

*Guidelines for Swimming Pools,
Wading Pools, and
Recirculating Spray Pools with*

Single Main Drains

September 2006



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Guidelines for Swimming Pools, Wading Pools, and Recirculating Spray Pools with Single Main Drains

This document provides guidance to state and local health jurisdictions, designers, builders, pool owners and other interested parties on the use of the emergency shut-off switch and the audible alarm required by Chapter 246-260 WAC for all swimming pools, wading pools, and recirculating spray pools that have a **single main drain**. In addition, guidance is offered about currently recognized potential alternatives which may be considered for protection. The pool industry is working on new standards to address problems with main drain design and entrapment. New products may be available in the coming years that meet these new standards.

Owners of facilities have until June 1, 2008 to comply with this requirement.

Several types of entrapment problems are associated with single main drain pools. These include hair entrapment, limb entrapment, body entrapment, evisceration, and entanglement. While these conditions are relatively rare, they are most devastating in consequence and preventable with good design. In an effort to provide an improved level of protection, the State Board of Health regulations have established a minimum upgrade to an **emergency shut-off switch and audible alarm**.

When providing protection with emergency shut-off switches or other mechanical methods discussed in this guidance document (e.g. vent lines, Safety Vacuum Relief Switches [SVRS], and in some instances collector tanks), it is important that routine testing of the product be conducted.

WACs 246-260-041(11)(h); 246-260-071(7); and 246-260-081(4) require the following minimum improvement for single main drain facilities by **June 1, 2008**: Use of a manual pool emergency shut-off switch within 20 feet of the pool and plainly marked "emergency shut-off switch" which will turn off all pumps recirculating pool water. The shutoff switch must include an audible alarm which can be heard by those in the area, or have an alarm that goes to a place where staff are always present during periods that the pool is open.

Emergency Shut-off Switches and Audible Alarms

There are numerous products with shut-off switches and audible alarms that can readily be installed on the pools. It is essential that the manual emergency shut-off switch be within 20 feet of the pool and be readily accessible to the public if an emergency occurs. It is necessary that the device(s) turn off all pumps recirculating water in a pool. The shutoff switch should be tested at least monthly and its results recorded to demonstrate that it is operating properly.

While the manual emergency shutoff switch does turn off the pump, it has limitations. The primary limitation is that if someone is entrapped on a drain, someone else has to see him/her and then know to turn off the pump(s). A second limitation is that, under certain conditions, the shutoff switch may not remove the actual vacuum condition on the main drain grate if a weighted check valve is in the system. Some types of Safety Vacuum Relief Systems (SVRS), discussed later in this report, are subject to the same limitation.

An audible alarm is coupled with the emergency shut-off switch. The alarm provides a warning of two conditions: 1) an emergency condition has occurred and help is needed, and 2) the shut-off switch has been activated for some other reason, turning

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off the water treatment system. The audible alarm needs to be a) loud enough to be readily heard by those in the area of the pool, or b) provide a remote alarm in a location where staff remain stationed when the pool is open for use (e.g. a front desk at a private club or hotel). When the latter option is used, clear instructions are needed for all staff as to what actions to take when this remote alarm is sounded.

There have been comments about the type of alarm needed, but regulations do not specify precisely what type of alarm. In general, an alarm that can readily be heard in the vicinity, that produces a sound level within the 80-85 decibel range, would be satisfactory.

Placement of the emergency shut-off switch needs to be within 20 feet of the pool and readily accessible to bathers. Some type of protection around the switch, such as an easily opened fire alarm type box, is allowed to help prevent “false” alarms.

Other options which can be considered in lieu of the manual pool emergency shut-off switch include:

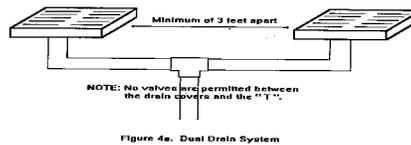
Option 1. Installation of a second main drain that provides a way to prevent vacuum conditions when properly designed and installed. When the two drains are connected such that no single drain can become the sole source of suction, the potential for entrapment is greatly reduced. A minimum distance of 3 feet must be maintained between the drains.

This option has two main drains with main drain piping manifolded close to the hydraulic center. It is essential to use the same diameter pipe on the manifolded lines as is used for the main line pulling to the pump. The piping must be designed so that (1) the water velocity does not exceed 6 fps up to the main drain outlet box (assuming one hundred percent of the pump recirculation flow), and (2) total open area of the main drain grates maintains flows at less than 1.5 fps at this 100% flow rate.

When considering this option it is important to consider the impacts on the pool shell. When reviewing potential bidders, ensure that consideration for the structural integrity of the pool shell is also closely reviewed.

Option 2. Main drain outlet will be connected to a collector tank. The capacity of the collector tank shall be at least equal to the volume of one minute of the recirculated flow. Vacuum filter tanks may be considered collector tanks depending on the piping arrangement with the pump. If a collector tank is planned, an engineering design is needed. A field test is also needed with this option. Testing is needed to ensure that the pump will not sustain a vacuum when the main drain is

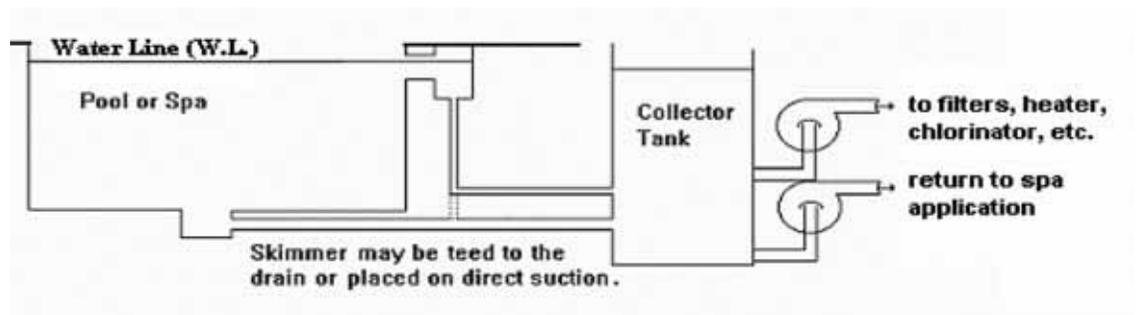
Two Drains per Pump



Drawing courtesy of the U.S. Consumer Product Safety Commission

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blocked. The demonstrations of this must be made with the overflow system blocked. A sustained vacuum at the main drain will constitute failure of the design method.

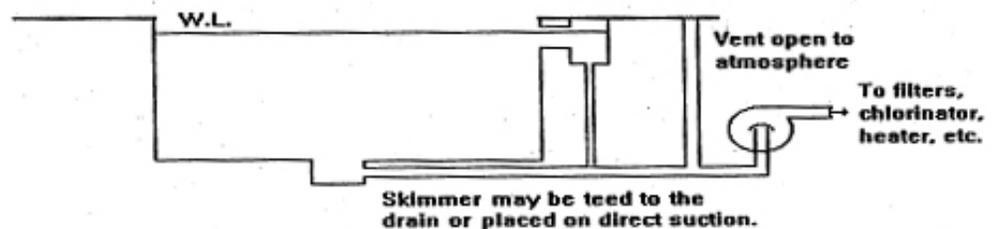


Drawing courtesy of the U.S. Consumer Product Safety Commission

A point of contact for further information on implementation of this system is Robert S. Pryor of the Florida Department of Health, (850) 245-4444 ext. 2369

Option 3. Use of a vent line for facilities that have recirculation pump, filter and associated recirculation pipe **below** pool water level. If a vent line is to be used, an engineering design and field test are needed to demonstrate that the pump will not sustain a vacuum where the main drain is to be blocked. This test shall be done with the overflow system blocked to simulate worst-case conditions. Review shall include conditions that could cause cavitation of the recirculating pump. If the engineer can provide justification for this to work with the pump and filter above pool water level, this will be given equal consideration.

Methods for routine testing of the vent on a monthly basis are needed. Test records are to be maintained by the owner. An audible alarm that will sound when the Safety Vacuum Relief System (SVRS) activates is needed to make the pool operator aware that the recirculation treatment system has stopped.



Vent System to Relieve Suction at Main Drain

Figure 5b. Vent System to Relieve Suction at Main Drain.

Drawing courtesy of the U.S. Consumer Product Safety Commission

Option 4. Safety Vacuum Relief Systems (SVRS) is any manufactured item that senses vacuum [below atmospheric pressure] and automatically shuts off pump(s). Consideration of these devices in lieu of the manual shutoff switch may be used. During initial review of the SVRS design, the design engineer is to include analysis of the upstream piping and valving. If for instance a check valve is provided at the

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heater, ensure that protection is provided with the SVRS to not sustain a vacuum condition at the main drain.

Routine monthly testing of such devices is needed. Records of testing are to be maintained. These systems have the ability to adjust the sensitivity of the readings and, like any mechanical device, are subject to wear and deterioration. Ongoing testing of the SVRS will ensure that the sensitivity is maintained correctly. Providing an audible alarm that will activate when the SVRS is activated is needed to make the pool operator aware that the recirculation treatment system has stopped.

Option 5. Use of a pre-engineered device. When considering this option, it will be necessary that such proposal be submitted to a technical group (such as ANSI, ASTM, NSF, UL, or other acceptable third party reviewer) to determine whether the device properly meets the intent to protect against entrapment.

Specific details on approved products may be found by working with local pool service companies.

For more information or questions, please contact:

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