



Pure, safe water.

*Always.*

## **UNDERSTANDING PRESSURE DROP WHEN INSTALLING NSF 55 CLASS A UV DISINFECTION SYSTEMS**

All systems that are [NSF/ANSI 55 Class A](#) certified are designed to deliver a dose of 40 mJ/cm<sup>2</sup>. This minimum UV dose has been established as a failsafe set point to ensure 3-4 log reduction of virus, bacteria and cysts found in typical drinking waters. The 40 mJ/cm<sup>2</sup> dose must be achieved at "end of lamp life" and at the maximum specified flow rate of the UV system. To achieve this "global gold standard" of certification by [NSF/ANSI](#), each system is tested with live organisms to establish a "kill rate" at a maximum flow. In simple terms, the calculation of dose required to deactivate pathogens is a function of UV Intensity or power, UV transmittance of water, and the amount of UV exposure of the pathogens (flow rate). The relationship between UV dose and flow rate is nearly linear, so that, for example, if a 10 GPM and a 20 GPM NSF/ANSI 55 Class A certified UV systems were operated at 10 GPM, the 10 GPM system would deliver about one-half the dose of the 20 GPM system.

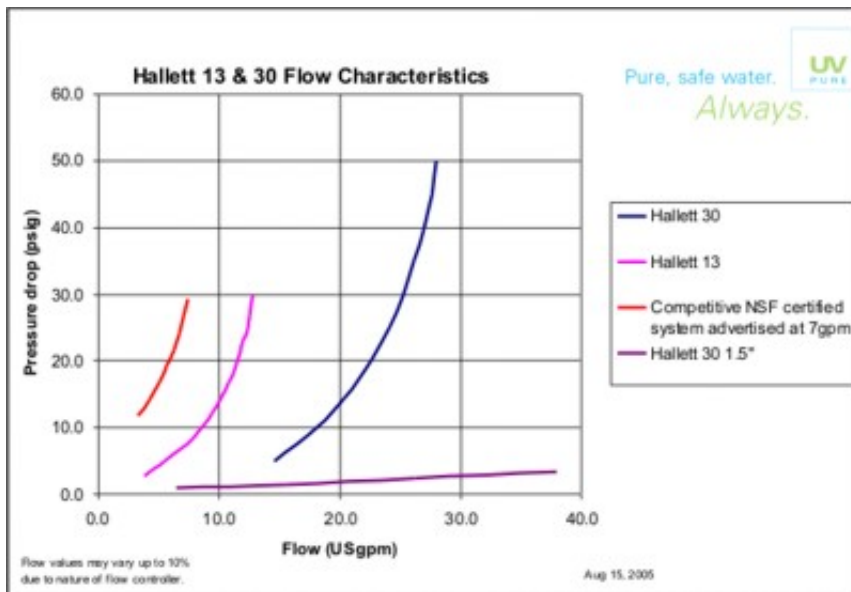
Maximum flow rate is fixed in all NSF 55 Class A certified systems. This is achieved by integrating a Flow Restrictor in all certified system configurations. Therefore, a certified system will not run at flow rates beyond the flow that it is certified for; a 10 GPM system will not allow more than 10 US gallons per minute of water to flow through the system.

Flow restrictors are often called dynamic orifices as they vary the size of the opening that water is allowed to flow through. The flow element contracts as the pressure increases allowing less water to flow - the greater the pressure, the smaller the opening. This characteristic allows flow restrictors to have better pressure drop values at lower flows as compared to orifices. UV systems that do not have flow restrictors cannot be certified as NSF 55 Class A systems, and conversely, removing the flow restrictor or installing a certified system without the restrictor invalidates the NSF certification.

While the flow restrictor is critical to ensuring purification, all flow restrictors create a significant pressure drop as they approach their maximum flow limit. This is an important factor to consider when configuring a UV system. In fact, it is not unusual for a flow restrictor to cause a pressure drop of up to 40 PSI as it approaches its limit. This is not a linear relationship, and therefore, at only a few GPM below a flow restrictor's limit, there may not be a significant drop at all.

Why is this important?

In residential or recreational properties, as well as small public facilities, maximum flow required may be 7 or 8 GPM. Installing an 8 GPM certified system, for example, will limit flow to 8 GPM which is enough to service the maximum flow required, but can induce a pressure drop of up to 35 or 40 PSI at flows near peak requirements. A pressure drop of this magnitude is significant and will noticeably affect users. Simply, in a home installation, it may mean that there is not enough pressure for a shower in the morning when other appliances and taps are all in use.



It is important to size certified UV systems so that the maximum flow rate is greater than the maximum required so that pressure drop is minimized. UV Pure Technologies' smallest NSF 55 Class A certified system is rated at a maximum flow rate of 13.3 GPM. We do not produce a smaller certified system. A flow rate of 13.3 GPM ensures that applications with maximum flow needs of around 10 GPM or less will not experience noticeable pressure drops at that level. Similarly, a certified 6-7 system will work well with low pressure drop at a flow rate of 4-5 GPM – however this may be too low for today's larger homes and recreational properties. Of course, the same relative calculations apply to small commercial and public applications, and are true for larger scale use as well.

**INSTALLING A CERTIFIED SYSTEM WITHOUT THE APPROVED FLOW RESTRICTOR WILL VOID ITS CERTIFICATION.** We have heard of installations where the flow restrictor is simply not installed in order to increase the flow or eliminate the pressure drop; in that case, the flow WILL go higher than rated and there will be little pressure drop, BUT THE WATER MAY NOT BE SAFE, AND THE SYSTEM IS NOT CERTIFIED.

For more information contact:  
Sandro Pecile  
Director of Product Engineering  
specile@uvpure.com  
Tel: 416-208-9884 ext 223  
Toll Free 1.888.407.9997

To find out everything, visit [www.puresafewater.com](http://www.puresafewater.com) or call 888-407-9997.

#### Contact:

UV Pure Technologies  
1-888-407-9997

