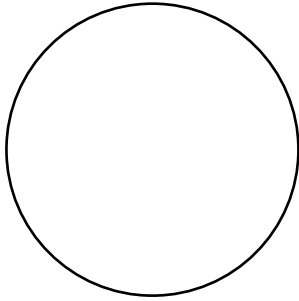


Product Catalog 2024



Example: Pool Length = 40 ft.
Pool Width = 20 ft.
Shallow Depth = 3 ft.
Deep Depth = +8 ft.
Total Depth = 11 ft.

Using formula A: $40 \times 20 = 800$ sq. ft., $800 \times 5.5 = 4,400$ cubic ft., $4,400 \times 7.5 = 33,000$ gallons

ENGINEERING DATA

UNITS OF LENGTH

UNIT	INCH	FOOT	YARD	METER
INCH	1.0	.0833	.0278	.0254
FOOT	12.0	1.0	.333	.305
YARD	36.0	3.0	1.0	.9144
METER	39.37	3.281	1.094	1.0

UNITS OF AREA

UNIT	SQUARE INCH	SQUARE FOOT	SQUARE YARD	SQUARE METER
SQUARE INCH	1.0	.00694	.000772	.000645
SQUARE FOOT	144.0	1.0	.1111	.0929
SQUARE YARD	1,296.0	9.0	1.0	.836
SQUARE METER	1,550.0	10.76	1.196	1.0

UNITS OF VOLUME

UNIT	U.S. GALLON	IMPERIAL GALLON	CUBIC FEET	POUNDS OF WATER	CUBIC METERS
U.S. GALLON	1.0	.833	.1337	8.33	.003785
IMPERIAL GALLON	1.2	1.0	.1605	10.0	.004546
CUBIC FEET	7.481	6.232	1.0	62.37	.0283
POUNDS OF WATER	.12	.09996	.0160	1.0	.00045
CUBIC METERS	264.2	220.0	35.31	2,204.0	1.0

UNITS OF FLOW

UNIT	U.S. G.P.M.	IMPERIAL G.P.M.	CUBIC FEET/SECOND	CUBIC FEET/HOUR	LITERS/SECOND
U.S. G.P.M.	1.0	.833	.00223	8.02	.0631
IMPERIAL G.P.M.	1.2	1.0	.00268	9.63	.0757
CUBIC FT. PER SECOND	448.8	374.0	1.0	3.600	28.32
CUBIC FT. PER HOUR	.1247	.104	.00028	1.0	.0078
LITERS PER SECOND	15.85	13.21	.0353	127.13	1.0

ENGINEERING DATA

PRESSURE AND EQUIVALENT FEET HEAD OF WATER

Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head
1	2.31	20	46.18	120	276.42	225	519.23
2	4.62	25	57.72	125	288.46	250	576.92
3	6.93	30	69.27	130	300.00	275	634.62
4	9.24	40	92.36	140	323.08	300	692.31
5	11.54	50	115.38	150	346.15	325	750.00
6	13.85	60					

ENGINEERING DATA

EQUIVALENT VALUES OF PRESSURE

Inches of		

WEIGHT

- 1 U.S. GALLON OF WATER = 8.33 LBS.
- 1 CUBIC FOOT OF WATER = 62.35 LBS.
- 1 KILOGRAM (LITRE) = 2.2 LBS.
- 1 IMPERIAL GALLON = 10.0 LBS.

CURRENT CAPACITY (AMPS) OF WIRE *

Three wires in cable, ambient temp. 86°F

WIRE SIZE	AMPERES	
	COPPER	ALUMINIUM
14	20	—
12	25	20
10	30	25
8	40	30
6	55	40
4	70	55
3	85	65
2	95	75
1	110	85
0	125	100

* Wire size is minimum for amperes listed.

EFFICIENCY

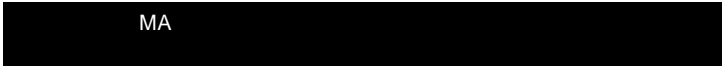
EFFICIENCY	$\frac{\text{POWER OUTPUT}}{\text{POWER INPUT}}$
MOTOR EFFICIENCY	$\frac{\text{HP OUTPUT}}{\text{K.W. INPUT}}$
PUMP EFFICIENCY	$\frac{\text{G.P.M.} \times \text{TOTAL HEAD (F.T.)}}{3960 \times \text{BHP}}$
OVERALL PLANT EFFICIENCY (OPE)	$\frac{\text{G.P.M.} \times \text{TOTAL HEAD (F.T.)}}{5310 \times \text{K.W. INPUT}}$

Amperage =	$\frac{\text{Watts}}{\text{Volts}}$
Watts =	Volts x Amperage
WHP =	Water Horsepower (output HP of pump) = $\frac{\text{g.p.m.} \times \text{total head}}{3960}$
HP input (to motor) =	KW input x 1.341
Total Head =	Discharge head + Pumping water level (ft)
Discharge Head =	Discharge Pressure (PSI) x 2.31 ft. of head

ENGINEERING DATA

Pool heaters can be sized by the volume method for maintenance heating or for spot heating. For many days during the swimming season, the sun maintains a desirable pool temperature of 78–80°F. and the pool requires no supplemental heating. However, during cooler periods a pool will usually lose 2–4°F. per day.

leaving the heater on every day. If you don't use the pool daily, it's more economical to spot heat the pool, say for the weekend. In this case, you could choose a larger heater which will heat the pool faster, and then can be turned off between uses. With either, maintenance heating or spot heating, you need to determine the size of heater to select and the time it will require to heat the pool.



* For Commercial Heaters 500,000 BTU/hr and over please contact factory for sizing.

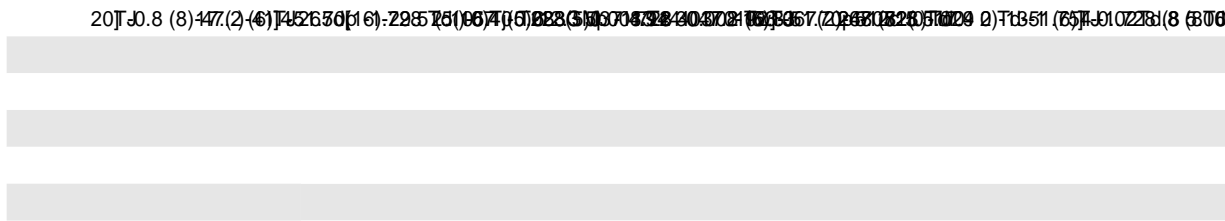
$$\text{TIME IN HOURS} = \frac{\text{Vol. in Gal.} \times 8.34 \text{ lb./gal.} \times \text{temprise}}{P^{\text{ac}} \text{ VWP} \text{ } \sim \text{ } \& \text{ } \sim \text{ } \text{ac}}$$

$$\text{TIME IN MINUTES} = \frac{\text{Vol. in Gal.} \times 8.34 \text{ lb./gal.} \times \text{temprise} \times 60}{P^{\text{ac}} \text{ VWP} \text{ } \sim \text{ } \& \text{ } \sim \text{ } \text{ac}}$$

ENGINEERING DATA

**ETi 400 ASME HIGH EFFICIENCY HEATER MODEL
REQUIRED TIME TO TEMPERATURE RISE**

° F Temperature Rise	Pool Volume (Gallons)									
	10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000	100,000
	Hours to Reach Temperature									
5	1.08	2.17	3.26	4.34	5.43	6.52	7.60	8.69	9.77	10.86
10	2.17	4.34	6.52	8.69	10.86	13.03	15.20	17.38	19.55	21.72
15	3.25	6.52	9.77	13.03	16.29	19.55	22.80	26.06	29.32	35.58



ENGINEERING DATA

When installing any Pentair or Sta-Rite pool or spa heater, it is very important to have the proper amount of gas supplied to all Pentair or Sta-Rite Heaters for pools. Below, for your information, is a table which will assist you in selecting the correct size of piping for the installation.

When installing any gas appliance, it is very important to have the proper size gas meter and home pressure regulator installed. Once you have selected the correct size heater for the pool or spa, contact the local utility which supplies the gas

4

Natural gas at 1000 BTU per Cubic Foot

Propane Gas at 2500 BTU per Cubic Foot

MODEL	1/2 in.		3/4 in.		1 in.		1-1/4 in.		1-1/2 in.		2 in.		2-1/2 in.	
	NAT	PRO	NAT	PRO	NAT	PRO	NAT	PRO	NAT	PRO	NAT	PRO	NAT	PRO
100 & 75	20 ft.	50 ft.	50 ft.	150 ft.	150 ft.	600 ft.	-	-	-	-	-	-	-	-
150	10 ft.	40 ft.	50 ft.	150 ft.	150 ft.	600 ft.	-	-	-	-	-	-	-	-
200	-	20 ft.	30 ft.	80 ft.	125 ft.	250 ft.	450 ft.	600 ft.	-	-	-	-	-	-
250	-	10 ft.	20 ft.	50 ft.	70 ft.	150 ft.	250 ft.	500 ft.	600 ft.	-	-	-	-	-
300	-	-	10 ft.	30 ft.	50 ft.	100 ft.	200 ft.	350 ft.	400 ft.	600 ft.	-	-	-	-
350	-	-	10 ft.	20 ft.	30 ft.	70 ft.	125 ft.	250 ft.	250 ft.	500 ft.	500 ft.	115 ft.	115 ft.	-
400	-	-	-	10 ft.	20 ft.	60 ft.	100 ft.	150 ft.	200 ft.	250 ft.	250 ft.	500 ft.	500 ft.	-

ENGINEERING DATA

“RESIDENTIAL” PROPANE GAS 2 STAGE REGULATION

In many Propane gas line installations, the gas supplier and or installer will utilize a two stage regulation process usually 10 psi. This higher pressure allows for much longer distance and in a much smaller pipe size. Then, within a short distance from the pool heater, generally around 24 inches, a second regulator, which is the second stage, would be installed and set at the required inlet pressure of the heater.

SEE “GAS PRESSURE REQUIREMENT CHART.”

Stage One “High Pressure” Gas Pipe Sizing				Stage Two “Low Pressure” Gas Pipe Sizing		
10 PSI @ 2500 BTU Per CU. FT.				Stage 2 set at 14 in. W.C.		
MAXIMUM EQUIVALENT PIPE LENGTH				MAXIMUM EQUIVALENT PIPE LENGTH		
Model	0 to 50 Feet	50 to 100 Feet	100 to 150 Feet	Model	0 to 10 Feet	10 to 20 Feet
75 through 400	1/2 in.	1/2 in.	1/2 in.	75 through 400	3/4 in.	3/4 in.

“RESIDENTIAL” NATURAL GAS 2 STAGE REGULATION

ENGINEERING DATA

BLOWER SIZING FORMULA

Measure total depth of water in spa (not total spa depth)

Add - 1 in. water for each 10 ft. of 2 in. air pipe

Add 1/2 in. water for each 90 deg. 2 in. elbow

Compare your total with maximum inches of water column and select that size or the next size higher blower than your total, in your selected voltage.

