Klea® 507 Engineers Tables – SI Units

1. Introduction

The following tables provide practical information to help you design or set up refrigeration systems using Klea® 507. 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 Datasheet for Klea® 507 and the booklets of Thermodynamic Property Data for Klea® 507.

2. Temperature-Pressure Tables for Klea® 507

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

Table 1-3: Maximum recommended suction line capacities for varying suction gas conditions
Table 4: Discharge line capacities
Table 5: Liquid line capacities

3. Refrigerant Line Capacity Tables

3.1 Methods used to generate the 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 Klea® datasheets, thermodynamic tables. 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 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 temperature 40 °C.
Zero subcooling.
Vapour leaving evaporator
(i) saturated or
(ii) superheated (superheat quoted in the table).

The capacity for other liquid temperatures may be found using the tabulated correction factors given in Table 9. Note that the tables are referenced to a condenser of 40 °C; the liquid temperature corresponding to this condition is quoted in the tables.

The tables quote capacity for pressure drops in the evaporating pressure equivalent to a drop in saturation temperature of 0.01, 0.02 and 0.04 Kelvin for every metre of suction line. 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).

3.3 Discharge Line Capacity Tables

These have been calculated on the following basis:

Condenser temperature of 40 °C.
Zero subcooling.
Vapour leaves evaporator at zero useful superheat
Superheat at compressor discharge is (i) 45 or (ii) 60 °C.

3.4 Liquid Line Capacity Tables

These are quoted for conditions of (i) 0.5 m/s maximum velocity or (ii) 0.02 K/m drop in saturation temperature. Use the velocity criterion for sizing selfventing lines.

3.5 Correcting for other Temperature Drops or Line Lengths

The suction capacity tables reference according to saturation temperature losses of 0.01, 0.02 and 0.04 K in one metre length. In order to correct the capacities for different values of temperature drop or line length, use the following equation:

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

where:

Δ Te is the change in evaporating temperature
Δ Le is the length of suction line

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

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

Table 1a: Suction line capacities in kW for Klea® 507 Saturated vapour leaving evaporator

Nominal line size mm	Saturation temperature change 1.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	63	75	87	102	117	135	154	174	197	221
Type L Copper										
10	0.064	0.082	0.104	0.130	0.161	0.198	0.241	0.291	0.348	0.414
12	0.149	0.191	0.241	0.301	0.373	0.457	0.556	0.670	0.802	0.953
15	0.283	0.361	0.456	0.570	0.704	0.863	1.05	1.26	1.51	1.79
19	0.486	0.620	0.782	0.976	1.21	1.48	1.79	2.16	2.58	3.06
22	0.755	0.963	1.21	1.51	1.87	2.29	2.77	3.34	3.99	4.74
28	1.54	1.97	2.48	3.09	3.81	4.65	5.64	6.79	8.10	9.61
35	2.70	3.44	4.33	5.40	6.65	8.13	9.85	11.8	14.1	16.8
42	4.30	5.47	6.88	8.56	10.5	12.9	15.6	18.7	22.4	26.5
54	8.97	11.4	14.3	17.8	21.9	26.8	32.4	38.9	46.4	54.9
67	15.9	20.2	25.4	31.6	38.9	47.4	57.3	68.8	82.0	97.1
79	25.5	32.4	40.6	50.5	62.1	75.7	91.5	109.8	130.8	154.8
92	38.0	48.2	60.5	75.2	92.4	112.7	136.2	163.3	194.5	230.1
105	53.7	68.2	85.5	106.2	130.5	159.0	192.1	230.3	274.2	324.3
Schedule 40 steel										
10	0.189	0.239	0.298	0.368	0.451	0.546	0.657	0.784	0.930	1.09
15	0.352	0.445	0.555	0.685	0.838	1.02	1.22	1.46	1.73	2.03
20	0.747	0.941	1.17	1.45	1.77	2.14	2.57	3.07	3.63	4.28
25	1.42	1.79	2.23	2.74	3.35	4.06	4.87	5.81	6.88	8.09
32	2.94	3.70	4.60	5.67	6.92	8.37	10.0	12.0	14.2	16.7
40	4.42	5.56	6.91	8.51	10.4	12.6	15.1	18.0	21.3	25.0
50	8.55	10.7	13.4	16.4	20.1	24.3	29.1	34.7	41.0	48.3
65	13.7	17.2	21.3	26.2	32.0	38.7	46.4	55.3	65.4	76.9
80	24.2	30.4	37.7	46.4	56.6	68.4	82.1	97.7	115.6	135.9
100	49.4	62.0	77.0	94.7	115.4	139.4	167.2	199.0	235.4	276.8

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 1b: Suction line capacities in kW for Klea® 507 Saturated vapour leaving evaporator

Nominal line size mm	Saturation temperature change 2.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	126	149	175	203	235	270	307	349	394	442
Type L Copper										
10	0.095	0.122	0.154	0.192	0.238	0.292	0.354	0.427	0.512	0.608
12	0.220	0.282	0.355	0.444	0.548	0.672	0.815	0.982	1.17	1.40
15	0.417	0.532	0.671	0.837	1.03	1.27	1.53	1.85	2.21	2.62
19	0.715	0.912	1.15	1.43	1.77	2.16	2.62	3.15	3.76	4.47
22	1.11	1.41	1.78	2.22	2.74	3.34	4.05	4.87	5.82	6.90
28	2.26	2.88	3.62	4.51	5.56	6.79	8.22	9.88	11.8	14.0
35	3.96	5.04	6.33	7.88	9.70	11.8	14.3	17.2	20.5	24.3
42	6.29	7.99	10.0	12.5	15.4	18.7	22.7	27.2	32.4	38.4
54	13.1	16.6	20.9	25.9	31.9	38.9	47.0	56.4	67.2	79.5
67	23.2	29.5	37.0	45.9	56.4	68.8	83.1	99.6	118.6	140.3
79	37.1	47.1	59.1	73.3	90.1	109.7	132.5	158.8	189.0	223.5
92	55.3	70.1	87.9	109.1	134.0	163.1	196.9	235.9	280.7	331.8
105	78.1	99.0	124.1	153.9	189.0	230.0	277.6	332.5	395.5	467.4
Schedule 40 steel										
10	0.272	0.343	0.428	0.527	0.644	0.780	0.938	1.12	1.32	1.56
15	0.507	0.638	0.795	0.980	1.20	1.45	1.74	2.07	2.46	2.89
20	1.07	1.35	1.68	2.07	2.52	3.05	3.66	4.37	5.17	6.08
25	2.03	2.56	3.18	3.91	4.77	5.77	6.93	8.26	9.77	11.5
32	4.20	5.28	6.56	8.08	9.85	11.9	14.3	17.0	20.1	23.7
40	6.31	7.93	9.85	12.1	14.8	17.9	21.4	25.5	30.2	35.5
50	12.2	15.3	19.0	23.4	28.5	34.5	41.3	49.2	58.2	68.4
65	19.5	24.4	30.3	37.3	45.5	54.9	65.9	78.4	92.8	109.1
80	34.4	43.2	53.7	66.0	80.4	97.1	116.4	138.6	163.9	192.7
100	70.2	88.1	109.4	134.4	163.7	197.8	237.1	282.2	333.7	392.2

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 1c: Suction line capacities in kW for Klea® 507 Saturated vapour leaving evaporator

Nominal line size mm	Saturation temperature change 4.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	252	298	350	407	470	539	615	697	787	884
Type L Copper										
10	0.141	0.180	0.227	0.283	0.350	0.428	0.520	0.626	0.749	0.889
12	0.325	0.415	0.523	0.652	0.805	0.984	1.19	1.44	1.72	2.03
15	0.614	0.782	0.985	1.23	1.51	1.85	2.24	2.70	3.22	3.81
19	1.05	1.34	1.68	2.10	2.58	3.15	3.82	4.59	5.48	6.49
22	1.63	2.07	2.61	3.24	3.99	4.88	5.90	7.09	8.45	10.0
28	3.31	4.21	5.29	6.58	8.10	9.88	12.0	14.3	17.1	20.2
35	5.79	7.35	9.24	11.5	14.1	17.2	20.8	25.0	29.7	35.2
42	9.18	11.7	14.6	18.2	22.3	27.2	32.9	39.4	46.9	55.5
54	19.1	24.2	30.4	37.7	46.3	56.3	68.0	81.5	97.0	114.7
67	33.8	42.8	53.7	66.6	81.7	99.5	120.1	143.8	171.0	202.1
79	54.0	68.4	85.7	106.2	130.3	158.5	191.3	229.0	272.3	321.6
92	80.3	101.7	127.4	157.8	193.6	235.5	284.0	339.9	404.0	477.1
105	113.4	143.5	179.6	222.5	272.9	331.8	400.1	478.7	568.8	671.6
Schedule 40 steel										
10	0.390	0.491	0.611	0.753	0.919	1.11	1.33	1.59	1.88	2.22
15	0.725	0.912	1.14	1.40	1.70	2.06	2.47	2.95	3.49	4.10
20	1.53	1.92	2.39	2.94	3.59	4.34	5.21	6.20	7.34	8.63
25	2.90	3.64	4.53	5.57	6.79	8.21	9.84	11.7	13.9	16.3
32	5.99	7.52	9.34	11.5	14.0	16.9	20.3	24.1	28.6	33.6
40	8.99	11.3	14.0	17.2	21.0	25.4	30.4	36.2	42.8	50.3
50	17.3	21.8	27.0	33.2	40.5	48.9	58.6	69.8	82.5	97.0
65	27.7	34.7	43.1	53.0	64.5	77.9	93.4	111.2	131.5	154.5
80	48.9	61.4	76.2	93.6	114.0	137.7	165.0	196.4	232.2	273.0
100	99.7	125.1	155.2	190.6	232.1	280.3	335.9	399.8	472.6	555.4

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 2a: Suction line capacities in kW for Klea® 507 Suction line vapour with 5.0 °C of superheat

Nominal line size mm	Saturation temperature change 1.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	63	75	87	102	117	135	154	174	197	221
Type L Copper										
10	0.080	0.098	0.119	0.143	0.170	0.200	0.234	0.271	0.312	0.356
12	0.187	0.229	0.277	0.332	0.394	0.463	0.540	0.625	0.719	0.820
15	0.355	0.434	0.524	0.627	0.744	0.874	1.02	1.18	1.35	1.54
19	0.610	0.744	0.899	1.08	1.27	1.50	1.74	2.01	2.31	2.63
22	0.948	1.16	1.40	1.67	1.98	2.32	2.70	3.12	3.58	4.08
28	1.94	2.36	2.85	3.40	4.02	4.72	5.49	6.34	7.26	8.27
35	3.40	4.14	4.98	5.95	7.03	8.24	9.59	11.1	12.7	14.4
42	5.40	6.57	7.91	9.44	11.2	13.1	15.2	17.5	20.1	22.8
54	11.3	13.7	16.5	19.6	23.2	27.2	31.5	36.4	41.6	47.3
67	20.0	24.3	29.2	34.8	41.1	48.1	55.8	64.3	73.6	83.6
79	32.0	38.9	46.8	55.7	65.7	76.8	89.2	102.7	117.4	133.3
92	47.8	58.0	69.7	82.9	97.8	114.3	132.6	152.7	174.5	198.2
105	67.5	82.0	98.5	117.1	138.0	161.4	187.1	215.3	246.1	279.4
Schedule 40 steel										
10	0.238	0.287	0.343	0.407	0.477	0.555	0.641	0.734	0.835	0.944
15	0.443	0.535	0.640	0.757	0.887	1.03	1.19	1.36	1.55	1.75
20	0.940	1.13	1.35	1.60	1.87	2.18	2.51	2.87	3.27	3.69
25	1.79	2.15	2.57	3.03	3.55	4.12	4.75	5.44	6.18	6.98
32	3.70	4.45	5.31	6.26	7.33	8.51	9.80	11.2	12.7	14.4
40	5.56	6.69	7.97	9.41	11.0	12.8	14.7	16.8	19.1	21.6
50	10.8	12.9	15.4	18.2	21.3	24.7	28.4	32.5	36.9	41.6
65	17.2	20.7	24.6	29.0	33.9	39.3	45.3	51.8	58.8	66.4
80	30.4	36.6	43.5	51.3	60.0	69.6	80.1	91.5	103.9	117.3
100	62.2	74.7	88.8	104.6	122.3	141.8	163.1	186.4	211.7	238.9

Note:
(i) Capacity based on superheated vapour (superheat assumed useful)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 2b: Suction line capacities in kW for Klea® 507 Suction line vapour with 5.0 °C of superheat

Nominal line size mm	Saturation temperature change 2.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	126	149	175	203	235	270	307	349	394	442
Type L Copper										
10	0.119	0.146	0.177	0.212	0.251	0.296	0.345	0.399	0.458	0.523
12	0.277	0.338	0.409	0.489	0.579	0.681	0.793	0.917	1.05	1.20
15	0.524	0.639	0.772	0.923	1.09	1.28	1.49	1.73	1.98	2.25
19	0.898	1.10	1.32	1.58	1.87	2.19	2.55	2.94	3.38	3.84
22	1.39	1.70	2.05	2.45	2.89	3.39	3.94	4.55	5.22	5.94
28	2.84	3.46	4.17	4.97	5.88	6.89	8.00	9.23	10.6	12.0
35	4.98	6.05	7.29	8.69	10.3	12.0	14.0	16.1	18.4	20.9
42	7.90	9.60	11.6	13.8	16.3	19.0	22.1	25.4	29.1	33.1
54	16.5	20.0	24.0	28.6	33.7	39.5	45.8	52.7	60.3	68.5
67	29.2	35.4	42.6	50.6	59.7	69.8	80.9	93.1	106.4	120.8
79	46.7	56.6	68.0	80.9	95.3	111.4	129.1	148.5	169.7	192.5
92	69.5	84.3	101.2	120.3	141.7	165.6	191.8	220.6	252.0	285.8
105	98.2	119.1	142.9	169.8	200.0	233.5	270.4	311.0	355.0	402.7
Schedule 40 steel										
10	0.342	0.413	0.493	0.583	0.683	0.793	0.914	1.05	1.19	1.34
15	0.638	0.768	0.916	1.08	1.27	1.47	1.70	1.94	2.21	2.49
20	1.35	1.62	1.93	2.28	2.67	3.10	3.57	4.09	4.64	5.24
25	2.56	3.08	3.66	4.32	5.06	5.87	6.76	7.73	8.78	9.91
32	5.29	6.36	7.57	8.92	10.4	12.1	13.9	15.9	18.1	20.4
40	7.94	9.55	11.4	13.4	15.7	18.2	20.9	23.9	27.1	30.6
50	15.4	18.4	21.9	25.9	30.2	35.0	40.3	46.1	52.3	59.1
65	24.5	29.4	35.0	41.2	48.2	55.9	64.3	73.5	83.4	94.1
80	43.4	52.1	61.9	72.9	85.2	98.7	113.6	129.8	147.4	166.3
100	88.4	106.2	126.2	148.6	173.5	201.1	231.3	264.3	300.0	338.5

Note:
(i) Capacity based on superheated vapour (superheat assumed useful)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 2c: Suction line capacities in kW for Klea® 507 Suction line vapour with 5.0 °C of superheat

Nominal line size mm	Saturation temperature change 4.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	252	298	350	407	470	539	615	697	787	884
Type L Copper										
10	0.176	0.216	0.261	0.312	0.370	0.434	0.506	0.585	0.671	0.765
12	0.408	0.498	0.601	0.718	0.850	0.998	1.16	1.34	1.54	1.75
15	0.771	0.939	1.13	1.35	1.60	1.88	2.18	2.52	2.88	3.28
19	1.32	1.61	1.94	2.31	2.73	3.20	3.72	4.29	4.91	5.59
22	2.04	2.49	3.00	3.58	4.22	4.95	5.75	6.63	7.58	8.62
28	4.16	5.06	6.09	7.26	8.57	10.0	11.6	13.4	15.3	17.4
35	7.27	8.84	10.6	12.7	14.9	17.5	20.3	23.3	26.7	30.3
42	11.5	14.0	16.8	20.0	23.6	27.6	32.0	36.9	42.1	47.8
54	24.0	29.1	34.9	41.5	49.0	57.2	66.3	76.2	87.1	98.8
67	42.5	51.5	61.8	73.4	86.5	101.0	117.0	134.5	153.5	174.1
79	67.9	82.2	98.6	117.2	137.9	161.0	186.4	214.2	244.5	277.1
92	101.0	122.3	146.7	174.2	204.9	239.1	276.7	318.0	362.8	411.1
105	142.5	172.6	206.9	245.6	288.8	336.9	389.8	447.8	510.8	578.7
Schedule 40 steel										
10	0.491	0.592	0.705	0.832	0.974	1.13	1.30	1.49	1.69	1.91
15	0.913	1.10	1.31	1.54	1.81	2.10	2.41	2.76	3.14	3.54
20	1.93	2.32	2.76	3.25	3.80	4.41	5.08	5.81	6.60	7.44
25	3.65	4.39	5.22	6.16	7.19	8.34	9.60	11.0	12.5	14.1
32	7.54	9.05	10.8	12.7	14.8	17.2	19.8	22.6	25.7	29.0
40	11.3	13.6	16.2	19.0	22.2	25.8	29.7	33.9	38.5	43.4
50	21.9	26.2	31.2	36.7	42.9	49.7	57.2	65.4	74.2	83.7
65	34.9	41.8	49.7	58.6	68.4	79.2	91.2	104.1	118.2	133.4
80	61.7	74.0	87.9	103.5	120.9	140.0	161.1	184.0	208.8	235.6
100	125.7	150.7	179.0	210.8	246.1	285.0	327.8	374.5	425.0	479.4

Note:
(i) Capacity based on superheated vapour (superheat assumed useful)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 3a: Suction line capacities in kW for Klea® 507 Suction line vapour at 20.0 °C

Nominal line size mm	Saturation temperature change 1.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	63	75	87	102	117	135	154	174	197	221
Type L Copper										
10	0.053	0.070	0.089	0.113	0.142	0.177	0.219	0.268	0.325	0.393
12	0.125	0.162	0.208	0.263	0.330	0.410	0.505	0.618	0.750	0.904
15	0.237	0.308	0.394	0.499	0.625	0.776	0.954	1.17	1.41	1.70
19	0.409	0.529	0.677	0.856	1.07	1.33	1.63	1.99	2.41	2.91
22	0.636	0.823	1.05	1.33	1.66	2.06	2.53	3.09	3.74	4.50
28	1.30	1.68	2.15	2.71	3.39	4.20	5.15	6.28	7.60	9.13
35	2.29	2.95	3.77	4.75	5.93	7.34	9.00	11.0	13.3	15.9
42	3.64	4.70	5.99	7.55	9.42	11.6	14.3	17.4	21.0	25.2
54	7.62	9.82	12.5	15.7	19.6	24.2	29.7	36.1	43.6	52.3
67	13.5	17.4	22.2	27.9	34.8	42.9	52.6	63.9	77.1	92.4
79	21.7	27.9	35.5	44.7	55.6	68.6	84.0	102.0	123.0	147.5
92	32.4	41.7	53.0	66.6	82.9	102.2	125.0	151.7	182.9	219.2
105	45.9	58.9	74.9	94.1	117.0	144.3	176.4	214.0	258.0	309.1
Schedule 40 steel										
10	0.162	0.208	0.263	0.329	0.407	0.500	0.607	0.733	0.879	1.05
15	0.304	0.389	0.491	0.613	0.758	0.93	1.13	1.36	1.63	1.94
20	0.646	0.825	1.04	1.30	1.60	1.96	2.38	2.87	3.44	4.10
25	1.23	1.57	1.98	2.46	3.04	3.72	4.51	5.44	6.51	7.75
32	2.55	3.25	4.09	5.10	6.29	7.68	9.32	11.2	13.4	16.0
40	3.84	4.89	6.15	7.66	9.44	11.5	14.0	16.8	20.1	24.0
50	7.44	9.47	11.9	14.8	18.2	22.3	27.0	32.5	38.9	46.2
65	11.9	15.1	19.0	23.6	29.1	35.6	43.1	51.8	62.0	73.7
80	21.1	26.8	33.7	41.9	51.5	62.9	76.2	91.7	109.6	130.3
100	43.1	54.8	68.7	85.4	105.1	128.2	155.3	186.7	223.2	265.3

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 3b: Suction line capacities in kW for Klea® 507 Suction line vapour at 20.0 °C

Nominal line size mm	Saturation temperature change 1.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	126	149	175	203	235	270	307	349	394	442
Type L Copper										
10	0.080	0.103	0.133	0.168	0.211	0.262	0.322	0.394	0.478	0.577
12	0.185	0.240	0.307	0.389	0.487	0.604	0.743	0.907	1.10	1.32
15	0.351	0.455	0.581	0.735	0.919	1.14	1.40	1.71	2.07	2.49
19	0.604	0.780	0.997	1.26	1.57	1.95	2.39	2.92	3.53	4.24
22	0.938	1.21	1.55	1.95	2.44	3.02	3.70	4.51	5.46	6.56
28	1.92	2.47	3.15	3.98	4.96	6.14	7.52	9.15	11.1	13.3
35	3.36	4.33	5.52	6.95	8.67	10.7	13.1	16.0	19.3	23.1
42	5.34	6.88	8.76	11.0	13.7	17.0	20.8	25.3	30.5	36.6
54	11.2	14.4	18.2	23.0	28.6	35.3	43.1	52.4	63.2	75.7
67	19.8	25.5	32.4	40.7	50.6	62.4	76.3	92.6	111.6	133.7
79	31.7	40.8	51.8	65.0	80.8	99.6	121.7	147.7	177.9	213.1
92	47.3	60.7	77.1	96.8	120.3	148.2	181.0	219.5	264.3	316.4
105	66.8	85.8	108.9	136.6	169.8	209.0	255.3	309.4	372.5	445.8
Schedule 40 steel										
10	0.235	0.300	0.379	0.473	0.584	0.715	0.868	1.05	1.25	1.49
15	0.439	0.560	0.706	0.880	1.09	1.33	1.61	1.94	2.32	2.77
20	0.930	1.18	1.49	1.86	2.29	2.80	3.40	4.09	4.89	5.82
25	1.77	2.25	2.83	3.52	4.34	5.30	6.43	7.74	9.26	11.0
32	3.66	4.65	5.85	7.27	8.96	10.9	13.3	16.0	19.1	22.7
40	5.50	6.99	8.79	10.9	13.5	16.4	19.9	23.9	28.6	34.0
50	10.6	13.5	17.0	21.1	26.0	31.7	38.4	46.2	55.2	65.6
65	17.0	21.6	27.1	33.7	41.4	50.5	61.2	73.6	88.0	104.6
80	30.1	38.2	48.0	59.6	73.3	89.4	108.2	130.1	155.4	184.7
100	61.5	78.0	97.8	121.4	149.3	182.0	220.3	264.9	316.4	376.0

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 3c: Suction line capacities in kW for Klea® 507 Suction line vapour at 20.0 °C

Nominal line size mm	Saturation temperature change 4.0 K in 100 m Mean evaporating temperature °C at corresponding dP Pa/m									
T	-40	-35	-30	-25	-20	-15	-10	-5	0	5
dP/dL	252	298	350	407	470	539	615	697	787	884
Type L Copper										
10	0.118	0.153	0.196	0.248	0.311	0.386	0.474	0.579	0.701	0.844
12	0.274	0.355	0.453	0.573	0.716	0.887	1.09	1.33	1.61	1.93
15	0.518	0.670	0.855	1.08	1.35	1.67	2.05	2.49	3.02	3.63
19	0.889	1.15	1.46	1.85	2.30	2.85	3.50	4.25	5.14	6.17
22	1.38	1.78	2.27	2.86	3.57	4.41	5.40	6.57	7.94	9.53
28	2.81	3.63	4.62	5.81	7.25	8.95	11.0	13.3	16.1	19.3
35	4.93	6.34	8.07	10.1	12.6	15.6	19.1	23.2	28.0	33.5
42	7.82	10.06	12.79	16.1	20.0	24.7	30.2	36.6	44.2	52.9
54	16.3	20.9	26.6	33.4	41.5	51.2	62.5	75.8	91.3	109.4
67	28.9	37.1	47.1	59.1	73.4	90.4	110.4	133.8	161.1	192.8
79	46.2	59.3	75.2	94.4	117.2	144.2	176.0	213.2	256.6	306.9
92	68.8	88.3	111.9	140.3	174.2	214.3	261.5	316.6	380.8	455.4
105	97.2	124.7	158.0	198.0	245.7	302.1	368.5	446.0	536.4	641.2
Schedule 40 steel										
10	0.339	0.432	0.544	0.677	0.835	1.02	1.24	1.49	1.78	2.12
15	0.631	0.803	1.01	1.26	1.55	1.89	2.30	2.76	3.31	3.93
20	1.33	1.70	2.13	2.65	3.27	3.99	4.83	5.81	6.95	8.27
25	2.53	3.22	4.04	5.02	6.18	7.54	9.14	11.0	13.1	15.6
32	5.23	6.64	8.34	10.4	12.7	15.6	18.8	22.6	27.1	32.2
40	7.86	9.97	12.5	15.5	19.1	23.3	28.2	34.0	40.6	48.2
50	15.2	19.3	24.2	30.0	36.9	45.0	54.5	65.5	78.2	93.0
65	24.2	30.7	38.5	47.8	58.8	71.7	86.8	104.4	124.7	148.2
80	42.9	54.4	68.2	84.6	104.0	126.8	153.4	184.4	220.3	261.7
100	87.5	110.9	138.9	172.3	211.8	258.2	312.3	375.3	448.3	532.6

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 4a: Discharge line capacities in kW for Klea® 507 Saturated vapour leaving evaporator

Nominal line size mm	Condenser Saturation temperature change 2.0 K in 100 m Pressure gradient of 904 Pa/m Mean evaporating temperature °C Discharge line superheat of 45.0K									
T	-40.0	-35.0	-30.0	-25.0	-20.0	-15.0	-10.0	-5.0	0.0	5.0
Type L Copper										
10	0.940	0.978	1.02	1.05	1.09	1.12	1.16	1.19	1.23	1.26
12	2.15	2.24	2.33	2.41	2.49	2.58	2.66	2.74	2.81	2.88
15	4.04	4.20	4.36	4.52	4.68	4.83	4.99	5.13	5.27	5.41
19	6.88	7.16	7.43	7.70	7.97	8.23	8.49	8.74	8.98	9.22
22	10.6	11.0	11.5	11.9	12.3	12.7	13.1	13.5	13.9	14.2
28	21.5	22.3	23.2	24.0	24.9	25.7	26.5	27.3	28.0	28.8
35	37.4	38.9	40.4	41.8	43.3	44.7	46.1	47.5	48.8	50.0
42	59.0	61.4	63.7	66.1	68.3	70.6	72.8	75.0	77.0	79.0
54	122.0	126.9	131.7	136.5	141.3	145.9	150.5	154.9	159.2	163.4
67	215.0	223.7	232.3	240.8	249.1	257.3	265.4	273.2	280.8	288.1
79	342.4	356.2	369.9	383.4	396.7	409.8	422.6	435.0	447.1	458.7
92	508.1	528.6	548.9	568.9	588.6	608.0	627.0	645.5	663.5	680.7
105	715.5	744.3	772.8	801.0	828.8	856.1	882.9	909.0	934.2	958.5
Schedule 40 steel										
10	2.37	2.47	2.56	2.66	2.75	2.84	2.93	3.01	3.10	3.18
15	4.39	4.57	4.75	4.92	5.09	5.26	5.42	5.58	5.74	5.89
20	9.24	9.61	9.98	10.3	10.7	11.1	11.4	11.7	12.1	12.4
25	17.5	18.2	18.9	19.6	20.2	20.9	21.6	22.2	22.8	23.4
32	36.0	37.4	38.9	40.3	41.7	43.0	44.4	45.7	47.0	48.2
40	53.9	56.1	58.3	60.4	62.5	64.5	66.6	68.5	70.4	72.3
50	104.0	108.1	112.3	116.4	120.4	124.4	128.3	132.1	135.7	139.3
65	165.6	172.3	178.9	185.4	191.9	198.2	204.4	210.4	216.3	221.9
80	292.6	304.4	316.1	327.6	339.0	350.1	361.1	371.7	382.1	392.0
100	595.5	619.5	643.2	666.7	689.8	712.6	734.9	756.5	777.6	797.8

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 4b: Discharge line capacities in kW for Klea® 507 Saturated vapour leaving evaporator

Nominal line size mm	Condenser Saturation temperature change 2.0 K in 100 m Pressure gradient of 904 Pa/m Mean evaporating temperature °C Discharge line superheat of 60.0K									
T	-40.0	-35.0	-30.0	-25.0	-20.0	-15.0	-10.0	-5.0	0.0	5.0
Type L Copper										
10	0.891	0.927	0.962	0.997	1.03	1.07	1.10	1.13	1.16	1.19
12	2.04	2.13	2.21	2.29	2.37	2.44	2.52	2.60	2.67	2.74
15	3.84	3.99	4.14	4.30	4.45	4.59	4.74	4.87	5.01	5.14
19	6.54	6.80	7.06	7.32	7.58	7.83	8.07	8.31	8.54	8.76
22	10.1	10.5	10.9	11.3	11.7	12.1	12.5	12.8	13.2	13.5
28	20.5	21.3	22.1	22.9	23.7	24.5	25.2	26.0	26.7	27.4
35	35.6	37.0	38.4	39.8	41.2	42.6	43.9	45.2	46.5	47.7
42	56.2	58.5	60.8	63.0	65.2	67.3	69.4	71.5	73.4	75.3
54	116.4	121.1	125.7	130.3	134.8	139.3	143.6	147.9	152.0	155.9
67	205.3	213.6	221.8	229.9	237.9	245.7	253.4	260.9	268.1	275.1
79	327.2	340.3	353.4	366.3	379.0	391.5	403.7	415.6	427.2	438.2
92	485.7	505.2	524.6	543.7	562.6	581.1	599.3	617.0	634.1	650.6
105	684.1	711.6	738.9	765.9	792.5	818.6	844.2	869.1	893.2	916.4
Schedule 40 steel										
10	2.28	2.37	2.46	2.55	2.64	2.73	2.81	2.90	2.98	3.06
15	4.23	4.40	4.57	4.73	4.90	5.06	5.22	5.37	5.52	5.66
20	8.89	9.25	9.61	9.96	10.3	10.6	11.0	11.3	11.6	11.9
25	16.8	17.5	18.2	18.8	19.5	20.1	20.7	21.4	21.9	22.5
32	34.6	36.0	37.4	38.8	40.1	41.4	42.7	44.0	45.2	46.4
40	51.9	54.0	56.1	58.1	60.2	62.1	64.1	66.0	67.8	69.6
50	100.1	104.1	108.1	112.1	116.0	119.8	123.5	127.2	130.7	134.1
65	159.5	166.0	172.3	178.6	184.8	190.9	196.9	202.7	208.3	213.7
80	281.9	293.2	304.5	315.6	326.5	337.3	347.8	358.1	368.0	377.6
100	573.7	596.8	619.7	642.3	664.6	686.5	707.9	728.8	749.1	768.5

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 5a: Liquid line capacities in kW for Klea® 507 Saturated vapour leaving evaporator

Nominal line size mm	Liquid line velocity 0.5 m/s Mean evaporating temperature °C									
T	-40.0	-35.0	-30.0	-25.0	-20.0	-15.0	-10.0	-5.0	0.0	5.0
Type L Copper										
10	1.91	1.98	2.06	2.14	2.21	2.28	2.35	2.42	2.49	2.56
12	3.56	3.70	3.84	3.98	4.12	4.25	4.39	4.52	4.64	4.76
15	5.71	5.94	6.17	6.39	6.62	6.83	7.05	7.26	7.46	7.65
19	8.54	8.88	9.22	9.56	9.89	10.2	10.5	10.8	11.1	11.4
22	11.9	12.3	12.8	13.3	13.7	14.2	14.6	15.1	15.5	15.9
28	20.2	21.0	21.8	22.6	23.4	24.2	24.9	25.7	26.4	27.1
35	30.8	32.0	33.2	34.5	35.7	36.8	38.0	39.1	40.2	41.2
42	43.6	45.3	47.1	48.8	50.5	52.1	53.8	55.4	56.9	58.4
54	75.8	78.8	81.9	84.9	87.8	90.7	93.5	96.3	99.0	101.5
67	116.9	121.6	126.2	130.8	135.4	139.8	144.2	148.5	152.6	156.6
79	166.8	173.5	180.2	186.8	193.2	199.6	205.8	211.9	217.8	223.5
92	225.7	234.8	243.7	252.6	261.4	270.0	278.5	286.7	294.6	302.3
105	293.3	305.1	316.8	328.4	339.8	351.0	362.0	372.7	383.0	393.0
Schedule 40 steel										
10	4.67	4.86	5.05	5.23	5.41	5.59	5.77	5.94	6.10	6.26
15	7.44	7.74	8.04	8.33	8.62	8.91	9.18	9.46	9.72	9.97
20	13.1	13.6	14.1	14.6	15.1	15.6	16.1	16.6	17.1	17.5
25	21.2	22.0	22.9	23.7	24.5	25.3	26.1	26.9	27.6	28.3
32	36.6	38.1	39.6	41.0	42.4	43.8	45.2	46.5	47.8	49.1
40	49.8	51.9	53.8	55.8	57.7	59.6	61.5	63.3	65.1	66.8
50	82.2	85.5	88.8	92.0	95.2	98.3	101.4	104.4	107.3	110.1
65	117.2	122.0	126.6	131.3	135.8	140.3	144.7	149.0	153.1	157.1
80	181.1	188.4	195.6	202.7	209.7	216.7	223.4	230.0	236.4	242.6
100	311.8	324.3	336.8	349.0	361.2	373.1	384.7	396.1	407.1	417.7

Note:
(i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Table 5b: Liquid line capacities in kW for Klea® 507 Saturated vapour leaving evaporator

Nominal line size mm	Condenser saturation temperature change 2.0 K in 100m Pressure gradient of 904 Pa/m Mean evaporating temperature °C									
T	-40.0	-35.0	-30.0	-25.0	-20.0	-15.0	-10.0	-5.0	0.0	5.0
Type L Copper										
10	2.36	2.46	2.55	2.64	2.74	2.83	2.91	3.00	3.08	3.16
12	5.55	5.77	6.00	6.21	6.43	6.64	6.85	7.05	7.25	7.44
15	10.6	11.0	11.5	11.9	12.3	12.7	13.1	13.5	13.8	14.2
19	18.3	19.1	19.8	20.5	21.2	21.9	22.6	23.3	23.9	24.5
22	28.6	29.7	30.9	32.0	33.1	34.2	35.3	36.3	37.3	38.3
28	58.8	61.2	63.5	65.8	68.1	70.4	72.6	74.7	76.8	78.8
35	103.5	107.7	111.8	115.9	119.9	123.9	127.8	131.5	135.2	138.7
42	165.1	171.8	178.4	184.9	191.3	197.6	203.8	209.8	215.6	221.2
54	346.5	360.5	374.3	387.9	401.4	414.6	427.6	440.2	452.4	464.2
67	617.7	642.6	667.2	691.6	715.6	739.2	762.3	784.8	806.6	827.5
79	992.3	1032.2	1071.8	1110.9	1149.4	1187.3	1224.4	1260.6	1295.6	1329.2
92	1483.0	1542.7	1601.9	1660.3	1717.9	1774.6	1830.0	1884.0	1936.4	1986.7
105	2100.9	2185.5	2269.2	2352.0	2433.7	2513.9	2592.5	2669.0	2743.1	2814.4
Schedule 40 steel										
10	7.47	7.77	8.07	8.36	8.65	8.94	9.22	9.49	9.75	10.0
15	14.0	14.6	15.2	15.7	16.3	16.8	17.3	17.8	18.3	18.8
20	30.0	31.2	32.4	33.6	34.7	35.9	37.0	38.1	39.1	40.2
25	57.3	59.6	61.9	64.2	66.4	68.6	70.7	72.8	74.8	76.8
32	119.4	124.2	128.9	133.6	138.3	142.8	147.3	151.7	155.9	159.9
40	180.1	187.3	194.5	201.6	208.6	215.5	222.2	228.7	235.1	241.2
50	350.1	364.1	378.1	391.9	405.5	418.9	432.0	444.7	457.1	468.9
65	560.9	583.5	605.8	628.0	649.7	671.2	692.1	712.6	732.4	751.4
80	997.0	1037.1	1076.9	1116.2	1154.9	1193.0	1230.3	1266.6	1301.7	1335.6
100	2042.9	2125.2	2206.6	2287.1	2366.5	2444.5	2520.9	2595.3	2667.4	2736.7

Note: (i) Capacity based on saturated vapour (no useful superheat)
(ii) Mean condenser temperature 40 °C (no subcooling) i.e. liquid temperature of 40.0 °C

Mexichem
Refrigerants

Mexichem UK Limited, The Heath Business & Technical Park, Runcorn, Cheshire, WA7 4QX
Tel: +44 (0)1928 518880 E-mail: info@mexichem.com www.mexichemfluor.com