

Simplified Total Dynamic Head (TDH) Calculation Worksheet - POOL ONLY

Design Parameters for Single Skimmer Pool: 35 GPM minimum (Required), 62 gpm maximum (pool)

Pool (TDH) Calculation

Determine Maximum System Flow Rate

- Calculate Pool Volume $\frac{616 \times 4.5 \times 7.481}{(Surface Area) (Avg. Depth)}$ (Gal./Cubic Foot) = $\frac{20,737}{(Vol. in Gallons)}$
- Determine Preferred Turnover Time in Hours: $\frac{5.56 \times 60}{(Hours)}$ = $\frac{334}{(Turnover in Mins.)}$
- Determine Max. Flow Rate $\frac{20,737}{334}$ + $\frac{N/A}{(Feature Flow)}$ = $\frac{62}{(Total Flow Rate)}$

MSFR does not exceed 62 gpm for 2" dia. plumbing for single skimmer pool.
- Spa Jets $\frac{N/A \times 16}{(No. of Jets) (Jet Flow)}$ GPM Per Jet = $\frac{N/A}{(Total Jet Flow)}$

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

Determine Pool Maximum System Flow Rate for Single Skimmer Pool

Branch Piping to be 2" Inch to keep velocity at 6 FPS max at 62 GPM Max. System Flow Rate

Trunk Piping to be 2" Inch to keep velocity at 8 FPS max at 62 GPM Max. System Flow Rate

Return Piping to be 1.5" Inch to keep velocity at 8 FPS max at 62 GPM Max. System Flow Rate

Determine Pool Simplified TDH

- Distance From Pool to Pump in feet 100 - (maximum distance from pool)
- Friction Loss (In Suction Pipe) In 2" Inch Pipe per 1 Foot at 62 GPM = 0.10' (From Pipe Flow/Friction Loss Chart)
- Friction Loss (In Return Pipe) In 1.5" Inch Pipe per 1 Foot at 62 GPM = 0.21' (From Pipe Flow/Friction Loss Chart)
- $\frac{100 \times 0.10}{(Length of Suction Pipe) (Friction Loss)}$ = 10.0
- $\frac{100 \times 0.21}{(Length of Return Pipe) (Friction Loss)}$ = 21.0

TDH in Piping	31.00
Filter Loss in TDH (From Filter Data Sheet)	8.32
Heater Loss in TDH (From Manufacture Head Loss Data Sheet)	7.00
Other Head Losses in System (Estimated - fittings, valves, elbows, and tees)	3.94
POOL TOTAL DYNAMIC HEAD	50.26

Design Parameters for Single Skimmer Pool: 35 GPM minimum, 62 gpm maximum (pool), 80 gpm maximum (spa)

Equipment Specifications Based on Determine Simplified TDH Calculations:

- Pump Selection PENTAIR WHISPERFLO VST Using Pump Curve for TDH & System Flow Rate 62 GPM @ 62 TDH
- Filter Selection PENTAIR CLEAN & CLEAR CC200 - 200SF - 150 GPM (MAXIMUM FILTER CAPACITY) Using Manufacturers Filter Chart Based on Maximum System Flow Rate
- Main Drain Cover CMP 25514-0XX (8" ROUND) System Flow Rate must not exceed approved cover flow rates
- Skimmer PENTAIR - BERMUDA - 506300 Using Skimmer for Gunite Pool Design - 2' Dia. Maximum System Flow Rate
- Return Fittings PENTAIR - MODEL 54007- Using Wall Fittings with 1 1/2" Threaded Directional Eyeball - 3/8" Opening

Determine The Number & Type of Required In-Floor Suctions

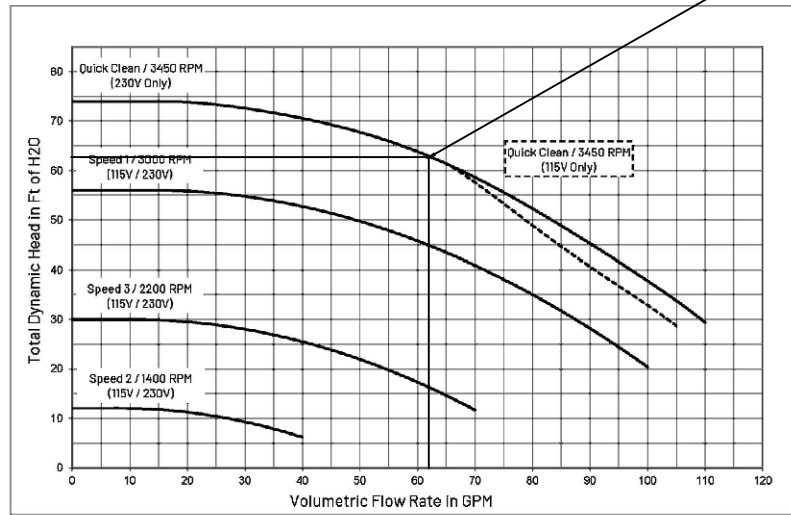
(Check all that apply)

- 3" CMP 25514-0XX Suction Outlets At 95 EACH = 190 GPM Max. Flow (See Note 2) 8" ROUND
- Suction Outlets At _____ GPM Max. Flow (See Note 3)
- Suction Outlets At _____ GPM Max. Flow (See Note 4)

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

COMPLIES WITH 2023 FLORIDA BUILDING CODE, 8TH EDITION

PENTAIR WHISPERFLO VST (011533) VARIABLE SPEED PUMP CURVE



FILTER HEAD LOSS EQUIVALENCE CHART

Filter Type	Approximate Head Loss vs Filter Type				
	Multiplier	Head Loss @ 10 GPM	Head Loss @ 20 GPM	Head Loss @ 30 GPM	Head Loss @ 40 GPM
Pentair Clean & Clear RP	None	0.2	0.9	2.1	3.7
Sta-Rite System 3 Cart	None	0.5	2.0	4.4	7.9
Pentair Clean & Clear	None	0.5	2.1	4.7	8.3
Hayward SwimClear	None	0.6	2.6	5.8	10.4
Pentair Quad DE	None	0.6	2.6	5.8	10.4
Sta-Rite System 3 DE	None	0.7	2.9	6.5	11.6
Hayward StarClear C750	None	0.8	3.1	6.9	12.3
Hayward StarClear C500	None	0.9	3.5	7.8	13.9
Hayward StarClear C250	None	1.2	4.6	10.4	18.5
Pentair FNS DE	None	1.2	4.6	10.4	18.5
Sta-Rite System 2 Cart	None	1.4	5.8	13.0	23.1
Pentair Quad DE	2	1.5	6.1	13.6	24.3
Pentair TR140 Sand	2	1.6	6.2	14.0	24.9
Sta-Rite System 3 DE	2	1.6	6.4	14.3	25.4
Pentair TR100 Sand	2	1.6	6.6	14.7	26.2
Pentair FNS DE	2	2.0	8.1	18.2	32.3
Hayward ProGrid DE	None	2.0	8.1	18.2	32.3
Pentair TR60 Sand	2	2.1	8.4	19.0	33.7
Pentair TR50 Sand	2	2.4	9.6	21.6	38.3
Pentair Quad DE	1.5	2.5	9.8	22.1	39.3
Pentair TR140 Sand	1.5	2.5	10.0	22.4	39.9
Sta-Rite System 3 DE	1.5	2.5	10.1	22.7	40.4
Pentair TR100 Sand	1.5	2.6	10.3	23.2	41.2
Hayward ProGrid DE	2	2.9	11.6	26.0	46.2
Pentair FNS DE	1.5	3.0	11.8	26.6	47.4
Pentair TR60 Sand	1.5	3.0	12.2	27.4	48.7
Pentair TR40 Sand	2	3.3	13.2	29.7	52.7
Pentair TR90 Sand	1.5	3.3	13.3	30.0	53.4
Hayward ProGrid DE	1.5	3.8	15.3	34.4	61.2
Pentair TR40 Sand	1.5	4.2	16.9	38.1	67.8

RECOMMENDED FILTER SIZING CHART

Pump Flow (gpm)	Min Pool Volume (gal)	Minimum Filter Size*			Filter Requirements		
		Cartridge (sq-ft)	Sand (sq-ft)	DE (sq-ft)	Cartridge (gpm)	Sand (gpm)	DE (gpm)
36	None	100	2.64	24	100	53	60
40	14,400	125	3.14	24	125	63	60
45	16,200	125	3.14	24	125	63	60
50	18,000	150	3.69	36	150	74	90
55	19,800	150	3.69	36	150	74	90
60	21,600	175	4.28	36	150	86	90
65	23,400	175	4.91	36	150	98	90
70	25,200	200	4.91	36	150	98	90
75	27,000	225	5.59	48	150	112	120
80	28,800	225	5.59	48	150	112	120
85	30,600	250	6.31	48	150	126	120
90	32,400	250	6.31	48	150	126	120
95	34,200	275	7.07	48	150	141	120
100	36,000	275	7.07	60	150	141	150

* Rounded up to nearest available size

TDH Calculation Options

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 calcs.

Maximum Flow Capacity Of the new or replacement pump

EQUIPMENT SUBSTITUTIONS MAY BE MADE ONLY IF APPROVED BY THE ENGINEER OF RECORD. SHOP DRAWINGS OR CUT SHEETS OF SUBSTITUTED EQUIPMENT NEED TO SHOW DESIGN FLOW EQUIVALENCY.

- Notes**
- If a variable speed pump is used, use the max. pump flow in calculations
 - For side wall drains, use appropriate side wall drain flow as published by manufacturer.
 - Insert manufacturer's name and approved maximum flow.
 - See installation instructions for number of parts to be used.
 - 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.
 - Pump, Filter & Heater make and model cannot change, and equipment location cannot be moved closer to the pool without submitting a revised plan and TDH calculation worksheet for approval.

FLOW & FRICTION LOSS PER FOOT SCH. 40 PVC PIPE

PIPE SIZE	6 FPS - BRANCH		8 FPS - TRUNK		10 FPS - RETURN	
	GPM	Friction Loss	GPM	Friction Loss	GPM	Friction Loss
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'		

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CERTIFICATE OF AUTHORIZATION 27934

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For: MY FAVORITE POOL BUILDER, INC.

NYLON RESIDENCE
296 SE NATURE DR
LAKE CITY, FLORIDA 32055
TDH CALCULATION WORKSHEET
FOR RESIDENTIAL SWIMMING POOL

SAMUEL A. LIBERATORE, P.E.
#55740

DATE: 11-11-2025