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## Muller



Singapore

**Beijer Ref Singapore Pte Ltd** 

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## Low & Medium Profile Unit Cooler



- Extended model and capacity range Medium Temp range : 26 models, 1 ~ 5 fans, 1.6 ~ 24 kw Low Temp range : 22 models, 1 ~ 5 fans, 1 ~ 12 kw
- The drain tray is reversible with new 32mm threaded fitting
- Larger hanger bars with clawed feet are located in the cabinet



- New cabinet design features easy front opening access to electrical panel and a separate panel for refrigeration components
- The electrical board is front facing for easy access and the terminal board simplifies wiring



At Beijer Ref, we have produced advanced low profile evaporators using the latest technology in the refrigeration industry.

Beijer Ref has developed a unique fin pattern using "Sine Wave" technology to produce innovative and efficient units to serve a variety of commercial and industrial applications.

#### **Coil Design & Defrost**

The coil loses less airflow as ice builds up due to the larger ratio of fin surface to tube surface, this results in more stable room conditions in between defrosts and allows the coil to hold more ice.

- Face heaters allow easy access for maintenance and replacement.
- heat to the end compartments.

In areas of high humidity it is sometimes necessary to use wider fin spacing on medium temperature coils due to rapid frost build. Because of the larger fin area and slower frost build up, air defrost is more efficient on the 9000 series coil. In fact, the rate of frost build on the 9000 series 6FPI is comparable to that of a standard 5FPI coil at the same KTD.

Designed and built for Commercial Refrigeration Applications with flexible manufacturing process, we are able to supply the following options :

- Medium temperature models with electric defrost
- Fin space in 4, 5, 6 FPI (4.23, 5.08, 6.35 mm)
- Fin coating, stainless steel casing



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Drain heaters are attached to the bottom of the coil for easy access and extended for more

#### **Options**

	MMT (Ø 300mm) Medium Temperature Unit Cooler											
			MMT021	MMT026	MMT035	MMT044	MMT049	MMT066	MMT105			
Model			MMT021H	MMT026H	MMT035H	MMT044H	MMT049H	MMT066H	MMT105H			
Canacity	0.00	R404A	2117	2626	3528	4443	4939	6599	10519			
W	Cond*1	R507	2182	2737	3606	4462	5129	6867	10813			
		R22	1960	2483	3162	4051	4704	6141	9800			
		R404A	0.77	1.11	1.06	1.60	2.11	2.37	4.10			
Refrigera	ant ² ka	R507	0.78	1.12	1.07	1.63	2.14	2.41	4.17			
Onarge	ĸġ	R22	0.85	1.23	1.17	1.78	2.34	2.63	4.56			
No. of C	oil Row	s	3	4	2	3	4	3	4			
Ean Data		No. of Fans	1	1	2	2	2	3	4			
(300mm	a Dia)	Air Flow m <sup>3</sup> /h	1296	1224	2736	2592	2448	3888	4896			
(240V/1/5	50Hz)	Air Throw m	6.9	6.5	10.3	9.8	9.3	12.1	12.9			
		Total Power W	73	73	146	146	146	219	292			
		Total Current A	0.32	0.32	0.64	0.64	0.64	0.96	1.28			
		Total Watts W	900	900	1800	1800	1800	2700	3600			
Heater D	ata	Total Amps A	3.75	3.75	7.5	7.5	7.5	-	-			
Only for		Amps/Phase	-	-	-	-	-	3.75	5			
MMT-H*3	5	Volts/Phase	240/1	240/1	240/1	240/1	240/1	415/3	415/3			
		Connection	-	-	-	-	-	Star	Star			
Connecti		Liquid	9.5	12.7	12.7	12.7	12.7	12.7	12.7			
Connecti	on mm	Suction	9.5	12.7	12.7	15.9	15.9	19.1	22.2			
Weight		Kg	10.3	11.5	15.1	16.9	18.7	23.0	32.4			
		Length	750	750	1155	1155	1155	1165	1970			
Dimensio	ons mm	Width	470	470	470	470	470	470	470			
		Height	430	430	430	430	430	430	430			

\*1 SC2 Conditions : - 8°C SST, 0°C Room Temperature, 8K TD

\*2 SC2 Conditions : 80% liquid and 20% vapour by volume including header and coil. \*<sup>3</sup> "H" Model with electrict defrost.

Correction Factors MMT											
Fin Correction Factor			6FPI	1	5FPI	0.89	4FPI	0.80			
Refrigerant Factor (Bas	ed on R404	1A)	R407C	1.09	R134a	0.87					
Capacity factor and application limits R404A											
SST ° C	-10	-8	-6	-4	-2	0	2	4	6	9	12
Correction Factor	0.97	1.00	1.01	1.02	1.04	1.07	1.10	1.13	1.17	1.21	1.21
Max KTD	9	10	10	10	10	10	10	10	10	10	10
Min KTD	4	4	4	4	4	5	5	5	5	6	6

Standard coils are 6FPI aluminium. Multiply capacity by factors to find capacity with required FPI and material. Application limits do not change for other fin space or copper coils.

Notes : Capacity Factor Tables

1. Capacity factor applies to SST @ 1KTD. Actual capacity = capacity x factor x required KTD + std KTD

2. The limits on this chart are intended to indicate the maximum application range of standard MMT coils.

3. For application outside these limits, consult your nearest Muller outlet. Distributors and /or circuiting may be unsuitable outside these limits.

4. Refrigerant capacity factors were calculated using the latest thermodynamic data from the refrigerant manufacturer and the Muller refrigeration coil rating program.

Madal			MI T040		N/I T007	MI T000		
Model			ML1012	ML1022	ML1027	ML1033	MLT038	ML1057
	SC3	R404A	11/1	2195	2744	3293	3796	5671
	Cond*1	R507	1198	2250	2813	3380	3910	5781
Capacity		R22	1054	1976	2470	2964	3416	5104
w	SC4	R404A	911	1709	2136	2563	2955	4414
	Cond*2	R507	933	1752	2189	2631	3044	4500
		R22	820	1538	1922	2307	2659	3973
		R404A	0.87	1.71	2.32	2.54	3.12	4.48
Refrigera	ant <sup>3</sup> ka	R507	0.91	1.79	2.43	2.65	3.26	4.68
onargo		R22	0.97	1.90	2.58	2.82	3.47	4.97
No. of C	oil Row	s	3	3	4	3	4	4
		No. of Fan	1	2	2	3	3	4
Fan Data	a	Air Flow m <sup>3</sup> /h	1296	2592	2488	3888	3672	4896
(300mm	Dia)	Air Throw m	6.4	9.1	8.6	11.2	10.6	11.9
(240 \/ 1/3	30HZ)	Total Power W	73	146	146	219	219	292
		Total Current A	0.32	0.64	0.64	0.96	0.96	1.28
		Total Watts W	900	1800	1800	2700	2700	3600
Heater D	ata	Total Amps A	3.75	7.5	7.5	-	-	-
(50 HZ)		Amps/Phase	-		-	3.75	3.75	5
	İ	Volts/Phase	240/1	240/1	240/1	415/3	415/3	415/3
		Connection	-		-	Star	Star	Star
0		Liquid	12.7	12.7	12.7	12.7	12.7	12.7
Connecti	ion mm	Suction	15.9	19.1	22.2	22.2	25.4	25.4
Weight		Kg	10.8	17.5	19.5	24.4	26.5	34.6
0		Length	750	1155	1155	1560	1560	1970
Dimensio	ons mm	Width	470	470	470	470	470	470
		Height	430	430	430	430	430	430

\*<sup>2</sup> SC4 Conditions : -31°C SST, -25°C Room Temperature, 6KTD

\*<sup>3</sup> SC3 Conditions : 80% liquid and 20% vapour by volume including header and coil.

Correction Factor MLT						
Fin Space	6FPI	5FPI	4FPI			
Fin Correction Factor	1.27	1.13	1.00			
Refrigerant Type	R22					
Refrigeration Correction Factor (R404A)	0.9					
Capacity factor and application limits R4	04A					
SST ° C	-40	-35	-30	-25	-20	-15
Correction Factor	0.71	0.82	0.91	1.00	1.09	1.18
Max KTD	11	11	10	10	10	10
Min KTD	4	4	4	4	4	4

Standard coils are 4 FPI aluminium. Multiply capacity by factors to find capacity with required FPI and material. Application limits do not change for 5 FPI or copper coils.

Notes : Capacity Factors Tables

1. Capacity factor applies to SST @ 1KTD. Actual capacity x factor x required KTD + std KTD 2. The limits of this chart are intended to indicate the maximum application range of standard MLT coils. 3. For applications outside these limits, consult your nearest Muller outlet. Distributors and / or circuiting may be unsuitable

outside these limits.

4. Refrigerant capacity factors were calculated using the latest thermodynamic data from the refrigerant manufacturer and the Muller refrigeration coil rating program.

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#### MMT (Ø 350mm) Medium Temperature Unit Cooler

Madal			MMT030	MMT039	MMT059	MMT082	MMT093	MMT098	MMT122	MMT139	MMT158	MMT172	MMT183	MMT201	MMT216	MMT235	MMT259
Model			ММТ030Н	ММТ039Н	MMT059H	MMT082H	MMT093H	MMT098H	MMT122H	MMT139H	MMT158H	MMT172H	MMT183H	MMT201H	MMT216H	MMT235H	MMT259H
Conocity	s.c.2	R404A	3031	3855	5880	8167	9277	9800	12152	13851	15811	17248	18293	20123	21560	23520	25872
W	Cond*1	R507	3110	3894	6115	8356	9330	10009	12426	14184	15922	17581	18424	20443	22043	23977	26316
		R22	2940	3463	5619	7579	8624	9277	11499	12805	13720	16203	17117	19077	20515	22475	24435
		R404A	1.35	1.85	2.15	2.72	3.73	4.58	4.23	5.32	6.48	5.28	7.37	8.81	6.59	9.13	10.93
Refrigera	ant <sup>:</sup> ka	R507	1.37	1.88	2.18	2.76	3.78	4.65	4.29	5.40	6.58	5.36	7.48	8.94	6.68	9.27	11.09
Charge		R22	1.50	2.06	2.39	3.02	4.14	5.09	4.69	5.91	7.19	5.86	8.18	9.78	7.31	10.14	12.13
No. of Co	oil Rows	5	3	4	3	3	4	5	3	4	5	3	4	5	3	4	5
		No. of Fans	1	1	2	2	2	2	3	3	3	4	4	4	5	5	5
Ean Data		Air Flow m <sup>3</sup> /h	2520	2448	5040	5040	4950	4752	7776	7416	7092	10368	9900	9468	12960	12384	11808
(350mm	Dia)	Air Throw m	8.8	8.3	12.6	12.6	11.9	11.5	15.4	14.7	14.2	17.3	16.4	15.9	19.3	18.4	17.8
(230V/1/	50Hz)	Total Power W	155	155	310	310	310	310	465	465	465	620	620	620	775	775	775
		Total Current A	0.65	0.65	1.30	1.30	1.30	1.30	1.95	1.95	1.95	2.60	2.60	2.60	3.25	3.25	3.25
		Total Watts W	1600	1600	3200	3200	3200	3200	4800	4800	4800	6400	6400	6400	8000	8000	8000
Heater D	ata	Total Amps A	6.67	6.67	-	-	-	-	-	-	-	-	-	-	-	-	-
Only for		Amps/Phase	-	-	6.67	6.67	6.67	6.67	10	10	10	13.33	13.33	13.33	16.67	16.67	16.67
MMT-H*3	1	Volts/Phase	240/1	240/1	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3
		Connection	-	-	Star												
Connectio	on mm	Liquid	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	12.7	15.9	15.9	15.9	15.9	15.9	15.9
		Suction	12.7	15.9	19.1	22.2	22.2	22.2	25.4	25.4	25.4	25.4	28.6	28.6	28.6	31.8	31.8
Weight		Kg	14.7	16.3	25.3	26.3	30.4	33.8	37.7	42.6	47.6	49.5	58.3	63.7	60.5	69.6	77.5
		Length	850	850	1485	1485	1485	1485	2060	2060	2060	2630	2630	2630	3200	3200	3200
Dimensio	ns mm	Width	470	470	470	470	470	470	470	470	470	470	470	470	470	470	470
		Height	545	545	545	545	545	545	545	545	545	545	545	545	545	545	545

\*1 SC2 Conditions : - 8°C SST, 0°C Room Temperature, 8K TD
 \*2 SC2 Conditions : 80% liquid and 20% vapour by volume including header and coil.
 \*3 "H" Model with electric defrost.

Correction factor MMT											
Fin Capacity Correction Factor   6FPI   1   5FPI   0.91   4FPI   0.83											
Refrigerant factor (R404A) R407C 1.09 R134a 0.87											
Capacity factor and application limits											
SST ° C	-10	-8	-6	-4	-2	0	2	4	6	9	12
Correction Factor	0.97	1.00	1.04	1.02	1.04	1.07	1.10	1.13	1.17	1.21	1.21
Max. KTD	9	10	10	10	10	10	10	10	10	10	10
Min. KTD	4	4	4	4	4	5	5	5	5	6	6

Standard coils are 6FPI aluminium. Multiply capacity by factors to find capacity with required FPI and material. Application limits do not change for other fin or copper coils.

Notes : Capacity Factor Tables

1. Capacity factor applies to SST @ 1KTD. Actual capacity = capacity x factor x required KTD ÷ std KTD

2. The limits on this chart are intended to indicate the maximum application range of standard MMT coils.

3. For application outside these limits, consult your nearest Muller outlet. Distributors and /or circuiting may be unsuitable outside these limits.

4. Refrigerant capacity factors were calculated using the latest thermodynamic data from the refrigerant manufacturer and the Muller refrigeration coil rating program.

			ML	T (Ø	350n	nm) l	_ow ]	Гетр	perati	ure U	nit C	oole	r		
Model			MLT016	MLT019	MLT041	MLT045	MLT049	MLT051	MLT061	MLT068	MLT081	MLT091	MLT103	MLT115	MLT124
		R404A	1610	1875	4116	4528	4893	5122	6083	6814	8141	9147	10336	11525	12439
	SC3	R507	1646	1944	4249	4642	5035	5264	6229	6970	8341	9430	10578	11753	12897
Capacity	, Conu	R22	1529	1781	3910	4301	1649	4866	5778	6474	7734	8689	9 819	10949	11817
W		R404A	1253	1460	3204	3524	3809	3987	4735	5304	6337	7120	8046	8971	9683
	Cond*2	R507	1282	1513	3307	3613	3920	4098	4849	5425	6472	7341	8234	9149	10039
		R22	1190	1387	3044	3348	3619	3788	4498	5039	6020	6764	7643	8523	9199
Definer		R404A	1.38	1.58	2.72	3.17	4.07	3.95	4.04	4.42	6.10	6.93	8.24	7.81	8.76
Charge*	kg <sup>3</sup>	R507	1.45	1.65	2.84	3.31	4.25	4.12	4.22	4.62	6.37	7.23	8.60	8.15	9.14
Ũ	0	R22	1.54	1.76	3.02	3.52	4.51	4.38	4.48	4.91	6.77	7.69	9.15	8.67	9.72
No. of C	oil Row	S	3	3	3	3	4	4	3	3	4	4	4	3	4
		No. of Fans	1	1	2	2	2	2	3	3	3	4	4	5	5
Fan Data	а	Air Flow m <sup>3</sup> /h	2520	2520	5040	5040	4950	4950	7776	7776	7416	9900	9900	12960	12384
(350mm	Dia)	Air Throw m	8.1	8.1	11.6	11.6	11.0	11.0	14.3	14.3	13.6	15.2	15.2	17.9	17.0
(230V/1/	(50Hz)	Total Power W	155	155	310	310	310	310	465	465	465	620	620	775	775
		Total Current A	0.65	0.65	1.3	1.3	1.3	1.3	1.95	1.95	1.95	2.6	2.6	3.25	3.25
		Total Watts W	1600	1600	3200	3200	3200	3200	4800	4800	4800	6400	6400	8000	8000
		Total Amps A	6.67	6.67	-	-	-	-	-	-	-	-	-	-	-
Heater D	Data	Amps/Phase	-	-	6.67	6.67	6.67	6.67	10	10	10	13.33	13.33	16.67	16.67
(00112)		Volts/Phase	240/1	240/1	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3	415/3
		Connection	-	-	Star										
Commont		Liquid	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	12.7	12.7	12.7	12.7	12.7
Connect	ion mm	Suction	19.1	19.1	25.4	25.4	25.4	25.4	28.6	28.6	31.8	34.9	41.3	41.3	41.3
Weight		Kg	15.2	15.5	27.0	27.8	31.2	31.3	38.1	38.9	45.2	58.9	63.0	69.6	77.8
		Length	850	850	1485	1485	1485	1485	2060	2060	2060	2030	2630	3200	3200
Dimensi	on mm	Width	470	470	470	470	470	470	470	470	470	470	470	470	470
		Height	545	545	545	545	545	545	545	545	545	545	545	545	545

\*1 SC3 Conditions : -25°C SST, -18°C Room Temperature, 7KTD

\*<sup>2</sup> SC4 Conditions : -31°C SST, -25°C Room Temperature, 6KTD

\*3 SC3 Conditions : 80% liquid and 20% vapour by volume including header and coil.

Correction Factor MLT						
Fin Space	6FPI	5FPI	4FPI			
Fin Correction Factor	1.25	1.12	1.00			
Refrigerant Type	R22					
Correction Factor (R404A)	0.95					
Capacity factor and application limits R4	104A					
SST ° C	-40	-35	-30	-25	-20	-15
Correction Factor	0.71	0.82	0.91	1.00	1.09	1.18
Max. KTD	11	11	10	10	10	10
Min. KTD	4	4	4	4	4	4

Standard coils are 4FPI aluminium. Multiple capacity by factors to find capacity with required FPI and material. Application limits do not change for 5FPI or copper coils.

#### Notes : Capacity Factor Tables

- 1. Capacity factor applies to SST @ 1KTD. Actual capacity = capacity x factor x required KTD + std KTD
- 2. The limits on this chart are intended to indicate the maximum application range of standard MLT coils.
- these limits.
- Muller refrigeration coil rating program.

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3. For application outside these limits, consult your nearest Heatcraft outlet. Distributors and /or circuiting may be unsuitable outside

4. Refrigerant capacity factors were calculated using the latest thermodynamic data from the refrigerant manufacturer and the

#### **MMT Performance Rating Basis**

1. CAPACITY - Based on SC2 Std guidelines at 40 ° C entering liquid (inherent subcooling), 0 ° C air on, 80% RH and 8 KTD. 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. For other FPI refer to factor table.

2. AIR FLOW - rated as standard air conditions ( 20 ° C dry air, 101.35kPa atmospheric pressure).

3. AIRTHROW - Based on CRMA guidlines. Measurements taken at 0.5, 0.7, 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 the air throw.

#### **MMT-H Advisory Defrost Guide**

In order to maximise efficiency and air flow, the advisory defrost data has been compiled based on 8 hour working time (from 9am to 5pm) for general applications.

24 hrs	03:00	08:00	09:00	11:00	14:00	17:00	22:00	03:00
Working Time			Start			End		
Defrost Cycle	Start	Start		Start	Start	Start	Start	Start
Defrost Interval	5	hr	3	hr	3 hr	3 hr	5 hr	5 hr

Defrost frequency for other applications outside this limit must be verified according to individual applications.

#### **MMT-H Defrost Termination Requirement**

Defrost time for average loads should be approx. 20 minutes including drainnage. 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 settings depends on frequency and severity of defrost, and location of the sensing device. If using the standard freezer thermostat, the defrosting guidelines above should be used.

#### **Fan Delay Requirements**

Fan delay requirements may vary with application, conditions, and control method, but should not be more than 4 minutes.

- 4 Distributors are account door to a with burning a
- Distributors are pressure drop type with brazing connection.
   External equalised line use either flare joint or brazing connection.
- 3. For brass/copper coil, add 50% to standard unpacked weight.

#### MMT Cool Room Relative Humidity Data





#### Notes: Relative Humidity Graphs

1. The realative 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 6 KTD
- 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.



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- counterflow. 3K useful coil superheat assumed. Rated capacity is for 6FPI (standard) coils. For other FPI refer to factor table.
- 2. AIR FLOW rated as standard air conditions ( 20 ° C dry air, 101.35kPa atmospheric pressure).
- average of the 3 values equals 0.5m/s is taken as the limit of the air throw.

In order to maximise efficiency and air flow, the advisory defrost data has been compiled based on 8 hour working time (from 9am to 5pm) for general applications.

24 Hour	08:00	09:00	13:00	17:00	18:00	01:00	08:00
Working Time		Start		End			
Defrost Cycle	Start		Start		Start	Start	Start
Defrost Interval			5 hr		5 hr	7 hr	7 hr

Defrost frequency for other applications outside this limit must be verified according to individual application 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 settings depends on frequency and severity of defrost, and location of the sensing device. If using the standard freezer thermostat, the defrosting guidelines above should be used.

#### Fan Delay Requirements

Fan delay requirements may vary with application, conditions, and control method, but should not be more than 4 minutes.

1. Distributors are pressure drop type with brazing connection.

- 2. External equalised line use either flare joint or brazing connection.
- 3. For brass/copper coil, add 50% to standard unpacked weight.





#### **MLT Performance Rating Basis**

1. CAPACITY - Based on SC3 Std guidelines at 40 ° C entering liquid 9 (inherent subcooling), -18 ° C air on, 80% RH and 7 KTD. Capacity is Total Capacity (rated with wet fin surfaces). KTD is defined as entering air temperature - refrigerant Saturation temperature. Coils are in

3. AIRTHROW - Based on CRMA guidlines. Measurements taken at 0.5, 0.7, and 1m from the ceiling at 20 ° C air. The distance at which the

#### **MLT Advisory Defrost Guide**

#### **MLT Defrost Termination Requirements**

#### **MLT Characteristics**

MMT/MM	Т*Н Ме	dium 1	Temper	ature
Model	А	В	С	D
300mm Fan Diame	eter	1	1	
MMT021/H	440	750	430	-
MMT026/H	440	750	430	-
MMT035/H	845	1155	430	-
MMT044/H	845	1155	430	-
MMT049/H	845	1155	430	-
MMT066/H	1250	1560	430	-
MMT105/H	1660	1970	430	-
350mm Fan Diame	eter			
MMT030/H	540	850	545	-
MMT039/H	540	850	545	-
MMT059/H	1175	1485	545	-
MMT082/H	1175	1485	545	-
MMT093/H	1175	1485	545	-
MMT098/H	1175	1485	545	-
MMT122/H	1745	2060	545	-
MMT139/H	1745	2060	545	-
MMT158/H	1745	2060	545	-
MMT172/H	2320	2630	545	1165
MMT183/H	2320	2630	545	1165
MMT216/H	2890	3200	545	1735
MMT235/H	2890	3200	545	1735
MMT259/H	2890	3200	545	1735

N/I	TLow	Tomos	roturo	
IVIL	I LOW	Tempe	erature	
Model	А	В	С	D
300mm Fan Diame	eter			
MLT012	440	750	430	-
MLT022	845	1155	430	-
MLT027	845	1155	430	-
MLT033	1250	1560	430	-
MLT038	1250	1560	430	-
MLT057	1660	1970	430	-
350mm Fan Diame	eter			
MLT019	540	850	545	-
MLT041	1175	1485	545	-
MLT045	1175	1485	545	-
MLT051	1175	1485	545	-
MLT061	1745	2060	545	-
MLT068	1745	2060	545	-
MLT081	1745	2060	545	-
MLT091	2320	2630	545	1165
MLT103	2320	2630	545	1165
MLT115	2890	3200	545	1735
MLT124	2890	3200	545	1735

Options Available										
	Muller	Muller								
Option available	MMT- Medium Temp	MLT- Low Temp								
Fin protection										
Fin protection	Optional	-								
Coil design										
Hot gas defrost ( Coil & Tray)	Optional	Optional								
Fin type & end plate										
Aluminium fin & end plate	Std	Std								
Fin space										
6FPI	Std	Optional								
5FPI	Optional	Optional								
4FPI	Optional	Std								
Defrost heater fitted	Optional	Std								
Fan motor connection	Std	Std								
Casing										
Painted Aluminium	Std	Std								
Stainless steel	Optional	Optional								

## Advantage





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Large space available for easy installation of the expansion valve.
Easily removable side panels offer comfortable access to all unit cooler components.

## **Heavy Duty Evaporators**

#### Main Features





1 to 5-500mm diameter fans,10 to 70kW

**11 Low Temperature Models:** 1 to 5-500mm diameter fans, 6 to 40kW

#### **Muller Heavy Duty Evaporator Features:**

- High efficiency heat exchanger incorporated.
- Interlink external rotor type fan motor. Optional: Ziehl-Abegg motor.
- 1.6mm powder-coated aluminium casing.
- · Stainless steel screws to prevent corrosion.
- Sturdy supports for shipping & ceiling mount.
- Hinged access panel to TXV valve location for ease of service and installation.
- 180 degrees reversible drain tray.

#### MHD Medium Temperature Heavy Duty Induced Draught Coolers (4.23mm / 6 fpi)

			MHD060	MHD083	MHD115	MHD130	MHD173	MHD210	MHD255	MHD290	MHD340	MHD470
		1	MHD060-H	MHD083-H	MHD115-H	MHD130-H	MHD173-H	MHD210-H	MHD255-1	MHD290-H	MHD340-H	MHD470-H
		R404A	10070	13930	18460	21830	29110	35620	42880	49550	58210	72860
Capacity	SC2	R22	9970	13810	18300	21630	28840	35280	42490	49090	57670	70010
vvatts	Cond	R407C	10230	14120	19950	22260	30500	32990	43720	50510	59350	72050
		R507	10250	14000	19670	21460	29410	31800	42160	48710	57240	69460
		R134A	8740	12480	16290	19540	26520	31850	38710	43190	51450	59720
		R404A	8.8	12.8	12.9	16.8	25.4	31.0	36.8	38.6	45.7	54.7
Refrigerar Charge ko	nt 1 <sup>*2</sup>	R22	10.0	14.5	14.6	19.0	28.7	35.0	41.6	43.6	51.6	61.7
	,	R407C	9.0	13.0	13.1	17.1	25.8	31.5	37.4	39.2	46.4	55.5
		R507	9.4	13.6	13.7	17.9	27.0	32.9	39.1	41.0	48.5	58.1
			9.9	14.4	14.4	18.9	28.5	34.7	41.3	43.3	51.2	61.3
No. of Rov	No. of Rows		4	6	3	4	6	5	6	5	6	6
Total Heat Tra	Total Heat Transfer Surface Area m <sup>2</sup>		39.2	58.8	58.8	78.4	117.5	147.1	176.3	180.7	216.5	270.6
	Ν	No. of Fan	1	1	2	2	2	3	3	4	4	5
Fan Data	A	Air Flow m³/h	7056	6912	14256	14112	13824	20952	20772	27972	27684	34596
(500mm Dia	a) A	ir Throw m	20	20	22	22	22	24	24	25	25	26
(415V 50HZ	JPn)⊢  T	Total Watts W	600	600	1200	1200	1200	1800	1800	2400	2400	3000
	Т	Total Amps A	1.15	1.15	2.3	2.3	2.3	3.45	3.45	4.6	4.6	5.75
Heater Data	a*3 T	Total Watts W	5250	5250	8700	8700	8700	13600	13600	15320	15320	18280
50 Hz Only for	Т	Total Amps A	8.5	8.5	14.6	14.6	14.6	20.0	20.0	28.2	28.2	33.6
MHD-H Mo	dels	Connection	Star	Star	Star	Star	Star	Star	Star	Star	Star	Star
Net Weight	kg		70	80	120	130	155	205	225	265	285	345
Shipping Vo	olume	m³	1.0	1.0	1.7	1.7	1.7	2.4	2.4	2.9	2.9	3.31
		Length	1265	1265	2215	2215	2215	3165	3165	3315	3315	4065
Dimensions	s mm	Width	520	520	520	520	520	520	520	520	520	520
		Height	890	890	890	890	890	890	890	1015	1015	1015
*1 SC2 Condit	tions : -	8°C SST. 0°C Roo	om Temperature	e 8K TD								

SC2 Conditions : ~ 80% liquid and 20% vapour by volume including header and heat exchanger. "H" Model with electrict defros

#### **Capacity Factor and Application Limits Table**

	SST °C	-10	-8	-6	-4	-2	0	2	4	8	12
DADAA	Factor	0.96	1.00	1.03	1.05	1.10	1.14	1.17	1.21	1.29	1.38
R404A	Max KTD	8	8	8	9	9	8	8	8	8	7
	Min KTD	4	3	3	3	3	3	4	4	4	4
	SST °C	-10	-8	-6	-4	-2	0	2	4	8	12
R22	Factor	0.97	1.00	1.02	1.04	1.09	1.11	1.14	1.18	1.24	1.31
	Max KTD	9	10	10	11	11	10	10	10	10	9
	Min KTD	4	3	3	3	3	3	4	4	4	4
	SST °C	-10	-8	-6	-4	-2	0	2	4	8	12
R407C	Factor	0.97	1.00	1.03	1.05	1.10	1.13	1.17	1.21	1.30	1.39
R507	Max KTD	9	9	9	10	10	9	9	9	9	8
	Min KTD	3	3	3	3	3	3	3	4	5	5
	SST °C	-10	-8	-6	-4	-2	0	2	4	8	12
D1340	Factor	0.96	1.00	1.03	1.05	1.10	1.14	1.17	1.21	1.28	1.36
11134a	Max KTD	9	10	11	11	11	11	11	10	9	8
	Min KTD	4	3	3	3	3	3	3	3	4	5
Limi	Limitations		ircuits	and/or	distrib	utor ne		if outsi	de max	c or mi	n KTD
		IINC VV (	0.501000	11115 118	eudu I	- 9	10.00				

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#### **Fin Capacity Correction Factors**

4FPI	5FPI	6FPI
0.83	0.93	1

#### **Notes : Capacity Factor Tables**

- 1. Actual capacity = Capacity at Rated Conditions X Factor X Actual KTD ÷ KTD at Rated Conditions.
- 2. For application below 0°C room temperature, please consult Heatcraft local representative regarding preferred defrost methods. MHD-H models are preferred for electric defrost systems.
- 3. Capacity Based on Eurovent Standards. SC2 Conditions : 8°C SST, 0°C Room Temperature, 8 KTD
- 4. For applications outside these limits, please consult Beijer Ref local representative. Distributors, circuiting and /or defrost characteristics may be unsuitable outside these limits.
- 5. Refrigerant capacity factors were calculated using the latest thermodynamic data from the refrigerant manufacturer, and the Heatcraft coil rating program.

### **Heavy Duty Evaporators**

#### MHDE Low Temperature Heavy Duty Induced Draught Coolers (6.35mm / 4 fpi)

			MHDE051	MHDE071	MHDE081	MHDE101	MHDE131	MHDE151	MHDE181	MHDE221	MHDE251	MHDE281	MHDE341
		R404A	6380	9170	9400	12410	16020	18340	22520	26810	30400	30400	40400
		R22	6260	8990	9220	12180	15710	17980	22070	26290	29800	33330	41180
	SC3	1 R407C	6890	9540	9760	12890	16370	18390	23440	27410	32840	35720	44130
Conocity	Cond	R507	6370	8820	9020	11910	15130	16990	21660	25330	30340	33010	40780
Watts	804	R404A	4870	6990	7170	9470	12220	13990	17180	20450	23190	25940	30820
	Cond*	2 R22	4890	7010	7190	9500	12250	14030	17220	20500	23250	26000	32120
		R407C	5490	7600	7780	10280	13050	14660	18680	21850	26180	48470	35180
		R507	4860	6720	6880	909	11540	12960	16520	19320	23140	25180	31110
No. of Rows		4	6	3	4	5	6	5	6	5	6	6	
Total Heat Transfer Surface Area m <sup>2</sup>		27.4	41.0	41.0	54.7	80.8	82.0	102.6	123.0	126.0	151.0	188.8	
Refrigerant		R404A	9.3	13.5	17.0	17.7	21.9	26.9	32.8	39.0	40.8	48.3	74.0
		R22	10.4	15.1	19.0	19.8	24.5	30.0	36.6	43.6	45.6	54.0	82.8
Charge	*³ kg	R407C	10.0	14.5	18.2	18.9	23.4	28.7	35.0	41.6	43.6	51.6	79.1
		R507	9.7	14.1	17.7	18.5	22.9	28.0	34.2	40.7	42.6	50.4	77.2
		No. of Fan	1	1	2	2	2	2	3	3	4	4	5
Fan Da	ta	Air Flow m <sup>3</sup> /h	7056	6912	14256	14112	13968	13824	20952	20772	27996	27684	34596
(500mn	n Dia)	Air Throw m	18	18	20	20	20	20	22	22	23	23	24
(415V 50F	Iz 3Ph)	Total Power Watts	600	600	1200	1200	1200	1200	1800	1800	24000	24000	3000
		Total Current Amps	1.15	1.15	2.3	2.3	2.3	2.3	3.45	3.45	4.6	4.6	5.75
		Total Watts W	52	5250	8700	8700	8700	8700	13600	13600	15320	15320	18280
Heater	Data	Total Amps* A	8.5	8.5	14.6	14.6	14.6	14.6	20.0	20.0	28.2	28.2	33.6
(50 H	2)	Connection	Star	Star	Star	Star	Star	Star	Star	Star	Star	Star	Star
Nett We	eight K	9	75	85	125	135	150	160	205	230	270	290	350
Shipping	g Volur	ne m³	1.0	1.0	1.7	1.70	1.70	1.70	2.4	2.4	2.85	2.85	3.31
		Length	1265	1265	2215	2215	2215	2215	3165	3165	3315	3315	4065
Dimens	sions	Width	520	520	520	520	520	520	520	520	520	520	520
		Height	890	890	890	890	890	890	890	890	1015	1015	1015
*1 SC3 Con	ditions :	25°C SST 18°C Roo	m Temperatu				* = G	iven as Total A	Amps for 240V	supply or Ma	aximum Amps	hase for 415	V supply

SC3 Conditions : -25°C SST, -18°C Room Temperature, 7KTD

\*<sup>2</sup> SC4 Conditions : -31°C SST, -25°C Room Temperature, 6KTD

\*<sup>3</sup> SC3 Conditions : ~ 80% liquid and 20% vapour by volume including header and heat exchanger.

#### **Capacity Factor and Application Limits Table**

	SST °C	-36	-33	-30	-27	-25	-21	-18	-15	-12
R404A	Factor R404A	0.79	0.85	0.91	0.96	1.00	1.08	1.14	1.22	1.29
R407C	Factor R407C	0.86	0.90	0.94	0.97	1.00	1.05	1.09	1.15	1.21
	Max KTD	8	9	9	9	9	9	9	9	8
	Min KTD	4	4	4	3	3	4	4	4	4
	SST°C	-36	-33	-30	-27	-25	-21	-18	-15	-12
R22	Factor R22	0.83	0.88	0.93	0.97	1.00	1.07	1.13	1.19	1.26
R507	Factor R507	0.81	0.86	0.91	0.97	1.00	1.08	1.13	1.21	1.28
	Max KTD	8	9	9	9	9	9	9	8	8
	Min KTD	4	4	3	3	3	3	4	4	5
Limitations		Fan p requir and / requir max/r	oeriphe red. D or circ red if c min K	eral he istribu cuit ch outside TD.	eaters tor ange e	Distributor change required if outside max/min KTD.				

#### **Fin Capacity Correction Factors**

4FPI	5FPI	6FPI
1	1.08	1.15

- **Notes : Capacity Factor Tables**
- 1. Actual capacity = Capacity at Rated Conditions X Factor X Actual KTD ÷ KTD at Rated Conditions
- 2. For application below -35°C room temperature, please consult Heatcraft local representative.
- 3. Capacity Based on Eurovent Standards. SC3 Conditions : -25°C SST, -18°C Room Temperature, 7KTD SC4 Conditions : -31°C SST, -25°C Room Temperature, 6KTD
- 4. For applications outside these limits, please consult Beijer Ref. local representative. Distributors, cicuiting and /or defrost characteristics may be unsuitable outside these limits
- 5. Refrigerant capacity factors were calculated using the latest thermodynamic data from the refrigerant manufacturer, and the Heatcraft coil rating program.





Notes on the Relative Humidity graph :

- 1. Relative Humidity graph is based on coil capacity with wet surface.
- the product is at desired temperature. It is not a measure of the condition of the air coming off the coil surface.
- 3. These graphs are approximate, as factors such as outside conditions, door usage, leakage, etc will affect the conditions achieved.

#### **Performance Rating Basis**

temperature.

3K useful coil superheat assumed.

- 2. AIRFLOW Rated at standard air conditions (20°C dry air,101.35kPa atmospheric pressure).
- average of the 3 values equals 0.5m/s is taken as the limit of the airthrow.



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#### **MHD Relative Humidity Data**



2. 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

1. CAPACITY - Based on SC2 conditions, 40°C entering liquid (inherent subcooling), 0°C air inlet temperature, 85% Relative Humidity, 8 KTD. Capacity figure is Total Capacity (including sensible and latent heat). KTD is defined as entering air temperature - leaving refrigerant saturation

3. 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

### **Heavy Duty Evaporators**

MHD Defrosts Data										
SST°C	-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)

DEFROSTS TIMING FOR -18°C ROOM										
KTD	LIGHT	LOAD		HEAVY LOAD		LIGHT LOAD				
KID	0:00~2:00	3:00~5:00	6:00~8:00	9:00~11:00	12:00~14:00	15:00~17:00	18:00~20:00	21:00~23:00		
10	Х	Х	Х	Х	Х	Х		Х		
8		Х	Х	Х	Х	Х		Х		
6		Х		Х		Х		Х		
4			Х		Х			Х		

Each column represents a 3 hour period during the day.

An X indicates the hour that a defrost should commence.

"Heavy Load" represents the norminal "working period" during the day.

#### 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 25-30 minutes with safety reset at 35 minutes.

#### **TEMPERATURE TERMINATION**

Temperature termination setting depends on frequency and severity of defrost, and location of the sensing device.

If using the standard freezer thermostat, the defrosting guidelines above should be used.

5 row coils may require longer defrost (higher termination temp.), or more frequent defrost, than 3 or 4 row coils, if using this type of control. If using an electronic defrost controller, the termination temperature setting must be determined for each unit.

The setting should not be less than 12°C cut-out. Location of the sensor must be determined to suit each application.

Fitting the sensor in the finned coil block requires higher settings, possibly 20°C or greater.

#### FAN DELAY REQUIREMENTS

Fan delay requirements may vary with application, conditions, and control method, but should not be more than 5 minutes.

#### ELECTRICAL DEFROST REQUIREMENTS WITH PUMPDOWN DEFROST CYCLE

Heatcraft does not recommend refrigerant pumpdown for electric defrost. There is clear evidence in testing that positive defrosting of the distributor, leads, header / suction line, cannot be achieved without refrigerant being present in the coil. Additional means, such as heater tape around these components, may be needed. Longer defrosting times and / or more frequent defrosting may also be necessary to ensure long term ice build-up does not occur.

It is the opinion of Heatcraft that if pump-down must be used, time termination is the only reliable way to ensure adequate defrosting. Installations must be properly checked for adequate defrosting by the installing technician. It is suggested that a MINIMUM of 25 minutes is required, with attention paid to the proper defrosting of the distributor and the tails etc..

Temperature termination is difficult to specify with pumpdown. Individual systems must be tested for location and setting of the sensor at the time of commissioning. Test suggest that it may be necessary to use temperature settings as high as 20°C or more, depending on the location of the sensor.

Liquid floodback after defrost can be controlled with adequately sized accumulator, and a liquid line shut-off valve closing during defrost can prevent additional refrigerant from being fed into the evaporator coil.

#### Dir



Drain	Connection
Diaili	CONTRECTION

Model	MHDE051	MHDE071	MHDE081	MHDE101	MHDE131	MHDE151	MHDE181	MHDE221	MHDE251	MHDE281	MHDE341
Woder	MHD060	MHD083	MHD115	MHD130	MHD173		MHD210	MHD255	MHD290	MHD340	MHD470
Dimension A o/all	1 265	1 265	2215	2215	2215	2215	3165	3165	3315	3315	4065
B o/all	890	890	890	890	890	890	890	890	1015	1015	1015
C crs	980	980	950	950	950	950	950	950	750	750	750
D crs	-	-	980	980	980	980	950	950	750	750	750
E crs	-	-	-	-	-	-			750	750	750
F crs	-	-	-	-	-	-	-	-	780	780	780
G mm	600	600	600	600	600	600	600	600	715	715	715
H mm	685	685	685	685	685	685	685	685	800	800	800
K mm	N/A	N/A	1930	1930	1930	1930	950	950	1500	1500	1500
L mm	N/A	N/A	N/A	N/A	N/A	N/A	1930	1930	1530	1530	2280
M(min) mm	N/A	N/A	905	905	905	905	905	905	1035	1035	1035
M(max) mm	N/A	N/A	1000	1000	1000	1000	1000	1000	1130	1130	1130
Suction Connection mm	28.6	28.6	34.9	34.9	34.9	41.3	41.3	41.3	50.8	50.8	50.8
Liquid Connection mm	12.7	12.7	12.7	12.7	15.9	15.9	15.9	19.1	22.2	22.2	22.2
Ext. Equaliser Conn. mm	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3



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#### **Dimensions**



Bracket for shipping or optional floor mount installation.