Kirby
CO_2 Evaporator

HEATCRAFT™
Worldwide Refrigeration

KIRBY

A refreshing
approach to cooling

1.3kW 13kW

Front Cover - Tall Glass of Soda Water & Ice

In 1772, scientists invented carbonated water using CO_2 gas to create the fizz. Today, CO_2 technology has taken another giant leap forward with the advent of the **Kirby CO_2 Evaporator** and its efficient low temperature cooling.

Kirby CO_2 Evaporator

Prior to the discovery of R12, liquid CO_2 was used as a refrigerant. It is now enjoying renewed interest due to its innate advantages.

Naturally occurring, non toxic (within a ventilated space) and non flammable, it is also non-ozone depleting. CO_2 has a very low GWP base value of 1 and is a low cost alternative to HFC or HC refrigerants.

As a result of its physical properties and high volumetric cooling capacity, CO_2 technology naturally lends itself to the refrigeration process. So it was a natural choice for Kirby to develop CO_2 equipment.

Backed by substantial research and development, the **Kirby CO_2 Evaporator** delivers state of the art technology. Each evaporator coil has been designed to take full advantage of the benefits of CO2 and oil circulation within the system has been improved. The result is optimum heat exchange efficiency and an impressive capacity.

The Kirby CO_2 Evaporator is reliable, efficient and offers a substantial reduction in compressor displacement. Suitable for direct expansion systems and low temperature freezer applications, the Kirby CO_2 Evaporator is a heavy duty unit which is easily installed.

- Higher flow rate than traditional evaporators
- More capacity for the same cooler compared to other refrigerants
- Low refrigerant costs

HEATCRAFT Worldwide Refrigeration

Kirby CO_2 Evaporator – Nomenclature Data

Medium Temperature

KMC | 106 | LR

LR = Liquid recirculation with a standard rate of 2.5:1

CO_2 BASIC CAPACITY (kW) = Number ÷ 10

Unit Type
KMC - Kirby Medium Temperature CO_2 Evaporators (Standard Aluminium Fin Coil & Painted White Aluminium Panels)

Low Temperature

KLC | 107

CO_2 BASIC CAPACITY (kW) = Number ÷ 10

Unit Type
KLC - Kirby Low Temperature CO_2 Evaporators (Standard Aluminium Fin Coil & Painted White Aluminium Panels)

Liquid Recirculation - 300mm Cooler (Medium Temperature)

RATED AT THE MEDIUM TEMPERATURE CONDITION OF -10°C SST, 12KTD, & 2.5:1 LIQUID RECIRCULATION RATE						
MODEL*	KMC031LR	KMC046LR	KMC062LR	KMC072LR	KMC093LR	KMC106LR
CO_2 (W) @ 12KTD	3140	4550	6150	7160	9270	10640
COIL ROWS	3	2	3	4	3	4

FAN MOTOR DATA (Ø300MM) 240V 50Hz						
NO. OF FANS	1	2	2	2	3	3
AIR FLOW (l/s)	360	760	720	680	1080	1020
AIR THROW (m)	6.9	10.3	9.8	9.3	12.1	11.5
TOTAL WATTS	73	146	146	146	219	219
TOTAL AMPS	0.32	0.64	0.64	0.64	0.96	0.96
SOUND POWER dB(A)*	68	71	71	71	72	72

UNIT CONNECTION DATA (MM) & UNPACKED WEIGHT						
LIQUID	9.5	12.7	12.7	15.9	15.9	15.9
SUCTION	12.7	12.7	15.9	15.9	19.1	19.1
WEIGHT (KG)	10.3	15.1	16.9	18.7	23.0	26.0

Heatcraft Australia encourages the use of solder fittings wherever possible in the interest of environmental protection.

REFRIGERANT CHARGE - CO_2 (KG)*						
OPERATING	0.65	0.89	1.35	1.78	2.00	2.61
MAXIMUM	0.80	1.10	1.66	2.18	2.46	3.20

Operating Charge = 80% liquid and 20% vapour by volume at -10°C SST
Maximum Charge = 100% liquid at -10°C sst

Kirby CO_2 Evaporator
Technical Data

Liquid Recirculation - 350mm Cooler (Medium Temperature)

RATED AT THE MEDIUM TEMPERATURE CONDITION OF -10°C SST, 12KTD, & 2.5:1 LIQUID RECIRCULATION RATE									
MODEL*	KMC068LR	KMC123LR	KMC158LR	KMC180LR	KMC219LR	KMC289LR	KMC315LR	KMC355LR	KMC389LR
CO_2 (W) @ 12KTD	6800	12320	15820	18040	21900	28850	31530	35520	38890
COIL ROWS	4	3	5	3	4	4	5	4	5

FAN MOTOR DATA (350MM) 240V 50Hz									
NO. OF FANS	1	2	2	3	3	4	4	5	5
AIR FLOW (l/s)	680	1400	1320	2160	2060	2750	2630	3440	3280
AIR THROW (m)	8.3	12.5	11.5	15.4	14.7	16.4	15.9	18.4	17.8
TOTAL WATTS	155	310	310	465	465	620	620	775	775
TOTAL AMPS	0.65	1.30	1.30	1.95	1.95	2.60	2.60	3.25	3.25
SOUND POWER dB(A)*	71	75	75	77	77	79	79	80	80

UNIT CONNECTION DATA (MM) & UNPACKED WEIGHT									
LIQUID	12.7	19.1	22.2	22.2	25.4	28.6	28.6	28.6	31.8
SUCTION	15.9	19.1	22.2	22.2	25.4	28.6	28.6	28.6	31.8
WEIGHT (KG)	16.3	26.3	33.8	37.7	42.6	58.3	63.7	69.6	77.5

Heatcraft Australia encourages the use of solder fittings wherever possible in the interest of environmental protection.

REFRIGERANT CHARGE CO_2 (KG)									
OPERATING	1.57	2.30	3.87	3.57	4.50	6.23	7.45	7.72	9.23
MAXIMUM	1.92	2.82	4.75	4.38	5.52	7.64	9.14	9.48	11.34

Liquid Recirculation - 350mm Cooler (Medium Temperature) Capacity Factor

CAPACITY FACTOR	SST (°C)							
KTD	-14	-12	-10	-8	-6	-4	-2	0
6	0.42	0.43	0.44	0.45	0.46	0.47	0.47	0.48
9	0.67	0.69	0.71	0.73	0.75	0.77	0.79	0.81
12	0.94	0.97	1.00	1.03	1.06	1.10	1.13	1.17
15	1.24	1.27	1.31	1.35	1.40	1.45	1.50	1.56
18	1.53	1.58	1.64	1.70	1.76	1.83	1.90	1.98
21	1.86	1.93	2.00	2.07	2.15	2.24	2.34	2.44

Notes: Capacity Factor Tables
CAPACITY FACTOR APPLIES TO SST AT 12KTD. ACTUAL CAPACITY = CAPACITY @ 12 KTD x FACTOR

Providing optimum heat exchange efficiency & impressive capacity, the Kirby CO_2 Evaporator is reliable, efficient and offers a substantial reduction in compressor displacement.

Kirby CO_2 Evaporator
Technical Data

Direct Expansion - 300 & 350mm Freezer (Low Temperature)

RATED AT THE STANDARD LOW TEMPERATURE CONDITION OF -24°C SST, 6KTD										
MODEL*	KLC013	KLC027	KLC035	KLC045	KLC054	KLC068	KLC081	KLC090	KLC107	KLC131
CO_2 (W) @ 6KTD	1330	2690	3480	4490	5350	6780	8050	9030	10650	13140
COIL ROWS	4	4	3	3	4	3	4	3	4	4

* = "Fan & heater element wiring" is a standard feature for KLC units.

FAN MOTOR DATA	300MM 240V 50Hz			350MM 240V 50Hz						
NO. OF FANS	1	2	3	2	2	3	3	4	4	5
AIR FLOW (l/s)	340	680	1080	1400	1375	2160	2060	2800	2750	3440
AIR THROW (m)	6.0	8.6	11.2	11.6	11.0	14.3	13.6	16.0	15.2	17.0
TOTAL WATTS	73	146	219	310	310	465	465	620	620	775
TOTAL AMPS	0.32	0.64	0.96	1.3	1.3	1.95	1.95	2.6	2.6	3.25
SOUND POWER dB(A)*	68	71	72	75	75	77	77	79	79	80

HEATER DATA 50 Hz										
TOTAL WATTS	900	1800	2700	3200	3200	4800	4800	6400	6400	8000
AMPS (1 Ph)	3.75	7.5	-	-	-	-	-	-	-	-
MAX. AMPS/Ph	-	-	3.75	6.67	6.67	10	10	13.33	13.33	16.67
VOLTS / PHASE	240 / 1	240 / 1	415 / 3	415 / 3	415 / 3	415 / 3	415 / 3	415 / 3	415 / 3	415 / 3
CONNECTION	PARALLEL	PARALLEL	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR

UNIT CONNECTION DATA (MM) & UNPACKED WEIGHT										
LIQUID (Bohn)	6.4	6.4	9.5	9.5	9.5	12.7	12.7	12.7	12.7	12.7
SUCTION (Both)	9.5	9.5	12.7	12.7	12.7	15.9	15.9	15.9	19.1	19.1
WEIGHT (KG)	11.8	19.4	24.4	27.0	31.2	38.1	45.2	51.0	58.9	77.8

REFRIGERANT CHARGE*										
CO_2 (KG)	1.03	1.98	2.18	2.72	3.49	3.79	5.23	5.30	7.07	7.51

* = 80% liquid and 20% vapour by volume at -24°C SST

Direct Expansion - 300 & 350mm Freezer (Low Temperature) Capacity Factor

CAPACITY FACTOR	SST					
KTD	-42	-36	-30	-24	-18	-12
3	0.40	0.41	0.43	0.45	0.47	TBA
6	0.87	0.90	0.95	1.00	1.08	
9	1.33	1.39	1.46	1.56	1.70	
12	1.79	1.88	2.00	2.15	2.36	

Notes: Capacity Factor Tables
*CAPACITY FACTOR APPLIES TO 6KTD, ACTUAL CAPACITY = CAPACITY @ 6KTD X FACTOR

Performance Rating Basis of CO_2 Liquid Re-Circulation

MEDIUM TEMPERATURE

CAPACITY — Based on industry guidelines at -10°C entering liquid with 2.5:1 recirculation rate, +2°C, 80%rh air on, and 12KTD. Capacity figure is total capacity (rated with wet fin surfaces). KTD is defined as "entering air temperature - leaving refrigerant saturation temperature". Coils are in counterflow. Rated capacity is for 177 fins per metre.

Design Pressure Limitation

Design pressure of standard coils for sub-critical cascade operation is 3750kPa (abs).

Systems must be protected from exceeding 3750kPa (abs) during operating, shut down, or emergency conditions.

Performance Rating Basis of CO_2 Direct Expansion

LOW TEMPERATURE

CAPACITY — Based on industry guidelines at -10°C entering liquid (inherent subcooling), -18°C, 90%rh air on, and 6KTD. Capacity figure is total capacity (rated with wet fin surfaces). KTD is defined as entering air temperature - leaving refrigerant saturation temperature. Coils are in counterflow. 3K useful coil superheat assumed.

Rated capacity is for 177 fins per metre.

AIRFLOW — Rated at standard air conditions (20°C dry air, 101.35kPa atmospheric pressure).

AIRTHROW — Based on industry guidelines. Measurements taken at 0.5, 0.75, and 1m from the ceiling at 20°C air. The distance at which the average of the three values equals 0.5m/s is taken as the limit of airthrow. Correction for +2°C room (0.94) is included.

SOUND POWER — Tests were done with a Sound Intensity meter generally in accordance with the methods of ISO9614-1:1993 (measured at discrete points).

Tests were conducted at 20°C ambient temp with only the fan(s) running & no refrigerant flow. Actual results may vary due to refrigerant flow noise & other factors.

Sound pressure level at 3m distance from the unit can be estimated using various deductions depending on the location of the unit in the room.

Unit Locations	Location 1	Location 2	Location 3	Location 4
Lw - Lp (dB(A)) (3m)	20.5	17.5	14.5	11.5

Location 1 Unit located with no hard surfaces to reflect the sound, such as suspended in mid air.

Location 2 Unit located with 1 hard surface to reflect the sound, such as mounted on ceiling.

Location 3 Unit located with 2 hard surfaces to reflect the sound, such as mounted on ceiling & close to a wall.

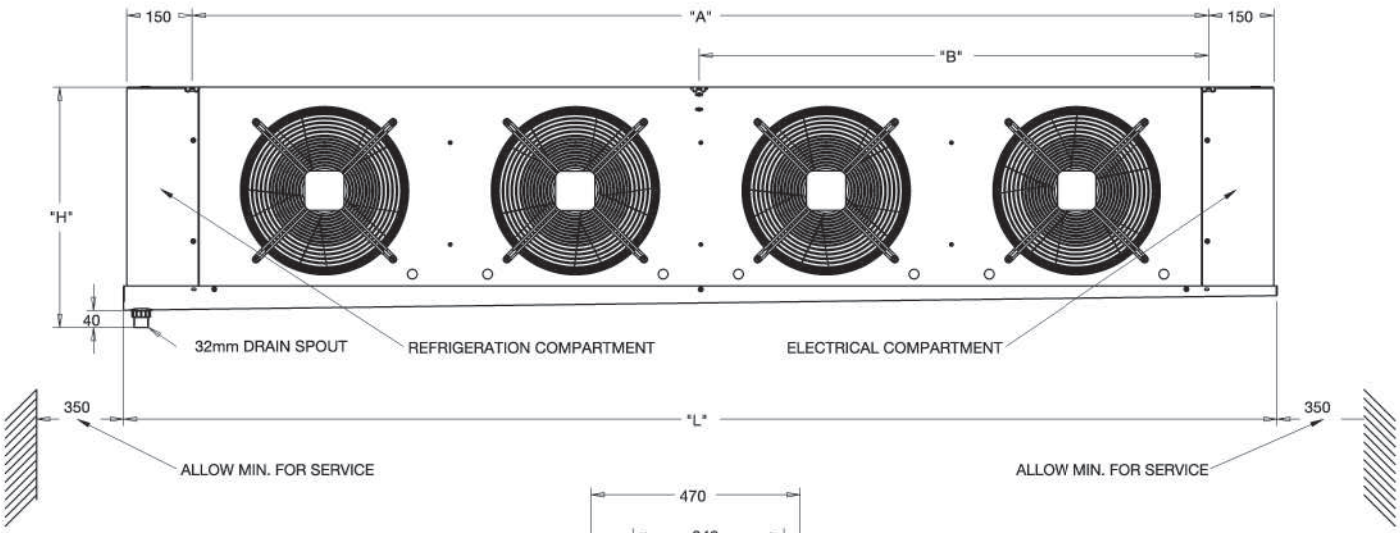
Location 4 Unit located with 3 hard surfaces to reflect the sound, such as mounted on ceiling & close to 2 walls.

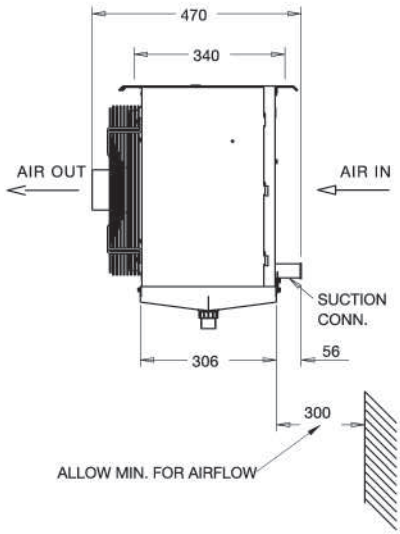
Lw Sound power level, dB(A).

Lp Sound pressure level, dB(A).

Kirby CO_2 Evaporator
Technical Data

Dimensional Data





DIMENSIONAL DATA (MM) - 300mm Cooler (Medium Temperature)						
MODELS	KMC031LR	KMC046LR	KMC062LR	KMC072LR	KMC093LR	KMC106LR
A	440	845	845	845	1250	1250
L (LENGTH)	750	1155	1155	1155	1560	1560
H (HEIGHT)	430	430	430	430	430	430

DIMENSIONAL DATA (MM) - 350mm Cooler (Medium Temperature)										
MODELS	KMC057LR	KMC068LR	KMC123LR	KMC158LR	KMC180LR	KMC219LR	KMC289LR	KMC315LR	KMC355LR	KMC389LR
A	540	540	1175	1175	1745	1745	2320	2320	2890	2890
B	-	-	-	-	-	-	1165	1165	1735	1735
L (LENGTH)	850	850	1485	1485	2060	2060	2630	2630	3200	3200
H (HEIGHT)	545	545	545	545	545	545	545	545	545	545

DIMENSIONAL DATA (MM) - 300 & 350mm Freezer (Low Temperature)										
MODELS	KLC013	KLC027	KLC035	KLC045	KLC054	KLC068	KLC081	KLC090	KLC107	KLC131
A	440	845	1250	1175	1175	1745	1745	2320	2320	2890
B	-	-	-	-	-	-	-	1165	1165	1735
L (LENGTH)	750	1155	1560	1485	1485	2060	2060	2630	2630	3200
H (HEIGHT)	430	430	430	545	545	545	545	545	545	545

HEATCRAFT™
Worldwide Refrigeration

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KIRCO20410BPG