



Muller

World-Class Refrigeration Products



MCC and MCF Evaporators

Muller – A trusted name in Asia



Muller MCC and MCF ranges of medium and low temperature evaporators

- Now with improved balance between coil design and airflow, for optimum performance.
- Designed to offer maximum performance with HFC and HCFC refrigerants.
- Fitted with external rotor motors and sickle blade fans.
- Improved defrost performance on MCF freezer models.
- MCF models fully wired in the factory.
- Reversible drain tray, with vertical drain tube.
- Removable access door and other features which simplify installation and service.
- All coils have inner grooved tube.

SELECTION DATA

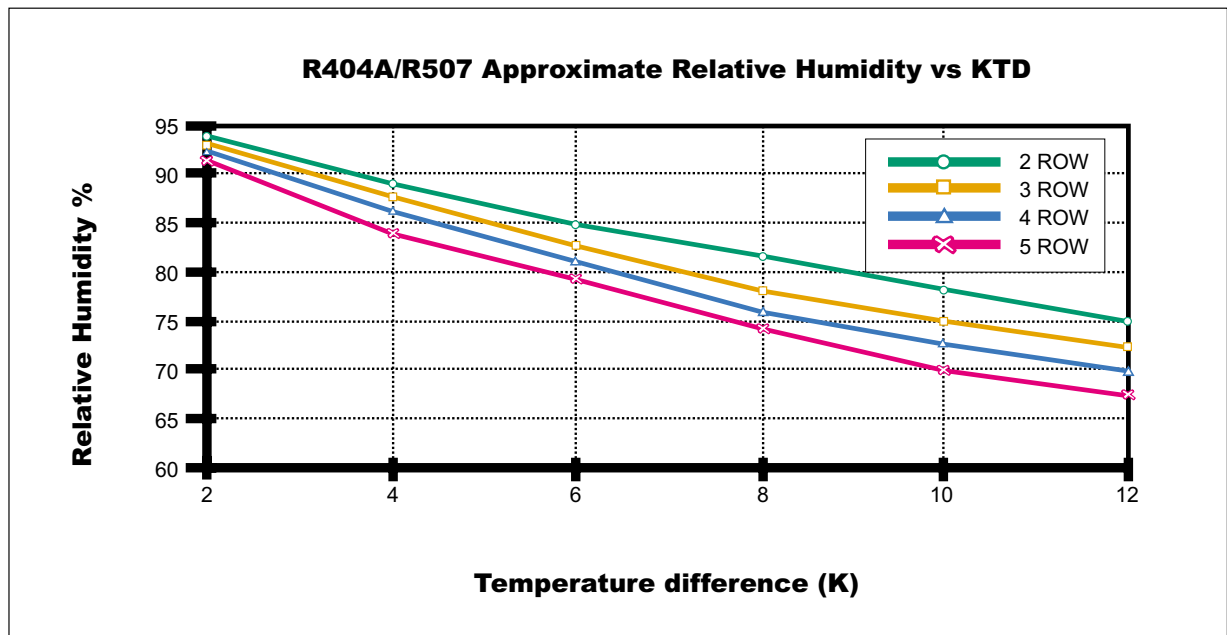
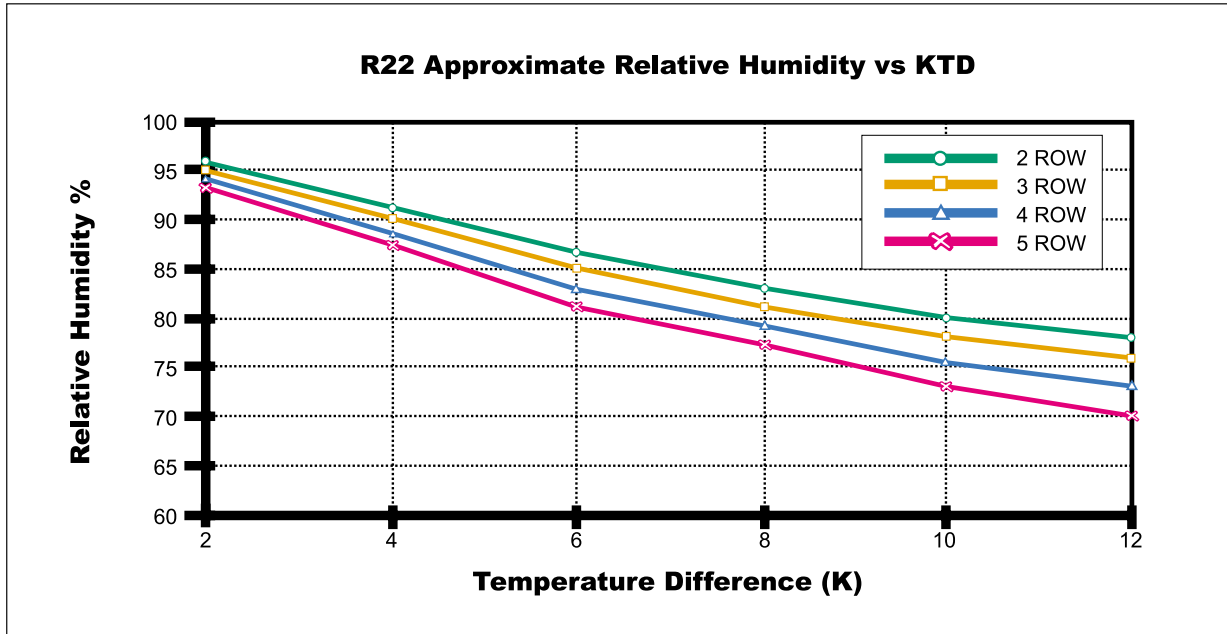
MODEL	MCC11	MCC16	MCC20	MCC27	MCC32	MCC39	MCC55	MCC60	MCC69	MCC81	MCC88	MCC103	MCC114	MCC129	MCC143	MCC175	MCC193
CAPACITY Watts @ 1KTD	187	263	325	447	537	657	908	1005	1153	1352	1465	1708	1898	2150	2383	2917	3222
R404A Watts @ 6KTD	1120	1580	1950	2680	3220	3940	5450	6030	6920	8110	8790	10250	11390	12900	14300	17500	19330
CAPACITY Watts @ 1KTD	173	222	308	413	520	610	798	965	1110	1255	1367	1558	1655	2083	2327	2750	2917
R22 Watts @ 6KTD	1040	1330	1850	2480	3120	3660	4790	5790	6660	7530	8200	9350	9930	12500	13960	16500	17500
CAPACITY Watts @ 1KTD	163	199	290	358	475	533	719	827	933	1124	1227	1440	1494	1727	1986	2402	2587
R134a Watts @ 6KTD	980	1190	1740	2150	2850	3200	4320	4960	5600	6750	7360	8640	8690	10360	11920	14410	15520
MCC-H CAPACITY FACTOR (Apply to MCC Capacity to find capacity of MCC-H model)																	
FIN SERIES	N/A	0.81	0.9	1	0.88	0.9	1	1	1	1	1	1	1	1	1	1	1
No. of ROWS	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
AIR QUANTITY l/s	2	3	4	2	3	4	3	4	5	3	4	5	3	4	5	4	5
AIR THROW m	380	360	340	760	720	680	1400	1375	1320	2160	2060	1970	2880	2750	2630	3440	3280
FAN SIZE Ømm	7.5	7	6.5	10.5	10	9.5	15	14.5	14	18.5	17.5	17	21.5	20.5	19.5	22.5	21.5
FAN/MOTOR QTY	300	300	300	300	300	300	350	350	350	350	350	350	350	350	350	350	350
FAN SPEED rpm	1	1	1	2	2	2	2	2	2	3	3	3	4	4	4	5	5
MOTOR TOTAL WATTS	1390	1390	1390	1390	1390	1390	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
TOTAL AMPS*	73	73	73	146	146	146	310	310	310	465	465	465	620	620	620	775	775
WATTS/24hrs	0.32	0.32	0.32	0.64	0.64	0.64	1.3	1.3	1.3	1.95	1.95	1.95	2.6	2.6	2.6	3.25	3.25
MCC-H HEATER DATA																	
HEATER TOTAL WATTS	N/A	1040	1040	2050	2050	2050	3060	3060	3060	4400	4400	4400	5950	5950	5950	7790	7790
TOTAL AMPS		4.3	4.3	8.5	8.5	8.5	5	5	5	7.3	7.3	7.3	10	10	10	13.3	13.3
SUPPLY VOLTS		220/240	220/240	220/240	220/240	220/240	380/420	380/420	380/420	380/420	380/420	380/420	380/420	380/420	380/420	380/420	380/420
PHASE		1	1	1	1	1	3	3	3	3	3	3	3	3	3	3	3
CONNECTION		PARALLEL	PARALLEL	PARALLEL	PARALLEL	PARALLEL	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR
*Given as total amps for 240V supply, or maximum amps per phase for 415V supply.																	
TX VALVE	R22 DANFOSS	TX2-0.3(00)	TX2-0.7(01)	TX2-0.7(01)	TX2-0.7(01)	TX2-1.0(02)	TX2-1.0(02)	TX2-1.5(03)	TX2-1.5(03)	TX2-1.5(03)	TX2-1.5(03)	TX2-1.5(03)	TX2-2.3(04)	TX2-2.3(04)	TX2-2.3(04)	TX2-3(05)	TX2-3(05)
Refer to Performance	R404A DANFOSS	TS2-0.45(01)	TS2-0.45(01)	TS2-0.6(02)	TS2-1.2(03)	TS2-1.2(03)	TS2-1.7(04)	TS2-1.7(04)	TS2-1.7(04)	TS2-2.2(05)	TS2-2.2(05)	TS2-2.2(05)	TS2-2.6(06)	TS2-2.6(06)	TS2-3.7(01)	TS2-3.7(01)	TS2-3.7(01)
Rating Basis Section	R134a DANFOSS	TM2-0.25(00)	TM2-0.5(01)	TM2-0.8(02)	TM2-1.3(03)	TM2-1.3(03)	TM2-1.9(04)	TM2-1.9(04)	TM2-1.9(04)	TM2-2.5(05)	TM2-2.5(05)	TM2-2.5(05)	TM2-3(06)	TM2-3(06)	TM2-3.7(01)	TM2-5.4(02)	TM2-5.4(02)

NOTES

SUPERHEAT SETTINGS ON SYSTEMS USING R407C, OR R407B MUST BE VERIFIED IN USE.
REFER TO VALVE MANUFACTURERS DATA FOR AVAILABILITY AND SELECTION.
R22 SELECTION BASED ON 1150kPa dP, R404A BASED ON 950kPa dP.



RELATIVE HUMIDITY DATA



NOTES: RELATIVE HUMIDITY GRAPHS

1. THE RELATIVE HUMIDITY IS AN EXPRESSION OF THE CONDITION MAINTAINED IN THE ROOM WHEN THE COIL BALANCES THE ROOM SENSIBLE AND LATENT HEAT LOADS, AND WHEN THE PRODUCT IS AT DESIRED TEMPERATURE. IT IS NOT A MEASURE OF THE CONDITION OF THE AIR COMING OFF THE COIL SURFACE.
2. THESE GRAPHS ARE APPROXIMATE, AS FACTORS SUCH AS OUTSIDE CONDITIONS, DOOR USAGE, LEAKAGE ETC WILL AFFECT THE CONDITIONS ACHIEVED.
3. TO APPROXIMATE RH FOR R407C, REDUCE THE R22 RH BY 1% FOR EACH 5% HIGHER CAPACITY AS GIVEN IN TABLES.
4. TO APPROXIMATE RH FOR R134a, INCREASE THE RH BY 1% BELOW 6KTD, AND BY 2% ABOVE 6KTD.
5. THE GRAPH AND CORRECTIONS ARE ONLY DIRECTLY APPLICABLE AT THE GIVEN AIR ON CONDITION. CORRECTIONS ARE REQUIRED FOR OTHER AIR ON CONDITIONS FOR ACCURATE RESULTS.
6. FOR 5FPI COILS, ADD 2% TO THE RH FOUND AS ABOVE FOR ANY GIVEN REFRIGERANT.

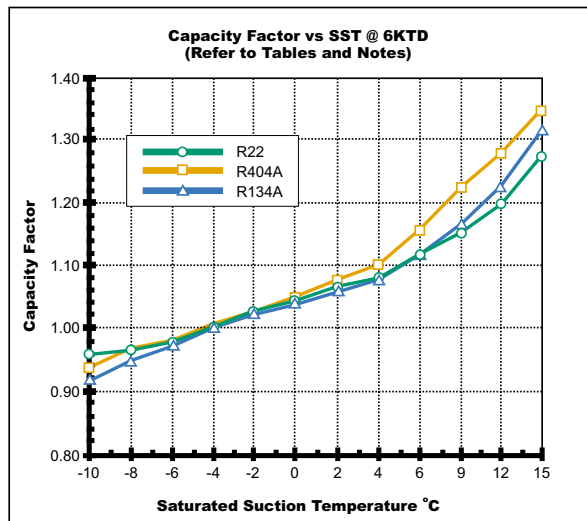
CAPACITY FACTOR AND APPLICATION LIMITS

R22 CAPACITY FACTOR AND APPLICATION LIMITS (80% RH)												
SST	-10	-8	-6	-4	-2	0	2	4	6	9	12	15
FACTOR	0.95	0.96	0.98	1.00	1.02	1.04	1.06	1.08	1.11	1.15	1.20	1.27
MAX. KTD	10	11	11	12	12	11	11	11	10	9	9	9
MIN. KTD	4	3	3	3	3	3	3	4	5	5	5	5
max. RSHF	0.91	0.94	0.97	0.99	1	—	—	—	—	—	—	—
min. RSHF	0.75	0.72	0.7	0.68	0.66	—	—	—	—	—	—	—
LIMITATION	NEW CIRCUITS AND/OR DISTRIB NEEDED IF OUTSIDE MAX OR MIN KTD.											

R404A CAPACITY FACTOR AND APPLICATION LIMITS (80% RH)												
SST	-10	-8	-6	-4	-2	0	2	4	6	9	12	15
FACTOR	0.93	0.96	0.98	1.00	1.01	1.04	1.07	1.10	1.15	1.21	1.27	1.34
MAX. KTD	9	9	9	10	10	9	9	9	8	8	8	8
MIN. KTD	3	3	3	3	3	3	3	4	4	4	4	4
max. RSHF	0.9	0.93	0.96	0.97	0.98	—	—	—	—	—	—	—
min. RSHF	0.75	0.72	0.7	0.68	0.66	—	—	—	—	—	—	—
LIMITATION	NEW CIRCUITS AND/OR DISTRIB NEEDED IF OUTSIDE MAX OR MIN KTD.									NEW DISTRIB. >= 9°SST		

R134a CAPACITY FACTOR AND APPLICATION LIMITS (80% RH)												
SST	-10	-8	-6	-4	-2	0	2	4	6	9	12	15
FACTOR	0.92	0.95	0.98	1.00	1.01	1.03	1.05	1.08	1.11	1.16	1.23	1.31
MAX. KTD	9	10	11	11	11	11	11	10	9	8	7	6
MIN. KTD	4	3	3	3	3	3	3	3	4	4	4	4
max. RSHF	0.93	0.96	0.98	0.99	1	—	—	—	—	—	—	—
min. RSHF	0.77	0.74	0.72	0.7	0.68	—	—	—	—	—	—	—
LIMITATION	NEW CIRCUITS AND/OR DISTRIB NEEDED IF OUTSIDE MAX OR MIN KTD.									NEW DISTRIB. >= 9°SST		

FIN CAPACITY CORRECTION FACTORS			
AL 5FPI	0.89	COPPER FIN 6FPI	1.022



NOTES: CAPACITY FACTOR TABLES

STANDARD COILS ARE 6FPI ALUMINIUM. MULTIPLY RATED CAPACITY BY FACTOR TO FIND CAPACITY WITH REQUIRED FPI & MATERIAL. APPLICATION LIMITS DO NOT CHANGE FOR 5FPI AND/OR COPPER COILS.

- CAPACITY FACTOR APPLIES TO SST AT 6KTD.
ACTUAL CAPACITY = CAPACITY @ 6 KTD x FACTOR x ACTUAL KTD/6.
- FOR APPLICATIONS BELOW 0°C ROOM TEMP USE CONSULT YOUR AUTHORISED MULLER OUTLET REGARDING PREFERRED DEFROST METHODS. MCC-H MODELS ARE PREFERRED FOR ELECTRIC DEFROST SYSTEMS.

- THE LIMITS ON THIS CHART ARE INTENDED TO INDICATE THE MAXIMUM APPLICATION RANGE OF STANDARD MCC COILS.
- FOR APPLICATIONS OUTSIDE THESE LIMITS, CONSULT YOUR AUTHORISED MULLER OUTLET. DISTRIBUTORS AND/OR CIRCUITING MAY BE UNSUITABLE OUTSIDE THESE LIMITS.

PERFORMANCE RATING BASIS OF MCC EVAPORATORS

- CAPACITY – Based on CRMA Guidelines at 40°C entering liquid (inherent subcooling), +2°C 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 6fpi (standard) coils. Other fpi refer to capacity factor table.
- AIRFLOW – Rated at standard air conditions (20°C dry air, 101.35kPa atmospheric pressure)
- AIRTHROW – Based on CRMA 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 3 values equals 0.5m/s is taken as the limit of airtthrow. Correction for +2°C room (0.94) is included.
- Motor Watts per 24 hours – Taken as the total heat input per day (fans run continuously) for equipment selection purposes. Value is motor wattage x 24.
- T-X valve selection – Based on coil capacity at -4°C SST & 40°C Liquid, 6KTD. R22 based on 1050kPa pressure drop, R404A based on 850kPa, R134a based on 550kPa.



MCC-H DEFROST DATA

IN ORDER TO MAXIMISE EFFICIENCY AND AIRFLOW, THE FOLLOWING ADVISORY DEFROST DATA HAS BEEN COMPILED

SST	-10	-8	-6	-4
DEFROSTS AT MAX. KTD	10	9	8	7
DEFROSTS AT 6KTD	8	7	6	5
DEFROSTS AT MIN. KTD	6	6	5	4

DEFROST DATA IS MINIMUM NO. REQUIRED FOR AVERAGE ROOM LOADS (REFER TO MAX & MIN. RSHF DATA)

ADVISORY DEFROST TIMING FOR 0°C ROOM								
KTD	LIGHT LOAD		HEAVY LOAD			LIGHT LOAD		
	1	2	3	4	5	6	7	8
10	X	X	X	X	X	X	X	X
8	X	X	X	X	X	X	X	
6	X	X	X	X	X		X	
4	X		X	X		X	X	

Each column represents a 3 hour period during the day. An X indicates the hour that a defrost should commence.

“Heavy Load” represents the nominal “working period” during the day.

Above data based on R22 Capacity figures. Defrost frequency for other refrigerants must be verified on the installation.

Control Setting Guidelines

Each application should be treated on its merits, however the following is given as a guide.

Termination Type	Sensor Location	Setting	Fan Delay (if req'd)
Time	n/a	20 – 25mins	4 mins (max)
Temperature	Suction Line Plate	11° – 14°C	1° to -2°C
Pressure	Header	700–720 kPa R22	n/a
		380–400kPa R134A	n/a
		790–810kPa R407C	n/a
		970–980kPa R507	n/a
		940–950kPa R404A	n/a

DEFROST TERMINATION REQUIREMENTS

Defrost time for average loads should be approx. 20 minutes including drainage. Time will vary with varying degrees of ice-up.

Time Termination

Time termination should be set to ensure complete defrost at the heaviest load condition. Typically allow 20 – 25 minutes with safety reset at 35 minutes.

Temperature Termination

Temperature termination setting depends on frequency and severity of defrosts, and location of the sensing device. If using the standard freezer thermostat (Kirby # MCC143-1), the defrosting guidelines above should be used. 5 row coils may require longer defrost (higher termination temp.), or more frequent defrosts, than 3 or 4 row coils, if using this type of control.

Pressure Termination

Pressure termination can be incorporated into the defrost in a number of ways. Whatever method is preferred, it must be noted that the temperature of the fins will be somewhat lower than the temperature corresponding to the refrigerant saturation pressure. Therefore a substantially higher refrigerant temperature must be allowed for when setting the pressure control. See table. It is also not recommended to control fan delay by pressure as a very low pressure will be reached quite quickly after defrost on TX valve systems, when the fans are not running. It is preferable to combine the pressure termination with a timeclock for fan delay.

Fan Delay Requirements

Fan delay requirements may vary with application, conditions, and control method, but should not be more than 4 minutes. Fan delays with MCC143-1 will be of the order of 2 – 4 mins.

The above guidelines allow for relatively heavy defrost loads. Shorter times or lower settings must be verified on the installation.

Pressures given for R407C, and R404A corresponds to the mid point at the required temperature.

Refer to the applicable Kirby Pressure/Temperature Chart.

All data given is for defrost without refrigerant pumpdown. Pumpdown is not recommended for electric defrost with temperature or pressure termination. Pumpdown may be used with time termination. Requirements must be determined on individual systems.

Data above based on R22 capacity. For R407C, R507 and R404A applications, it may be necessary to increase number of defrosts to maintain efficient performance. If so, the defrost should be added during the heavy load period.

SELECTION DATA

MODEL	MCF11	MCF14	MCF18	MCF23	MCF28	MCF36	MCF44	MCF50	MCF56	MCF70	MCF80	MCF85	MCF95	MCF116	MCF135
CAPACITY	Watts @ 1KTD	185	228	307	390	470	603	733	840	933	1167	1327	1413	1583	1940
R404A	Watts @ 6KTD	1110	1370	1840	2340	2820	3620	4400	5040	5600	7000	7960	8480	9500	11640
CAPACITY	Watts @ 1KTD	173	210	275	357	442	558	683	767	883	1092	1267	1333	1517	1833
R22	Watts @ 6KTD	1040	1260	1650	2140	2650	3350	4100	4600	5300	6550	7600	8000	9100	11000
CAPACITY	Watts @ 1KTD	185	228	304	389	467	598	733	834	939	1176	1338	1421	1594	1953
R507	Watts @ 6KTD	1110	1370	1820	2330	2800	3590	4400	5000	5640	7050	8030	8530	9560	11720
FIN SERIES		6	6	6	6	6	6	6	6	6	6	6	6	6	6
No. of ROWS		3	4	2	3	4	3	4	3	4	5	4	5	4	5
AIR QUANTITY	l/s	360	340	760	720	680	1080	1020	1440	2160	2060	1970	2750	2630	3440
AIR THROW	m	6.7	6.5	8.3	8	7.7	11.3	11	12.4	17	16	15.5	19	18	21
FAN SIZE	Ø mm	300	300	300	300	300	300	300	300	350	350	350	350	350	350
FAN/MOTOR	QTY	1	1	2	2	2	3	3	4	3	3	3	4	4	5
FAN SPEED	rpm	1390	1390	1390	1390	1390	1390	1390	1390	1400	1400	1400	1400	1400	1400
MOTOR	TOTAL WATTS	73	73	146	146	146	219	219	292	465	465	465	620	620	775
	TOTAL AMPS	0.32	0.32	0.64	0.64	0.64	0.96	0.96	1.28	1.95	1.95	1.95	2.6	2.6	3.25
	WATTS/24hrs	1750	1750	3500	3500	3500	5260	5260	7010	11160	11160	11160	14880	14880	18600
HEATER	TOTAL WATTS	1040	1040	2050	2050	2050	3000	3000	3960	4400	4400	4400	5950	5950	7790
	TOTAL AMPS*	4.3	4.3	8.5	8.5	8.5	4.6	4.6	6.2	7.3	7.3	7.3	10	10	13.3
SUPPLY	VOLTS	220/240	220/240	220/240	220/240	220/240	380/420	380/420	380/420	380/420	380/420	380/420	380/420	380/420	380/420
	PHASE	1	1	1	1	1	3	3	3	3	3	3	3	3	3
	CONNECTION	PARALLEL	PARALLEL	PARALLEL	PARALLEL	PARALLEL	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR
		PARALLEL	PARALLEL	PARALLEL	PARALLEL	PARALLEL	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR	STAR

* = Given as total amps for 240V supply, or maximum amps per phase for 415V supply.

TX VALVE	R22 DANFOSS	TEX2-0.3(00)	TEX2-0.3(00)	TEX2-0.7(01)	TEX2-0.7(01)	TEX2-1.0(02)	TEX2-1.0(02)	TEX2-1.0(02)	TEX2-1.5(03)	TEX2-1.5(03)	TEX2-1.5(03)	TEX2-2.3(04)	TEX2-2.3(04)	TEX2-2.3(04)	TEX2-3.0(05)
Refer to Rating Notes	R404A DANFOSS	TEX2-45(01)	TEX2-45(01)	TEX2-0.6(02)	TEX2-0.6(02)	TEX2-1.2(03)	TEX2-1.2(03)	TEX2-1.2(03)	TEX2-1.7(04)	TEX2-1.7(04)	TEX2-2.2(05)	TEX2-2.6(06)	TEX2-2.6(06)	TEX2-2.6(06)	TEX2-3.7(07)

NOTES

**SUPERHEAT SETTINGS ON SYSTEMS USING R407C, OR R407B MUST BE VERIFIED IN USE.

REFER TO VALVE MANUFACTURERS DATA FOR AVAILABILITY AND SELECTION. R22 SELECTION BASED ON 1150KPa dP, R404A BASED ON 950KPa dP.

PERFORMANCE RATING BASIS OF MCF EVAPORATORS

- CAPACITY – Based on CRMA Guidelines at 40°C entering liquid (inherent subcooling), -18°C 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 6fpi (standard) coils. Other fpi refer to capacity factor table.
- AIRFLOW – Rated at standard air conditions (20°C dry air, 101.35KPa atmospheric pressure).
- AIRTHROW – Based on CRMA 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 3 values equals 0.5m/s is taken as the limit of airtthrow. Correction for -18°C room (0.87) is included.
- Motor Watts per 24 hours – Taken as the total heat input per day (fans run continuously) for equipment selection purposes. Value is motor wattage x 24.
- TX valve selection – Based on coil capacity at -24°C SST & 40°C LIQUID, 6KTD. R22 based on 1150KPa pressure drop, R404A based on 950KPa.



CAPACITY FACTOR AND APPLICATION LIMITS

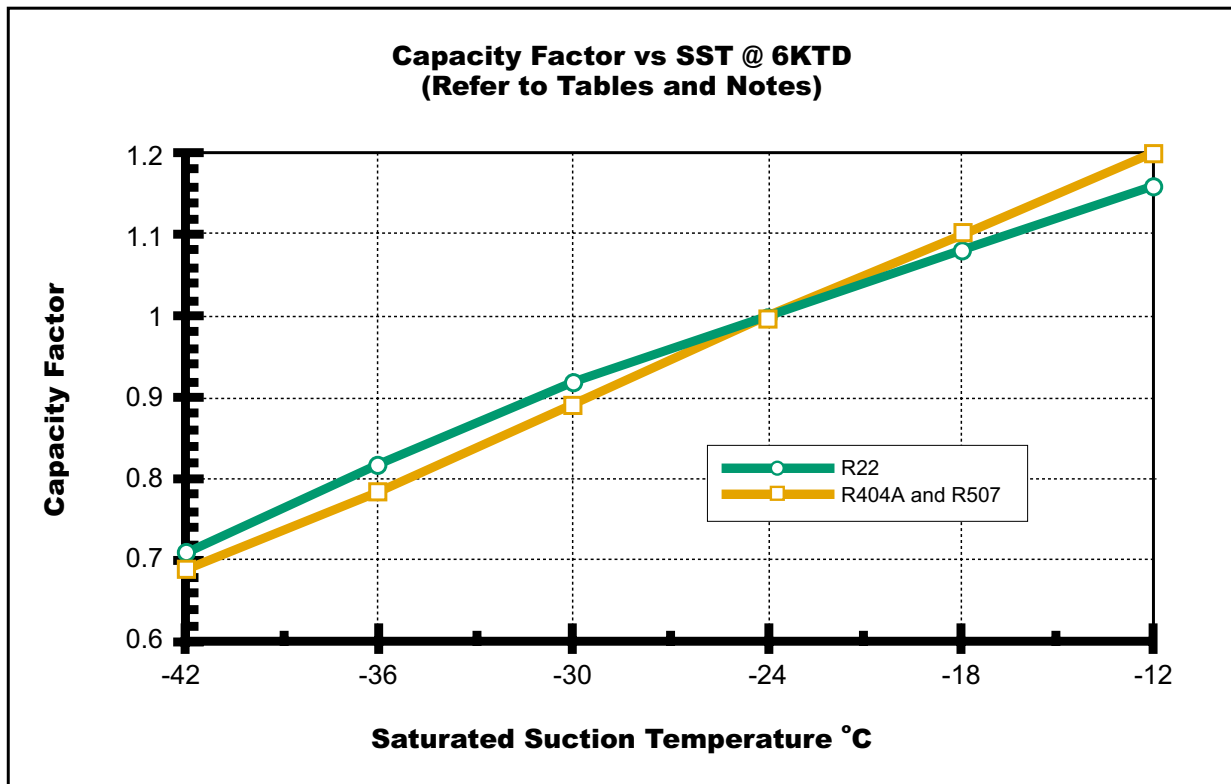
R22 CAPACITY FACTOR AND APPLICATION LIMITS						
SST	-42	-36	-30	-24	-18	-12
FACTOR	0.71	0.79	0.94	1	1.05	1.16
MAX KTD	6	8	10	10	9	8
MIN KTD	4	4	3	3	4	5
min RSHF	0.9	0.9	0.85	0.8	0.8	0.75
max RSHF	1	1	1	1	0.95	0.95
R404A, R507 CAPACITY FACTOR AND APPLICATION LIMITS						
SST	-42	-36	-30	-24	-18	-12
FACTOR	0.69	0.78	0.89	1.00	1.10	1.20
MAX KTD	6	8	9	9	9	8
MIN KTD	4	4	3	3	4	4
max RSHF	1	1	1	1	0.95	0.95
min RSHF	0.9	0.9	0.85	0.8	0.8	0.75

FIN CAPACITY CORRECTION FACTORS					
COPPER FIN 6FPI	1.022	AL 5FPI	0.93	AL 4FPI	0.87

NOTES: CAPACITY FACTOR TABLE

STANDARD COILS ARE 6FPI ALUMINIUM. MULTIPLY RATED CAPACITY BY FACTOR TO FIND CAPACITY WITH REQUIRED FPI & MATERIAL. APPLICATION LIMITS DO NOT CHANGE FOR OTHER FPI AND/OR COPPER FIN.

- CAPACITY FACTOR APPLIES TO SST AT 6KTD. ACTUAL CAPACITY = CAPACITY @ 6 KTD x FACTOR x ACTUAL KTD / 6
- THE LIMITS OF THIS GRAPH ARE INTENDED TO INDICATE THE MAXIMUM APPLICATION RANGE OF STANDARD MCF COILS.
- MAX AND MIN RSHF (ROOM SENSIBLE HEAT FACTOR) REFER TO THE RANGE IN WHICH DEFROST DATA IS CALCULATED. MAX RSHF CORRESPONDS TO MIN KTD, MIN RSHF CORRESPONDS TO MAX KTD.
- FOR APPLICATIONS OUTSIDE THESE LIMITS, CONSULT YOUR AUTHORIZED MULLER OUTLET. DISTRIBUTORS, CIRCUITING, AND/OR DEFROST CHARACTERISTICS MAY BE UNSUITABLE OUTSIDE THESE LIMITS.



MCF DEFROST DATA

IN ORDER TO MAXIMISE EFFICIENCY AND AIRFLOW, THE FOLLOWING ADVISORY DEFROST DATA HAS BEEN COMPILED

SST	-42	-36	-30	-24	-18	-12
DEFROSTS AT MAX. KTD	6	7	7	7	6	6
DEFROSTS AT 6KTD	6	5	5	4	4	4
DEFROSTS AT MIN. KTD	5	5	4	3	3	4

DEFROST DATA IS MINIMUM NO. REQUIRED FOR AVERAGE ROOM LOADS (REFER TO MAX & MIN. RSHF DATA)

ADVISORY DEFROST TIMING FOR 0°C ROOM								
KTD	LIGHT LOAD		HEAVY LOAD			LIGHT LOAD		
	1	2	3	4	5	6	7	8
10	X	X	X	X	X	X		X
8		X	X	X	X	X		X
6		X		X		X		X
4			X		X			X

Each column represents a 3 hour period during the day.
 An X indicates the hour that a defrost should commence.
 "Heavy Load" represents the nominal "working period" during the day.

Control Setting Guidelines

Each application should be treated on its merits, however the following is given as a guide.

Termination Type	Sensor Location	Setting	Fan Delay (if req'd)
Time	n/a	20 – 25mins	4 mins (max)
Temperature	Suction Line Plate	11° – 14°C	1° to -2°C
Pressure	Header	600–630 kPa R22	n/a
		690–710kPa R502	n/a
		760–780 R407B	n/a
		610–630kPa R407C	n/a
		750–770kPa R404A	n/a

DEFROST TERMINATION REQUIREMENTS

Defrost time for average loads should be approx. 20–25 minutes including drainage. Time will vary with varying degrees of ice-up.

Time Termination

Time termination should be set to ensure complete defrost at the heaviest load condition. Typically allow 20–25 minutes with safety reset at 35 minutes.

Temperature Termination

Temperature termination setting depends on frequency and severity of defrosts, and location of the sensing device. If using the standard freezer thermostat (Part # MCC143-1), the defrosting guidelines above should be used. 5 row coils may require longer defrost (higher termination temp.), or more frequent defrosts, than 3 or 4 row coils, if using this type of control.

Pressure Termination

Pressure termination can be incorporated into the defrost in a number of ways. Whatever method is preferred, it must be noted that the temperature of the fins will be somewhat lower than the saturation temperature corresponding to the refrigerant pressure. Therefore a somewhat higher refrigerant temperature must often be allowed for when setting the pressure control. See table below. It is also not recommended to control fan delay by pressure as a very low pressure will be reached quite quickly after defrost on TX valve systems, when the fans are not running. It is preferable to combine the pressure termination with a timeclock for fan delay.

Fan Delay Requirements

an delay requirements may vary with application, conditions, and control method, but should not be more than 5 minutes. Fan delays with MCC143-1 will be of the order of 2 – 4 mins.

4 and 5 FPI Coils

Testing has shown that 4fpi coils can operate satisfactorily with fewer defrosts than indicated above, depending on moisture load. Each installation should be treated on an individual basis. 5 fpi coils should be operated to the above guidelines unless otherwise indicated on the installation concerned.

The above guidelines allow for relatively heavy defrost loads. Shorter times or lower settings must be verified on the installation.

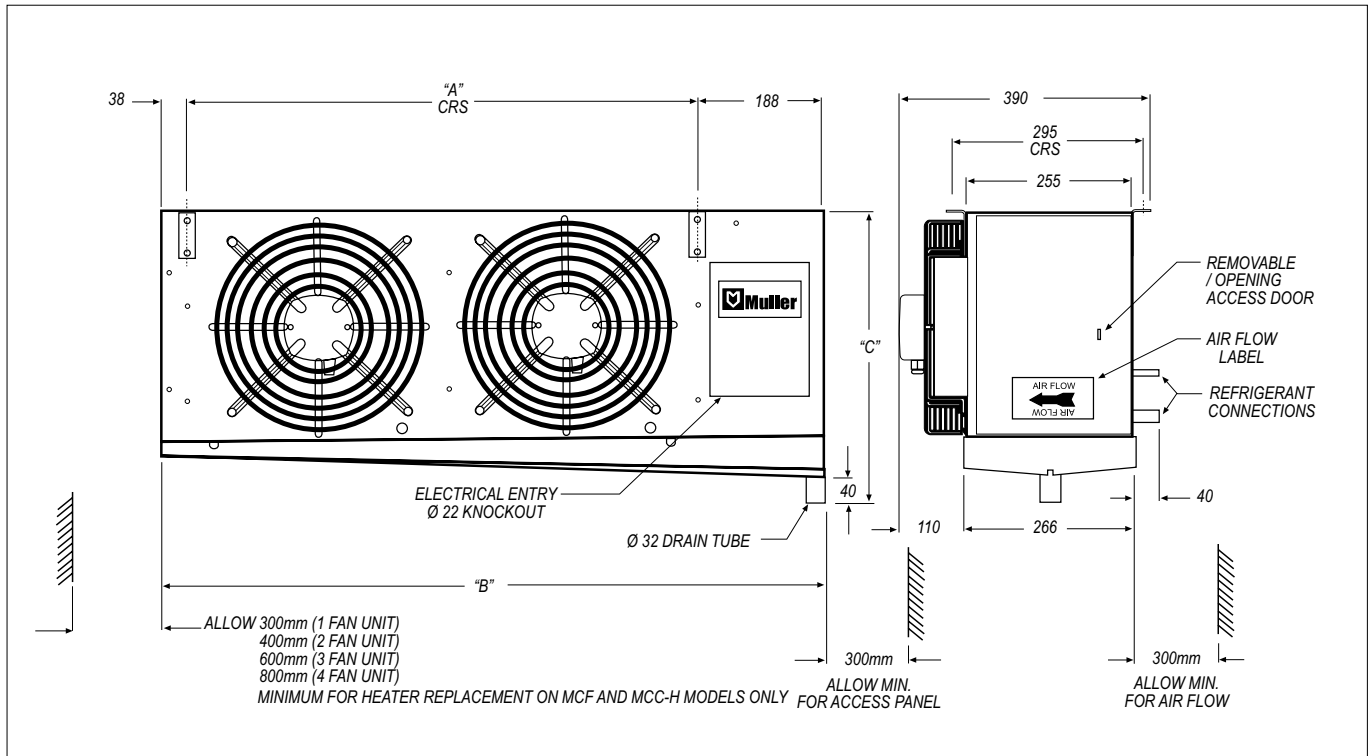
Pressure termination given for R404A & R407B/C corresponds to the mid point at the required temperature.

Refer to the applicable Pressure/Temperature Chart.

All data given is for defrost without refrigerant pumpdown. Pumpdown is not recommended for electric defrost.

Data above based on R22 Capacity. For R507, and R404A applications, it may be necessary to increase number of defrosts per day to maintain efficient performance. If so the defrost should be added during the heavy load period.

MODELS: MCC, MCC-H, MCF (300mm FANS)



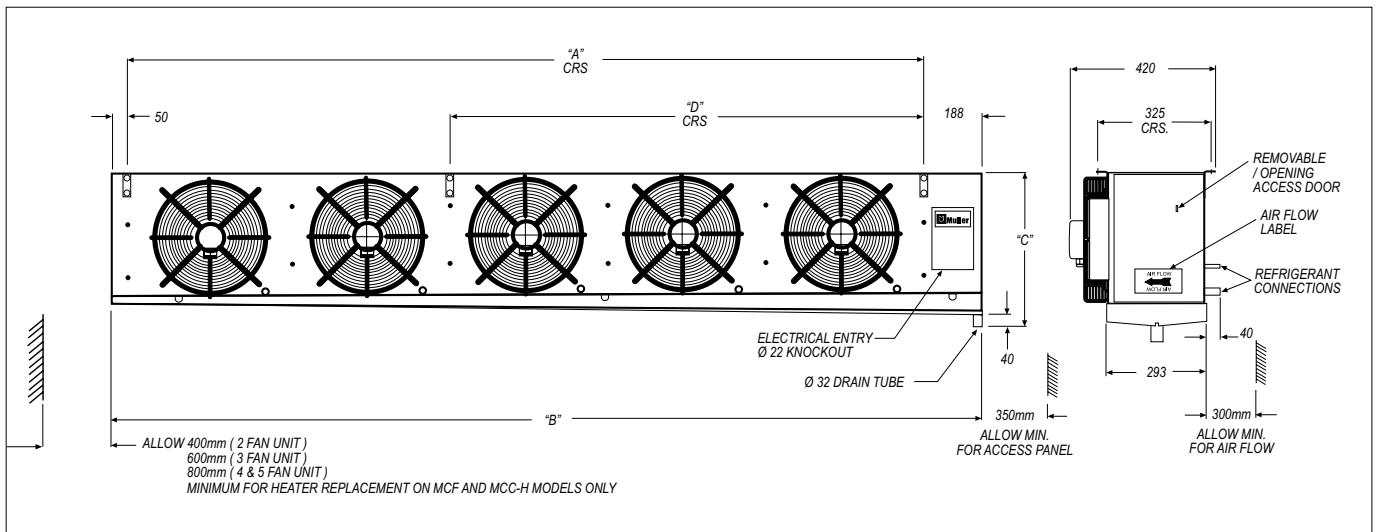
MODEL		MCC11	MCC16	MCC20	MCC27	MCC32	MCC39
DIMENSIONS	Amm	404	404	404	784	784	784
	Dmm	—	—	—	—	—	—
	Bmm	638	638	638	1018	1018	1018
	Cmm	415	415	415	415	415	415
SUCTION CONN.	Ømm	9.5	12.7	12.7	15.9	15.9	19
LIQUID CONN.	Ømm	6.3	6.3	6.3	6.3	6.3	9.5
T-X CONN.*	mm	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S
DIST. CONN.**	mm	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF
EXT. EQ. CONN.***	mm	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S
WEIGHT +	MCC kg	8.5	9.8	11.2	15.6	18.1	21.9
	MCC-H kg	N/A	10.3	11.7	16.2	18.7	22.5
SHIPPING VOL.	m3	0.16	0.16	0.16	0.24	0.24	0.24

MODEL		MCF11	MCF14	MCF18	MCF23	MCF28	MCF36	MCF44	MCF50
DIMENSIONS	Amm	404	404	784	784	784	1164	1164	1544
	Dmm	—	—	—	—	—	—	—	—
	Bmm	638	638	1018	1018	1018	1398	1398	1778
	Cmm	415	415	415	415	415	415	415	415
SUCTION CONN.	Ømm	15.9	15.9	19	19	22.2	25.4	25.4	28.6
LIQUID CONN.	Ømm	6.3	6.3	9.5	9.5	12.7	12.7	12.7	12.7
T-X CONN.*	Ømm	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S
DIST. CONN.**	Ømm	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF
EXT. EQ. CONN.***	Ømm	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S
WEIGHT +	MCF kg	10.3	11.7	16.2	18.7	23	26.8	30.6	34.8
	MCF kg	10.3	11.7	16.2	18.7	23	26.8	30.6	34.8
SHIPPING VOL.	m3	0.16	0.16	0.24	0.24	0.24	0.32	0.32	0.40

NOTES

- * = outlet of liquid subcooler — most recommended valves have 9.5 dia. inlet fitting
- ** = Frost free flare nut. Distributors are all pressure drop type.
- *** = Tube for flaring or brazing. Liquid and Ext. Eq. lines are soldered together for testing and must be separated on installation.
- + For Brass/Copper coils, add 50% to standard unpacked weight.

MODELS: MCC, MCC-H, MCF (350mm FANS)



MODEL		MCC55	MCC60	MCC69	MCC81	MCC88	MCC103	MCC114	MCC129	MCC143	MCC175	MCC193
DIMENSIONS	Amm	1065	1065	1065	1585	1585	1585	2105	2105	2105	2625	2625
	Dmm	-	-	-	-	-	-	1041	1041	1041	1561	1561
	Bmm	1315	1315	1315	1835	1835	1835	2355	2355	2355	2875	2875
	Cmm	462	462	462	462	462	462	462	462	462	462	462
SUCTION CONN.	Ømm	19	22.2	22.2	22.2	28.6	28.6	28.6	28.6	34.9	34.9	34.9
LIQUID CONN.	Ømm	9.5	12.7	12.7	12.7	15.9	15.9	15.9	15.9	19	19	19
T-X CONN.*	mm	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S
EXT. EQ. CONN.***	mm	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF
	mm	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S
WEIGHT +	MCC kg	29.7	32.4	35.2	42.0	46.1	50.2	55.2	60.6	66.1	74.3	81.1
	MCC-H kg	30.6	33.4	36.1	43.4	47.5	51.5	57.0	62.4	67.8	76.5	83.3
SHIPPING VOL.	m3	0.4	0.4	0.4	0.55	0.55	0.55	1.1	1.1	1.1	1.3	1.3

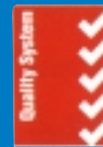
MODEL		MCF56	MCF70	MCF80	MCF85	MCF95	MCF116	MCF135
DIMENSIONS	Amm	1585	1585	1585	2105	2105	2625	2625
	Dmm	-	-	-	1041	1041	1561	1561
	Bmm	1835	1835	1835	2355	2355	2875	2875
	Cmm	462	462	462	462	462	462	462
SUCTION CONN.	Ømm	28.6	34.9	34.9	34.9	41.3	41.3	41.3
LIQUID CONN.	Ømm	12.7	15.9	15.9	15.9	19	19	19
T-X CONN.*	Ømm	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S	9.5 S
DIST. CONN.**	Ømm	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF	12.7 FF
EXT. EQ. CONN.***	Ømm	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S	6.3 S
WEIGHT +	MCF kg	44.0	48.1	57.8	63.2	68.6	77.5	84.3
SHIPPING VOL.	m3	0.6	0.6	0.6	1.1	1.1	1.3	1.3

NOTES

- * = outlet of liquid subcooler — most recommended valves have 9.5 dia. inlet fitting
- ** = Frost free flare nut. Distributors are all pressure drop type.
- *** = Tube for flaring or brazing. Liquid and Ext. Eq. lines are soldered together for testing and must be separated on installation.
- + For Brass/Copper coils, add 50% to standard unpacked weight.



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