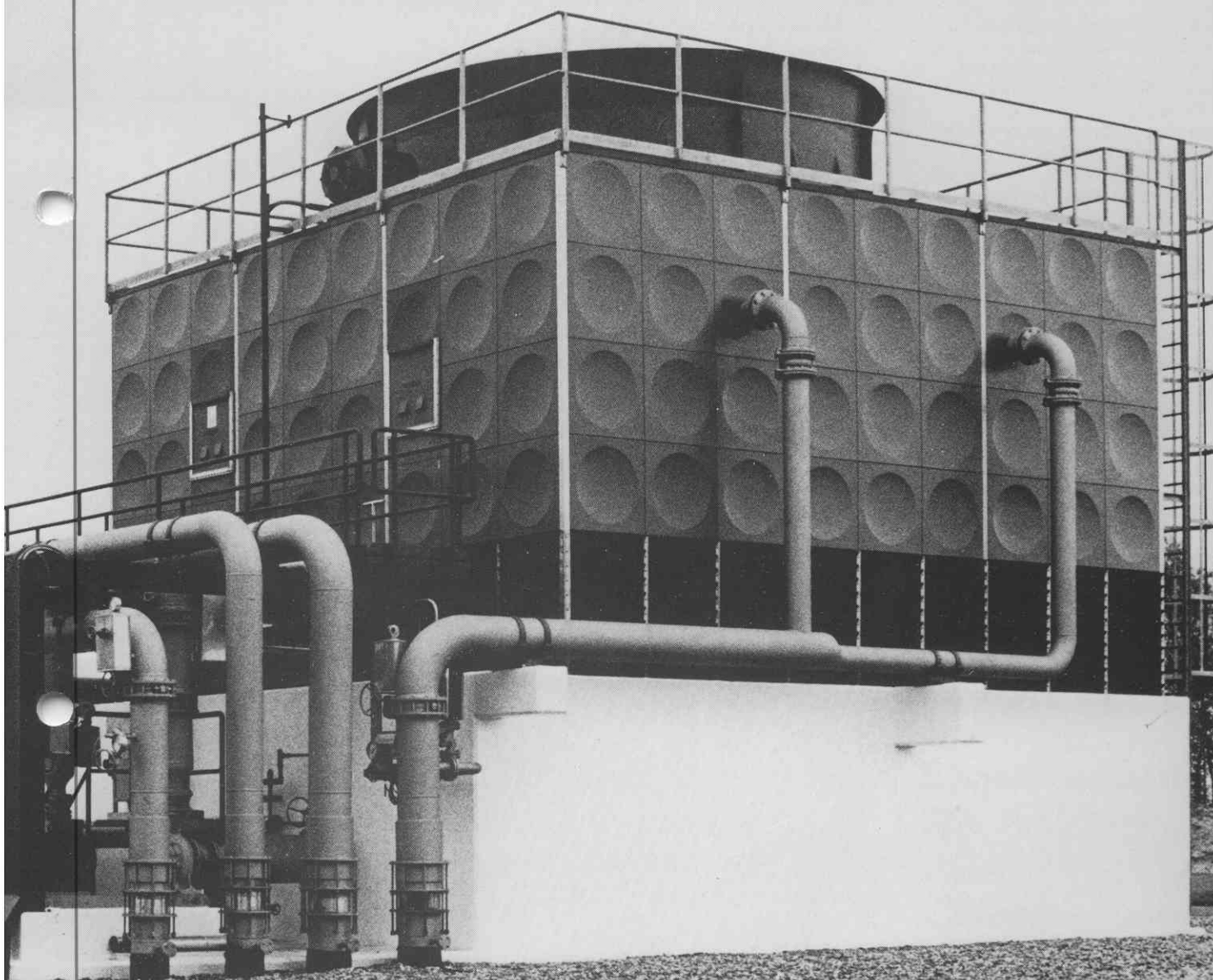


# Polacel cooling towers CM Series Counterflow



# General information on the CM cooling towers

## Operating principle

The Polacel cooling tower CM operates according to the counterflow principle. The water to be cooled is fed into the tower at the top and is distributed by full cone nozzles with low pressure drop, in the form of a thin waterfilm and small droplets, over the largest possible fill surface for the heat transfer.

The water falls through the fill and is collected again in a reservoir at the bottom of the tower. The outside air is sucked in through the louvres of the tower and is forced in counterflow through the fill. The circulating water is cooled by transferring heat to the passing air by evaporation and direct contact.

## Selection of materials

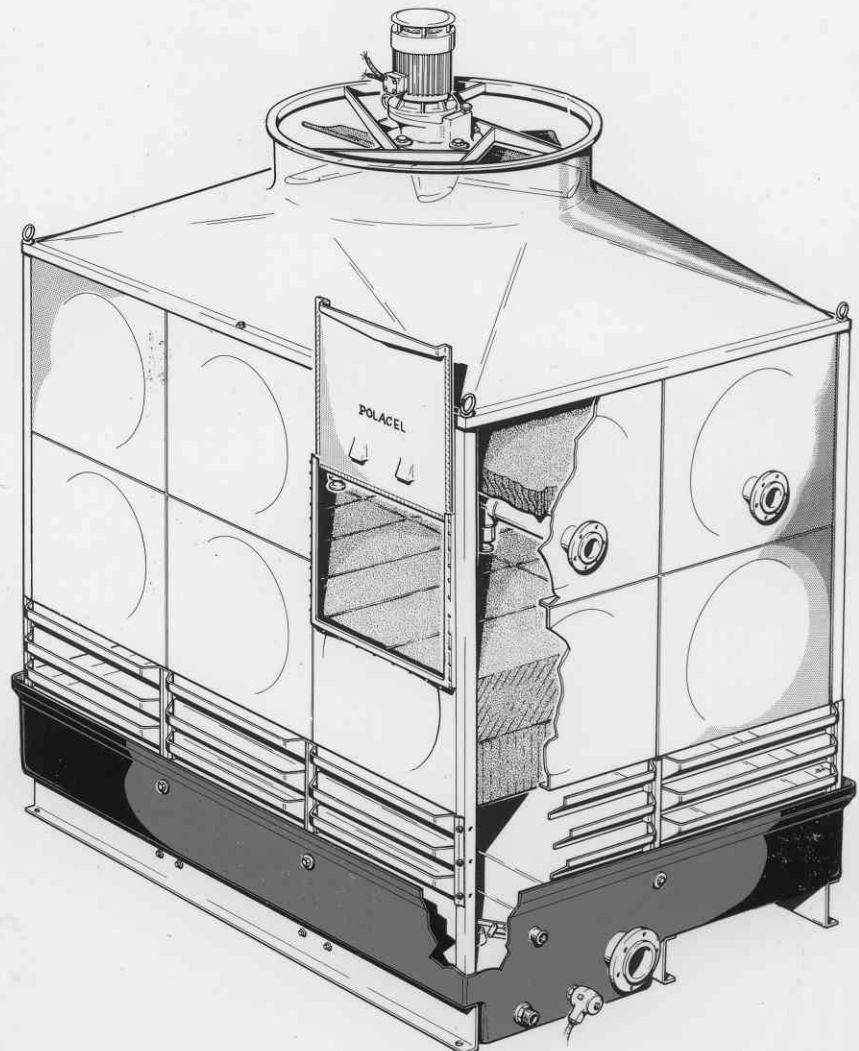
Polacel has based the selection of materials for the CM cooling towers on the requirement that they must be completely resistant to corrosion and chemicals. This has been achieved through the exclusive use of PVC, polypropylene, fibreglass reinforced polyester (FRP) and stainless steel (304 SS) for the internals and hot dipped galvanized steel for the externals.

## Material specifications:

- Hot pressed FRP panels for the casing, colour grey RAL 7035.
- 304 SS corner support and internal profiles.
- Basin, fan deck, fan stack of FRP.
- Munters fill material of PVC (max. temp. 55°C).
- 304 SS bolts.
- High efficient axial fans of polypropylene (PP) or FRP.
- Munters drift eliminators of PVC (drift percentage shall not exceed 0,05% of circulating waterflow).
- Water distribution system with PVC pipe and PP nozzles.
- Air inlet louvres of hot pressed FRP, colour black.
- Foundation beams of hot dipped galvanized steel.

## Why Polacel CM cooling towers?

- Energy efficient, use of high efficient fill, and nozzles with a low pressure drop.
- Durable, use of high quality materials.
- Guaranteed performance, use of Munters fill.
- Attractive looks, use of hot pressed FRP panels.



# Polacel sizing and engineering data for CM cooling towers

Cooling tower model	Wet surf (m <sup>2</sup> )	Nominal capacity (kW)					Fan diam. (mm/ft)	Fan power installed (kW)	Fan speed (Rpm)	SPL at 10m. dB (A)	Dimensions			Weight			
		HWT (°C) CWT (°C) WBT (°C)	37	31	31	31					L (mm)	W (mm)	H (mm)	Ship. (kg)	Oper. (kg)	Emer. (kg)	
			32	26	26	26											26
CM 1 - DL-60 - DM-60 - DH-60	0,8		102	70	80	88	94	700	0,55	960	50	940	940	3075	270	550	700
			121	83	96	104	110										
			144	99	114	124	132										
CM 1 - DL-90 - DM-90 - DH-90	0,8		112	80	89	98	103	700	0,55	960	50	940	940	3475	310	610	800
			132	94	105	115	122										
			156	112	125	138	146										
CM 2 - DL-60 - DM-60 - DH-60	1,5		192	132	151	165	175	700	1,1	960	53	1740	940	2775	380	910	1130
			227	156	180	195	207										
			270	186	213	232	247										
CM 2 - DL-90 - DM-90 - DH-90	1,5		209	149	167	183	194	700	1,5	1440	59	1740	940	3175	430	990	1330
			247	176	197	216	229										
			293	209	234	258	273										
CM 3 - 2DL-60 - 2DM-60 - 2DH-60	2,3		294	202	231	253	269	2x700	2x0,75	960	55	2540	940	2775	490	1290	1640
			348	239	276	298	317										
			415	285	326	356	378										
CM 3 - 2DL-90 - 2DM-90 - 2DH-90	2,3		321	229	257	281	297	2x700	2x0,75	960	56	2540	940	3175	550	1400	1920
			378	270	302	332	352										
			449	321	358	396	419										

CM 4 - DL-60 - DM-60 - DH-60	2,9		371	255	292	319	339	4	1,5	720	57	1740	1740	3055	600	1610	2050
			438	302	347	376	400										
			523	359	411	449	477										
CM 4 - DL-90 - DM-90 - DH-90	2,9		405	288	324	354	374	4	2,2	720	58	1740	1740	3455	670	1740	2390
			477	341	381	418	444										
			567	405	452	499	528										
CM 6 - DL-60 - DM-60 - DH-60	4,3		550	378	433	473	503	4	2,2	720	58	2540	1740	3155	820	2320	2960
			650	448	515	558	593										
			775	533	610	665	708										
CM 6 - DL-90 - DM-90 - DH-90	4,3		600	428	480	525	555	4	3,0	720	59	2540	1740	3555	900	2480	3450
			708	505	565	620	658										
			840	600	670	740	783										
CM 9 - DL-60 - DM-60 - DH-60	6,3		806	553	634	692	736	5	3,0	720	63	2540	2540	3525	1150	3340	4290
			952	656	755	817	868										
			1136	780	894	974	1037										
CM 3 - DL-90 - DM-90 - DH-90	6,3		879	626	703	769	813	5	4,0	720	64	2540	2540	3925	1260	3580	5000
			1037	740	828	909	963										
			1231	879	982	1084	1147										

CM 12 - DL-60 - DM-60 - DH-60	8,3		1062	729	835	912	970	5	5,5	720	64	3340	2540	3775	1480	4360	5610
			1255	864	994	1076	1144										
			1496	1028	1178	1284	1366										
CM 12 - DL-90 - DM-90 - DH-90	8,3		1158	825	927	1014	1071	5	5,5	720	65	3340	2540	4175	1610	4660	6530
			1366	975	1091	1197	1269										
			1622	1158	1293	1429	1511										
CM 16 - DL-60 - DM-60 - DH-60	10,9		1394	957	1097	1198	1274	6	5,5	580	63	3340	3340	4175	1910	5690	7330
			1648	1135	1306	1413	1502										
			1965	1350	1547	1686	1794										
CM 16 - DL-90 - DM-90 - DH-90	10,9		1521	1084	1217	1331	1407	6	7,5	580	64	3340	3340	4575	2090	6090	8550
			1794	1280	1432	1572	1667										
			2130	1521	1699	1876	1984										
CM 20 - DL-60 - DM-60 - DH-60	13,5		1727	1185	1358	1484	1578	7	7,5	480	63	4140	3340	4175	2360	7050	9080
			2041	1405	1617	1751	1861										
			2434	1672	1915	2088	2222										
CM 20 - DL-90 - DM-90 - DH-90	13,5		1884	1342	1507	1649	1743	7	11,0	480	64	4140	3340	4575	2570	7520	10560
			2222	1586	1774	1947	2065										
			2638	1884	2104	2324	2457										

Cooling tower model	Wet surf (m <sup>2</sup> )	Nominal capacity (kW)					Fan diam. (ft)	Fan power installed (kW)	Fan speed (Rpm)	SPL at 10m. dB (A)	Dimensions			Weight			
		HWT (°C)	37	31	31	31					L (mm)	W (mm)	H (mm)	Ship. (kg)	Oper. (kg)	Emer. (kg)	
		CWT (°C)	32	26	26	26											
WBT (°C)	27	21	20	19	18												
CM 25 - DL-60	16,8		2149	1475	1690	1846	1964	8	9,0	450	63	4260	4140	4475	2940	8770	11290
-DM-60			2540	1749	2012	2179	2315		15,0	450	65						
-DH-60			3028	2081	2384	2599	2765		22,0	450	67						
CM 25 - DL-90	16,8		2345	1671	1876	2052	2169	8	11,0	450	64	4260	4140	4875	3190	9360	13140
-DM-90			2765	1973	2208	2423	2569		18,5	450	66						
-DH-90			3282	2345	2618	2892	3058		30,0	450	67						
CM 36 - DL-60	25,2		3224	2213	2535	2770	2945	9	15,0	410	66	5060	5060	4930	4910	5750	9530
-DM-60			3810	2623	3019	3268	3473		30,0	410	67						
-DH-60			4543	3121	3576	3898	4147		45,0	410	68						
CM 36 - DL-90	25,2		3517	2506	2814	3077	3253	9	18,5	410	67	5060	5060	5730	5290	6630	13000
-DM-90			4147	2960	3312	3634	3854		30,0	410	68						
-DH-90			4924	3517	3927	4338	4587		45,0	410	69						
CM 49 - DL-60	33,9		4337	2977	3410	3726	3962	11	18,5	340	67	5860	5860	5070	6950	8090	13170
-DM-60			5125	3529	4061	4396	4672		30,0	340	68						
-DH-60			6111	4199	4810	5244	5579		45,0	340	69						
CM 49 - DL-90	33,9		4731	3371	3785	4140	4376	11	22,0	340	68	5860	5860	5880	7460	9270	16900
-DM-90			5579	3982	4455	4889	5184		37,0	340	69						
-DH-90			6624	4731	5283	5835	6170		55,0	340	70						

CM 64 - DL-60	43,8		5603	3846	4406	4814	5119	13	22,0	300	68	6660	6660	5630	9640	11140	17710
-DM-60			6622	4559	5247	5680	6036		37,0	300	69						
-DH-60			7896	5425	6215	6775	7208		55,0	300	70						
CM 64 - DL-90	43,8		6113	4355	4890	5349	5654	13	30,0	300	68	6660	6660	6440	10070	12440	22300
-DM-90			7208	5145	5756	6316	6699		45,0	300	70						
-DH-90			8558	6113	6826	7539	7972		75,0	300	71						
CM 81 - DL-60	55,1		7049	4838	5543	6056	6440	16	30,0	240	68	7460	7460	6800	12950	14880	23150
-DM-60			8331	5735	6600	7145	7594		45,0	240	70						
-DH-60			9933	6825	7818	8523	9068		75,0	240	71						
CM 81 - DL-90	55,1		7690	5479	6152	6729	7113	16	30,0	240	69	7460	7460	6800	13500	16520	28920
-DM-90			9068	6472	7241	7946	8427		55,0	240	70						
-DH-90			10766	7690	8587	9484	10029		90,0	240	71						

NOTE: CM 1 to CM 16 direct drive  
CM 20 to CM 81 right angle drive

NOTE: mentioned weights and dimensions of CM 36 to CM 81 are excluding water basin.

## Selection tables for CM cooling towers

### How to select a Polacel cooling tower type CM

#### Design conditions (example):

- circulating water quantity  
Q<sub>w</sub> = 180 m<sup>3</sup>/hr
- water inlet temperature  
T<sub>w1</sub> = 37°C
- water outlet temperature  
T<sub>w2</sub> = 29°C
- Wet bulb temperature  
T<sub>wb</sub> = 24°C

Determine range:  
T<sub>w1</sub> - T<sub>w2</sub> = 8°C

Determine approach:  
T<sub>w2</sub> - T<sub>wb</sub> = 5°C

### Selection procedure:

The selection tables on the last page give 6 values for the specific waterflow R (m<sup>3</sup>/m<sup>2</sup>.hr)

CM type	Fill height	
	60 cm	90 cm
DL	R = 13,0	R = 15,0
DM	R = 15,5	R = 17,7
DH	R = 18,4	R = 21,0

To determine the necessary tower surface, divide the circulating water flow by the specific water flow (in the above table).

Select a cooling tower model from the tables on this page, taking into account the fact that the wet surface in the table (first column) is greater than or equal to the necessary tower surface.

Cooling tower type	Necessary tower surface (m <sup>2</sup> )	Selected cooling tower model
DL-60	13,8	CM 25 - DL-60
DM-60	11,6	CM 20 - DM-60
DH-60	9,8	CM 16 - DH-60
DL-90	12,0	CM 20 - DL-90
DM-90	10,2	CM 16 - DM-90
DH-90	8,6	CM 16 - DH-90

Cooling tower model	Wet surf (m <sup>2</sup> )	Nominal capacity (kW)						Fan diam. (ft)	Fan power installed (kW)	Fan speed (Rpm)	SPL at 10m. dB (A)	Dimensions			Weight		
		HWT (°C)	37	31	31	31						L	W	H	Ship.	Oper.	Emer.
		CWT (°C)	32	26	26	26	26					(mm)	(mm)	(mm)	(kg)	(kg)	(kg)
CM 25 - DL-60	16,8		2149	1475	1690	1846	1964	8	9,0	450	63	4260	4140	4475	2940	8770	11290
-DM-60		2540	1749	2012	2179	2315	15,0		450	65							
-DH-60		3028	2081	2384	2599	2765	22,0		450	67							
CM 25 - DL-90	16,8		2345	1671	1876	2052	2169	8	11,0	450	64	4260	4140	4875	3190	9360	13140
-DM-90		2765	1973	2208	2423	2569	18,5		450	66							
-DH-90		3282	2345	2618	2892	3058	30,0		450	67							
CM 36 - DL-60	25,2		3224	2213	2535	2770	2945	9	15,0	410	66	5060	5060	4930	4910	5750	9530
-DM-60		3810	2623	3019	3268	3473	30,0		410	67							
-DH-60		4543	3121	3576	3898	4147	45,0		410	68							
CM 36 - DL-90	25,2		3517	2506	2814	3077	3253	9	18,5	410	67	5060	5060	5730	5290	6630	13000
-DM-90		4147	2960	3312	3634	3854	30,0		410	68							
-DH-90		4924	3517	3927	4338	4587	45,0		410	69							
CM 49 - DL-60	33,9		4337	2977	3410	3726	3962	11	18,5	340	67	5860	5860	5070	6950	8090	13170
-DM-60		5125	3529	4061	4396	4672	30,0		340	68							
-DH-60		6111	4199	4810	5244	5579	45,0		340	69							
CM 49 - DL-90	33,9		4731	3371	3785	4140	4376	11	22,0	340	68	5860	5860	5880	7460	9270	16900
-DM-90		5579	3982	4455	4889	5184	37,0		340	69							
-DH-90		6624	4731	5283	5835	6170	55,0		340	70							

CM 64 - DL-60	43,8		5603	3846	4406	4814	5119	13	22,0	300	68	6660	6660	5630	9640	11140	17710
-DM-60		6622	4559	5247	5680	6036	37,0		300	69							
-DH-60		7896	5425	6215	6775	7208	55,0		300	70							
CM 64 - DL-90	43,8		6113	4355	4890	5349	5654	13	30,0	300	68	6660	6660	6440	10070	12440	22300
-DM-90		7208	5145	5756	6316	6699	45,0		300	70							
-DH-90		8558	6113	6826	7539	7972	75,0		300	71							
CM 81 - DL-60	55,1		7049	4838	5543	6056	6440	16	30,0	240	68	7460	7460	6800	12950	14880	23150
-DM-60		8331	5735	6600	7145	7594	45,0		240	70							
-DH-60		9933	6825	7818	8523	9068	75,0		240	71							
CM 81 - DL-90	55,1		7690	5479	6152	6729	7113	16	30,0	240	69	7460	7460	6800	13500	16520	28920
-DM-90		9068	6472	7241	7946	8427	55,0		240	70							
-DH-90		10766	7690	8587	9484	10029	90,0		240	71							

NOTE: CM 1 to CM 16 direct drive  
CM 20 to CM 81 right angle drive

NOTE: mentioned weights and dimensions of CM 36 to CM 81  
are excluding water basin.

## Selection tables for CM cooling towers

### How to select a Polacel cooling tower type CM

#### Design conditions (example):

- circulating water quantity  
Q<sub>w</sub> = 180 m<sup>3</sup>/hr
- water inlet temperature  
Tw<sub>1</sub> = 37°C
- water outlet temperature  
Tw<sub>2</sub> = 29°C
- Wet bulb temperature  
Tw<sub>b</sub> = 24°C

Determine range:  
Tw<sub>1</sub> - Tw<sub>2</sub> = 8°C

Determine approach:  
Tw<sub>2</sub> - Tw<sub>b</sub> = 5°C

### Selection procedure:

The selection tables on the last page give 6 values for the specific waterflow R (m<sup>3</sup>/m<sup>2</sup>.hr)

CM type	Fill height	
	60 cm	90 cm
DL	R = 13,0	R = 15,0
DM	R = 15,5	R = 17,7
DH	R = 18,4	R = 21,0

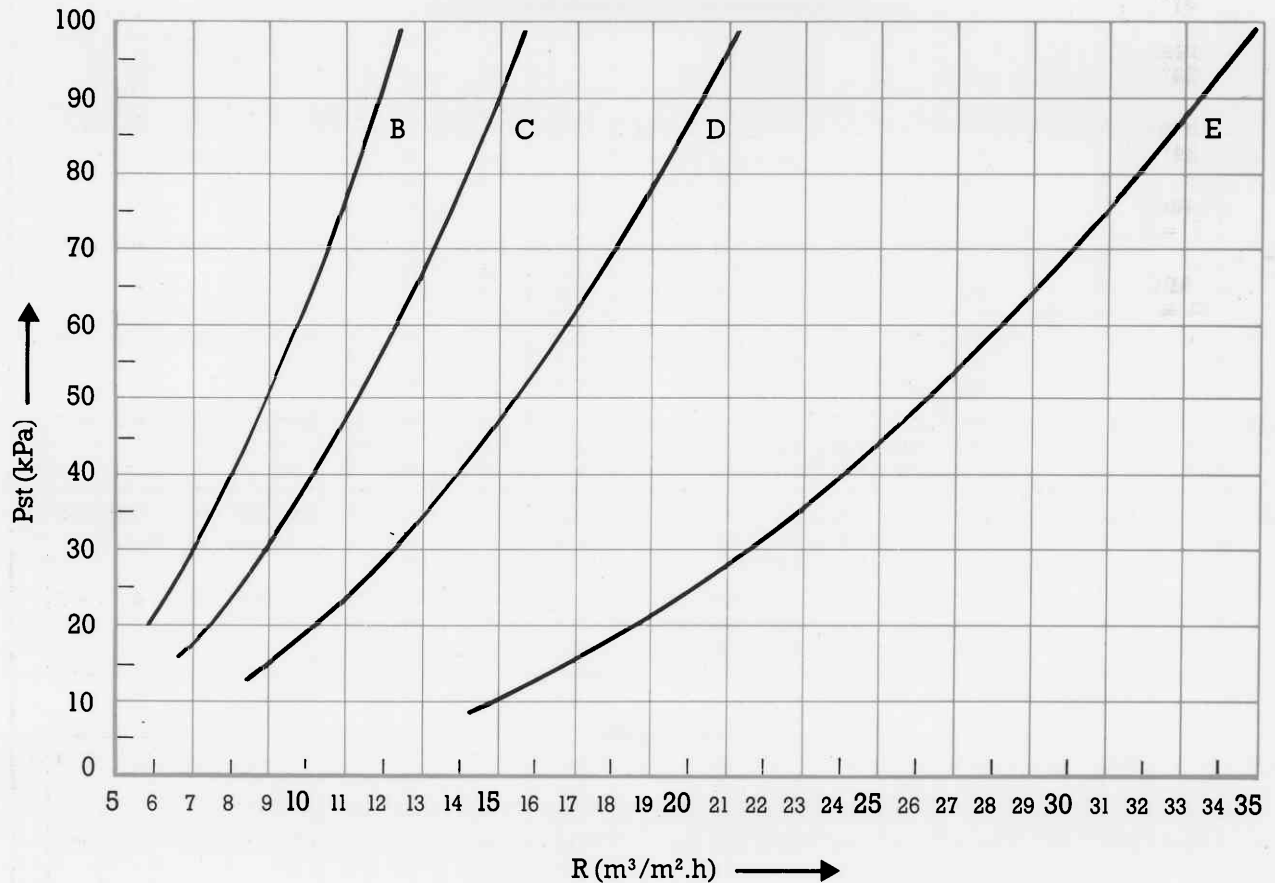
To determine the necessary tower surface, divide the circulating water flow by the specific water flow (in the above table).

Select a cooling tower model from the tables on this page, taking into account the fact that the wet surface in the table (first column) is greater than or equal to the necessary tower surface.

Cooling tower type	Necessary tower surface (m <sup>2</sup> )	Selected cooling tower model
DL-60	13,8	CM 25 - DL-60
DM-60	11,6	CM 20 - DM-60
DH-60	9,8	CM 16 - DH-60
DL-90	12,0	CM 20 - DL-90
DM-90	10,2	CM 16 - DM-90
DH-90	8,6	CM 16 - DH-90

# Nozzle selection

## PRESSURE DROP NOZZLES

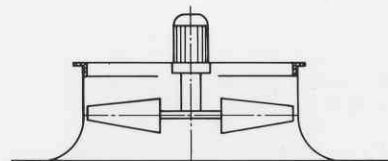


The above graph shows the specific waterflow versus the pressure drop for nozzle type B, C, D or E.

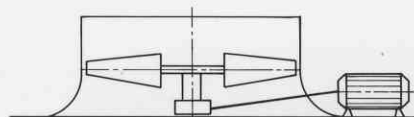
### Selection example:

Which nozzle type to choose for a cooling tower model CM 25 - DL - 60 with a specific waterflow  $R = 15 \text{ m}^3/\text{m}^2 \cdot \text{hr}$ ?

Nozzle type	B	C	D	E
Pressure drop (kPa)	—	90	47	10



CM 1 to CM 16 direct drive



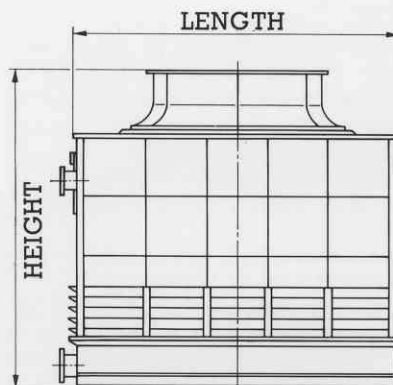
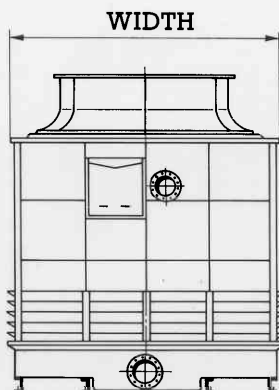
CM 20 to CM 81 right angle drive

### Standard options:

- frost protection waterpan
- two speed motors (1:2) (2:3)
- execution including waterpan or without
- vibration switches.

### Non standard options:

- very low noise levels
- non clogging fill for poluted water
- multi cell units
- crossflow cooling towers
- stainless steel 316 SS
- CM 9 to CM 16 right angle drive
- any size not mentioned in this catalogue
- temperature resistance of fill and nozzles up to 90°C
- diffusers
- available performance curves at different air velocities and wet bulb temperatures
- ladders and railings



# Selection tables for CM cooling towers

## FILL HEIGHT 60 CM

CF 12 fill		Specific water flow R (m <sup>3</sup> /m <sup>2</sup> .hr)							
range °C		3	4	5	6	7	8	9	10
approach °C									
Twb 18°C	3	12,5	10,1	8,7	7,7	7,0	6,6	6,3	6,1
	5	17,8	14,8	12,7	11,3	10,1	9,6	9,2	8,9
	7	24,4	21,5	17,7	15,7	14,3	13,0	12,3	11,8
	9	29,6	25,7	22,2	20,0	17,8	16,3	15,5	14,9
Twb 21°C	3	14,5	12,1	10,2	9,2	8,3	7,8	7,5	7,2
	5	20,9	17,7	15,1	13,5	12,2	11,6	11,0	10,5
	7	27,2	23,6	20,4	18,2	16,7	15,3	14,6	14,0
	9	33,2	28,7	25,3	22,9	20,5	18,9	17,9	17,2
Twb 24°C	3	17,8	14,8	12,7	11,3	10,1	9,6	9,2	8,9
	5	24,4	21,5	17,7	15,7	14,3	13,0	12,3	11,8
	7	31,2	27,6	24,5	22,0	19,4	18,1	17,2	16,5
	9	35,0	33,8	30,3	27,5	24,7	22,6	21,5	20,3
Twb 27°C	3	21,4	18,5	15,8	14,1	13,0	11,9	11,2	10,9
	5	28,8	25,1	22,0	19,2	17,5	16,0	15,2	14,6
	7	35,0	32,2	29,2	26,1	23,5	21,4	20,0	19,0
	9	35,0	35,0	35,0	32,0	29,5	26,4	25,2	23,6

CF 12 fill		Specific water flow R (m <sup>3</sup> /m <sup>2</sup> .hr)							
range °C		3	4	5	6	7	8	9	10
approach °C									
Twb 18°C	3	14,8	11,9	10,2	9,1	8,2	7,8	7,5	7,3
	5	21,0	17,4	14,9	13,2	12,0	11,3	10,8	10,5
	7	28,8	24,1	21,0	18,5	16,8	15,5	14,7	14,0
	9	35,0	30,3	26,3	23,7	21,0	19,2	18,3	17,6
Twb 21°C	3	17,2	14,3	12,0	10,9	9,9	9,2	8,9	8,6
	5	24,6	21,0	17,9	16,0	14,5	13,7	13,0	12,5
	7	32,2	27,8	24,1	21,5	19,7	18,0	17,1	16,5
	9	35,0	34,2	30,0	26,9	24,0	22,3	21,1	20,3
Twb 24°C	3	21,0	17,4	14,9	13,2	12,0	11,3	10,8	10,5
	5	28,8	24,1	21,0	18,5	16,8	15,5	14,7	14,0
	7	35,0	32,6	29,0	25,9	22,9	21,3	20,3	19,5
	9	35,0	35,0	35,0	32,4	29,2	26,7	25,3	24,0
Twb 27°C	3	25,3	21,8	18,6	16,4	15,4	14,0	13,3	12,8
	5	34,0	29,6	26,0	22,6	20,6	19,0	18,0	17,2
	7	35,0	35,0	34,6	31,0	27,8	25,3	23,6	22,6
	9	35,0	35,0	35,0	35,0	35,0	31,2	29,9	27,9

CF 12 fill		Specific water flow R (m <sup>3</sup> /m <sup>2</sup> .hr)							
range °C		3	4	5	6	7	8	9	10
approach °C									
Twb 18°C	3	17,6	14,2	12,3	11,0	9,7	9,3	8,9	8,7
	5	25,0	20,8	17,7	16,9	14,3	13,5	12,9	12,5
	7	34,0	28,8	25,0	22,0	20,0	18,4	17,4	16,5
	9	35,0	35,0	31,3	28,2	25,0	22,9	21,9	21,0
Twb 21°C	3	20,5	17,0	14,3	13,0	11,8	11,0	10,5	10,2
	5	29,3	25,0	21,3	19,0	17,2	16,3	15,5	14,9
	7	35,0	33,0	28,7	25,5	23,5	21,4	20,4	19,6
	9	35,0	35,0	35,5	32,0	28,7	26,5	25,2	24,1
Twb 24°C	3	25,0	20,8	17,7	16,9	14,3	13,5	12,9	12,5
	5	34,0	28,8	25,0	22,0	20,0	18,4	17,4	16,5
	7	35,0	35,0	34,2	30,9	27,2	25,4	24,1	23,1
	9	35,0	35,0	35,0	35,0	35,0	31,6	30,2	28,6
Twb 27°C	3	30,0	26,0	22,0	19,6	18,3	16,8	15,8	15,2
	5	35,0	35,0	31,0	26,9	24,4	22,5	21,3	20,6
	7	35,0	35,0	35,0	35,0	33,0	30,1	28,1	26,8
	9	35,0	35,0	35,0	35,0	35,0	35,0	35,0	33,0

## FILL HEIGHT 90 CM

CF 12 fill		Specific water flow R (m <sup>3</sup> /m <sup>2</sup> .hr)							
range °C		3	4	5	6	7	8	9	10
approach °C									
Twb 18°C	3	14,2	11,8	10,3	9,2	8,4	8,0	7,6	7,4
	5	19,8	16,7	14,5	13,0	12,0	11,4	10,8	10,3
	7	27,0	22,6	19,9	17,5	16,1	15,0	14,2	13,5
	9	32,0	28,6	24,5	22,0	19,9	18,3	17,4	16,7
Twb 21°C	3	16,5	13,8	11,9	10,9	9,9	9,3	8,9	8,6
	5	23,0	19,7	17,1	15,3	14,0	13,2	12,6	12,1
	7	29,5	26,7	22,5	20,2	18,5	17,1	16,4	15,9
	9	35,0	31,0	27,8	25,1	22,9	21,0	20,0	19,2
Twb 24°C	3	19,8	16,7	14,5	13,0	12,0	11,4	10,8	10,3
	5	27,0	22,6	19,9	17,5	16,1	15,0	14,2	13,5
	7	33,5	30,0	26,6	24,1	21,6	20,2	19,1	18,3
	9	35,0	35,0	33,1	30,0	27,0	24,8	23,5	22,6
Twb 27°C	3	23,6	20,3	17,8	16,8	14,9	13,6	13,0	12,6
	5	31,1	27,4	24,0	21,4	19,5	18,0	17,0	16,4
	7	35,0	35,0	31,8	28,6	25,7	23,7	22,2	21,0
	9	35,0	35,0	35,0	35,0	32,0	28,6	27,7	26,0

CF 12 fill		Specific water flow R (m <sup>3</sup> /m <sup>2</sup> .hr)							
range °C		3	4	5	6	7	8	9	10
approach °C									
Twb 18°C	3	16,8	14,0	12,2	10,9	10,0	9,4	9,1	8,9
	5	23,4	19,8	17,0	15,2	14,2	13,5	12,8	12,3
	7	31,5	26,7	23,4	20,7	19,0	17,7	16,8	16,0
	9	35,0	33,2	29,0	26,0	23,4	21,6	20,5	19,9
Twb 21°C	3	19,4	16,2	14,0	12,8	11,6	11,0	10,5	10,2
	5	27,1	23,1	20,2	18,2	16,5	15,8	15,0	14,3
	7	35,0	30,4	26,7	23,9	21,9	20,2	19,3	18,7
	9	35,0	35,0	32,9	29,6	26,9	24,8	23,5	22,7
Twb 24°C	3	23,4	19,8	17,0	15,2	14,2	13,5	12,8	12,3
	5	31,5	26,7	23,4	20,7	19,0	17,7	16,8	16,0
	7	35,0	35,0	31,3	28,5	25,5	23,8	22,6	21,8
	9	35,0	35,0	35,0	35,0	32,0	29,3	27,8	26,7
Twb 27°C	3	27,8	24,0	21,0	18,6	17,5	16,0	15,2	14,8
	5	35,0	32,3	28,3	25,2	23,0	21,2	20,1	19,3
	7	35,0	35,0	35,0	33,9	30,2	27,9	26,1	24,9
	9	35,0	35,0	35,0	35,0	35,0	33,9	32,6	30,6

CF 12 fill		Specific water flow R (m <sup>3</sup> /m <sup>2</sup> .hr)							
range °C		3	4	5	6	7	8	9	10
approach °C									
Twb 18°C	3	20,0	16,6	14,7	12,9	12,0	11,3	10,9	10,6
	5	27,9	23,4	20,3	18,1	17,0	16,0	15,3	14,7
	7	35,0	31,8	27,9	24,7	22,7	21,0	19,9	19,0
	9	35,0	35,0	35,0	31,0	28,0	25,8	24,5	23,5
Twb 21°C	3	23,0	19,3	16,8	15,2	13,9	13,2	12,6	12,2
	5	32,4	27,5	24,0	21,7	19,7	18,7	17,8	17,0
	7	35,0	36,0	31,7	28,3	26,0	24,1	22,0	20,2
	9	35,0	35,0	35,0	35,2	32,0	29,5	28,2	27,1
Twb 24°C	3	27,9	23,4	20,3	18,1	17,0	16,0	15,3	14,7
	5	35,0	31,8	27,9	24,7	22,7	21,0	19,9	19,0
	7	35,0	35,0	35,0	33,9	30,3	28,3	26,9	25,8
	9	35,0	35,0	35,0	35,0	35,0	35,0	33,0	31,6
Twb 27°C	3	33,2	28,6	25,0	22,0	21,0	19,1	18,1	17,6
	5	35,0	35,0	33,6	30,0	27,3	25,3	24,0	23,1
	7	35,0	35,0	35,0	35,0	35,0	33,1	31,1	29,6
	9	35,0	35,0	35,0	35,0	35,0	35,0	35,0	35,0



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