TriangleTube

The Triangle Tube Maxi-Flo heat exchanger, when combined with any boiler, makes for an ideal heating system for swimming pool, spa and hot tub applications.

Available in 5 sizes, ranging from 95,000 to 400,000 Btu/hr thermal output, they can accommodate any size pool or spa.

MAXI-FLO®

Stainless Steel Heat Exchanger

for Swimming Pools & Spas

- Available in Stainless Steel & Titanium -

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

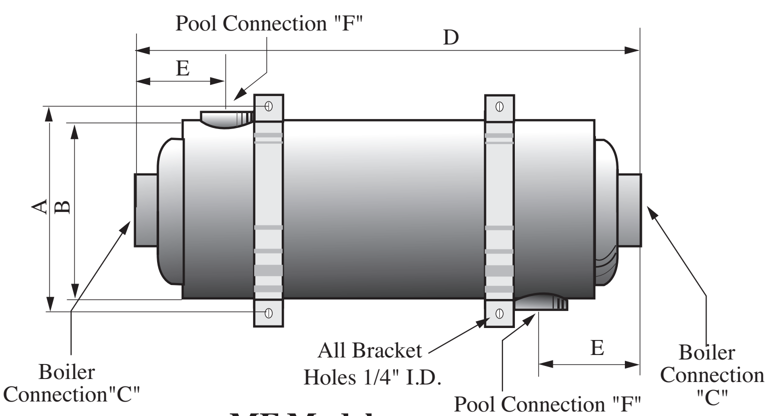
Standard Features

- Constructed of high quality corrosion resistant stainless steel (AISI 316)
- Rolled formed to shape and then precision welded
- Specially designed built in flow restrictor to assure maximum heat exchange
- Designed to minimize pressure loss in the heating system
- Leak tested to assure that they are totally functionable
- Compact in size and require a minimum installation space - light weight
- Significant energy savings
- Available for all types of swimming pools, spas and hot tubs
- Equipped with stainless steel holding brackets

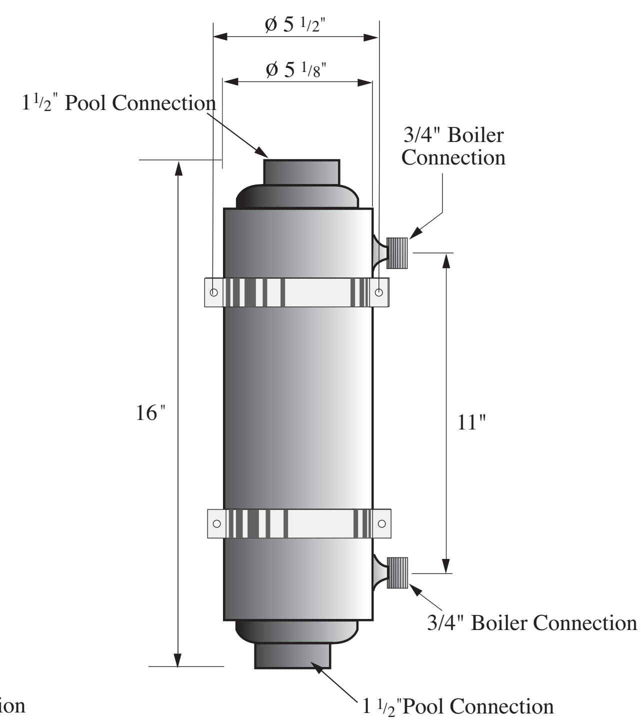
Dimensions

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 below)						6

Maximum working temperature 230°F
Maximum working pressure: 140 psi (primary and secondary)



MF Model

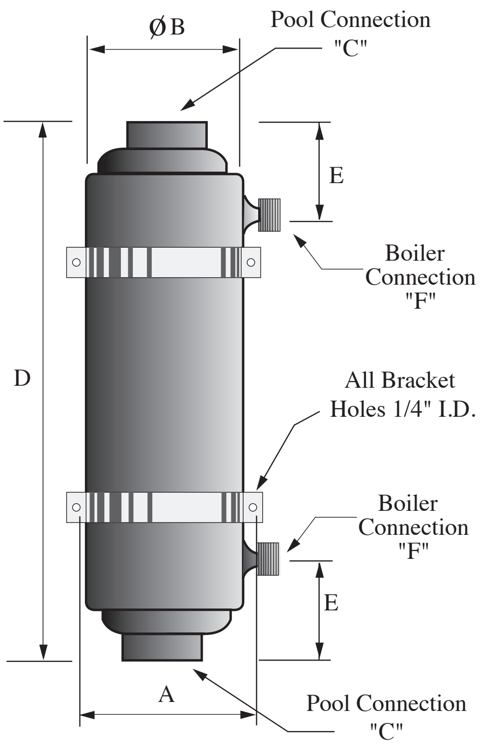


MF 80 Model

Thermal Output Maxi-Flo Titanium Heat Exchangers

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
MF-350PT	340,000	11	7.5	88	3

Maximum working temperature 230ºF
Maximum working pressure: 425 psig (primary) and 70 psi (secondary)



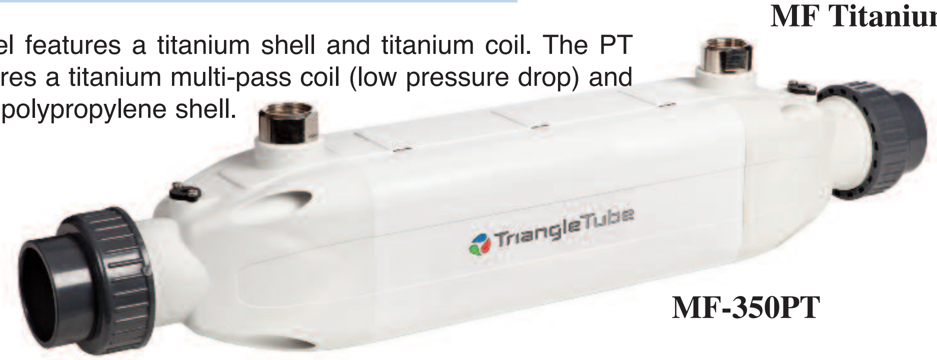
MF Titanium Model

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.	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
MF-350PT	7"	5 1/2"	2"	37"	4 1/4"	1"	12

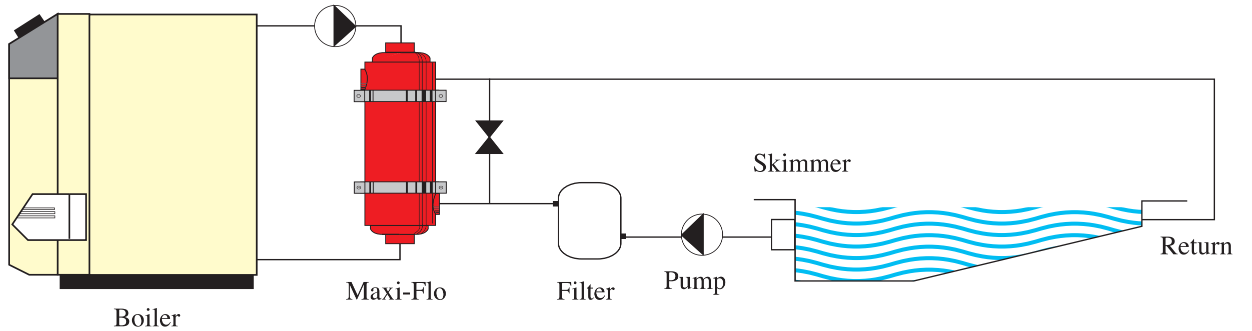
The T model features a titanium shell and titanium coil. The PT model features a titanium multi-pass coil (low pressure drop) and reinforeced polypropylene shell.



MF-350PT

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 back-up 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	83,415	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	383,180	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

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

Circular Pools

$$\text{Capacity (gals.)} = 5.9 \times \text{Diameter (feet)}^2 \times \text{Average depth (feet)}$$

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

$$\text{Heat loss (btu/hr)} = 12 \times \left[\text{Pool surface area (sq. ft.)}\right] \times \left[\text{Desired pool temp.}(^{\circ}F) - \text{Coldest avg. air temp. during use}(^{\circ}F)\right]$$

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.

Step1:
For extended use, the desired heat-up rate is 1°F/hour.

Step2:
Pool capacity = 7.5 gal/Ft^3 x 30' x 16' x 5.5' = 19,800 gallons

Step3:
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

Step4:
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.

Correction Factors

The performance of a heat exchanger varies according to the liquid flow through the primary (hot) and secondary (cold) circuits and the temperature difference between both media.

From the graph below, nominal thermal output for heat exchanger may be obtained.

This output is based upon given liquid flow through both circuits, which is quoted in the table, and a temperature difference of 110ºF between the incoming primary and secondary media.

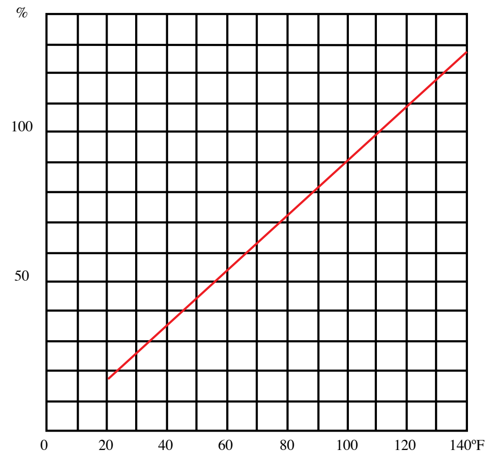
By the use of diagrams A and B the thermal output may be calculated for other liquid flows and temperature differences than those quoted in the table.

Diagram A

Diagram A shows the variation in thermal output with changes in temperature difference between the incoming media. The output is virtually proportional to the temperature difference.

The nominal value is based upon a temperature difference of 110ºF and this value represents 100% on the graph.

% of nominal thermal output



Difference in temperature between incoming warm and incoming cold water

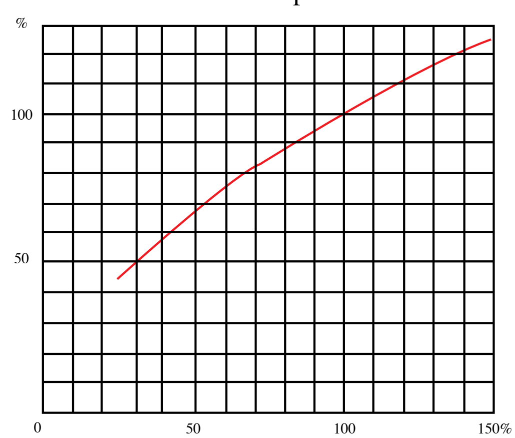
Diagram B

Diagram B represents the variation in thermal output with changes in liquid flow. This diagram is based upon the nominal values given in the tables which values represent 100% on the graph.

If the flow in both primary and secondary circuits is in the same ratio to the nominal values, then the rate of the thermal output from the heat exchanger may be read from the graph.

If, however, the flow in both circuits does not have the same ratio to the nominal values, the thermal output can be approximated as the average of the two readings based on the two separate ratios.

% of nominal thermal output



% of nominal flow rate

TriangleTube

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Revised Date: 3/1/13

2013-3 MF Literature_W/Titanium