

# Cost Effective Analytical Solutions Optimize Chromatography & Purification Systems

## RESULTS

- Optimize Asset Utilization
- Minimize Panel Space and Power Consumption
- Higher Purity and Production Yields
- Improved Cleaning Validation



## BACKGROUND

Biopharmaceutical Chromatography Systems are designed for separating and purifying proteins and bio-engineered products. Flow systems are compact in design to maximize throughput. No dead legs in process pipe can exist since unswept areas are more challenging to completely clean as well as delaying product throughput. The systems must maintain a hygienic design. Wetted surface finish must be < 20 pinch Ra and material traceability is important to maintain system integrity.

## CHALLENGE

Analytical measurements play a critical role in the purification process. Conductivity is one of the determinants of when to start the collection process as well as when to end it. Tighter conductivity controls will increase purity yields. In addition, it may improve secondary collection processing steps. Conductivity is also a critical determining factor to validate the cleaning process. Often, sensors that require tees or larger

branches to ensure best installation practices may create half filled process pipes, which lead to lower conductivity values. The conductivity sensors must differentiate between CIP cleaning fluids and rinse water phases. The faster and more accurately the interface detection is determined, then the higher percentage of time the asset will be put into service. Typically, two conductivity sensors are used in the systems, one pre-filtration and one post-filtration.

pH measurement also plays an important role in the purification process, providing feedback control of buffer and effluent feed through the column. The system's wetted components must withstand Cleaned in Place (CIP) and Steamed in Place (SIP) cycles, so the pH sensor must be able to make accurate and stable pH measurements after the cleaning cycles.

Three analytical control points are included in most Chromatography Systems. The ability to package multiple measurement parameters in one common transmitter optimizes the system's foot print and minimizes power consumption requirements.

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## SOLUTION

The **PUR-SENSE™** Model 410VP Four Electrode Conductivity Sensor from Rosemount Analytical can accurately monitor the protein purification process. The conductivity sensors are optimized to accurately measure highly conductive solutions as well as low conductivity rinse water during cleaning phases.

Throughput is maximized by using a sensor designed to eliminate dead legs and unswept pipes. The Model 410 Conductivity Sensor installs directly into the process piping via triclamp, G 1-1/4", or Varivent process connections. The installation minimizes pressure drops so flow rates are not impeded. The compact design ensures that conductivity is accurately measured in CIP phases. This design also makes sure that the cleaning solutions make contact with all wetted components. The surface finish for the 410 sensor is better than 16 µinch Ra.

The sensors can also differentiate between CIP solutions and rinse water. The sensor is made with FDA

compliant materials and wetted surfaces have a better than 16 µinch Ra finish. Temperature compensation is achieved with a highly accurate, fast responding internal RTD.

The **PUR-SENSE™** Model 3800 Steam Sterilizable pH Sensor can accurately monitor buffers and effluent used in the protein purification process. The improved Accuglass® technology withstands frequent SIP cycles, which prolongs the sensor's life. The proprietary reference technology provides drift free pH performance, which leads to less frequent user interaction to keep the pH control loop within specifications

The Model 1057 Intelligent Transmitter works with the Models 410 and 3800. The 1057 allows any combination of three conductivity / pH sensor inputs, reducing cost and minimizing panel space. The 1057 has improved signal conditioning to allow a wider conductivity range with one sensor. The Model 1057 has four isolated current outputs.

## INSTRUMENTATION & SENSORS

### **PUR-SENSE Model 3800 Steam Sterilizable pH Sensor**

- Highly accurate pH sensor
- Improved reference technology minimizes drift
- Improved Accuglass technology withstands multiple SIP cycles
- Documented lot traceability on wetted components available



### **Model 1057 Three Input Transmitter**

- Large local operator interface
- Easy to use menu structure
- Improved signal conditioning
- Any combination of pH / Conductivity configurations available



### **PUR-SENSE Model 410 Four Electrode Conductivity Sensor**

- Highly accurate conductivity sensor
- Better than 16 micro inch Ra surface finish
- Compact design minimizes flow impedance
- Documented lot traceability on wetted components available



### **Emerson Process Management**

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