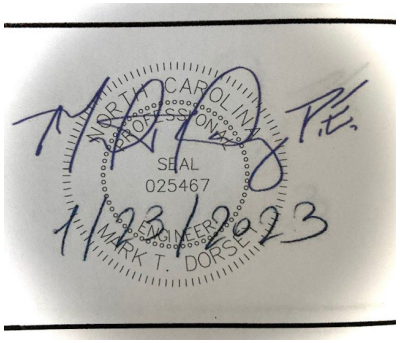
Basic Pool Plan Review Calculations sheet

SOP Class in Raleigh, NC

February 20 – 21, 2024

Before starting on calculations sheets



- Read through the submitted application for plan review.
- Assure the plan is stamped by a NC Licensed Engineer or Architect
- Look at the plan. If there is more than 1 pool on the plan, use a separate calculations sheet for each body of water.
- Review the 1st page – "Drawing Index". Identify sheets specific for the pool. Usually identified as "SP" or "P".
    - Over head view, cross section view, pool specifications, equipment lists, piping schematic, equipment room, chemical room, dressing room/ shower.
- Have pencil, paper, calculations sheet, calculator, architect's ruler, color markers, etc.

Does your County Have a Pool Plan Review Application and charge a fee?

§ 130A-39. Powers and duties of a local board of health.

(g) A local board of health may impose a fee for services to be rendered by a local health department, except where the imposition of a fee is prohibited by statute or where an employee of the local health department is performing the services as an agent of the State. Notwithstanding any other provisions of law, a local board of health **may impose cost-related fees for services** performed pursuant to Article 11 of this Chapter, … Article 8 of this Chapter, "Public Swimming Pools", for services performed pursuant to Part 11, and for services performed pursuant to G.S. 87-97. Fees shall be based upon a plan recommended by the local health director and approved by the local board of health and the appropriate county board or boards of commissioners. The fees collected under the authority of this subsection are to be deposited to the account of the local health department so that they may be expended for public health purposes in accordance with the provisions of the Local Government Budget and Fiscal Control Act. (1901, c. 245, s. 3; Rev., s. 4444; 1911, c. 62, s. 9; C.S., s. 7065; 1957, c. 1357, s. 1; 1959, c. 1024, s. 1; 1963, c. 1087; 1973, c. 476, s. 128; c. 508; 1977, c. 857, s. 2; 1981, c. 130, s. 2; c. 281; c. 949, s. 4; 1983, c. 891, s. 2; 1985, c. 175, s. 1; 1989, c. 577, s. 2; 1991 (Reg. Sess., 1992), c. 944, s. 10; 1993 (Reg. Sess., 1994), c. 670, s. 2; 1995, c. 507, s. 26.8(c); 2006-202, s. 6; 2007-182, s. 2.)

The Health Department is not restricted to a $250 plan review fee under 130A-248, but the fees must be comparable to the actual cost of providing the service. Also, if you charge a fee, you must insure to provide the service.

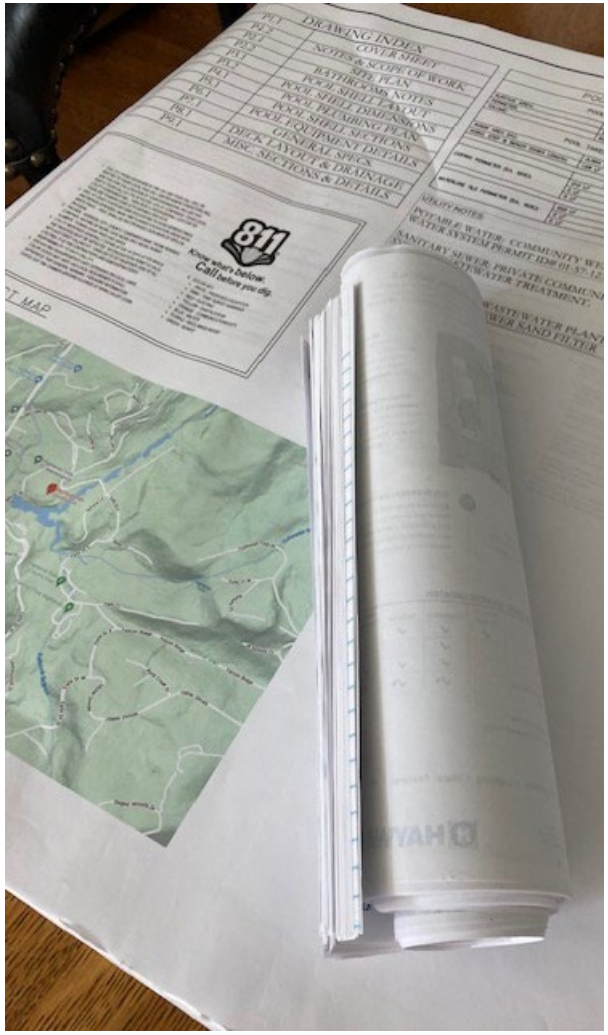
Examples of Plan Review Applications in NC

https://nc-orangecounty.civicplus.com/DocumentCenter/View/1774/Plan-Review-for-new-construction-or-remodel-PDF

https://www.buncombecounty.org/common/health/public-pool-construction-application.pdf

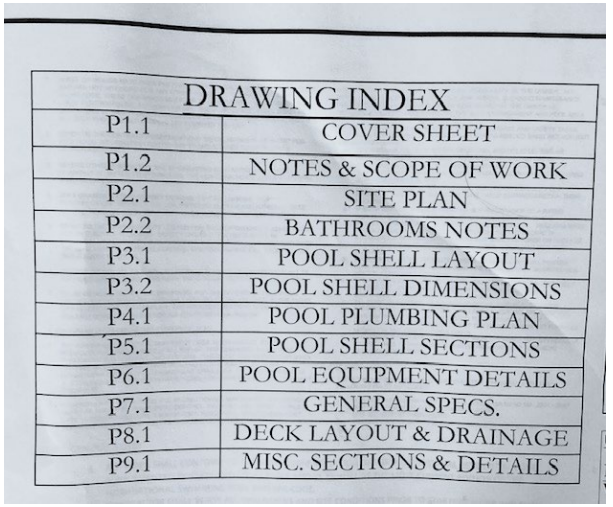
https://mecknc.widen.net/s/npzfhvqksz/plan-review-application

http://www.lincolncountync.gov/DocumentCenter/View/13520/Application-for-Approval-to-Construct-or-Renovate-a-Public-Swimming-Pool

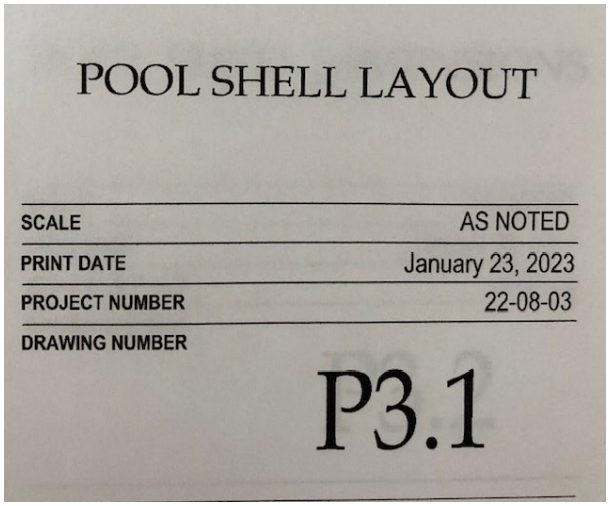


Getting started with the Calculations Sheet.

- Use guide as a worksheet.
- Notate Page #s on worksheet.



DRAWING INDEX	
P1.1	COVER SHEET
P1.2	NOTES & SCOPE OF WORK
P2.1	SITE PLAN
P2.2	BATHROOMS NOTES
P3.1	POOL SHELL LAYOUT
P3.2	POOL SHELL DIMENSIONS
P4.1	POOL PLUMBING PLAN
P5.1	POOL SHELL SECTIONS
P6.1	POOL EQUIPMENT DETAILS
P7.1	GENERAL SPECS.
P8.1	DECK LAYOUT & DRAINAGE
P9.1	MISC. SECTIONS & DETAILS



POOL SHELL LAYOUT

SCALE	AS NOTED
PRINT DATE	January 23, 2023
PROJECT NUMBER	22-08-03
DRAWING NUMBER	P3.1

Facility _____ Date _____

Physical Address _____

SWIMMING POOL PLAN REVIEW CALCULATIONS, COMPONENTS AND PIPING (January 2024)

(√) beside item # if correct; (X) if need info or not approved for plan review letter.

1. **Pool Type and required turnover rate denominator in minutes**

_____

(Use chart to the right)

2. **Pool perimeter** (lengths + widths) _____FT

(circle perimeter = πd)

3. **Pool surface area** (length X width) _____SF

(circle area $A = \pi r^2$)

4. **Pool volume** _____GAL

(length X width X avg. depth X 7.48),

(circular is πr^2 X avg depth X 7.48)

5. **Minimum turnover flow rate** required

(pool volume (**Ref #4**) ÷ assigned denominator (**Ref #1**))

Ex. 36,000 ÷ 360 = 100 gpm _____ GPM

6. **Design Flow per Engineer or Architect** _____ GPM

.2518 (h) Use circulation design flow rate for:
1. Calculating # of inlets
2. Determining filter size
3. Determining pipe size for returns, skimmers, and drains.

Pool Type and Turnover Rates
6 Hour Turnover USE (360) Swimming pool (standing water 0+' but usually 3' min water depth) .2518(b), Water slide landing pool >60,000 gal .2543(b), Scuba pool, .2544(e)(2)
3 Hour Turnover USE (180) Water slide landing pool <60,000 gal with auto chemical controller .2543(b)
2 Hour Turnover USE (120) Wading pool (24" max depth).2531(a)(3), Water slide pools <60,000 gal without auto chemical controller .2543(b), Training pools (24-36" depth) .2543(e)(1) Exercise therapy spa >1000 gal .2544(d)(2)
1 Hour Turnover USE (60) Stand- alone children's activity pool(CAP) .2531(b)(2)
.5 Hour Turnover USE (30) Recreational spas, all swim spas, hot tubs .2532(1), Interactive Play Attractions (IAPA), Spray grounds .2543(d)(5), Exercise therapy spa <1000 gal .2544(d)(2) Float Tank .2544(b)(4) 2X every hr. not in use and 2X between @ user

CIRCULATION COMPONENTS

Circulation Pump: Either single speed OR variable speed: Pumps greater than 3 HP require NSF 50 or 3rd party approval

_____**Single Speed Pumps** - TDH is assumed at 65 feet of head unless design engineer provided calculated TDH.

Pump mfg.; _____**Model #:** _____**HP** _____

6a. **Design Flow:** _____**GPM at 65 FT TDH.**

1. Pool type and required turnover rate.

Review the drawings to see what type of pool

Pool Type and Turnover Rates
6 Hour Turnover USE (360) • Swimming pool (standing water 0+' but usually 3' min water depth) .2518(b), • Water slide landing pool >60,000 gal .2543(b), • Scuba pool, .2544©(2)
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Different turnover rates per the rules as shown in the chart

Ex: swimming pool turnover rate is every 6 hours = 360 minutes.

Ex: Water slide landing pool <60,000 gallons with chemical controller is every 3 hours = 180 minutes.

Ex: Water slide landing pool <60,000 gallons without a chemical controller is every 2 hours = 120 minutes.

Ex: Wading pool <3' deep is every 2 hours = 120 minutes.

Ex: Stand alone children's activity pool is every hour = 60 minutes.

Ex. Recreational spa is every 30 minutes.

1. Pool type and required turnover rate denominator.

___swimming pool use 360_____

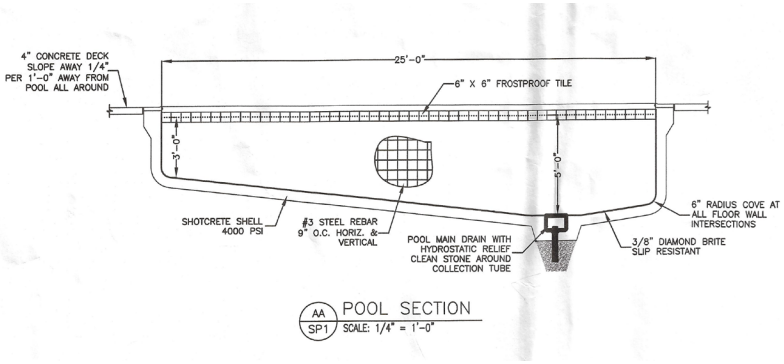
Ex: If plans submitted are for a pool

Rule .2518 (b) “Circulation system shall be sufficient to clarify and disinfect the entire volume of swimming pool water four times in 24 hours.”

24 hours ÷ 4 = 6 hours

One hour = 60 minutes

6 hr = 360 minutes



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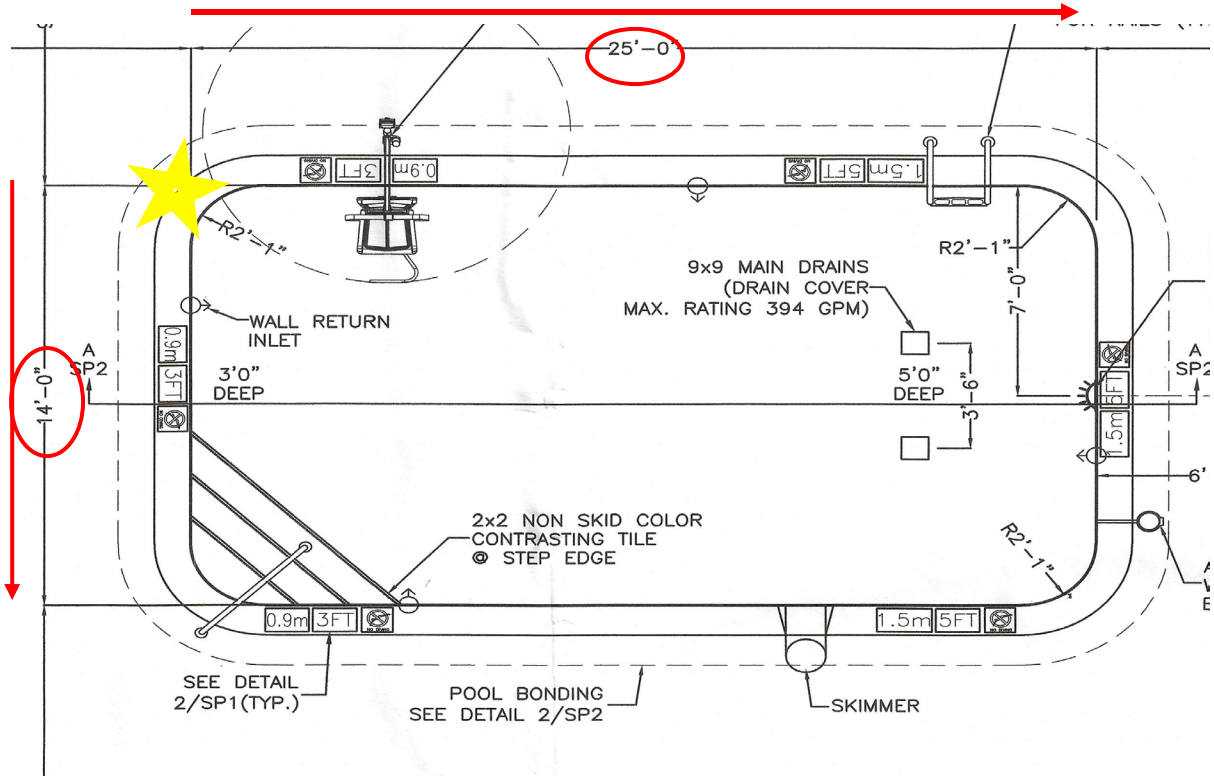
2. Pool perimeter (lengths + widths) _____ FT

(circle perimeter = πd)

- Pool perimeter is measured in linear feet.
- Registered Design Professionals use computer programs that will precisely calculate, and measure better than we can. It is still a good idea to try to calculate and compare for accuracy.
- Use their calculated number in the Pool Specifications Chart if different from your results.
- Perimeter is used for reviewing required stairs and access to the pool as well as decorative features on decks.

Example

2. Pool Perimeter (lengths + widths)



Measure along inside wall. Add lengths + widths 14' + 14' + 25' + 25' = 78' LF

Example

POOL SPECIFICATIONS

- WATER SURFACE AREA IS 346 SQ. FT.
- WATER DEPTH IS 3'–0" TO 5'–0"
- NET CAPACITY IS 10,366 GALLONS WITH A FILTRATION CYCLE OF 5 HOURS AND 24 MIN AT A FLOW OF 32 GPM. (BASED ON A DYNAMIC HEAD OF 65 FEET)
- POOL PERIMETER = 74.5 LN. FT
- ALL PIPE WORK SHALL BE SCHEDULE 40 PVC, PRESSURE TESTED BEFORE PLACING CONCRETE
- BATHER LOAD IS 23 PERSONS AS PER GS 15A:18A SECTION 2529
- DECK AREA = 1,787 SQ. FT. BY OTHER THAN SPC

Close to our measurement of 78 FT, but the computer program will account for the rounded corners. Go with 74.5 FT. Record on the calculations sheet which page you found the answer. Ex. SP-1 or P1, etc.

2. Pool perimeter (lengths + widths) 74.5 FT

(circle perimeter = πd)

3. **Pool surface area** (length X width) _____**SF**

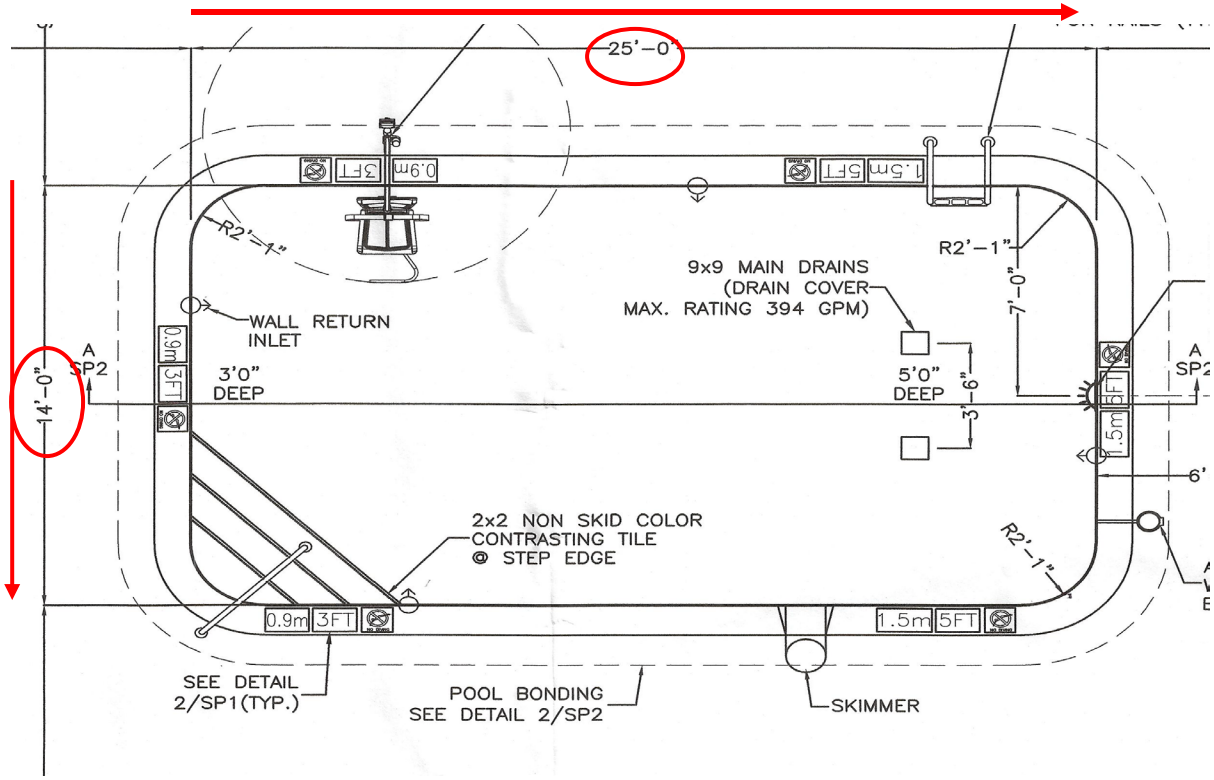
(circle area $A = \pi r^2$)

- Pool surface area is measured in square feet.
- Pool surface area is used to determine required surface overflow systems such as skimmers, gutters or combined systems.
- Also used to determine deck requirements, bather load, pool lighting, and units of safety equipment on the checklist.

3. Pool surface area (length x width)

14’ x 25’ = 350 SF

Example



3. Pool surface area (length X width) 346 **SF**

(circle area $A = \pi r^2$)

Example

Pool Specifications on page SP-1 show 346 SQ. FT. The pool has coved corners. Our calculation was 350 SF, but use 346 SF.

POOL SPECIFICATIONS

- WATER SURFACE AREA IS 346 SQ. FT.
- WATER DEPTH IS 3'–0" TO 5'–0"
- NET CAPACITY IS 10,366 GALLONS WITH A FILTRATION CYCLE OF 5 HOURS AND 24 MIN AT A FLOW OF 32 GPM. (BASED ON A DYNAMIC HEAD OF 65 FEET)
- POOL PERIMETER = 74.5 LN. FT
- ALL PIPE WORK SHALL BE SCHEDULE 40 PVC, PRESSURE TESTED BEFORE PLACING CONCRETE
- BATHER LOAD IS 23 PERSONS AS PER GS 15A:18A SECTION 2529
- DECK AREA = 1,787 SQ. FT. BY OTHER THAN SPC

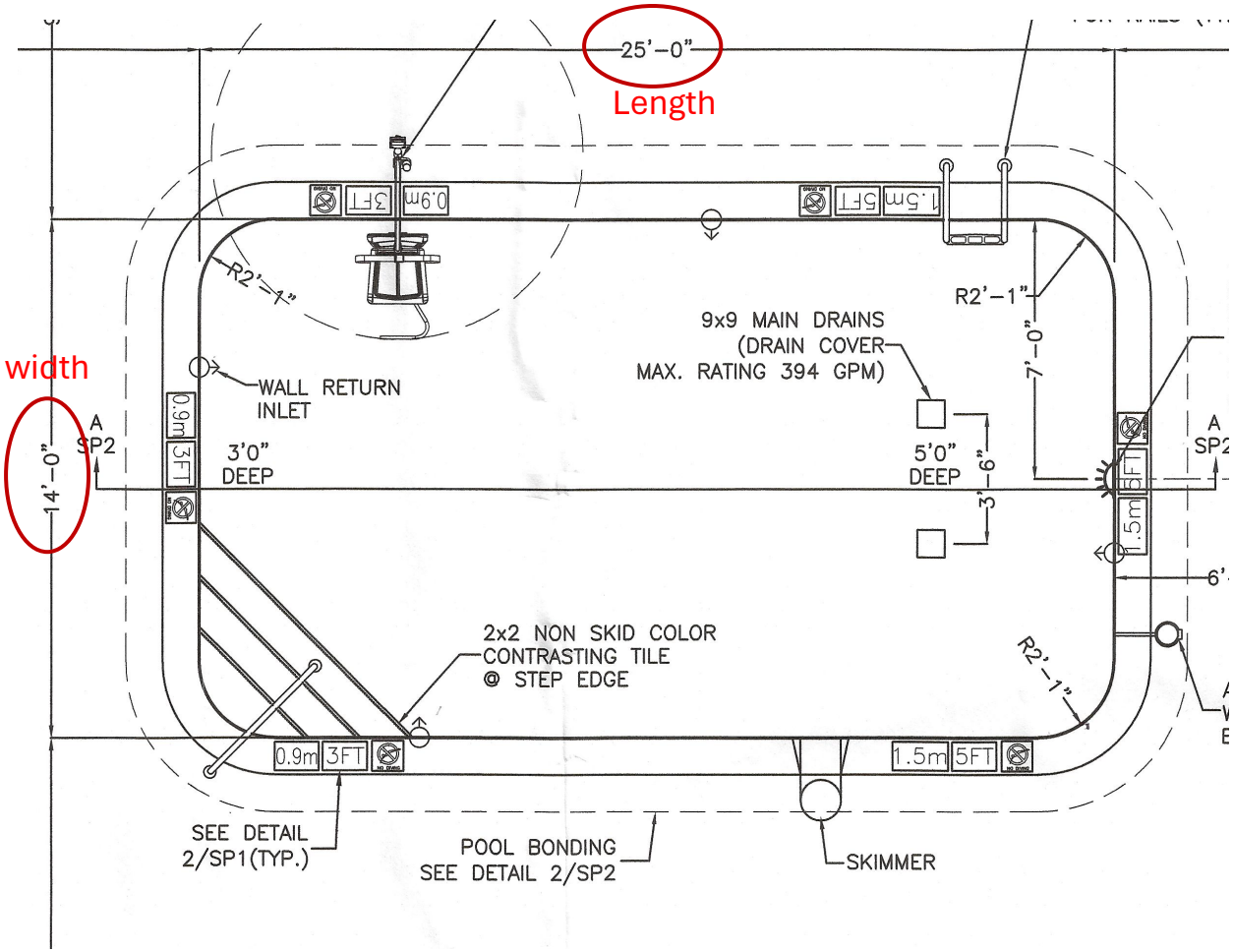
4. Pool volume _____GAL

(length X width X avg. depth X 7.48),
(circular is πr^2 X avg depth X 7.48)

- Pool volume is measured in gallons.
- Volume is used for calculating minimum turnover rate, calculating required chemical storage, and reviewing disinfectant methods.

Example

4. Pool Volume



Example

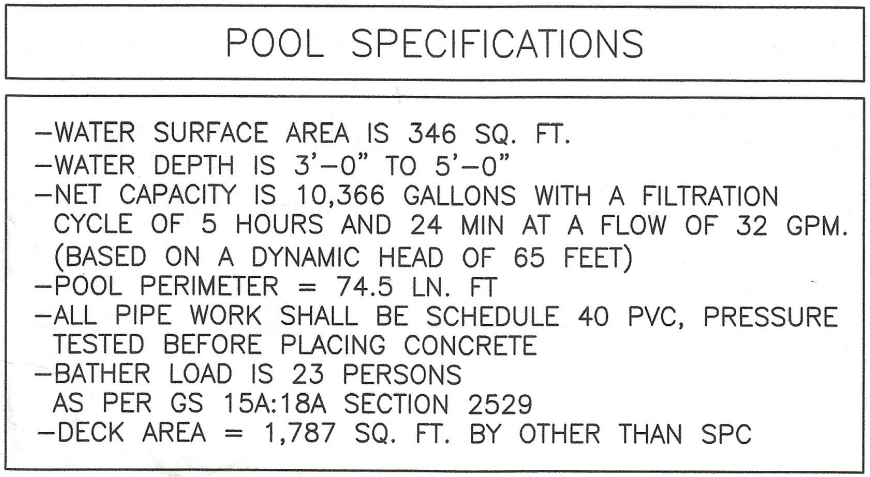
Pool volume = length X width X avg. depth X 7.48
(There are 7.48 gallons per cubic foot of water.)

(circular is πr^2 X avg depth X 7.48 is used for round pools.)

Length = 25’ Width = 14’ Average depth (3’+ 5’) = 8’/2 = 4’

25’ x 14’ x 4’ x 7.48 = 10,472 gal

Pool Specifications on plans, page SP1 show 10,366 gal and our number doesn’t subtract water volume from the stairs. USE 10,366 gallons.



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–WATER SURFACE AREA IS 346 SQ. FT.
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–NET CAPACITY IS 10,366 GALLONS WITH A FILTRATION CYCLE OF 5 HOURS AND 24 MIN AT A FLOW OF 32 GPM. (BASED ON A DYNAMIC HEAD OF 65 FEET)
–POOL PERIMETER = 74.5 LN. FT
–ALL PIPE WORK SHALL BE SCHEDULE 40 PVC, PRESSURE TESTED BEFORE PLACING CONCRETE
–BATHER LOAD IS 23 PERSONS AS PER GS 15A:18A SECTION 2529
–DECK AREA = 1,787 SQ. FT. BY OTHER THAN SPC

4. Pool volume _____10,366_____ GAL

(length X width X avg. depth X 7.48),
(circular is πr^2 X avg depth X 7.48)

5. Minimum turnover flow rate required

(pool volume (Ref #4) ÷ assigned denominator (Ref #1))

Ex. 36,000 ÷ 360 = 100 gpm _____ GPM

Minimum turnover rate is the lowest GPM the pump can circulate water through the filter and meet the minimum requirements of a public pool.

Example

5. Minimum turnover flow rate required

(pool volume (Ref #4) ÷ assigned denominator (Ref #1))

Ex. 36,000 ÷ 360 = 100 gpm

28.8 GPM

From our swimming pool example:

10,366 gallons ÷ 360 minutes = 28.8 GPM

6. Design Flow per Engineer or Architect _____ GPM

> **.2518 (h)** Use circulation design flow rate for:
> 1. Calculating # of inlets
> 2. Determining filter size
> 3. Determining pipe size for returns, skimmers, and drains.

CIRCULATION COMPONENTS

Circulation Pump: Either single speed OR variable speed: Pumps greater than 3 HP require NSF 50 or 3rd party approval

_____**Single Speed Pumps** - TDH is assumed at 65 feet of head unless design engineer provided calculated TDH.
Pump mfg.; _____**Model #:** _____**HP** _____

6a. Design Flow: _____**GPM at 65 FT TDH.**
Max flow per curve _____ **GPM**

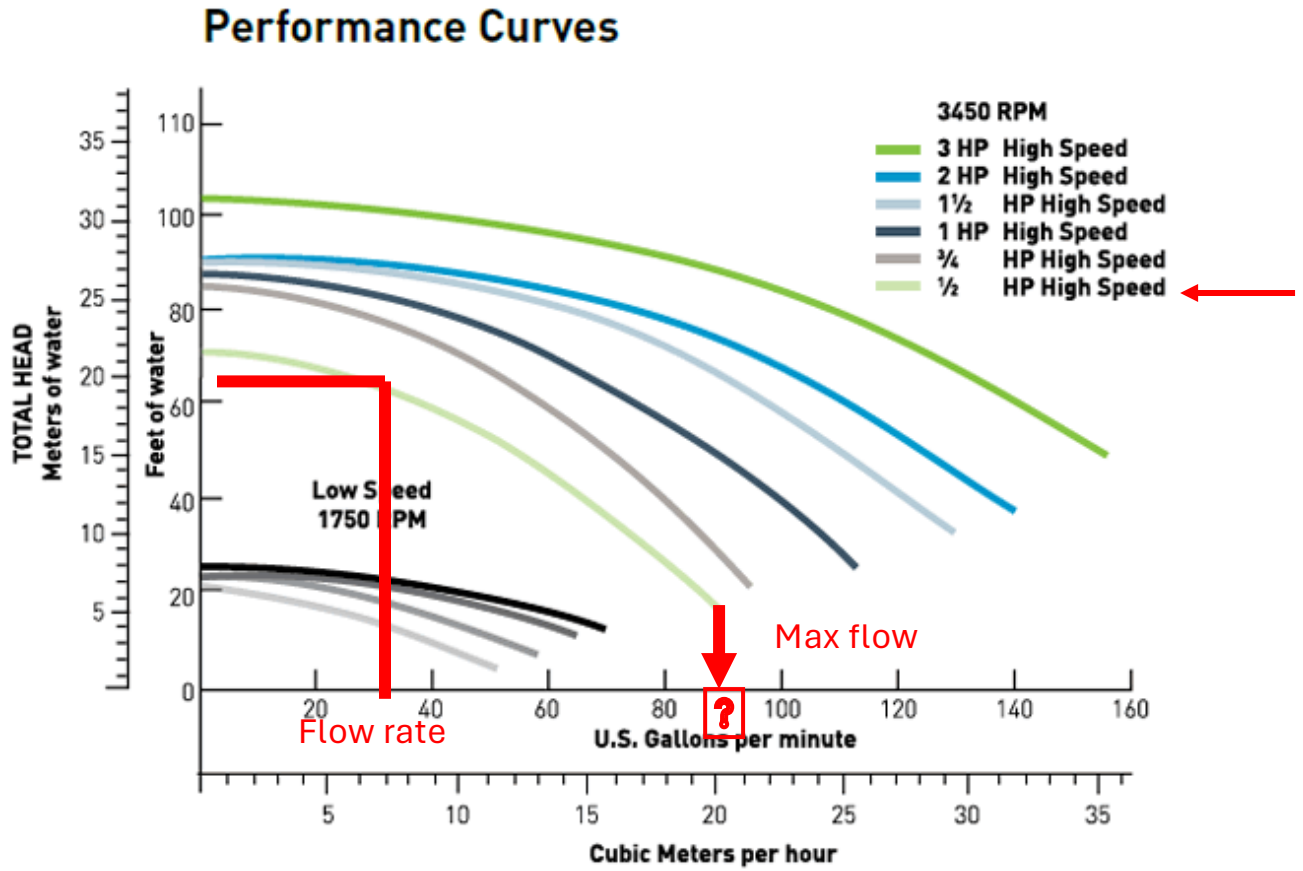
_____**Variable speed pumps OR pumps with variable frequency drives**. This set up allows the designer to establish a "custom designed flow range" using the infinite flow ranges available on energy efficient pumps. This range will include the minimum turnover rate (#5a) and the maximum flow rating allowed by the system (i.e., pipe size, # of inlets, # of skimmers, filter, etc.) The pump can be set to a custom design flow, which must fall within this range. The designer must specify the most limiting component of the system and provide a supporting pump curve for the chosen pump.
Pump Mfg.: _____**Model #:** _____

6b. Design Flow Range: _____ **to** _____**GPM Limiting Factors** _____.
Max flow per curve _____ **GPM* for drain covers and sumps**.
* Use the highest GPM from the fastest speed unless a limiting factor yields a flow range maximum.

6. Design Flow per Engineer or Architect _____ GPM

- Design flow is determined by the RDP.
- Design flow is used to calculate:
  - required number of inlets,
  - determining filter size, and
  - determining pipe sizes for returns, skimmers, and drains.
- Design flow may result in a range if a variable speed pump or variable frequency drive is used.

Our example uses a single speed pump for the circulation system without a variable frequency drive. Pentair WFE-2, ½ HP



POOL SPECIFICATIONS

- WATER SURFACE AREA IS 346 SQ. FT.
- WATER DEPTH IS 3'-0" TO 5'-0"
- NET CAPACITY IS 10,366 GALLONS WITH A FILTRATION CYCLE OF 5 HOURS AND 24 MIN AT A FLOW OF 32 GPM. (BASED ON A DYNAMIC HEAD OF 65 FEET)
- POOL PERIMETER = 74.5 LN. FT
- ALL PIPE WORK SHALL BE SCHEDULE 40 PVC, PRESSURE TESTED BEFORE PLACING CONCRETE
- BATHER LOAD IS 23 PERSONS AS PER GS 15A:18A SECTION 2529
- DECK AREA = 1,787 SQ. FT. BY OTHER THAN SPC

X **Single Speed Pumps**

TDH is assumed at 65 feet of head unless design engineer provided calculated TDH.

Pump mfg.; Pentair **Model #:** WFE-2 **HP** 1/2

6a. Design Flow: 32 **GPM at 65 FT TDH.**

Max flow per curve 90 **GPM**

Does the design flow of 32 GPM exceed the minimum turnover rate of 28.8 GPM? YES

What if a variable speed pump is used? Let's use a Pentair IntelliFlo VSF pump with a design flow submitted on plans of 40 GPM and see the difference.

___X___**Variable speed pumps OR pumps with variable frequency drives**. This set up allows the designer to establish a "custom designed flow range" using the infinite flow ranges available on energy efficient pumps. This range will include the minimum turnover rate (#5a) and the maximum flow rating allowed by the system (i.e., pipe size, # of inlets, # of skimmers, filter, etc.) The pump can be set to a custom design flow, which must fall within this range. The designer must specify the most limiting component of the system and provide a supporting pump curve for the chosen pump.

Pump Mfg.: _Pentair _____Model #: __IntelliFlo VSF_____

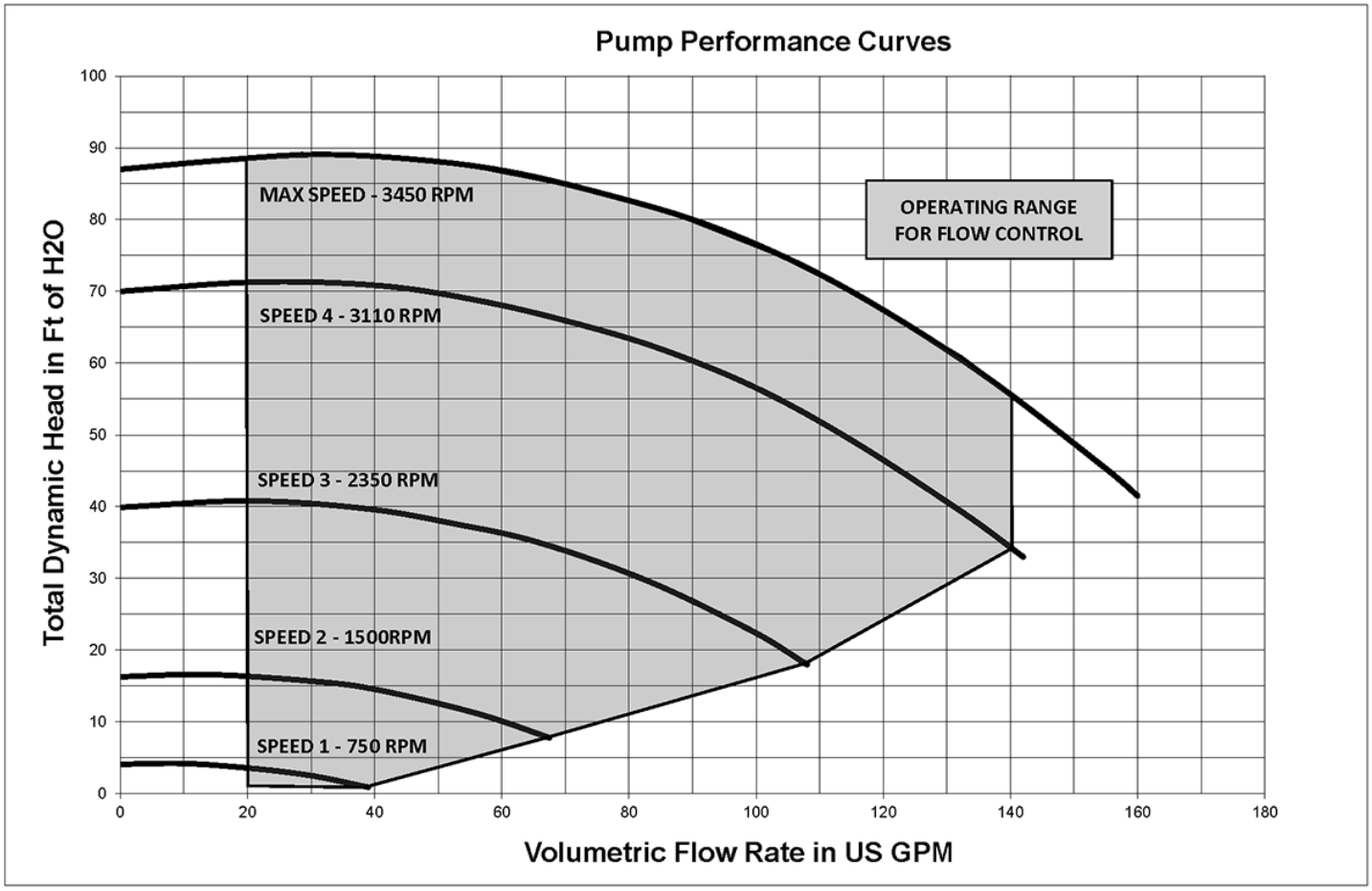
6b. Design Flow Range: __40_____ to _____?_____GPM Limiting Factors____???_____

Max flow per curve _____160_____ GPM* for drain covers and sumps.

* Use the highest GPM from the fastest speed *unless a limiting factor yields a flow range maximum*.

1. Does the engineer set a design flow rate?
2. Does it meet the minimum turnover rate?
3. What are the limiting factors? We will come back to this after looking at the piping and components.

Example using INTELLIFLO® VSF VARIABLE SPEED AND FLOW PUMP



7. **Number of inlets required** _____ , Plan shows _____ (Design flow in **Ref #6 ÷ 20 GPM)**, min 4 for pools, min 2 for wading pools and spas, and no part of pool more than 25 ft. from any inlet AND adjustable as required per .2518(i)(1-4), .2531(a)(2),.2532(3) For spas, uniform location for providing uniform circulation of water .2532(2)

Inlet Mfg. & Model # _____

1. If design flow is 40 GPM, how many inlets must the pool have?

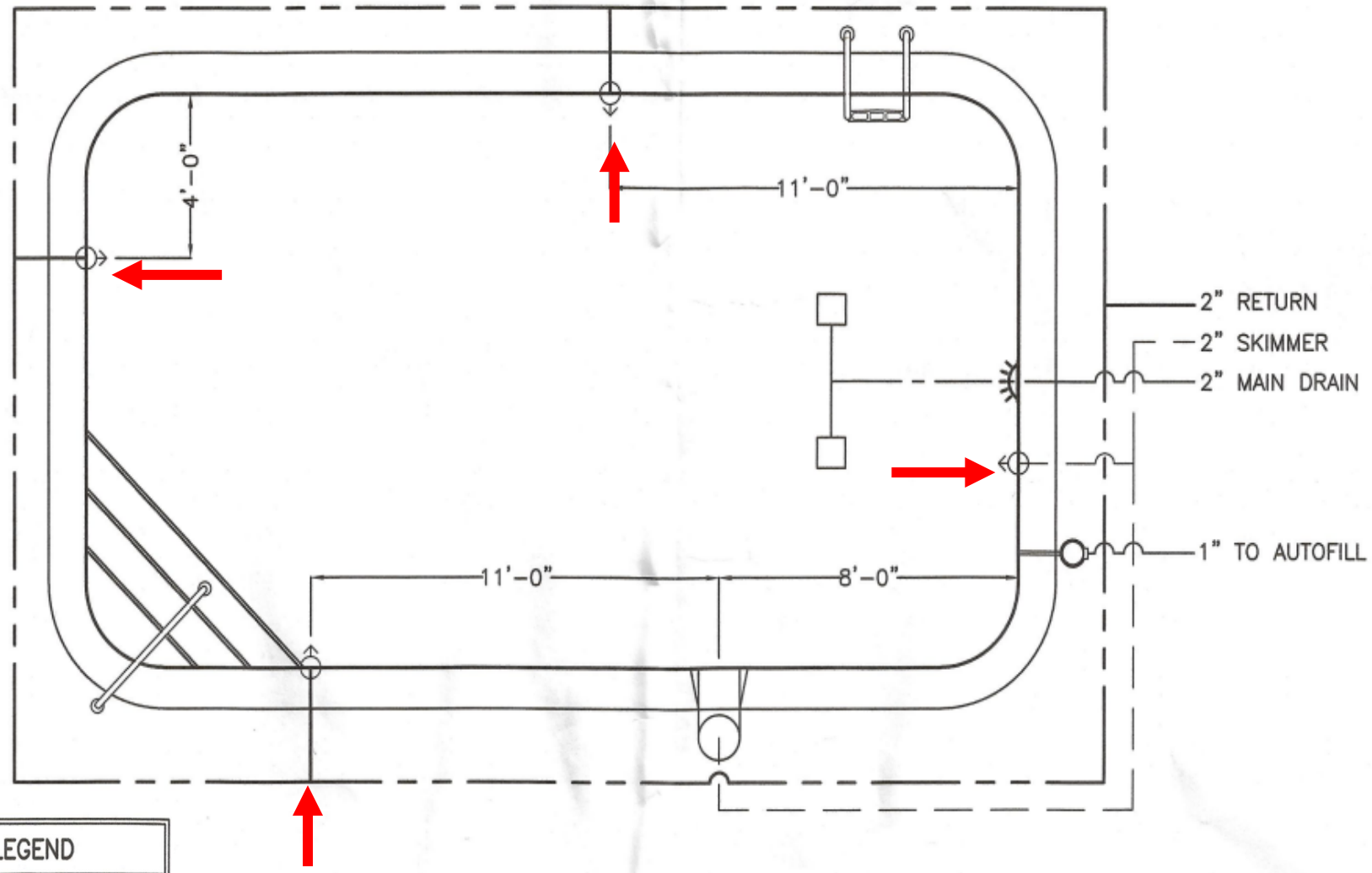
Document the inlet #s the plan shows and if it is adequate. Also look at the spec sheet for the inlets to see if it meets the rules.

Example

Inlets are listed on Pool Equipment list on SP2

POOL EQUIPMENT LIST				
QTY.	ITEM	MANUFACTURER	MODEL #	DESCRIPTION
1	PUMP	PENTAIR	WFE–2	1/2 HP WHISPER FLO COMMERCIAL PUMP (1 PHASE PUMP)
1	BASKET	PENTAIR	070387	EXTRA STAINER BASKET
1	FILTER	PENTAIR	TR50	NSF APPROVED WITH AIR RELIEF PRESSURE GAUGE
1	VALVE	PENTAIR	261055	MULTIPORT VALVE
1	FLOWMETER	FLOW VIS	FV–C	2" PVC MOUNT (BACKWASH NOT TO EXCEED 50 GPM)
1	CHLORINATOR	PENTAIR	320	AUTOMATIC EROSION TYPE (PENTAIR #171096)
1	SKIMMER	AQUASTAR	SKR101	INCLUDES BASKET
4	RETURN INLETS	HAYWARD	SP–1419C	ADJUSTABLE EYEBALLS
2	SUCTION OUTLET	ASA	FPK–50–809	9x9 SUCTION OUTLET WITH 3" PORT
2	*MAIN DRAIN COVERS	*AQUASTAR	914101	9x9 ANTI–ENTRAPMENT FRAME & GRATE COVER (394 GPM MAX. RATING)
1	RELIEF VALVE	HAYWARD	SP–1056	1 1/2" HYDROSTATIC RELIEF VALVE
1	COLLECTOR TUBE	HAYWARD	SP–1055	1–1/2" x 12" COLLECTOR TUBE
1	AUTO FILL	PENTAIR	T40FW	AUTOFILL W/ BRASS FLOAT VALVE
1	HANDRAIL	S.R. SMITH	3HR–4–065	4'–0" STAINLESS STEEL HANDRAIL
1	LADDER	S.R. SMITH	VLLS–103S–MG	3–STEP LADDER
1	LIGHT	PENTAIR	78458100	500W INCANDESCENT UNDERWATER LIGHT (50 FT CORD)
1	NICHE	PENTAIR	78210600	STAINLESS STEEL W/ 1" HUB
1	LIFT	AQUA CREEK	RANGER	ADA COMPLIANT HANDICAP SWIM LIFT BATTERY POWERED 350 LB. OPERATING LOAD CAPACITY

4 inlets minimum are required for pools



Example

7. **Number of inlets required** ___4___ , Plan shows ___4___ (Design flow in **Ref #6 ÷ 20 GPM)**, min 4 for pools, min 2 for wading pools and spas, and no part of pool more than 25 ft. from any inlet AND adjustable as required per .2518(i)(1-4), .2531(a)(2),.2532(3) For spas, uniform location for providing uniform circulation of water .2532(2)

Inlet Mfg. & Model #: Hayward SP – 1419C

1. If design flow is 40 GPM, how many inlets must the pool have?

Document the inlet #s the plan shows and if it is adequate. Also look at the spec sheet for the inlets to see if it meets the rules.

8. Filter (sand, DE, cartridge) sized properly per .2519 Reference NSF.org

Type Filter	Filter Rate / SF
High-Rate Sand	**15 – 20** gpm per sf of filter surface area
Rapid Rate Sand	**3** gpm per sf of filter surface area
Vacuum Sand	**15** gpm per sf of filter surface area
DE with slurry	**2.5** gpm per sf of filter surface area
DE without slurry	**2** gpm per sf of filter surface area
Cartridge	**.375** gpm per sf of filter surface area

Filter Mfg. & Model # _____

Number of Filters: _____

Design Flow (#6):_____≤Filter Flow Rate _____

Design Flow Rate **Ref # 6 ÷ FILTER RATE** listed in chart above = SF of filter surface area required. Refer to filter specification sheet for filter surface provided. If the filter square footage is not adequate for design flow rate, more than 1 filter will be needed or a different model # required.

Trying to determine if the filter can handle the design flow rate of the system.

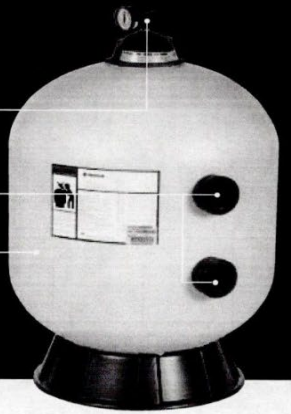
Example

Filter is listed on Pool Equipment list on SP2

POOL EQUIPMENT LIST				
QTY.	ITEM	MANUFACTURER	MODEL #	DESCRIPTION
1	PUMP	PENTAIR	WFE–2	1/2 HP WHISPER FLO COMMERCIAL PUMP (1 PHASE PUMP)
1	BASKET	PENTAIR	070387	EXTRA STAINER BASKET
1	FILTER	PENTAIR	TR50	NSF APPROVED WITH AIR RELIEF PRESSURE GAUGE
1	VALVE	PENTAIR	261055	MULTIPORT VALVE
1	FLOWMETER	FLOW VIS	FV–C	2" PVC MOUNT (BACKWASH NOT TO EXCEED 50 GPM)
1	CHLORINATOR	PENTAIR	320	AUTOMATIC EROSION TYPE (PENTAIR #171096)
1	SKIMMER	AQUASTAR	SKR101	INCLUDES BASKET
4	RETURN INLETS	HAYWARD	SP–1419C	ADJUSTABLE EYEBALLS
2	SUCTION OUTLET	ASA	FPK–50–809	9x9 SUCTION OUTLET WITH 3" PORT
2	*MAIN DRAIN COVERS	*AQUASTAR	914101	9x9 ANTI–ENTRAPMENT FRAME & GRATE COVER (394 GPM MAX. RATING)
1	RELIEF VALVE	HAYWARD	SP–1056	1 1/2" HYDROSTATIC RELIEF VALVE
1	COLLECTOR TUBE	HAYWARD	SP–1055	1–1/2" x 12" COLLECTOR TUBE
1	AUTO FILL	PENTAIR	T40FW	AUTOFILL W/ BRASS FLOAT VALVE
1	HANDRAIL	S.R. SMITH	3HR–4–065	4'–0" STAINLESS STEEL HANDRAIL
1	LADDER	S.R. SMITH	VLLS–103S–MG	3–STEP LADDER
1	LIGHT	PENTAIR	78458100	500W INCANDESCENT UNDERWATER LIGHT (50 FT CORD)
1	NICHE	PENTAIR	78210600	STAINLESS STEEL W/ 1" HUB
1	LIFT	AQUA CREEK	RANGER	ADA COMPLIANT HANDICAP SWIM LIFT BATTERY POWERED 350 LB. OPERATING LOAD CAPACITY

Filter Spec Sheet

TRITON® II
FIBERGLASS SAND FILTER



Easy access, heavy-duty closure with built-in pressure relief valve makes inspection and maintenance fast, safer and easy

Threaded bulkhead connectors for easy installation and service

Glaslok™ process creates a one-piece, fiberglass-reinforced tank with UV-resistant surface finish for years of unequaled strength and durability

Model Number	Filter Area Sq. Ft	Vertical* Clearance	Filter Diameter	Required Sand† (lbs)	Flow Rate GPM		Turnover Capacity-Res. (Gallons)		
					Res.**	Com.	8 hrs.	10 hrs.	12 hrs.
TR 40	1.92	32.5"	19"	175	38	38	18,240	22,800	27,360
TR 50	2.46	36.75"	21"	225	49	49	23,520	29,400	35,280
TR 60	3.14	37.5"	24"	325	63	63	30,240	37,800	45,360
TR 100	4.91	41.75"	30"	600	98	74	47,040	58,800	70,560
TR 140	7.06	47.25"	36"	925	141	106	67,680	84,600	101,520

†Use standard #20 silica sand.

*Required clearance to remove the closure.

**Maximum flow rate. Flow rate is based on 20 GPM per sq. ft. of filter area. Actual system flow will depend on plumbing size and other system components.

AVAILABLE FROM:

PENTAIR

WATER SOLUTIONS, 1620 HAWKINS AVE, SANFORD, NC 27330 800.831.7133 WWW.PENTAIRPOOL.COM

pumps / filters / heaters / heat pumps / automation / lighting / cleaners / sanitizers / water features / maintenance products

Example

8. Filter (sand, DE, cartridge) sized properly per .2519 Reference NSF.org

Type Filter	Filter Rate / SF
High-Rate Sand	**15 – 20** gpm per sf of filter surface area
Rapid Rate Sand	**3** gpm per sf of filter surface area
Vacuum Sand	**15** gpm per sf of filter surface area
DE with slurry	**2.5** gpm per sf of filter surface area
DE without slurry	**2** gpm per sf of filter surface area
Cartridge	**.375** gpm per sf of filter surface area

Filter Mfg. & Model # Pentair TR 50

Number of Filters: 1

Design Flow (#6): 40 GPM ≤Filter Flow Rate 49

Design Flow Rate **Ref # 6 ÷ FILTER RATE** listed in chart above = SF of filter surface area required. Refer to filter specification sheet for filter surface provided. If the filter square footage is not adequate for design flow rate, more than 1 filter will be needed or a different model # required.

Model Number	Filter Area Sq. Ft.	Vertical Clearance*	Filter Diameter	Required Sand** (lbs.)	Flow Rate GPM (Comm.)	Turnover Capacity-Res. (Gallons) 8 hrs.	10 hrs.	12 hrs.
TR 40	1.92	32.5"	19"	175	38	18,240	22,800	27,360
TR 50	2.46	36.75"	21"	225	49	23,520	29,400	35,280
TR 60	3.14	37.5"	24"	325	63	30,240	37,800	45,360
TR 100	4.91	41.75"	30"	600	74	35,520	44,400	53,280
TR 140	7.06	47.25"	36"	925	106	50,880	63,600	76,320

*Required clearance to remove the closure.

**Use standard #20 silica sand.

40 GPM ÷ 20 GPM = 2 SF of filter surface area

9. Surface Overflow systems: Skimmers, Gutter System or Combined

Number of NSF skimmers required: _____ Plan shows _____ (Pool surface area **Ref #3 ÷ 400sf** or fraction thereof for swimming and wading pools, **Ref #3 ÷ 100 sf** for spas or fraction thereof per .2518(k)(3), .2531(a)(2) and .2532(4)(b), G.S. 130A-282(c)) & protected from air entrapment by auto-fill, fill spout/ hose or flooded suction on the pump per .2518 (l).

Auto-fill mfg. # _____

No skimmer equalizers allowed for new construction.

Skimmer Mfg. _____& Model # _____

Max flow for Skimmer provided per NSF Listing. _____ GPM;

may require additional skimmers if allowed flow per skimmer is inadequate.

If Gutter pool with Balance Surge Tank Capacity, plan shows tank capacity: _____ gallons

Ex: 1 gal X **(Ref #3)** = required size of surge tank in gallons.

Note: This can include capacity of the piping system if submitted. (1 gallon per SF of pool surface area required per .2518(k)(2)(b))

Example

Skimmer and Auto Fill are listed on Pool Equipment list on SP2

POOL EQUIPMENT LIST				
QTY.	ITEM	MANUFACTURER	MODEL #	DESCRIPTION
1	PUMP	PENTAIR	WFE–2	1/2 HP WHISPER FLO COMMERCIAL PUMP (1 PHASE PUMP)
1	BASKET	PENTAIR	070387	EXTRA STAINER BASKET
1	FILTER	PENTAIR	TR50	NSF APPROVED WITH AIR RELIEF PRESSURE GAUGE
1	VALVE	PENTAIR	261055	MULTIPORT VALVE
1	FLOWMETER	FLOW VIS	FV–C	2" PVC MOUNT (BACKWASH NOT TO EXCEED 50 GPM)
1	CHLORINATOR	PENTAIR	320	AUTOMATIC EROSION TYPE (PENTAIR #171096)
1	SKIMMER	AQUASTAR	SKR101	INCLUDES BASKET
4	RETURN INLETS	HAYWARD	SP–1419C	ADJUSTABLE EYEBALLS
2	SUCTION OUTLET	ASA	FPK–50–809	9x9 SUCTION OUTLET WITH 3" PORT
2	*MAIN DRAIN COVERS	*AQUASTAR	914101	9x9 ANTI–ENTRAPMENT FRAME & GRATE COVER (394 GPM MAX. RATING)
1	RELIEF VALVE	HAYWARD	SP–1056	1 1/2" HYDROSTATIC RELIEF VALVE
1	COLLECTOR TUBE	HAYWARD	SP–1055	1–1/2" x 12" COLLECTOR TUBE
1	AUTO FILL	PENTAIR	T40FW	AUTOFILL W/ BRASS FLOAT VALVE
1	HANDRAIL	S.R. SMITH	3HR–4–065	4'–0" STAINLESS STEEL HANDRAIL
1	LADDER	S.R. SMITH	VLLS–103S–MG	3–STEP LADDER
1	LIGHT	PENTAIR	78458100	500W INCANDESCENT UNDERWATER LIGHT (50 FT CORD)
1	NICHE	PENTAIR	78210600	STAINLESS STEEL W/ 1" HUB
1	LIFT	AQUA CREEK	RANGER	ADA COMPLIANT HANDICAP SWIM LIFT BATTERY POWERED 350 LB. OPERATING LOAD CAPACITY

FLOWSTAR® SKIMMER WITH WATER STOP FACE, FLOAT ASSEMBLY, BASKET, LID AND ADJUSTABLE COLLAR

Built in conformance with NSF 50 and SPS 3 standards

FEATURES

Designed for commercial and residential use, 15 GPM min, 90 GPM max

Adjustable collar

New weir clip lock secures the clips in the weir door

Self-contained gunite grip, water stop on the faceplate to prevent water leaks

Large self-contained basket with lock-in feature (will not float)

Underwater dampers on the faceplate for noise reduction on weir plate – especially on windy days

Super strong engineered polymer upper housing

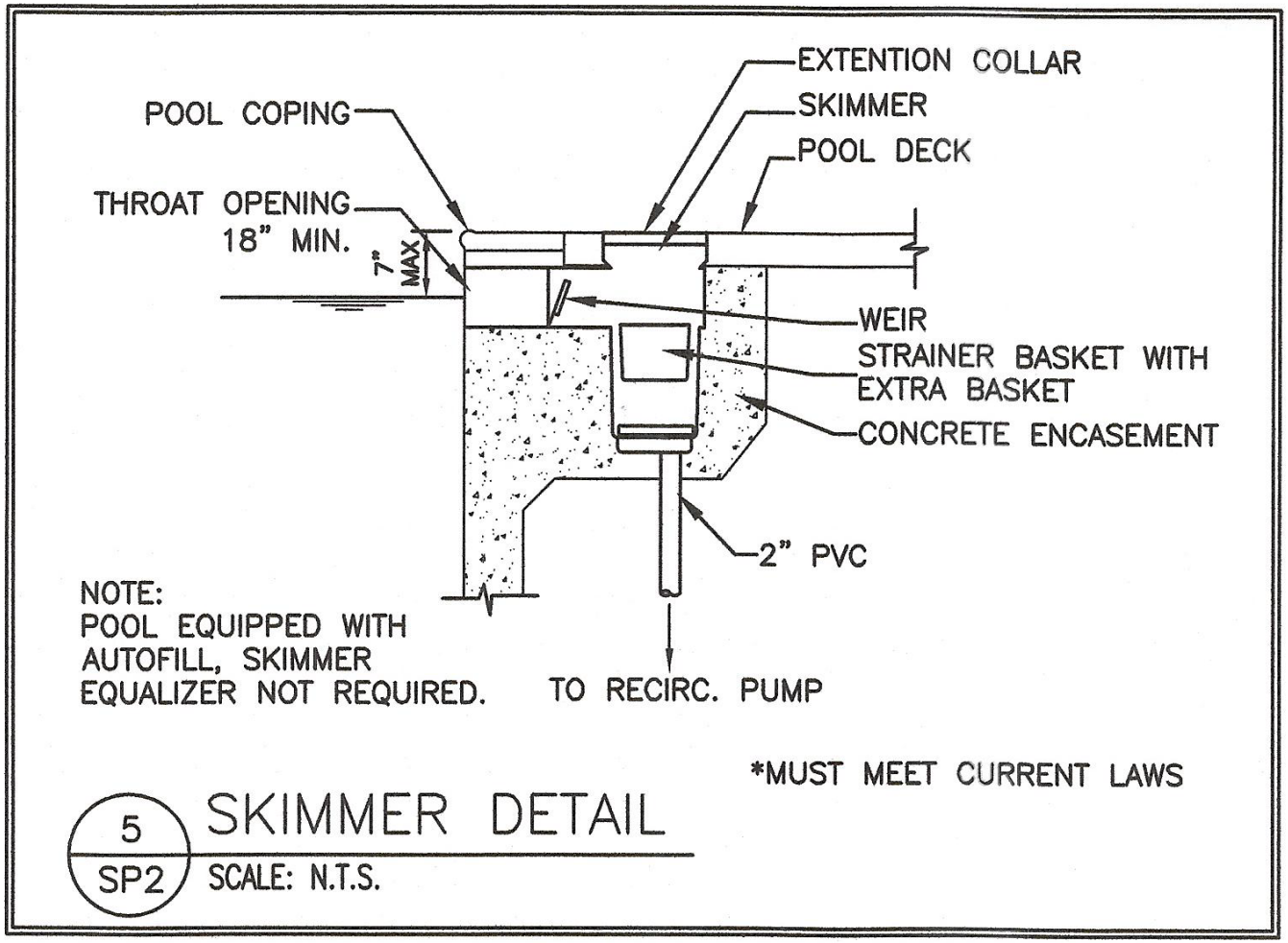
Extra heavy duty PVC lower unit (no transitional glue required)

2½" outside slip and 2" inside slip (outside skimmer)

2" threads for pressure testing (inside skimmer)

Two additional lid options available (sold separately): square or snap-in round/square

Optional vacuum pla
snap-in lug can be glued i
lid for easy storage p/n S



5 / SP2

SKIMMER DETAIL

SCALE: N.T.S.

PENTAIR

AUTOMATIC POOL FILLER INSTALLATION GUIDES

Model # T40-F

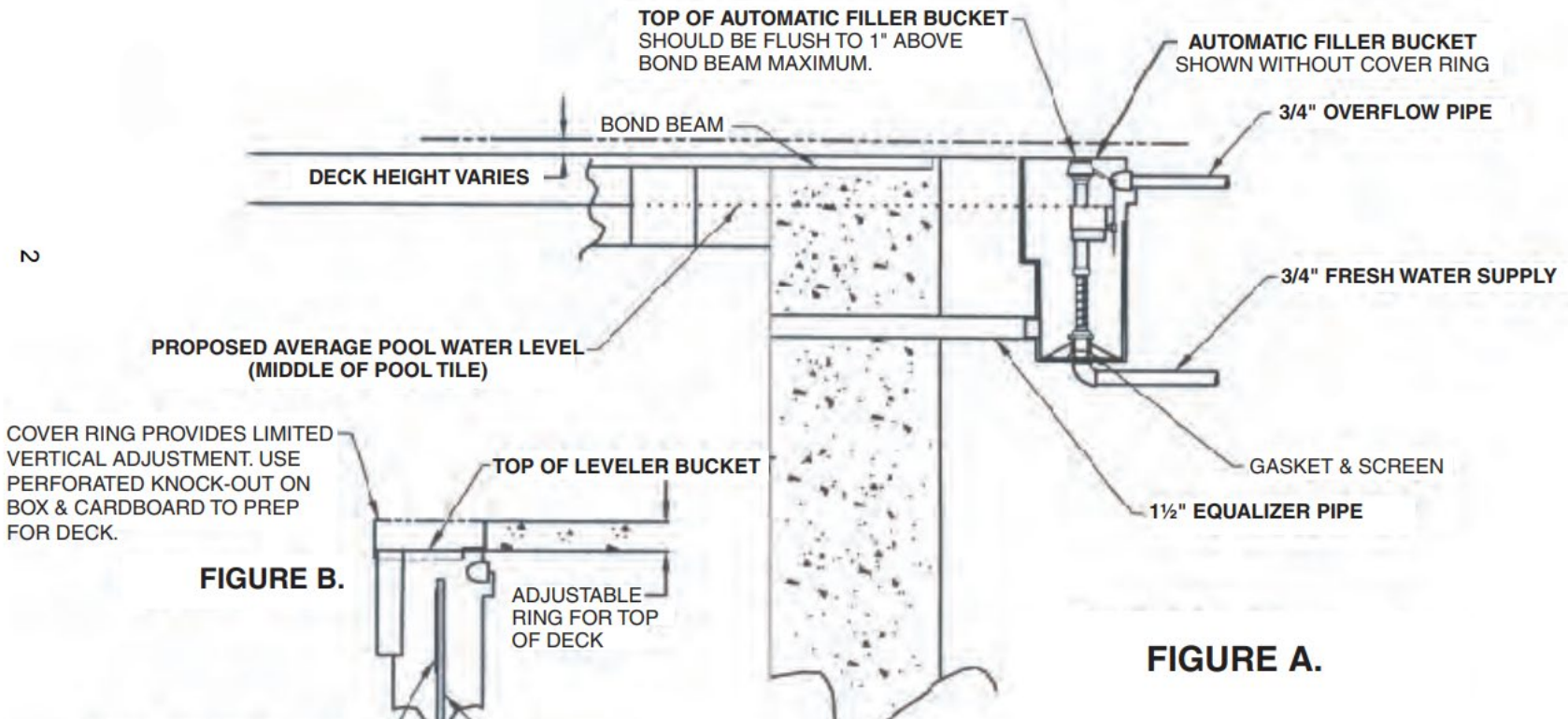
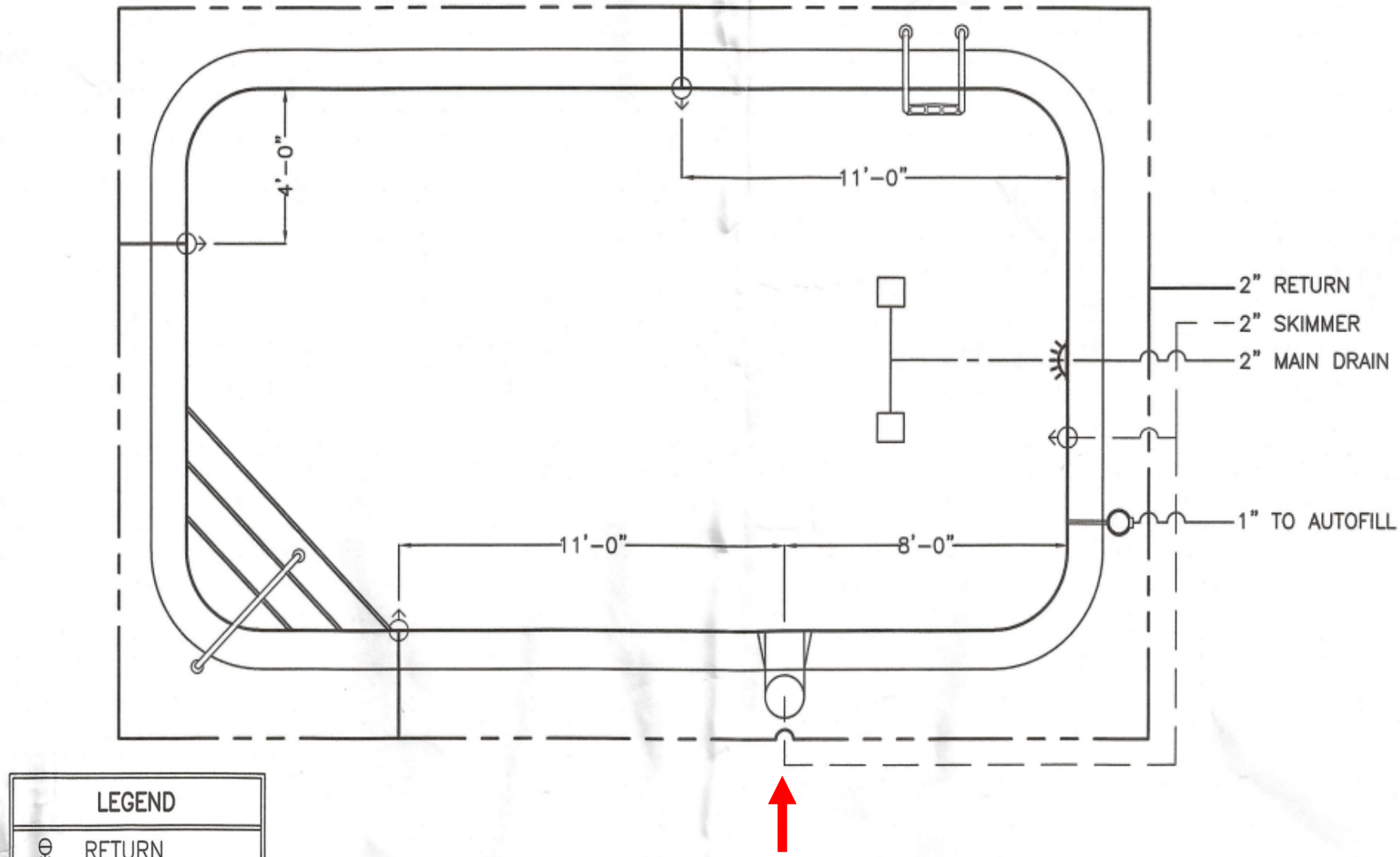


FIGURE A.

FIGURE B.

Only 1 Skimmer is required per 400 SF surface area



Example

Our previous example pool has 346 SF of surface area. 346 ÷ 400 = .86 so round up to 1. Per the rule at least 1 skimmer will be required for every 400 SF. Then verify on the drawing how many skimmers are shown.

9. **Surface Overflow systems: Skimmers, Gutter System or Combined**

Number of NSF skimmers required: 1 Plan shows 1 (Pool surface area **Ref #3 ÷ 400sf** or fraction thereof for swimming and wading pools, **Ref #3 ÷ 100 sf** for spas or fraction thereof per .2518(k)(3), .2531(a)(2) and .2532(4)(b), G.S. 130A-282(c)) & protected from air entrapment by auto-fill, fill spout/ hose or flooded suction on the pump per .2518 (l).

Auto-fill mfg. # Pentair T40FW

No skimmer equalizers allowed for new construction.

Skimmer Mfg. Aquastar **& Model #** SKR101

Max flow for Skimmer provided per NSF Listing. 90 **GPM**;

may require additional skimmers if allowed flow per skimmer is inadequate.

If Gutter pool with Balance Surge Tank Capacity, plan shows tank capacity: N/A gallons

Ex: 1 gal X **(Ref #3)** = required size of surge tank in gallons.

Note: This can include capacity of the piping system if submitted. (1 gallon per SF of pool surface area required per .2518(k)(2)(b))

- List the skimmer mfg. and model # and include per the spec sheet the max flow allowed per skimmer.
- Is an auto-fill system shown on the equipment list? If so, list manufacturer and model #

CIRCULATION PIPING AND SUCTION OUTLETS

10. **Circulation Drain Covers & SUMPS – (Bather accessible submerged suction outlets SOFAs are not allowed in wading pools less than 18" deep**
References: .2518(J) (1-3), .2532(4)(a) for spas, .2539 (a-c), ANSI/ PHTA/ ICC 7 – 2020 and ANSI/ APSP/ ICC -16 2017

Number of drains provided: _____

- Blockable or unblockable per manufacturer (circle one)
- Located within 15 ft. from a side wall
- Located in deepest section or other means for draining pool provided
- Dual drains connected by T pipe at least 3' apart at center or on different planes of pool structure.
- Connected dual drains are less than 30' apart
- Configuration must meet ANSI/ PHTA/ ICC page 7 and 8
- If no drains are provided, provisions for emptying pool completely provided

Cover Mfg. & Model # _____VGBA – 2017 spec sheet? _____ Life Span of Cover _____ years
Maximum Flow of Drain Cover: _____ GPM, floor_____ or wall _____, Does flow rating exceed max flow of pump (#5c)? Y/N

Feature drain sump Use **VGB 2017 drain cover Manufacturer Installation Instructions** to verify sump requirements
*** **FIELD BUILT SUMPS ARE ANY SUMP NOT SUPPLIED BY THE COVER MANUFACTURER per ANSI-PHTA-ICC 7 - 2020**

Matching Manufactured Sump	OR Field Built Sump Measurements
Model #	Field built sump as specified by cover manufacturer. Y/N Pipe size outlet of sump_____, Pipe depth _____ Pipe Orientation: side/ bottom, Sump Depth _____

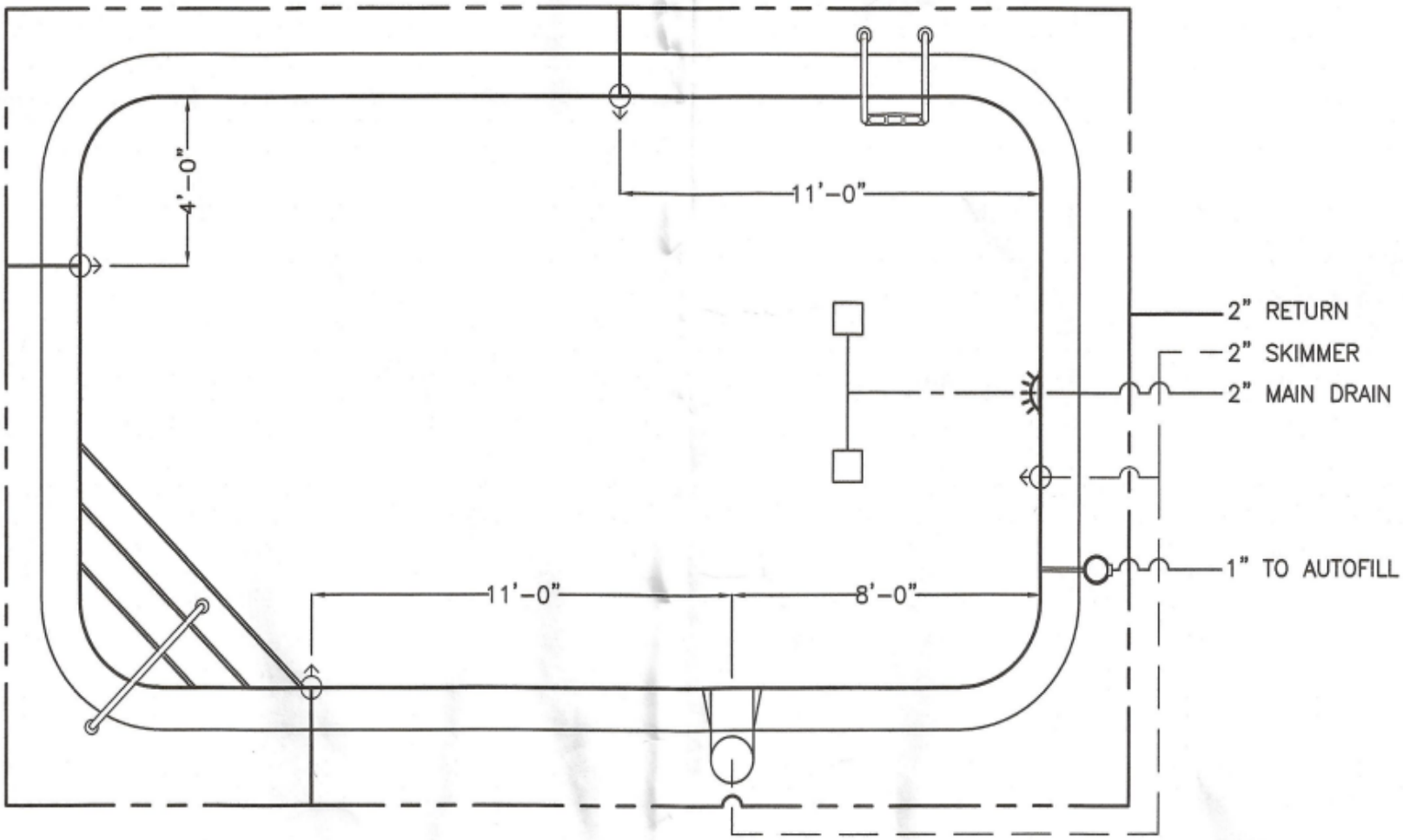
Hydrostatic Relief Valve or Drainage Provided per .2515 (b). Manufacturer and Model # _____
***Obtain a copy of final drain safety data compliance form for the file signed by the engineer or architect prior to first permit.**

11. **Circulation main drain pipe size** required using pipe sizing chart above: _____" Plan shows _____"
Pipe size must be capable of carrying **100% design flow of** circulation pump **(Ref #6)** per .2518(c)
Any flexible piping on spa shells must meet .2518(d)) In spas, T piping must be the same diameter of the main drain outlet per .2532(4)(a).

Example

Suction Outlet Covers and Sumps as well as Hydrostatic Relief Valve are listed on Pool Equipment list on SP2

POOL EQUIPMENT LIST				
QTY.	ITEM	MANUFACTURER	MODEL #	DESCRIPTION
1	PUMP	PENTAIR	WFE-2	1/2 HP WHISPER FLO COMMERCIAL PUMP (1 PHASE PUMP)
1	BASKET	PENTAIR	070387	EXTRA STAINER BASKET
1	FILTER	PENTAIR	TR50	NSF APPROVED WITH AIR RELIEF PRESSURE GAUGE
1	VALVE	PENTAIR	261055	MULTIPORT VALVE
1	FLOWMETER	FLOW VIS	FV-C	2" PVC MOUNT (BACKWASH NOT TO EXCEED 50 GPM)
1	CHLORINATOR	PENTAIR	320	AUTOMATIC EROSION TYPE (PENTAIR #171096)
1	SKIMMER	AQUASTAR	SKR101	INCLUDES BASKET
4	RETURN INLETS	HAYWARD	SP-1419C	ADJUSTABLE EYEBALLS
2	SUCTION OUTLET	ASA	FPK-50-809	9x9 SUCTION OUTLET WITH 3" PORT
2	*MAIN DRAIN COVERS	*AQUASTAR	914101	9x9 ANTI-ENTRAPMENT FRAME & GRATE COVER (394 GPM MAX. RATING)
1	RELIEF VALVE	HAYWARD	SP-1056	1 1/2" HYDROSTATIC RELIEF VALVE
1	COLLECTOR TUBE	HAYWARD	SP-1055	1-1/2" x 12" COLLECTOR TUBE
1	AUTO FILL	PENTAIR	T40FW	AUTOFILL W/ BRASS FLOAT VALVE
1	HANDRAIL	S.R. SMITH	3HR-4-065	4'-0" STAINLESS STEEL HANDRAIL
1	LADDER	S.R. SMITH	VLLS-103S-MG	3-STEP LADDER
1	LIGHT	PENTAIR	78458100	500W INCANDESCENT UNDERWATER LIGHT (50 FT CORD)
1	NICHE	PENTAIR	78210600	STAINLESS STEEL W/ 1" HUB
1	LIFT	AQUA CREEK	RANGER	ADA COMPLIANT HANDICAP SWIM LIFT BATTERY POWERED 350 LB. OPERATING LOAD CAPACITY



4 / SP1 POOL PLUMBING PLAN

SCALE: 1/4" = 1'-0"

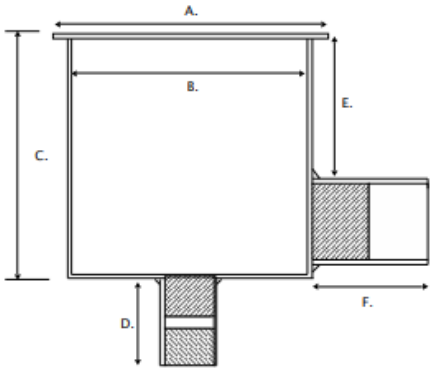
A.S.A. MFG. INC.

www.asamfg.com
email: info@asamfg.com

HEAVY DUTY FIBERGLASS SUMPS

14879 SW 111th St.
Dunnellon, FL 34432
352-465-0236
352-465-0239 FAX

- Fast installation
- Rough sand exterior finish
- Durable smooth gelcoat interior
- No forming! No pouring!
- Premium fiberglass & resin for maximum structural strength
- Non-metallic -- No grounding**
- 2" f.p.t. x f.p.t. fitting for hydro relief valve and pebble pipe
- "Quick Mount" hardware and sealant included
- Custom configurations fabricated -- Call us today!
- Optional waterstop flange



The ASME A112.19.8a-2008 Standard recommends the "E" dimension to be 1.5 times the diameter of the sump's outlet from the bottom of the grate to the top of the outlet.

Made in the USA

VGB 2008

NSF COMPONENT

Legacy Flange Design

Frame & Grates Sold Separately

Fiberglass LEGACY SUMP Dimensions

Sump Sizes & Part #'s	Dimensions (in inches) * A	B	C	D	E	F	Outlet Size Compatible f.p.t. x soc	Grates **	NOTES
9" x 9"									
FPK-50-809	10.5	8.5	12	4.5	6.5	3	3"	List A	1

VGB Compatible Grates *

Grate Sizes Part #'s	List	Open Area (sq in.)**	Flow Rate** @1.5 ft/ sec	NOTES
9" x 9"	A			
CMP 25508-090		38.9	120 gpm	
640-479XV		39.9	186 gpm	
MLD-FGD-0909		42.1	248 gpm	
914101		84	394 gpm	
12" x 12"	B			
WG1032HF		41.07	232 gpm	
640-4720		62.4	292 gpm	

VGBA-2017 PRODUCT SPECIFICATIONS

Suction Outlet Fitting Assembly (SOFA)

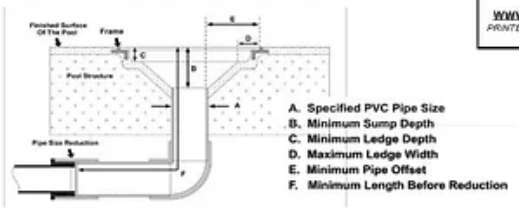
VGBA-2017 Flow Ratings, Sump Dimensions, Sump Flow Path Zone, and Head Loss Curves

Certified to NSF/ANSI/CAN 50 ANSI/APSP/ICC 16 - 2017

DIRECTIONS: Please follow the SOFA specific flow rates, sump specifications, and flow path zone information below. The installation must conform to these minimum/maximum requirements including the SOFA dimension defined in Figure 1. The flow path zone is defined by dimensions A through E. The installed sump may be manufactured or field-built and it may be larger/deeper than Figure 1. Please write the Cover Model Number, orientation, and SOFA Model Flow Rating on the *VGBA DRAIN COVER IDENTIFICATION INFORMATION* label that comes with each AquaStar Pool Products, Inc. drain cover.

Cover Model Number:
914xxx

FIGURE 1 – SOFA MODEL & FLOW PATH



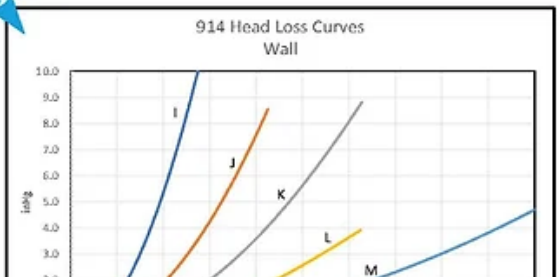
FOR MOST CURRENT INFORMATION SCAN THE QR CODE OR VISIT
WWW.AQUASTARPOOLPRODUCTS.COM/FLOWCODE
PRINTED DOCUMENTS MAY NOT HAVE THE MOST CURRENT FLOW RATINGS OR INSTALLATION OPTIONS.

SOFA Model No.	Pipe Size (Nominal)	Pipe Depth (Minimum)	Orientation (Wall / Floor)	Flow Rating (GPM)	Head Loss Curve
914-8f_A-2s_B1.6_C0.4_D0.5_E2.4_F16	2" (s)	1.6"	Floor (f)	150	A
914-9f_A-2b_B3_C1.6_D0.5_E2.8_F16	2" (b)	3"	Floor (f)	170	B
914-9f_A-2,1.5b_B0_C1.6_D0.5_E2.8_F16	2" + 1.5" (b)	0"	Floor (f)	130	C
914-9f_A-2.5b_B3_C1.6_D0.5_E2.6_F16	2.5" (b)	3"	Floor (f)	250	D
914-9f_A-3b_B3_C1.6_D0.5_E2.5_F16	3" (b)	3"	Floor (f)	250	E
914-10f_A-3s_B5.6_C1.6_D0.5_E1.7_F16 [Sump P/N 9-3SB]	3" (s)	5.6"	Floor (f)	275	F
914-9f_A-4s_B5.6_C1.6_D0.5_E1.7_F16 [Sump P/N 9-3SB]	4" (s)	5.6"	Floor (f)	300	G
914-9f_A-4b_B9.8_C1.6_D0.5_E1.8_F16 [Sump P/N 9-4SB]	4" (b)	9.8"	Floor (f)	560	H
914-9w_A-1.5b_B3_C1.6_D0.5_E1.6_F16	1.5" (b)	3"	Wall (w)	126	I
914-9w_A-2b_B3_C1.6_D0.5_E2.8_F16	2" (b)	3"	Wall (w)	170	J
914-9w_A-2.5b_B3_C1.6_D0.5_E2.6_F16	2.5" (b)	3"	Wall (w)	250	K
914-9w_A-3b_B3_C1.6_D0.5_E2.5_F16	3" (b)	3"	Wall (w)	250	L
914-9w_A-4b_B9.8_C1.6_D0.5_E1.8_F16 [Sump P/N 9-4SB]	4" (b)	9.8"	Wall (w)	430	M

Note 1: "SOFA Model No" nomenclature; bottom pipe = (b), side pipe = (s). See Fig 1 for capital letters A through E

Note 2: Head loss inHg is measured 16 to 24 inches from the finish surface of the pool. Reference Fig 1 dimension F.

Note 3: [Sump P/N 9-xSB] are the part numbers marked inside these manufactured Sump Buckets. Use of these sumps is not required. Installing 914xxx covers on field-built sumps is permitted. To order 914xxx product with these sumps, please see the catalog or visit www.aquastarpoolproducts.com.



Hydrostatic Valve
SP1056

CIRCULATION PIPING AND SUCTION OUTLETS

10. **Circulation Drain Covers & SUMPS – (Bather accessible submerged suction outlets SOFAs are not allowed in wading pools less than 18" deep**
References: .2518(J) (1-3), .2532(4)(a) for spas, .2539 (a-c), ANSI/ PHTA/ ICC 7 – 2020 and ANSI/ APSP/ ICC -16 2017

Number of drains provided: 2

- Blockable or unblockable per manufacturer (circle one)
- Located within 15 ft. from a side wall
- Located in deepest section or other means for draining pool provided
- Dual drains connected by T pipe at least 3' apart at center or on different planes of pool structure.
- Connected dual drains are less than 30' apart
- Configuration must meet ANSI/ PHTA/ ICC page 7 and 8
- If no drains are provided, provisions for emptying pool completely provided

Cover Mfg. & Model # Aquastar 914101 **VGBA – 2017 spec sheet?** yes **Life Span of Cover** 5 years

XX **Maximum Flow of Drain Cover:** 150 **GPM, floor** X **or wall** _____, **Does flow rating exceed max flow of pump (#5c)? Y/N** NO

Feature drain sump Use **VGB 2017 drain cover Manufacturer Installation Instructions** to verify sump requirements
*** **FIELD BUILT SUMPS ARE ANY SUMP NOT SUPPLIED BY THE COVER MANUFACTURER per ANSI-PHTA-ICC 7 - 2020**

Matching Manufactured Sump	OR Field Built Sump Measurements
Model # ASA FPK-50-809	Field built sump as specified by cover manufacturer. Y/N Pipe size outlet of sump_____, Pipe depth _____ Pipe Orientation: side/ bottom, Sump Depth _____

Hydrostatic Relief Valve or Drainage Provided per .2515 (b). Manufacturer and Model # Hayward SP 1056
***Obtain a copy of final drain safety data compliance form for the file signed by the engineer or architect prior to first permit.**

11. **Circulation main drain pipe size** required using pipe sizing chart above: _____" Plan shows _____"
Pipe size must be capable of carrying **100% design flow of** circulation pump **(Ref #6)** per .2518(c)
Any flexible piping on spa shells must meet .2518(d)) In spas, T piping must be the same diameter of the main drain outlet per .2532(4)(a).

Require T piping size for drains to be a 3" pipe or require the flow meter verification of max flow reduction to max 150 GPM with a 2" T pipe on the permit.

Example using 40 GPM design flow with 1 skimmer, dual drains and 4 inlets. What size pipes are required?

Checking Pipe Sizes

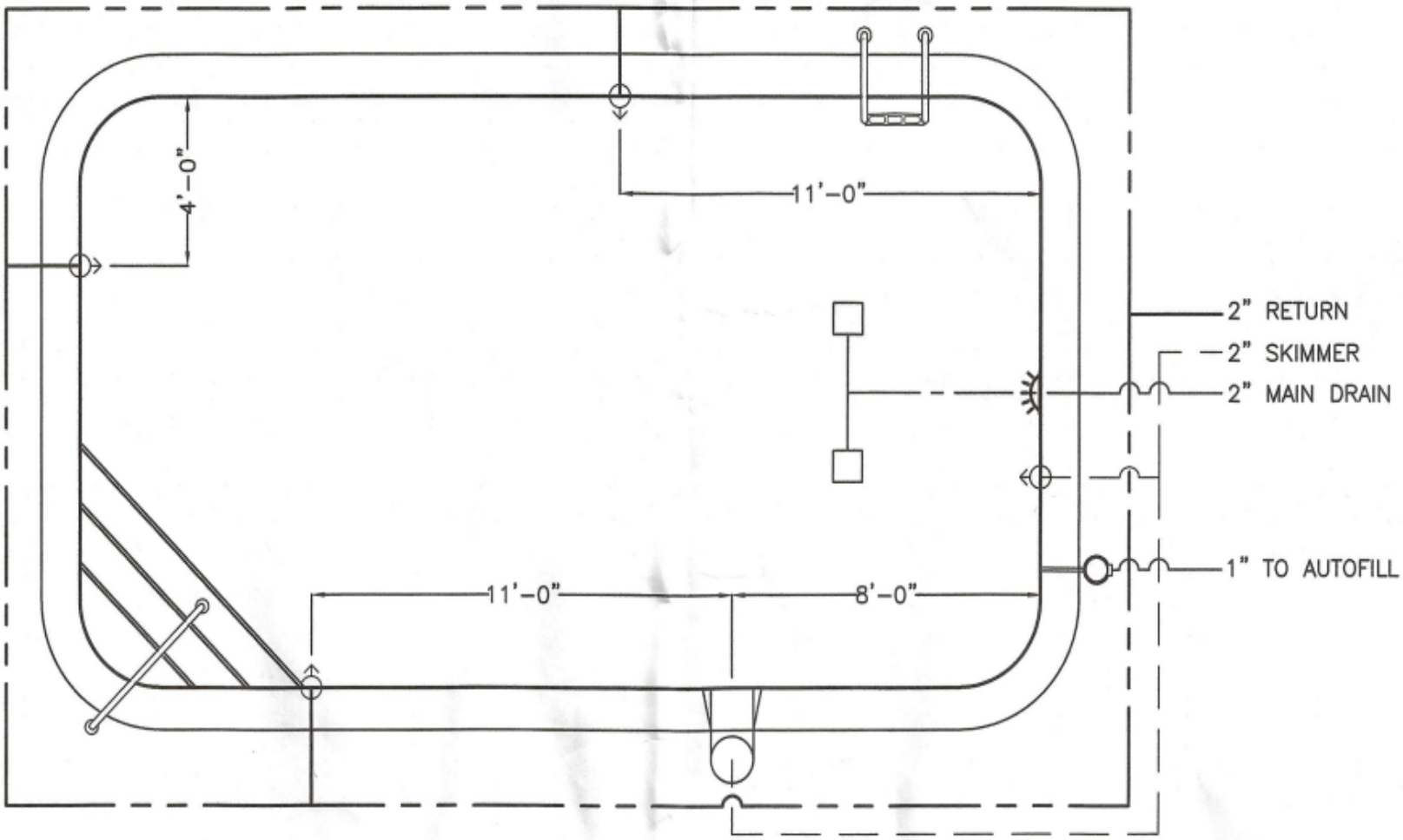
11. **Circulation main drain pipe size** required using pipe sizing chart above: 2" Plan shows _____"
    Pipe size must be capable of carrying **100% design flow of** circulation pump **(Ref #6)** per .2518(c)
    Any flexible piping on spa shells must meet .2518(d)) In spas, T piping must be the same diameter of the main drain outlet per .2532(4)(a).

12. **Skimmers pipe size** required 2" (Use Suction pipe sizing at bottom of page) Plan shows _____"
    (Pipe must handle **100% of design flow rate** (**Ref #6**) per.2518(c).

    Or gutter system overflow pipe size required N/A" Plan shows _____"
    Must handle 100% of design flow per .2518(c) (**Ref #6**) Use pipe sizing chart to check max flow per pipe.

13. **Inlet return pipe size** required 1.5" Plan shows _____"
    Must handle 100% design flow of discharge (**Ref #6**) per .2518(d) and reduction in pipe branches must be sized to handle flow of inlets in each branch.

PVC Sch. 40 Pipe Sizing Chart per .2518(d)										
pipe size	1"	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"
Suction PVC pipe @6ft/sec (all drains, skimmers, gutters)	16	38	62	89	138	238	539	935	1474	2093
Discharge or Returns (inlets) PVC pipe @10ft/sec	27	63	104	149	230	396	899	1559	2457	3488



4 / SP1 POOL PLUMBING PLAN

SCALE: 1/4" = 1'-0"

After checking what pipe sizes are needed, verify the plans shows at least minimum pipe sizes are shown. Record any discrepancies needing corrections.

Checking Pipe Sizes

11. **Circulation main drain pipe size** required using pipe sizing chart above: 2" Plan shows 2"
    Pipe size must be capable of carrying **100% design flow of** circulation pump **(Ref #6)** per .2518(c)
    Any flexible piping on spa shells must meet .2518(d)) In spas, T piping must be the same diameter of the main drain outlet per .2532(4)(a).

12. **Skimmers pipe size** required 2" (Use Suction pipe sizing at bottom of page) Plan shows 2"
    (Pipe must handle **100% of design flow rate** (**Ref #6**) per.2518(c).

    Or gutter system overflow pipe size required N/A" Plan shows _____"
    Must handle 100% of design flow per .2518(c) (**Ref #6**) Use pipe sizing chart to check max flow per pipe.

13. **Inlet return pipe size** required 1.5" Plan shows 2"
    Must handle 100% design flow of discharge (**Ref #6**) per .2518(d) and reduction in pipe branches must be sized to handle flow of inlets in each branch.

PVC Sch. 40 Pipe Sizing Chart per .2518(d)										
pipe size	1"	1.5"	2"	2.5"	3"	4"	6"	8"	10"	12"
Suction PVC pipe @6ft/sec (all drains, skimmers, gutters)	16	38	62	89	138	238	539	935	1474	2093
Discharge or Returns (inlets) PVC pipe @10ft/sec	27	63	104	149	230	396	899	1559	2457	3488

Now that we have looked at components of the circulation system, let's go back and see what the limiting factors are on flow to complete item 6.

6b. Design Flow Range: 28.8 to ? 49 GPM Limiting Factors ? 49

On the example pool used for checking the circulation pumping system and filtration, what was the most limiting factor?

Minimum turnover rate	28.8 GPM
Design turnover rate	40 GPM
Suction pipe size @ 6'/sec	62 GPM
Discharge pipe size @ 10'/sec	104 GPM
Sand filter	49 GPM
4 inlets	80 GPM
1 skimmer	90 GPM

Our range is 28.8 GPM to 49 GPM because the filter is small.

14. Disinfectant Method: (Erosion, salt or liquid) Reference NSF.org

Verify NSF & properly sized per volume of pool:_____
Ref. NSF.org Mfg. & Model #_____

Note:

- Sized and installed per manufacturer's instructions. Consider all variables for individual pool. Ex. type of desired disinfectant, erosion feeder uses specified chemical, designed for specific volume of water, etc.

- If liquid chlorine or acid pump is used, a method to prevent operation when no water circulation pump operating per .2535(6) (aka Interlock) See manufacturer's instructions.

Example

PENTAIR AUTOMATIC CHLORINE/BROMINE* FEEDER MODEL #320

(* Using Bromine tablets with this device is not NSF certified)

Features:

- **No special venting required.**
- **Completely enclosed-no escaping gases.**
- **Positive external no-clog control valve.**
- **When used with timer, feeder is designed to automatically lower the water level so tablets are not soaking during off period of pump. This allows more efficient use of tablets.**
- **No equipment damage. Feeds sanitizer directly to pool or spa.**
- **All parts replaceable.**
- **To prevent over chlorination during use, completely completely close the control valve and the built in check valve will prevent chemical from being fed into pool or spa.**

YOUR FEEDER IS THE MOST EFFICIENT AND TROUBLE-FREE AUTOMATIC FEEDER YOU CAN BUY, BUT IT CAN ALSO BE DANGEROUS TO YOU AND YOUR EQUIPMENT. PLEASE FOLLOW INSTRUCTIONS EXACTLY AND HEED ALL CAUTIONS. YOUR SAFETY AND THE PROTECTION OF YOUR EQUIPMENT IS OUR FIRST CONCERN.

It is important to read all information **BEFORE** proceeding with the installation. The information will guide you in installing your feeder properly and to avoid problems due to improper installation.

IF YOUR POOL OR SPA HAS COPPER PLUMBING . . . STOP!!

Never install the feeder into copper plumbing as pipe damage will occur. (See Equipment Safety CAUTION sheet enclosed). **NOTE:** If heaters are used, a Fireman's Switch or equivalent must be installed to prevent possible damage and improper operation of Check Valve and other equipment subject to heat damage.

INSTALLATION INSTRUCTIONS MODEL #320

Note: Make sure all pumps and timer switches are in the OFF position.

WHERE TO INSTALL YOUR FEEDER

The #320 feeder is designed for permanent installation in the return line of your new pool or spa and must always be installed after the heater, pool cleaner, valves, etc. If your pool does not have a heater, then it must be installed after the filter or any other piece of equipment.

DAMAGE TO THE HEATER AND OTHER EQUIPMENT COULD RESULT IF HIGHLY CHLORINATED WATER FLOWS THROUGH IT.

If your pool is equipped with a solar system it may be necessary to install a **HI FLOW KIT.** This kit can be installed if your feeder is not getting adequate flow and/or pressure through the system. Refer to information on sheet enclosed. Your feeder may be installed in existing PVC plumbing but will require a union and/or other fittings. The feeder comes complete for installation with 2" or 1½" PVC plumbing. Choose a site in the return line where feeder can be installed in a vertical position. Always install as far from any metal equipment as practical since fumes, etc. can corrode them. If optional corrosion resistant check valve is required refer to installation instructions before next step.

BASIC PLUMBING INSTALLATION INSTRUCTIONS

2" OR 1½" PVC PIPE: If feeder is being installed on a pool, spa or pool/spa combination, correct plumbing procedures must be followed to insure proper flow through feeder. If pool or spa is plumbed with 2" PVC pipe, be certain the pump, filter and heater all have 2" inlet and outlet fittings. If any part of the equipment has less than 2" fittings or pipe, then a minimum of 6" x 1½" reducer bushings must be installed directly into the inlet side of the feeder using the 2" x 1½" reducer bushings supplied. This will build pressure directly into the feeder insuring proper operation. Continue with 2" PVC pipe on the outlet side of the feeder.

POOL/SPA COMBINATION: If plumbing and equipment is a full 2" and the feeder is being installed on the pool return line after the diverter valve, with a portion of the water diverted to the spa, install a minimum section of 6" x 1½" PVC pipe directly into the inlet side of the feeder using the 2" x 1½" reducer bushing supplied. Continue with 2" PVC pipe on the outlet side of the feeder. This will compensate for that portion of water being diverted to the spa.

90° ELBOWS: Plumbing a 90° elbow directly into the inlet side of the feeder may cause turbulence inside the elbow. This will prevent water from being scooped into the feeder. A minimum of a 6" length of PVC pipe should be installed between the 90° elbow and the inlet side of the feeder.

chemical residual. It is recommended that the chemical residual be checked daily for the first 5 days. Remember . . . hot days, higher water temperature or increased pool/spa activity will cause your pool/spa to use more sanitizer. When possible, increase the feed rate a day or two in advance. Because the chlorine demand in your pool/spa varies and is dependent on many factors (sunlight, bather load, water temperature, etc) your valve setting may have to be changed from time to time to adjust to these conditions. For example, the winter setting may be #2 while the summer setting is #3. Check the chlorine residual daily to find the ideal setting. Note: Higher numbers dispense more chemical. Small gradual changes are imperative for control.

HOW TO RECHARGE FEEDER

1. Turn control valve to the closed position. **SHUT OFF PUMP.**
2. Wait one minute. This will allow water and fumes to drain from feeder.
3. Leave control valve closed and turn on pump. The check valve will prevent water from entering the feeder.
4. Remove cap and fill with proper size tablets or sticks. (See Operating Instructions #1)
5. Making sure O-ring is clean, lubricated with Lifegard silicone and is in place, replace cap. Hand tighten only.
6. Open control valve to original setting. Inspect inlet line below control valve each time feeder is recharged. Replace lines yearly if necessary.

SPECIAL FEATURES AND INSTRUCTIONS

If while using 3" diameter tablets the #320 feeder does not provide enough chlorine residual, switch to 1" tablets. The smaller tablet will erode faster producing more chlorine residual. If this does not correct the situation, the #320 has been fitted with an optional opening at the top of the feeder (which is plugged). To accommodate attachment of the valve and tubing assembly for top entry of water into the feeder, an additional length of tubing has been included. The following procedure should only be used if the suggested change has not solved the situation. Top entry in normal situations can cause over chlorination.

1. Turn off pump and timer switches.
2. Remove tubing by unscrewing compression nut at each end of tubing.
3. Remove plug at top of feeder directly above control valve.
4. Remove control valve. If nipple stays in valve, carefully remove by using pliers at the center of nipple. There is no need to remove the 90° tube fittings.
5. Wrap plug with 2 or 3 wraps of threaded tape in opposite direction of tightening. Screw into opening where control valve was attached. Hand tighten plus 2 or 3 turns. Do not overtighten.
6. Wrap threads of nipple with threaded tape. Thread nipple into top opening. Finger tighten only. Thread valve onto nipple. After nipple starts to turn from tightening valve, 2 to 3 more turns is enough. The nipple or valve can be broken by overtightening.
7. Slide compression nut over long section of tube. Slide tube over tapered part of 90° tube fitting and tighten. Hand tighten only. Repeat for other end of tubing.
8. Set control valve to #1. Turn on pump and timers. Check residual daily to determine proper setting. Small gradual changes are imperative for control.

Rainbow Chlorine and Bromine Feeders

Years of customer use and satisfaction have proven Rainbow feeders to be the performance leader in pool & spa chemical dispensers.

Featured Highlights

- 300 and 320 series feeders available in clear amber for easy tablet level monitoring
- Completely enclosed system – no special venting required
- No escaping gases
- 50 PSI maximum operating pressure

In-Line Feeders

- **320 Series.** For permanent installation in return line of new or existing pools or spas. Installs in return line on pressure side of pump downstream of all equipment. Standard with 2 in. slip PVC fittings and adapters for 1-1/2 in.

Off-Line Feeders

- **300 Series.** Retrofits into existing pools or spas. Operates on pressure side of pump. Uses 1/4 in. feeder hoses, control valve and fittings.

Output rating for Bromine is not NSF Certified.

Ordering Information

Product	Model	Description	Carton Qty.	Carton Wt. (Lbs.)
		IN-LINE FEEDERS		
R171096[1]	320	Holds 11 large or 98 small Bromine or slow dissolving Trichlor tablets. Treats 6,500 to 27,000 gallons bottom feed and 18,000 to 70,000 gallons top feed.	1	30
R171218[1]	320C	Holds 11 large or 98 small Bromine or slow dissolving Trichlor tablets. Treats 6,500 to 27,000 gallons in a bottom feed configuration and 18,000 to 70,000 gallons in a top feed configuration with see-through amber body.	1	30
		OFF-LINE FEEDERS		
R171016[1]	300	Holds 11 large or 98 small tablets. Treats 12,000 to 48,000 gallons.	1	26
R171022[1]	300C	Holds 11 large or 98 small tablets. Treats 12,000 to 48,000 gallons with see-through amber body.	1	26
R171026	302	Spa feeder. Includes spa chamber. Treats 500 to 2,000 gallons. Holds 15 small tablets.	1	28

14. Disinfectant Method: Verify NSF & properly sized per volume of pool per manufacturer spec sheet? yes

Reference NSF.org

Mfg. & Model # Pentair Model #320

If salt system, cell capacity/ # cells N/A. If salt generator is primary disinfectant, review manufacturer sizing.

Per .2535 (6),

"Automatic chlorine, bromine (and acid) pumps shall be automatically prevented from operating when the circulation pump is not in operation."

15. Vacuum cleaning system provided per .2518(f)

- Note:
- Vacuum ports located on pool wall 6”-<18” below water level. Skimmer vacuums may be used in pools with ≤2 skimmers and negate need for separate vacuum port.
- Vacuum piping, if separate from skimmer operation may be suction or discharge and should be sized according to manufacturer’s requirements.
- Specifics not mentioned in rules.
- Self- closing caps requiring tools to open per .2518 (f)

Port vacuum cover Mfg._____

Model#_____

Note: If no vacuum line is shown on plumbing plan and there are 2 or fewer skimmers, CPO will vacuum through the skimmer.

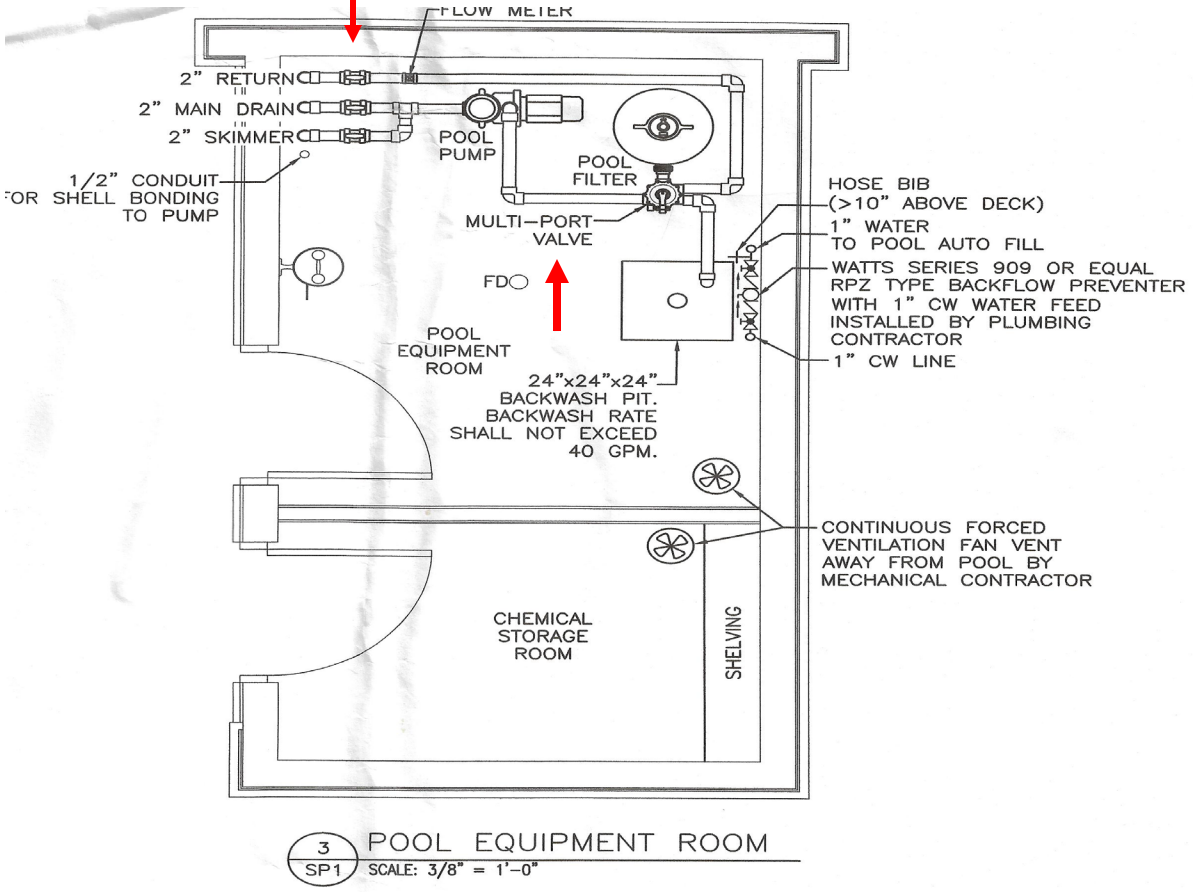
CLEANING AND SAFETY EQUIPMENT

QTY.	ITEM	MANUFACTURER	MODEL #	DESCRIPTION
1	VACUUM HEAD	PENTAIR	R201126	19 IN. FLEXIBLE VACUUM HEAD
1	WALL BRUSH	PENTAIR	R111316	18 IN. WHITE POLYPROPYLENE
1	LEAF SKIMMER	PENTAIR	R121196	HEAVY DUTY SKIMMER
1	ADJUSTABLE POLE	PENTAIR	R500070	8'–16' ADJUSTABLE POLE
1	LIFE HOOK	PENTAIR	R221026	ALUMINUM HOOK WITH HARDWARE SET
1	UTILITY POLE	PENTAIR	R191106	12' STRAIGHT POLE
1	VACUUM HOSE	ACTION/HAVILAND	NA225	1–1/2" x 50 FEET
1	LIFE RING	CAL–JUNE	GW–24	20" USCG APPROVED
1	THROW LINE	AJ GIAMMANCO	#60	1/4" x 50 FEET
1	TEST KIT	PENTAIR	R151716	PROFESSIONAL TEST LAB
2	SIGNS	PENTAIR	R234000	N.C. POOL RULES SIGN
4	SIGNS	PENTAIR	R231200	NO DIVING ALLOWED
2	SIGN	HAE	SBE	SHOWER BEFORE ENTERING
4	SIGN	PENTAIR	R230500	NO LIFEGUARD ON DUTY
2	SIGN	–	–	NO NIGHT SWIMMING
2	SIGN	–	R231700	EMERGENCY TELEPHONE SIGN

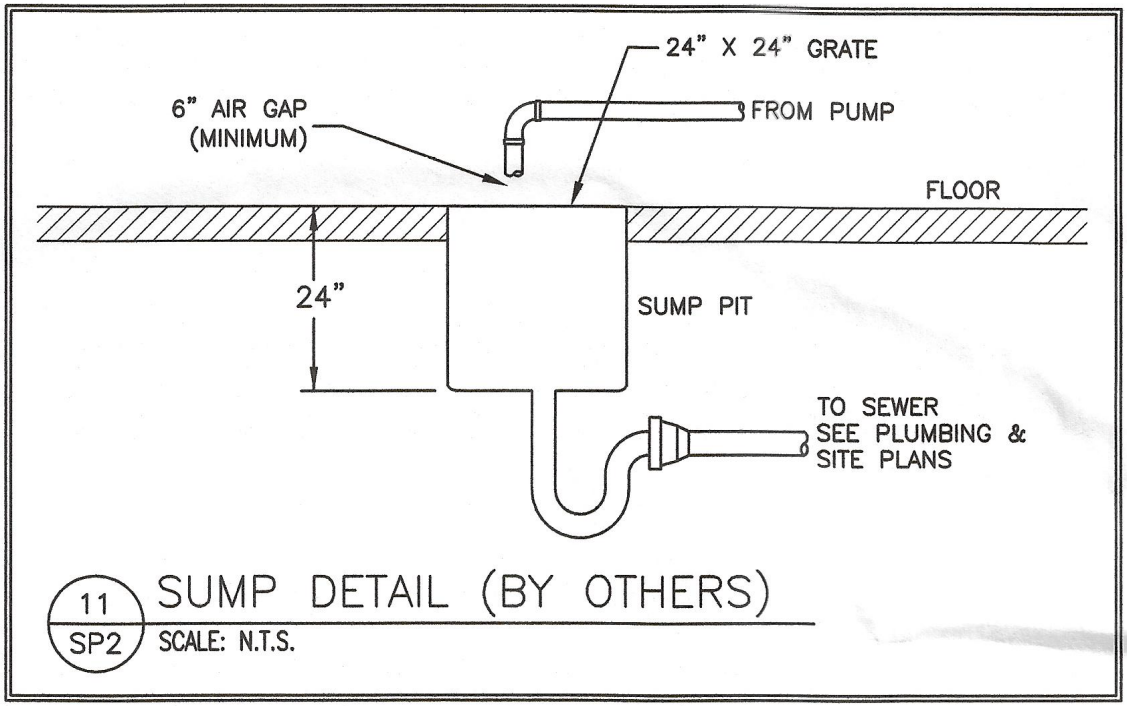
16. Valves provided to control flow from drains, surface skimmers or surface overflow systems, and vacuuming cleaning system .2518 (c) and (f)

POOL EQUIPMENT LIST				
QTY.	ITEM	MANUFACTURER	MODEL #	DESCRIPTION
1	PUMP	PENTAIR	WFE-2	1/2 HP WHISPER FLO COMMERCIAL PUMP (1 PHASE PUMP)
1	BASKET	PENTAIR	070387	EXTRA STAINER BASKET
1	FILTER	PENTAIR	TR50	NSF APPROVED WITH AIR RELIEF PRESSURE GAUGE
1	VALVE	PENTAIR	261055	MULTIPORT VALVE
1	FLOWMETER	FLOW VIS	FV-C	2" PVC MOUNT (BACKWASH NOT TO EXCEED 50 GPM)
1	CHLORINATOR	PENTAIR	320	AUTOMATIC EROSION TYPE (PENTAIR #171096)

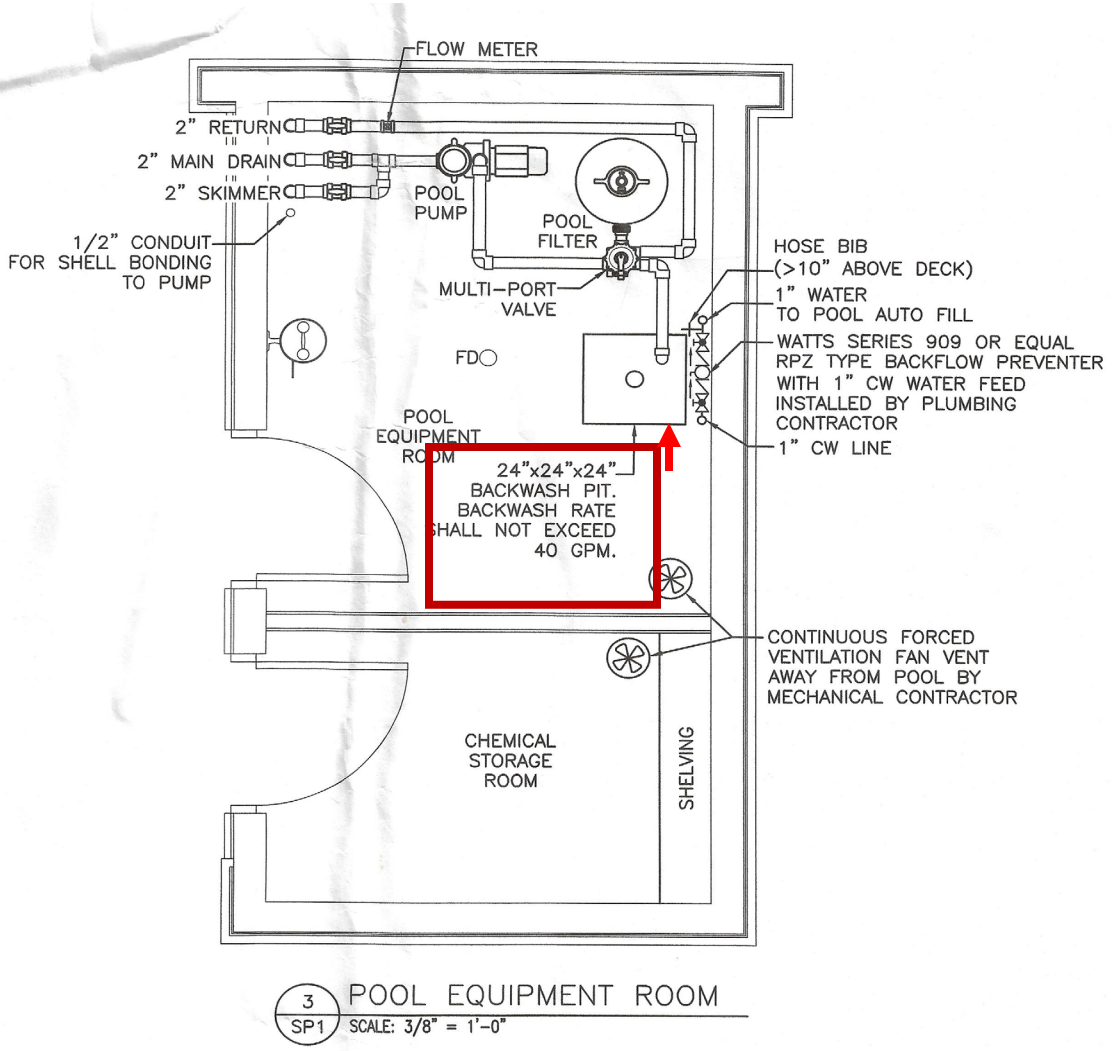
Valves on each suction and return line plus a multi-port valve required.



17. Drainage discharged through air gap from pool overflow, deck drains and filter backwash per .2513(b)



Backwash pit in equipment room



18. If lighting is provided: 0.5 watts per SF of pool surface (or lumens as required in rule .2524(d).

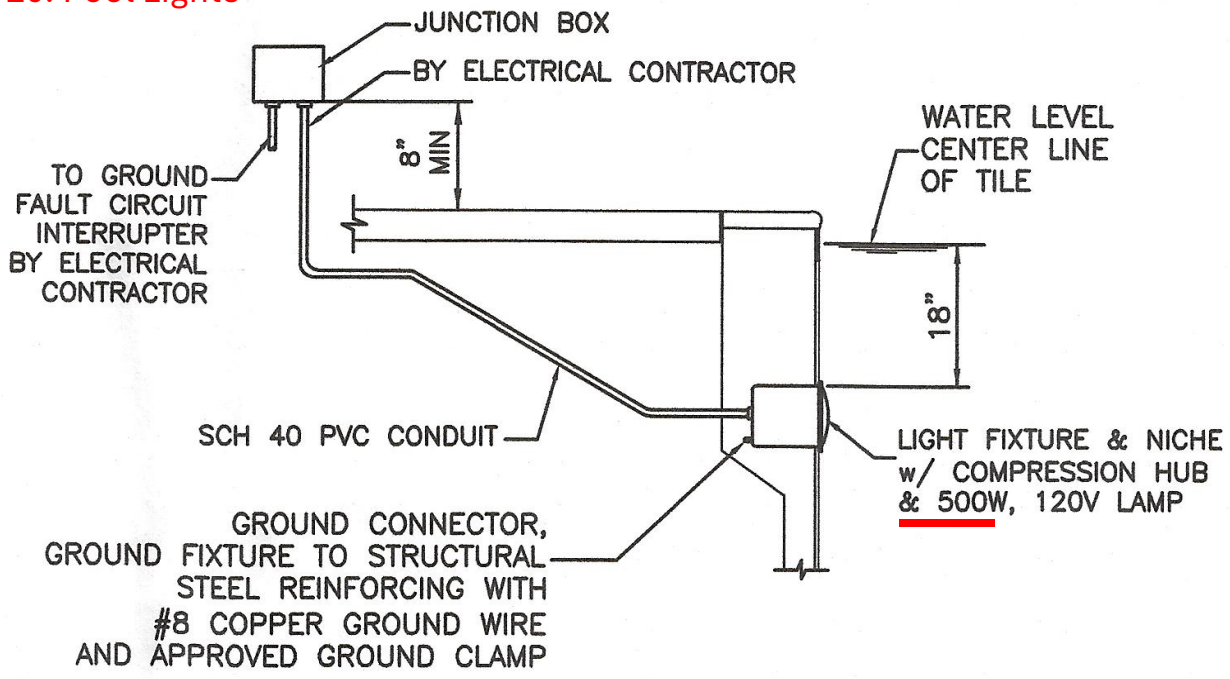
Nighttime swimming must meet Session Law 2017-209 and requires a nighttime visit by EHS.

Pool plan shows 1 light @ 500-watt

350 sq. ft. x 0.5 = 175 watts required, lighting on plan exceeds requirement.

New LED options are available. Look for equivalence to designed wattage or a statement from RDP. LED wattage will be much lower than incandescent lights.

20. Pool Lights



6
SP2

UNDERWATER LIGHT DETAIL

SCALE: N.T.S.

19. **Minimum deck** width required _____ ft. per .2522 (a) – © & (i) (**Ref #3**)

Minimum Deck Requirements

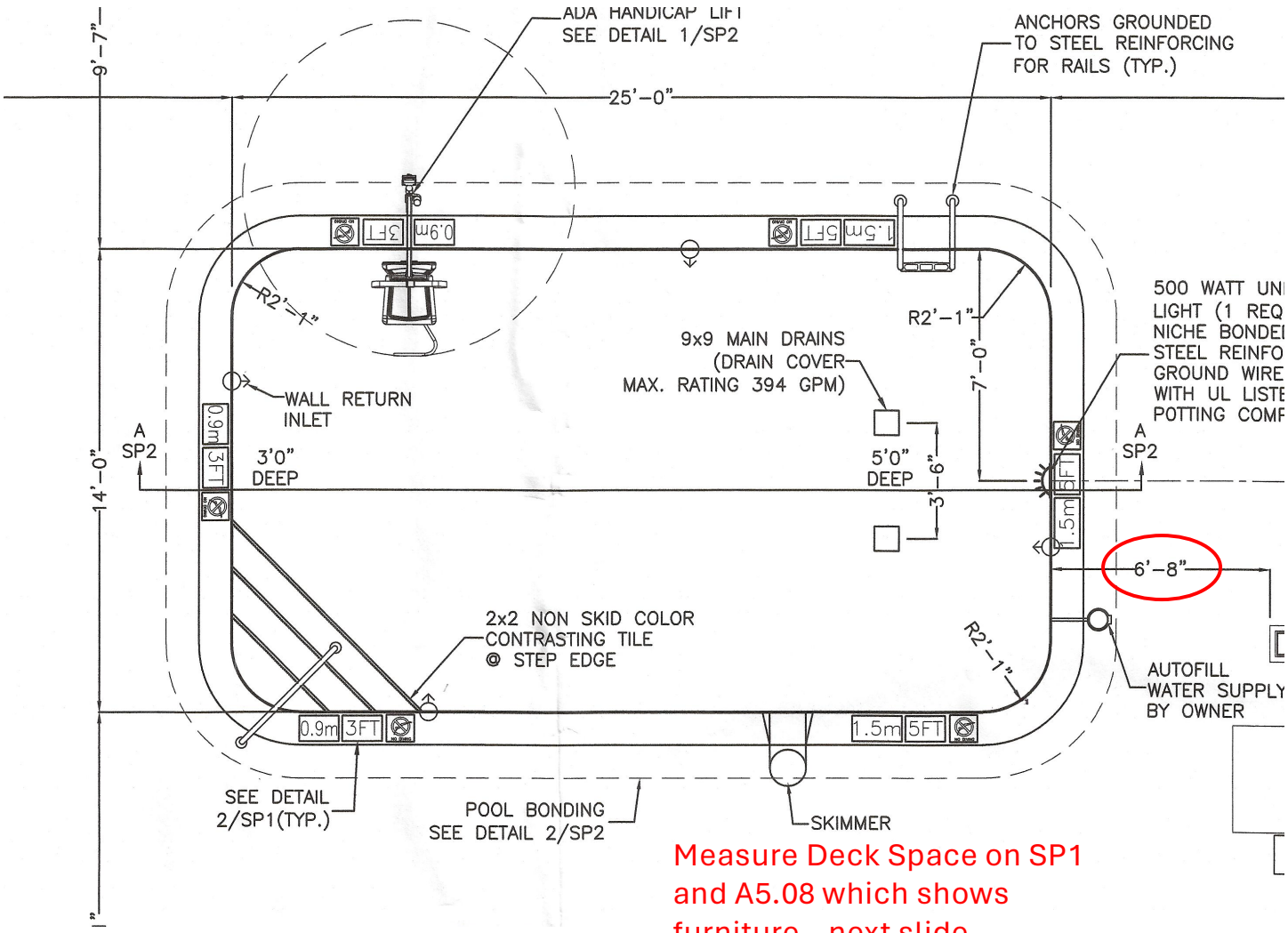
	Outdoor Pool	Indoor Pool	Wading Pool	Spa	Interactive Play	Permanent Structure
Deck Clearance	< 1600 sf = 6 ft > 1600sf = 8 ft	5 ft	4 ft	4 ft at least ½ around	Not Required	5 ft around diving board, handrail, slide, or other permanent structure
Vertical Clearance	NA	7 ft	7 ft	7 ft	Not Required	13 ft above board See Rule .2517

.2522 (a-e, i), .2543 (10), Special purpose pools such as waterslides and wave pools may vary from the minimum requirements to accommodate feat
ADA Chairs – NC Building Code enforced. New constructed pools over 300' perimeter may be required 2 access entries (lift and ramp). Lifts are per
infringe on pool decks but cannot block emergency egress corridors required for fire safety. Deck slope to drain ¼ to ½"/ft; slip resistant.

Example

Minimum deck width required is 6 FT. because pool surface area is < 1600 sf

SP1 shows sufficient deck space

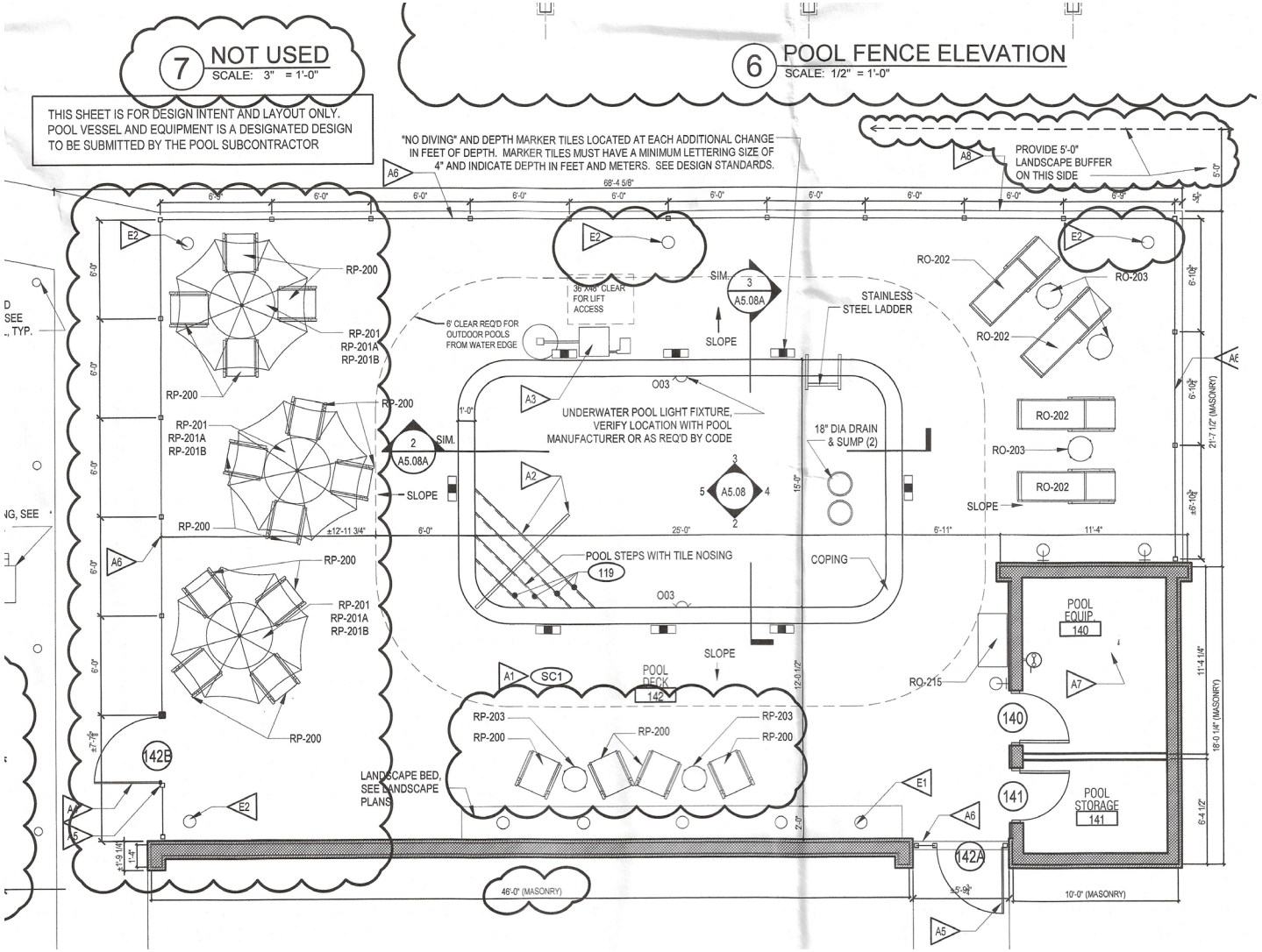


Measure Deck Space on SP1 and A5.08 which shows furniture – next slide

7 NOT USED
SCALE: 3" = 1'-0"

THIS SHEET IS FOR DESIGN INTENT AND LAYOUT ONLY.
POOL VESSEL AND EQUIPMENT IS A DESIGNATED DESIGN
TO BE SUBMITTED BY THE POOL SUBCONTRACTOR

6 POOL FENCE ELEVATION
SCALE: 1/2" = 1'-0"



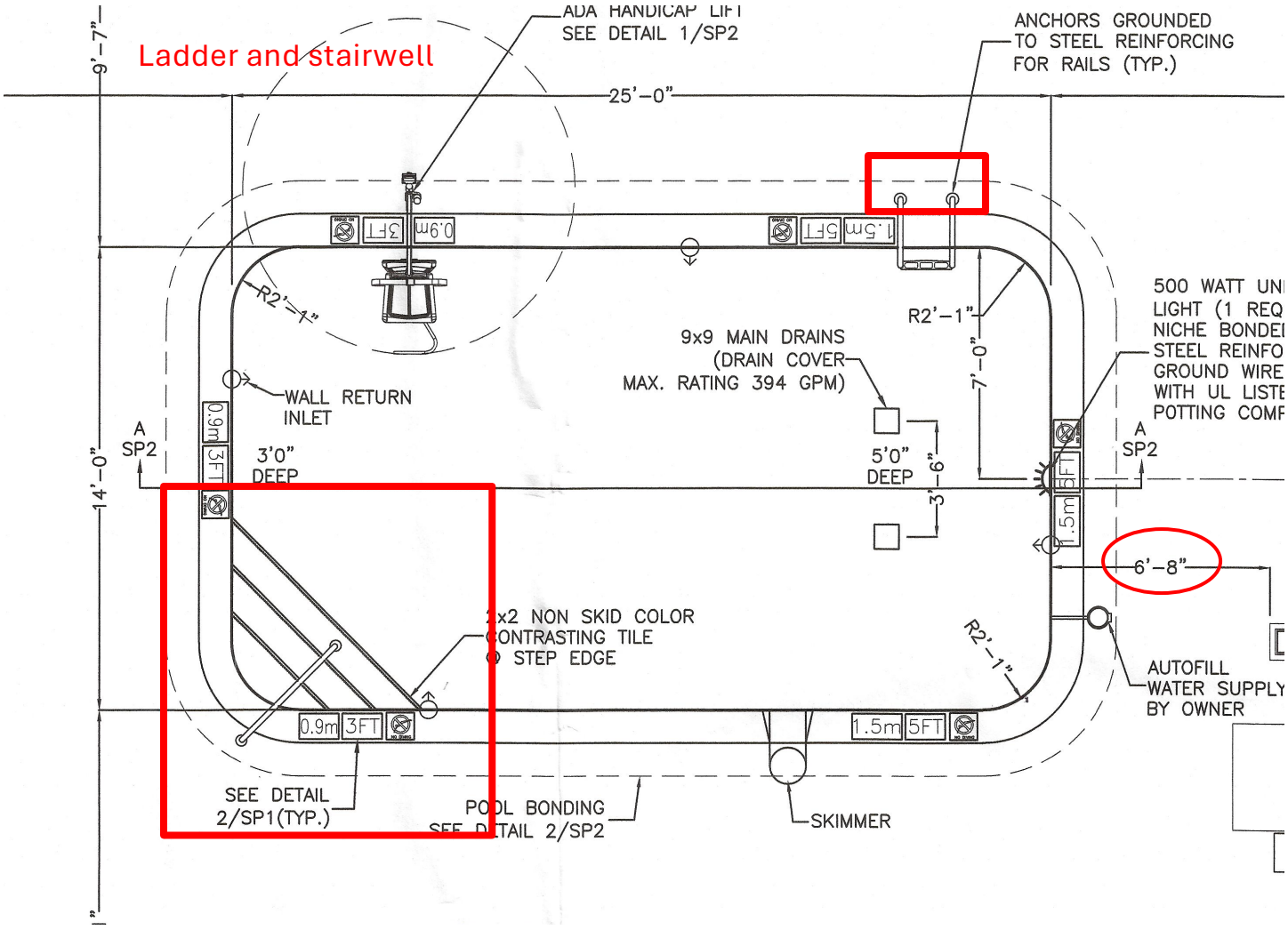
20. Ladders, steps, stairs, handrails required _____, Plan shows _____

Notes:

- If >2' deep, 1 in shallow; 1 in shallow & deepest, every 75'.
- If pool width > 30 ft, 2 ladders are required on either side of the deep end.
- Total # of Ladders/ Handrails Required = Perimeter ÷ 75 ft along shallow (5' depth of perimeter. Subtract one if steps present in shallow end)

Perimeter is < 75' and width is less than 30'.
Need 1 in shallow and 1 in deep

SP1 show a set of stairs in the shallow end and a ladder in the deep end



The check list will go into further rules for evaluating the stair treads, ladders, etc.

21. **Pool bather load** _____ (Pool surface area (**Ref #3**) ÷ applicable # in chart below and round down) **POOL DEPTH(s)** _____

Portion of Pools <5 ft	**15**sf/person per .2529(1)
Portion of Pools >5 ft (-300sqft at diving boards)	**24**sf/person per .2529(2)
Spas, wading pools, CAP	**10**sf/person per .2529(3) &.2531(a)(8)
Interactive play attraction splash zone	**25**sf/person per .2529(4)

346sf/15sf per person = 23 people

Pool Specifications shows bather load is 23 persons on SP1

POOL SPECIFICATIONS

- WATER SURFACE AREA IS 346 SQ. FT.
- WATER DEPTH IS 3'-0" TO 5'-0"
- NET CAPACITY IS 10,366 GALLONS WITH A FILTRATION CYCLE OF 5 HOURS AND 24 MIN AT A FLOW OF 32 GPM. (BASED ON A DYNAMIC HEAD OF 65 FEET)
- POOL PERIMETER = 74.5 LN. FT
- ALL PIPE WORK SHALL BE SCHEDULE 40 PVC, PRESSURE TESTED BEFORE PLACING CONCRETE
- BATHER LOAD IS 23 PERSONS AS PER GS 15A:18A SECTION 2529
- DECK AREA = 1,787 SQ. FT. BY OTHER THAN SPC

Found on page SP1

22. Restroom fixtures based on bather load. (.2526) Use chart for bath houses for male/ female facilities. At hotel, motel, condo or apartment complex where the farthest unit is more than 300' from the pool as measured along walkways, only a toilet and lavatory are required.

Divide Ref #12 equally between men and women.

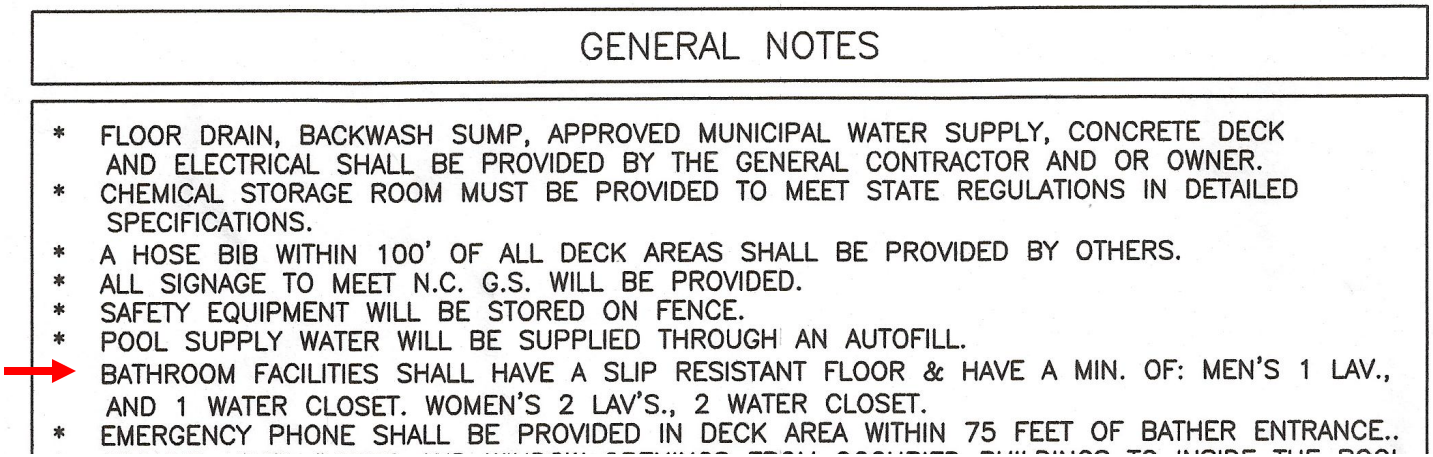
Men	Toilet	Lavatory	Urinal	Showers	Women	Toilet	Lavatory Showers
0-50	1	1	0	1	0-50	1	1
51-100	1	1	1	1	51-100	2	2
101-200	2	2	2	1	101-200	3	3
201-300	2	2	2	2	201-300	4	4
301-400	3	3	3	2	301-400	5	5
401-500	3	3	3	3	401-500	6	6
501-750	5	5	5	3	501-750	8	7

*If rinse showers are located on pool deck, 1 per every 200 bathers

*Shower drains are enforced by the building codes department. Typically, showers in bathhouses drain to sewer and cold-water showers on pool decks drain to the deck drains.

With a bather load of 23, 1 toilet 1 lavatory and 1 shower would be required for both men and women.

Bathroom facilities



GENERAL NOTES

* FLOOR DRAIN, BACKWASH SUMP, APPROVED MUNICIPAL WATER SUPPLY, CONCRETE DECK AND ELECTRICAL SHALL BE PROVIDED BY THE GENERAL CONTRACTOR AND OR OWNER.
* CHEMICAL STORAGE ROOM MUST BE PROVIDED TO MEET STATE REGULATIONS IN DETAILED SPECIFICATIONS.
* A HOSE BIB WITHIN 100' OF ALL DECK AREAS SHALL BE PROVIDED BY OTHERS.
* ALL SIGNAGE TO MEET N.C. G.S. WILL BE PROVIDED.
* SAFETY EQUIPMENT WILL BE STORED ON FENCE.
* POOL SUPPLY WATER WILL BE SUPPLIED THROUGH AN AUTOFILL.
* BATHROOM FACILITIES SHALL HAVE A SLIP RESISTANT FLOOR & HAVE A MIN. OF: MEN'S 1 LAV., AND 1 WATER CLOSET. WOMEN'S 2 LAV'S., 2 WATER CLOSET.
* EMERGENCY PHONE SHALL BE PROVIDED IN DECK AREA WITHIN 75 FEET OF BATHER ENTRANCE..

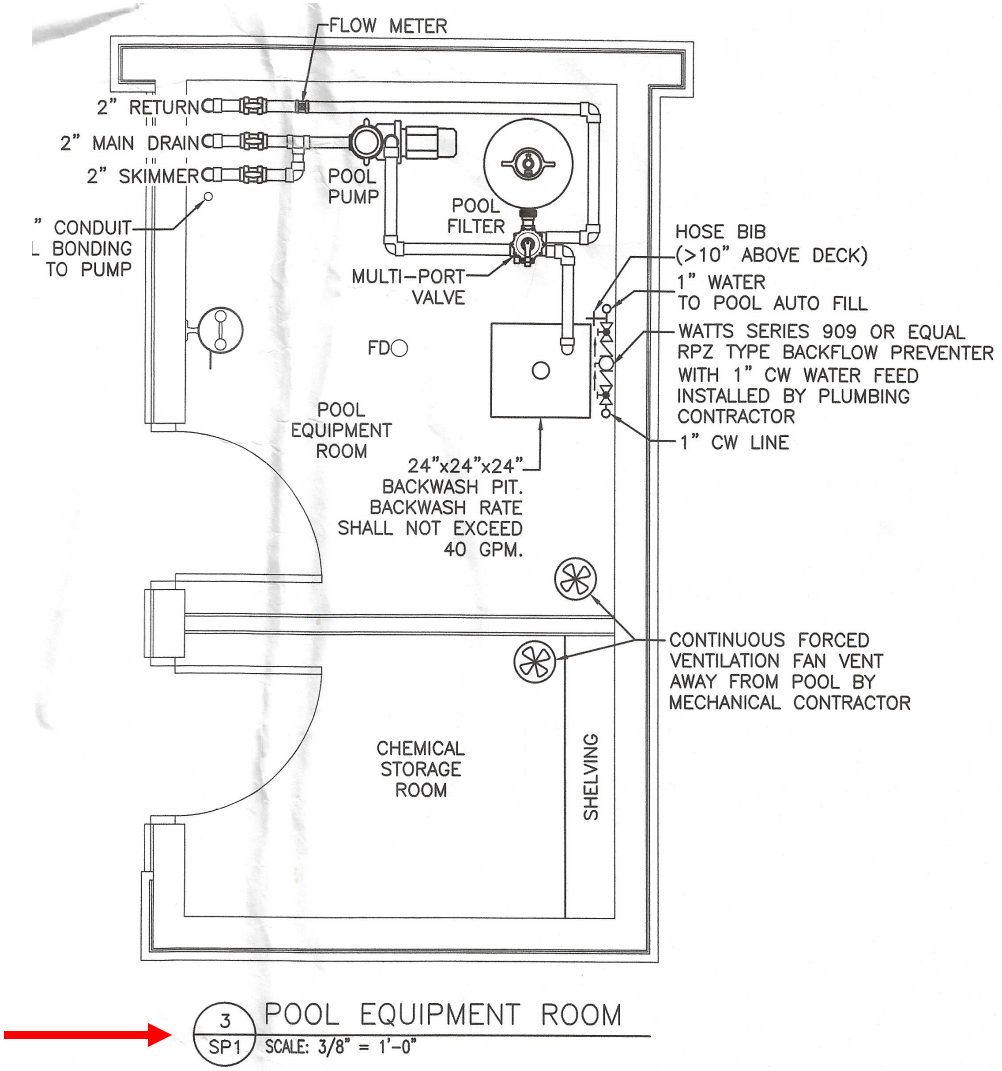
1 extra water closet and lavatory for the women's restroom. What about shower?

23. Chemical storage room minimum size: _____ sf
Rules require a min 5sf for 10,000 gallons + 1sf for each additional 3000 gallons
(REF #4) PLAN _____ SF

	10,366	
-	10,000 g	5 SF
=	366 g	1 SF
		6 SF required minimum chemical storage

Plan shows ? SF of chemical storage space.

Use architect's scale to measure chemical storage room dimensions for comparing to requirement.



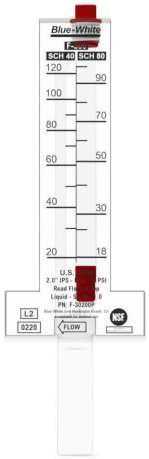
24. Flow Meter: Mfg. & Model _____

The flow meter must have a range that is inclusive of the minimum turnover rate, design flow, and include head space above the design flow.

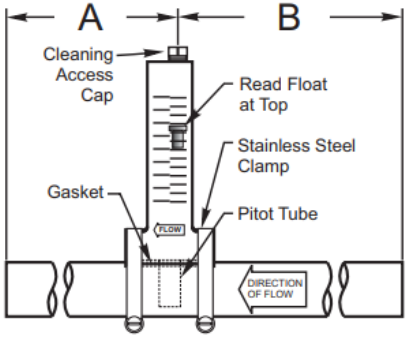
Range: _____- _____. Minimum turnover: _____Design flow: _____.
Upper limit: _____

Fits return pipe diameter: Y/N _____"
Require horizontal length of pipe **before**_____" flow meter; **after**_____" flow meter

Blue White F-300



F-300 Flowmeter Installation Instructions



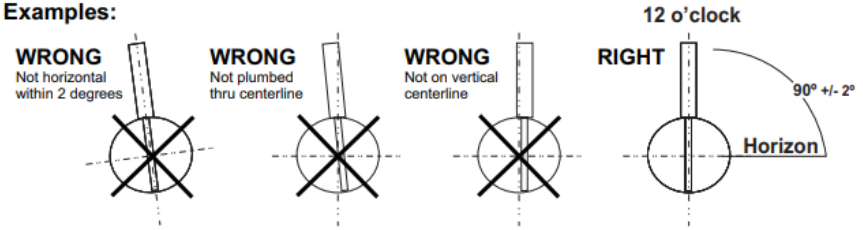
Dimension	Accuracy (L2 and L3)
A	Outlet pipe length = 2 x Pipe I.D.*
B	Inlet pipe length = 5 x Pipe I.D.*

* Minimum acceptable dimensions.
Must be straight horizontal piping.

Models w/ suffix "P" = PVC pipe, SCH 40 and SCH 80 (IPS pipe, ASTM - D-1785)*
Models w/ suffix "T" = Copper Tubing, Type "K" or "L"
Models w/ suffix "M" = PVC pipe, PN10 and Pn16

Installation: To prevent debris from entering the meter, install the flowmeter downstream from the filter if possible with at least the minimum straight pipe dimensions called for in the above drawing. Drill the pitot tube hole in the top (12 o'clock position) of the horizontal pipe. Carefully remove all burrs. Insert the pitot tube, with the gasket in place, into the drilled hole. Tighten the clamps alternately, a little at a time. Make certain the flow direction is towards the pitot tube opening.

Examples:



Flowmeter size	Drill size for pitot tube
1" thru 4"	5/8" to 41/64"
6" thru 8"	3/4" to 49/64"

Note: Incorrect installation may result in a damaged pitot tube.

Troubleshooting: Should the meter fail to read, make certain the openings in the front and rear of the pitot tube are not clogged, that the pitot tube opening faces the direction of the flow, and that you have installed the meter on the correct IPS (ASTM-D-1785) type and size pipe. Note that the top of the float is the largest diameter.

FLOWVIS® MODELS

Feature	FV-15	FV-15-U	FV-2	FV-2-U	FV-25	FV-3	FV-3-40	FV-4	FV-6	FV-8
NSF 50 Certified	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
Pipe Size	1.5"	1.5"	2"	2"	2.5"	3"	3"	4"	6"	8"
Operating Range (GPM)	10-80	10-90	10-110	10-110	10-110	70-240	70-240	150-460	300-1000	600-1800
Average Accuracy	98.7%	98.7%	99.4%	99.0%	99.2%	98.9%	99.2%	99.6%	98.1%	N/A*
NSF 50 Level	L1	L1	L1	L1	L1	L1	L1	L1	L1	L1

*FlowVis® model FV-8 includes FlowVis® Digital upgrade as standard. For accuracy of this model, please refer to the FV-8 information in the FlowVis Digital table below.

FLOWVIS® DIGITAL MODELS

Feature	FV-15	FV-15-U	FV-2	FV-2-U	FV-25	FV-3	FV-3-40	FV-4	FV-6	FV-8
NSF 50 Certified	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pipe Size	1.5"	1.5"	2"	2"	2.5"	3"	3"	4"	6"	8"
Operating Range (GPM)	10-80	10-90	10-110	10-110	10-110	70-240	70-240	150-460	300-1000	600-1800
Average Accuracy	98.6%	99.0%	98.8%	98.5%	98.3%	98.4%	98.0%	98.3%	98.9%	98.9%
NSF 50 Level	L1	L1	L1	L1	L1	L1	L1	L2	L1	L1

NOTE: FlowVis is the only NSF 50 certified Level 1 flow meter in the world today.

Guide for NSF 50 Accuracy Levels

Level 1 (L1): Average of absolute values of all single point deviations must be ≤2%. Single point deviations shall not exceed ±4%.
Level 2 (L2): Average of absolute values of all single point deviations must be ≤5%. Single point deviations shall not exceed ±7.5%.
Level 3 (L3): Average of absolute values of all single point deviations must be ≤10%. Single point deviations shall not exceed ±12.5%.
Level 4 (L4): Average of absolute values of all single point deviations must be ≤12.5%. Single point deviations shall not exceed ±15%.
Level 5 (L5): Average of absolute values of all single point deviations must be ≤15%. Single point deviations shall not exceed ±20%.

Flo Vis Sizes

7.2 Systems using Erosion Chlorine Feeders (hockey puck-style)

Material selections such as corrosion resistant Viton and Hastelloy c-276 ensure that FlowVis will provide many years of trouble-free operation in normally treated, sanitized pool water conditions. However, certain brands and designs of inexpensive Erosion Chlorine feeders are known to fail and release high concentrations of chlorine or even chlorine gas into the surrounding filtration system. When this occurs, any equipment that comes into contact with these abnormal levels of chemicals will experience premature failure.

When this occurs, an inspection of the components within the FlowVis will quickly confirm the cause of the damage and, under these circumstances, the product's **warranty will be void.**

Under no circumstances should FlowVis be used as a 'check valve' to prevent the effects of these Chlorine Feeders damaging other equipment such as Heaters.

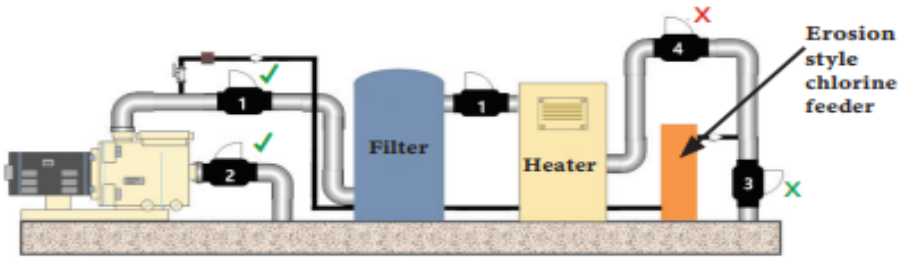


Fig.1.8

LEGEND

1 = IDEAL ✓
2 = GOOD ✓
3 = ACCEPTABLE X
4 = AVOID X

Flo Vis Installation locations

WATER FEATURES OR HYDROTHERAPY JETS (if available) **Use additional sheets for extra pumping systems.**

Features such as water slides, waves, rapids, lazy rivers, interactive play features can be included in main circulation system **IF** the drain(s) and pipe(s) are sized to handle the flow of all pumps without exceeding flow velocities in .2518 per .2543 (d) (3). Pump and piping reference is .2518. 2531(b)(1) requires separate feature pumps in children's activity pools so they can be turned off at times.

25. **Features such as waterfalls and decorative fountains located ON POOL DECKS** must meet the following per .2515(g)(1-6):
__not occupy more than 20% or the pool perimeter in **Ref #2**
__if located next to water > 5', feature shall not be more than 20' wide
__not encourage climbing above deck level with handholds and footholds.
__walkway provided to permit free access around decorative feature as wide as the lesser of 5 feet or required deck width in .2522(e)
__shall not obstruct the view of any part of the pool from any seating area
__ Feature with moving water must be separate from pool re-circulation system. (separate plumbing with an isolation valve)

26. **Fountains installed WITHIN SWIMMING POOL must meet the following per .2516(f)(1-5):**
__ be located in water <18" in depth
__ must be recommended by manufacturer for use in public pools (not residential)
__ shall be installed in accordance with manufacturer's instructions
__ shall be separate from the circulation system
__ shall not releasee water at a velocity > 10' per second above water.

27. **Feature(s) Design Flow**: **The designer must provide manufacturer spec sheets with flow ranges for features to operate properly and a supporting pump curve for the chosen pump to assure pump is adequate. Include ALL features on the same pumping system.**

Feature List with applicable flows: Example – Pentair ColorVision LED bubbler @ 15 GPM with ½" nozzle diameter
a_____ **b.** _____**c.** _____ **d.** _____
Design Flow Range for TOTAL features connected to feature pump to function properly: _____ **to** _____**GPM**
Pump(s) mfg.; _____**Model #**: _____
Max flow per pump curve _____ **GPM** (Use the lowest TDH on highest speed for VSP. If more than one feature pump connects to feature drains, add both flows for total maximum flow for sizing VGB cover): Total maximum flow of both pumps _____ GPM

28. **Feature pump suction pipe size** required _____**" Plan shows**_____"
Use pipe sizing chart on page 2 per .2518 (d); Pipe size must be capable of carrying **100% design flow (Ref #25)** of feature pump provided per .2518(c). Use top of the feature flow range for sizing pipe. Any flexible piping on spa shells meets .2518(d)

29. **Feature Drain Covers & SUMPS – (Bather accessible submerged suction outlets SOFAs are not allowed in wading pools less than 18" deep References: .2518(i)(1), 2518(i)(3), .2532(4)(a) for spas, ANSI/ PHTA/ ICC 7 – 2020 and ANSI/ APSP/ ICC -16 2017**

ibility: Investigate

25. Features such as waterfalls and decorative fountains located ON POOL DECKS must meet the following per .2515(g)(1-6):

__not occupy more than 20% or the pool perimeter in Ref #2

__if located next to water > 5', feature shall not be more than 20' wide

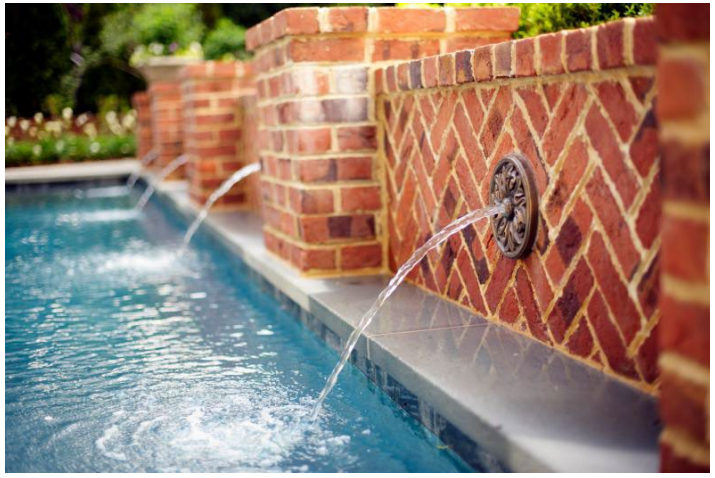
__not encourage climbing above deck level with handholds and footholds.

__walkway provided to permit free access around decorative feature as wide as the lesser of 5 feet or required deck width in
.2522(e)

__shall not obstruct the view of any part of the pool from any seating area

__ Feature with moving water must be separate from pool re-circulation system. (separate plumbing with an isolation valve)

Perimeter in earlier example was 74.5 feet.
74.5 x 20% = 14.9' restriction for a feature on the pool deck.



26. Fountains installed WITHIN SWIMMING POOL must meet the following per .2516(f)(1-5):
    __ be located in water <18” in depth
    __ must be recommended by manufacturer for use in public pools (not residential)
    __ shall be installed in accordance with manufacturer’s instructions
    __ shall be separate from the circulation system
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Max flow per pump curve _____ **GPM** (Use the lowest TDH on highest speed for VSP. If more than one feature pump connects to feature drains, add both flows for total maximum flow for sizing VGB cover): Total maximum flow of both pumps _____ GPM

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Use pipe sizing chart on page 2 per .2518 (d); Pipe size must be capable of carrying **100% design flow (Ref #25)** of feature pump provided per .2518(c). Use top of the feature flow range for sizing pipe. Any flexible piping on spa shells meets .2518(d)

THE SIMPLICITY OF COMPATIBILITY

Enjoy fast and easy control of pool lighting with the Pentair automation including the Pentair IntelliCenter® Pool Control System or the optional Color Sync™ Controller for Pentair Color LED Pool lights.

Color Sync™ Controller for Pentair Color LED Pool Lights

	Water Depth									
	2"		4"		6"		8"		10"	
	Plume Height*									
	Nozzle Diameter									
GPM	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"	1/2"	3/4"
15		20"	42"	11"	28"	8"	14"	6"	12"	4"
20		32"		18"		12"	24"	8"	16"	8"
25				26"		18"		12"	23"	10"
30						25"		16"		14"
35								24"		18"
40								30"		22"
45										26"

* Plume height data should only be used as a reference; actual plume height may vary based upon a variety of circumstances including, but not limited to, system plumbing and water conditions.

29. **Feature Drain Covers & SUMPS – (Bather accessible submerged suction outlets SOFAs are not allowed in wading pools less than 18" deep**
References: .2518(j)(1), 2518(j)(3), .2532(4)(a) for spas, ANSI/ PHTA/ ICC 7 – 2020 and ANSI/ APSP/ ICC -16 2017
Number of drains provided: _____
- Blockable or unblockable per manufacturer (circle one)
- Located within 15 ft. from a side wall
- Located in deepest section or other means for draining pool provided
- Dual drains connected by T pipe at least 3' apart at center or on different planes of pool structure.
- Connected dual drains are less than 30' apart
- Configuration must meet ANSI/ PHTA/ ICC page 7 and 8
- If no drains are provided, provisions for emptying pool completely provided
- (Use VGB 2017 drain cover **Manufacturer Installation Instructions** to verify sump requirements

Cover Mfg. & Model # _____VGBA – 2017 spec sheet? _____ Life Span of Cover _____ years
Maximum Flow of Drain Cover: _____ GPM, floor_____ or wall _____,
(Cover rating must be higher than max feature pump flow per *.2539(c)(2).)
Feature drain sump
*** **FIELD BUILT SUMPS ARE ANY SUMP NOT SUPPLIED BY THE COVER MANUFACTURER per ANSI-PHTA-ICC 7 - 2020**

Matching Manufactured Sump	OR Field Built Sump Measurements
Model #	Field built sump as specified by cover manufacturer. Pipe size outlet of sump____, Pipe depth _____ Pipe Orientation: side/ bottom

***Maintain a copy of final drain safety data compliance form for the file signed by the engineer or architect at final construction visit and prior to first permit.**

30. **Feature return pipe size** required _____" **Plan shows**_____" (Use chart below.)
(Pipe size must carry 100% discharge design flow of feature pump provided (**Ref #28**). Use top of the range for sizing pipe. Check branch pipe sizes for flow to each feature.)

You will review this just like you did for Circulation Components