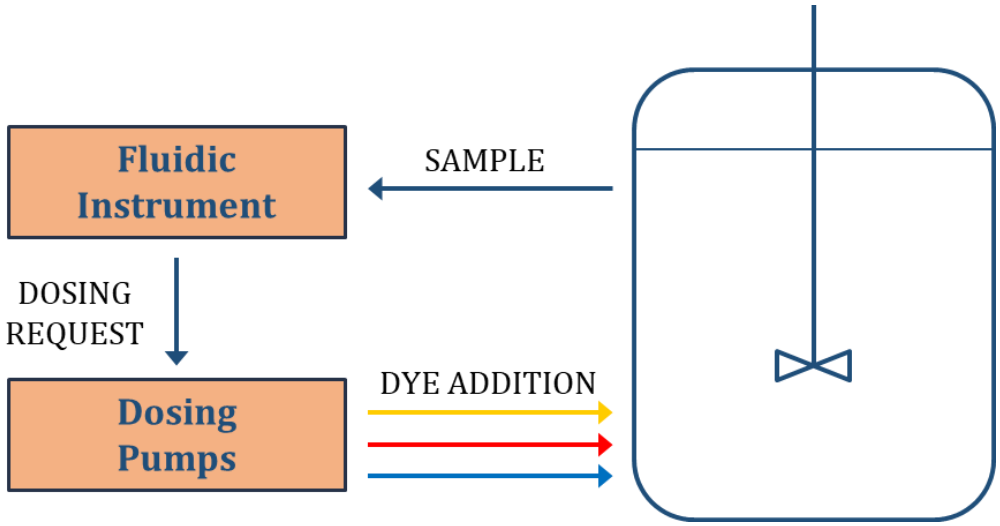
Application Note: On-line Dye Tank Monitoring

Introduction

In order to deliver consistent and high product quality, industrial dyeing processes require on-line monitoring of the dye bath color intensity and composition. An analyzer was developed to measure dye component intensities in a bath solution and initiate dosing of appropriate color components in response to observed differences from the standard color balance.

Principle

The FIAlab fluidic analyzer draws coloring solution from an industrial dye bath. The solution is routed through a series of narrow-path absorbance detectors where the of the solution color is measured. The results are subjected to multivariate data analysis to determine the proportions of the essential color components, and those are compared to a standard color balance. If deviations from the standard balance are observed, dosing of the appropriate color component stock solution(s) is triggered to maintain the desired balance.



Application benefits

Automation	→	On-line monitoring possible
Real-time operation	→	Immediate result availability

Experimental

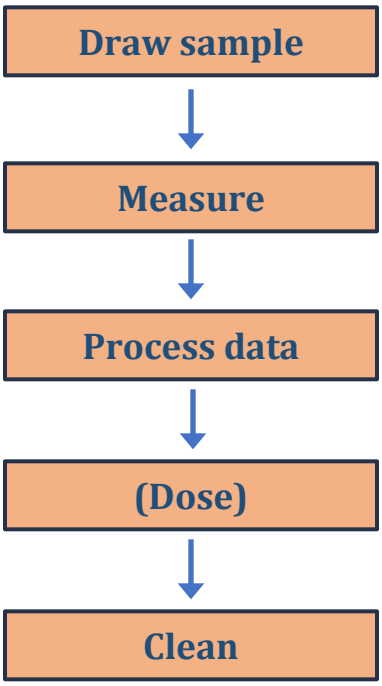
Instrument Configuration

Analyzer: FIAlab Process Analyzer

Detection: VIS (wide spectrum)
UV 280 nm

Ultra-short path flow cells

Measurement Sequence



Results

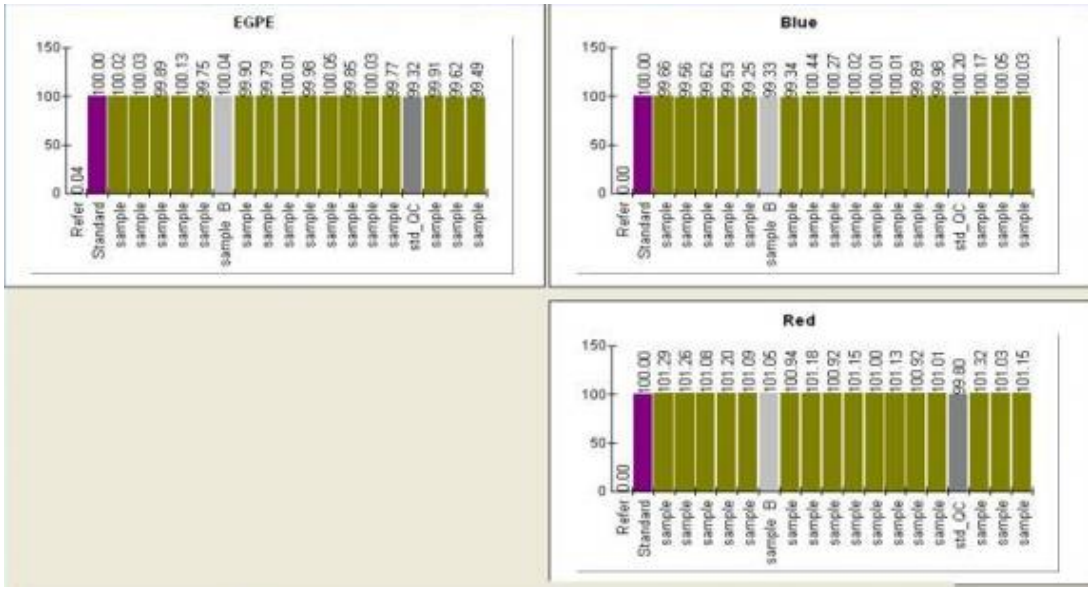


Figure 1 On-line monitoring of color components in an industrial dye bath. A QC standard is measured periodically to verify that the analyzer response remains within acceptance limits.

Conclusions

The FIAlab fluidic analyzer is capable of successful and reliable quantification of color components in an industrial dye tank. The setup solves the following obstacles for successful on-line measurements of such solutions:

- Accurate and reliable measurement of very highly colored (high optical density) solutions.
- Multivariate data analysis for accurate color component determination.
- Automated color component dosing when off-balance conditions are detected.