

maxi-flo

HEAT EXCHANGERS



5 Sizes from 95,000 to 400,000 BTU



Stainless steel and titanium options



Designed to minimize pressure loss in system



STANDARD FEATURES

- Constructed of high quality corrosion resistant stainless steel (AISI 316)
- Rolled formed to shape and then precision welded
- Specially designed built in flow turbulators to assure maximum heat exchange
- Leak tested to assure that they are totally functional
- Compact in size and require a minimum installation space - light weight
- Perfect for all types of swimming pools, spas and hot tubs
- Equipped with stainless steel holding brackets

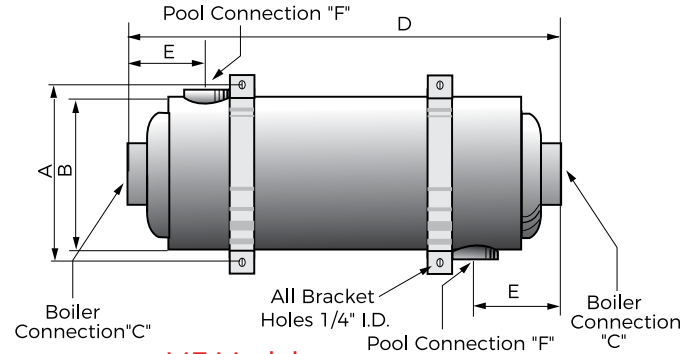
Thermal Output Maxi-Flo Stainless Steel Heat Exchangers

Model No.	Thermal Output (Btu/hr)*	Hot Water Flow		Cold Water Flow		Heat Transfer Surface Sq. Ft.
		GPM	Pressure Drop Ft.	GPM	Pressure Drop Ft.	
MF-80	95,000	7	6	77	6	2
MF-135	135,000	7	2	52	3	3
MF-200	200,000	8	2	65	5	5
MF-260	260,000	9	2	77	6	6
MF-400	400,000	13	3	93	8	12

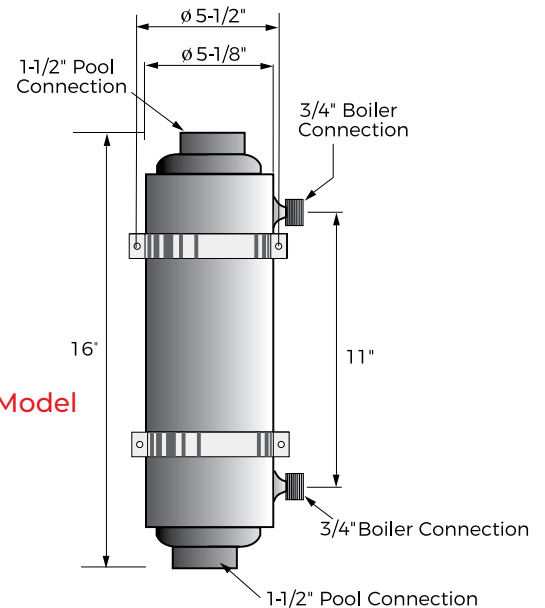
*correction factors must be taken into account for thermal outputs
 Maximum working temperature 230° F
 Maximum working pressure: 140 psi (primary and secondary)

Dimensions

Model No.	A	B	C	D	E	F	Weight lb.
MF-135	5-1/2"	5-1/8"	1"	13-1/2"	3"	1-1/2"	8
MF-200	5-1/2"	5-1/8"	1"	18-3/4"	3"	1-1/2"	11
MF-260	5-1/2"	5-1/8"	1"	23-3/4"	3"	2"	14
MF-400	5-1/2"	5-1/8"	1-1/2"	41-3/4"	3-1/2"	2"	24
MF-80	(See right)						6



MF Model



MF 80 Model

Titanium Construction

Titanium is chosen for the high resistance to corrosion and is suitable for pools and spas with aggressive water, salt water and when a salt chlorinator is used.

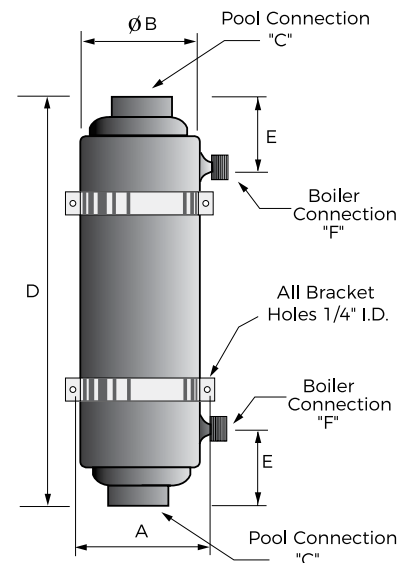
Model No.	Thermal Output (Btu/hr)*	Hot Water Flow		Cold Water Flow	
		GPM	Pressure Drop Ft.	GPM	Pressure Drop Ft.
MF-135T	135,000	11	9	92	5
MF-260T	260,000	13	24	92	6

*correction factors must be taken into account for thermal outputs
 Maximum working temperature 230°F
 Maximum working pressure: 425 psig (primary) and 70 psi (secondary)

Dimensions

Model No.	A	B	C	D	E	F	Weight lb.
MF-135T	5-1/2"	5"	1-1/2"	20"	4-1/4"	1"	4
MF-260T	5-1/2"	5"	1-1/2"	29-1/2"	4-1/4"	1"	6

The T model features a titanium shell and titanium coil.



MF Titanium Model

CORRECTION FACTORS

The performance of a heat exchanger varies according to the liquid flow and temperature difference between both the hot and cold circuits.

The output is based upon the given flowrates specified in the tables, and a temperature difference of 110°F between the incoming hot and cold liquid.

Using diagrams A and B, the thermal output can be calculated for other applications different than those quoted in the table.

Diagram A

Diagram A shows the variation in thermal output with different incoming temperature difference between the hot and cold liquid.

Example: An application calls for a hot water inlet temperature of 160°F and cold water inlet temperature of 60°F. The temperature difference is 100°F (160°F-60°F). Using Diagram A, a temperature difference of 100°F corresponds to 90% correction factor. A MF200 with a thermal out of 200,000 btu/hr is corrected to 180,000btu/hr (200,000 * 90%).

Diagram B

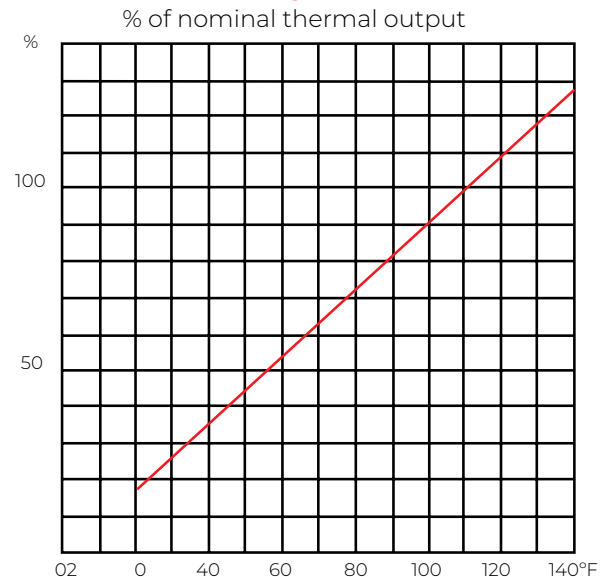
Diagram B represents the variation in thermal output with changes in liquid flow that differ from, the nominal values given in the tables.

Take the average of the ratios of the actual flow rate to design flow rate for the hot and cold flow rates.

Example: A MF-200 has a hot water design flow of 8 gpm and cold water design flow of 65 gpm. If the application calls for 10 gpm of hot water and 75 gpm of cold water, the change in flow rate would be 125% (10/8*100) for the cold side and 115% (75/65*100) for the hot side. 125% and 115% average to 120% [(125+115)/2]. Using diagram B, 120% change in flowrate corresponds to 110% correction factor. A MF200 with a thermal output of 200,000 btu/hr is corrected to 220,000btu/hr (200,000 btu/hr * 110%).

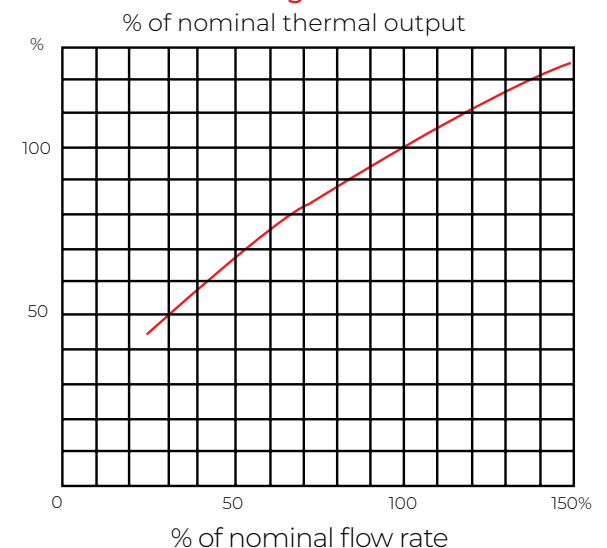
If combined with the example above, the final corrected thermal output is 198,000 btu/hr (200,000 btu/hr * 110% * 90%).

Diagram A



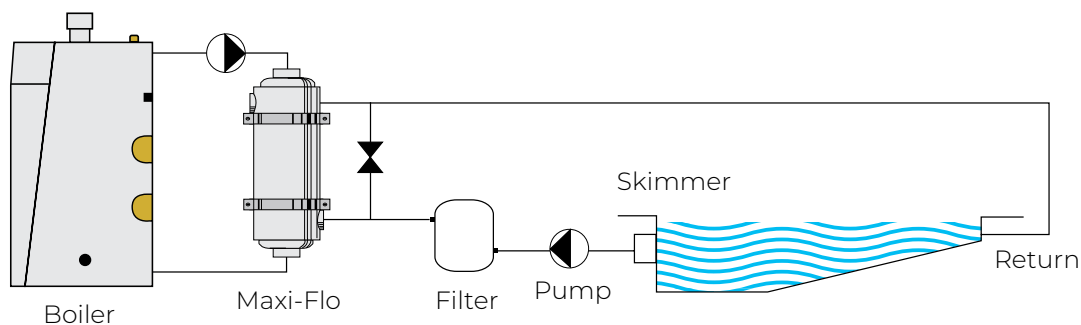
Difference in temperature between incoming warm and incoming cold water

Diagram B



INSTALLATION PRINCIPLE

(Refer to Installation Manual for more information)



WARNING: Automatic chlorinators and chemical feeders

Chlorinators must feed downstream of the heat exchanger and have an anti-siphoning device to prevent chemical backup in the heat exchanger when the pump is shut off.

SIZING GUIDE

Boiler Output and Heat Exchanger Selection Table

Pool Capacity (gal.)	1 F/hr Heat-Up Rate		2 F/hr Heat-Up Rate	
	Boiler Output Required (Btu/hr)	Heat Exchanger Model	Boiler Output Required (Btu/hr)	Heat Exchanger Model
2,000	16,683	MF-80	33,366	MF-80
4,000	33,366	MF-80	66,732	MF-80
6,000	50,049	MF-80	100,098	MF-135
8,000	66,732	MF-80	133,464	MF-135
10,000	83,416	MF-80	166,830	MF-200
12,000	100,098	MF-135	200,196	MF-260
14,000	116,781	MF-135	233,562	MF-260
16,000	133,464	MF-135	266,928	MF-400
18,000	150,147	MF-200	300,294	MF-400
20,000	166,830	MF-200	333,660	MF-400
22,000	183,513	MF-200	367,026	MF-400
24,000	200,196	MF-260	400,392	MF-260 (2)**
26,000	216,879	MF-260	433,758	MF-260 (2)**
28,000	233,562	MF-260	467,124	MF-260 (2)**
30,000	250,245	MF-260	500,490	MF-260 (2)**
32,000	266,928	MF-400	533,856	MF-400 (2)**
34,000	283,611	MF-400	567,222	MF-400 (2)**
36,000	300,294	MF-400	600,588	MF-400 (2)**
38,000	316,977	MF-400	633,954	MF-400 (2)**
40,000	333,660	MF-400	667,320	MF-400 (2)**
42,000	350,343	MF-400	700,686	MF-400 (2)**
44,000	367,026	MF-400	734,052	MF-400 (2)**
46,000	383,709	MF-400	767,418	MF-400 (2)**

Note: **Two heat exchangers piped reverse return

Step 1: Determine heat up rate based on type of pool use

The desired heat-up rate is usually the most important factor affecting boiler/heat exchanger selection.

The desired heat-up rate for extended use (summer season) is 1°F/hour, for periodic use (weekends, holidays) 2°F/hour.

Step 2: Determine pool capacity

Rectangular Pools

$$\text{Capacity (gals.)} = 7.5 \times \text{Length (feet)} \times \text{Width (feet)} \times \text{Avg. Depth (feet)}$$

Circular Pools

$$\text{Capacity (gals.)} = 5.9 \times \text{Dia.}^2 \text{ (feet)} \times \text{Avg. Depth (feet)}$$

Step 3: Select Maxi-Flo Exchanger required

Enter selection table with pool capacity and select Maxi-Flo heat exchanger and its recommended boiler output capacity, based on heat-up rate.

Step 4: Check heat loss to surroundings

$$\text{Heat Loss (btu/hr)} = 12 \times \left[\begin{array}{c} \text{Pool Surface Area (sq. ft.)} \end{array} \right] \times \left[\begin{array}{c} \text{Desired Pool Temp. (F}^\circ\text{)} \\ \text{Coldest Avg. Air Temp. During Use (F}^\circ\text{)} \end{array} \right]$$

Boiler output selected in Step 3 must be larger than the heat loss to the surroundings.

Note: The typical desired pool temperature is 80°F.

Note: The heat-up rate will decrease as outdoor temperature drops.

EXAMPLE

Determine the boiler output and heat exchanger required for a 30-foot long by 16-foot wide by 5.5 foot average depth pool. The pool is for extended use during the summer season and the coldest air temperature anticipated is 65°F.

Step 1:

For extended use, the desired heat-up rate is 1°F/hour.

Step 2:

$$\text{Pool capacity} = 7.5 \text{ gal/Ft}^3 \times 30' \times 16' \times 5.5' = 19,800 \text{ gallons}$$

Step 3:

From selection table, for 20,000 gallons and 1°F heat-up rate:

Required Boiler Output = 166,830 Btu/hr.

Required Heat Exchanger = Model MF-200

Step 4:

Surface Area = 30ft. x 16ft. = 480 sq. ft.

Heat Loss = 12 x 480 x (80°F - 65°F) = 86,400 Btu/hr.

Heat loss is well within required boiler output capacity.

The calculations are valid for a boiler which provide heat transfer fluid (hot water) with the temperatures around 170-180° F (80° C). Using a colder heat source, like a heat pump, one should consider a "more powerful" heat exchanger (or increase the number of them)