

## FAQs: UV and Dairy/PMO Applications

### Is UV effective?

- Yes. UV is extremely effective at low doses for inactivating a wide variety of pathogens, particularly microbes that are resistant to traditional chemical disinfectants. UV systems use either low pressure UV lamps or medium pressure UV lamps. Recent research, however, has shown that medium pressure lamps, which deliver broad spectrum UV, can inactivate even the most resistant viruses at reasonable doses.

### Is it reliable?

- Yes. Unlike chemicals, UV is independent of pH, generally independent of temperature and inactivates microorganisms within milliseconds. To ensure that the accurate UV dose is reliably delivered to the water, a UV system should automatically measure water quality and intensity of the UV lamps and then adjust the dose in real time, as needed. Systems that read and use real time data to maintain the required dose ensure that whenever the power is on, the unit will provide a uniform reliable UV dose.

### How do you know that it is working?

- Many units sold for treatment of drinking water have a control system designed to track when the unit is providing the required dose and when it is not. Good UV equipment will continually track the dose with one of several technologies and provide a real time user interface with the information needed. UV units should generate reports automatically and capture the information in a secure database.

### How important is sensor calibration?

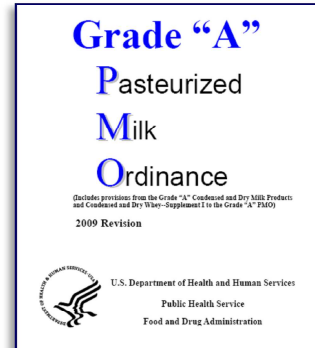
- If the sensor is not working properly, the water will not get the prescribed dose. EPA rules recommend checking once a month until a clear pattern is established. Units that have a sensor that never gets wet will stay calibrated longer and need less frequent checking to keep the sensor from drifting and the UV unit working reliably.

### Do particles in the water affect the treatment of water?

- Particles can absorb UV, thereby lowering water's UV transmittance (UVT – sometimes loosely referred to as 'clarity') or hiding microbes. This is why tracking the UVT is important to make sure the unit is providing the necessary dose. Units that work based on fiber optics have UV photons coming from all directions and provide a more uniform dose and better treatment, especially if there are particles in the water.

### Is there a need to filter the water prior to treating with UV?

- Depending on the quality and UVT of the water as well as the type of UV technology, filtration may or may not be necessary. Some units have the UV light coming from a central source and may need filtration if the water quality fluctuates. Others have UV photons attacking microbes from all directions and can self-adjust as the water quality fluctuates and in this case, filtration may not be necessary.



### **What dosage is required?**

EPA standards require a 186 LP equivalent dose for a 4-log virus disinfection credit, benchmarked on adenovirus. The prescribed dose is enough to inactivate the most resistant pathogens to an equivalent standard of chlorine and other chemical disinfectants .

In practice, Medium Pressure (MP) technology requires a dose of only 120 because MP polychromatic light damages both the DNA and the cell's repair mechanisms. MP has more action mechanisms, modes of attack on microbes and a broader spectrum of wavelengths to disable repair & attachment mechanisms and other proteins than a monochromatic low pressure lamp has.

Chemicals can create disinfection by-products, which UV does not. Also, the efficacy, performance and amount of chemicals needed for proper disinfection is dependent on the pH and the temperature of the water, while Medium Pressure UV is independent of these variables.

### **Is UV more cost effective than heat pasteurization for water?**

- Yes. Due to electric, steam and labor costs, traditional water pasteurization using heat is expensive. From an operational standpoint, UV makes large volumes of pasteurized-equivalent process water easy and inexpensive to produce, and provides it on-demand - no batch pasteurizing, no storage tanks. To provide an example: for heat pasteurization, one dairy had costs of about 150-Kw/hour plus labor; when they switched to pasteurization by UV, the cost dropped to 3 Kw/hour and it ran automatically, needing no labor.

### **Will UV systems pasteurize milk?**

- Most UV systems that treat drinking water are optimized for water with a high level of UVT; as milk is opaque, units that treat industrial flows and will not be effective. One company is promoting multi-lamp systems for thin-film treatment of milk; studies are being conducted to determine the impact of the high doses needed on proteins, flavors, etc.

### **What about other liquids?**

- UV can treat water and clear liquids with reasonable levels of UVT. It is important to use a unit that has real-time UVT analysis integrated into the dose calculation, to ensure that the required minimum dose is provided.

For more information, please contact your Atlantium representative.  
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