

SELECTIONS – SWIMMING POOLS & SPAS

Selecting a FlatPlate Heat Exchanger for Swimming Pool Applications is quick and easy, based on the Total Pool Capacity (gallons), Heat Loss of the pool and the Heat Up Rate desired. FlatPlate's MP Marine Series is designed for Swimming Pool applications where chemically treated water and biological elements are present.

Note: MP Series Heat Exchangers use a special Marine Stainless Alloy and MUST be used in pool environments. Materials such as 316 Stainless steel will corrode and fail due to chlorine, and other chemical and biological elements typical in pool water.

Swimming Pools

To select a Heat Exchanger for Boiler to Pool Water Heating:

Step 1 Select the Heat Up Rate Desired

Pool Use

Periodic Use Only (weekends, holidays)

Extended Use (summer season)

Heat Up Rate

2°F/hour

1°F/hour

Step 2 Determine Pool Capacity

Rectangular Pools

Capacity (gallons) = _____ Length (ft) x _____ Width (ft) x _____ Average Depth (ft) x 7.5 gallons/cu ft

Circular Pools

Capacity (gallons) = _____ Diameter² (ft) x _____ Avg Depth (ft) x .785 x 7.5 gallons/cu ft

Pool Capacity (Gallons)	1°F/Hr Heat up Rate			2°F/Hr Heat up Rate		
	Boiler Output Required (BTUH)	Boiler Side Minimum GPM	FlatPlate Model	Boiler Output Required (BTUH)	Boiler Pump Minimum GPM	FlatPlate Model
1,000	8,345	2	MP5x12-4 (1" MPT)	16,690	2	MP5x12-4 (1" MPT)
2,000	16,690	2	MP5x12-4 (1" MPT)	33,380	2	MP5x12-6 (1" MPT)
4,000	33,380	2	MP5x12-6 (1" MPT)	66,760	4	MP5x12-8 (1" MPT)
6,000	50,070	3	MP5x12-6 (1" MPT)	100,140	7	MP5x12-10 (1" MPT)
8,000	66,760	4	MP5x12-8 (1" MPT)	133,520	9	MP5x12-10 (1" MPT)
10,000	83,450	6	MP5x12-8 (1" MPT)	166,900	11	MP5x12-16 (1" MPT)
12,000	100,140	7	MP5x12-10 (1" MPT)	200,280	13	MP5x12-16 (1" MPT)
15,000	125,175	8	MP5x12-10 (1" MPT)	250,350	17	MP5x12-20 (1-1/4" MPT)
20,000	166,900	11	MP5x12-16 (1" MPT)	333,800	22	MP5x12-24 (1-1/4" MPT)
25,000	208,625	14	MP5x12-16 (1" MPT)	417,250	28	MP5x12-30 (1-1/4" MPT)
30,000	250,350	17	MP5x12-20 (1-1/4" MPT)	500,700	33	MP5x12-40 (1-1/4" MPT)
35,000	292,075	18	MP5x12-20 (1-1/4" MPT)	584,150	36	MP5x12-40 (1-1/4" MPT)
40,000	333,800	19	MP5x12-24 (1-1/4" MPT)	667,600	38	MP5x12-50 (1-1/4" MPT)
45,000	375,525	21	MP5x12-30 (1-1/4" MPT)	751,050	43	MP5x12-50 (1-1/4" MPT)
50,000	417,250	24	MP5x12-30 (1-1/4" MPT)	834,500	48	MP5x12-60 (1-1/4" MPT)
60,000	500,700	29	MP5x12-40 (1-1/4" MPT)	1,001,400	57	MP5x12-70 (1-1/4" MPT)
70,000	584,150	33	MP5x12-40 (1-1/4" MPT)	1,168,300	67	MP5x12-80 (1-1/4" MPT)
80,000	667,600	38	MP5x12-50 (1-1/4" MPT)	1,335,200	76	MP5x12-90 (1-1/4" MPT)
90,000	751,050	43	MP5x12-50 (1-1/4" MPT)	1,502,100	86	MP5x12-100 (1-1/4" MPT)
100,000	834,500	48	MP5x12-60 (1-1/4" MPT)	1,669,000	95	MP5x12-110 (1-1/4" MPT)
125,000	1,043,125	60	MP5x12-70 (1-1/4" MPT)	2,086,250	119	(2) MP5x12-70 (1-1/4" MPT)
150,000	1,251,750	72	MP5x12-80 (1-1/4" MPT)	2,503,500	143	(2) MP5x12-80 (1-1/4" MPT)
175,000	1,460,375	83	MP5x12-100 (1-1/4" MPT)	2,920,750	167	(2) MP5x12-100 (1-1/4" MPT)
200,000	1,669,000	95	MP5x12-110 (1-1/4" MPT)	3,338,000	191	(2) MP5x12-110 (1-1/4" MPT)

1. Typical Design Conditions: 180°F Boiler Water to HX, 80°F Pool Water.

2. For 160°F Boiler Water, multiply product model by 1.5 to select larger required model. (ie, FP5x12-16 at 180°F, use FP5x12-24 at 160°F).

3. For 200°F Boiler Water and Steam, use model number shown for 180°F. Multiply minimum Boiler gpm by .60.

4. Bypass/Balancing valve on Pool side of HXREQUIRED to allow for full pool pump flow from 30 to 100 gpm or more.

5. Pool side Pressure drop for all models ranges for typical flow with bypass/balancing valve 4.0 psi or higher.

6. Boiler side Pressure drop for all models ranges 4.0 psi to 4.5 psi for the above Minimum Flow rates.

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Step 3 Select the Heat Exchanger and Boiler Output Required

From the Selection table, based on the Pool Capacity (gallons) select the appropriate heat exchanger and boiler capacity based on the Heat Up Rate.

For Example: For a 15x30 ft pool, averaging 5.5 ft deep, the pool capacity is 24,475 gallons. Using the Selection table, a 1°F/hr heat up rate, requires 208,625 BTUH and a MP5x12-16 heat exchanger.

Step 4 Check for Heat Loss to surroundings

Heat Loss (BTUH) = 12 x _____ Pool Surface Area (sq ft) x _____ (Desired Pool Temp (°F) – _____ Coldest Ambient Temp During Use (°F))

Use this calculation to verify that the Boiler output exceeds the heat loss to surroundings.

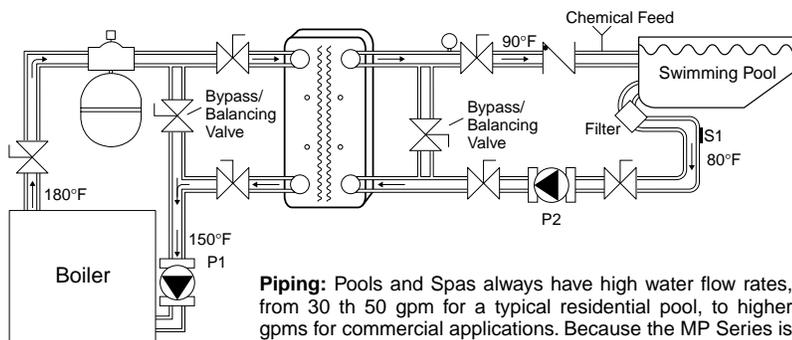
Spas

To select a MP Series Heat Exchanger for a Spa:

Step 1 Determine the Capacity (gallons) of the Spa or Hot Tub. (See Step 2 in Pool calculations)

Step 2 From the Spa selection table, based on the Spa Capacity (gallons) select the appropriate heat exchanger and boiler capacity based on the Heat Up Rate.

Note: A spa is typically operated at 100°F to 105°F, requires a faster heat up rate, and due to aeration, has a higher loss to ambient surroundings. The above table is based on 3F/hr plus ambient losses due to aeration.



Piping: Pools and Spas always have high water flow rates, from 30 to 50 gpm for a typical residential pool, to higher gpm for commercial applications. Because the MP Series is a high efficiency heat exchanger and does not require the full pool gpm flow, a BYPASS balancing valve is required to bypass 50% to 80% of the pool water. This bypass/balancing valve should be adjusted and permanently set at start-up.

Chemical feeds **MUST** be down stream from the heat exchanger, and a check valve should also be installed to prevent back-flow of chemicals into the heat exchanger when the pump is not in operation.

Controls: Temperature control of the pool should be based on a return water temperature stat, controlling (on/off) the boiler and boiler pump. Temperature control of the 90-100°F feed to the pool should be controlled by permanent adjustment of the bypass valve.

Startup: Start up the system, and adjust the pool side bypass valve so that the pool heats up no faster than 2°F/hr, initially. After the pool reaches approximately 78-80°F, and the boiler water is entering at 180°F, adjust the pool side bypass/balancing valve to obtain 90°F to 100°F water to the pool. Then adjust the boiler bypass/balancing valve so that approximately 150°F water is being returned to the boiler.

2°F/Hr Heat up Rate, plus Aeration			
Spa Capacity Gallons	Boiler Output Required (BTUH)	Boiler Side Minimum GPM	FlatPlate Model
750	31,300	2	MP5x12-6 (1" MPT)
1,000	41,725	3	MP5x12-8 (1" MPT)
1,500	62,588	4	MP5x12-10 (1" MPT)
2,000	83,450	6	MP5x12-16 (1" MPT)
4,000	166,900	11	MP5x12-20 (1-1/4" MPT)
6,000	250,350	17	MP5x12-30 (1-1/4" MPT)
8,000	333,800	22	MP5x12-40 (1-1/4" MPT)

1. Typical Design Conditions: 180°F Boiler Water to HX, 105°F Spa Water.
2. For 160°F Boiler Water, multiply product model by 1.5 to select larger required model. (ie, FP5x12-16 at 180°F, use FP5x12-24 at 160°F).
3. For 200°F Boiler Water and Steam, use model number shown for 180°F.
4. Bypass/Balancing valve on SPA side of HX REQUIRED to allow for full spa pump flow of 20 to 60 gpm.
5. Use individual HX's for each SPA.