

CUSTOM SENSORS & TECHNOLOGY

A DIVISION OF CUSTOM SAMPLE SYSTEMS

ON-LINE CLEANING VALIDATION

Effective monitoring and control of residual materials during and after the cleaning of pharmaceutical or food & beverage processing equipment is a critical component of any cleaning validation procedure. As the costs associated with cleaning—such as remediation of cleaning agents and production downtime—continue to rise, optimizing the process has never been more important.

Custom Sensors & Technology's PX2+ Photometric Transmitter, when used with our specialized process flow cells and probes, delivers a real-time monitoring and control solution suitable for WFI, ultrafiltration, or CIP systems. The PX2+ supports one or two absorbance wavelength measurements across the 200–2400 nm range or fluorescence measurements from 250–700nm, enabling precise detection of trace residues throughout the entire cleaning cycle.

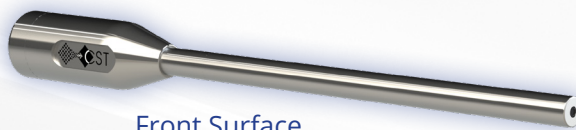
Turnaround time savings as high as 50% have been realized by some customers!

SAMPLE INTERFACE TO PROCESS STREAM

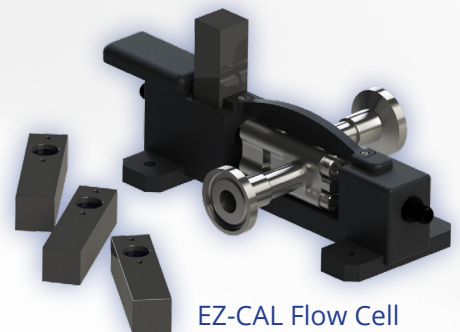
CST can offer either extractive sample flow cells or in situ probes that interface with the process fluids. The flow cells or probes can operate at high pressures and temperatures up to 327°C. Probe construction is typically 316SS and is supplied with silica or sapphire windows. Since fiber optics couple directly to the probe or flow cell, there is no concern with electrical components in contact with potentially explosive vapors or liquids. The flow cells and probes can be supplied with sanitary flanges which prevent potential contamination of the solution.



PX2+ Photometric Transmitter



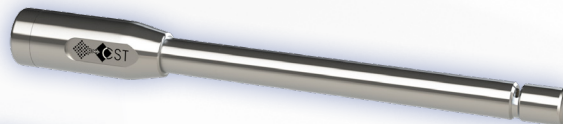
Front Surface Fluorescence Probe



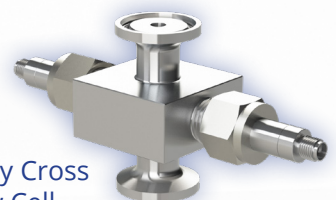
EZ-CAL Flow Cell



Long Path Length Flow Cell



In Situ Process Transmission Probe



Sanitary Cross Flow Cell

BENEFITS OF THE MONITORING SYSTEM

The top priority for our customers is implementing a control strategy that safeguards critical assets while increasing production efficiency. This is achieved by reducing cleaning time between product batches—without compromising cleanliness or compliance.

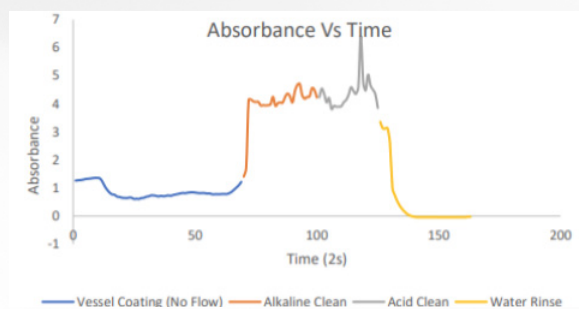
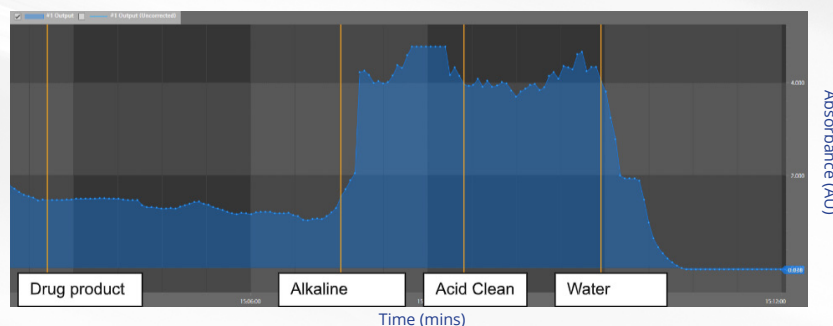
By integrating real-time monitoring solutions like the PX2+ Photometric Transmitter, customers can realize a range of operational and environmental benefits:

- **Reduced consumption of cleaning agents** such as methanol and high-purity water, including WFI
- **Lower waste volume**, decreasing the burden on waste treatment systems
- **Continuous, real-time monitoring** of rinse cycles to accurately determine end-of-cleaning
- **Simultaneous detection of multiple target residues** across a wide spectral range (200–2400 nm)
- **Effective monitoring of membrane filter cleaning**
- **Potential reduction in scale formation**, especially in brewery operations

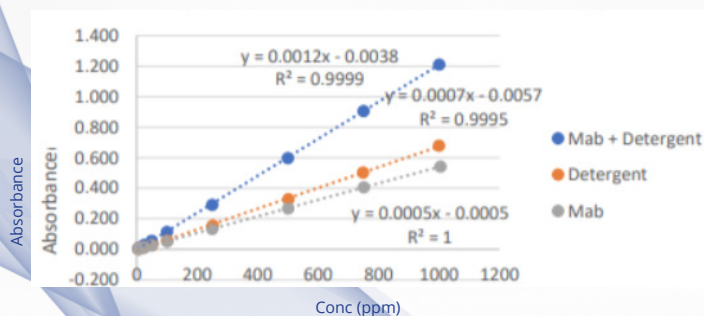
This control strategy not only ensures cleaning validation compliance but also drives meaningful cost savings and process optimization across manufacturing lines

REAL-TIME DATA FROM END-USER

Working with an industry partner, CST was able to utilize the PX2+ and Long Path Length Flow Cell to identify when the vessel was coated with drug product, rinsed with detergent, and sufficiently cleaned by the absorbance signal returning to a baseline of zero. CST was also able to measure the concentration of each component of the process.



Linearity Curves for mAV + Detergent



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