

Petition VGBA 15-1 - Petition to Classify "Vacuum Diffusion Technology" as an Anti-Entrapment System Under the Virginia Graeme Baker Pool and Spa Safety Act

6/11/2015

PSD INDUSTRIES

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"Petition to Commissioners of the Consumer Product Safety Commission to include "Vacuum Diffusion Technology" into the 'Other Systems' category of the Virginia Graeme Baker Pool and Spa Safety Act."

Parts of the Petition: The petition will include the 5 sections as listed below:

1. The definition of what we surmise Congress intended when they listed "Other Systems" in section (ii) – (VI) of the VGBA. Also included are definitions of
2. Recent technological developments within the pool and spa industry that impact former protective technologies as well as our new "Vacuum Diffusion Technology".
3. Deficiencies of currently accepted technologies.
4. Strengths of Vacuum Diffusion Technology
5. My response to the claims in the letter of response that I received from the Consumer Product Safety Commission on May 12, 2015.

Respectfully Submitted:



6/11/2015

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"Petition to Commissioners of the Consumer Product Safety Commission to include "Vacuum Diffusion Technology" into the 'Other Systems' category of the Virginia Graeme Baker Pool and Spa Safety Act."

***This is a petition to the Commissioners of the Consumer Product Safety Commission to reevaluate their initial objections and reconsider including "Vacuum Diffusion Technology (here after referred to as VDT)" into the Other Systems Category of the Virginia Graeme Baker Pool and Spa Safety Act (here after referred to as (VGBA)).***

**Introduction:** VDT is a good back up system for when a drain cover comes off due to poor maintenance, degradation of the drain (UV exposure, chemical exposure....) or from ordinary wear and tear. And like an SVRS allowed by the law, the VDT can help prevent the risks of entrapment as a back-up layer of protection. The SVRS does this by shutting the pump off all together while the VDT organizes the water flow so as to remove the concentrated vacuum draw. Without the concentrated vacuum draw, you 1) eliminate the availability of swimmers coming into contact with the vacuum intake orifice; 2) diffuse the intense suction and indeed eliminate the entrapment potential. Drains break. Drains come off. Drains are poorly maintained. The VDT absolutely satisfies the intent of Congress by requiring a back-up system or "other technology" that serves the same purpose as an SVRS. The discussion to follow will address the points mentioned in the letter received from the CPSC dated May 12, 2015 and show that the functions of Vacuum Diffusion Technology to be as good as or better than the currently allowed 2007 technologies.

Of importance: We are not asking the CPSC to add the ProteKtor to the "Other Systems" category as that would be an endorsement of our product. We are asking that Vacuum Diffusion Technology be added to the "Other Systems" category. The ProteKtor is just the initial version of Vacuum Diffusion Technology that instituted this new technology and was included in the new Brazilian National Pool Standard.

Vacuum Diffusion Technology Defined - *A system that removes the intense vacuum draw from the intake point of a pumping system by occluding the intake orifice from swimmers and diffusing the vacuum from a potential blockage immediately in multiple directions from the blockage. To be considered Vacuum Diffusion Technology, covering 50% of the Vacuum Diffusion Technology intake device should not raise the normal vacuum draw by more than .4" Hg. Vacuum Diffusion Technology devices must automatically adjust to changing conditions in the system in which it is installed, cannot be by-passed, require no calibration and contain no electronics or moving parts to malfunction.*

The ProteKtor Defined – The ProteKtor is simply the initial device that led to the discovery and subsequent development of Vacuum Diffusion Technology.

**Parts of the Petition:** The petition will include the 5 sections as listed below:

1. The definition of what we surmise Congress intended when they listed "Other Systems" in section (ii) – (VI) of the VGBA.
2. Recent technological developments within the pool and spa industry that impact former protective technologies as well as our new "Vacuum Diffusion Technology".
3. Deficiencies of currently accepted technologies.
4. Strengths of Vacuum Diffusion Technology
5. My response to the claims in the letter of response that I received from the Consumer Product Safety Commission on May 12, 2015.

1) *Other Systems Defined*

When Congress wrote into the Virginia Graeme Baker Pool and Spa Safety Act, the potential for future "Other Systems", they meant:

*As new technology within the pool/spa industry advanced there would be a need for new safety technology that would keep pace with these technological advances. Knowing that current pump technology (2007) would not remain static, there was a high probability that current safety products (2007) would not be able to provide a sufficient level of protection; thus the need for "Other Systems".*

As an example of unknown technology at the time of the VGBA passage, the proliferation of the requirements for variable speed motors necessitates a need for a new safety technology that will keep pace with these technological advances, where the current listed products do not.

**Other Systems Defined: *Any technology that will provide equal or greater protection from vacuum entrapment than any of the listed systems in the Virginia Graeme Baker Pool and Spa Safety Act, that keeps pace with advancements within the pool and spa industry from the date of passage of the VGBA.***

- 2) *Recent technological developments within the pool and spa industry that impact former protective technologies negatively as well as our new "Vacuum Diffusion Technology" positively.*
- A) One of the most recent advances within the industry is Variable Speed Pumps. These pumps are designed to run at lower RPM's thus saving energy. These pumps are being mandated in some states and due to the conservation of energy movement; it is likely to be mandated across the country. *To be discussed in section #4.*
  - B) Dual or multiple drains are a very good addition to pools if done correctly, but they do have a resulting negative return. With the development of multi drain systems came the resulting discovery of "differential hold down force". *To be discussed in section #4.*
  - C) Dual drains are frequently not plumbed properly or one of the drains is blocked.

D) The presence of old flat drains still presents a whole new set of problems among which are hair entanglement potential. *To be addressed in section #4.*

3) Deficiencies of currently accepted technologies.

All of the technologies listed in the Virginia Graeme Baker Pool and Spa Safety Act attempt to solve the problem of vacuum entrapment AND come with a list of what they can protect against and what they cannot protect against. As an inventor of one of the first Safety Vacuum Release Systems (SVRS) that ultimately sold to Hayward Pool Products, I have an in-depth understanding of the functions and limitations of these products.

SVRS's were the best of what was coming to the market when the legislation was created.

Unfortunately, they have run their course keeping up with technology AND technicians have found ways to defeat proper functions of these technologies. The discussion below will explain.

A) When SVRS's were created, there were no variable speed pumps. These pumps are

becoming desirable and mandated in some states due to their energy saving function by running at low RPM's. SVRS's DO NOT function on Variable speed pumps!

B) A second deficiency of SVRS's is one that is created by the legislation itself by not evolving with new technology. Technicians must comply with the VGBA on their commercial pools and spas even though the SVRS will not function with the new pump technology. The problem exists that SVRS's are a nuisance on many pools and spas and absolutely cannot adjust to variable speed pumps.

Problem Created: The technicians have learned to BY-PASS SVRS's. An inspector will see the unit running and assume it is protecting the facility while in effect it is only reading vacuum levels and not protecting against vacuum entrapment.

With most SVRS's it is as simple as moving 2 wires or putting a plastic cap over the air intake. The unit is totally negated.

C) Another problem is that SVRS's are either electro-mechanical, electronic or spring loaded.

All of these are susceptible to the harsh corrosive environment in which they are located and are subject to electrical malfunctions or surges and/or moving part failure. None of these are sufficiently durable, they are very cost prohibitive, require a skilled professional to install it, must be constantly reset and recalibrated and they all have the potential for a very limited life span.

D) Current technologies do nothing to enhance fluid flow, reduce energy usage or lessen the workload of the pump.

E) Another problem with SVRS's is that when a pool maintenance company sells a 2 HP pump to the pool/spa owner who had a system designed for a ¼ HP pump, for the same price as a ¾ HP pump, the owner jumps on it. A dangerous situation has just been created by implementing a larger HP pump than the system is designed for, the the SVRS cannot adjust to this. This is an everyday occurrence.

4) Strengths of Vacuum Diffusion Technology (VDT) – Vacuum Diffusion Technology does not suffer from any of the deficiencies listed above! I will discuss in same order as above.

A) **(Sect. 2A and Sect. 3A above)** - Vacuum Diffusion Technology automatically adjusts to any change in running vacuum or increase or decrease in RPM's. There is no calibrating nor resets for VDT as all is done automatically.\*

\*Not safety related but an issue that will enhance the usage of VDT which WILL provide MORE safety in MORE facilities. When used in conjunction with variable speed pumps, the improved flow produced by VDT actually enhances the flow at low RPM's allowing the mixing of chemicals to improve which in turn allows the technician to keep the pump running at the desired low RPM's. Currently, many technicians are locking out the variable speed pumps at higher RPM's to deliver sufficient flow and mixing of chemicals. This negates the energy saving function of these very expensive pumps. *This is one reason this technology will be installed over the other technologies as long as it satisfies VGBA compliance.*

B) **(Sect. 2B above)** - VDT eliminates differential hold down force in dual drains. Although not an extreme force, it has been identified and VDT will eliminate that action.

C) **(Sect. 3B above)** - VDT can NOT be by-passed! If it is located within the sump, it is working! There are also no nuisances created by the VDT. If it is there, it is working!

D) **(Sect. 3C above)** - The ProteKtor VDT is made of PVC plastic – the same formulation that the pool piping is made of. It has an unlimited life span, is at least 1/6<sup>th</sup> the cost of the least expensive SVRS, has no electronics or moving parts to malfunction and requires no special technician to install.

E) **(Sect. 3D above)** - SVRS's do nothing to improve the water flow in pools or spas. VDT actually improves fluid flow allowing for better mixing of chemicals and allowing the pump to function with less effort, saving energy. This in turn allows most variable speed pumps to operate at their desired low RPM's. Safety doesn't sell but energy efficiency and improved fluid flow do sell. Although not directly related to safety, these factors are what will get the technology installed to provide its safety aspects and not only in VGBA required commercial facilities but also in residential facilities not covered by the VGBA, which are just as dangerous as commercial facilities. It just needs to satisfy VGBA compliance.

F) **(Sect. 3E above)** - No matter what pump is attached to the piping; the VDT will automatically adjust to the change in vacuum, from any cause, without any user adjustments.

G) **(Sect. 2D above)** – Although VDT does not claim to make a bad drain cover good, VDT does diffuse the concentrated vacuum over the entire aspect of the drain cover instead of the concentrated pull of an unobstructed open suction orifice in the sump.

5) Response to the objections in the letter of response from the Consumer Product Safety Commission dated May 12, 2015.

There were 3 issues stated that the commission felt would eliminate the VDT from inclusion in the Other Systems category of the Virginia Graeme Baker Pool and Spa Safety Act. I will list the objection and then answer the claim.

1. **Objection:** That the VDT is only effective when the drain cover becomes missing.  
**Response:** The VDT, like an SVRS, a vent pipe or other approved device are all back-up systems. If the approved drain cover is intact and in place, none of these devices will be called into action.

The difference is that while the drain cover is in place, the VDT is improving fluid flow through the system, reducing work load on the pump, providing a better mixing of chemicals within the pool or spa and reducing energy consumption.

2. **Objection:** The ProteKtor does not protect against full body entrapment.  
**Response:** Since the ProteKtor sits down inside the sump, we cannot claim to protect against full body entrapment. On some sumps we sit above the rim and probably would stop a full body entrapment, but since we don't know what sump it will be installed into, we don't claim full body entrapment avoidance.

There is nothing in the Virginia Graeme Baker Pool and Spa Safety Act that requires full body entrapment protection. All of the listed devices in the VGBA claim what they can protect against and what they cannot protect against. Most of the devices claim to protect against full body and limb entrapment. That leaves 3 other types of entrapments that they do not protect against.

Vacuum Diffusion Technology protects against limb, hair, and mechanical entrapment and will mitigate an evisceration. The only type of entrapment the ProteKtor does not claim is full body, which is the only type of entrapment the bather can remove themselves from. Dr. William Rawley made a very good video entrapping himself with a full body entrapment. He simply rolled off the drain.

By sheer numbers of types of entrapments protected against, we are at least as good and actually better than currently VGBA approved technologies.

Furthermore, the ProteKtor was designed to fit on one of the most prolifically sold sumps, and actually sits above the rim of this sump. In this instance, it is probable that all 5 types of entrapments will be eliminated. Our 2<sup>nd</sup> version for new pools and major remodels includes an entire sump assembly that is only slightly larger than our current version that WILL eliminate all 5 types of entrapments. There are millions of pools and spas that are in existence today and need to be protected WHEN the drain cover comes off. Our current version was designed to fulfill this need.

3. **Objection:** The Commission in its letter stated that it appeared that the ProteKtor could be removed without the use of a tool.  
**Response:** The adapter is designed to be inserted into the pipe coming into the sump. It is designed to be removable as I will discuss later. Next the ProteKtor is inserted on the tract on the adapter and a 316 stainless screw is inserted connecting the ProteKtor to the adapter. If you pull on the ProteKtor, the adapter should stay in place. If you were to pull hard enough, you may be able to dislodge the adapter with the ProteKtor still attached. The length of the ProteKtor and adapter together are too long to be removed from the opening in a normal 8" sump. Although not firmly seated in the pipe, the assembly is still in place protecting the opening of the sump.

**In order to comply with the requirements of tool usage to remove the protective device, we are changing our installation procedure to mandate gluing the adapter into the pipe coming into the sump. This will make the adapter permanent requiring a tool to remove the ProteKtor from the adapter.**

The reason the adapter was not glued into place, was that it was a non-discussed secondary safety device in itself. We are the first company to put a barrier between the child's hand and the internal diameter of the pool or spa pipe. Should a child get an appendage pulled into the sump opening with the ProteKtor removed, this secondary safety back-up will have to be negated to fit the requirements of the legislation.

IF a drain cover comes off and IF someone took a screwdriver and removed the ProteKtor, and IF a child got his/her appendage pulled into the pipe, the adapter would have been able to be pulled free. There would undoubtedly have been some broken fingers or toes, but the child would have come to the surface.

We did not advertise this safety back-up as we do not want people to think that this was the safety device but it would have acted as such in the event of removal of the ProteKtor. Even though I believe in multiple redundancies, we are going to eliminate this safety back-up to satisfy the requirements in order to become VGBA compliant.

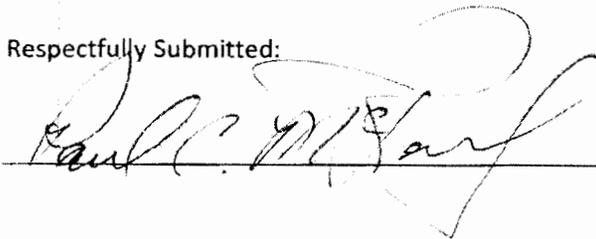
Summation:

For all of the reasons mentioned above, I believe it should be apparent that Vacuum Diffusion Technology is at least equal to but more likely better than the accepted means of VGBA approved technologies.

Not only does the ProteKtor function better, it is virtually indestructible and at much less cost. The installation is much simpler than currently approved devices and VDT can function with the new pump technologies that the conventional VGBA technologies cannot. The improved flow characteristics are the features that will get the technology installed as the flow benefits are perpetual after installation, paying for itself in the short term. If VGBA approved, VDT can cross over to the unregulated residential market making both commercial and residential pools and spas safer from vacuum entrapment.

The only way to stop an entrapment is to not let the mechanisms of the entrapment begin in the first place. Reacting to an entrapment scenario is too slow. Vacuum Diffusion Technology such as The ProteKtor, eliminates these mechanisms before they can begin!

Respectfully Submitted:



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