

## HOW TO INSPECT POOLS & SPAS

In this part of the course, we will cover the following topics:

- Skimmers
- Weirs
- Gutters
- Entrapment and entrapment safety
- Pipes
- Valves
- Solar heating



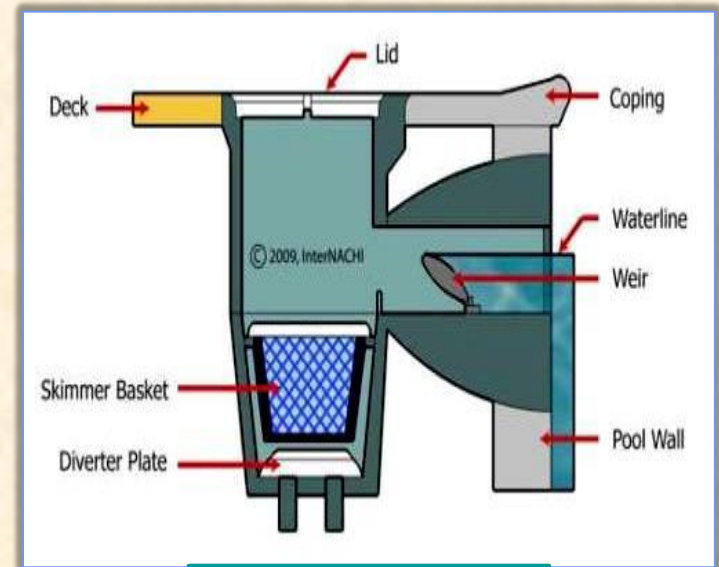
## SKIMMERS

- Skimmers are box-like openings in the wall of the pool located at the surface of the water. Some pool codes require one skimmer for every 500 square feet of surface water.
- Skimmers are vented to the atmosphere, typically through the “finger holes” in the lid.
- It pulls in leaves, debris, bugs and dirt before all that stuff falls to the bottom of the pool. A skimmer can vacuum a pool by attaching a hose or suction line.



## WHAT IS A WEIR?

- A typical skimmer has a weir, which is the small floating, hinged device that allows water to enter the skimmer. The floating weir will always adjust to the level of the water and provides the skimming action.
- When the suction stops and water stops entering the skimmer basket, the floating weir rises up and prevents debris from coming out of the skimmer and re-entering the pool.
- Weirs can cause problems if they stick closed (or in the upright position), thus blocking water from entering the system. If water is blocked from entering, the pump will lose prime (or water flow) and will run dry, causing damage.



A Pool Skimmer

## SKIMMER SAFETY

- Be sure to keep away from the skimmer when the pump is on. Skimmers have been known to pull on fingers, shirts and small objects. Keep your hands from covering the pipe's suction hole inside the skimmer.
- When visually inspecting the skimmer, look for any cracks in the material, a missing basket, or a broken gasket.
- Be sure to inspect the inside of the mouth of the skimmer, as this area is prone to breaking. Indications of repair, glue, epoxy or cracks should be reported.
- Skimmers should not have visible repairs. Repairs will likely not be reliable.
- A crack in the skimmer might allow the pool to leak. If the pool is leaking, there may be a crack or separation that is allowing water to leak out of the pool through the skimmer unit.
- Replacement is typically recommended, but that requires a much larger undertaking and might involve working with a new liner or plaster work.



## GUTTERS

- Gutters are typically found in commercial pool installations. There are different types, including scum, surge and rim-flow.
- Gutters are similar to troughs that work by the principle of surface tension pulling the water into the gutter. The top layer of the pool water is drawn into the gutter system.
- Surge gutters are designed to handle a large volume of water and are found at large private and public pools
- Gutters have grates above them that can be walked upon.



## SUCTION AND ENTRAPMENT

Circulating the water in a pool can create a risk to bathers, who can be entrapped in the vacuum flow created by the pump. Once trapped, a person can be injured or drowned.

The 5 ways someone can be entrapped in a pool:

- Hair entrapment
- Limb entrapment
- Body entrapment
- Evisceration/disembowelment
- Mechanical entrapment



Pool entrapment can be dangerous!

## THE VIRGINIA GRAEME BAKER POOL & SPASAFETY ACT

- Under the law, all public pools and spas must have ASME/ANSI A112.19.8-2007-compliant drain covers installed, with a second anti-entrapment system installed when there is a single main drain other than an unblockable drain.
- All operating public pools and spas must have drain covers on every drain and grate that meet the ASME/ANSI A112.19.8–2007 standard

### Virginia Graeme Baker Pool and Spa Safety Act

- Law enacted by Congress and signed by President Bush on December 19, 2007, to prevent the hidden hazard of drain entrapments and eviscerations in pools and spas.
- The law became effective on December 19, 2008.



## FEDERAL SAFETY: REQUIREMENT 1

Under the law, all pool and spa owners are required to comply with the following regulations:

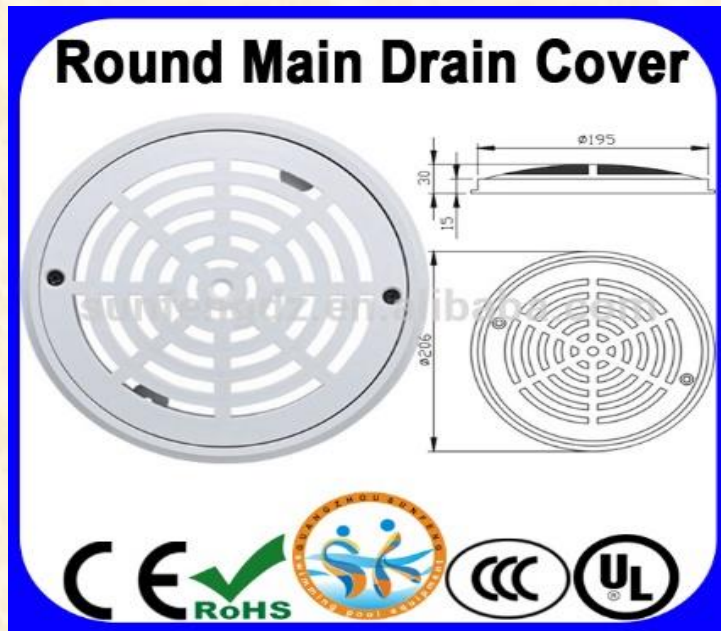
- **Safety drain covers:** Each swimming pool or spa drain cover manufactured, distributed or entered into commerce in the United States shall conform to the American National Standard ASME A112.19.8: “2007 Suction Fittings for Use in Swimming Pools, Wading Pools, Spas and Hot Tubs,” published by the American Society of Mechanical Engineers (ASME).
- Compliance with this Standard will be enforced by the CPSC as a consumer product-safety rule.





## FEDERAL SAFETY: REQUIREMENT 2

**Public pool drain covers:** Each public pool and spa (as defined), both new and existing, shall be equipped with drain covers conforming to the ASME/ANSI A112.19.8 2007 Standard described in the previous slide.



## FEDERAL SAFETY REQUIREMENT 3

- **Public pool drain systems:** Each public pool and spa (pump) with a single main drain, other than an unblockable drain, shall be equipped with one or more additional devices or systems designed to prevent suction entrapment that meet the requirements of any applicable ASME/ANSI Standard or applicable consumer product-safety rule.
- In addition to a compliant drain cover, such additional devices or systems must include a safety vacuum-release system (SVRS), or suction-limiting vent system, or gravity drainage system, or automatic pump shut-off system, or drain disablement, or other system determined by the CPSC to be equally effective in preventing suction entrapment.



## PIPES

- Pipes are the heart of a pool or spa's circulation system. There are many different types of pipes and fittings used in residential pools.
- PVC pipes are non-toxic and are able to withstand pressure. The best choice for this use is Schedule 40 PVC.



## USE STRONG PLASTIC PIPING

- The stronger the plastic pipe is, the higher its schedule number.
- PVC pipe can be deteriorated by sunlight and UV radiation. Over time, PVC exposed to the sun loses its structural integrity and becomes brittle.
- If you find some pipes that need support -- for example, pipes that might be running above the ground and under a deck -- then the pipes will require support every 6 to 8 feet.
- Rubber fittings or connections can break, leak, wear out or fail when under a lot of pressure.





## VALVES

Valves control the flow of the water in a pool or spa. There are several common types of valves, including:

- Gate valves
- Ball valves
- Butterfly or water valves
- Multi-port (3-port) valves
- Globe valves
- Check valves



## THE 3-PORT VALVE

These uniquely-shaped valves form the letter “y”. Water moves up the stem and can be diverted through either of the 2 branches. These valves are usually paired with 1.5” or 2” pipes. They’re often used when a single pump controls both the pool and the spa. When the diverter is designed with a gasket, then it’s referred to as a positive seal. As with most pool and spa equipment, stainless steel fasteners and screws should be used.



The 3-port valve

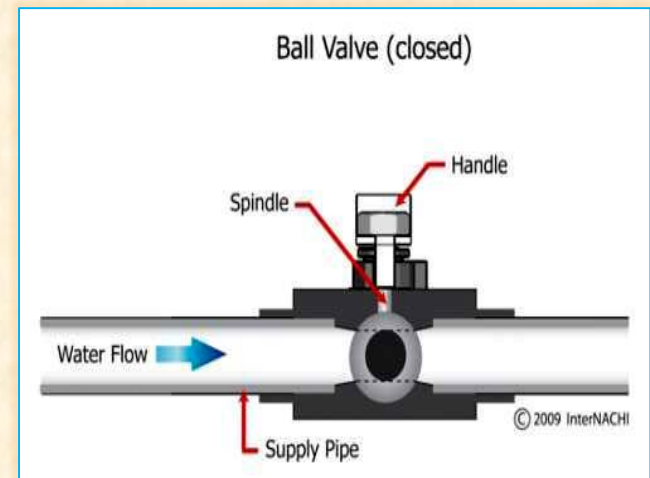
## MORE ON 3-PORT VALVES

- One of the best features of this valve is, nothing much can go wrong. They're easy to maintain, although they should be lubricated every 6 months.
- If they spring a leak, it's usually fixed by replacing the gasket.
- At a motorized valve, look for a clean motor with no signs of rust or corrosion. If there is a solar-panel heating system installed, warping may be found.
- If a solar panel is installed and heats water to greater than 200° F, which then backflows into the valves, the super-heated water may warp the components.
- Motorized valves are installed on the plumbing system for a few reasons, such as for valves that are located far away or are difficult to access.
- If the motor is found to be burned out, it is easy to replace, and it does not require total replacement of the valve -- just the motor.



## SHUT-OFF VALVES

- Gate and ball valves are installed on the plumbing system for a pool or spa in order to stop (or shut off) the flow of water. On older systems, shut-off valves might be installed and used as a 3-port valve.
- A ball valve is a valve with a sphere (or ball) inside it. The ball is the part that controls the flow through it. A ball valve can be totally open, totally closed, or any position in between.
- Gate valves are meant to be fully open or closed. A gate valve permits you to completely stop, but not modulate, the flow within a pipe. It should not be used in a partially open or partially closed position. The gate valve has a handle that drives a worm screw-style shaft inside a threaded gate.  
**Remember: "Righty-tighty, lefty-loosey."**





## CHECK VALVES

- The check valve allows water to flow in only one direction. A check valve might be installed to prevent hot water from flowing back into the filter.
- A check valve might be used to stop the flow of caustic chemicals of a chlorinator from flowing in the wrong direction. Check valves could be swing-gate valves or spring-loaded gate valves.
- Inside a flapper check valve, the water is stopped by a flapper that moves (opens or closes), according to the flow of water.
- Inside a spring-loaded gate valve, the water pressure pushes on the spring-loaded gate.
- All check valves can become clogged with debris. Check valves might remain open if clogged.
- A 90°-check valve is one that has an access port to open and clean or replace the valve's interior.
- Some check valves are made of clear PVC that allows you to check the operation and water flow.

## UNION FITTINGS

- Union fittings are very handy when the need to repair or replace exists, and cutting and reconnecting plumbing are necessitated.
- When a piece of equipment needs to be disconnected from the system and removed, and there are union fittings installed, the task becomes easier.
- Unions allow a contractor to remove and replace equipment without installing new plumbing.



## SOLAR HEATING SYSTEMS

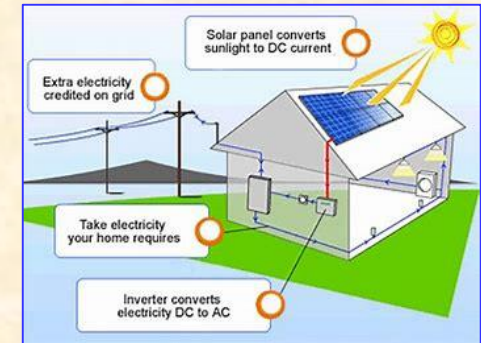
- The 2 most common types of solar panels used in pool and spa heating system are “closed-loop” and “open-loop” panels.
- The general rule of thumb for determining the size of solar panels required in relation to the size of the pool or spa is that around 70% of the surface area of the pool and spa should be the same as the surface area of the solar panels, like this:

*60% to 75% of the surface area of the pool and spa = the surface area of the solar panels.*



## MORE ON SOLAR PANELS

- Solar panels should face the sun, so they are generally installed facing south. Winds may have to be factored in.
- Make sure that all of the pipes and lines going to and coming from the panels are insulated.
- Inspect them for leaks once a month.
- They can be easily cleaned with some soap and water.





## COMMON SOLAR PANEL ISSUES

- If the water is not warming up enough, it might be because:
- The panels are too small
- The panels are improperly oriented
- The controls are not working properly
- The water is circulating through the panels at the wrong time of day.



## END OF MODULE 2

This concludes Module 2. Please proceed to the 10-question quiz. Once you have completed that, you may proceed to Module 3.

