NC Department of Health and Human Services

POOL HOT TOPICS

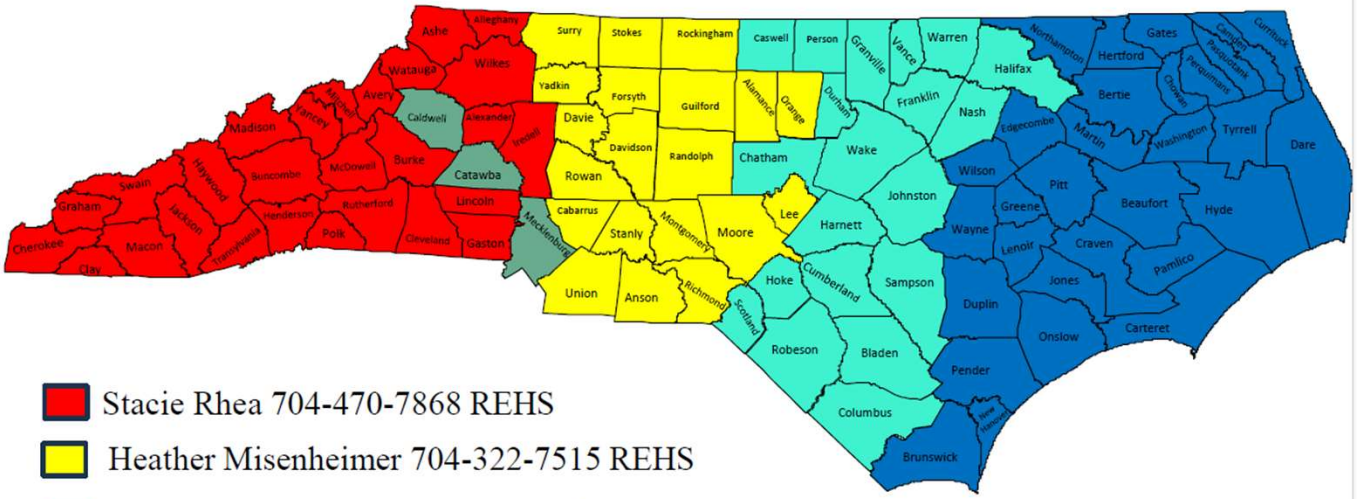
Chad Gambill
Field Supervisor

November 20, 2024

Pools, Tattoos, and State Institutions Program

Regional Environmental Health Specialists Territory Map

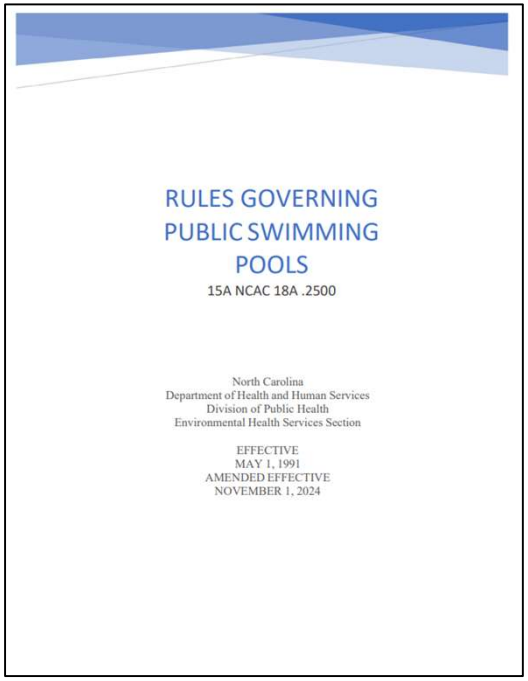
May 2024



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

What's New – Website Updates

- New .2500 Rule Book
  - Revised .2518 &.2539
  - Fence Chart -.2528
  - Diving Chart - .2517
- .2518 &.2539 Guidance Memo
  - Removed Variable Speed Pump Guidance
- Night Swimming Form
- Sun Shelf Plan Review Guidance


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

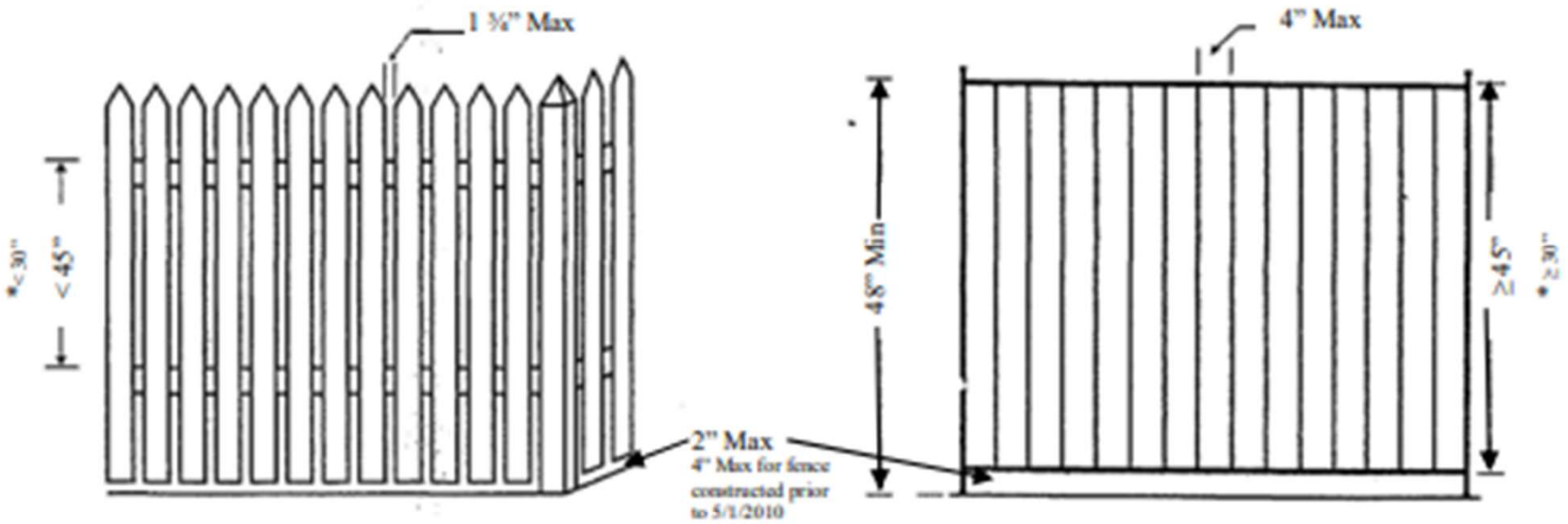


Fig. 1

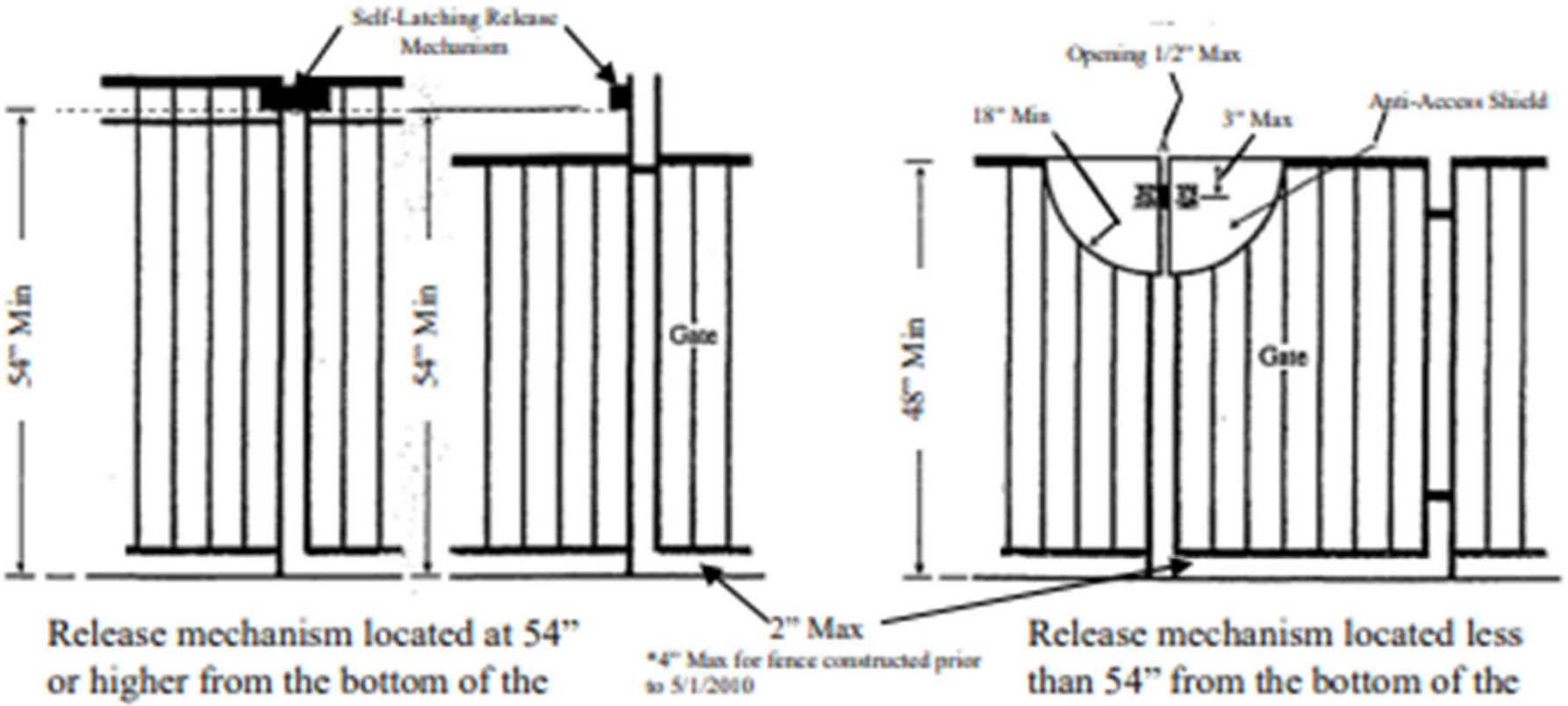
If horizontal members are less than 45" apart,* the space between vertical members shall not exceed 1 3/4"

*30" apart for fences constructed prior to 5/1/2010

Fig. 2

If horizontal members are equal to or more than 45" apart,* the space between vertical members shall not exceed 4"

*30" apart for fences constructed prior to 5/1/2010



Release mechanism located at 54" or higher from the bottom of the gate

Release mechanism located less than 54" from the bottom of the gate

Fig. 4 Latch Release Mechanism

ILLUSTRATION A

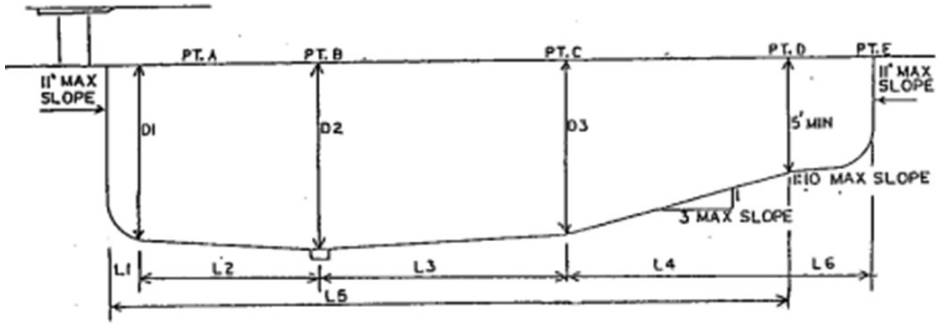
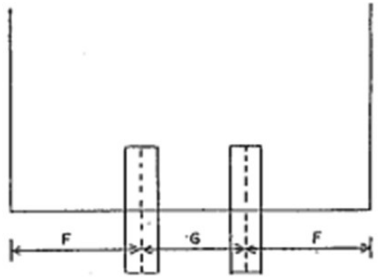


ILLUSTRATION B



Note: This illustration is for further clarification of Rule 15 A NCAC 18A .2517.

TABLE I

Maximum Board Length	Maximum Board Height Above Water	Board Overhang (Pt A)		Minimum Water Depths			Horizontal Distances						Minimum Pool Width	Minimum Separation Distances	
		Max.	Min.	D1	D2	D3	L1	L2	L3	L4	L5	L6		F.	G.
12'	Up to 30"	5'	4'0"	8'0"	9'0"	8'3"	3'	7'	10'3"	9'9"	30'	4'	20'	10'	10'
16'	1 Mtr	6'	5'0"	8'6"	10'0"	8'6"	5'	5'	11'6"	10'6"	32'	4'	24'	12'	10'
16'	3 Mtrs	6'	5'0"	11'6"	12'0"	11'6"	5'	5'	7'6"	19'6"	37'	3'	28'	14'	12'

Revised .2518 and .2539

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 13, 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

Flow Reduction

- VGBA compliance -

highest flow rate of the pump system < flow rating of the drain covers

- The preferred method

  Maximum pump flow from the manufacturer's pump curve < flow rating of the drain covers

- .2539 (d) – Allows flow reductions

  Maximum achievable pump system flow < flow rating of the drain covers

Maximum Achievable Pump System Flow

- **MAXIMUM SYSTEM FLOW RATE** For purposes of this suction entrapment avoidance standard, maximum system flow rate is defined as the **maximum potential flow** when all available system flow is directed through the submerged suction outlet(s). See Section 4.4.5 for specific procedures required to determine the system-specific, maximum system flow rate.

- After the maximum system flow rate is determined, that flow rate must be equal to or less than the SOFA system flow rating, as determined in accordance with Section 4.4.3.

Determining Max Achievable System Flow

1) Highest speed on the manufacturer's pump curve
    1) Default
    2) Preferred
    3) 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

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.*

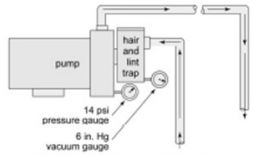
Pump Method 1: Measure flow rate with a flow meter accurate to ±5% (see Section 4.4.5).*

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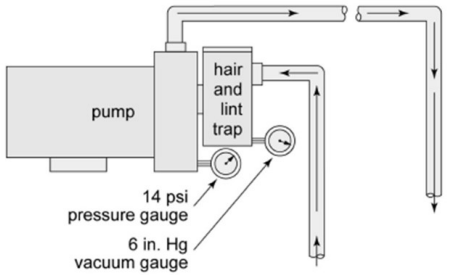
EXAMPLE: If the pressure gauge reads 14 psi and the vacuum gauge reads 6 inches of mercury (Hg), the approximate Total Dynamic Head (TDH) of the system would be 39.12 feet.



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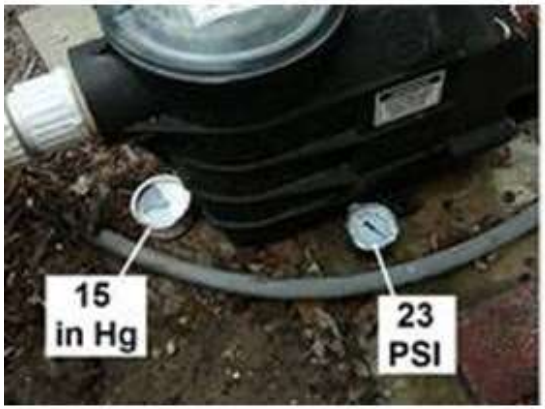
TDH Measurements



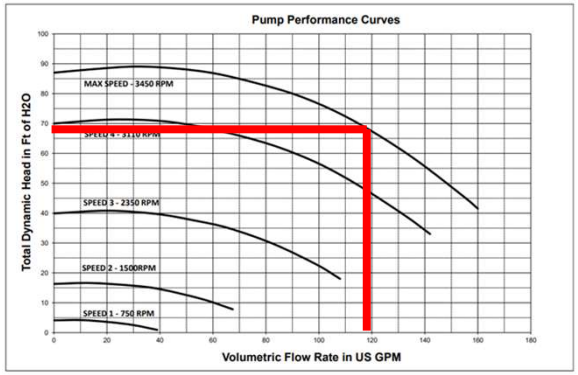
VACUUM

15 x 1.13 = 17

PRESSURE

23 x 2.31 = 53

TDH = 17 + 53 = 70 ft

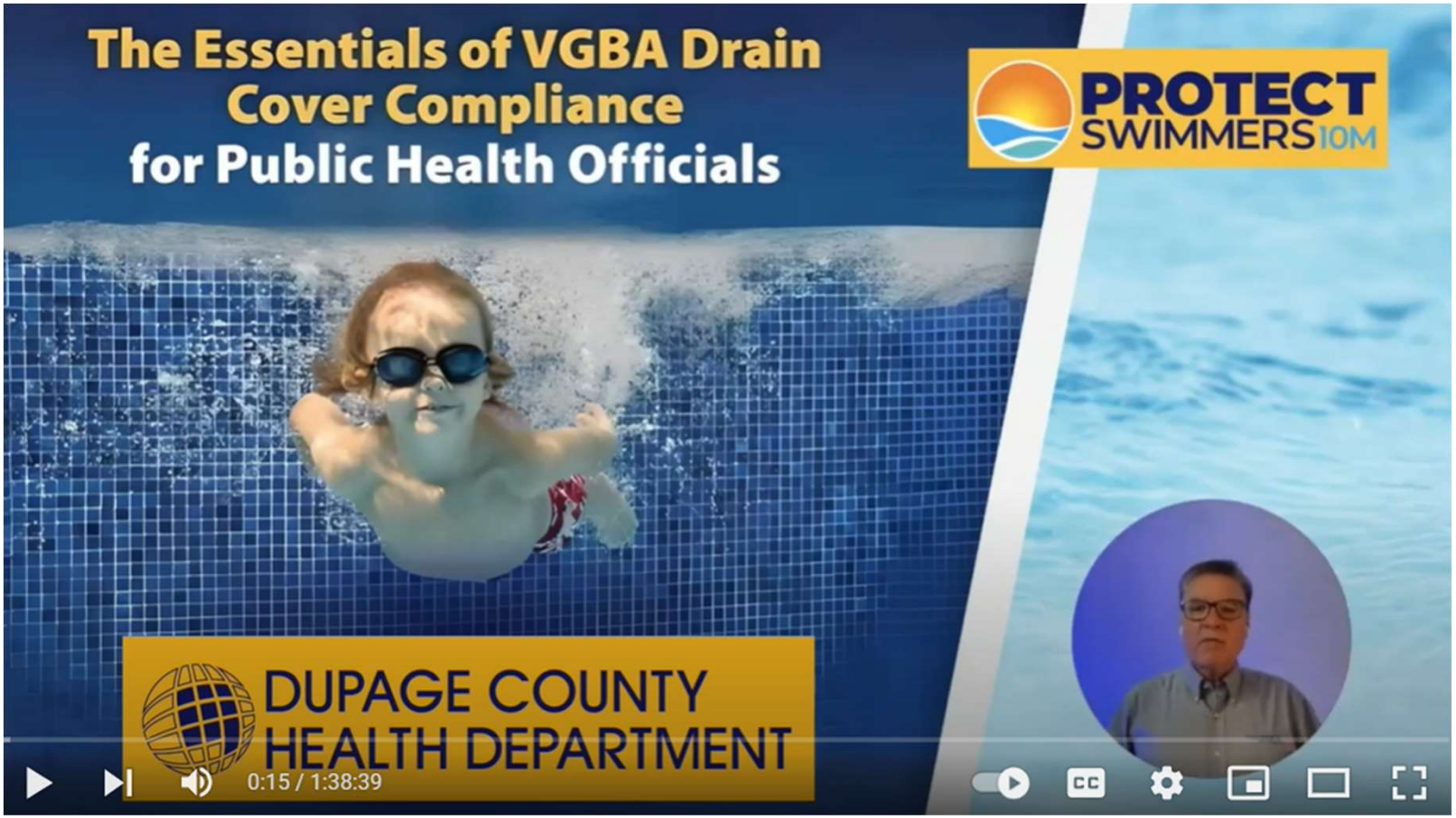


Measuring with a Flow Meter

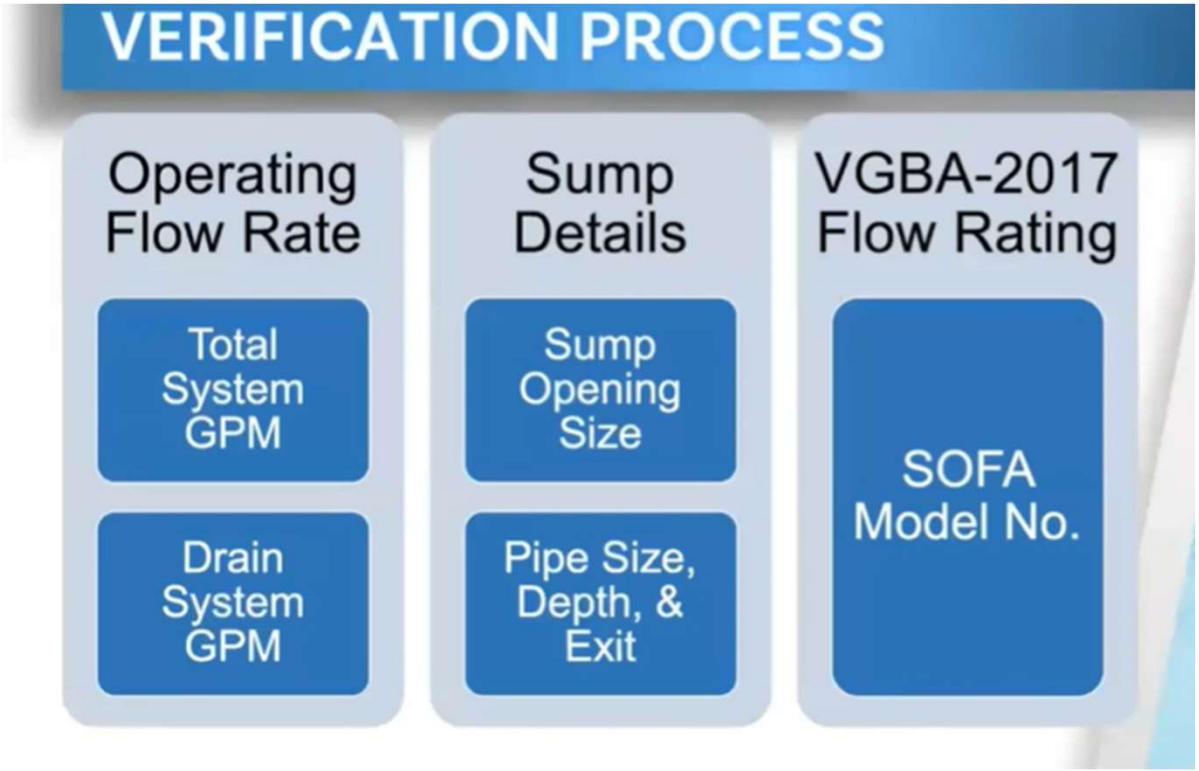
The pool permit should be conditioned to maintain the speed setting (rpm) determined to be in compliance with drain safety.

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


The Essentials of VGBA Drain Cover Compliance for Public Health Officials
PROTECT SWIMMERS 10M
DUPAGE COUNTY HEALTH DEPARTMENT
0:15 / 1:38:39
CC

VGBA Drain Cover Compliance



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.

More on .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.**

More on .2518 and .2539

- .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.

More on .2518 and .2539

- **.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.**
- **.2539 (d)(1) now specifies that photographs must be taken of flow reduction measurements [vacuum and pressure gauges for TDH measurements or readings from a properly installed flow meter accurate to 5% (ICC-7 4.4.5.2) within two (2) hours of backwashing or replacing the (cartridge) filter]. The Rule requires these photographs to be part of the documentation submitted with the pool application when there is a flow reduction needed for VGBA compliance.**

- **Virtual Pool Regional Meeting 1/15/2025**
  - **CEUs**
  - **Get ready for 2025 pool season**
  - **More hot topics**
- **Guidance memo on Cyanuric acid**
- **Updated plan review calculation sheet**

Plan Review Calculation Sheet Pipe Sizes

PVC Sch. 40 Pipe Sizing Chart per .2518(d) & ICC-7 2020										
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~~ 63	~~89~~ 90	138	238	~~539~~ 540	~~935~~ 936	~~1474~~ 1475	2093
Discharge or Returns (inlets) PVC pipe @10ft/sec	27	~~63~~ 62	~~104~~ 103	~~149~~ 146	~~230~~ 227	~~366~~ 391	~~889~~ 890	1559	2457	3488

Reminders

- Field verify the PDSC at every inspection
- Record flow meter readings at every pool inspection