



NC Department of Health and Human Services

Pool Program Updates

Chad Gambill

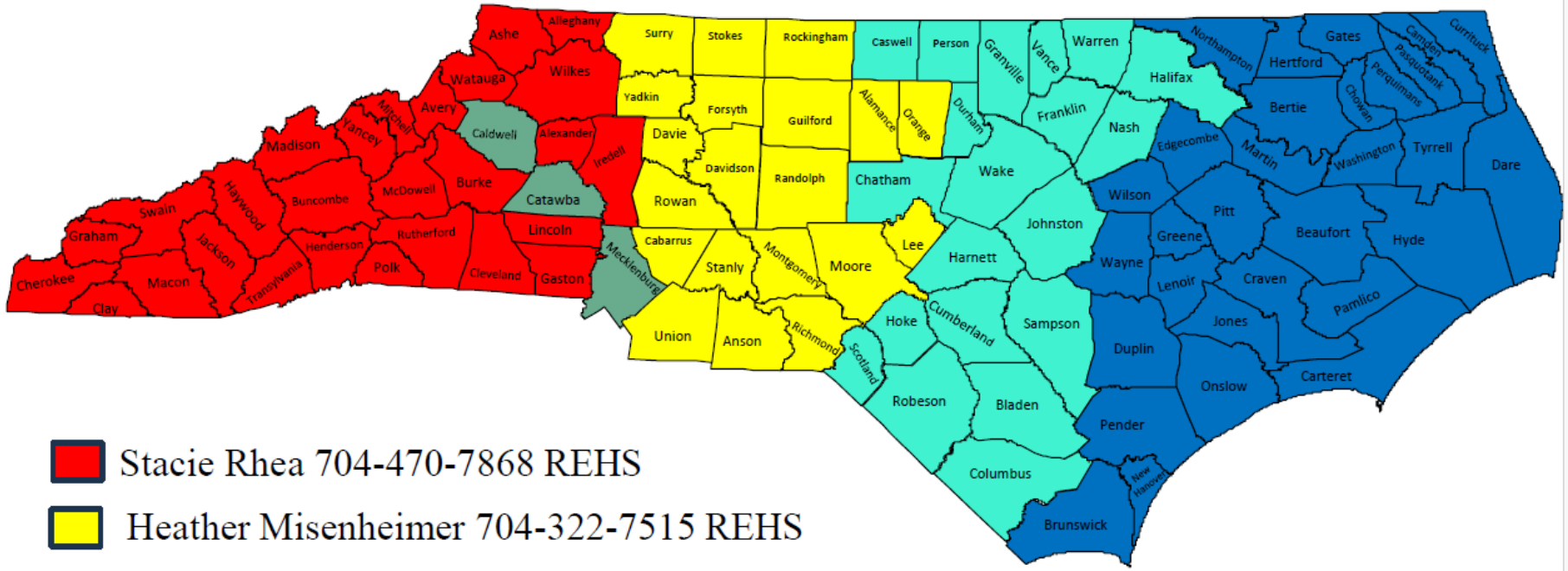
Field Supervisor – PTSI Program

May 13, 2025

Pools, Tattoos, and State Institutions Program

Regional Environmental Health Specialists Territory Map

May 2024



Stacie Rhea 704-470-7868 REHS

Heather Misenheimer 704-322-7515 REHS

Terry Chappell 919-218-1907 REHS

Tammy Rodriguez 252-714-4711 REHS

Chad Gambill 336-312-5421 Program Manager

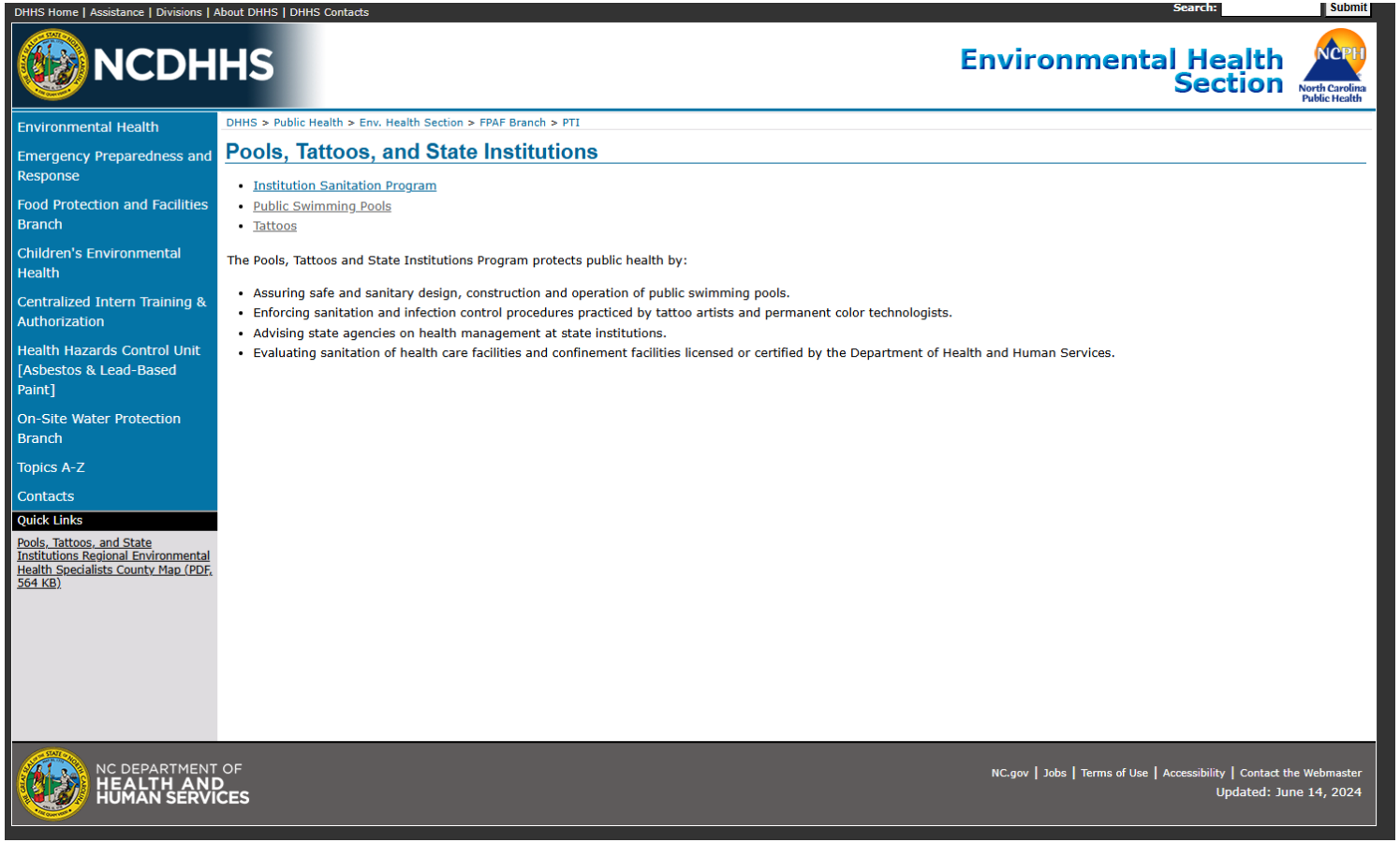
Veronica Bryant 919-218-6943
EH Emergency Preparedness
and Outbreak Coordinator

Presentation Outline

- Helpful Links
- Updates – What's new?
- VGBA compliance
  - What has changed - How did we get here?
  - Field Built Sumps
  - Aegis Shield 3030AEC
- When is an RDP Required
- Tips/Reminders

PTSI Web page

https://ehs.dph.ncdhhs.gov/faf/pti/index.htm



Laws and Rules

- N.C. General Statutes 130A-280-282 Public Swimming Pools (PDF, 64 KB)
- Rules Governing Public Swimming Pools (PDF, 3.8 MB)

Forms and Educational Materials

- Pool Night Lighting Documentation Form (PDF, 108 KB)
- Fecal Incidence Response Summary Chart (PDF, 67 KB)
- 3960 Inspection of Swimming Pool (PDF, 327 KB)
- Monthly Pool Record Sheet (PDF, 18 KB)
- N.C. Required Pool Signs (PDF, 17 KB)

Memos and Correspondence

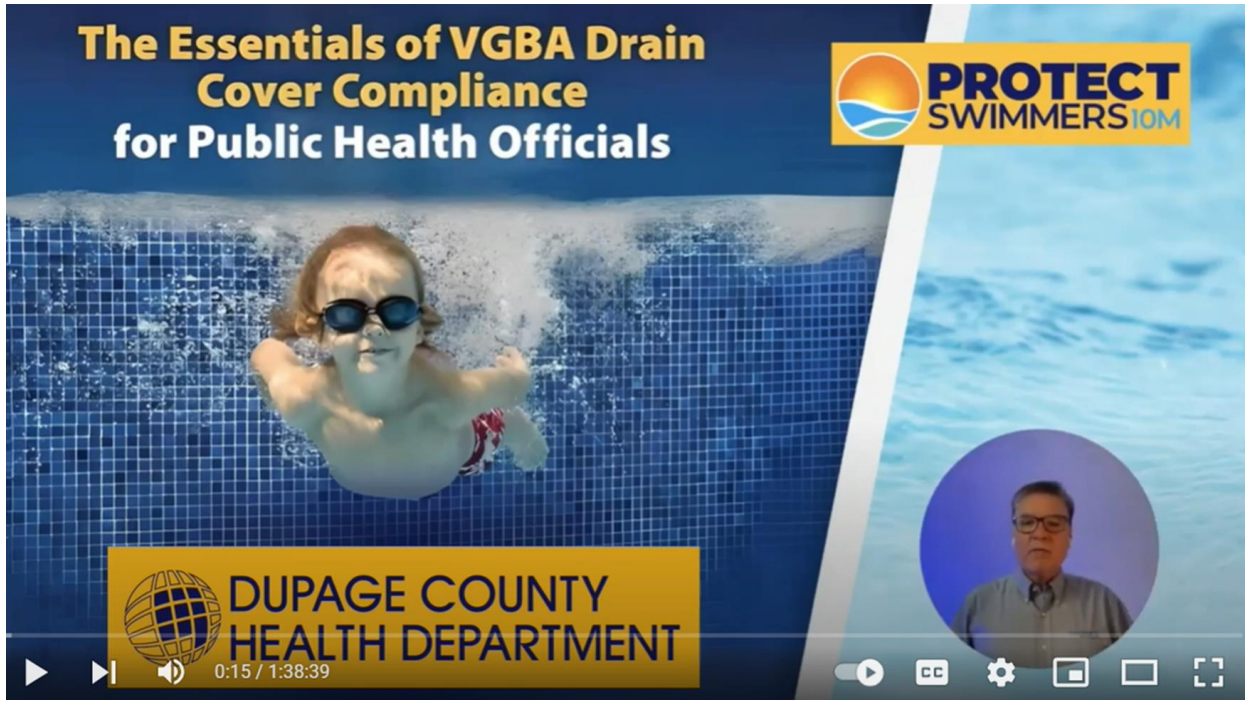
- Display Spas at Temporary Events Memo (PDF, 201 KB)
- Dogs in Pools
- Sizing Suction Piping
- Year Around Pool Amenities
- Ritual Immersion Pools
- Position Statement: Public Pool Fencing Regulation
- Position Statement - Rescind Correspondence
- Position Statement: Spas in Rental Units (PDF, 197 KB)
- Position Statement: Equipment/Chemical Storage Rooms as Vaults (PDF, 201 KB)
- Position Statement: Swimming Pools in Single Family Dwellings (PDF, 262 KB)
- Memo on Electrical Safety During inspections (PDF, 160 KB)
- Memo on Lighting in Pool at Night (PDF, 168 KB)
- Memo on NSF Listed Pool Products (PDF, 168 KB)
- Memo on Emergency Phone Location (PDF, 167 KB)
- Memo on Circulation System and Suction Hazard Reduction Rule Changes (PDF, 1.57 MB)
- Memo on Flow Reduction 2025 (PDF, 982 KB)

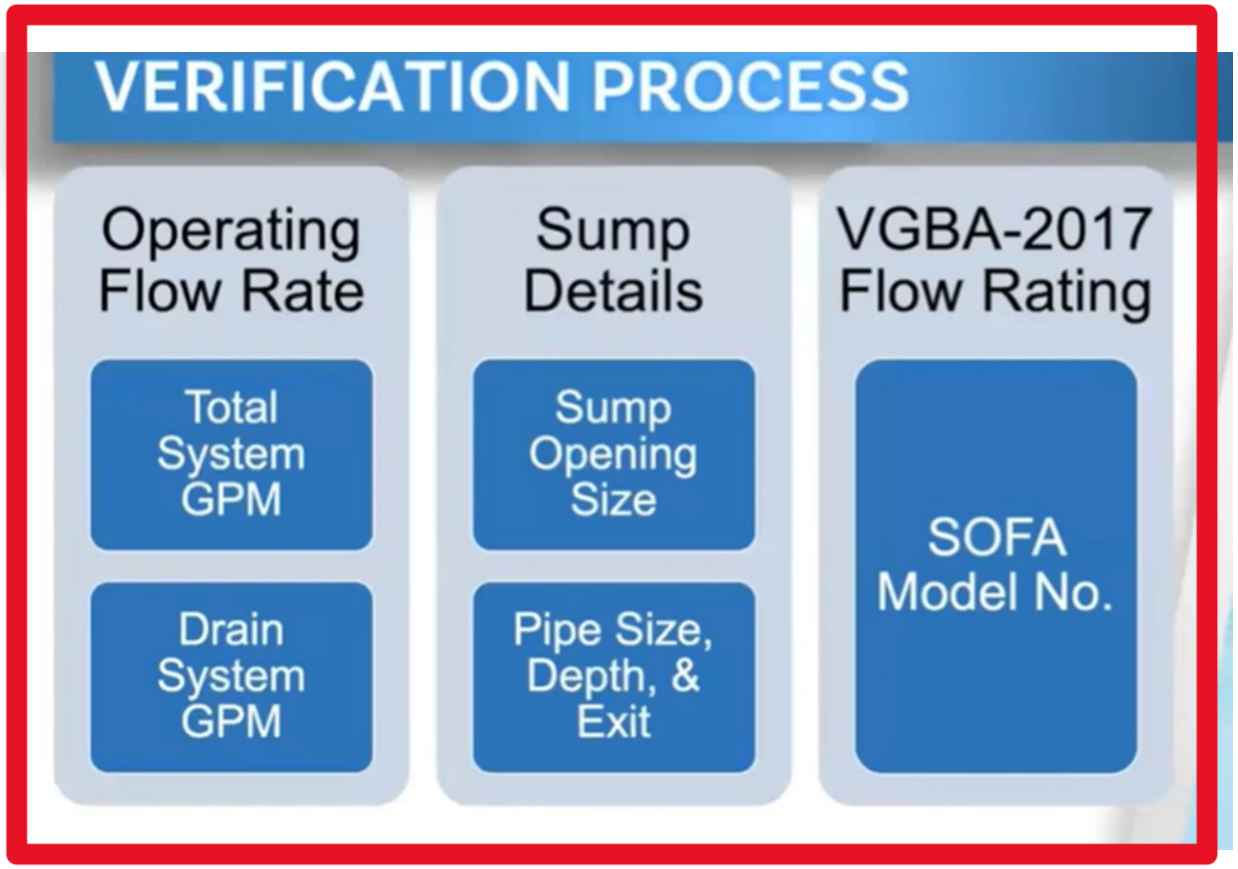
Plan Review

- Plan Review Guidance for Sun Shelves with Adjoining Stairs (PDF, 292 KB)
- Plan Review Checklist (PDF, 155 KB)
- Plan Review Calculations (PDF, 312 KB)
- Instructions for Drain Safety Compliance Data Sheet (PDF, 106 KB)
- Drain Safety Compliance Data Sheet for Printing (PDF, 111 KB)
- Drain Safety Compliance Data Sheet Fillable (PDF, 112 KB)

VGBA for Public Health Officials Webinar

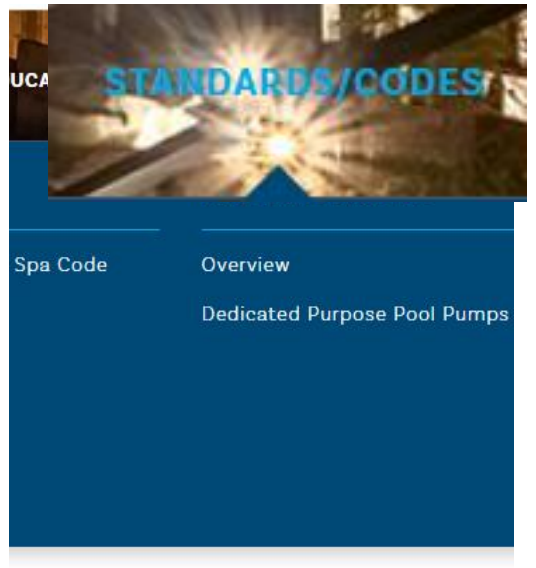
https://youtu.be/nojQduooBrw





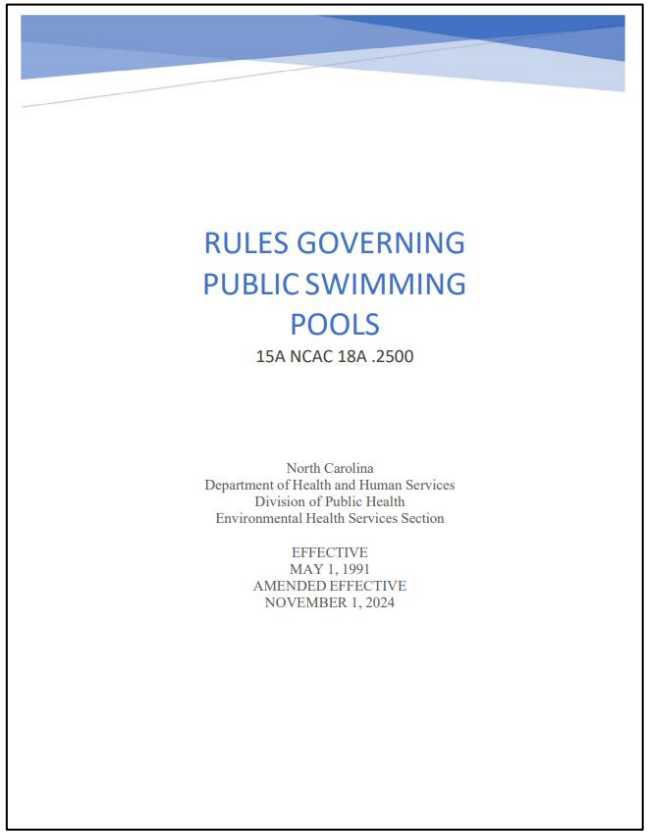
PHTA.org

- ANSI/PHTA/ICC-7 2020 *American National Standard for Suction Entrapment Avoidance In Swimming Pools, Wading Pools, Spas, Hot Tubs and Catch Basins*
  Purchase | Read
- ANSI/APSP/ICC-8 2005 (R2023) *American National Standard Model Barrier Code for Residential Swimming Pools, Spas, and Hot Tubs*
  Purchase | Read
- ANSI/PHTA/ICC-10 2021 *American National Standard for Elevated Pools, Spas and Other Aquatic Venues Integrated into a Building or Structure*
  Purchase | Read
- ANSI/APSP/ICC/NPC-12 2016 *American National Standard for the Plastering of Swimming Pools and Spas*
  Purchase | Read | Learn More
- ANSI/PHTA/ICC-15 2021 *American National Standard for Residential Swimming Pool and Spa Energy Efficiency*
  Purchase | Read
- ANSI/APSP/ICC-16 2017 *American National Standard for Suction Outlet Fitting Assemblies (SOFA) for Use in Pools, Spas and Hot Tubs*
  Purchase | Read | Learn More



Updates - Nov. 1, 2024

- **New .2500 Rule Book**
  - **Revised .2518 & .2539**
  - **Revised Swimming Pool Inspection Sheet**
  - **Fence Chart - .2528**
  - **Diving Chart - .2517**
- **.2518/.2539 Guidance document**

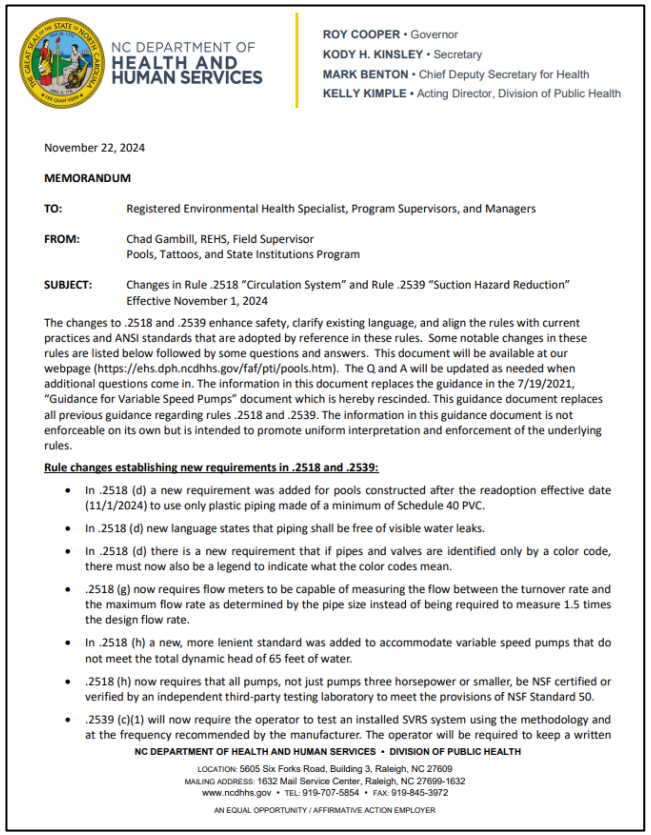


RULES GOVERNING
PUBLIC SWIMMING
POOLS

15A NCAC 18A .2500

North Carolina
Department of Health and Human Services
Division of Public Health
Environmental Health Services Section

EFFECTIVE
MAY 1, 1991
AMENDED EFFECTIVE
NOVEMBER 1, 2024



NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

ROY COOPER • Governor
KODY H. KINSLEY • Secretary
MARK BENTON • Chief Deputy Secretary for Health
KELLY KIMPLE • Acting Director, Division of Public Health

November 22, 2024

MEMORANDUM

TO: Registered Environmental Health Specialist, Program Supervisors, and Managers

FROM: Chad Gambill, REHS, Field Supervisor
Pools, Tattoos, and State Institutions Program

SUBJECT: Changes in Rule .2518 "Circulation System" and Rule .2539 "Suction Hazard Reduction"
Effective November 1, 2024

The changes to .2518 and .2539 enhance safety, clarify existing language, and align the rules with current practices and ANSI standards that are adopted by reference in these rules. Some notable changes in these rules are listed below followed by some questions and answers. This document will be available at our webpage (https://ehs.dph.ncdhhs.gov/faf/pti/pools.htm). The Q and A will be updated as needed when additional questions come in. The information in this document replaces the guidance in the 7/19/2021, "Guidance for Variable Speed Pumps" document which is hereby rescinded. This guidance document replaces all previous guidance regarding rules .2518 and .2539. The information in this guidance document is not enforceable on its own but is intended to promote uniform interpretation and enforcement of the underlying rules.

Rule changes establishing new requirements in .2518 and .2539:

- In .2518 (d) a new requirement was added for pools constructed after the readoption effective date (11/1/2024) to use only plastic piping made of a minimum of Schedule 40 PVC.
- In .2518 (d) new language states that piping shall be free of visible water leaks.
- In .2518 (d) there is a new requirement that if pipes and valves are identified only by a color code, there must now also be a legend to indicate what the color codes mean.
- .2518 (g) now requires flow meters to be capable of measuring the flow between the turnover rate and the maximum flow rate as determined by the pipe size instead of being required to measure 1.5 times the design flow rate.
- In .2518 (h) a new, more lenient standard was added to accommodate variable speed pumps that do not meet the total dynamic head of 65 feet of water.
- .2518 (h) now requires that all pumps, not just pumps three horsepower or smaller, be NSF certified or verified by an independent third-party testing laboratory to meet the provisions of NSF Standard 50.
- .2539 (c)(1) will now require the operator to test an installed SVRS system using the methodology and at the frequency recommended by the manufacturer. The operator will be required to keep a written

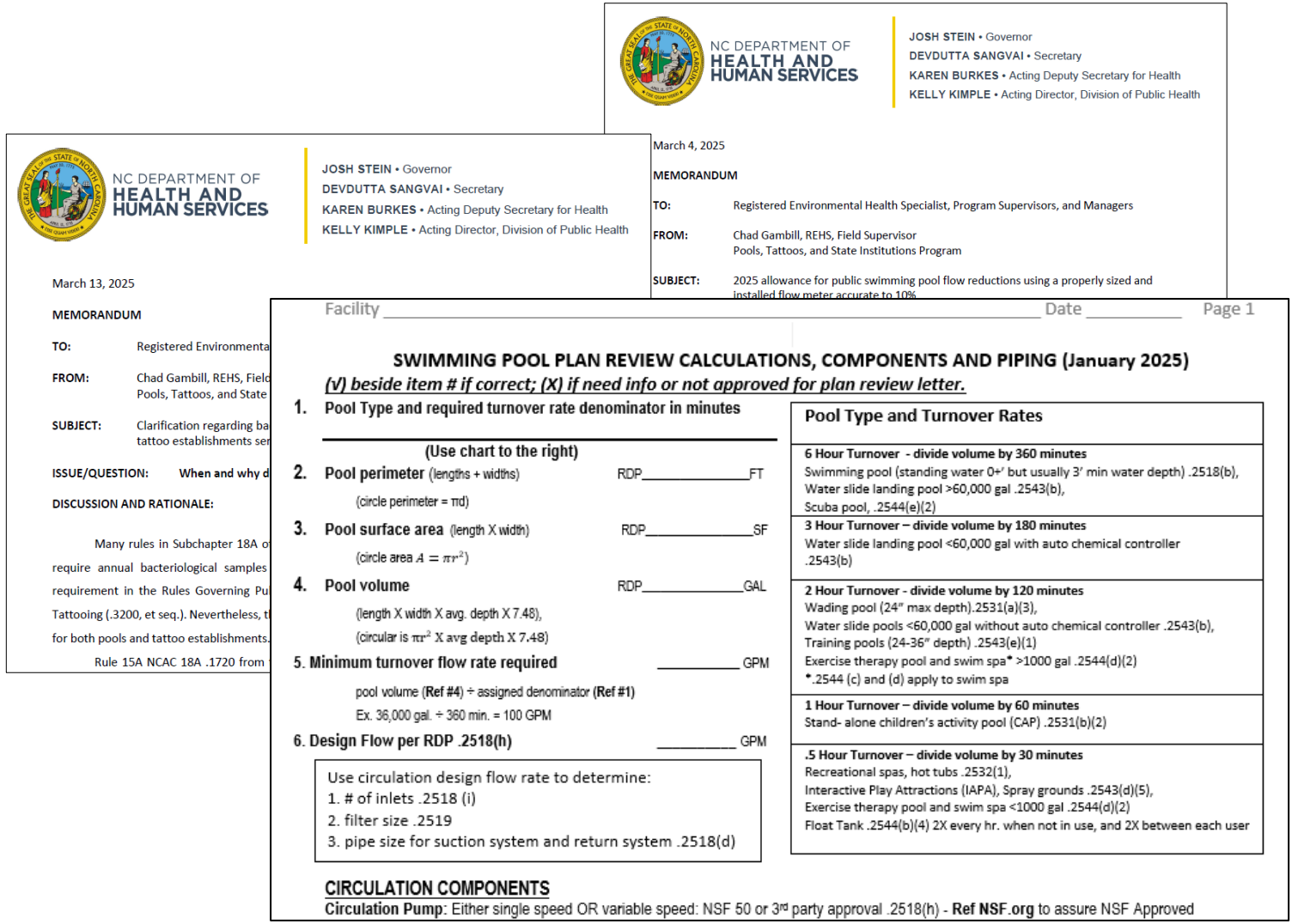
NC DEPARTMENT OF HEALTH AND HUMAN SERVICES • DIVISION OF PUBLIC HEALTH

LOCATION: 5605 Six Forks Road, Building 3, Raleigh, NC 27609
MAILING ADDRESS: 1632 Mail Service Center, Raleigh, NC 27699-1632
www.ncdhhs.gov • TEL: 919-707-5854 • FAX: 919-845-3972

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER

Updates 2025 Guidance Docs

- **Water sample Guidance**
- **10% flow meter Guidance**
- **Plan Review Calculations Document**



NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

JOSH STEIN • Governor
DEVDUTTA SANGVAI • Secretary
KAREN BURKES • Acting Deputy Secretary for Health
KELLY KIMPLE • Acting Director, Division of Public Health

March 4, 2025

MEMORANDUM

TO: Registered Environmental Health Specialist, Program Supervisors, and Managers

FROM: Chad Gambill, REHS, Field Supervisor
Pools, Tattoos, and State Institutions Program

SUBJECT: 2025 allowance for public swimming pool flow reductions using a properly sized and installed flow meter accurate to 10%

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

JOSH STEIN • Governor
DEVDUTTA SANGVAI • Secretary
KAREN BURKES • Acting Deputy Secretary for Health
KELLY KIMPLE • Acting Director, Division of Public Health

March 13, 2025

MEMORANDUM

TO: Registered Environmenta

FROM: Chad Gambill, REHS, Field
Pools, Tattoos, and State

SUBJECT: Clarification regarding ba
tattoo establishments ser

ISSUE/QUESTION: When and why d

DISCUSSION AND RATIONALE:

Many rules in Subchapter 18A o
require annual bacteriological samples
requirement in the Rules Governing Pu
Tattooing (.3200, et seq.). Nevertheless, t
for both pools and tattoo establishments.

Rule 15A NCAC 18A .1720 from

Facility _____ Date _____ Page 1

SWIMMING POOL PLAN REVIEW CALCULATIONS, COMPONENTS AND PIPING (January 2025)

(√) 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) RDP_____FT
(circle perimeter = πd)

3. **Pool surface area** (length X width) RDP_____SF
(circle area $A = \pi r^2$)

4. **Pool volume** RDP_____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** _____ GPM
pool volume (**Ref #4**) ÷ assigned denominator (**Ref #1**)
Ex. 36,000 gal. ÷ 360 min. = 100 GPM

6. **Design Flow per RDP .2518(h)** _____ GPM

Use circulation design flow rate to determine:
1. # of inlets .2518 (i)
2. filter size .2519
3. pipe size for suction system and return system .2518(d)

Pool Type and Turnover Rates

6 Hour Turnover - divide volume by 360 minutes
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 – divide volume by 180 minutes
Water slide landing pool <60,000 gal with auto chemical controller .2543(b)

2 Hour Turnover - divide volume by 120 minutes
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 pool and swim spa* >1000 gal .2544(d)(2)
*.2544 (c) and (d) apply to swim spa

1 Hour Turnover – divide volume by 60 minutes
Stand- alone children's activity pool (CAP) .2531(b)(2)

.5 Hour Turnover – divide volume by 30 minutes
Recreational spas, hot tubs .2532(1),
Interactive Play Attractions (IAPA), Spray grounds .2543(d)(5),
Exercise therapy pool and swim spa <1000 gal .2544(d)(2)
Float Tank .2544(b)(4) 2X every hr. when not in use, and 2X between each user

CIRCULATION COMPONENTS

Circulation Pump: Either single speed OR variable speed: NSF 50 or 3rd party approval .2518(h) - **Ref NSF.org** to assure NSF Approved

Variable Speed Pumps - Limiting Factors

6b. ____**Variable speed pumps OR pumps with variable frequency drives**. Variable speed pumps allow 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 **(Ref #5)** and the maximum flow rating allowed by the system (i.e., pipe size, # of inlets, # of skimmers, filter, SOFAs, etc.) The pump can be set to a custom design flow which must fall within this range. The designer must provide a supporting pump curve and the designer should specify the most limiting component of the pump system. EHS will need to verify the most limiting component during plan review.

RDP Targeted Design Flow: _____GPM **(Ref #6)** .2518 (h)

Limiting Factors (list the GPM for each of the following – then circle the most limiting factor:
main drain pipe size **(Ref #11))** _____, skimmer pipe size **(Ref #12)** _____, return pipe size **(Ref #13)** _____, filter rate **(Ref #8)** _____, # of inlets **(Ref #6)** X 20 _____, Flow per skimmer X # of skimmers**(Ref #9)** _____ .2518 (k)(2)(B), Other _____.

Design flow range _____ to _____ GPM (Minimum turnover **(Ref #5)** to most limiting factor)

Pump Mfg.:_____Model #: _____
Max flow per pump curve _____ GPM – for SOFA compliance use the max flow from the highest speed of the pump curve for SOFA compliance .2539(d)(1)

- If more than one pump connects to drains, add pump flows for total maximum flow for sizing VGB cover

.2526 (a) - DRESSING AND SANITARY FACILITIES

22. **Restroom fixtures** based on bather load (.2526). Use chart below 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. We recommend at least a cold-water rinse shower on the deck at any pool where a required shower with soap is exempted by 2526 (a). No soap should be allowed or required at cold water rinse showers on the deck since these showers are not a required shower per 2526.

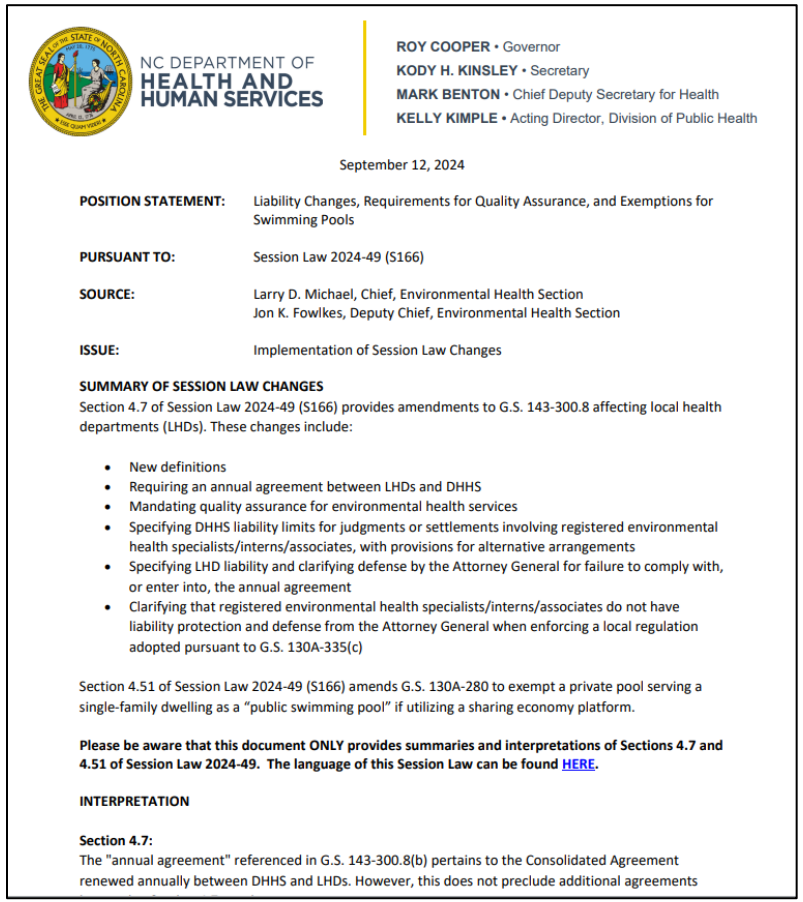
Divide **Ref #21** bather load equally between men and women.

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

***If not exempt per .2526 (a), 1 shower (with soap) per every 200 bathers is required. .2526 (h), (j)**
***Shower drains are enforced by the building codes department.**
Typically, showers with soap in bathhouses drain to sewer and cold-water rinse showers on pool decks drain to the deck drains.

Updates 2025 – Single Family Dwelling Pool Rentals

- **SL 2024-49 (SB-166) Section 4.51 – Effective July 1, 2025**
- **This Section amends G.S. 130A-280 to exempt swimming pools serving a single-family dwelling that is rented out.**



NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

ROY COOPER • Governor
KODY H. KINSLEY • Secretary
MARK BENTON • Chief Deputy Secretary for Health
KELLY KIMPLE • Acting Director, Division of Public Health

September 12, 2024

POSITION STATEMENT: Liability Changes, Requirements for Quality Assurance, and Exemptions for Swimming Pools

PURSUANT TO: Session Law 2024-49 (S166)

SOURCE: Larry D. Michael, Chief, Environmental Health Section
Jon K. Fowlkes, Deputy Chief, Environmental Health Section

ISSUE: Implementation of Session Law Changes

SUMMARY OF SESSION LAW CHANGES

Section 4.7 of Session Law 2024-49 (S166) provides amendments to G.S. 143-300.8 affecting local health departments (LHDs). These changes include:

- New definitions
- Requiring an annual agreement between LHDs and DHHS
- Mandating quality assurance for environmental health services
- Specifying DHHS liability limits for judgments or settlements involving registered environmental health specialists/interns/associates, with provisions for alternative arrangements
- Specifying LHD liability and clarifying defense by the Attorney General for failure to comply with, or enter into, the annual agreement
- Clarifying that registered environmental health specialists/interns/associates do not have liability protection and defense from the Attorney General when enforcing a local regulation adopted pursuant to G.S. 130A-335(c)

Section 4.51 of Session Law 2024-49 (S166) amends G.S. 130A-280 to exempt a private pool serving a single-family dwelling as a "public swimming pool" if utilizing a sharing economy platform.

Please be aware that this document ONLY provides summaries and interpretations of Sections 4.7 and 4.51 of Session Law 2024-49. The language of this Session Law can be found HERE.

INTERPRETATION

Section 4.7:
The "annual agreement" referenced in G.S. 143-300.8(b) pertains to the Consolidated Agreement renewed annually between DHHS and LHDs. However, this does not preclude additional agreements

Updates 2025 – Quality Assurance

SL 2024-49 (SB-166) Section 4.7 – Effective Sept. 2024

- Mandates **QUALITY ASSURANCE** programs for EH services
- SL Effective September 2024 → QA requirements in the FY 25 AA
- QA workgroup and subcommittees have created draft materials that will be distributed after July 1st, 2025
  - QA policy templates
  - QA file review and field assessment worksheets
- **LHD QA policies/plans submitted to DPH by January 1, 2026, for review and approval – Plans implemented by LHD upon submission and approval.**

Pool and Tattoo QA Sneak Peek

Pool Program Fieldwork Evaluation Checklist						
Pool Name:			County/District:			
State ID#:			EHS Name:			
Instructions: If in compliance, enter a number 1 under the "I" column. If out of compliance, enter a number 1 under the "N" column. If the item is not applicable, enter a number 1 under the "NA" column			REHS#:			
			Evaluator:		Date:	
	Items Evaluated	IN	OUT	NA	Comments	
	Prior to Inspection					
1	Reviews pool file – (1-3) previous inspections, current application, permit, PDSC's and supporting docs.					
2	Awareness of permit restrictions and conditions (i.e. flow reduction, night swimming)					
3	REHS properly equipped – rules, forms (or working field client), test kit, tape measure, thermometer, etc.					
	Conducting the Inspection					
4	Properly identifies him/herself & asks operator to accompany during inspection					
5	Properly uses equipment					
6	Attempts to observe bonding wire attachment to pump upon first visit to pump room					
7	Ensures facility is in compliance with .2537 regardless of year of construction					
9	Professional rapport and appropriate attire					
10	Best Practice: Prioritizes evaluation of 6 point items at the beginning of the inspection(1,2,3,4,6,15,22)					
	Water Quality					
11	Water clear enough to clearly see bottom of pool and pool drain (1)					
12	Disinfectant residual provided and CYA within limits (2)					
13	Pool pH (3)					
14	Water temperature of heated pool (4)					
15	Daily written records of water quality & test kit kept on site (5)					
	Pool Maintenance – Submerged Suction Outlets (6)					
16	Verifies all submerged suction outlet covers are in good condition, securely attached, properly separated, not expired – .2537(b)(7), .2518(j)					
17	Field verification of accuracy of information on the PDSC data form regarding pump, drain covers, equalizer covers, and vacuum line covers – .2539(d)					
18	Correctly assesses the flow meter and documents flow meter reading .2518(j)					
19	Verifies that SOFA flow ratings are greater than the maximum achievable pumping system flow rate – .2539(b)					
20	Verifies or works with operator on plans to obtain and verify sump information on (or missing from) the PDSC data form to verify SOFA instillation in accordance with manufacturer's instructions –					

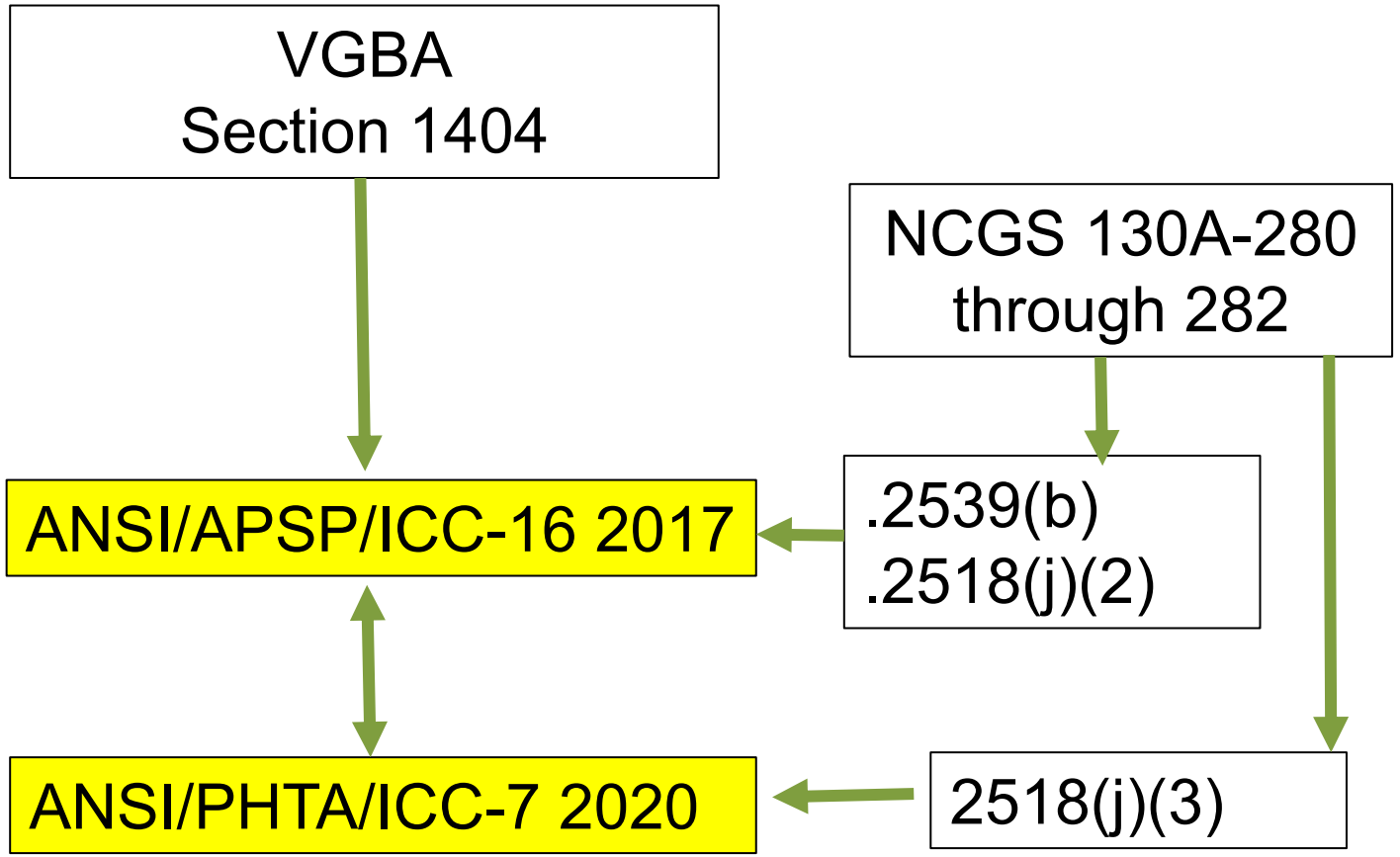
Tattoo Program – Individual File Review Form					
Artist Name:		County/Distric			
State ID#:		QA Reviewer:		Review Date	
Shop Name:		REHS #s (on recent inspection)			
Instructions: If in compliance, enter a number 1 under the "Y" column; if out of compliance, enter a number 1 under the "N" column					
	Items Evaluated	Y	N	Comments	
1	Separate file for each artist with a unique state ID number				
2	File contains inspection reports, permits, permit actions, visits, and status changes in chronological order				
3	Inspection reports are properly completed				
4	File contains properly completed applications				
5	File contains properly completed permit				
6	There is a system in place to keep track of when tattoo permits expire				
7	Permit action documentation (ITS, IS, Permit denial)				
8	Status changes				
9	Water and wastewater				
10	Complaints				
	Additional Comments				

VGBA Compliance – The Problem!

The entrapment hazards include:

1. **Body:** A body part, often the torso or bottom, covers a drain and is held down by the intensity of the suction
2. **Hair:** Long hair is caught in a faulty drain cover
3. **Limbs:** Arms, legs, feet or fingers are lodged in a suction opening
4. **Mechanical:** Jewelry, bathing suits or other materials are entangled in a drain cover
5. **Evisceration/disembowelment:** When suction draws out the intestines and organs

VGBA Compliance – The Solution!



.2539(b)
All submerged suction outlets in public swimming pools other than vacuum ports shall be protected by a cover in compliance with ANSI/APSP/ICC-16 2017 (PA 2021) American National Standard for Suction Outlet Fitting Assemblies (SOFA) for Use in Pools, Spas, and Hot Tubs, which is hereby incorporated by reference, including any subsequent amendments or editions,

.2518(j)(2)
Drain outlets shall comply with the ANSI/APSP/ICC-16 2017 American National Standard for Suction Outlet Fittings Assemblies (SOFA) for Use in Pools, Spas, and Hot Tubs, which is hereby incorporated by reference, including any subsequent amendments or editions

.2518(j)(3)
Public swimming pool drains shall comply with ANSI/PHTA/ICC-7 2020 American National Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs and Catch Basins, which is hereby incorporated by reference, including any subsequent amendments or editions

VGBA Compliance Golden Rules

- **ANSI/APSP/ICC-16 2017**
  - **SOFA flow rating must be greater than pumping system max flow rate**
  - **Must follow manufacturer's installation instructions**
  - **Only installed on approved sumps**

3.6.3.2 Compliance with this standard requires selecting and installing a SOFA, or combination of SOFAs, such that the resulting *individual suction system flow rating* is greater than the pumping system's *maximum system flow rate*.

3.6.1 **Installation.** All SOFAs shall be installed in accordance with the *manufacturer's* installation instructions, or for *RDP SOFAs*, in accordance with the *registered design professional's* engineering plans.

3.5.1 **Sump specifications.** *Cover/grates* shall only be installed on *sump* configurations authorized by the *manufacturer's* installation instructions resulting in a unique SOFA configuration, with a specific certified flow rating. *Manufactured or field-built sumps* shall be permitted. Refer to Figures 2, 3, 5 and 6.

VGBA Compliance – What is a SOFA?

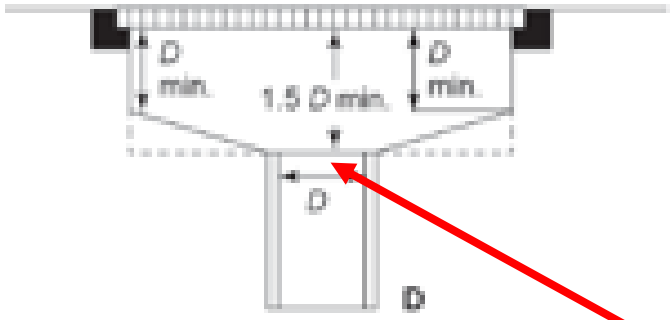
ANSI/APSP/ICC-16 2017

Suction outlet fitting assembly (SOFA): All components, including the *cover/grate*, used to attach a *cover/grate(s)* to the *finished surface of a pool* and to an *individual suction system*.

ANSI/APSP-16 2011

suction outlet: A fitting, fitting assembly, cover/grate, and related components that provide a localized low-pressure area for the transfer of water from a swimming pool, wading pool, spa, or hot tub.

SOFA Handoff Point – VGB 2008 vs. VGBA 2017

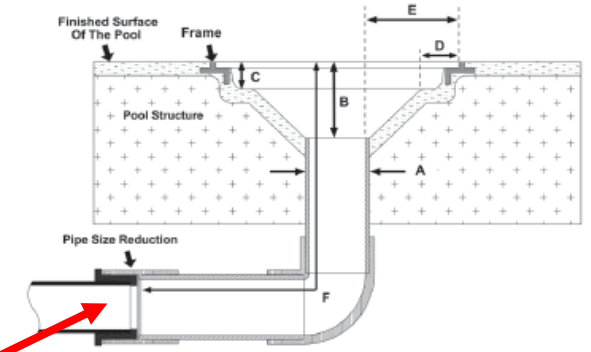


ANSI/APSP-16 2011

Suction outlet fitting assembly (SOFA): All components, including the *cover/grate*, used to attach a *cover/grate(s)* to the *finished surface of a pool* and to an *individual suction system*.

Individual suction system: A *direct-suction* or *indirect-suction* system that connects one or more SOFAs to one or more pumps, the combination of which is used to determine the *maximum system flow rating* of the *individual suction system*.

Figure 5: Sump specifications

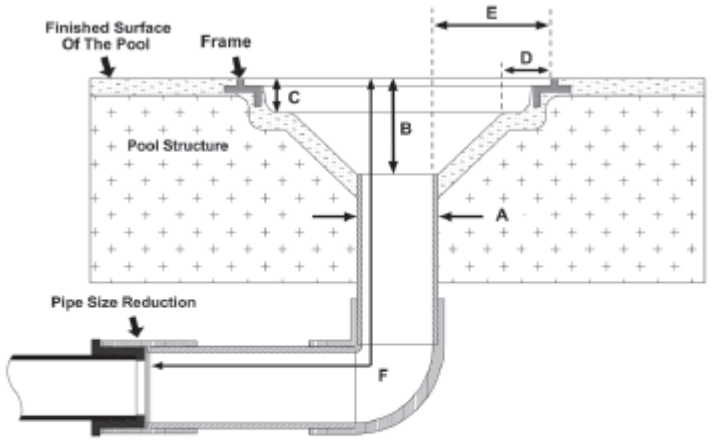


A. Specified PVC Pipe Size
B. Minimum Sump Depth
C. Minimum Ledge Depth
D. Maximum Ledge Width
E. Minimum Pipe Offset
F. Minimum Length Before Reduction

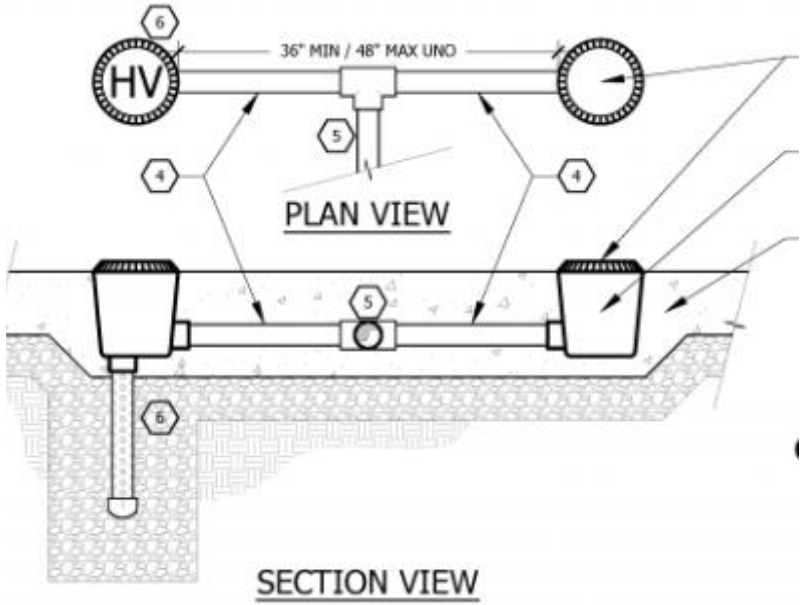
ANSI/APSP/ICC-16 2017

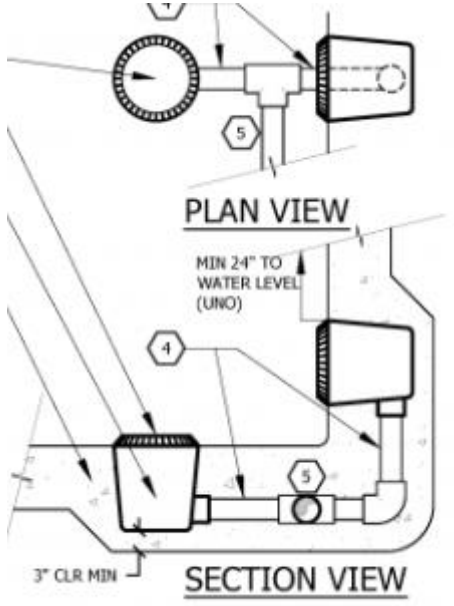
SOFA Handoff Point – VGB 2008 vs. VGBA 2017

Figure 5: Sump specifications



A. Specified PVC Pipe Size
B. Minimum Sump Depth
C. Minimum Ledge Depth
D. Maximum Ledge Width
E. Minimum Pipe Offset
F. Minimum Length Before Reduction





.2518(j) – Symmetrical "T" Piping

Submerged Suction Outlets ANSI/PHTA/ICC-7 2020

Figure 1. Branch piping

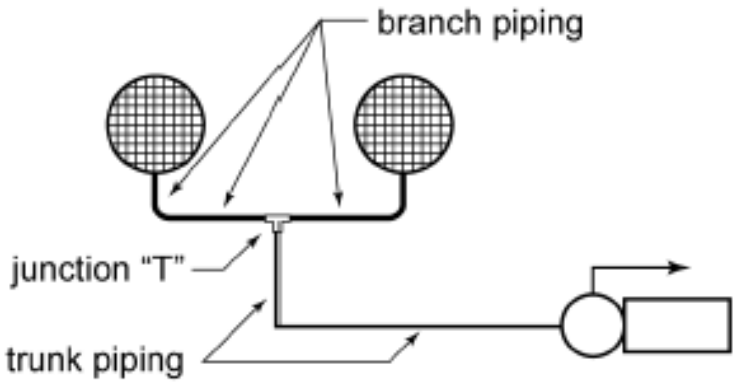


Figure 17. Three or more outlets in parallel, looped piping

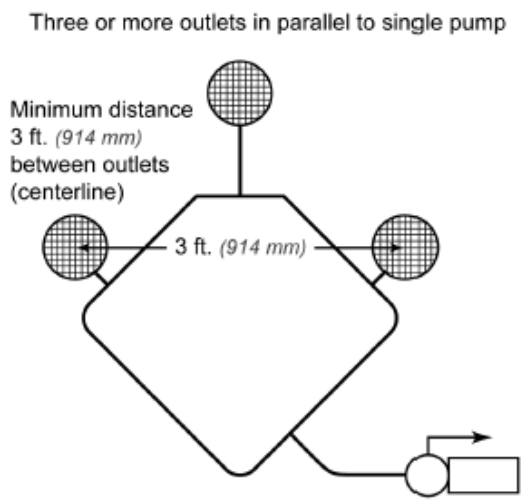


Figure 11. Dual outlets in parallel to one pump

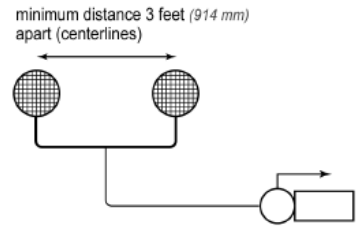


Figure 12. Dual outlets in parallel to dual pumps

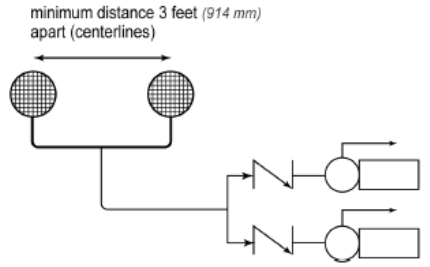


Figure 13. Dual parallel outlets to two pumps

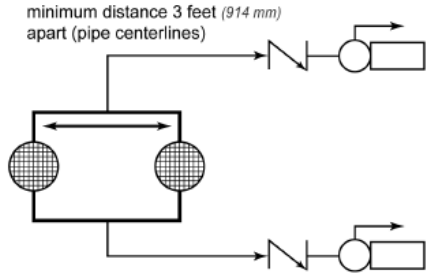


Figure 14. Dual outlets on different planes

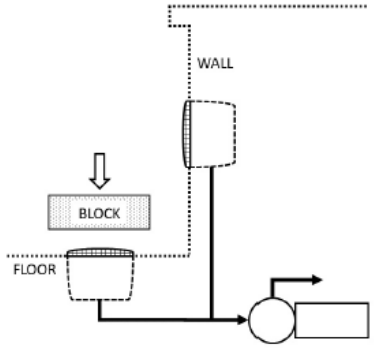
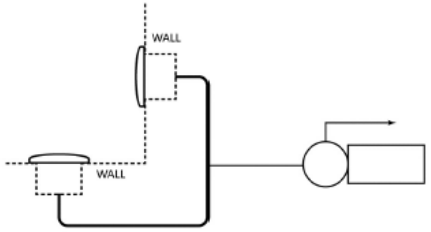
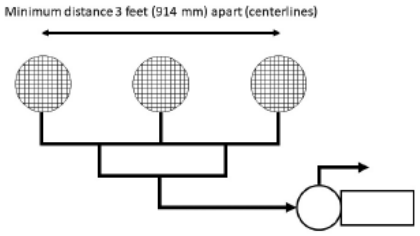


Figure 15. Dual outlets on separate vertical walls (aerial view)



5.3.2 Multiple blockable separation. Three or more submerged outlets are subject to the separation requirement of Section 5.3.1 only on the most widely spaced of the group (see Figure 16 or Figure 17).

Figure 16. Three or more outlets to (a) single pump(s)



.2518(j) ~~— Symmetrical “T” Piping~~ Submerged Suction Outlets

ANSI/APSP-7 2006

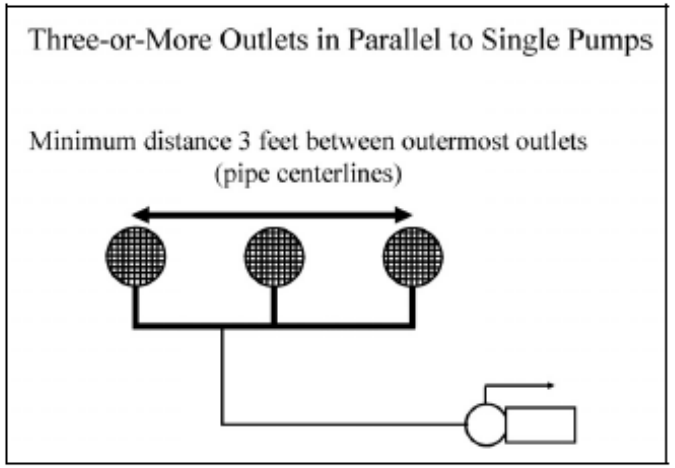


Figure 9 – Three or more outlets in parallel
Eccentrically tapped piping

ANSI/APSP/ICC-7 2013

5.3.2 Multiple Blockable Separation. Three or more submerged outlets are subject to the separation requirement of 5.3.1 only on the most widely spaced of the group. (See *Figure 13* or *14*.)

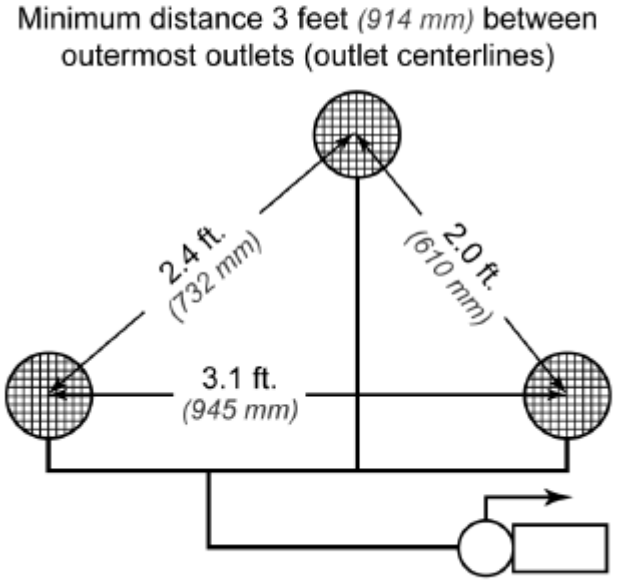
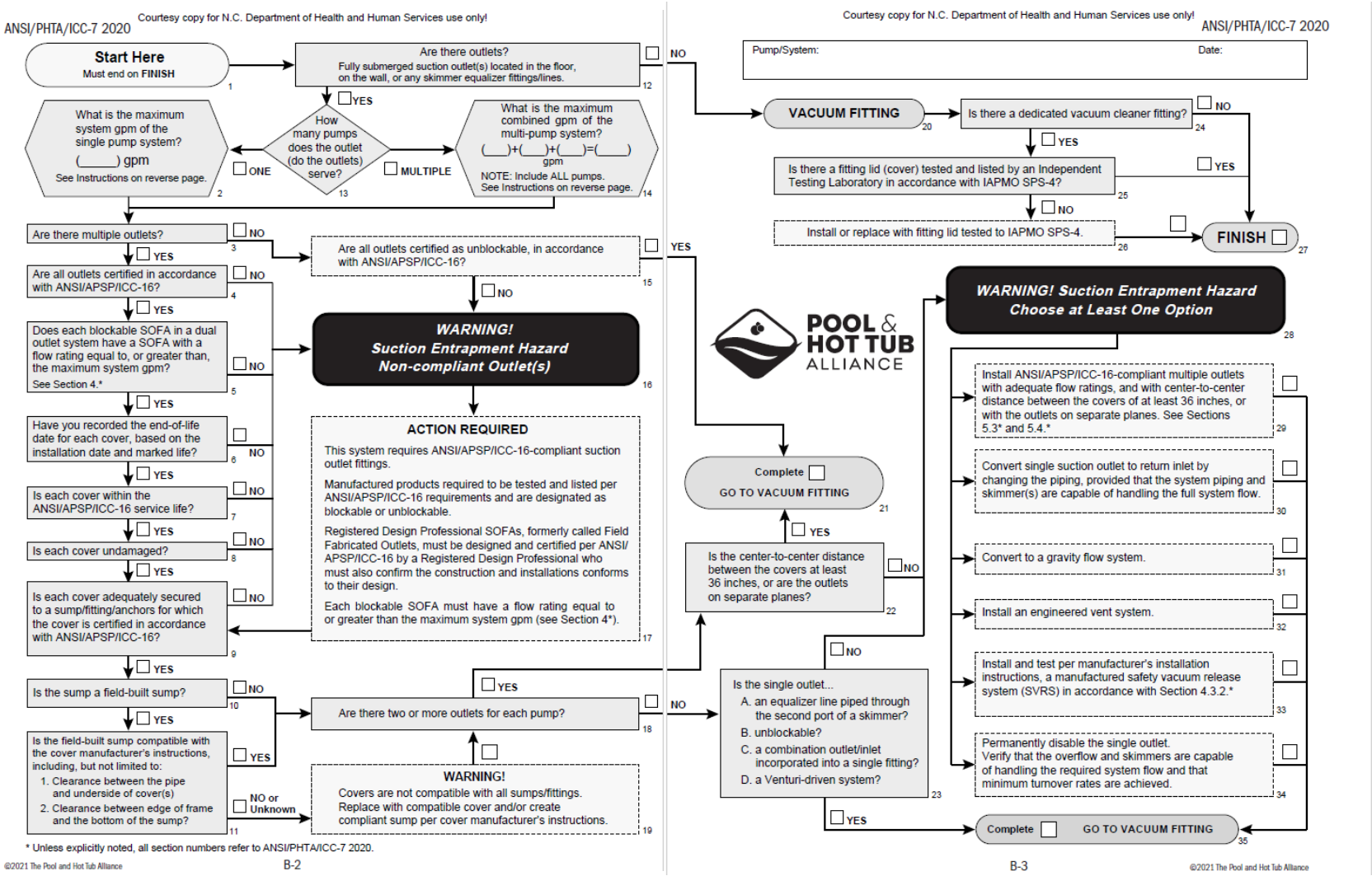


Figure 13. Three or more outlets to (a) single pump(s)

.2518(j) – Symmetrical “T” Piping

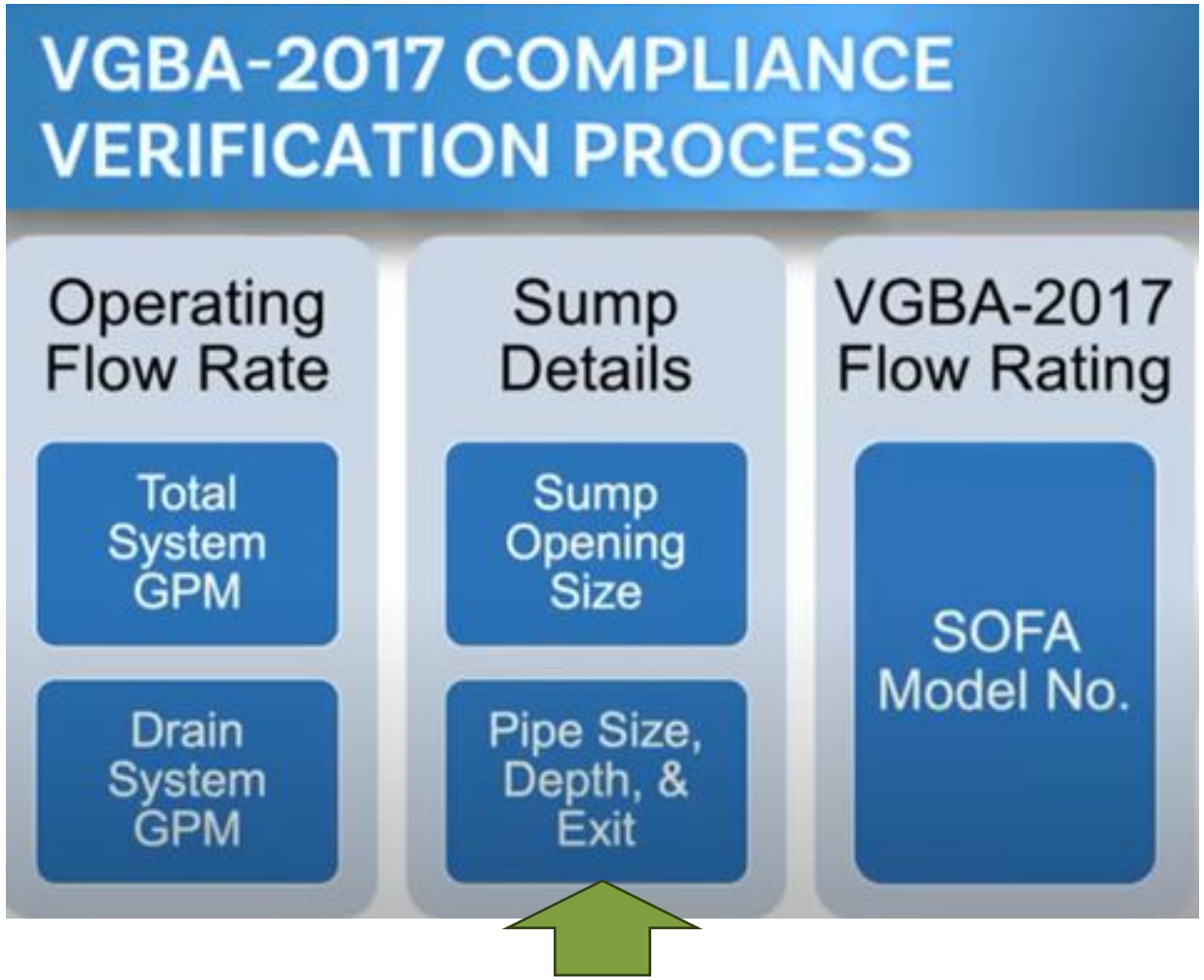
Submerged Suction Outlets

VGBA Compliance Flow Chart



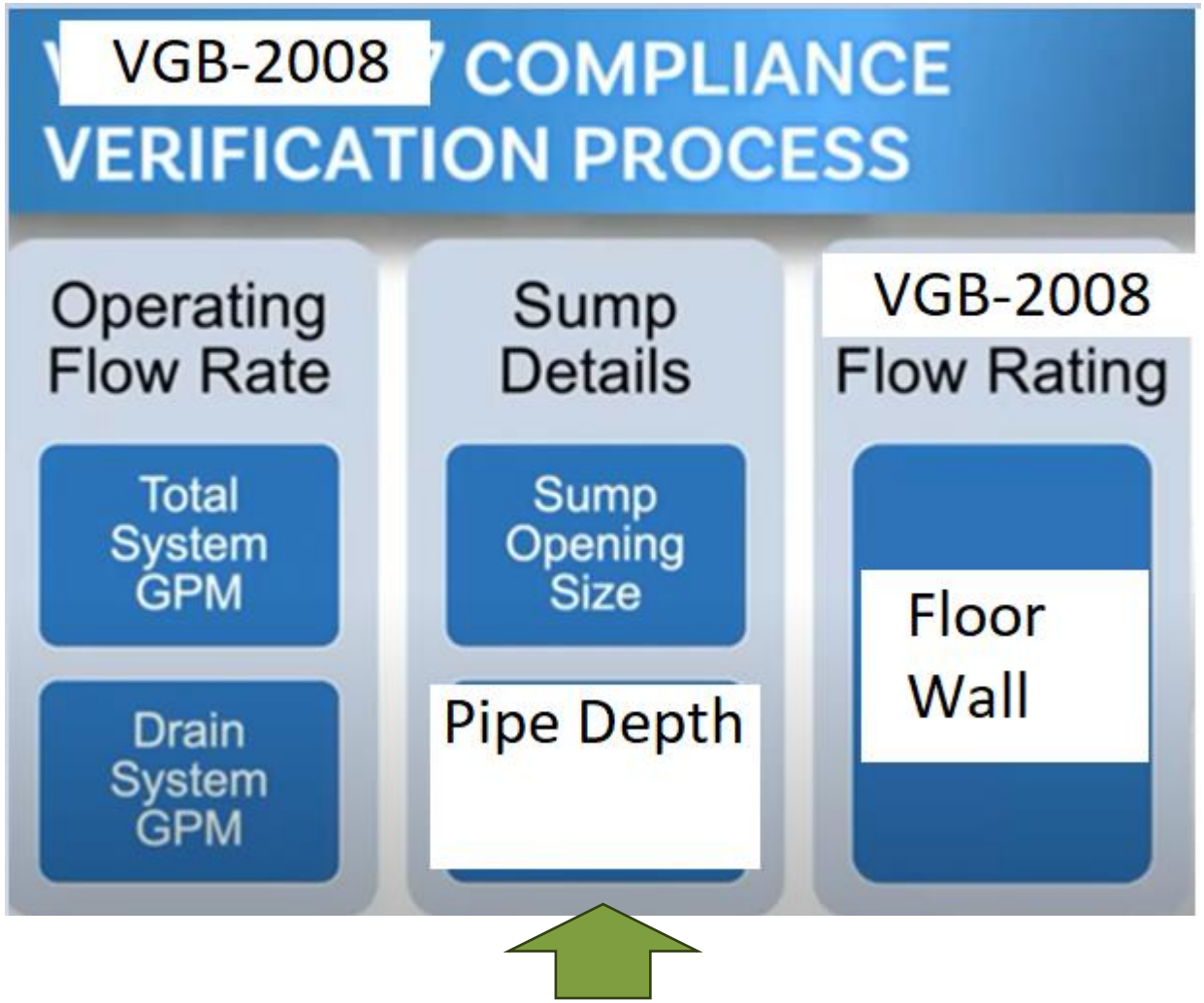
VGBA Compliance 2017 Overview

- **ANSI/APSP/ICC-16 2017**
- **Golden Rules**
  - **SOFA flow rating must be greater than pumping system max flow rate**
  - **Must follow manufacturer's installation instructions**
  - **Only installed on approved sumps**



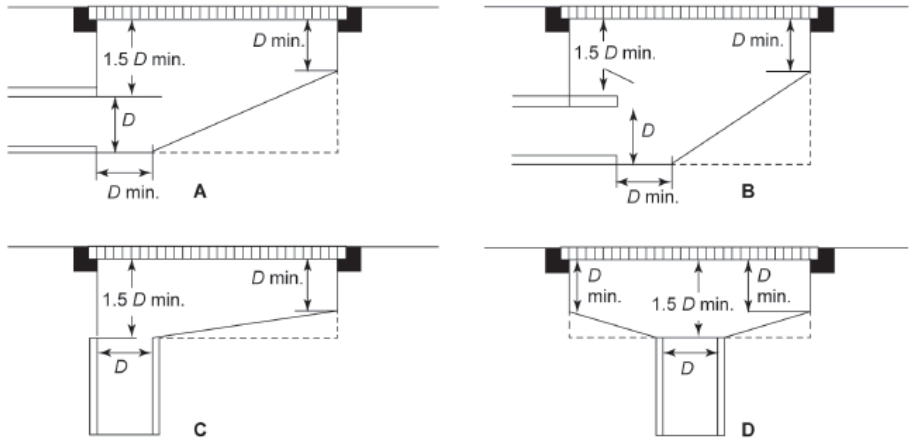
Pipe Size – Pipe Depth – Pipe Exit Orientation

VGBA Compliance 2008 Overview



ANSI/APSP-16 2011

Figure 2: Field Built Sump



NOTES:
(a) D = inside diameter of pipe.
(b) All dimensions shown are minimums.
(c) A broken line (- - -) indicates suggested sump configuration.

VGBA Compliance – Pump System Flow Rate

ANSI/PHTA/ICC-7 2020

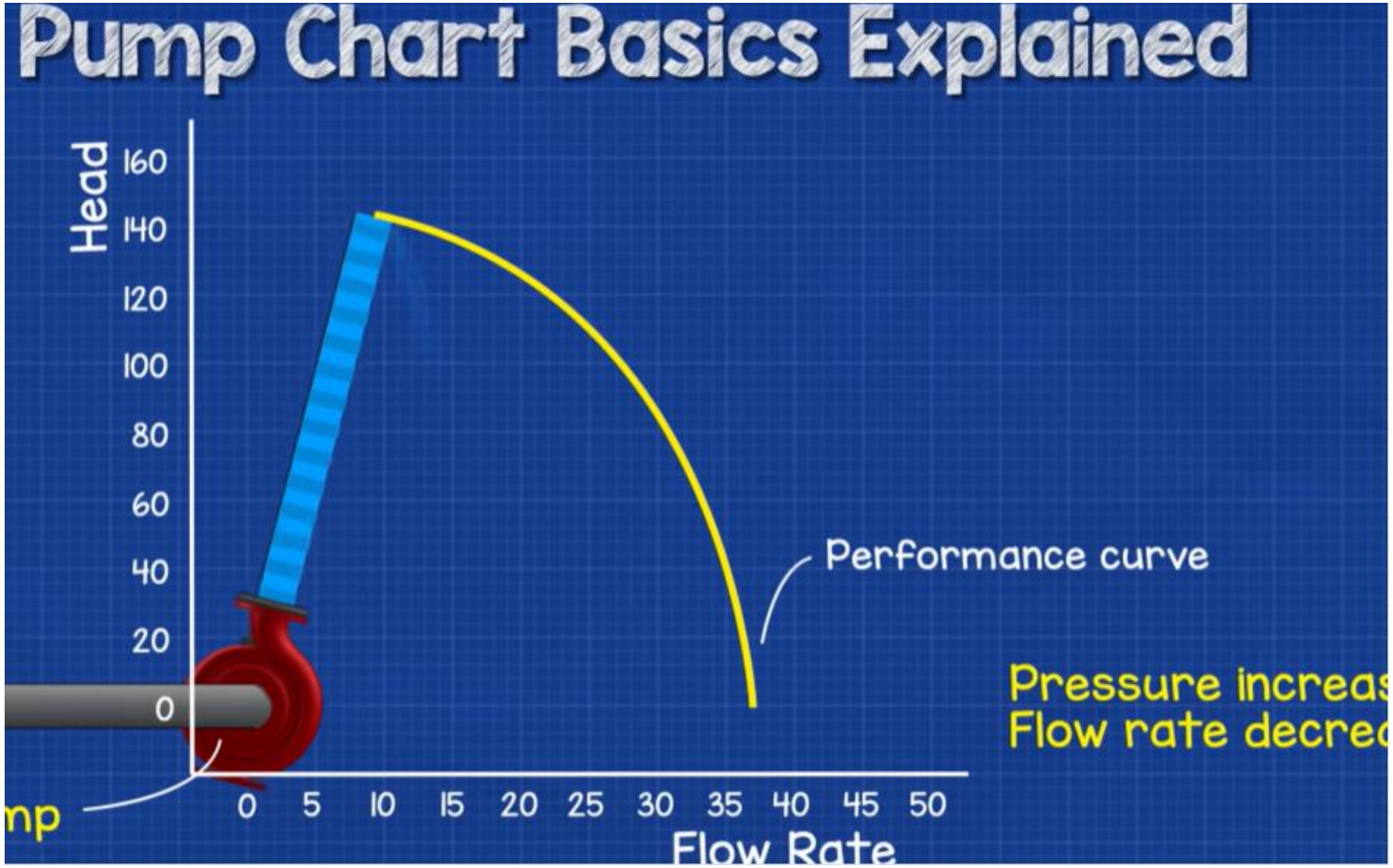
MAXIMUM SYSTEM FLOW RATE is defined as the <u>maximum potential flow</u> when all available system flow is directed through the submerged suction outlet(s) with the lowest resistance. (Valve is fully open to the main drain(s) and filter is clean.)

(ANSI/ PHTA/ ICC – 7 2020; See Section 4.4.5 for specific procedures required to determine the system-specific, maximum system flow rate.)

VGBA Compliance – Determining Max System Flow Rate

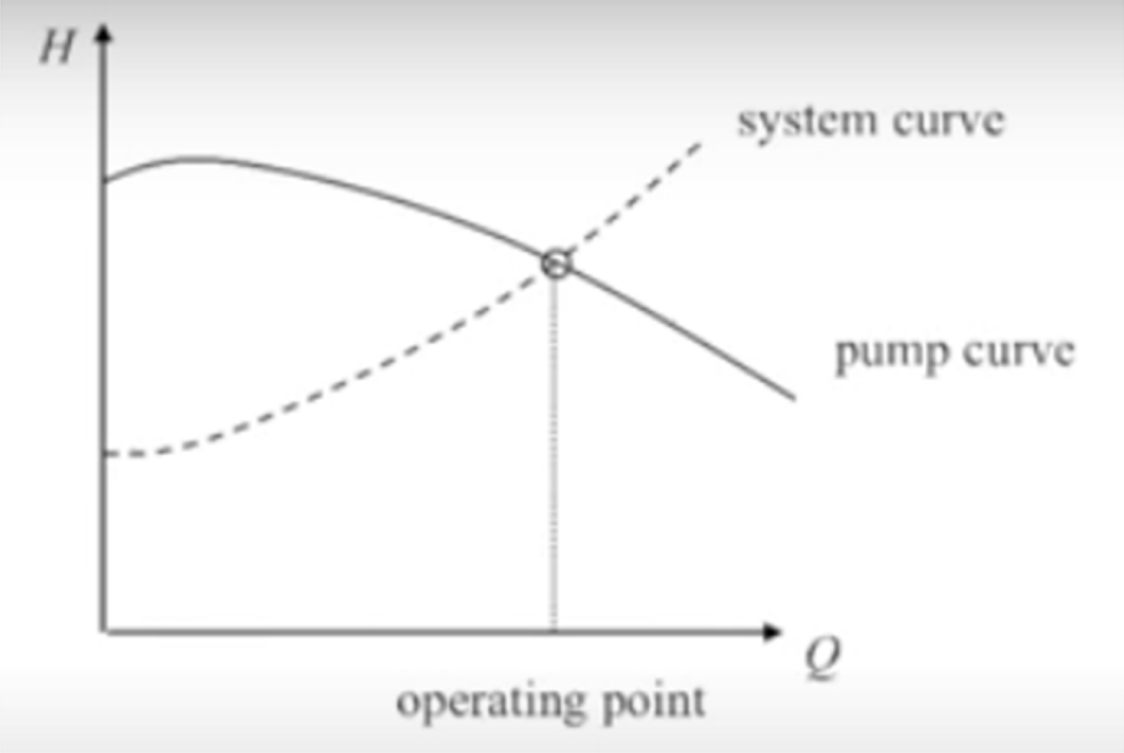
1) **Highest speed on the manufacturer's pump curve**
    1) **Default – New pools**
    2) **Preferred – Easy & Fool Proof!**
2) **The maximum system flow rate based on submitted head loss calculations (Submitted head loss calculations must be verified using method 3 or 4 below)**
3) **TDH measurements from vacuum and pressure gauges**
4) **Flow rate measured with a properly installed flow meter – A.K.A. "True Flow"**

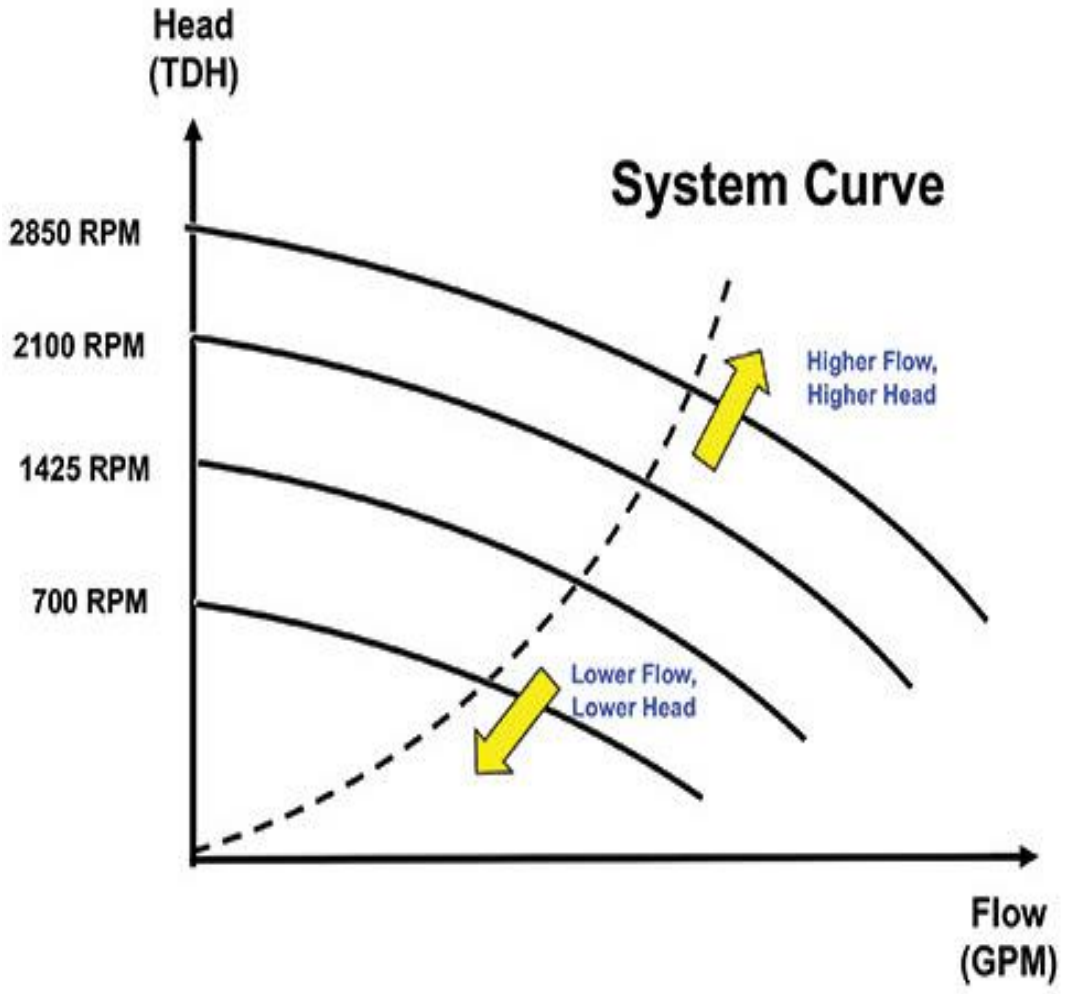
Pump Curves



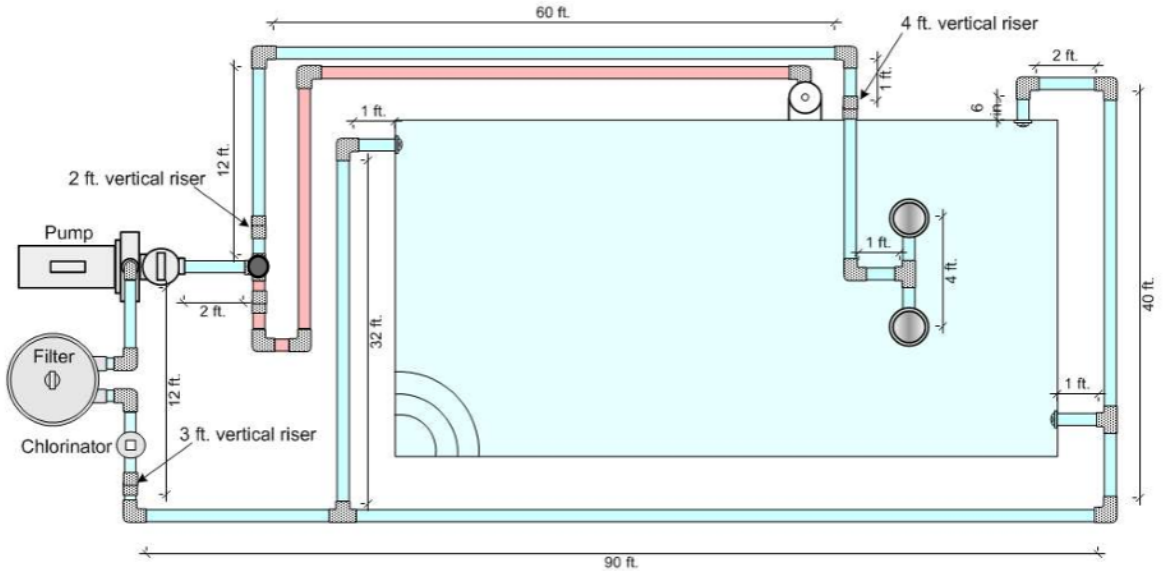
https://www.youtube.com/watch?v=U8iWNaDuUek

Pump Curve Vs. System Curve





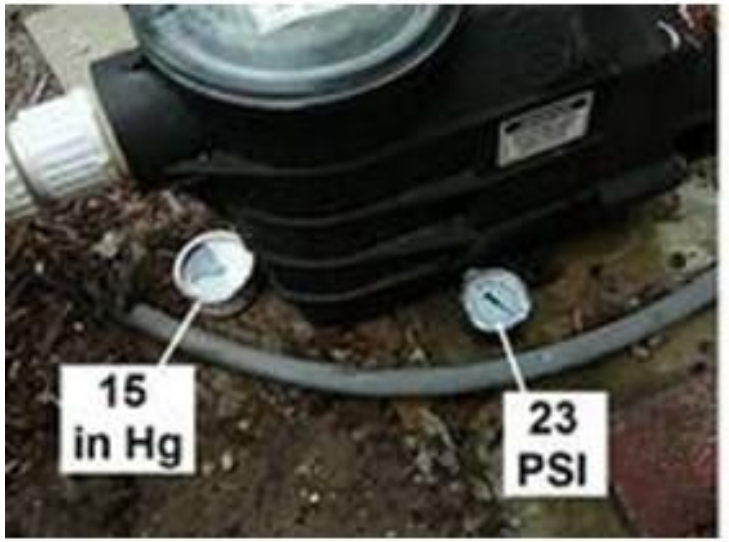
TDH Head Loss Calculations



Suction side loss	15.3
Return side loss	19.2
Filter loss	12.0
Chlorinator loss	2.0
Return fitting loss	1.6

Total *Calculated* Loss =50.1 (TDH)

TDH Measurements



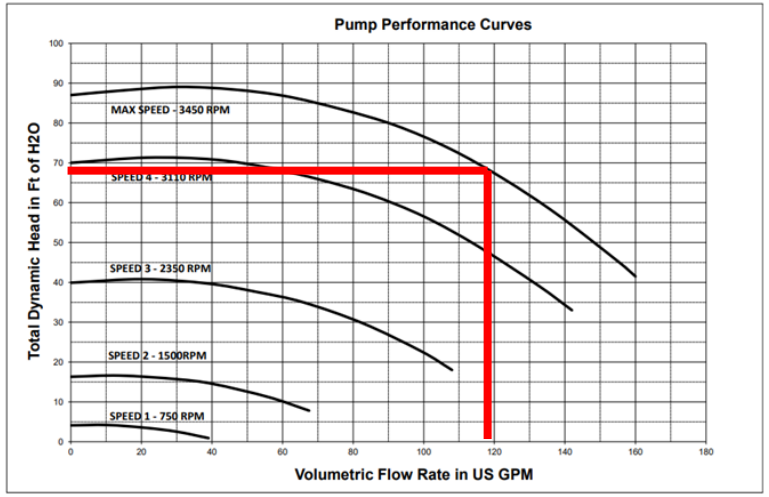
VACUUM

15 x 1.13 = 17

PRESSURE

23 x 2.31 = 53

TDH = 17 + 53 = 70 ft



TDH Measurements

ANSI/PHTA/ICC-7 2020

Finding the Maximum Flow Rate of an Existing System

Preparation:
1. Open all valves to their full open position for pool or spa circulation. (For secured systems, do not adjust valves.)
2. Remove eyeball fittings from return inlets (when removable by hand).
3. Clean skimmer and pump baskets. Turn off skimmer to isolate outlet, if possible.
4. Backwash or clean sand filter/DE grids, or remove cartridge.

When inspecting existing installations, the maximum possible flow rate of suction system must be determined as explained in Section 4.4.5.*

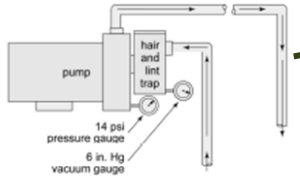
Pump Method 1: Measure flow rate with a flow meter accurate to ±5% (see Section 4.4.5).*

Pump Method 2: Calculate using pressure and vacuum gauge readings (see diagram below).

1. Install a vacuum gauge as close to the bottom of the strainer basket as possible.
2. Install a pressure gauge as close to the pump discharge as possible.
   NOTE: It may be necessary to use an NPT[9] × barb fitting with a short section of plastic tubing connected to a gauge if gauges cannot be screwed into drain holes provided in pump.
3. Multiply vacuum reading by 1.13 and record.
4. Multiply pressure reading by 2.31 and record.
5. Add results of Steps 3 and 4 together to get the approximate Total Dynamic Head (TDH) in feet of head.
6. Using the published curve for the pump, find the Total Dynamic Head calculated above on the vertical axis, and read the flow rate on the horizontal axis.
7. This will give you the maximum flow rate within approx. 10%.

Pressure head: gauge psi × 2.31 = feet of water
Suction head: gauge inches Hg × 1.13 = feet of water

EXAMPLE: If the pressure gauge reads 14 psi and the vacuum gauge reads 6 inches of mercury (Hg), the approximate Total Dynamic Head (TDH) of the system would be 39.12 feet.



Pressure Head = 14 psi × 2.31 = 32.34 feet
Suction Head = 6 in. Hg × 1.13 = 6.78 feet
Total Dynamic Head = 39.12 feet

Gravity Flow Calculation

$$\text{Flow (gpm)} = \sqrt{\frac{1786 \times [\text{D (inch)}]^5 \times \text{H (inch)}}{\text{L (inch)} + [55 \times \text{D (inch)}]}}$$

(Where 55 x D accounts for energy loss of stream)

EXAMPLE: Gravity flow through 2" IPS Schedule 40 PVC pipe with an inside diameter of 2.067" with 32.0 feet of pipe and 2 elbows of equivalent length of 6.0 feet. The top of the pipe opening into the collector tank is 8" below pool water level.

$$\text{Flow (gpm)} = \sqrt{\frac{1786 \times [2.067]^5 \times 8}{[32 + (2 \times 6)] \times 12 + [55 \times 2.067]}} = 29 \text{ gpm}$$

Fitting Assembly Audit

Existing Pump _____ (Manufacturer) _____ (Model)

Pool Volume _____ (Gallons)

Filter _____ (Manufacturer) _____ (Model) _____ (Size (Sq. Ft.))

Existing Cover _____ (Manufacturer) _____ (Model) _____ (GPM)

Pressure _____ (PSI) Vacuum _____ (Inches of Hg)

TDH _____ (Feet of Water) System Flow _____ (GPM) (from Pump Curve)

Maximum Flow _____ (GPM)

New Cover _____ (Manufacturer) _____ (Model) _____ (GPM)

Replacement Date ____/____/____

Maximum Drawdown _____ (Calculated)

_____ (Measured) _____ (Measured) _____ (Measured) _____ (Measured)

NOTE: Check cover manufacturer's installation instructions for the following items per applicable standard - ASME/ANSI A112.19.8, ANSI/APSP-16 2011 or ANSI/APSP/ICC-16 2017:

☐ Cover compatible with sump
☐ Attachments (hardware/screws)
☐ Field-built sump as specified by cover manufacturer

POOL & HOT TUB ALLIANCE

9. National Pipe Thread

* Unless explicitly noted, all section numbers refer to ANSI/PHTA/ICC-7 2020.

Pump Method 1: Measure flow rate with a flow meter accurate to ±5% (see Section 4.4.5).*

Pump Method 2: Calculate using pressure and vacuum gauge readings (see diagram below).

Pressure head: gauge psi × 2.31 = feet of water
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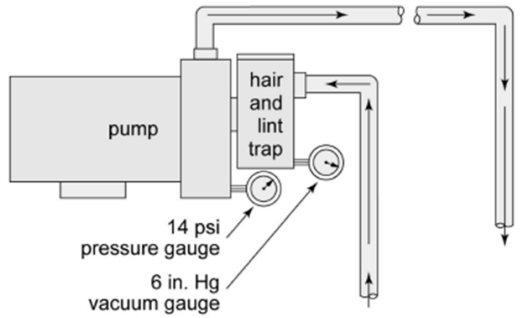
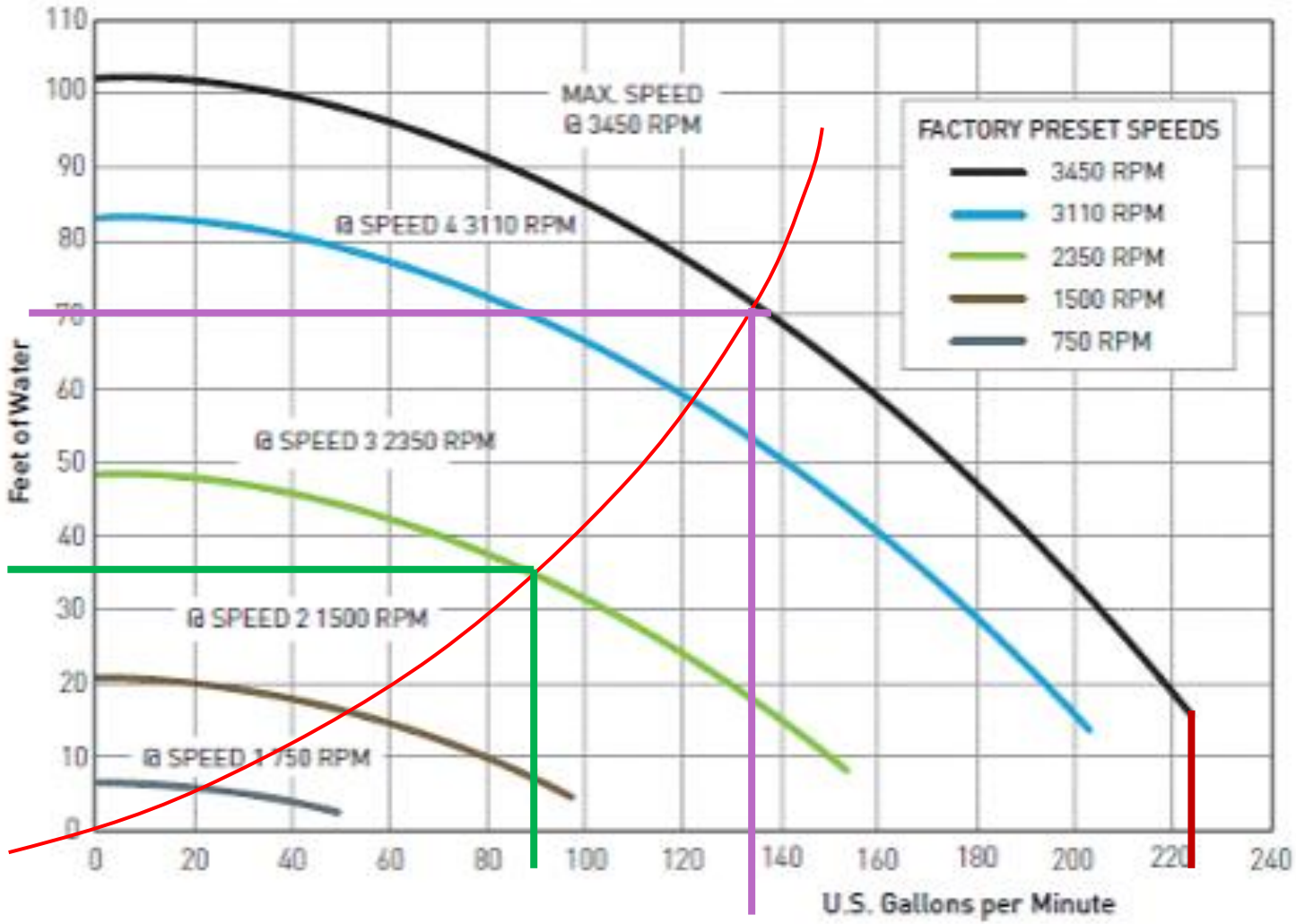


Pressure Head = 14 psi × 2.31 = 32.34 feet
Suction Head = 6 in. Hg × 1.13 = 6.78 feet
Total Dynamic Head = 39.12 feet

Flow Reduction – Variable Speed Pump



Measuring with a Flow Meter

The pool permit should be conditioned to maintain the speed setting (rpm) determined to be in compliance with drain safety.

Required Flow Meter Accuracy?

- 5% or 10%?
  - ICC-7 requires 5% accuracy for flow meters used for a flow reduction measurement
  - Rule 2518 (g) requires 10% accuracy for flow meters for measuring turnover
  - Rule .2539 (d)(1) requires a flow meter for ongoing verification of system flow rate when there has been a flow reduction without RDP head loss calculations

- **Memo - Can continue to use flow meters accurate to 10% for flow reductions in 2025**

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

JOSH STEIN • Governor
DEVDUTTA SANGVAI • Secretary
KAREN BURKES • Acting Deputy Secretary for Health
KELLY KIMPLE • Acting Director, Division of Public Health

March 4, 2025

MEMORANDUM

TO: Registered Environmental Health Specialist, Program Supervisors, and Managers

FROM: Chad Gambill, REHS, Field Supervisor
Pools, Tattoos, and State Institutions Program

SUBJECT: 2025 allowance for public swimming pool flow reductions using a properly sized and installed flow meter accurate to 10%

DISCUSSION AND RATIONALE:

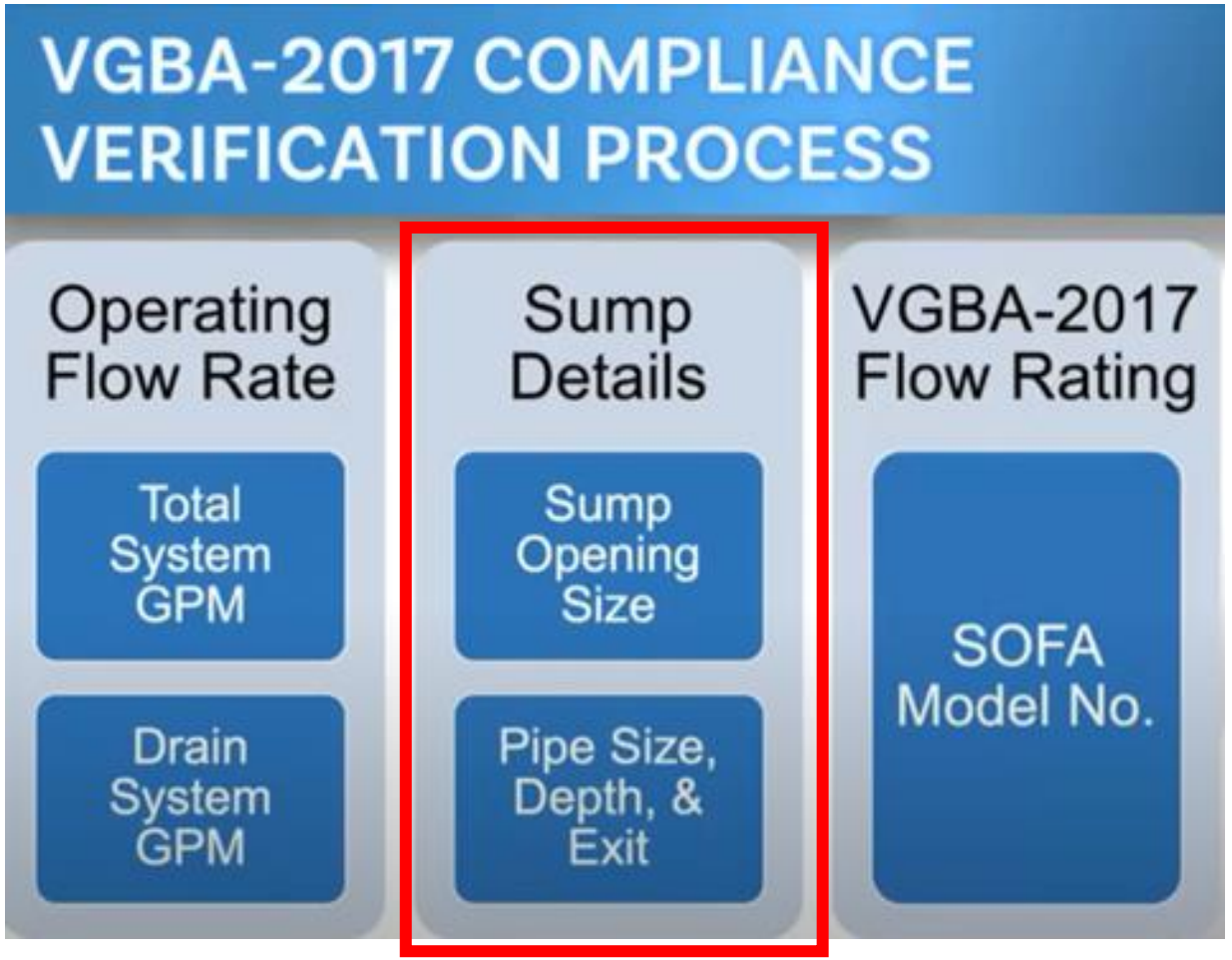
The Pools, Tattoos, and State Institutions Program ("Program") has received questions and concerns from local health departments and industry personnel regarding the ANSI/PHTA/ICC-7 2020 standard ("2020 standard") which required a flow meter to be accurate to 5% when used to determine the maximum system flow rate of a pool pumping system for VGBA compliance. The 2020 standard, which became effective November 2020, is a revision of the previous standard, ANSI/APSP/ICC-7 2013 ("2013 standard"). The 2013 standard allowed the determination of maximum system flow rates for VGBA compliance using flow meters accurate to 10%. 15A NCAC 18A .2518 incorporates by reference the ANSI/PHTA/ICC-7 and ANSI/APSP/ICC-16 standards into the NC Rules Governing Public Swimming Pools.

It has come to the Program's attention that many pools received flow reductions in recent years utilizing a flow meter accurate to 10% as allowed by the 2013 standard. These flow reductions were necessitated by several factors:

- Limited or no availability of flow meters with a 5% accuracy for larger pipe sizes.
- No availability of tools and pump curves necessary to utilize alternative option of obtaining a

VGBA Compliance – Sump Details

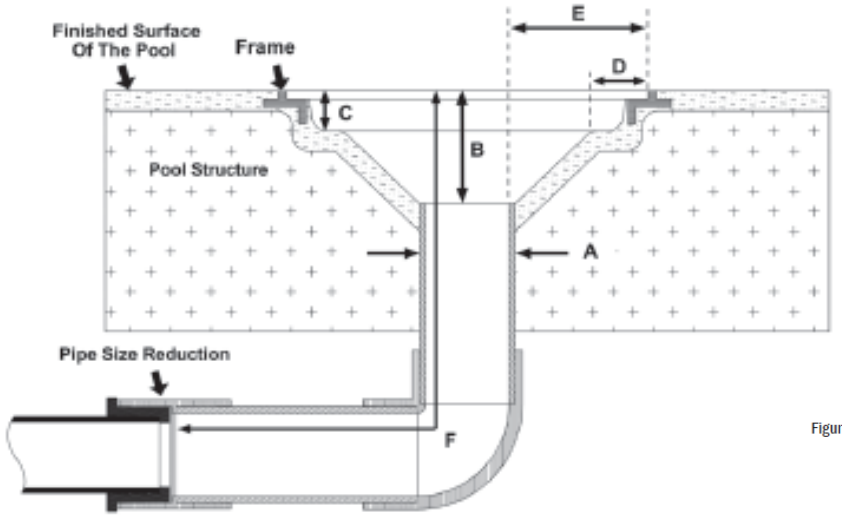
- **Golden Rules**
  - SOFA flow rating must be greater than pumping system max flow rate
  - Must follow manufacturer's installation instructions
  - Only installed on approved sumps



VGBA Compliance – Determining Sump Compatibility

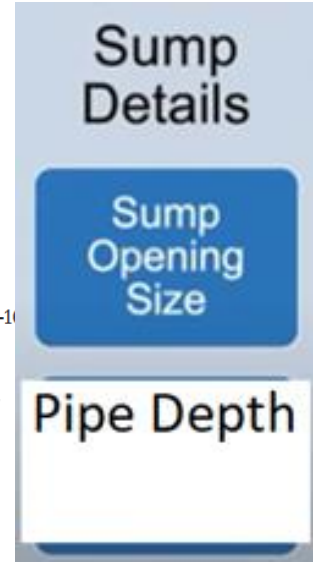
VGBA - 2017

Figure 5: Sump specifications



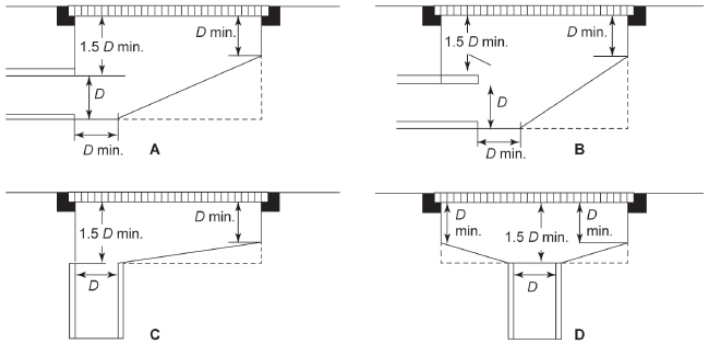
A. Specified PVC Pipe Size
B. Minimum Sump Depth
C. Minimum Ledge Depth
D. Maximum Ledge Width
E. Minimum Pipe Offset
F. Minimum Length Before Reduction

VGB - 2008



ANSI/APSP-1(

Figure 2: Field Built Sump



NOTES:
(a) *D* = inside diameter of pipe.
(b) All dimensions shown are minimums.
(c) A broken line (- - -) indicates suggested sump configuration.

VGBA - 2017

- **Pipe size?**
- **Pipe depth?**
- **Pipe exit orientation?**

Pool Drain Safety Compliance Data

PERMIT CANNOT BE ISSUED IF FORM IS INCOMPLETE

A separate form is required for each pump including circulation, jet or feature.

Name of Pool_____ **ID#**_____

1. **Pump Flow**
   Pump Manufacturer _____ Model # _____ Horsepower_____

   Maximum Pump Flow at highest speed **FROM PUMP CURVE**: _____ gpm. Pump use: Circulation / jet / feature (circle one)

   Has pump been serviced (disconnected from power for any reason) or changed out in last 12 months? YES / NO

   Flow meter manufacturer _____ Flow meter reading _____GPM

2. **Drain Sump Measurements** Is drain cover sumpless? YES/NO

2. **Drain Sump Measurements** Is drain cover sumpless? YES/NO

Sump manufacturer and model _____ OR: Field built sump (circle if yes)

Diameter of pipe entering sump _____ inches. Pipe enters through BOTTOM /SIDE of sump (Must circle one)

Distance between highest point of outlet pipe and top edge of sump _____ inches. Sump dimensions _____

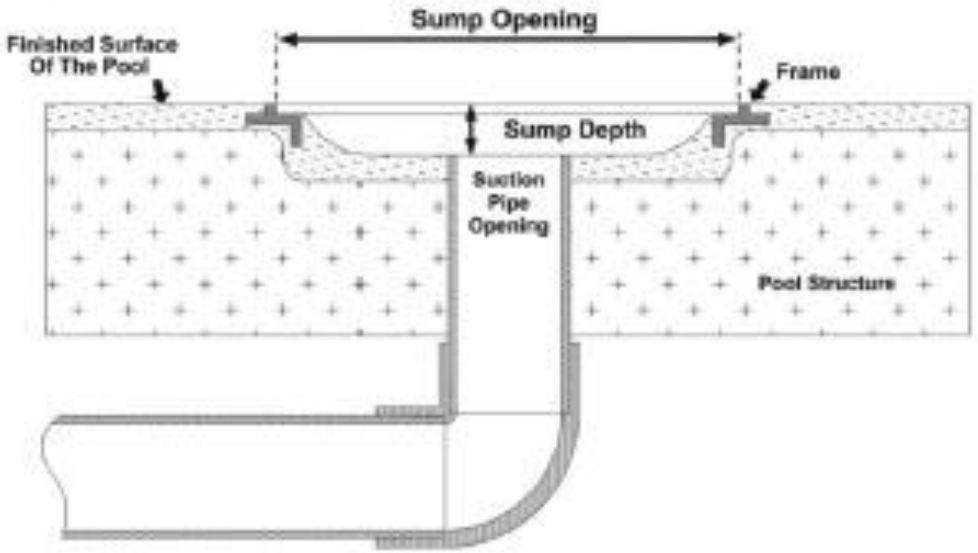
Flow rating from instructions:_____gpm Cover(s) located on pool: Floor / wall (circle one)

Date installed _____ Lifespan _____ **EXPIRATION DATE** _____

What is a Field-Built Sump?

ANSI/PHTA/ICC-7 2020

Figure 2. Field-built sump



FIELD-BUILT SUMP. Any sump not supplied by the cover/grate manufacturer. This includes sumps formed in the pool structure during the concrete, fiberglass, and stainless steel installation or fabrication process, and includes sumps fabricated or manufactured off-site by anyone other than the cover/grate manufacturer. Sumps provided by a SOFA manufacturer are not field-built sumps. A cover/grate may only be installed on sumps that meet or exceed the minimum dimensions specified by the cover/grate installation instructions (see Figure 2).

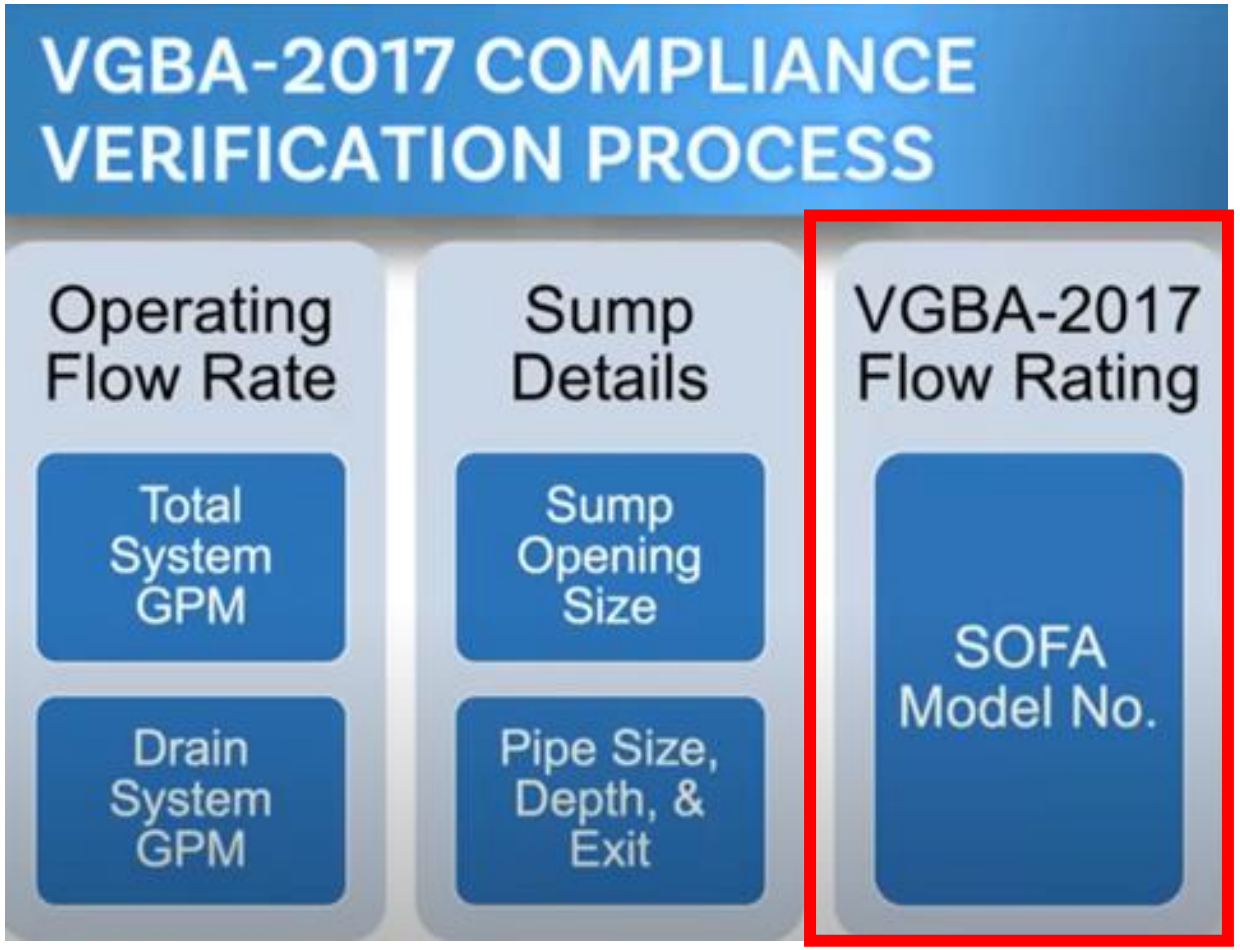
FIELD FABRICATED OUTLET(S). This is the term used by the predecessor standards to ANSI/APSP/ICC-16 2017 to identify Suction Outlet Fitting Assemblies (SOFAs) designed and certified by a Registered Design Professional in accordance with either ASME/ANSI A112.19.8 or ANSI/APSP-16 2011. The term for this type of SOFA was changed in ANSI/APSP/ICC-16 2017 to Registered Design Professional SOFA to reduce confusion with the term field-built sumps. See REGISTERED DESIGN PROFESSIONAL SOFA.

Field-built Sump?

VGBA Compliance – SOFA Flow Rating

Golden Rules

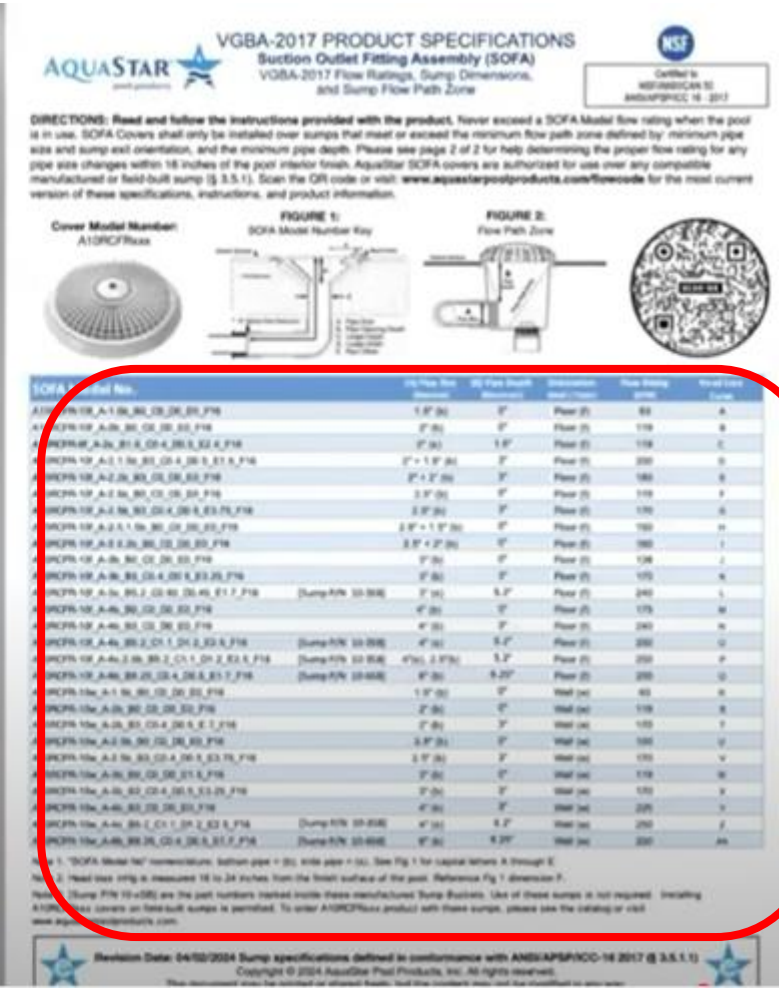
- SOFA flow rating must be greater than pumping system max flow rate
- Must follow manufacturer's installation instructions
- Only installed on approved sumps



SOFA Flow Ratings - VGB 2008 Vs. VGBA 2017

VGB-2008 drain covers typically have 2 flow ratings

VGBA-2017 drain covers typically have multiple flow ratings



VGBA 2017 – Determining SOFA Flow Rating

- **Certified, Listed, Labeled**
- **Pipe Size, Pipe Depth, Pipe Exit Orientation**

Cover Model Number:
A10RCFRxxx

FIGURE 1:
SOFA Model Number Key

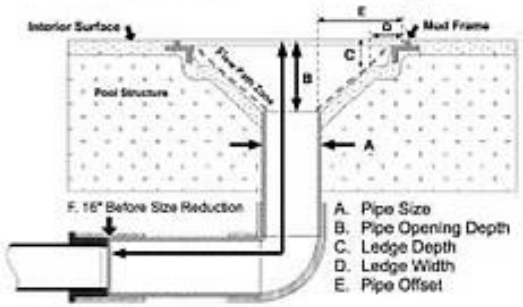
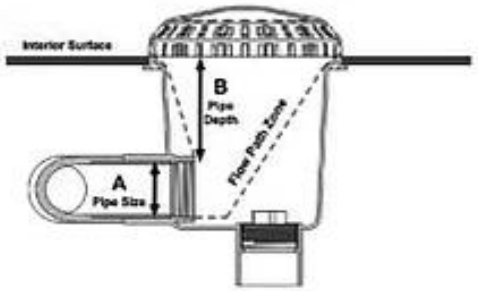


FIGURE 2:
Flow Path Zone



SOFA Model No.	(A) Pipe Size (Nominal)	(B) Pipe Depth (Minimum)	Orientation (Wall / Floor)	Flow Rating (GPM)	Head Loss Curve
A10RCFR-10f_A-1.5b_B0_C0_D0_E0_F16	1.5" (b)	0"	Floor (f)	63	A
A10RCFR-10f_A-2b_B0_C0_D0_E0_F16	2" (b)	0"	Floor (f)	119	B
A10RCFR-8f_A-2s_B1.5_C0.4_D0.5_E2.4_F16	2" (s)	1.6"	Floor (f)	119	C
A10RCFR-10f_A-2,1.5b_B3_C0.4_D0.5_E1.5_F16	2" + 1.5" (b)	3"	Floor (f)	200	D
A10RCFR-10f_A-2,2b_B3_C0_D0_E0_F16	2" + 2" (b)	3"	Floor (f)	180	E

VGBA 2008 – Determining SOFA Flow Rating

VGB Series

The AquaStar line of suction outlet covers, compliant with the Virginia Graeme-Baker Pool and Spa Safety Act (ANSI/APSP 16-2011 and NSF/ANSI 50-2009a)

Features

For single or multiple drain use (see installation instructions)

Single – 3" sump depth / min. 2" pipe
Floor: 166 GPM at 3.2 fps
Wall: 115 GPM at 2.2 fps

Floor/wall: 77.8 GPM at 1.5 fps
Floor/wall: 51.9 GPM at 1.0 fps

16.6 square inch opening

Additional sump and frame versions also available

#316 stainless steel screws

Manufactured from superior UV-resistant engineered polymers

Meets or exceeds ANSI/APSP 16-2011 and NSF/ANSI 50-2009a national standards and ASTM G154 UV testing

Replace every five years from the date of installation

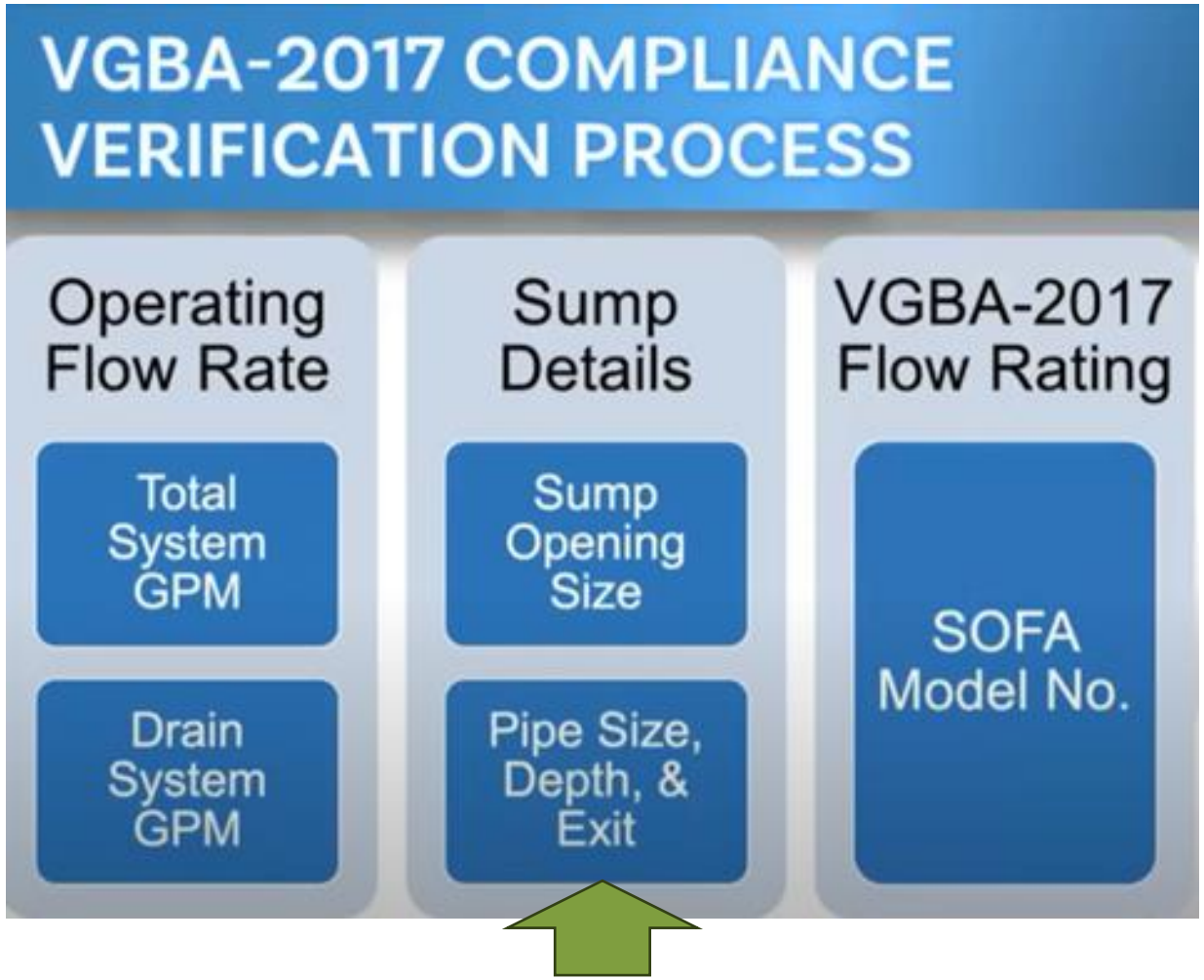
36 per case

NEW

Drain Cover Specification Sheet

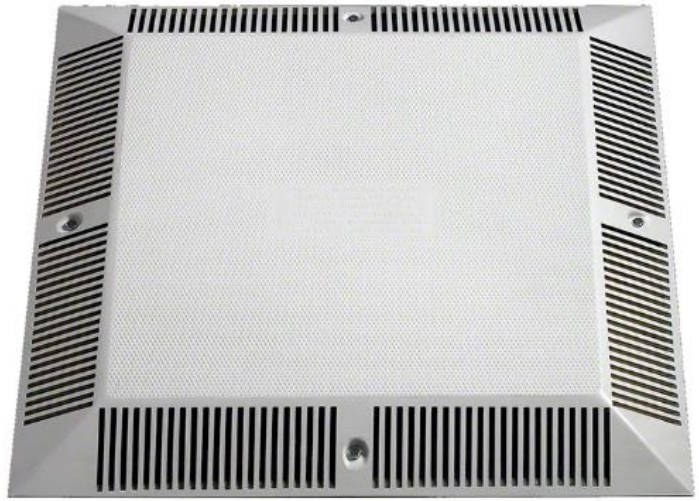
VGBA Compliance Recap

- **ANSI/APSP/ICC-16 2017**
- **Golden Rules**
  - **SOFA flow rating must be greater than pumping system max flow rate**
  - **Must follow manufacturer's installation instructions**
  - **Only installed on approved sumps**



Pipe Size – Pipe Depth – Pipe Exit Orientation

Aegis Shield – NSF Listing



Neptune-Benson, Inc.

334 Knight Street
Suite 3100
Warwick, RI 02886
United States
401-821-2200
Visit this company's website

Facility : # 1 USA

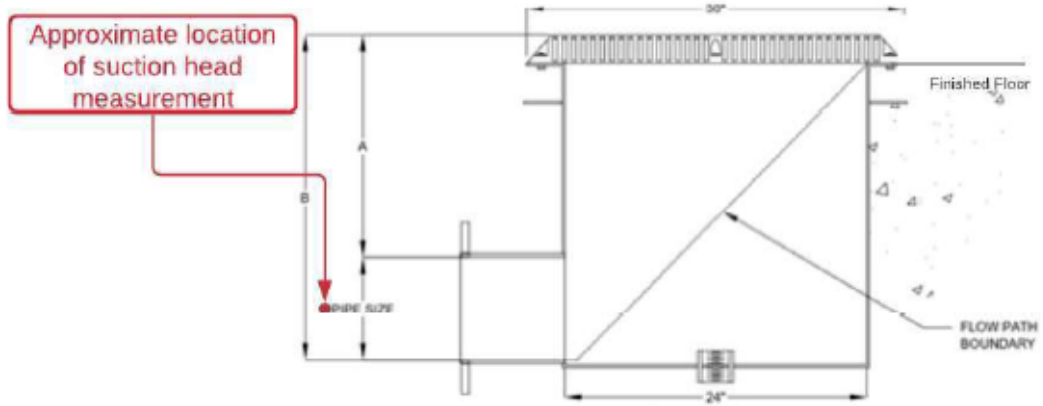
Suction Outlet Fitting Assembly Model	Sump Port Location	Pipe size	Orientation (Wall and/or Floor)	Design Flow Rate (GPM)
30" x 30" Suction Outlet Cover[1] [2] [3]				
1000-6864[4]	Side	8"	Wall	1120
1000-6864[4]	Side	8"	Floor	1432
3030AEC[5]	N/A	12"	Floor	1432

[1] Certified to ANSI/APSP/ICC-16-2017 and NSF/ANSI/CAN 50-2020.
[2] NSF Listed units have a white cover.
[3] For single and multiple drain use.
[4] The sumps are stainless steel.
[5] Drain cover tested with a centrally located in floor 12 inch diameter pipe (No Sump).
Testing qualifies use with 12 inch diameter pipe or smaller.

Aegis Shield - Product Specifications

Neptune Benson evoqua

Product Specification

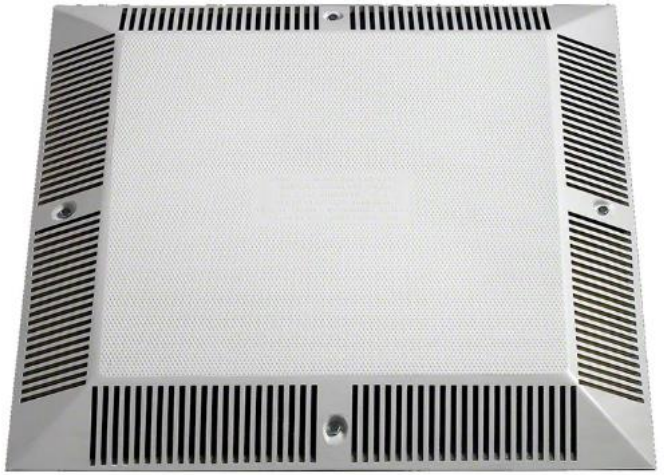


Tap Located in 12" pipe immediately after 12" elbow

Suction head measurement was made at a tap located in a 12" pipe immediately after a 12" elbow

Flow path zone dimensions must be equal to or exceed the dimensions of the sumps used during testing.

		MINIMUM FLOW PATH DIMENSIONS		
	PIPE SIZE (in)	A	B	MINIMUM SUCTION PIPE OPENING LENGTH BEFORE REDUCTION IN PIPE SIZE
242424SSMD-AE-8	8"	17 9/16"	25 11/16"	40"
3030AEC	8"	17 9/16"	25 11/16"	40"



Aegis Shield – Technical Data Sheet

Tel: +1 (800) 832-8002 / +1 (401) 821-2200
334 Knight St, Warwick RI 02886 www.Neptunebenson.com

Part #	Overall Size L x W	Open Area	Max. Flow Rate @ 1.5 F.P.S.
3030AEC	30"X30"	128.21 in²	600 GPM

Tested to ANSI/ASME 112.19.82017 per section 1404 of the Virgina Graeme Baker Act VGBA Pool and Spa Safety Act

NSF Certified to NSF 50

Certified by NSF International 789 N Dixboro Road Ann Arbor, MI 48113-0140

Technical Data Sheet

Neptune Benson evoqua

Tel: +1 (800) 832-8002 / +1 (401) 821-2200
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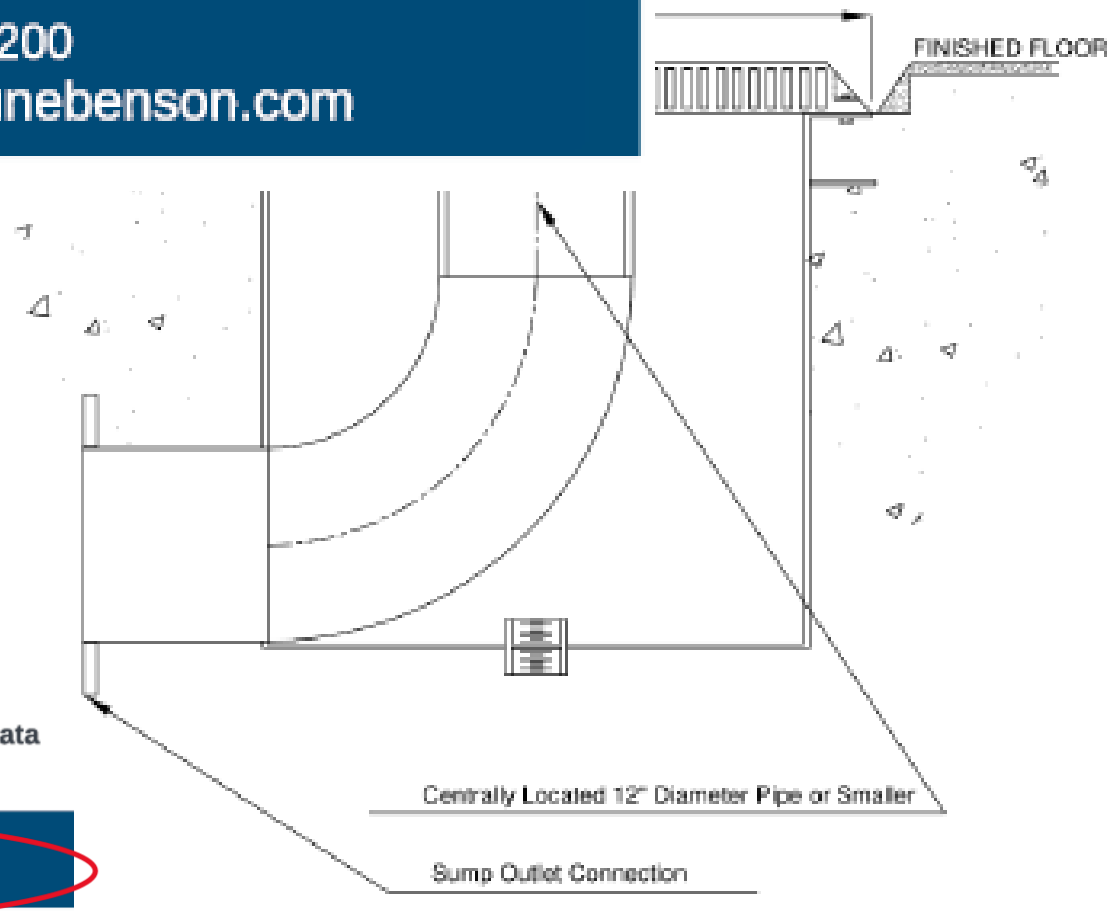
Field Built Sump and Aegis Cover Diagram



When is an RDP Required? - .2508 Definitions

- **Remodel -** means renovations requiring disruption of major portions of the pool shell or deck, changes in the pool profile, or redesign of the pool hydraulic system. Remodeled does not include equipment replacement, or repair or addition of outlets for the purpose of reducing suction hazards.
- **Repair** - means repair of existing equipment, replastering or repainting of the pool interior, replacement of tiles or coping or similar maintenance activities. This term includes replacement of pool decks where the Department has determined that no changes are needed to underlying pipes or other pool structures.
- **"Equipment replacement"** means replacement of individual components of the hydraulic and disinfection systems such as pumps, filters, and automatic chemical feeders

When is an RDP Required? – Rule .2510

- **Remodel – requires RDP and plan review**
  - .2510(a) For public swimming pools which are constructed or remodeled, plans and specifications shall have been approved by the Department in accordance with Rule .2509.
- **Repair**
  - .2510(b) Repairs do not require prior approval by the Department.
- **Equipment replacement**
  - .2510(b) …shall be approved by the Department prior to installation.
  - Prior approval by the Department necessitates submission of a scope of work and equipment specifications

What would you require if someone was…

1. Changing out the pump?
2. Changing out a valve?
   a. What if a ball valve is being replaced with a gate valve?
   b. What if a valve that is used for flow reduction is being replaced?
3. Replacing a degraded deck but not messing with the pipes underneath or the pool shell?

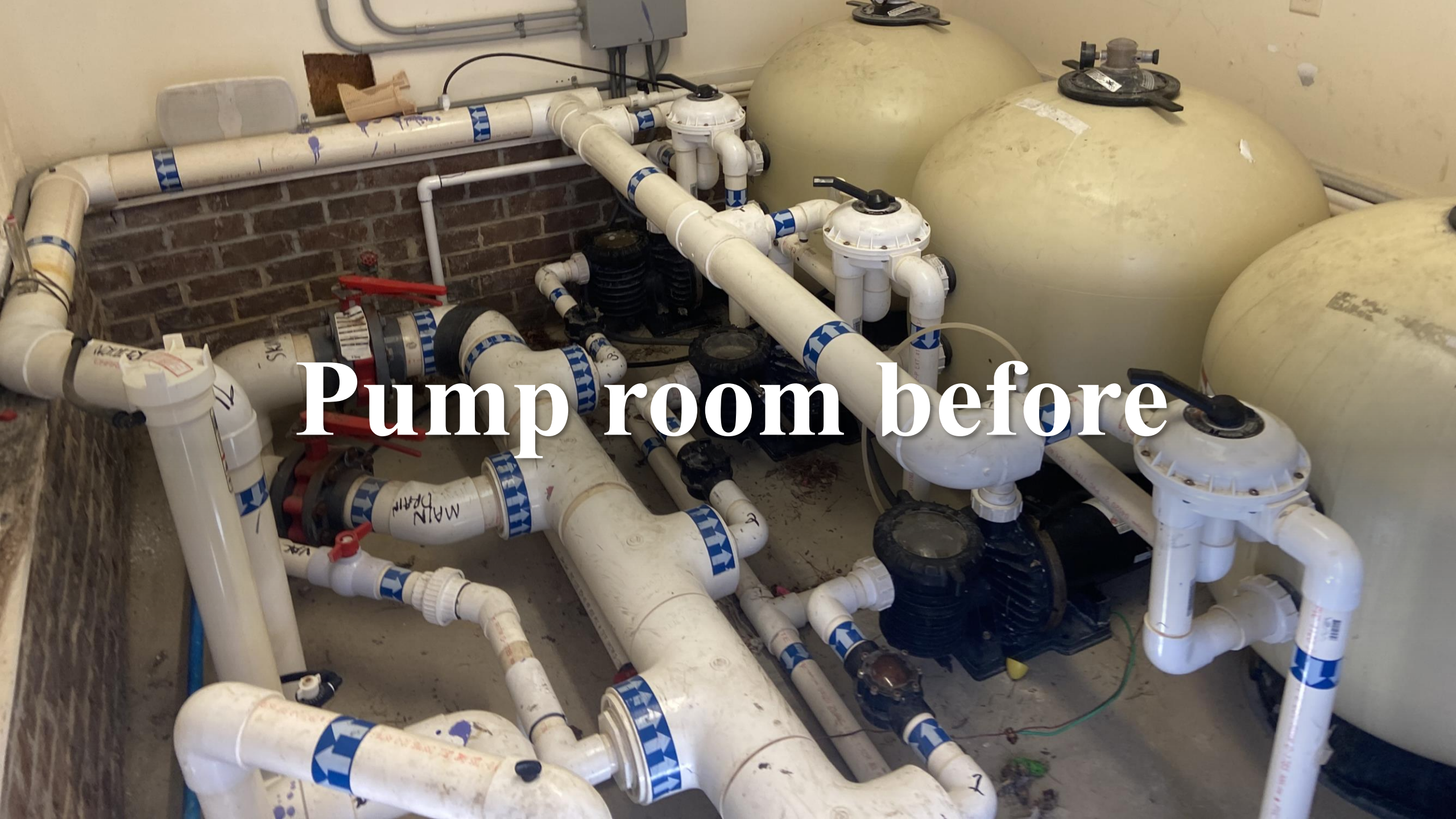
What would you require if someone was…

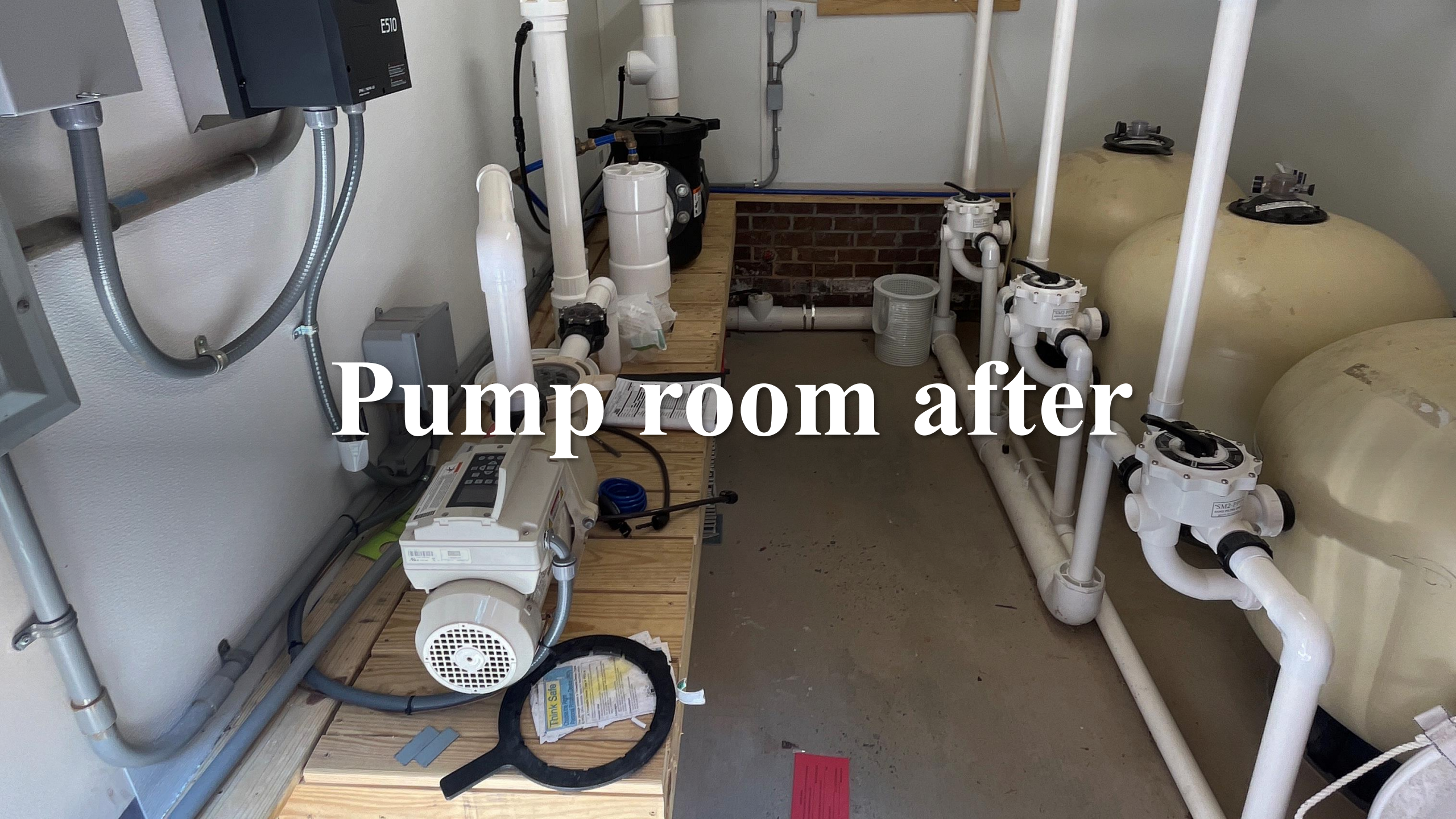
4. Adding a sump to a single drain pool for VGBA compliance?
5. Reconfiguring sumps (field built) to meet VGBA requirements?
    a. Including cutting the pool shell back to the T to increase pipe size back to the T?
    b. What verification that sumps meet manufactures instructions should be required by LHD ?
6. Upsizing a section of pipe in the pump room to accommodate a flow meter for flow reduction?

What would you require if someone was…

7. Taking everything out of the pump room and replacing it with new equipment?
8. Reconfiguring the pump room during the equipment replacement?

See the pictures on the next 4 slides and then come back to these questions


Pump room before



Pump room after


Before


After

What would you require if someone was…

9. Converting the main drains into returns for VGBA compliance?

- **.2518 (j) Drains shall not be required in public swimming pools when an alternate method to drain the pool is provided.**

ANSI/PHTA/ICC-7 2020

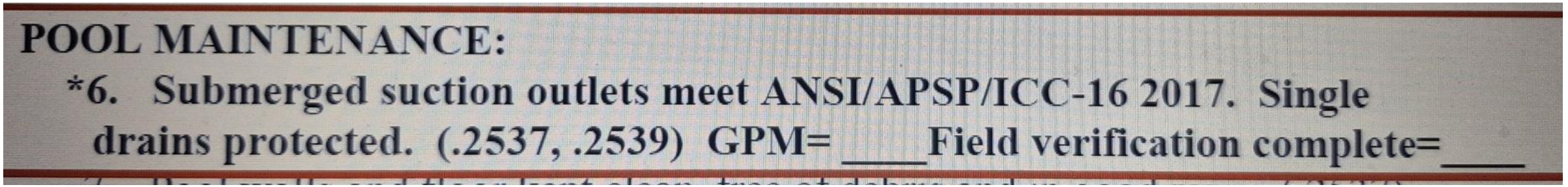
4.4.1 Submerged suction outlets are optional. Fully submerged suction outlets (SOFA) are not required in pools and spas. When SOFAs are not used, surface skimming or overflow systems shall be provided and capable of handling 100 percent of the design flow.

6.6.1 Convert suction outlet to return inlet by changing the piping and installing an appropriate floor (or wall) inlet(s), designed and/or approved by the manufacturer for that purpose, provided the system piping and skimmer(s) shall be capable of handling the full system flow, in accordance with Section 4.4.5.

Reminders / Tips

- **Field verify the PDSC at every inspection**

- **Record flow meter readings at every pool inspection**



POOL MAINTENANCE:

*6. Submerged suction outlets meet ANSI/APSP/ICC-16 2017. Single drains protected. (.2537, .2539) GPM= ____Field verification complete= ____

Best Practice

- Recommend operators keep VGB information in their pool logbook. (PDSC, pump curve, drain cover instructions)
- Once a PDSC sheet has been verified – retain it for future reference even though you get a new one each year.
- Be safe!

For Older Pools - Keep In Mind!

Pumps should be set to achieve required turnover rate for water quality, based on the year of pool construction. Pre-1993 pools may have had a lower turnover rate and the pipes may not be able to handle an increase in water flow.

If you have the pump curve for the original pump, estimate the flow by looking at the pump curve at 65 ft TDH of previous pump.

SVRS – Safety Vacuum Release Systems

- CPO to test per the manufacturer's recommendations and record on the daily log.
- Ask CPO to test during the inspection and show you the records indicating its is tested

Emotron

Vac-Alert

Stingle Switch

Vac-Less

Hayward Stratum

Providing Good Customer Service

- **Who is your customer?**
  - The Public – we protect the public health
  - The Pool Industry
    - Builders
    - Designers
    - Operators
    - Manufacturers
- **Good Communication is Key**
  - Annual pool letter in January
    - Avoid surprises 2 days before the pool is supposed to open!