VOLUSIA COUNTY
BUILDING & ZONING

12 APRIL 2012

ANSI/APSP–7 2006 Specifies three methods for determining the maximum system flow rate. The following simplified TDH calculation is one of the methods specified.

Simplified Total Dynamic Head (TDH) Calculation Worksheet

Determine Maximum System Flow Rate

Minimum Flow Rate Required: 35 gpm Per Skimmer (Required: 1 skimmer per 800 sf of surf. area)

1. Calculate Pool Volume: _____ (Surf. Area) X _____ (Avg. Depth) X 7.48 (gal./cubic foot) = _____ (Vol. in gal.)
2. Determine preferred TurnoverTime in hours: _____ (Hours) x 60 (min. / Hr.) = _____ (Turnover in Min.)
3. Determine Max Flow Rate _____ (Vol. in gal.) / ff _____ (Turnover mins.) = _____ (Pool flow rate) + ff _____ Feature flow rate) = _____ (System flow rate)
4. Spa Jets: _____ (No. of Jets) x _____ (Jet Flow) gpm per jet = _____ (Total Jet Flow Rate) flow rate.

(For single pump pool/spa combo, use the higher of No. 3 or No. 4 in the following calculations for the pool & spa.)

Determine Pipe Sizes:

Branch Piping to be [ ] inch to keep velocity @ 6 fps max. at _____ gpm Maximum System Flow Rate.

Suction Piping to be [ ] inch to keep velocity @ 8 fps max. at _____ gpm Maximum System Flow Rate.

Return Piping to be [ ] inch to keep velocity @ 10 fps max. at _____ gpm Maximum System Flow Rate.

Determine Simplified TDH:

1. Distance from pool, to pump in feet: gg _____
2. Friction loss (in suction pipe) in _____ inch pipe per 1 ft. @ _____ gpm = _____ (from pipe flow/friction loss chart)
3. Friction loss (in return pipe) in _____ inch pipe per 1 ft. @ _____ gpm = _____ (from pipe flow/friction loss chart)
4. _____ (Length of Suct. Pipe) x _____ (Ft of head/1 ft of Pipe) = _____ (TDH Suct. Pipe)
5. _____ (Length of Return Pipe) x _____ (Ft of head/1 ft of Pipe) = _____ (TDH Return Pipe)

Flow and Friction Loss Per Foot
Schedule 40 PVC Pipe

Pipe Size	Velocity – Feet Per Second					
	6 fps		8 fps		10 fps	
1.5"	37 gpm	0.08'	50 gpm	0.14'	62 gpm	0.21'
2"	62 gpm	0.06'	82 gpm	0.10'	103 gpm	0.16'
2.5"	88 gpm	0.05'	117 gpm	0.09'	146 gpm	0.13'
3"	136 gpm	0.04	181 gpm	0.07'	227 gpm	0.10'

TDH in Piping: _____

Filter loss in TDH (from filter data sheet): _____

Heater loss in TDH (from heater data sheet): _____

Total all other loss: _____

Total Dynamic Head (TDH): [ ]

Selected Pump and Main Drain Cover:

Pump selection [ ] using pump curve for TDH & System Flow Rate
(Pump model and size in Horsepower)

Main Drain Cover [ ] (System Flow Rate must not exceed approved cover flow rates)
(Pump model and size in Horsepower)

Notes: Minimum system flow based on min. flow per skimmer of 35 gpm.

Determine the Number and Type of Required In–Floor Suction Outlets:

Check all that apply.

[ ] ◎ 3'–0" ◎ 2 [ ] suction outlets @ [ ] gpm max. flow (see note 2).

[ ] ◎ ◎ ◎ 3 [ ] suction outlets @ [ ] gpm max. flow (see note 3)

[ ] ▭ [ ] channel drain @ [ ] gpm w/ [ ] ports (see note 4).

TDH Calculation Options

For each pump

Check one.

☐ Simplified Total Dynamic Head (STDH)
Complete STDH Worksheet – Fill in all blanks.

☐ Total Dynamic Head (TDH)
Complete Program or other calcs. Fill in required blanks on worksheet & attach calculations.

☐ Maximum Flow Capacity
of the new or replacement pump.

Notes

1. If a variable speed pump is used, use the max. pump flow in calculations.
2. For side wall drains, use appropriate side wall drain flow as published by manufacturer.
3. Insert manufacturer's name and approved maximum flow.
4. See installation instructions for number of ports to be used.
5. In-Floor suction outlet cover/grate must conform to most recent edition of ASME/ANSI A112.19.8 and be embossed with that edition approval.
6. Pump, Filter & Heater make and model cannot change, and equipment location cannot be moved closer to pool without submitting a revised plan and TDH calculation worksheet for approval.

Flow and Friction Loss Per Foot

Schedule 40 PVC Pipe

Pipe Size	Velocity – Feet Per Second					
	6 fps		8 fps		10 fps	
1.5"	37 gpm	0.08'	50 gpm	0.14'	62 gpm	0.21'
2"	62 gpm	0.06'	82 gpm	0.10'	103 gpm	0.16'
2.5"	88 gpm	0.05'	117 gpm	0.09'	146 gpm	0.13'
3"	136 gpm	0.04	181 gpm	0.07'	227 gpm	0.10'
4"	234 gpm	0.03'	313 gpm	0.05'	392 gpm	0.07'
6"	534 gpm	0.02'	712 gpm	0.03'		

ANSI/APSP/ICC 15 Worksheet

Swimming Pool Energy Efficiency Compliance Information

NOTE: These Requirements Apply ONLY to the Filtration Pump

Maximum Filtration flow rate calculations

Pool water volume _____ ÷ 360 = _____ gpm = filtration flow rate

Is there an Auxiliary load on the filtration pump? Yes ____ No ____

If so, what is the auxiliary flow rate _____ gpm

Maximum Flow Rate _____ gpm (maximum auxiliary pool loads or the filtration flow rate, whichever is greater).

The pool filtration flow rate shall not be greater than the rate needed to turn over the pool water volume in 6 hours or 36 gpm, whichever is greater. This means that for pools of less than 13000 gallons, the pump shall be sized to a have a flow rate of 36gpm or less.

Suction pipe size @ 6 fps _____in.

Return pipe size @ 8 fps _____in.

Filter Factors: (Cartridge .375) or (D.E. 2) or (Sand 15)

_____ ÷ _____ = _____

Flow rate filter factor minimum filter size

Filter Make/Size _____

Backwash valve? Yes_____ No _____ (If yes, must be 2 inch minimum)

Pump Selection from APSP database on Curve **A (less than 17000 gallons)** or **C (greater than 17000 gallons)** (circle one)

Model _____

Flow Rate (low speed) _____ gpm @ _____ rpm.

Flow Rate (high speed) _____ gpm @ _____ rpm. (not required if no auxiliary load on filtration pump)

Pump Controls

standard time clock / 2 speed time clock_____or other_____

Heater Model _____

Notes: suction piping in front of pump inlet must be 4 pipe diameters in length. Must have 18" of straight pipe after the filter for solar.

_____
Date

_____
Contractors Signature

_____
Contractors Printed Name

_____
Contractors Cert. No.

_____
Contractors Telephone No.

Swimming Pool Specification For:

_____

_____

_____

_____

Scale: None

Total Head In Feet Conversion Chart

Inches Mercury (Vacuum Gauge)

PSI (Pressure Gauge)	0	2	4	6	8	10	12	14	16	18
0	0.0	2.3	4.5	6.8	9.0	11.3	13.6	15.8	18.1	20.3
1	2.3	4.6	6.8	9.1	11.4	13.6	15.9	18.1	20.4	22.7
2	4.6	6.9	9.1	11.4	13.7	15.9	18.2	20.4	22.7	25.0
3	6.9	9.2	11.5	13.7	16.0	18.2	20.5	22.8	25.0	27.3
4	9.2	11.5	13.8	16.0	18.3	20.5	22.8	25.1	27.3	29.6
5	11.5	13.8	16.1	18.3	20.6	22.8	25.1	27.4	29.6	31.9
6	13.9	16.1	18.4	20.6	22.9	25.2	27.4	29.7	31.9	34.2
7	16.2	18.4	20.7	23.0	25.2	27.5	29.7	32.0	34.3	36.5
8	18.5	20.7	23.0	25.3	27.5	29.8	32.0	34.3	36.6	38.8
9	20.8	23.1	25.3	27.6	29.8	32.1	34.3	36.6	38.9	41.1
10	23.1	25.4	27.6	29.9	32.1	34.4	36.7	38.9	41.2	43.4
11	25.4	27.7	29.9	32.2	34.5	36.7	39.0	41.2	43.5	45.8
12	27.7	30.0	32.2	34.5	36.8	39.0	41.3	43.5	45.8	48.1
13	30.0	32.3	34.6	36.8	39.1	41.3	43.6	45.9	48.1	50.4
14	32.3	34.6	36.9	39.1	41.4	43.6	45.9	48.2	50.4	52.7
15	34.6	36.9	39.2	41.4	43.7	45.9	48.2	50.5	52.7	55.0
16	37.0	39.2	41.5	43.7	46.0	48.3	50.5	52.8	55.0	57.3
17	39.3	41.5	43.8	46.1	48.3	50.6	52.8	55.1	57.4	59.6
18	41.6	43.8	46.1	48.4	50.6	52.9	55.1	57.4	59.7	61.9
19	43.9	46.2	48.4	50.7	52.9	55.2	57.4	59.7	62.0	64.2
20	46.2	48.5	50.7	53.0	55.2	57.5	59.8	62.0	64.3	66.5
21	48.5	50.8	53.0	55.3	57.6	59.8	62.1	64.3	66.6	68.9
22	50.8	53.1	55.3	57.6	59.9	62.1	64.4	66.6	68.9	71.2
23	53.1	55.4	57.7	59.9	62.2	64.4	66.7	69.0	71.2	73.5
24	55.4	57.7	60.0	62.2	64.5	66.7	69.0	71.3	73.5	75.8
25	57.8	60.0	62.3	64.5	66.8	69.1	71.3	73.6	75.8	78.1
26	60.1	62.3	64.6	66.8	69.1	71.4	73.6	75.9	78.1	80.4
27	62.4	64.6	66.9	69.2	71.4	73.7	75.9	78.2	80.5	82.7
28	64.7	66.9	69.2	71.5	73.7	76.0	78.2	80.5	82.8	85.0
29	67.0	69.3	71.5	73.8	76.0	78.3	80.5	82.8	85.1	87.3
30	69.3	71.6	73.8	76.1	78.3	80.6	82.9	85.1	87.4	89.6
31	71.6	73.9	76.1	78.4	80.7	82.9	85.2	87.4	89.7	92.0
32	73.9	76.2	78.4	80.7	83.0	85.2	87.5	89.7	92.0	94.3
33	76.2	78.5	80.7	83.0	85.3	87.5	89.8	92.0	94.3	96.6
34	78.5	80.8	83.1	85.3	87.6	89.8	92.1	94.4	96.6	98.9
35	80.9	83.1	85.4	87.6	89.9	92.2	94.4	96.7	98.9	101.2

NOTE: FIELD TDH MUST BE EQUAL TO OR HIGHER THAN THE CALCULATED TDH.