



VIQUA PRO with LightWise Technology

09.2015

A 15 Year Transformation

15 years from the launch of the very first NSF/ANSI 55 Class A ultraviolet microbiological water treatment system, VIQUA continues to be an industry game changer...


2001



Trojan became the first UV manufacturer to have a UV system certified to NSF Standard 55 Class A.


2007



Amalgam Lamp Technology



COMMCenter


2014



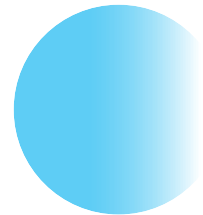
Flow-Meter



Improved Sensor Design


2015

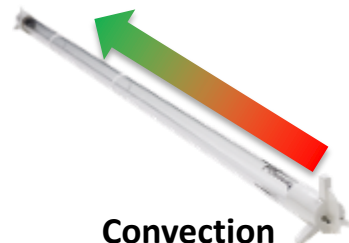
Sept. 3



Lamp Dimming Technology (LightWise)



CoolTouch Fan and Heatsink



Convection Lamp Cooling

PRO10, PRO20, PRO30



FLOW-METER RECAP

Flow-Meter Refresh

$$\text{Dose} = \text{Lamp Intensity} \times \text{Time (Flow)}$$

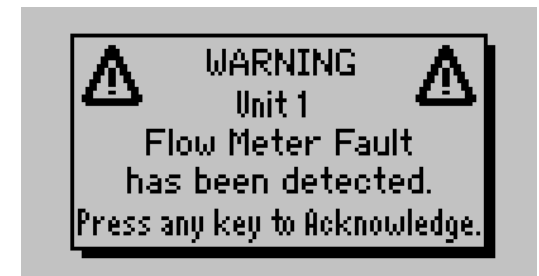
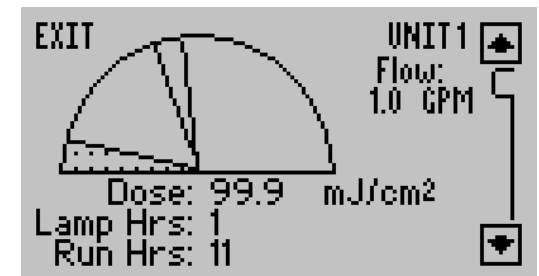
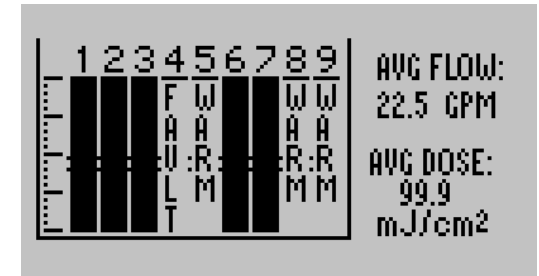
VIQUA introduced the flow-meter in 2014 to give PRO units the ability to calculate real time dose in varying flow conditions

The flow sensor converts flow rate readings to a 4-20mA signal, which in conjunction with the UV sensor's 4-20mA signal, is used to calculate the actual real-time UV dose.

Dual flow sensing devices are used to ensure that the reading is safe and accurate



Flow-Meter Refresh - Monitoring



The COMMcenter has been updated to display flow rates along with dose readings.

Flow-Meter Refresh - Benefits

- Allows the controller to calculate the **real time UV Dose**
- Eliminated **low-UV alarms** due to low flow conditions
- Increased the **diagnostics functionality** of the COMMcenter
- Allows end-users to **gauge** when the sleeve will need to be cleaned
- Potentially **lengthens the time between cleaning** for systems that typically have low flow rates



INTRODUCING

LightWise

Problem Statement

In some situations, a challenge that may arise when using UV disinfection systems is the **fouling of quartz sleeves** which surround the UV disinfection lamps. The rate of sleeve fouling is influenced by **water temperature, water flow, and concentrations of calcium, magnesium, and iron** in water – the most common materials that lead to “sleeve fouling”.

Periods of no water flow elevate the water temperature in a UV chamber, accelerating the rate of calcium, magnesium, and iron deposits precipitating onto the quartz sleeve, thereby **decreasing the level of UV transmittance through quartz sleeve** until it reaches a level that necessitates sleeve cleaning maintenance.

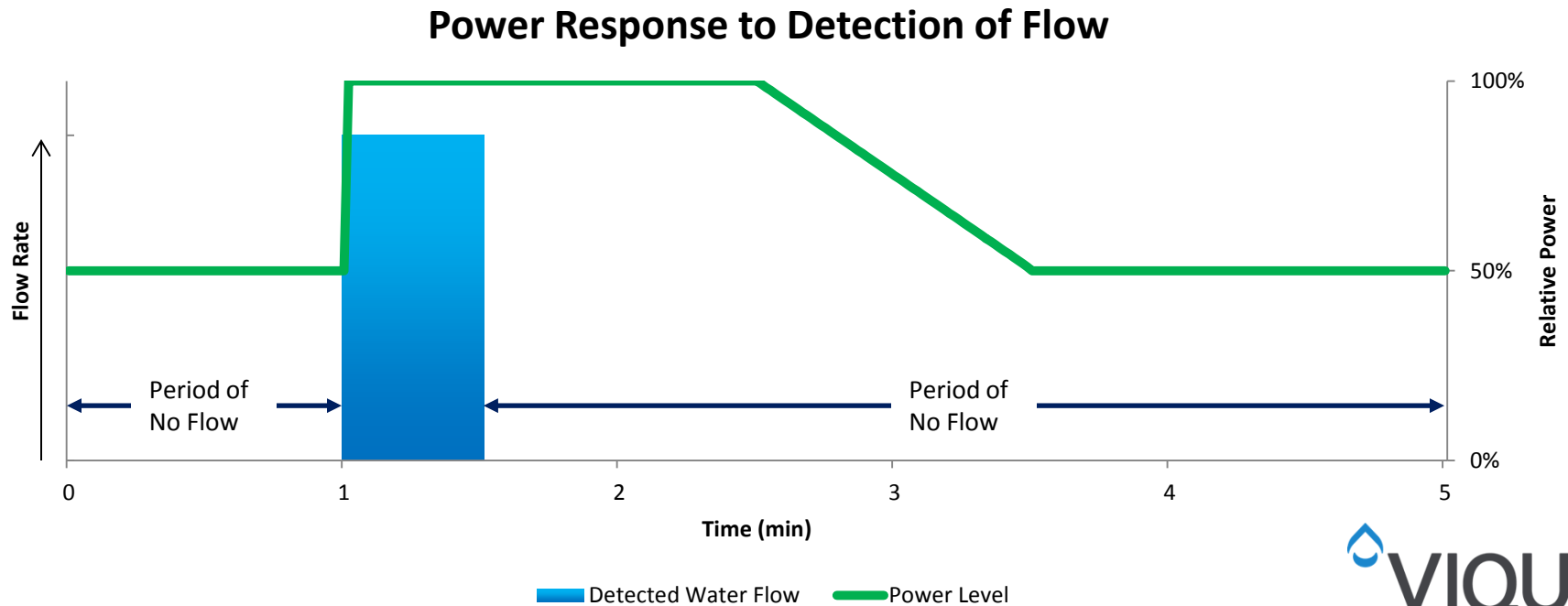
Problem Statement

While actual water usage may vary significantly during the span of a day, **conditions of no water flow** can account for as much as **60% of the time**.

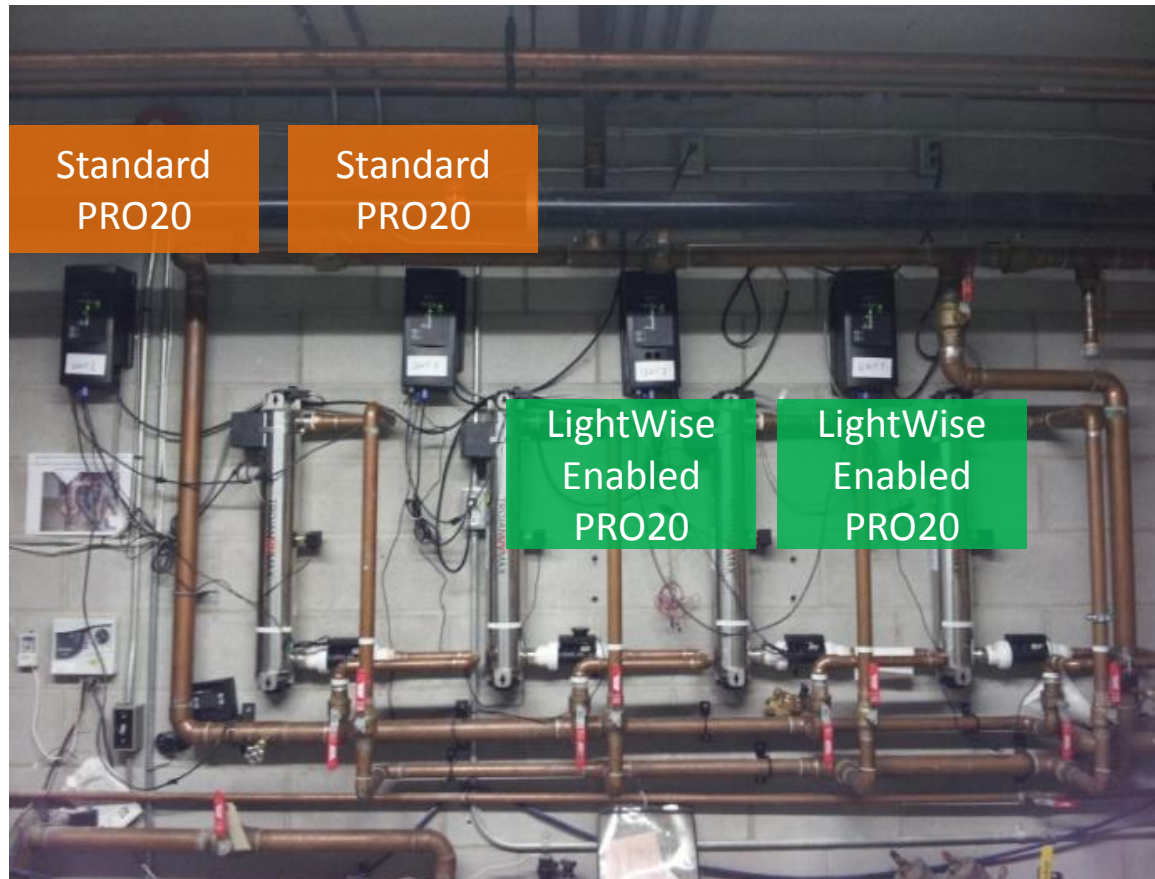
During this time, heat is transferred by the UV lamp, resulting in water temperatures as high as 55°C (131°F) in chamber, and significantly increasing the rate of sleeve fouling.

LightWise - How it Works

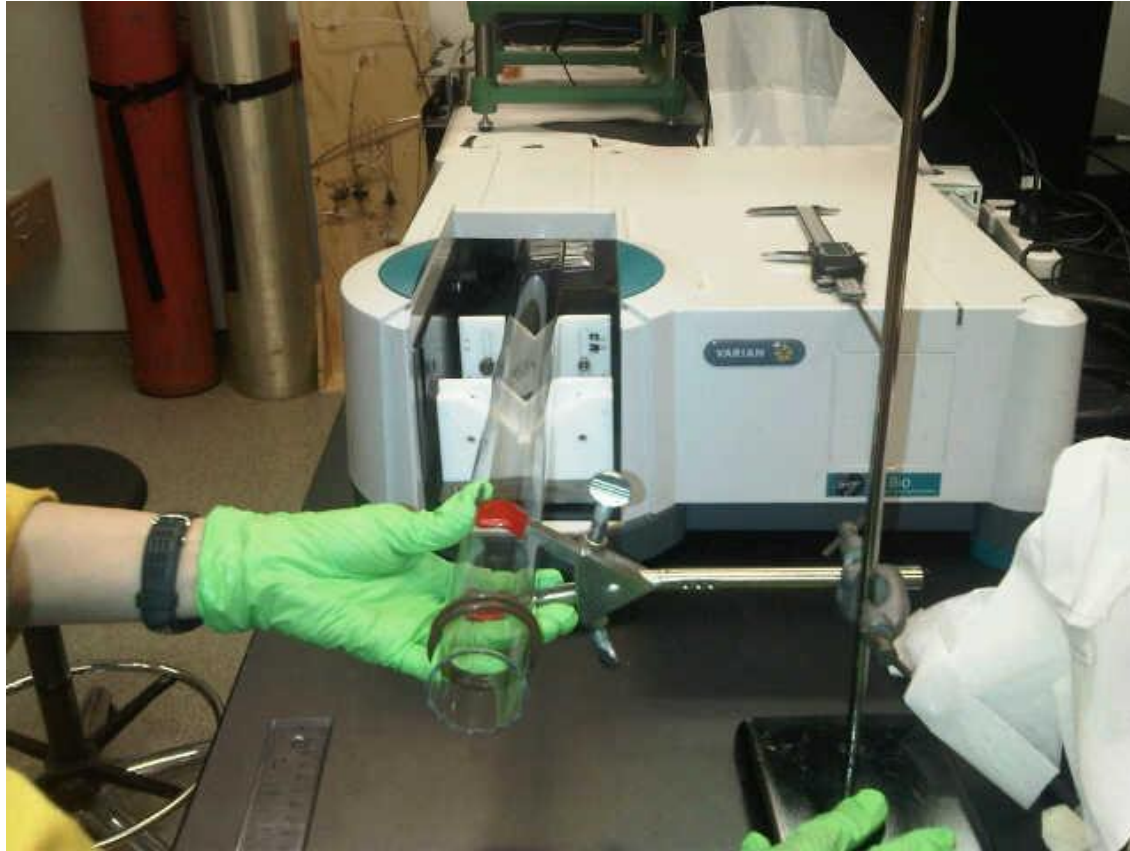
1. Upon detection of flow, UV system will immediately go to full power
2. When no flow is detected for a period of 1 min, system will reduce lamp power to 50% or a minimum dose of 80mJ dose level



Performance Testing



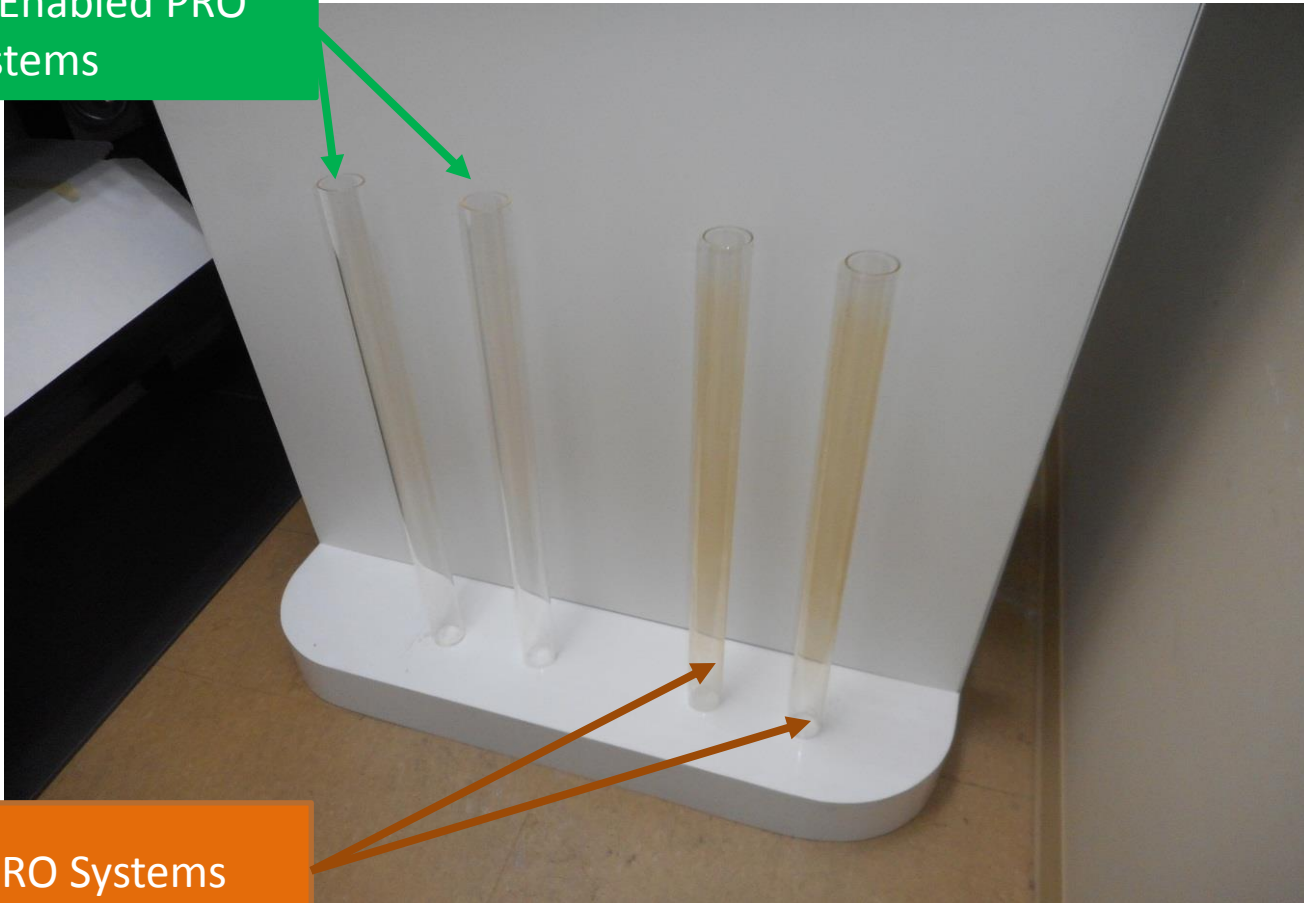
Performance Testing



Sleeve fouling testing at the University of Guelph

Results – Sleeve Fouling

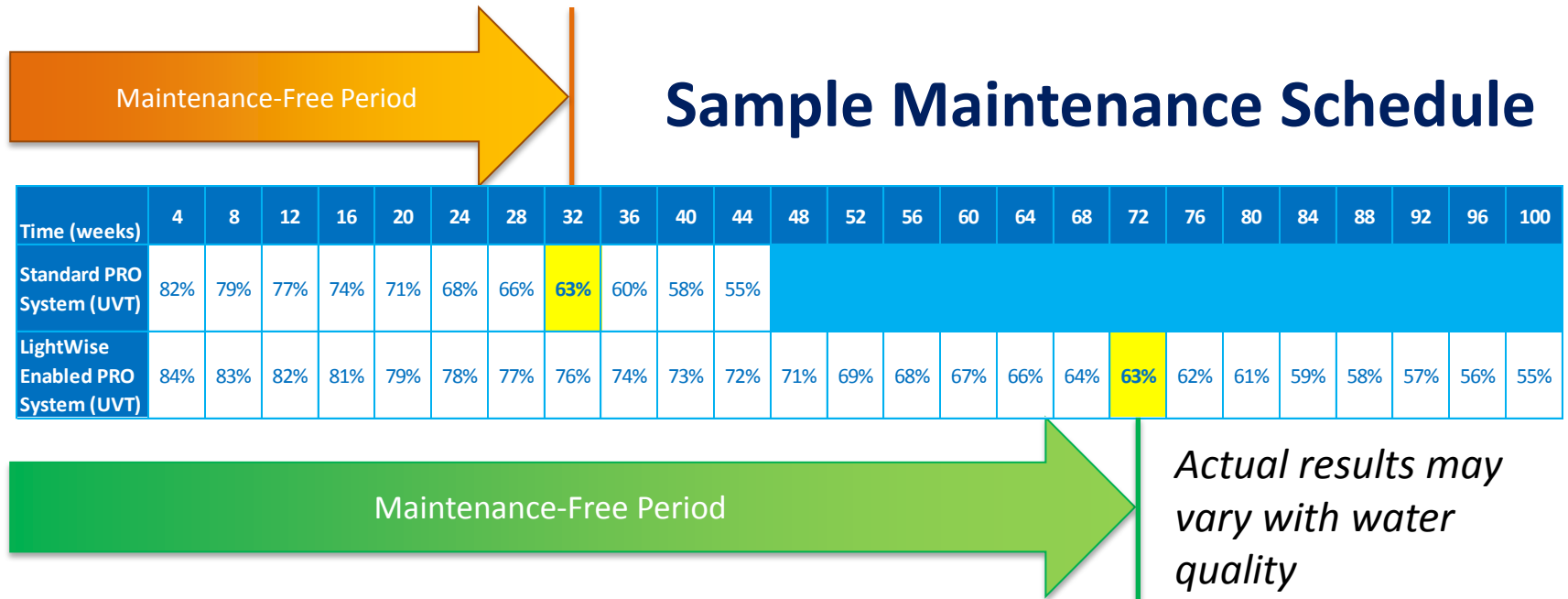
LightWise Enabled PRO Systems



Standard PRO Systems

After one year of use.

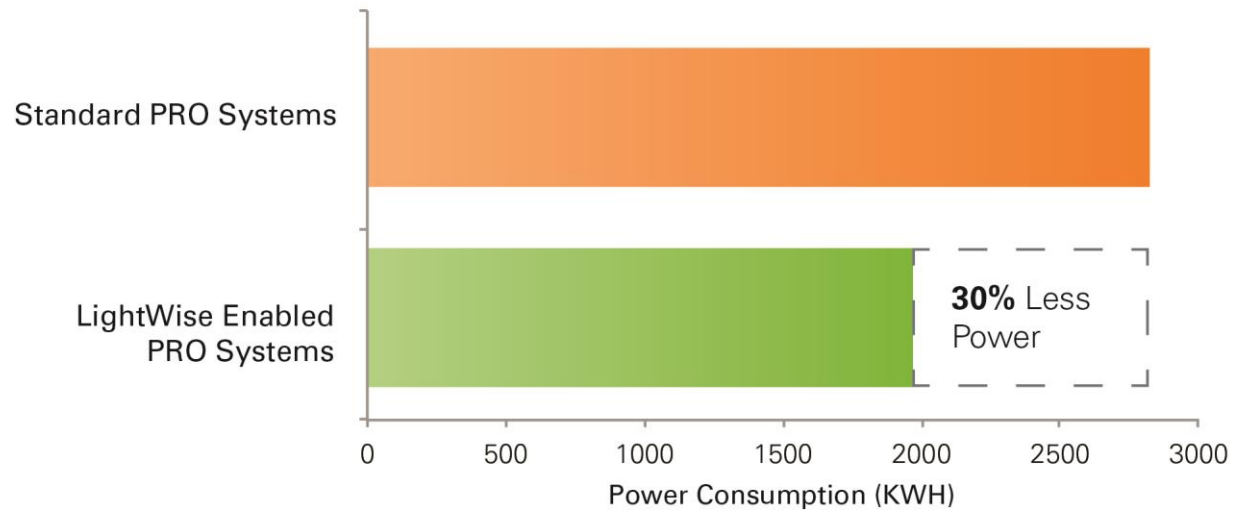
Results – Service Maintenance



End-users can expect to extend their required sleeve cleaning maintenance cycle by a factor greater than 2X.

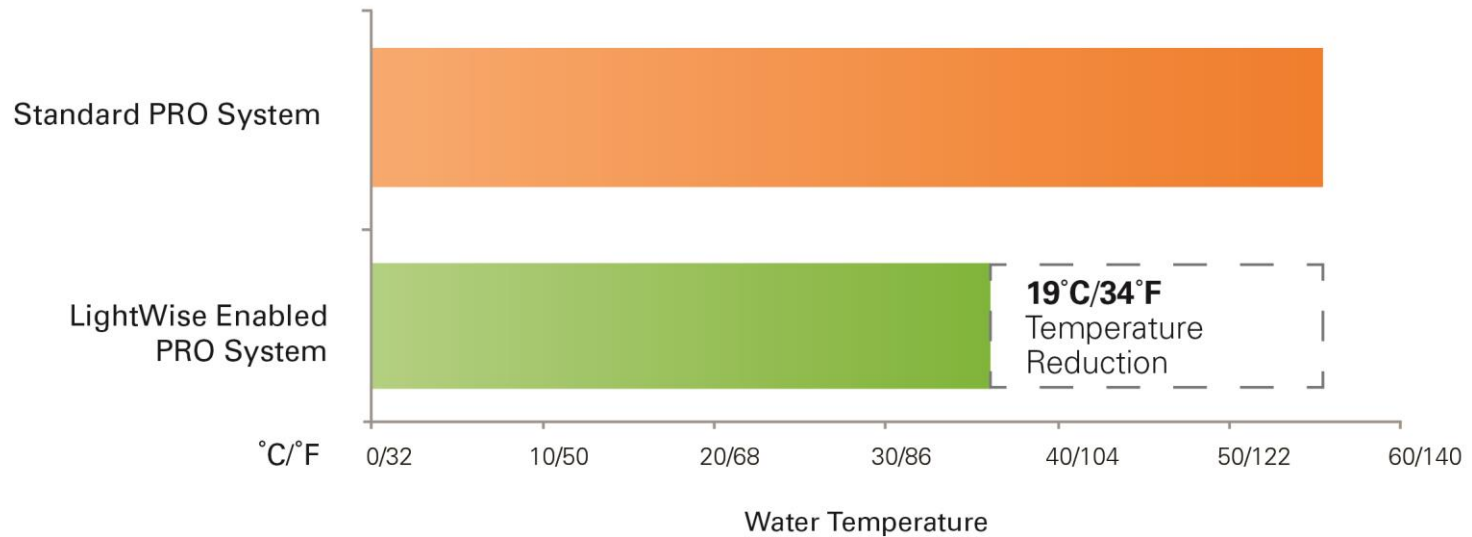
Results – Power Saving

Yearly Power Consumption - 2 x PRO20 Systems



Results – Temperature

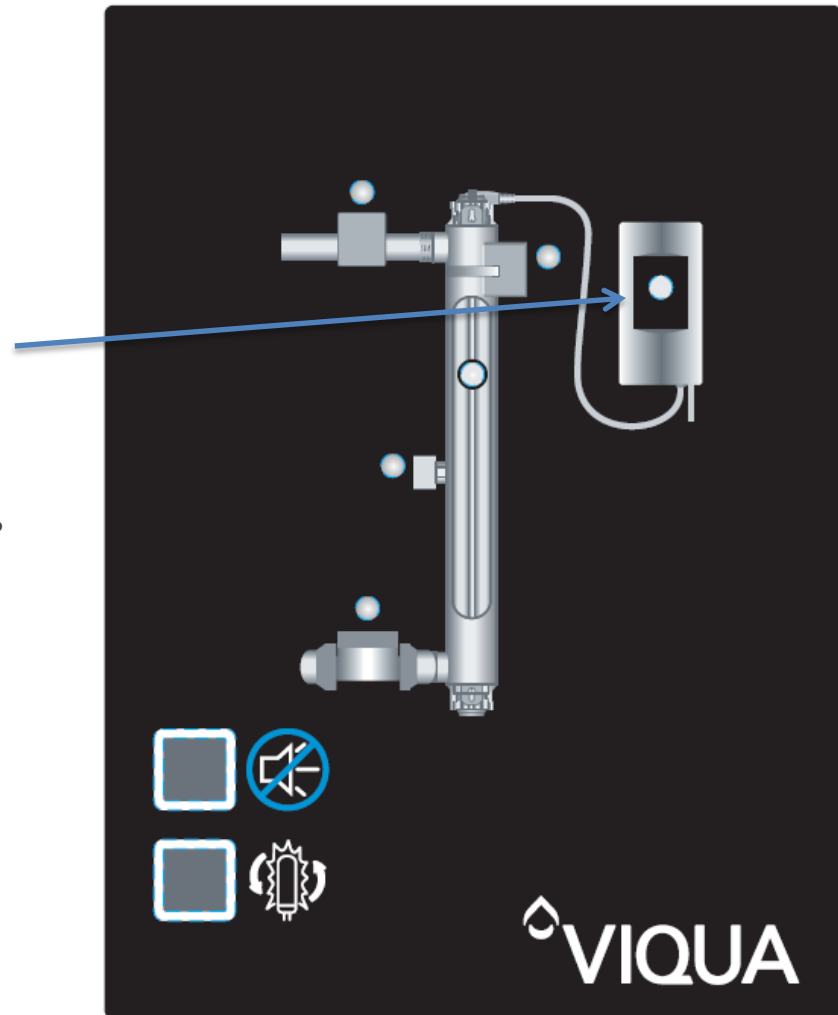
Water Temperature After 6 Hours of No Flow



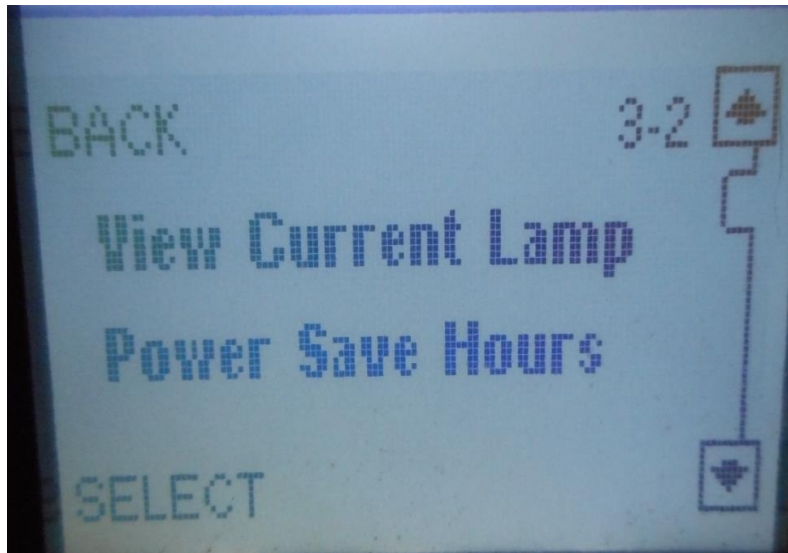
Monitoring

Controller indicator on the display membrane will flash green when the system is in “Power Save” mode (50% power).

Note: LED indicator will only flash if the power level is at 50%.



COMMcenter Update



A screenshot of the COMMcenter table. The table has three columns: 'Unit', 'Lamp Hrs', and '50%Pwr Hrs'. The first row is highlighted in green. The data is as follows:

Unit	Lamp Hrs	50%Pwr Hrs
1	550	400
2	3576	2600
3	1194	702

The table is displayed on a screen with a 'BACK' button at the top left and a vertical navigation bar on the right side.

COMMcenter firmware update adds a new screen – “Power Save Hours”

Note: System will only track “Power Save Hours” when the output is at 50%.

Problem Solution

VIQUA's new LightWise technology allows the control system to lower the power during periods of no water flow, leading to energy savings. This technology allows for a substantial reduction in sleeve fouling by as much as 60%. The main benefits:

- Significant reduction in **sleeve cleaning maintenance** - >50%
 - Estimated **energy savings** of 30%
 - Water temperature is **maintained below 40°C (104°F)** in no flow conditions (reduced hot water shot on initial flow)
- ***End-users can expect to extend their required sleeve cleaning maintenance cycle by greater than 2X.***