Non-Substantial Alteration Submissions

JEREMY HARPER, REHS

AQUATIC HEALTH PLAN REVIEW

Review Process

Application is submitted to Aquatic Health

An invoice is generated and sent to the applicant

Once the invoice is paid, the review is assigned to plan review staff

The review is conducted on the scheduled review date

Approval is granted if the scope of work is compliant with the appropriate sections of the SNHD Aquatic Facility Regulations

Outstanding Fees

- Applications will not be accepted if the permit holder has unpaid fees at the time of submission
- Permit fees, closure or verified complaint fees, etc.

Submission Requirements

A contractor with an appropriate classification, or a professional engineer or architect, is required to submit all applications

Required Documentation

A completed non-substantial alteration application signed by the contractor or design professional	Certification of contracted services completed and signed by the permit holder	A SOFA worksheet if the SOFAs are being replaced	All required specifications, plans, or other documentation for the scope of work

Application Review

- During the review, plan review staff will check the scope of work for compliance with the SNHD Aquatic Facility Regulations
- Work may not begin until the application has been approved
- Additional requirements outside of the scope of work may be imposed if other areas are impacted:
  - A pump replacement must be compatible with filter and SOFA flow rates
  - A deck remodel will require deck depth/no diving markers and compliant deck drains
  - More examples can be found on our non-substantial alteration page

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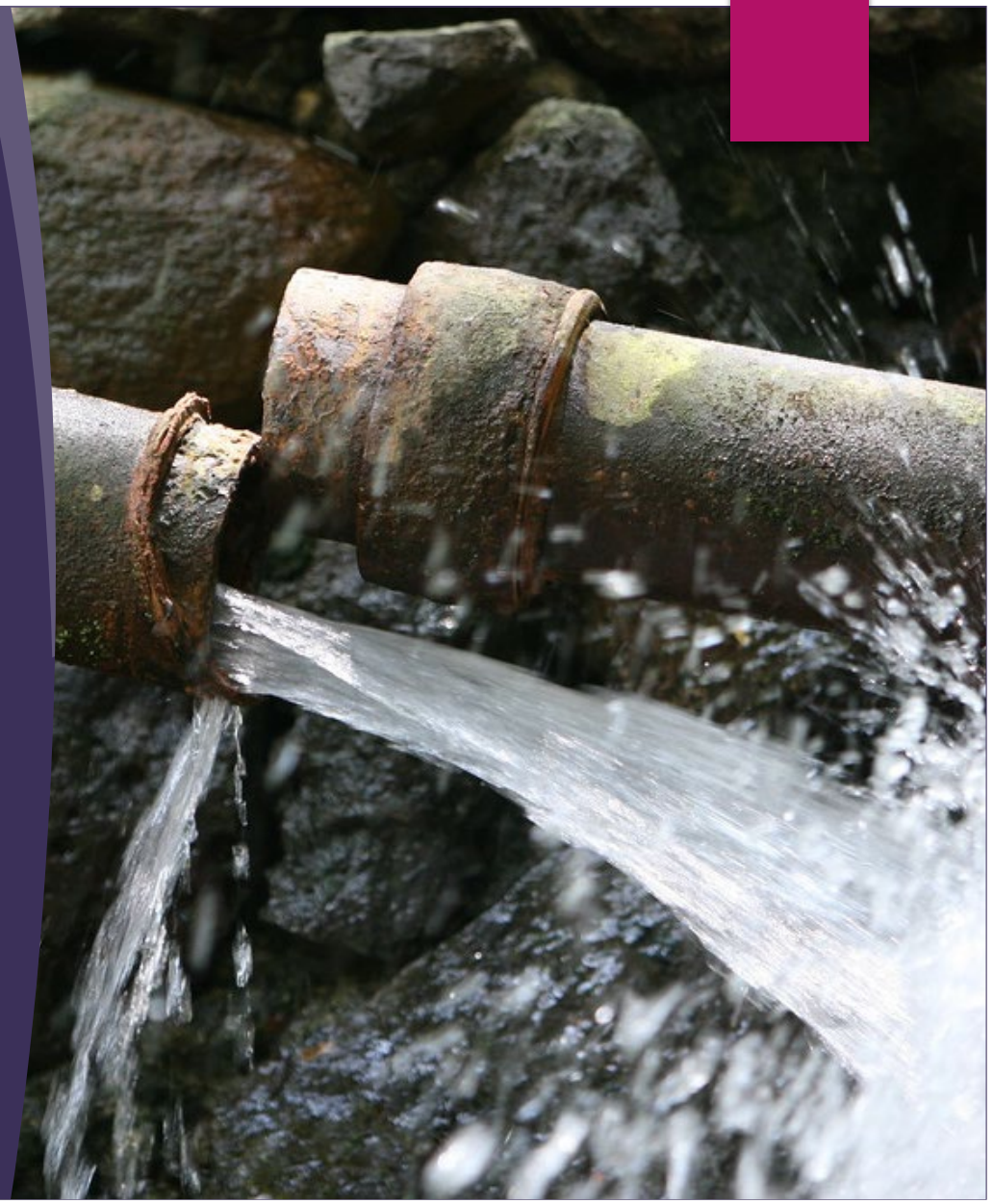
Inspections

- Once the review is approved, the inspection will be scheduled when requested by the applicant
- Inspections are first-come first-served, and must be requested at least 3 business days in advance of the proposed inspection date

Emergency Equipment Replacements

- Equipment may be replaced prior to SNHD review in some scenarios
- An emergency replacement form *and* non-substantial alteration application must be submitted within one day of the replacement
- The aquatic venue must remain closed until the replacement is reviewed and inspected by SNHD
- If the equipment is not approvable, a revised application and revision fees will be required



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Emergency Replacement (cont.)

What qualifies as an emergency replacement?

- Any equipment failure resulting in the inability to recirculate the aquatic venue
- Catastrophic plumbing failures that may compromise the aquatic venue structure

What DOES NOT qualify as an emergency replacement?

- Any planned equipment replacement
- Broken chlorinator
- Inoperable heater

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Waivers

- An agreement between the permit holder and SNHD to waive a section of the regulations
- Risk must be adequately identified and mitigated
- NOT an acceptable solution for non-compliant construction or installation without SNHD approval
- Applications must be submitted by the permit holder, not a contractor

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Preparing for an Inspection

Types of Inspections

- Substantial Alterations (Major Remodel) and New Construction
  - Excavation and plumbing
  - Preplaster
  - Final permitting inspection

    **Inspection-specific checklists are provided for these inspections*

- Non-substantial Alterations (Minor Remodel)
  - Plumbing inspection (SOFA, skimmer, interior remodels)
  - Final remodel inspection

What to Expect (Remodels)

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Plumbing inspection

- All plumbing and equipment must be accessible for inspection (venue is empty)
- Sump depth
- Pipe size
- Sump port configuration
- Equipment matches the file
- Depth markers (if necessary)

Plumbing Inspections

Final Remodel Inspections

- Aquatic venue must be closed to the public
- Compliance with the regulations
- Flow calculations
- Water chemistry
- Any required measurements/dimensions
- A complete operational inspection may take place

When will a final remodel inspection fail?

- Gates and doors are not compliant at an enclosure final
- Flow is not compliant at a recirculation system final
- Water chemistry is not compliant for a chemical feeder final
- Equipment installed is not operational
- The aquatic venue is empty

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Additional reasons for closure

The remodel scope of work can be approved but the aquatic venue may not be approved to operate:

- If an imminent health hazard is present on site
- If a compliance schedule from a previous inspection is not met
- If additional equipment has been replaced without approval and compliance cannot be determined

PIPE SIZE VELOCITIES

Dominick Franchino

OLD REGULATION NAC 444

Sched 40 / Sched 80 PVC Pipe = Max Velocity 6 fps (Suction Side)

Sched 40 / Sched 80 PVC Pipe = Max Velocity 10 fps (Pressure Side)

OLD REGULATIONS

NAC 444

SKIMMER

Designed to 80 percent of the total flow for a pool and 67 percent for a spa

MAIN DRAIN

Designed to 50 percent of the total flow for any body of water

RETURN

Designed to 50 percent of the total flow for any body of water

Schedule 40 / 80 piping : max velocity suction side 6 fps / max velocity pressure side 10 fps

OLD REGULATION NAC 444 (EXAMPLE)

Sched 40 / Sched 80 PVC Pipe = Max Velocity 6 fps (Suction Side)
Sched 40 / Sched 80 PVC Pipe = Max Velocity 10 fps (Pressure Side)

Example:
Pool (130 x .80 = 104 gpm suction skimmer)
Pool (130 gpm x .50 = 65 gpm suction main drain/ pressure return)

Minimum Flow 30 gpm Maximum Flow 140 gpm Design Flow 130 gpm
Pipe size: 3″ inch skimmer / 2 ½″ inch main drain / 2.5″ inch return

MAXIMUM ALLOWABLE VELOCITIES BY PIPE SIZE

Before 2016

Sched. 40 PVC Pipe (Max Velocity = 6 fps)			
Pipe Size		Suction Side	
Nominal	Actual	Max Flow	Velocity
1	1.049	16	5.94
1.5	1.610	38	5.99
2	2.067	62	5.93
2.5	2.469	89	5.97
3	3.068	138	5.99
4	4.026	238	6.00
6	6.065	540	6.00
8	7.981	935	6.00
10	10.020	1475	6.00
12	11.938	2093	6.00

Sched. 40 PVC Pipe (Max Velocity = 8 fps)			
Pipe Size		Pressure Side	
Nominal	Actual	Max Flow	Velocity
1	1.049	21	7.80
1.5	1.610	50	7.88
2	2.067	83	7.94
2.5	2.469	119	7.97
3	3.068	184	7.99
4	4.026	317	7.99
6	6.065	720	8.00
8	7.981	1248	8.00
10	10.020	1967	8.00
12	11.938	2792	8.00

Sched. 40 PVC Pipe (Max Velocity = 10 fps)			
Pipe Size		Pressure Side	
Nominal	Actual	Max Flow	Velocity
1	1.049	26	9.66
1.5	1.610	63	9.93
2	2.067	104	9.95
2.5	2.469	149	9.99
3	3.068	230	9.99
4	4.026	396	9.99
6	6.065	900	10.00
8	7.981	1559	10.00
10	10.020	2457	10.00
12	11.938	3488	10.00

Sched. 80 PVC Pipe (Max Velocity = 6 fps)			
Pipe Size		Suction Side	
Nominal	Actual	Max Flow	Velocity
1	0.957	13	5.80
1.5	1.500	33	5.99
2	1.939	55	5.98
2.5	2.323	79	5.98
3	2.900	123	5.97
4	3.826	215	6.00
6	5.761	487	5.99
8	7.625	854	6.00
10	9.562	1344	6.00
12	11.374	1902	6.00

Sched. 80 PVC Pipe (Max Velocity = 8 fps)			
Pipe Size		Pressure Side	
Nominal	Actual	Max Flow	Velocity
1	0.957	17	7.58
1.5	1.500	44	7.99
2	1.939	73	7.93
2.5	2.323	105	7.95
3	2.900	164	7.97
4	3.826	286	7.98
6	5.761	650	8.00
8	7.625	1139	8.00
10	9.562	1793	8.00
12	11.374	2535	8.00

Sched. 80 PVC Pipe (Max Velocity = 10 fps)			
Pipe Size		Pressure Side	
Nominal	Actual	Max Flow	Velocity
1	0.957	22	9.81
1.5	1.500	55	9.99
2	1.939	92	10.00
2.5	2.323	132	9.99
3	2.900	205	9.96
4	3.826	358	9.99
6	5.761	812	9.99
8	7.625	1423	10.00
10	9.562	2240	10.00
12	11.374	3169	10.00

NEW REGULATIONS

All pipe sizes are designed to 100 percent of the flow

Schedule 40 / 80 piping : max velocity suction side 6 fps / max velocity pressure side 8 fps

NEW REGULATION AFR 2018

Sched 40 / Sched 80 PVC Pipe = Max Velocity 6 fps (Suction Side)

Sched 40 / Sched 80 PVC Pipe = Max Velocity 8 fps (Pressure Side)

Example:

Pool (100 percent of the flow design flow)

Minimum Flow 30 gpm Maximum Flow 140 gpm Design Flow 130 gpm

Pipe size: 3″ inch skimmer / 3″ inch main drain / 3″ inch return

Applies to New Construction and Major Remodels

REMEMBER

Jet and Water Feature pumps will use the max flow of the pump to determine pipe velocities.

Example: Intelliflo VSF – 160 gpm max of pump

Pipe size: 4” inch main drain / 3” inch return

QUESTIONS ???

THANK YOU

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Aquatic Health Plan Review

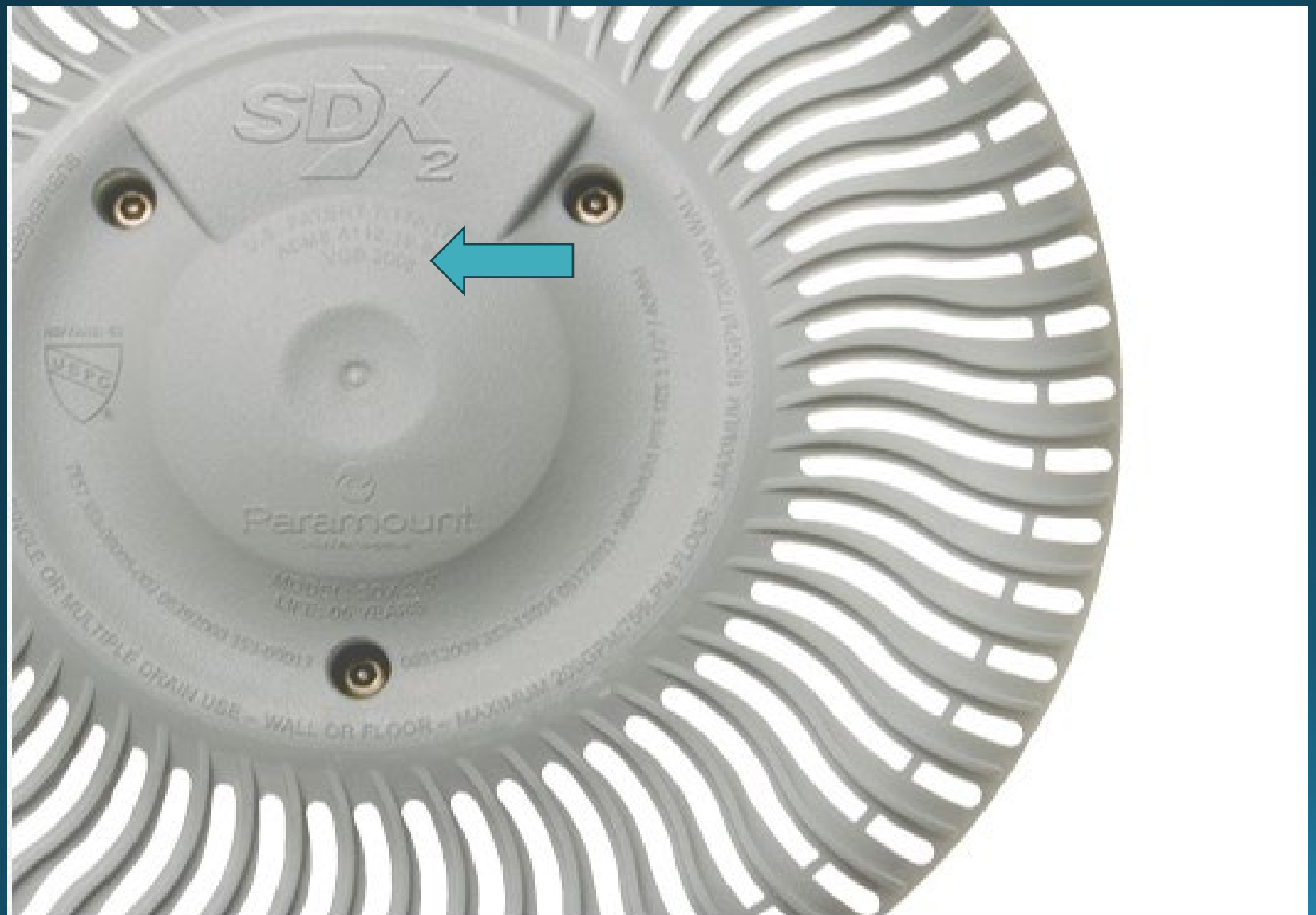
Suction Outlet Fitting Assembly (SOFA)

SOFA cont.

- VGB 2008 vs VGBA 2017
- In May of 2021, that Virginia Graeme Baker Act was updated with the enactment of the standard APSP-16/2017.
- This standard establishes new requirements for markings, instructions, material durability, physical testing and flow rate certification procedures for Suction Outlet Fitting Assemblies (SOFA)
- The VGBA 2008 drain covers installed or still in distribution are still compliant with the new standard. However, when you inevitably buy and use the new, VGBA 2017 drain covers, new installation requirements must be met. Those requirements will be included in the product packaging.

But how do you know which drain you have?

Not all SOFAs are easily marked



Choosing a SOFA

- All the new drains have new instructions concerning flow rates, pipe sizes and sump depths. You must follow these new instructions to make it a compliant installation.
- The manufacturer documentation will include a flow rating for different pipe size and sump configurations

Documentation

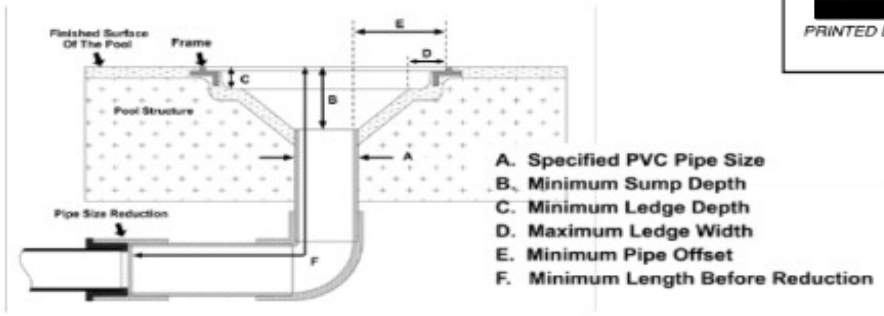
SOFA FLOW RATINGS							
Flow Rating (GPM)	Pipe Size	Pipe Port Orientation	Drain Mounting Orientation	Flow Rating (GPM)	Pipe Size	Pipe Port Orientation	Drain Mounting Orientation
180	3"	Side	Floor	140	3"	Side	Wall
116	2.5"	Side	Floor	108	2.5"	Side	Wall
100	2"	Side	Floor	100	2"	Side	Wall
60	1.5"	Side	Floor	60	1.5"	Side	Wall
178	3"	Bottom	Floor	140	3"	Bottom	Wall
120	2.5"	Bottom	Floor	108	2.5"	Bottom	Wall
100	2"	Bottom	Floor	100	2"	Bottom	Wall
60	1.5"	Bottom	Floor	60	1.5"	Bottom	Wall

More Documentation

Cover Model Number:

[redacted]

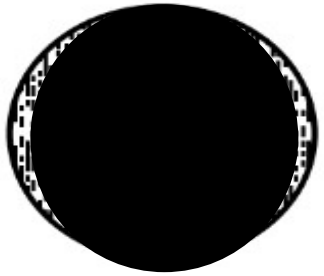
FIGURE 1 – SOFA MODEL & FLOW PATH



FOR MOST CURRENT INFORMATION SCAN THE QR CODE OR VISIT

[redacted]

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
[redacted]	2" (b)	3"	Floor (f)	170	A
	2.5" (b)	3"	Floor (f)	186	B
	3" (b)	3"	Floor (f)	275	C
	4" (s)	5.6"	Floor (f)	258	D
	4" (b)	9.8"	Floor (f)	275	E
	1.5" (b)	3"	Wall (w)	126	F
	2" (b)	3"	Wall (w)	170	G
	2.5" (b)	3"	Wall (w)	186	H
	3" (b)	3"	Wall (w)	200	I
	4" (b)	9.8"	Wall (w)	275	J

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.

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Environmental Health Division – Aquatic Health Program
Email: aquatic@snhd.org | Phone: (702) 759-0572

Suction Outlet Fitting Assembly (SOFA) Worksheet
(One worksheet required per aquatic venue)

Recent changes to the *American National Standard for Suction Outlet Fitting Assemblies (SOFA) for Use in Pools, Spas, and Hot Tubs,* ANSI/APSP/ICC-16 2017, have resulted in new testing procedures to determine the maximum allowable flow rate through the SOFA/drain cover. Southern Nevada Health District 2018 Aquatic Facility Regulations section 2-502.5 requires flow rates to comply with the APSP-16 standard.

Instructions:

- This worksheet is required for all SOFA replacements, including VGB 2008-listed models
- If a SOFA is being replaced, this worksheet must be submitted prior to the scheduled review date. **Submission and approval must occur prior to the start of work**
- Once plumbing and sump configuration have been determined and a SOFA has been selected for the system*, fill out the fields below. All fields are required. Incomplete or missing information will result in delays
- Plumbing and sump configurations that have not been tested/listed to the appropriate standard will not be approved
- **The applicant is responsible for ensuring that all installation requirements are met**

**The maximum flow potential of the pump and operating flow rate must be determined prior to selecting a SOFA*

Inspections:

- A plumbing inspection will be conducted to verify sump depth and pipe size.
- A final inspection will be required unless the scope of work is limited to SOFAs and the pump maximum potential flow is less than the rating of the SOFA. In these cases, photos may be accepted in lieu of the final inspection.

SOFA Configuration:

- SNHD review is limited to plumbing configuration, pipe size, and sump depth. Refer to manufacturer installation instructions/VGBA certified documents for specific installation requirements
- For sumps with more than one pipe, ensure minimum sump depth is based on the pipe size with the deepest sump requirement

Suction System: Choose one

Model #		Max Flow Rating	GPM	Choose one
Location	Choose one	SOFA Quantity		
# of ports		Min Sump Depth	in	

	Port 1	Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Choose one

- Choose one
- Filtration
- Auxiliary/Jet
- Skimmer Equalizer

Model #		w Rating	GPM	Choose one
Location	Cho	uantity		
# of ports		np Depth	in	

	Port 1	Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Filtration

Model #	9MFxxx	Max Flow Rating	170 GPM	Choose one
Location	Choose one	SOFA Quantity		
# of ports		Min Sump Depth	in	

	Port 1	Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Filtration

Model #	9MFxxx	Max Flow Rating	170 GPM	Choose one
Location	Floor	SOFA Quantity	2	Choose one Blockable Unblockable
# of ports		Min Sump Depth	in	

	Port 1	Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Filtration

Model #	9MFxxx	Max Flow Rating	GPM	Choose one
Location	Choose one	SOFA Quantity		
# of ports	Choose one	Min Sump Depth	in	

Choose one
Floor
Wall
Floor and Wall

		Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Filtration

Model #	9MFxxx	Max Flow Rating	170 GPM	Choose one
Location	Floor	SOFA Quantity	2	
# of ports		Min Sump Depth	in	

	Port 1	Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Filtration

Model #	9MFxxx	Max Flow Rating	170 GPM	Choose one
Location	Choose one	SOFA Quantity	2	
# of ports	1	Min Sump Depth	in	

	Port 1	Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Filtration

Model #	9MFxxx	Max Flow Rating	170 GPM	Choose one
Location	Choose one	SOFA Quantity	2	
# of ports	1	Min Sump Depth	3 in	

	Port 1	Port 2	Port 3	Port 4
Pipe size				
Port location				
Pump model				
Pump maximum potential flow				
Pump actual flow				

Suction System: Filtration

Model #	9MFxxx	Max Flow Rating	170 GPM	Choose one
Location	Choose one	SOFA Quantity	2	
# of ports	1	Min Sump Depth	3 in	

	Port 1	Port 2	Port 3	Port 4
Pipe size	2"			
Port location	Bottom			
Pump model	IntelliFlo vs+svrs			
Pump maximum potential flow	170 gpm			
Pump actual flow	140 gpm			

Equalizer SOFA

- **ISPSC section 315.5: Equalizers**
- Equalizers on skimmers shall be prohibited.
- New aquatic venue projects from here on in shall not include the use of skimmer equalizer lines.
- Existing aquatic venues that have skimmer equalizer lines installed can:
  - Keep existing equalizer lines but must have a SOFA compliant with current VGBA 2017 standards (including flow rating and sump depth requirements)
  - Eliminate the equalizer line by removing all water from the line, capping the line opening on aquatic venue wall and plastering over it, and inserting a permanent plug in the line opening inside the skimmer.

Questions

DEVICES AND SYSTEMS DESIGNED TO PREVENT SUCTION ENTRAPMENT IN AQUATIC VENUES

Brian Penksa

SNHD EHS II

Aquatic Health Plan Review

VIRGINIA GRAEME BAKER POOL AND SPA SAFETY ACT (VGBA)

- The requirements of the act state that all public pools and spas must be retrofitted or outfitted with anti-entrapment drain covers. The drain covers must be ASME/ANSI compliant, which means they are in compliance with safety standards that have been accredited by the American National Standards Institute and published by the American Society of Mechanical Engineers.

IN ADDITION TO HAVING ASME/ANSI COMPLIANT DRAIN COVERS, ANY POOLS OR SPAS WITH ONLY ONE MAIN DRAIN (UNLESS IT IS UNBLOCKABLE) MUST BE RETROFITTED IN ONE OF THE FOLLOWING WAYS:

- Safety vacuum release system: A safety vacuum release system ceases operation of the pump and reverses the circulation flow when a blockage is detected.
- Suction-limiting vent system: A system that limits the force of suction on a drain; this system must also be tamper-resistant.
- Gravity drainage system: A gravity drainage system with a collector tank.
- Automatic pump shut-off system,
- Drain disablement: Any device that allows the drain to be disabled.
- Alternately, a pool or spa with one main drain may be retrofitted to have two drains, thereby minimizing the force of suction on any one drain.

SNHD AQUATIC FACILITY REGULATIONS REQUIREMENTS

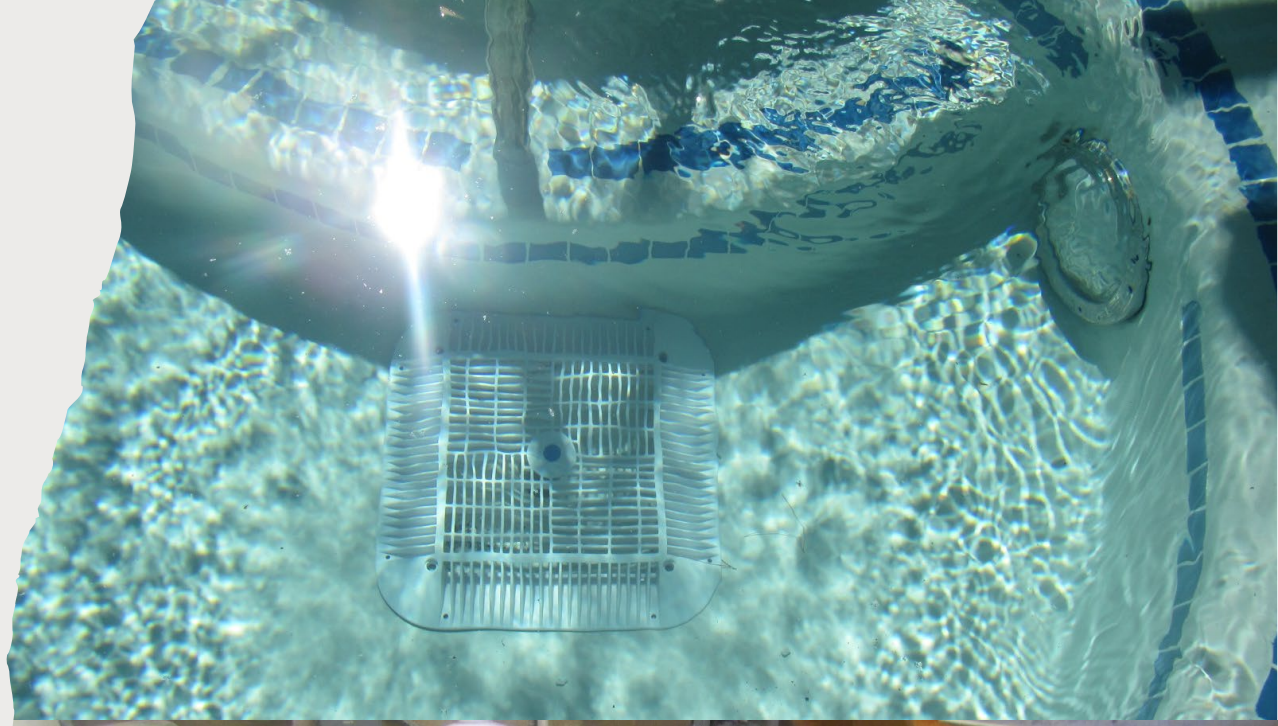
- 2-502.5 Submerged Suction Outlet
- (A) Submerged suction outlets, including sumps and covers, shall be listed and labeled to the requirements of ANSI/APSP-16 2011 or successor standard.
- (B) Unless an UNBLOCKABLE DRAIN COVER design is provided, a minimum of two (2) hydraulically balanced filtration system outlets are required in the bottom of an AQUATIC VENUE
- (H): Flow velocities shall meet ANSI/APSP-16 2011, or successor standard, based on a 100 percent design flow through each main drain cover.

WHAT ARE DEVICES AND SYSTEMS DESIGNED TO PREVENT SUCTION ENTRAPMENT?

- Devices and systems that are designed to prevent suction entrapment in lieu of unblockable and/or multiple suction outlet fitting assemblies (SOFAs) installed in an existing aquatic venue.

- Commonly referred to as “Safety Vacuum Release Systems (SVRS)”.

- These devices and systems are typically found installed in conjunction with the recirculation system for the aquatic venue.



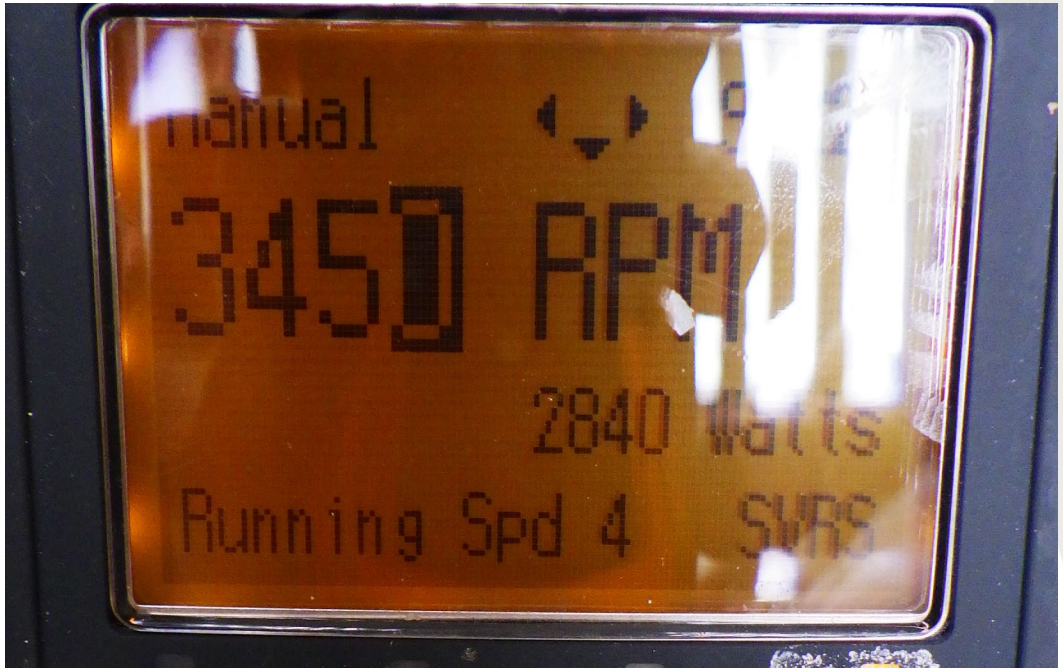
EXAMPLES OF DEVICES AND SYSTEMS DESIGNED TO PREVENT SUCTION ENTRAPMENT

SVRS-INTEGRATED PUMPS

- Pumps that include built-in Safety Vacuum Release System that detects drain blockage and automatically shuts the pump off.

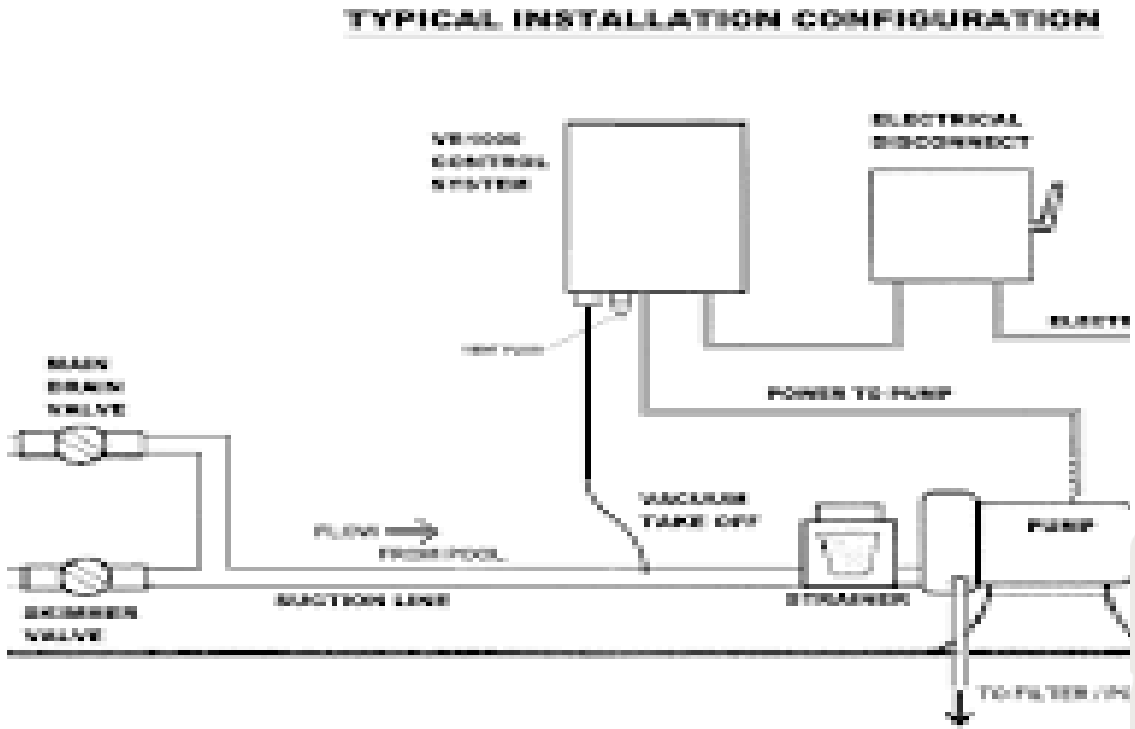
- Pump display and/or unit product badging will state it is SVRS.

- Replacing drive/motor with non-SVRS version removes function from system and will require installation of multiple drains and/or unblockable drains.



EXTERNAL MONITORING SYSTEMS

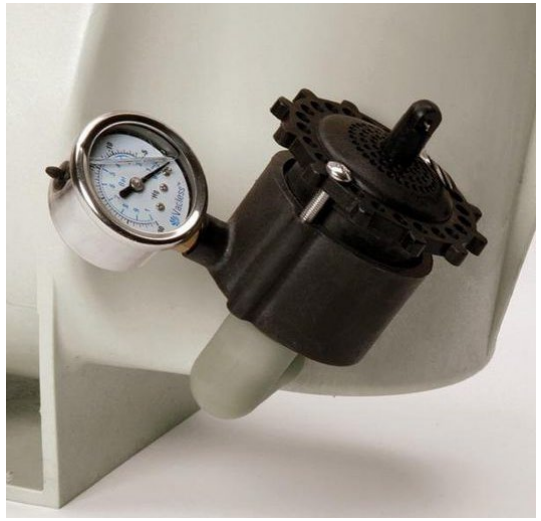
- Mounted on a wall in the equipment room and connected to the system suction line and pump/electrical box.
- These systems constantly monitor for changes in a pump's suction line. When a change of pressure is detected, the device shuts off all power to the pump.
- Depending on model, it may restart the pump automatically when obstruction has been removed or the pump may need to be restarted manually.

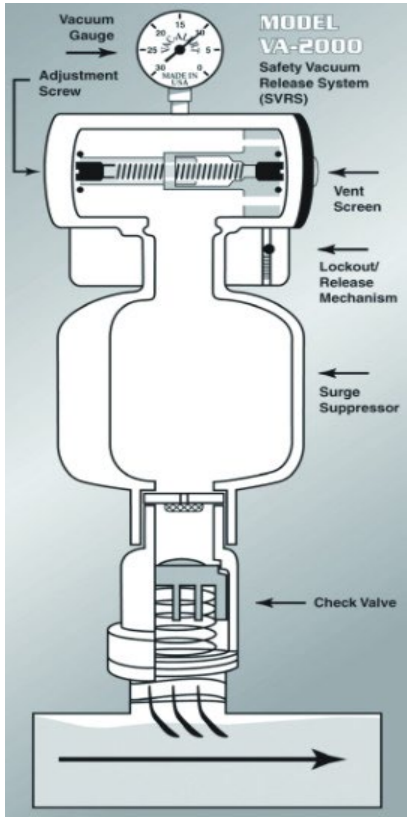


VACLESS/VAC-ALERT SVRS DEVICES

- Vacless anti entrapment safety function is achieved by allowing ambient air to rapidly fill the pump suction side, in the event of a high vacuum occurrence, causing it to lose prime providing for the quick release of an entrapment.

- Vac-Alert is a safety system that responds to an increase in pump suction vacuum that can be caused when someone is trapped by a high-powered suction pump underneath the water. The systems spring-loaded piston reacts by opening to atmosphere and releasing the life-threatening system suction.





AQUATIC VENUES THAT DO NOT HAVE EXISTING SVRS SYSTEMS INSTALLED

- SNHD AFR states: Submerged suction outlets, including sumps and covers, shall be listed and labeled to the requirements of ANSI/APSP-16 2011 or successor standard.

- ANSI/APSP/ICC-16 2017 3.6.4.2 states: The flow rating for existing pools with a single, *blockable* SOFA is the flow rating of the SOFA, when also installed in conjunction with an *additional device or system designed to prevent suction entrapment*, where the additional device or systems is of a type listed in section 9.4. A single, *blockable* SOFA in a system that does not also include of the additional devices or systems shall result in a **flow rating of zero.**

- When submitted a pump and/or SOFA remodel: If the system does not have an existing SVRS in place, then the aquatic venue will need to either have unblockable SOFA or multiple SOFA installed during non-substantial alteration submittal process with SNHD Aquatic Health Plan Review.