	1.47
3/4	0.437	0.570	0.733	0.929	1.16	1.44	1.76	2.14	2.58	3.09
1	0.829	1.08	1.39	1.76	2.20	2.73	3.34	4.05	4.88	5.84
1-1/4	1.72	2.24	2.87	3.63	4.54	5.62	6.88	8.35	10.1	12.0
1-1/2	2.58	3.36	4.31	5.45	6.82	8.43	10.3	12.5	15.1	18.0
2	4.98	6.49	8.32	10.5	13.2	16.3	19.9	24.2	29.1	34.8
2-1/2	7.96	10.4	13.3	16.8	21.0	25.9	31.7	38.5	46.4	55.4
3	14.1	18.3	23.5	29.7	37.1	45.8	56.1	68.0	81.9	97.9
4	28.7	37.4	47.9	60.5	75.5	93.3	114	139	167	199

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 7a: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Suction line Vapor at 65.0T

Nominal line size inch	**Saturation temperature change 0.5 °F in 100ft Mean evaporating temperature °F at corresponding dP psi/100ft**									
T	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
dP/dL	**0.19**	**0.24**	**0.29**	**0.35**	**0.42**	**0.49**	**0.58**	**0.67**	**0.78**	**0.89**
	Type L Copper									
1/4	0.014	0.020	0.026	0.034	0.045	0.057	0.073	0.091	0.113	0.140
3/8	0.034	0.046	0.061	0.080	0.104	0.133	0.168	0.211	0.262	0.323
1/2	0.064	0.087	0.116	0.152	0.197	0.251	0.318	0.398	0.493	0.608
5/8	0.111	0.150	0.200	0.262	0.338	0.431	0.545	0.681	0.844	1.04
3/4	0.173	0.234	0.311	0.407	0.525	0.67	0.845	1.06	1.31	1.61
1	0.355	0.480	0.637	0.832	1.07	1.37	1.72	2.15	2.66	3.27
1-1/4	0.625	0.843	1.12	1.46	1.88	2.39	3.01	3.76	4.64	5.70
1-1/2	0.997	1.34	1.78	2.32	2.99	3.80	4.78	5.95	7.36	9.03
2	2.09	2.81	3.72	4.85	6.23	7.92	9.95	12.4	15.3	18.8
2-1/2	3.73	5.01	6.62	8.61	11.1	14.0	17.6	21.9	27.1	33.2
3	5.98	8.03	10.6	13.8	17.7	22.5	28.2	35.0	43.2	52.9
3-1/2	8.94	12.0	15.8	20.6	26.4	33.5	42.0	52.2	64.3	78.7
4	12.7	17.0	22.4	29.1	37.3	47.3	59.3	73.6	90.7	111
	Schedule 40 Steel									
3/8	0.045	0.060	0.079	0.103	0.131	0.165	0.206	0.254	0.311	0.378
1/2	0.085	0.113	0.148	0.192	0.244	0.307	0.383	0.472	0.578	0.702
3/4	0.180	0.241	0.315	0.407	0.517	0.650	0.809	0.997	1.22	1.48
1	0.344	0.459	0.600	0.773	0.983	1.23	1.53	1.89	2.31	2.80
1-1/4	0.717	0.953	1.24	1.60	2.03	2.55	3.17	3.90	4.76	5.78
1-1/2	1.08	1.44	1.87	2.41	3.06	3.83	4.76	5.85	7.15	8.67
2	2.10	2.79	3.63	4.66	5.91	7.41	9.19	11.3	13.8	16.7
2-1/2	3.37	4.46	5.81	7.45	9.44	11.8	14.7	18.0	22.0	26.7
3	5.98	7.91	10.3	13.2	16.7	20.9	26.0	31.9	38.9	47.2
4	12.2	16.2	21.0	27.0	34.1	42.7	52.9	65.0	79.3	96.1

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 7b: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Suction line Vapor at 65.0°F

Nominal line size inch	**Saturation temperature change 1.0 °F in 100ft Mean evaporating temperature °F at corresponding dP psi/100ft**									
T	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
dP/dL	**0.39**	**0.48**	**0.58**	**0.70**	**0.83**	**0.99**	**1.15**	**1.34**	**1.55**	**1.79**
	Type L Copper									
1/4	0.021	0.029	0.039	0.051	0.066	0.085	0.107	0.134	0.167	0.206
3/8	0.050	0.068	0.090	0.119	0.153	0.196	0.248	0.310	0.384	0.473
1/2	0.095	0.129	0.172	0.225	0.290	0.370	0.467	0.584	0.723	0.890
5/8	0.164	0.222	0.295	0.386	0.498	0.634	0.799	0.998	1.24	1.52
3/4	0.256	0.345	0.458	0.599	0.772	0.983	1.24	1.54	1.91	2.35
1	0.524	0.707	0.937	1.22	1.57	2.00	2.52	3.14	3.88	4.76
1-1/4	0.921	1.24	1.64	2.14	2.75	3.50	4.40	5.48	6.76	8.30
1-1/2	1.47	1.97	2.61	3.40	4.37	5.55	6.97	8.67	10.7	13.1
2	3.07	4.12	5.45	7.09	9.10	11.5	14.5	18.0	22.2	27.2
2-1/2	5.46	7.33	9.67	12.6	16.1	20.4	25.6	31.8	39.2	48.0
3	8.76	11.7	15.5	20.1	25.8	32.7	40.9	50.8	62.6	76.6
3-1/2	13.1	17.5	23.1	30.0	38.4	48.6	60.9	75.6	93.0	113.8
4	18.5	24.8	32.6	42.4	54.2	68.6	85.9	106.6	131.2	160.3
	Schedule 40 Steel									
3/8	0.066	0.088	0.115	0.148	0.189	0.237	0.295	0.363	0.444	0.540
1/2	0.123	0.164	0.214	0.276	0.351	0.441	0.548	0.674	0.824	1.00
3/4	0.261	0.347	0.454	0.584	0.741	0.930	1.155	1.42	1.74	2.11
1	0.498	0.661	0.862	1.11	1.41	1.76	2.19	2.69	3.28	3.98
1-1/4	1.03	1.37	1.79	2.29	2.91	3.64	4.51	5.55	6.77	8.21
1-1/2	1.56	2.06	2.68	3.45	4.36	5.46	6.78	8.33	10.2	12.3
2	3.02	3.99	5.20	6.66	8.43	10.6	13.1	16.1	19.6	23.8
2-1/2	4.83	6.38	8.30	10.6	13.5	16.8	20.9	25.6	31.2	37.9
3	8.57	11.3	14.7	18.8	23.8	29.8	36.9	45.3	55.2	66.9
4	17.5	23.1	30	38.4	48.5	60.7	75.1	92.3	112	136

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 7c: Suction Line Capacities in Tons Refrigeration for KLEA 407C
Suction Line Vapor at 65.0°F

Nominal line size inch	**Saturation temperature change 2.0 °F in 100ft Mean evaporating temperature °F at corresponding dP psi/100ft**									
	T	**-40**	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
	dP/dL	**0.77**	**0.96**	**1.16**	**1.40**	**1.67**	**1.97**	**2.31**	**2.68**	**3.10**	**3.57**
	Type L Copper										
1/4		0.032	0.043	0.058	0.076	0.098	0.125	0.158	0.198	0.245	0.302
3/8		0.074	0.101	0.134	0.175	0.226	0.288	0.364	0.454	0.563	0.692
1/2		0.141	0.191	0.253	0.331	0.427	0.544	0.685	0.854	1.06	1.30
5/8		0.243	0.327	0.434	0.567	0.731	0.929	1.17	1.46	1.80	2.21
3/4		0.377	0.509	0.674	0.880	1.13	1.44	1.81	2.25	2.79	3.42
1		0.772	1.04	1.37	1.79	2.30	2.92	3.67	4.57	5.64	6.91
1-1/4		1.35	1.82	2.41	3.13	4.02	5.10	6.41	7.96	9.82	12.0
1-1/2		2.15	2.89	3.82	4.97	6.38	8.08	10.1	12.6	15.5	19.0
2		4.50	6.03	7.96	10.3	13.2	16.8	21.0	26.1	32.1	39.3
2-1/2		7.99	10.7	14.1	18.3	23.5	29.7	37.2	46.1	56.7	69.3
3		12.8	17.1	22.6	29.3	37.5	47.4	59.3	73.5	90.4	110
3-1/2		19.1	25.5	33.6	43.6	55.7	70.5	88.1	109	134	164
4		27.0	36.1	47.5	61.5	78.7	99.4	124	154	189	231
	Schedule 40 Steel										
3/8		0.095	0.127	0.165	0.213	0.27	0.339	0.421	0.518	0.633	0.768
1/2		0.178	0.236	0.308	0.396	0.502	0.629	0.781	0.961	1.17	1.42
3/4		0.377	0.500	0.651	0.836	1.06	1.33	1.65	2.02	2.47	2.99
1		0.717	0.949	1.23	1.58	2.01	2.51	3.11	3.83	4.67	5.66
1-1/4		1.49	1.96	2.55	3.27	4.14	5.18	6.42	7.88	9.61	11.7
1-1/2		2.23	2.95	3.83	4.91	6.21	7.77	9.63	11.8	14.4	17.5
2		4.32	5.71	7.41	9.49	12.0	15.0	18.6	22.8	27.8	33.7
2-1/2		6.91	9.11	11.8	15.1	19.1	23.9	29.6	36.4	44.3	53.7
3		12.2	16.1	20.9	26.8	33.8	42.3	52.3	64.2	78.3	94.8
4		25.0	32.9	42.7	54.6	68.9	86.1	107	131	159	193

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 8a: Discharge line Capacities in Tons Refrigeration for KLEA 407C
Saturated Vapor Leaving Evaporator

Nominal line size inch	**Condenser saturation temperature change 1.0 °F in 100 ft Pressure gradient of 3.59 psi/100 ft Discharge line superheat of 85.0 °F Mean evaporating temperature °F**									
	T -40	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
	Type L Copper									
1/4	0.363	0.373	0.383	0.393	0.403	0.413	0.422	0.431	0.44	0.448
3/8	0.83	0.854	0.877	0.900	0.923	0.945	0.966	0.987	1.01	1.03
1/2	1.56	1.60	1.65	1.69	1.73	1.77	1.81	1.85	1.89	1.92
5/8	2.65	2.73	2.80	2.87	2.95	3.02	3.08	3.15	3.21	3.27
3/4	4.09	4.21	4.32	4.43	4.55	4.65	4.76	4.86	4.96	5.05
1	8.27	8.51	8.74	8.97	9.19	9.41	9.62	9.83	10.0	10.2
1-1/4	14.4	14.8	15.2	15.6	16.0	16.4	16.7	17.1	17.4	17.8
1-1/2	22.7	23.3	24.0	24.6	25.2	25.8	26.4	27.0	27.5	28.0
2	46.9	48.2	49.6	50.8	52.1	53.4	54.6	55.7	56.9	57.9
2-1/2	82.7	85.0	87.3	89.6	91.9	94.0	96.2	98.2	100	102
3	132	135	139	143	146	150	153	156	160	163
3-1/2	195	201	206	212	217	222	227	232	237	241
4	275	283	290	298	305	313	320	327	333	339
	Schedule 40 steel									
3/8	0.909	0.934	0.96	0.985	1.01	1.03	1.06	1.08	1.10	1.12
1/2	1.68	1.73	1.78	1.82	1.87	1.91	1.96	2.00	2.04	2.08
3/4	3.54	3.64	3.74	3.84	3.93	4.03	4.12	4.21	4.29	4.37
1	6.69	6.88	7.07	7.25	7.43	7.61	7.78	7.95	8.11	8.26
1-1/4	13.8	14.2	14.5	14.9	15.3	15.7	16.0	16.4	16.7	17.0
1-1/2	20.6	21.2	21.8	22.4	22.9	23.5	24.0	24.5	25.0	25.5
2	39.8	40.9	42.0	43.1	44.2	45.3	46.3	47.3	48.2	49.2
2-1/2	63.4	65.2	67.0	68.7	70.5	72.1	73.8	75.3	76.9	78.3
3	112	115	118	121	124	127	130	133	136	138
4	228	234	241	247	253	259	265	271	276	282

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 8b: Discharge Line Capacities in Tons Refrigeration for KLEA 407C
Saturated Vapor Leaving Evaporator

Nominal line size inch	**Condenser saturation temperature change 1.0 °F in 100 ft Pressure gradient of 3.59 psi/100 ft Discharge line superheat of 110.0 °F Mean evaporating temperature °F**									
	T -40	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
	Type L Copper									
1/4	0.350	0.360	0.370	0.379	0.389	0.398	0.407	0.416	0.424	0.432
3/8	0.801	0.824	0.847	0.869	0.890	0.911	0.932	0.952	0.971	0.990
1/2	1.50	1.55	1.59	1.63	1.67	1.71	1.75	1.79	1.82	1.86
5/8	2.56	2.63	2.70	2.77	2.84	2.91	2.98	3.04	3.10	3.16
3/4	3.95	4.06	4.17	4.28	4.39	4.49	4.60	4.69	4.79	4.88
1	7.99	8.22	8.44	8.66	8.88	9.09	9.29	9.49	9.68	9.87
1-1/4	13.9	14.3	14.7	15.1	15.4	15.8	16.2	16.5	16.8	17.2
1-1/2	21.9	22.6	23.2	23.8	24.4	25.0	25.5	26.1	26.6	27.1
2	45.3	46.6	47.9	49.2	50.4	51.6	52.8	53.9	55.0	56.0
2-1/2	80.0	82.2	84.5	86.7	88.8	91.0	93.0	95.0	96.9	98.7
3	127	131	134	138	141	145	148	151	154	157
3-1/2	189	194	200	205	210	215	220	224	229	233
4	266	274	281	288	296	303	309	316	322	328
	Schedule 40 steel									
3/8	0.881	0.906	0.931	0.955	0.979	1.00	1.02	1.05	1.07	1.09
1/2	1.63	1.68	1.72	1.77	1.81	1.86	1.90	1.94	1.98	2.02
3/4	3.43	3.53	3.63	3.72	3.81	3.90	3.99	4.08	4.16	4.24
1	6.49	6.67	6.85	7.03	7.21	7.38	7.55	7.71	7.86	8.01
1-1/4	13.4	13.7	14.1	14.5	14.8	15.2	15.5	15.9	16.2	16.5
1-1/2	20.0	20.6	21.2	21.7	22.3	22.8	23.3	23.8	24.3	24.7
2	38.6	39.7	40.8	41.9	42.9	43.9	44.9	45.9	46.8	47.7
2-1/2	61.5	63.3	65.0	66.7	68.4	70.0	71.6	73.1	74.6	76.0
3	109	112	115	118	121	124	126	129	132	134
4	221	227	234	240	246	252	257	263	268	273

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 9a: Liquid Line Capacities in Tons Refrigeration for KLEA 407C
Saturated Vapor Leaving Evaporator

Nominal line size inch	**Liquid line velocity 1.5 fps**									
	Mean evaporating temperature °F									
	T -40	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
	Type L Copper									
1/4	0.876	0.901	0.925	0.949	0.973	0.996	1.02	1.04	1.06	1.08
3/8	1.63	1.68	1.72	1.77	1.81	1.86	1.90	1.94	1.98	2.01
1/2	2.62	2.70	2.77	2.84	2.91	2.98	3.05	3.11	3.18	3.24
5/8	3.92	4.03	4.14	4.25	4.35	4.46	4.56	4.65	4.75	4.84
3/4	5.44	5.59	5.75	5.90	6.04	6.19	6.33	6.46	6.59	6.72
1	9.28	9.54	9.80	10.1	10.3	10.6	10.8	11.0	11.2	11.5
1-1/4	14.1	14.5	14.9	15.3	15.7	16.1	16.4	16.8	17.1	17.4
1-1/2	20.0	20.6	21.1	21.7	22.2	22.7	23.3	23.8	24.2	24.7
2	34.8	35.8	36.7	37.7	38.6	39.6	40.5	41.3	42.2	43.0
2-1/2	53.6	55.2	56.7	58.1	59.6	61.0	62.4	63.7	65.0	66.2
3	76.5	78.7	80.9	83.0	85.1	87.1	89.0	91.0	92.8	94.5
3-1/2	104	106	109	112	115	118	120	123	126	128
4	135	138	142	146	150	153	157	160	163	166
	Schedule 40 Steel									
3/8	2.14	2.21	2.27	2.32	2.38	2.44	2.49	2.55	2.60	2.65
1/2	3.42	3.51	3.61	3.70	3.79	3.89	3.97	4.06	4.14	4.22
3/4	5.99	6.16	6.33	6.50	6.66	6.82	6.97	7.12	7.27	7.40
1	9.71	9.99	10.3	10.5	10.8	11.0	11.3	11.5	11.8	12.0
1-1/4	16.8	17.3	17.8	18.2	18.7	19.1	19.6	20.0	20.4	20.8
1-1/2	22.9	23.5	24.2	24.8	25.4	26.0	26.6	27.2	27.7	28.3
2	37.7	38.8	39.8	40.9	41.9	42.9	43.9	44.8	45.7	46.6
2-1/2	53.8	55.3	56.8	58.3	59.8	61.2	62.6	63.9	65.2	66.5
3	83.1	85.5	87.8	90.1	92.3	94.5	96.7	98.7	101	103
4	143	147	151	155	159	163	166	170	173	177

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table 9b: Liquid Line Capacities in Tons Refrigeration for KLEA 407C
Saturated Vapor Leaving Evaporator

Nominal line size inch	**Condenser saturation temperature change 1.0 °F in 100 m**									
	Pressure gradient of 3.59 psi/100 ft									
	Mean evaporating temperature °F									
	T -40	**-30**	**-20**	**-10**	**0**	**10**	**20**	**30**	**40**	**50**
	Type L Copper									
1/4	1.44	1.48	1.52	1.56	1.60	1.64	1.68	1.71	1.75	1.78
3/8	3.31	3.41	3.50	3.59	3.68	3.77	3.86	3.94	4.02	4.09
1/2	6.24	6.42	6.59	6.76	6.93	7.10	7.26	7.41	7.56	7.71
5/8	10.7	11.0	11.3	11.5	11.8	12.1	12.4	12.7	12.9	13.2
3/4	16.5	16.9	17.4	17.9	18.3	18.7	19.2	19.6	20.0	20.4
1	33.4	34.4	35.3	36.2	37.1	38.0	38.9	39.7	40.5	41.3
1-1/4	58.3	59.9	61.6	63.2	64.8	66.3	67.8	69.3	70.7	72.0
1-1/2	92.2	94.8	97.4	100.0	102	105	107	110	112	114
2	191	197	202	207	212	218	222	227	232	236
2-1/2	338	347	357	366	375	384	393	401	410	417
3	539	554	569	584	599	613	627	640	653	666
3-1/2	801	824	846	868	890	911	932	952	971	989
4	1129	1161	1193	1224	1255	1284	1313	1342	1369	1394
	Schedule 40 Steel									
3/8	3.81	3.92	4.03	4.14	4.24	4.34	4.44	4.53	4.62	4.71
1/2	7.08	7.28	7.48	7.67	7.86	8.05	8.23	8.41	8.58	8.74
3/4	14.9	15.3	15.7	16.2	16.6	17.0	17.3	17.7	18.1	18.4
1	28.2	29.0	29.8	30.6	31.3	32.1	32.8	33.5	34.2	34.8
1-1/4	58.1	59.8	61.4	63.0	64.6	66.1	67.6	69.1	70.5	71.8
1-1/2	87.2	89.7	92.1	94.5	96.9	99.2	101	104	106	108
2	168	173	178	182	187	191	196	200	204	208
2-1/2	268	276	283	291	298	305	312	319	325	331
3	474	487	501	514	527	539	551	563	574	585
4	965	992	1019	1046	1072	1098	1122	1146	1170	1192

Note:
(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F

Table l0a: Minimum Refrigeration Capacities in Tons Refrigeration for KLEA 407C
Lubricant *Is* EMKARATE RL32S

Type L Copper Tubing														
Evap. Temp °F	**Suction Temp °F**	**Nominal line size, inch**												
		1/4	**3/8**	**1/2**	**5/8**	**3/4**	**1**	**1-1/4**	**1-1/2**	**2**	**2-1/2**	**3**	**3-1/2**	**4**
50	60	0.080	0.175	0.316	0.523	0.788	1.537	2.60	4.01	8.02	13.8	21.5	31.3	43.5
	70	0.079	0.172	0.311	0.515	0.776	1.512	2.56	3.95	7.89	13.6	21.2	30.9	42.8
	80	0.078	0.170	0.307	0.507	0.764	1.490	2.52	3.89	7.77	13.4	20.8	30.4	42.2
40	50	0.073	0.158	0.286	0.472	0.712	1.388	2.35	3.62	7.24	12.4	19.4	28.3	39.3
	60	0.072	0.156	0.281	0.465	0.701	1.367	2.31	3.57	7.13	12.3	19.1	27.9	38.7
	70	0.070	0.153	0.277	0.458	0.691	1.347	2.28	3.52	7.02	12.1	18.8	27.5	38.1
30	40	0.065	0.142	0.257	0.425	0.641	1.248	2.11	3.26	6.51	11.2	17.5	25.5	35.4
	50	0.064	0.140	0.253	0.419	0.631	1.230	2.08	3.21	6.42	11.0	17.2	25.1	34.8
	60	0.063	0.138	0.250	0.412	0.622	1.212	2.05	3.17	6.32	10.9	16.9	24.7	34.3
20	30	0.058	0.127	0.230	0.380	0.574	1.118	1.89	2.92	5.83	10.0	15.6	22.8	31.7
	40	0.058	0.125	0.227	0.375	0.565	1.101	1.86	2.88	5.75	9.87	15.4	22.5	31.2
	50	0.057	0.124	0.224	0.369	0.557	1.086	1.84	2.84	5.66	9.73	15.2	22.1	30.7
10	20	0.052	0.113	0.205	0.339	0.511	0.996	1.68	2.60	5.20	8.93	13.9	20.3	28.2
	30	0.051	0.112	0.202	0.334	0.504	0.981	1.66	2.56	5.12	8.80	13.7	20.0	27.8
	40	0.051	0.110	0.199	0.329	0.496	0.967	1.64	2.53	5.05	8.67	13.5	19.7	27.4
0	10	0.046	0.100	0.182	0.300	0.453	0.882	1.49	2.30	4.60	7.91	12.3	18.0	25.0
	20	0.045	0.099	0.179	0.296	0.446	0.870	1.47	2.27	4.54	7.79	12.2	17.7	24.6
	30	0.045	0.098	0.177	0.292	0.440	0.857	1.45	2.24	4.47	7.69	12.0	17.5	24.3
-10	0	0.041	0.088	0.160	0.264	0.399	0.777	1.31	2.03	4.05	6.96	10.9	15.9	22.0
	10	0.040	0.087	0.158	0.261	0.393	0.766	1.29	2.00	3.99	6.86	10.7	15.6	21.7
	20	0.039	0.086	0.155	0.257	0.387	0.755	1.28	1.97	3.94	6.77	10.6	15.4	21.4
-20	-10	0.036	0.077	0.140	0.231	0.349	0.680	1.15	1.77	3.55	6.09	9.50	13.9	19.2
	0	0.035	0.076	0.138	0.228	0.344	0.670	1.13	1.75	3.49	6.00	9.37	13.7	19.0
	10	0.035	0.075	0.136	0.225	0.339	0.660	1.12	1.72	3.45	5.92	9.24	13.5	18.7
-30	-20	0.031	0.067	0.122	0.201	0.303	0.590	0.998	1.54	3.08	5.29	8.25	12.0	16.7
	-10	0.030	0.066	0.120	0.198	0.298	0.582	0.983	1.52	3.03	5.21	8.13	11.9	16.5
	0	0.030	0.065	0.118	0.195	0.294	0.573	0.970	1.50	2.99	5.14	8.02	11.7	16.2
-40	-30	0.027	0.058	0.105	0.173	0.261	0.508	0.859	1.33	2.65	4.55	7.11	10.4	14.4
	-20	0.026	0.057	0.103	0.170	0.257	0.501	0.847	1.31	2.61	4.49	7.00	10.2	14.2
	-10	0.026	0.056	0.102	0.168	0.253	0.494	0.835	1.29	2.58	4.43	6.90	10.1	14.0

(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F
(iii) Content of refrigerant in lubricant estimated from solubility data at suction gas temperature and pressure

Table l0b: Minimum Refrigeration Capacities in Tons Refrigeration for KLEA 407C
Lubricant Is EMKARATE RL32S

Schedule 40 Steel Pipe											
Evap. Temp °F	**Suction Temp °F**	**Nominal line size, inch**									
		3/8	**1/2**	**3/4**	**1**	**1-1/4**	**1-1/2**	**2**	**2-1/2**	**3**	**4**
50	60	0.246	0.441	0.890	1.63	3.23	4.75	8.87	13.8	23.8	47.0
	70	0.242	0.434	0.876	1.60	3.18	4.67	8.73	13.6	23.4	46.2
	80	0.239	0.427	0.863	1.58	3.13	4.60	8.60	13.4	23.1	45.5
40	50	0.222	0.398	0.804	1.47	2.92	4.29	8.01	12.5	21.5	42.4
	60	0.219	0.392	0.792	1.45	2.87	4.22	7.89	12.3	21.2	41.8
	70	0.216	0.386	0.780	1.43	2.83	4.16	7.77	12.1	20.9	41.2
30	40	0.200	0.358	0.723	1.32	2.62	3.86	7.21	11.2	19.3	38.2
	50	0.197	0.353	0.712	1.30	2.58	3.80	7.10	11.1	19.1	37.6
	60	0.194	0.348	0.702	1.28	2.55	3.74	6.99	10.9	18.8	37.0
20	30	0.179	0.321	0.647	1.18	2.35	3.45	6.45	10.1	17.3	34.2
	40	0.177	0.316	0.638	1.17	2.31	3.40	6.36	9.91	17.1	33.7
	50	0.174	0.311	0.629	1.15	2.28	3.35	6.27	9.77	16.8	33.2
10	20	0.160	0.286	0.577	1.05	2.09	3.08	5.75	8.96	15.4	30.4
	30	0.157	0.281	0.568	1.04	2.06	3.03	5.66	8.83	15.2	30.0
	40	0.155	0.277	0.560	1.02	2.03	2.99	5.58	8.71	15.0	29.6
0	10	0.141	0.253	0.511	0.934	1.85	2.73	5.09	7.94	13.7	27.0
	20	0.139	0.249	0.504	0.920	1.83	2.69	5.02	7.83	13.5	26.6
	30	0.137	0.246	0.497	0.908	1.80	2.65	4.95	7.72	13.3	26.2
-10	0	0.125	0.223	0.450	0.822	1.63	2.40	4.48	6.99	12.0	23.7
	10	0.123	0.220	0.444	0.811	1.61	2.37	4.42	6.89	11.9	23.4
	20	0.121	0.217	0.437	0.799	1.59	2.33	4.36	6.80	11.7	23.1
-20	-10	0.109	0.195	0.394	0.719	1.43	2.10	3.92	6.12	10.5	20.8
	0	0.107	0.192	0.388	0.709	1.41	2.07	3.87	6.03	10.4	20.5
	10	0.106	0.189	0.383	0.699	1.39	2.04	3.81	5.94	10.2	20.2
-30	-20	0.095	0.169	0.342	0.625	1.24	1.82	3.41	5.31	9.14	18.0
	-10	0.093	0.167	0.337	0.616	1.22	1.80	3.36	5.23	9.01	17.8
	0	0.092	0.164	0.332	0.607	1.21	1.77	3.31	5.16	8.88	17.5
-40	-30	0.081	0.146	0.294	0.538	1.07	1.57	2.93	4.57	7.87	15.5
	-20	0.080	0.144	0.290	0.530	1.05	1.55	2.89	4.51	7.76	15.3
	-10	0.079	0.142	0.286	0.523	1.04	1.53	2.85	4.44	7.65	15.1

(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F
(iii) Content of refrigerant in lubricant estimated from solubility data at suction gas temperature and pressure

Table l0c Minimum Refrigeration Capacities in Tons Refrigeration for KLEA 407C
Lubricant Is EMKARATE RL68S

Type L Copper Tubing														
Evap. Temp	**Suction Temp**	**Nominal line size, inch**												
°F	**°F**	**1/4**	**3/8**	**1/2**	**5/8**	**3/4**	**1**	**1-1/4**	**1-1/2**	**2**	**2-1/2**	**3**	**3-1/2**	**4**
50	60	0.081	0.175	0.317	0.524	0.790	1.54	2.60	4.02	8.03	13.8	21.5	31.4	43.6
	70	0.079	0.173	0.312	0.516	0.778	1.52	2.56	3.96	7.91	13.6	21.2	30.9	42.9
	80	0.078	0.170	0.307	0.508	0.766	1.49	2.52	3.90	7.79	13.4	20.9	30.5	42.3
40	50	0.073	0.158	0.287	0.473	0.714	1.39	2.35	3.63	7.26	12.5	19.5	28.4	39.4
	60	0.072	0.156	0.282	0.466	0.703	1.37	2.32	3.58	7.15	12.3	19.2	27.9	38.8
	70	0.071	0.154	0.278	0.459	0.692	1.35	2.28	3.52	7.04	12.1	18.9	27.5	38.2
30	40	0.065	0.143	0.258	0.426	0.642	1.25	2.12	3.27	6.53	11.2	17.5	25.5	35.4
	50	0.064	0.140	0.254	0.420	0.633	1.23	2.08	3.22	6.43	11.1	17.2	25.2	34.9
	60	0.064	0.138	0.250	0.413	0.623	1.21	2.05	3.17	6.34	10.9	17.0	24.8	34.4
20	30	0.059	0.128	0.231	0.381	0.575	1.12	1.90	2.93	5.85	10.0	15.7	22.9	31.7
	40	0.058	0.126	0.227	0.376	0.567	1.10	1.87	2.88	5.76	9.90	15.4	22.5	31.3
	50	0.057	0.124	0.224	0.370	0.558	1.09	1.84	2.84	5.68	9.76	15.2	22.2	30.8
10	20	0.052	0.114	0.206	0.340	0.512	0.999	1.69	2.61	5.21	8.95	14.0	20.4	28.3
	30	0.051	0.112	0.203	0.335	0.505	0.984	1.66	2.57	5.13	8.82	13.8	20.1	27.9
	40	0.051	0.110	0.200	0.330	0.498	0.970	1.64	2.53	5.06	8.70	13.6	19.8	27.5
0	10	0.046	0.101	0.182	0.301	0.454	0.885	1.50	2.31	4.62	7.93	12.4	18.1	25.1
	20	0.046	0.099	0.180	0.297	0.447	0.872	1.47	2.28	4.55	7.82	12.2	17.8	24.7
	30	0.045	0.098	0.177	0.293	0.441	0.860	1.45	2.25	4.49	7.71	12.0	17.5	24.3
-10	0	0.041	0.089	0.160	0.265	0.400	0.779	1.32	2.03	4.06	6.98	10.9	15.9	22.1
	10	0.040	0.087	0.158	0.261	0.394	0.768	1.30	2.01	4.01	6.88	10.7	15.7	21.7
	20	0.040	0.086	0.156	0.258	0.389	0.757	1.28	1.98	3.95	6.79	10.6	15.4	21.4
-20	-10	0.036	0.078	0.140	0.232	0.350	0.682	1.15	1.78	3.56	6.11	9.53	13.9	19.3
	0	0.035	0.077	0.138	0.229	0.345	0.672	1.14	1.75	3.50	6.02	9.39	13.7	19.0
	10	0.035	0.075	0.136	0.225	0.340	0.662	1.12	1.73	3.46	5.94	9.26	13.5	18.8
-30	-20	0.031	0.067	0.122	0.201	0.304	0.592	1.00	1.55	3.09	5.30	8.27	12.1	16.8
	-10	0.031	0.066	0.120	0.198	0.299	0.583	0.986	1.52	3.04	5.23	8.16	11.9	16.5
	0	0.030	0.065	0.118	0.196	0.295	0.575	0.973	1.50	3.00	5.16	8.04	11.7	16.3
-40	-30	0.027	0.058	0.105	0.173	0.261	0.510	0.862	1.33	2.66	4.57	7.13	10.4	14.4
	-20	0.026	0.057	0.103	0.171	0.258	0.502	0.849	1.31	2.62	4.50	7.02	10.2	14.2
	-10	0.026	0.056	0.102	0.169	0.254	0.495	0.837	1.29	2.58	4.44	6.92	10.1	14.0

(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F
(iii) Content of refrigerant in lubricant estimated from solubility data at suction gas temperature and pressure

Table l0d: Minimum Refrigeration Capacities in Tons Refrigeration for KLEA 407C
Lubricant Is EMKARATE RL68S

Schedule 40 Steel Pipe											
Evap. Temp °F	**Suction Temp °F**	**Nominal line size, inch**									
		3/8	**1/2**	**3/4**	**1**	**1-1/4**	**1-1/2**	**2**	**2-1/2**	**3**	**4**
50	60	0.247	0.442	0.892	1.63	3.24	4.76	8.89	13.9	23.9	47.1
	70	0.243	0.435	0.878	1.60	3.19	4.68	8.75	13.6	23.5	46.3
	80	0.239	0.428	0.864	1.58	3.14	4.61	8.61	13.4	23.1	45.6
40	50	0.223	0.399	0.806	1.47	2.92	4.30	8.03	12.5	21.6	42.5
	60	0.220	0.393	0.793	1.45	2.88	4.23	7.91	12.3	21.2	41.9
	70	0.216	0.387	0.782	1.43	2.84	4.17	7.79	12.1	20.9	41.2
30	40	0.201	0.359	0.725	1.32	2.63	3.87	7.22	11.3	19.4	38.3
	50	0.198	0.354	0.714	1.31	2.59	3.81	7.12	11.1	19.1	37.7
	60	0.195	0.348	0.704	1.29	2.55	3.75	7.01	10.9	18.8	37.1
20	30	0.180	0.321	0.649	1.19	2.36	3.46	6.47.	10.1	17.4	34.3
	40	0.177	0.317	0.640	1.17	2.32	3.41	6.37	9.94	17.1	33.7
	50	0.174	0.312	0.630	1.15	2.29	3.36	6.28	9.80	16.9	33.3
10	20	0.160	0.286	0.578	1.06	2.10	3.09	5.76	8.99	15.5	30.5
	30	0.158	0.282	0.570	1.04	2.07	3.04	5.68	8.86	15.2	30.1
	40	0.156	0.278	0.562	1.03	2.04	3.00	5.60	8.73	15.0	29.6
0	10	0.142	0.254	0.512	0.937	1.86	2.73	5.11	7.96	13.7	27.0
	20	0.140	0.250	0.505	0.923	1.83	2.69	5.03	7.85	13.5	26.6
	30	0.138	0.247	0.498	0.910	1.81	2.66	4.96	7.74	13.3	26.3
-10	0	0.125	0.223	0.451	0.825	1.64	2.41	4.50	7.01	12.1	23.8
	10	0.123	0.220	0.445	0.813	1.61	2.37	4.43	6.91	11.9	23.5
	20	0.121	0.217	0.439	0.802	1.59	2.34	4.37	6.81	11.7	23.1
-20	-10	0.109	0.195	0.395	0.721	1.43	2.11	3.93	6.13	10.6	20.8
	0	0.108	0.193	0.389	0.711	1.41	2.08	3.88	6.05	10.4	20.5
	10	0.106	0.190	0.384	0.701	1.39	2.05	3.82	5.96	10.3	20.2
-30	-20	0.095	0.170	0.343	0.626	1.24	1.83	3.42	5.33	9.17	18.1
	-10	0.093	0.167	0.338	0.617	1.23	1.80	3.37	5.25	9.04	17.8
	0	0.092	0.165	0.333	0.609	1.21	1.78	3.32	5.18	8.91	17.6
-40	-30	0.082	0.146	0.295	0.539	1.07	1.57	2.94	4.59	7.89	15.6
	-20	0.080	0.144	0.291	0.532	1.06	1.55	2.90	4.52	7.78	15.3
	-10	0.079	0.142	0.287	0.524	1.04	1.53	2.86	4.46	7.67	15.1

(i) Capacity based on saturated vapor (no useful superheat)
(ii) Mean condenser temperature 110°F (no subcooling) i.e. liquid temperature of 105.5°F
(iii) Content of refrigerant in lubricant estimated from solubility data at suction gas temperature and pressure

Table 11: Suction Line Capacity Correction Factors for KLEA 407C
To convert from tabulated values at a mean condenser temperature of 110°F to the desired value multiply by the appropriate factor.

T evap °F	T liquid °F 106						
	70	80	90	100	106	110	120
40	1.210	1.154	1.095	1.034	1.000	0.971	0.905
30	1.214	1.163	1.110	1.056	1.000	0.942	0.881
20	1.219	1.166	1.113	1.057	1.000	0.941	0.878
10	1.224	1.170	1.115	1.058	1.000	0.939	0.876
0	1.229	1.174	1.118	1.060	1.000	0.938	0.873
-10	1.235	1.179	1.121	1.061	1.000	0.936	0.870
-20	1.241	1.183	1.124	1.063	1.000	0.935	0.866
-30	1.247	1.188	1.127	1.065	1.000	0.933	0.863
-40	1.254	1.193	1.131	1.066	1.000	0.931	0.859

Note:
liquid temperature at a mean condensing temperature of 110.0°F is 105.5°F
hence table is referenced to a liquid temperature of 105.5°F

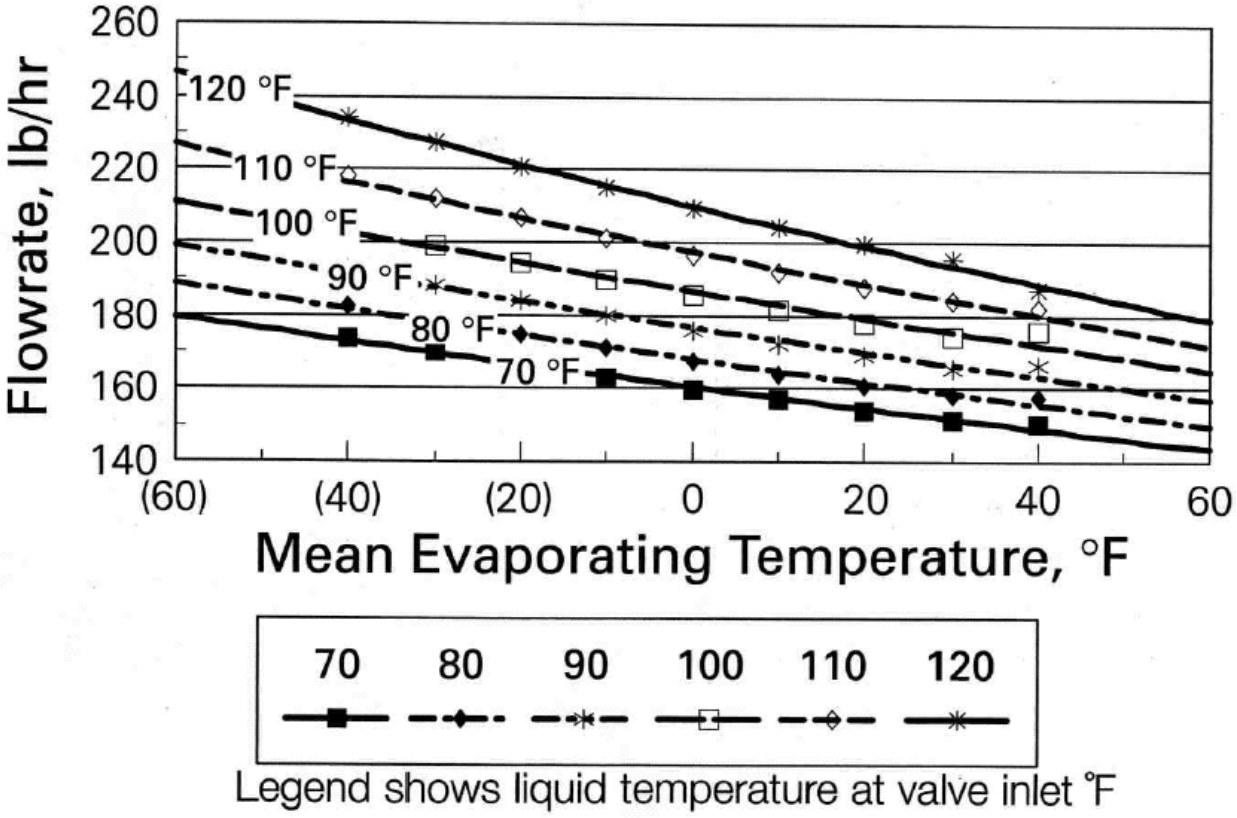
Table l1b: Discharge Line Capacity Correction Factors for KLEA 407C
To convert from tabulated values to capacities at other condensing temperatures, use the factors below:

Evaporator temperature °F	Condenser temperature		
	85 °F	110 °F	130 °F
50	0.830	1.000	1.108
40	0.832	1.000	1.104
30	0.834	1.000	1.101
20	0.836	1.000	1.097
10	0.839	1.000	1.093
0	0.842	1.000	1.089
-10	0.845	1.000	1.084
-20	0.848	1.000	1.079
-30	0.851	1.000	1.074
-40	0.855	1.000	1.068

Note: temperatures are MEAN values

Refrigerant Flowrate for 1 Ton of Refrigeration

KLEA 407C



Legend shows liquid temperature at valve inlet °F

KLEA® 407C

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