

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:  $\frac{\text{Surf. Area}}{\text{Vol. in gal.}} \times \frac{\text{Avg. Depth}}{\text{Vol. in gal.}} \times 7.48 \text{ (gal./cubic foot)} = \frac{\text{Vol. in gal.}}{\text{Vol. in gal.}}$
2. Determine preferred Turnover Time in hours:  $\frac{\text{Hours}}{\text{Turnover in Min.}} \times 60 \text{ (min. / Hr.)} = \frac{\text{Turnover in Min.}}{\text{Turnover in Min.}}$
3. Determine Max Flow Rate  $\frac{\text{Vol. in gal.}}{\text{Vol. in gal.}} / \frac{\text{ff}}{\text{(Turnover mins.)}} = \frac{\text{Pool flow rate}}{\text{Pool flow rate}} + \frac{\text{ff}}{\text{Feature flow rate}} = \frac{\text{System flow rate}}{\text{System flow rate}}$
4. Spa Jets:  $\frac{\text{No. of Jets}}{\text{No. of Jets}} \times \frac{\text{Jet Flow}}{\text{Jet Flow}} \text{ gpm per jet} = \frac{\text{Total Jet Flow Rate}}{\text{Total Jet Flow Rate}} \text{ flow rate.}$

(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.  $\frac{\text{Length of Suct. Pipe}}{\text{Length of Suct. Pipe}} \times \frac{\text{Ft of head/1 ft of Pipe}}{\text{Ft of head/1 ft of Pipe}} = \frac{\text{TDH Suct. Pipe}}{\text{TDH Suct. Pipe}}$
5.  $\frac{\text{Length of Return Pipe}}{\text{Length of Return Pipe}} \times \frac{\text{Ft of head/1 ft of Pipe}}{\text{Ft of head/1 ft of Pipe}} = \frac{\text{TDH Return Pipe}}{\text{TDH Return Pipe}}$

**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'	148 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: \_\_\_\_\_

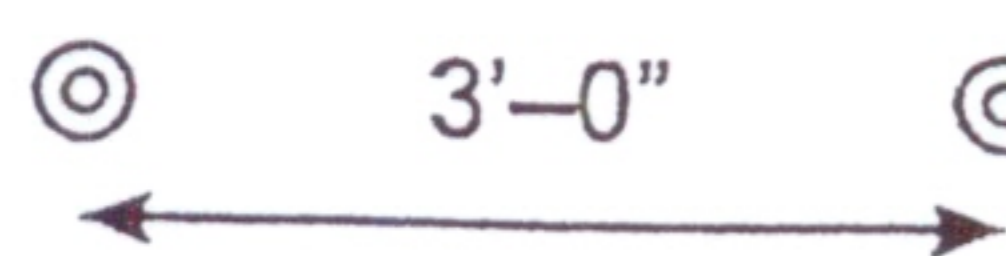

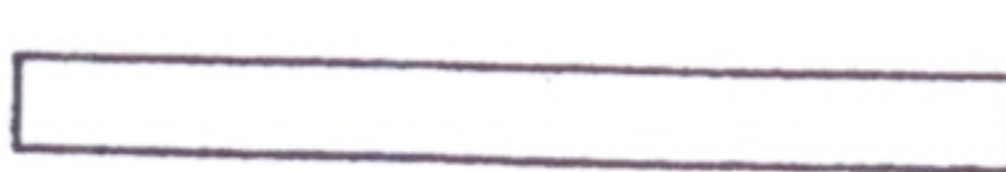
Total Dynamic Head (TDH):

**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.
-  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).

