

ANSI/ASP-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

1. Calculate Pool Volume: $\frac{\text{Surf. Area}}{\text{Avg. Depth}} \times 7.48 \text{ (gal./cubic foot)} = \text{Vol. in gal.}$

2. Determine preferred Turnover Time in hours: $\frac{\text{Vol. in gal.}}{\text{Turnover in Min.}} \times 60 \text{ (min. / hr.)} = \text{Hours}$

3. Determine Max Flow Rate: $\frac{\text{Vol. in gal.}}{\text{Turnover Mins.}} = \text{Pool Flow Rate} + \text{Feature Flow Rate} = \text{System Flow Rate}$

4. Spa Jets: $\frac{\text{No. of Jets}}{\text{Jet Flow}} \times \text{gpm per jet} = \text{Total Jet Flow Rate}$ 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.

Trunk 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: _____

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. $\frac{\text{Length of Suct. Pipe}}{\text{Ft of head/1 ft of Pipe}} \times \text{Friction Loss} = \text{TDH Suct. Pipe}$

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

TDH in Piping: _____

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

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

Total all other loss: _____

Total Simplified TDH: _____

Selected Pump and Main Drain Cover:

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

Main Drain Cover _____ (System Flow Rate must not exceed approved cover flow rate)
(Make and Model)

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

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. 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.
4. Pump & Filter make, model and location can not change without submitting a revised plans and TDH worksheet.

Flow and Friction Loss Per Foot Schedule 40 PVC Pipe

Pipe Size	Velocity - Feet Per Second					
	6 fps		8 fps		10 fps	
1"	16 gpm	0.14'	21 gpm	0.23'	26 gpm	0.35'
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"	138 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'		

Total Head In Feet Conversion Chart

		Inches Mercury (Vacuum 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	34.5	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.

Determine the Number and Type of Required In-Floor Suction Outlets

type of cover Dual Main Drains suction outlets @ _____ gpm max. flow
 Multi Main Drains suction outlets @ _____ gpm max. flow
 Channel Drain channel drain @ _____ gpm w/ _____ ports



Job Address: _____

Company Name: _____

License Number: _____

Signature of License Holder _____