

Project No. : 2604780
Project Name : BARNARD
Project Address : 201 HERMITAGE GLN, HIGH SPRINGS, FLORIDA, 32643

POOL/ SPA HYDRAULICS WORKSHEET

DESIGN CIRCULATION FLOW PARAMETERS:

1. Pool circulation volume :

$$V := 693 \text{ ft}^2 \cdot 4.5 \text{ ft} + 14 \text{ ft} \cdot 8 \text{ ft} \cdot 6 \text{ in} + 8 \text{ ft} \cdot 8 \text{ ft} \cdot 3.5 \text{ ft} = 25422.544 \text{ gal}$$

2. Preferred turnover rate: $t := 8 \text{ hr} = 480 \text{ min}$

3. Pool circulation flow rate : $Q_p := \frac{V}{t} = 52.964 \text{ gpm}$

Bubblers flow rate, $Q_{wf} := 30 \text{ gpm}$

Total circulation flow rate, $Q_c := Q_p + Q_{wf} = 82.964 \text{ gpm}$

4. Spa Jets: Number of jets, $n := 6$ [Max.]

$$Q_{jet} := n \cdot 12 \text{ gpm} = 72 \text{ gpm}$$

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

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

Pool/ Spa pump flow rate $Q := \text{Trunc}(\max(Q_c, Q_{min}, Q_{jet}), 1 \text{ gpm}) + 1 \text{ gpm} = 83 \text{ gpm}$

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PIPE SIZES & SIMPLIFIED TDH:

Pool/ Spa pump max. flow rate: $Q = 83 \text{ gpm}$

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

Pipe Sizes Per 2023 FBC, 8th Edition:

Main Drain Piping: **2.5"** to keep velocity @ **8 fps** max at flow rate = **117 gpm** max.

Skimmer/ Vac line Piping: **2.5"** to keep velocity @ **8fps** max at flow rate = **117 gpm** max.

Std. Return Piping: **2.0"** to keep velocity @ **10 fps** max at flow rate = **103 gpm** max.

Spa Jets Piping: **2.0"** to keep velocity @ **10 fps** max at flow rate = **103 gpm** max.

Bubbler Piping: **2.0"** to keep velocity @ **10 fps** max at flow rate = **103 gpm** max.

The distance of the pool equipment pad from the nearest edge of the pool = **20 ft.** (max.)

1. Friction loss (suction/trunk pipe) **2.5"** pipe per ft. at $f_{suction} := 0.09$

2. Friction loss (return pipe) **2.0"** pipe per ft. at $f_{return} := 0.16$

3. Length of suction pipe $L_{suction} := 70 \text{ ft}$

TDH in suction pipe $TDH_{suction} := L_{suction} \cdot f_{suction} = 6.3 \text{ ft}$

4. Length of return pipe $L_{return} := 120 \text{ ft}$

TDH in return pipe $TDH_{return} := L_{return} \cdot f_{return} = 19.2 \text{ ft}$

5. TDH in Piping $TDH_{piping} := TDH_{suction} + TDH_{return} = 25.5 \text{ ft}$

6. Filter loss in TDH $TDH_{filter} := 8 \text{ ft}$

7. Heater loss in TDH $TDH_{heater} := 0 \text{ ft}$

8. All other losses $TDH_{other} := 14 \text{ ft}$...head losses in fittings, etc

9. Total simplified TDH $TDH := TDH_{piping} + TDH_{filter} + TDH_{heater} + TDH_{other} = 47.5 \text{ ft}$

Filter (As Listed or Equal): Pentair CCRP 200 Cartridge

Pool/ Spa Pump (As Listed or Equal):

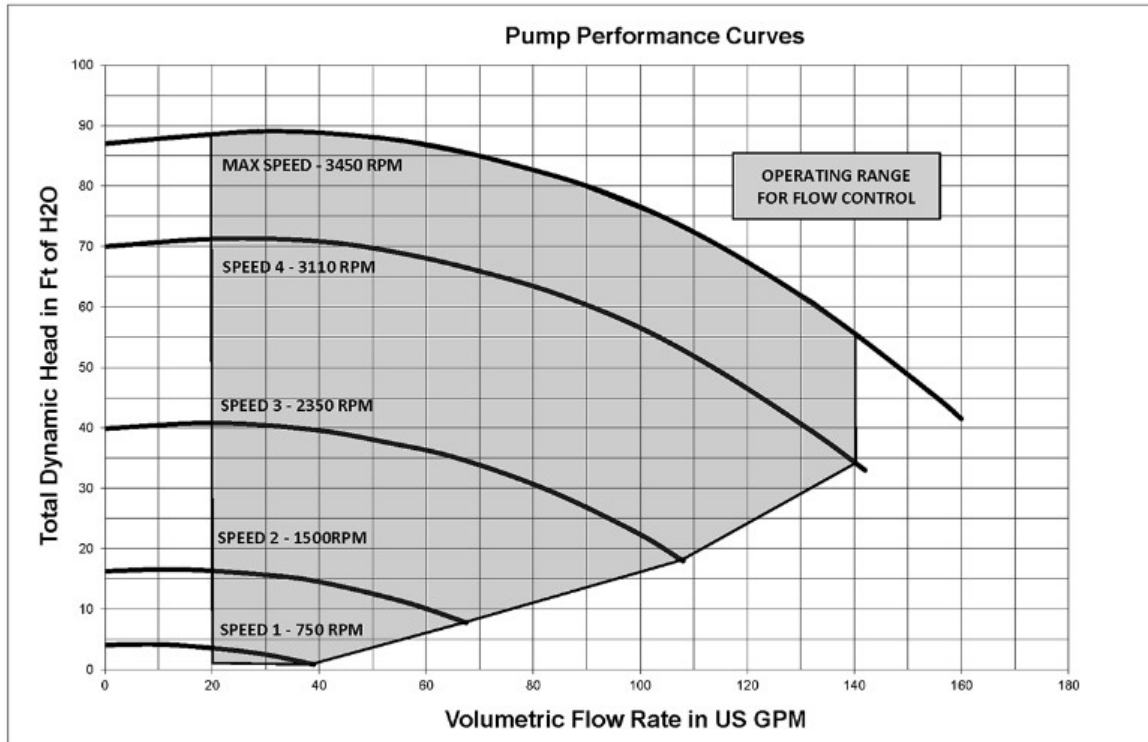
Manufacturer : Pentair

Model : IntelliFlo VS

Size / HP = 3.0

Maximum flow rate, $Q = 83 \text{ gpm}$

Total simplified TDH, $TDH = 47.5 \text{ ft}$



Main Drain Cover (As Listed or Equal):

Manufacturer : CMP

Model : 25506-32X-VGBA

Max. cover flow rate (floor) = 184 gpm

Cover Replacement Date = 7 years

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. Single drains shall be unblockable.
2. Center to center spacing of multiple drains shall be at least 3'-0".
3. Pump and Filter make, model and location cannot change without submitting a revised plan TDH worksheet.