Pools, Spas and Everyone's Safety

Layers of Protection and
The Virginia Graeme Baker Pool and Spa Safety Act

This information was prepared by the CPSC staff; it has not been approved by and does not necessarily represent the views of the Commission.

Drownings: Pools and Spas Can Claim Lives

Swimming pools should always be happy places but unfortunately, each year many American families encounter pool tragedies – drowning and submersion incidents. These tragedies are preventable.

In 2009 the Commission released a report related to pool and spa submersion incidents involving children under 5.

- Reported drowning deaths in this age group remained about the same with yearly averages of 283 (2003-2005) to 285 (2004-2006).
- Emergency room-treated submersion injuries increased from an annual average of 2,700 (2005-2007) to 3,100 (2006-2008).

Drownings Can Be Prevented

The CPSC staff estimates that each year nearly 300 hundred children under 5 years old drown in swimming pools, and hospital emergency room treatment is required for more than 3,100 children under 5 years old who were submerged in residential pools.

Are Kids Out of Sight? They Shouldn't Be!

- **Supervision:**
  Never take your eyes off children in and around the water – not for a minute!
- **Barriers:**
  Fences, self-closing or self-latching gates, and secured doors with alarms help prevent children from wandering into the pool area.
- **Avoid Entrapment:**
  Suction from a pool's drain is so powerful it can trap an adult under-water. Do not use a pool or spa with broken or missing drain covers. Ask your pool service professional if your pool's drains are compliant with the Pool & Spa Safety Act.
- **Learn to Swim:**
  Everyone should learn to swim and learn basic water safety tips.
- **Know How to Respond:**
  Get training in basic water rescue skills, first aid and CPR. Have rescue equipment and a phone by the pool in case of emergency.

Layers of Protection

- **Barriers** – Fencing or walls with self-closing or self-latching gates to restrict access to swimming pools and spas

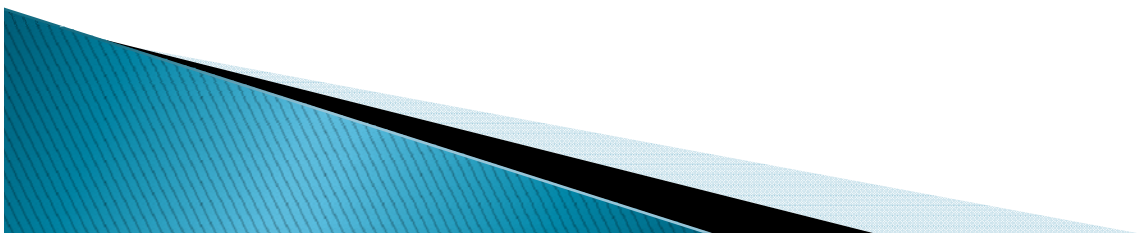
  (See ASTM F1908-08 fence standard)

- **Door Alarms** – To help prevent children's access to a pool from the house

  (See UL 1207)

- **Safety Covers** – To help prevent direct access to pools when they are not in use

  (See ASTM F1346)



Entrapment Protection

CPSC staff began investigating reported incidents of pool/spa suction entrapment in the 1970s. Figures from 1999 to 2008 include:

- 83 reported entrapments
  - 11 fatality reports (7 residential, 4 public)
  - 69 injury reports (38 residential, 21 public, 10 unknown location)
  - 3 no injury reports (residential)

<u>Types of entrapment</u>

- Hair
- Body
- Limb
- Evisceration/disembowelment
- Mechanical: Jewelry, bathing suits

The Virginia Graeme Baker Pool and Spa Safety Act was enacted to prevent the tragic and hidden hazard of drain entrapments and eviscerations in pools and spas. The law became effective on Dec.19, 2008. Under the law, all public pools and spas must have ASME/ANSI A112.19.8 compliant drain covers installed and a second anti-entrapment system installed, when there is a single main drain (other than an unblockable drain) or multiple drains that are less than 3 feet apart.

Federal Requirements

VGB Pool and Spa Safety Act

Effective date: December 19, 2008

Sec. 1404: Federal Swimming Pool and Spa Drain Cover Standard

Top Priority for Public Pool And Spa Owners/Operators

- All pool/spa drain covers manufactured, distributed or entered into commerce on or after December 19, 2008 must meet ASME/ANSI A112.19.8 standard
- All public pools/spas must be equipped with new ASME/ANSI A112.19.8 compliant drain covers.
- Pools/spas operating off of a single main drain (other than an unblockable drain) must also add one or more of the following options:
  - a safety vacuum release system (SVRS), or
  - a suction-limiting vent system, or
  - a gravity drainage system, or
  - an automatic pump shut-off system, or
  - disable the drain, or
  - any other system determined by the Commission to be equally effective as or better than the others listed above.

Public Pool and Spa Defined

- The VGB Act states the term ‘‘public pool and spa’’ means a swimming pool or spa that is—
- (A) open to the public generally, whether for a fee or free of charge;
- (B) open exclusively to—

  (i) members of an organization and their guests;

  (ii) residents of a multi-unit apartment building, apartment complex, residential real estate development, or other multi-family residential area (other than a municipality, township, or other local government jurisdiction); or

  (iii) patrons of a hotel or other public accommodations facility; or
- (C) operated by the Federal Government (or by a concessionaire on behalf of the Federal Government) for the benefit of members of the Armed Forces and their dependents or employees of any department or agency and their dependents.

Drain Covers and Grates

Q: Who is approving new drain cover designs?

A: As of January 30, 2009 third-party testing and certification is being conducted by Underwriters Laboratories, the National Sanitation Foundation, and IAPMO (International Association of Plumbing and Mechanical Officials).

Q: What is the proper marking on approved drain covers?

A: There is no requirement in the VGB Act for markings but the CPSC has asked manufacturers to mark them "VGB 2008". Covers are to display (per ASME standard) :

- Use – single or multiple
- Flow rate GPM
- "Life" (number of years)
- Wall and/or floor mount
- Manufacturer's name
- Model number

Drain covers made during a short period in the summer of 2008 used the ASME symbol and/or the "ASME/ANSI A112.19.8-2007" mark. For a short period in the late summer and early fall of 2008, no marking was placed on drain covers made to comply with the standard. Since November 12, 2008, newly made drain covers should have the "VGB 2008" marking. The drain cover manufacturer should provide a certification document with each drain cover stating that it complies with the requirements of the VGB Act. If there is no mark or you are otherwise in doubt, contact the manufacturer and ask for a copy of the certificate. Also keep a record of where and when you purchased the cover.

Drain Covers and Grates

Q: What types of drain covers are available for purchase?

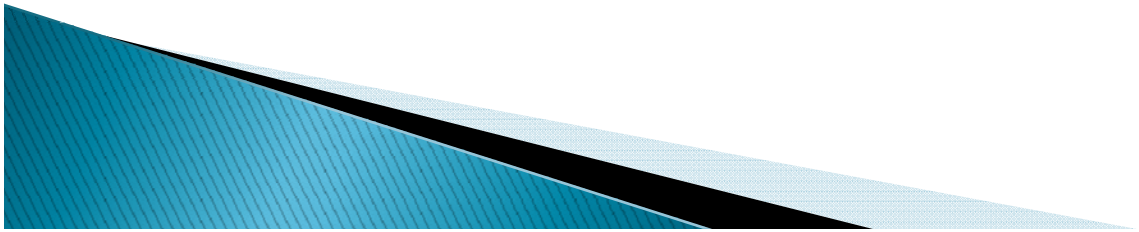
A: A variety of drain covers have already been certified to ASME/ANSI A112.19.8-2007. These include covers that are round (for blockable and unblockable drains), 9"x 9" square, 12"x 12" square, and 18"x 18" square, and larger. CPSC staff expects additional square unblockable drain covers and other sizes to enter the market in 2009. To view a complete listing of drain cover manufacturers who have received certification that their product meets the ASME/ANSI standard, log on to: www.cpsc.gov/businfo/vgb/draincman.html.

All drain covers must be compliant with the ASME/ANSI A112.19.8-2007 standard. You can either have your older covers tested to the standard to determine if they comply or you can replace your covers with new compliant drain covers. If your covers are field fabricated, then a Registered Design Professional or a licensed professional engineer (PE) can specify that your covers meet the ASME/ANSI A112.19.8-2007 standard.

New Drain Covers and Residential Pools

For residential pools, CPSC staff recommends replacing the drain cover with an ASME/ANSI A112.19.8 compliant cover, but it is not required for residential pools under the VGB Act.

Pursuant to section 1404(b) of the Act, all drain covers manufactured, distributed or entered into commerce in the U.S. shall be ASME/ANSI A112.19.8 compliant. This is a consideration for all pools, even residential pools, since non-compliant drain covers are not permitted to be imported, manufactured, distributed or sold in the U.S. after December 19, 2008.



Drain Covers continued

Oversized or Unblockable Covers

- Q. Can an **unblockable drain cover be placed on top of an existing outlet**?
- **A.** A drain cover that is larger than 18 in x 23 in does not make a drain unblockable. The Commission is considering whether certain types of drain covers could create an unblockable drain, but it has not made a determination at this time. Single main drains would need to be equipped with one of the five secondary anti-entrapment devices or systems specifically mentioned in the VGB Act.

- Q. We have pool designers specifying the **larger metal covers to be installed over a small sump**. Do you know if these are approved in that fashion?
- **A.** The cover manufacturer should be consulted – the certification for use should include instructions and/or sump requirements. Depending on the cover's shape/design and flow requirements, the large cover installed over the smaller sump may be acceptable.

Drain Covers continued

Custom Drain Covers

- To certify field fabricated covers, the PE should obtain the ASME/ANSI standard through ASME and ensure that the fabricated covers meet all the performance requirements of the standard.

Field Fabricated Drain Covers

- Should be designed by a licensed professional engineer (PE) to meet all the requirements of the standard (flow rate, entrapment considerations, structural integrity, etc.) and then fabricated.

  A pre-2007 anti-vortex drain cover can be tested to determine if it meets the ASME/ANSI A112.19.8 standard. The UV test and the performance requirements regarding hair entrapment testing in the 2007 version of the standard are more stringent. (More stringent hair entrapment testing --using a full head of hair--may down-rate the cover for flow.)

Flow Rates and State Requirements

Approved flow rates are determined by drain cover manufacturers, but some State standards require that the water velocity through grates not exceed 1.5 feet per second (fps) with one drain 100% blocked. How do we rectify this issue?

- Drain cover ratings are based on allowable flow in gallons per minute (GPM). Covers are tested in the laboratory to determine maximum flow rate, which can result in velocities through the open area of the cover that are greater than 1.5 fps. Alignment of the flow-ratings of the new covers with state requirements may require adjustments to some of the state codes. State officials may want to evaluate their code requirements in light of the new requirements made mandatory by the VGB Act.

  Given the pool volume and turnover rate required by the state/local authority, the minimum required GPM should be known and the cover GPM determined based on the number of covers present.

Multiple Drains

Multiple Drains consist of, at a minimum, two fully submerged suction outlets per pump, with drain cover centers at least 3 feet apart (measured 'on center'). While no maximum separation is noted in the VGB Act, the connections between the outlets and the pump are important for proper operation and should be certified by a design professional and inspected by a licensed inspector to ensure hydraulic balance between outlets and the main suction line to the pump.

Drains that are connected to the same pump but located in separate pools do not constitute multiple main drains. The language of the VGB Act sets requirements for single main drains for "each public pool and spa." See section 1404(c)(1)(A)(ii). Those drains in each pool would need ASME/ANSI A112.19.8-2007 compliant drain covers and each pool with a single main drain, unless it is an unblockable drain, would also need one of the secondary anti-entrapment devices or systems listed at section 1404(c)(1)(A)(ii)(I)-(VI) of the VGB Act.

Flow Rates for Multiple Drains

The general concept to calculate flow for multiple drains is to subtract one drain (presume that it is blocked) so the total flow through the remaining drains should meet the system requirements. *

- **One drain** = total system flow (plus a secondary anti-entrapment system if the single main drain is not unblockable)
- **Two drains** = each rated at total system flow
- **Three drains** = each rated at 1/2 total system flow
- **Four drains** = each rated at 1/3 total system flow
- **Flow rate per cover** = total system flow/(# of drains – 1)

Note: The flow rate calculations are independent of 'unblockable.'

*This is a CPSC staff position that coincides with the ANSI/APSP-7 Entrapment Avoidance standard. The VGB Act does not reference APSP-7 and owners/operators/service companies should be complying with the ASME/ANSI standard first and foremost.

Skimmers and Equalizers

Skimmers
The CPSC staff does not consider skimmers to be part of a "**multiple drain system**" because **skimmers are designed to clog.**

Equalizer lines are submerged suction outlets or drains and must either be covered with an ASME/ANSI A112.19.8-2007 compliant cover or plugged. Pool owners and operators may choose either option to comply with the VGB Act. If your state (e.g., Oklahoma) requires pools to have equalizer lines, then CPSC staff recommends you cover the equalizer lines with compliant drain covers.

Equalizers and Flow Rates
Typically, equalizer lines are gravity feed, but on occasion when the water level drops, or a skimmer basket is filled/clogged, equalizers would be capable of the rated flow for the skimmer, which is about 55 GPM. Equalizer covers should be appropriately rated.

Secondary Layers of Entrapment Protection

In addition to having a drain cover or other anti-entrapment device that complies with ASME/ASNI A112.19.8-2007, public pools and spas With single, blockable main drains must have an additional layer of protection using one of the following systems or devices.

1. SAFETY VACUUM RELEASE SYSTEM (SVRS) – A safety vacuum release system, which ceases operation of the pump, reverses the circulation flow, or otherwise provides a vacuum release at a suction outlet when a blockage is detected, that has been tested by an independent third party and found to conform to ASME/ANSI standard A112.19.17 or ASTM standard F2387.

Secondary Layers continued

2. SUCTION-LIMITING VENT SYSTEM - A suction-limiting vent system with a tamper resistant atmospheric opening also called an **atmospheric vent.** It is a pipe teed to the suction side of the circulation system on one end and open to the atmosphere on the opposite end. The pipe is normally full of water equal to the same height as the pool. When a blockage occurs at the main drain, air is introduced into the suction line thus causing the pump to lose prime and relieving the suction forces at the main drain (suction outlet).

Currently there are no approved voluntary standards for suction-limiting vent systems; however, an ASTM International voluntary standards task group is currently developing minimum requirements for field-fabricated vent pipes. The correct design and construction of the suction-limiting vent system are important to the overall function and should be certified by a design professional and inspected by a licensed inspector.

Secondary Layers continued

3. GRAVITY POOLS

A gravity drainage system utilizes a collector tank and has a separate water storage vessel from which the pool circulation pump draws water. Water moves from the pool to the collector tank due to atmospheric pressure, gravity, and the displacement of water by bathers, which removes the need for direct suction at the pool. This type of system is also referred to as a reservoir, surge tank or surge pit.

- **Pools with gravity drain systems automatically fall into the category of having a second anti-entrapment system, so ensuring that the existing covers are compliant with ASME/ANSI A112.19.8 or replacing them with compliant covers is all that is required.**
- **The flow rate formula remains the same in gravity pools with multiple drains.**

Currently there are no voluntary standards for gravity drainage systems or collector tank specifications.

Secondary Layers continued

4. AUTOMATIC PUMP SHUT-OFF SYSTEM

An automatic pump shut-off system is a device that would sense a drain blockage and automatically shut off the pump system.

- Some safety vacuum release systems may meet this definition.
- One pump motor manufacturer has developed a circuit board for its motors that monitors current to the motor and shuts the pump off when a noticeable change in current occurs, possibly caused by an entrapped bather.
- The National Electrical Code (NEC) article number 680.40 has a requirement for an emergency stop switch for the pump to be located within 5 feet of a public spa in case of bather entrapment. However, this switch is manually operated and would require the presence of another person to activate the switch and therefore would not qualify as “an automatic pump shut-off system” under the VGB Act.

Currently there are no voluntary standards for automatic pump shut-off systems, though the current SVRS standards specify release and response times.

Secondary Layers continued

5. DRAIN DISABLEMENT

This is the only option that eliminates rather than mitigates the hazard. Turning the drain off does not satisfy "drain disablement" pursuant to the VGB Act. You would need some type of "device or system" that disables the drain. To satisfy the definition of drain disablement, the drain/outlet would need to be physically removed from the system which could include one of the following options:

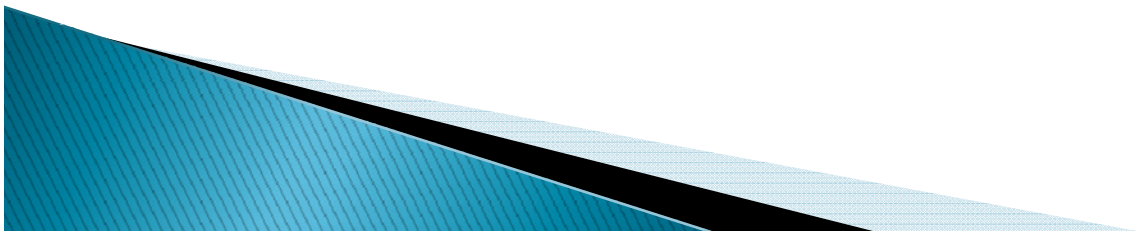
- **Fill the sump with concrete**, in effect, filling the outlet piping as long as another source(s) of water for the suction side of the pump is (are) available, such as skimmers.
- **Cut and cap the piping in the equipment room** in such a way that it cannot be reinstalled.
- **Re-plumb the suction line** from the drain to the pressure side of the pump to create a return line and reverse the flow.

Secondary Layers continued

6. OTHER SYSTEMS

Any other system determined by the Commission to be equally effective as, or better than, the systems described in subclauses (I) through (V) of section 1404(c)(1)(A)(ii) at preventing or eliminating the risk of injury or death associated with pool drainage systems.

- Staff interpretation: **This will allow the development of future products.**
- Currently, the Commission has not determined that any other system is equally effective as, or better than, the systems described above. Further, there are no voluntary standards for such other systems.



Sumps

CPSC staff recognizes and supports the technical requirement of the ASME/ANSI A112.19.8-2007 standard, which calls for field-built sumps to have a depth, when measured from the bottom of the cover to the top of the outlet piping, of 1.5 times the diameter of the piping; however,

- The P&SSAct does not require pool owners/operators to replace their sump. If a new, compliant drain cover can be safely secured onto a pre-existing sump, while properly controlling the flow rate, then it meets the intent of the law.
- If a PE determines that additional engineering work needs to be done to the sump to bring it into compliance with the standard and ensure a secure connection with a new cover, then that work should be carried out.
- Finally, if a PE determines that a new drain cover cannot be safely placed on a pre-existing sump, then the sump should be removed and replaced with a new, compliant sump that is compatible with the compliant drain cover.

Installation

- There is no federal requirement that a pool professional install the ASME/ANSI A112.19.8-2007 compliant drain covers. You should have documentation that the drain covers installed in your pool are compliant, but you do not need to have documentation of the installation. CPSC staff advises checking with your local and state officials to confirm any local/state certification, installation requirements, or other pool/spa regulations.

Miscellaneous Features

THERAPY POOLS

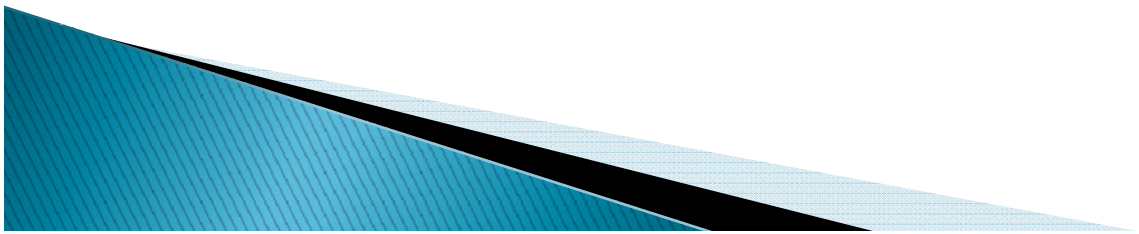
- A therapy pool at a rehabilitation center limited at all times to the center's patients and not open to the public generally would not be subject to the requirements of the Act. However, a therapy pool in a salon/spa would meet the definition of a "public pool" and would thus be subject to the Act.

BAPTISMALS

- Pools intended for use only for baptisms do not fall under the definition of swimming pool or spa under the Act, as they are not intended for swimming or recreational bathing.

FOUNTAINS

- Fountains are not covered under the law unless they are intended for swimming and recreational bathing.



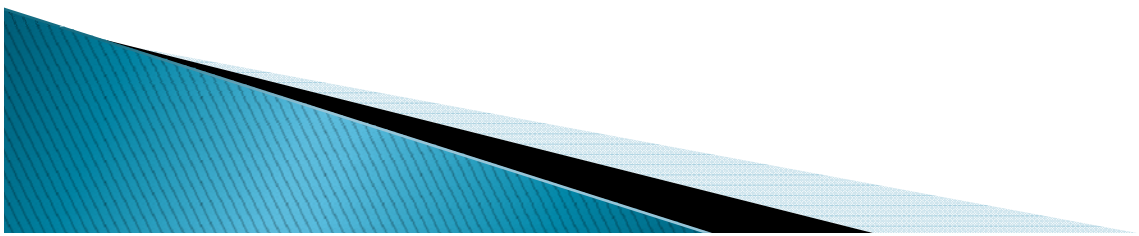
Enforcement

Will CPSC be actively looking to penalize pool operators who don't comply?

- A. The law reinforces CPSC's civil and criminal penalty authority and, while the intention is not to bring multi-million dollar lawsuits against pool owners or operators, the agency does have the ability to step in and shut down pools or spas found to not be in compliance.

Which types of public pools and spas pose the greatest danger of entrapment and evisceration to consumers?

- A: Children's public wading pools, other pools designed specifically for young children, and in-ground spas that have flat drain grates and single main drain systems.



Enforcement and the States

- Both the CPSC and State Attorneys General are empowered to enforce the VGB Act. States have the authority to enforce the requirements of the Act, but States are not required to do so. CPSC is looking to the States and counties, including state and local health departments, to assist us in enforcing the requirements of the Act.

- State or local law can be more restrictive than the federal law as long as the state or local law does not make complying with the VGB Act a physical impossibility. For example, drain disablement is one option for a secondary anti-entrapment system. States are permitted to limit these options or even specify which of the five options listed under section 1404(c)(1)(A)(ii)(I)-(VI) of the VGB Act they require. In this case, the county health department is permitted to disallow drain disablement as one of the options for a secondary anti-entrapment system as long as the other options are still available.

Other Information

STATE SWIMMING POOL SAFETY GRANT PROGRAM
(sections 1405 and 1406)

For purposes of grants to States, see CPSC Staff Draft Technical Guidance on Section 1406: Minimum State Law Requirements
http://www.cpsc.gov/businfo/vgb/pssa1406.pdf

