

Florida Engineering LLC

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License Number #30782, #60102

Project No. : 2129275-P
Project Name : Oliveria Residence
Project Address : 4020 62nd Ave NE Naples, FL

SIMPLIFIED TOTAL DYNAMIC HEAD (TDH) CALCULATIONS WORKSHEETDETERMINE MAXIMUM SYSTEM FLOW RATE :

1. Calculate Pool Volume : Surface area $A := 14 \text{ ft} \cdot 30 \text{ ft} = 420 \text{ ft}^2$

Average depth $d := 5.25 \text{ ft}$

$V := A \cdot d = 16494.545 \text{ gal}$

2. Determine preferred turnover time in hours : $t := 8 \text{ hr} = 480 \text{ min}$

3. Determine Max. Flow Rate : $Q_1 := \frac{V}{t} = 34.364 \text{ gpm}$

4. Spa jets : N/A $Q_2 := 0 \text{ gpm}$

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

Calculated flow rate $Q := \text{Round}(\max(Q_1, Q_2), 1 \text{ gpm}) + 1 \text{ gpm} = 35 \text{ gpm}$

Allowable flow rate $Q_{min} := 36 \text{ gpm}$

Actual flow rate $Q := \max(Q, Q_{min}) = 36 \text{ gpm}$

Actual turnover time $t := \frac{V}{Q} = 7.636 \text{ hr}$

RECOMMENDED MINIMUM PIPE SIZE (2020 FBC, 7TH EDITION) :

Branch Piping to be : 3" to keep velocity @ 6fps max at $Q = 36$ *gpm*

Trunk Piping to be : 2.5" to keep velocity @ 8fps max at $Q = 36$ *gpm*

Return Piping to be : 2" to keep velocity @ 10fps max at $Q = 36$ *gpm*

FLOW AND FRICTION LOSSES PER FOOT - SCH. 40 PVC PIPE						
Pipe size (in)	Velocity					
	6 ft/s		8 ft/s		10 ft/s	
	gpm	ft	gpm	ft	gpm	ft
1	16	0.14	21	0.23	26	0.35
1 1/2	37	0.08	50	0.14	62	0.21
2	62	0.06	82	0.1	103	0.16
2 1/2	88	0.05	117	0.09	146	0.13
3	138	0.04	181	0.07	227	0.1
4	234	0.03	313	0.05	392	0.07
5	534	0.02	712	0.03	890	0.05

SIMPLIFIED TDH :

1. Friction loss (in suction pipe) in 2.5" pipe per ft at $Q = 36 \text{ gpm}$ $f_{suction} := 0.09$
2. Friction loss (in return pipe) in 2" pipe per ft at $Q = 36 \text{ gpm}$ $f_{return} := 0.16$
3. Length of suction pipe $L_{suction} := 50 \text{ ft}$
TDH in suction pipe $TDH_{suction} := L_{suction} \cdot f_{suction} = 4.5 \text{ ft}$
4. Length of return pipe $L_{return} := 80 \text{ ft}$
TDH in return pipe $TDH_{return} := L_{return} \cdot f_{return} = 12.8 \text{ ft}$
5. TDH in Piping $TDH_{piping} := TDH_{suction} + TDH_{return} = 17.3 \text{ ft}$
6. Filter loss in TDH $TDH_{filter} := 16.6 \text{ ft}$
7. Heater loss in TDH $TDH_{heater} := 10.0 \text{ ft}$
8. All other losses $TDH_{other} := 16.0 \text{ ft}$...head losses in fittings, etc
9. Total simplified TDH $TDH := TDH_{piping} + TDH_{filter} + TDH_{heater} + TDH_{other} = 59.9 \text{ ft}$

Pump Selection using pump curve for simplified TDH and System Flow Rate :

Manufacturer : Pentair Model : Superflo VS Size / HP = 1.5

Main Drain Cover :

Manufacturer : Paramount Model : SDX2

Max. cover flow rate = 188 gpm Cover Replacement Date = 7 years

MAIN DRAIN PLUMBING METHOD OPTIONS :

- Pool
- A. Dual outlets in parallel one pump
 - B. Dual outlets in parallel to dual pumps in parallel
 - C. Parallel dual outlets to two pumps
 - D. Dual outlets on different planes
 - E. Three or more outlets in parallel symmetric piping
 - F. Three or more outlets in parallel electrically tapped piping
 - G. Three or more outlets in parallel looped piping
 - H. Single unblockable channel outlets to single pump
(channel drain @ 316 gpm max. flow rate)
 - I. Single unblockable channel outlets to two pumps
(channel drain @ 217 w/2 ports & 278 gpm w/3 ports
(see note 4))

Notes :

1. In flow suction outlets cover/grate must conform to most recent edition of ASME/ANSI A112.19.8 and be embossed with that edition approval.
2. Pump and Filter make, model and location cannot change without submitting a revised plan TDH worksheet.
3. See manufacturer's specifications for pump curve of specified pump.
4. Contractor to choose main drain plumbing method from the options (A to I) listed above.