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Project No. : **2333370**
Project Name : **ALONZO**
Project Address : **152 SW MAPLE PL, LAKE CITY FL 32024**

POOL/ SPA HYDRAULICS WORKSHEET

DESIGN CIRCULATION FLOW PARAMETERS:

1. Pool circulation volume : $V := 24\ ft \cdot 15\ ft \cdot 3.75\ ft + 6\ ft \cdot 15\ ft \cdot 9\ in = 10603.636\ gal$

2. Preferred turnover rate: $t := 6\ hr = 360\ min$

3. Pool circulation flow rate : $Q_p := \frac{V}{t} = 29.455\ gpm$

   Add water feat. flow rate $Q_{wf} := 20\ gpm$

   Total circulation flow rate $Q_c := Q_p + Q_{wf} = 49.455\ gpm$

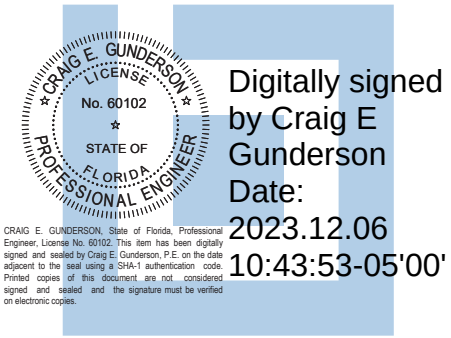
4. Spa: Number of jets, $n := 0$ [N/A.]

   $Q_{jet} := n \cdot 12\ gpm = 0\ gpm$

(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 $Q_{min} := 36\ gpm$

Design flow rate $Q := \mathrm{Trunc}\left(\max\left(Q_c, Q_{min}, Q_{jet}\right), 1\ gpm\right) + 1\ gpm = 50\ gpm$



CRAIG E. GUNDERSON, P.E. #60102
DATE:

PIPE SIZES & SIMPLIFIED TDH:

Maximum flow rate: $Q = 50\ gpm$

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 2020 FBC, 7th Edition:

Main Drain Branch Piping to be : 2.5" to keep velocity @ 6fps max at flow rate = $88\ gpm$ max.

Suction/Trunk Piping to be : 2.5" to keep velocity @ 8fps max at flow rate = $117\ gpm$ max.

Return Piping to be : 2.0" to keep velocity @ 10fps max at flow rate = $103\ gpm$ max.

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

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

[Maximum distance of pool from pool equipment pad to be 20 ft.]

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

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

4. Length of return pipe $L_{return} := 100\ ft$

   TDH in return pipe $TDH_{return} := L_{return} \cdot f_{return} = 16\ ft$

5. TDH in Piping $TDH_{piping} := TDH_{suction} + TDH_{return} = 22.3\ ft$

6. Filter loss in TDH $TDH_{filter} := 5\ ft$

7. Heater loss in TDH $TDH_{heater} := 13\ ft$

8. All other losses $TDH_{other} := 15\ ft$ ...head losses in fittings, etc

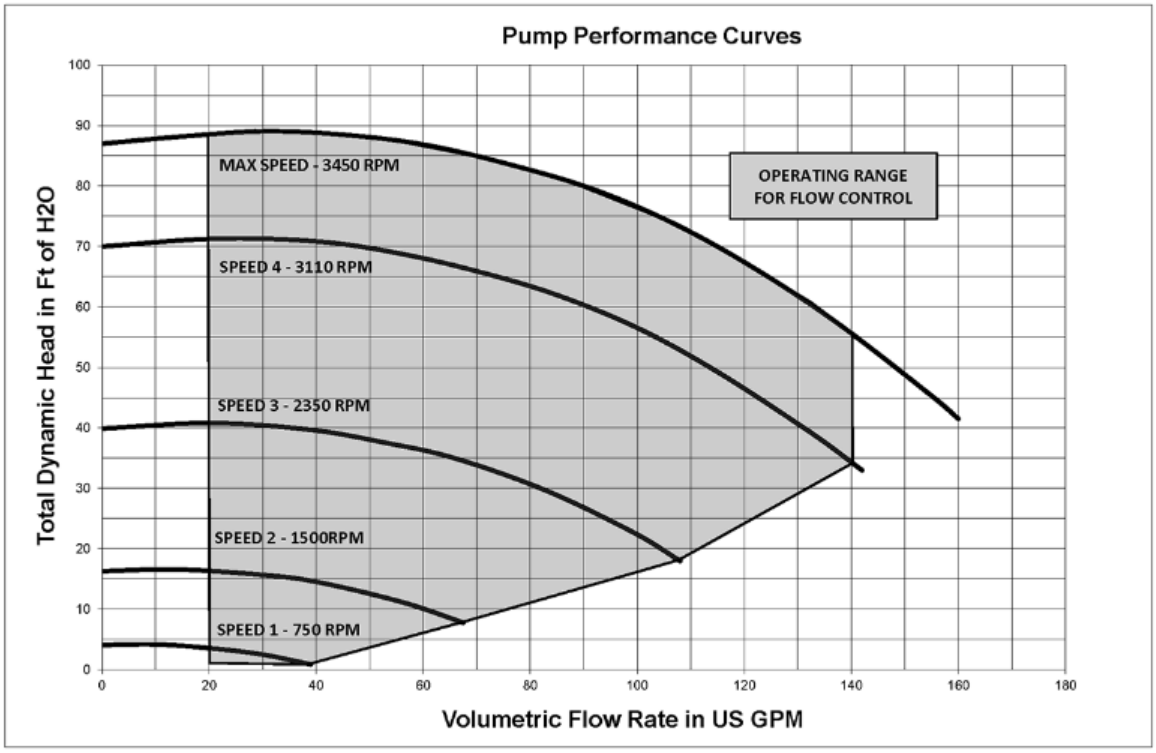
9. Total simplified TDH $TDH := TDH_{piping} + TDH_{filter} + TDH_{heater} + TDH_{other} = 55.3\ ft$

Filter (As Listed or Equal): Pentair TR100 Sand

Pump (As Listed or Equal) :

Manufacturer : Pentair | Model : IntelliFlo VS | Size / HP = 3.0

Maximum flow rate, $Q = 50$ *gpm* Total simplified TDH, $TDH = 55.3$ *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. Center to center spacing of multiple drains shall be at least 3'-0".

2. Pump and Filter make, model and location cannot change without submitting a revised plan TDH worksheet.