

# FMC Biopolymer reduces operating expenses more than 80% with PERpH-X™ sensors.

## RESULTS

- 80% Reduced Maintenance Cost
- \$200K Yearly OpEx Savings
- Measurement Deadtime reduced by 70%



## APPLICATION

pH in a Chemical Processing Plant

## CUSTOMER

FMC Biopolymers in Rockland, Maine, USA

## CHALLENGE

FMC makes ingredients for consumer products such as toothpaste, baking mixes, and other food products. The plant makes carrageenan out of seaweed using a sequence of chemical processing steps that starts with soaking the seaweed at 200°F. The processing tanks and lines are regularly subjected to both acid and base clean in place (CIP) solutions. pH measurement in the recirculation line of the modification tank is used to control acid addition and keep the pH in the range of 7.5 to 8. pH values in this range minimize downstream buildup on filters. Unfortunately, conventional pH electrodes were only lasting less than 1 week in this application, so FMC had installed a triple redundant system to make sure the pH reading is continuously available.

The process in the modification tank is a thick brown gel that can be difficult to remove completely from the pH sensor and tends to foul the reference junction, causing the sensor to become nonresponsive. Maintenance on the pH sensor included cleaning the sensor, replacing the glass electrode every week, replacing the reference electrode every 2 weeks, and replacing the pH assembly every 6 months. Every time the sensor was rebuilt, the pH reading required recalibration, which took an average of 30 minutes to complete.

Mike McNeil, E/I Planning Engineer at FMC had investigated several pH vendors but was still looking for a more reliable measurement. He



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[www.EmersonProcess.com/QBR](http://www.EmersonProcess.com/QBR)  
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estimated that 20 man-hours a week were required to keep the seven pH loops operating.

**SOLUTION**

Rosemount Analytical's PERpH-X model 3400HTVP sensor and loop powered transmitter model XMT were installed in May 2006 to run side by side with 3 sensors from another manufacturer to see if they could provide better results. FMC had been testing so many different pH products that it was quite simple to install a new test sensor. Paul Geilser of FMC said "we have tested everybody's pH probe over the last 15 years – we usually trash them within 24 hours." After 3 months of operation, FMC was amazed that the PERpH-X sensor was still working and only needed one rebuild during that entire time! Calibration time was reduced by over 70% because the sensor responded quickly to buffer solutions and did not need to be rechecked to verify operation. Reduced measurement lagtime is a key benefit that enables tighter control, prevents overshooting the pH target, and saves on chemical costs.

The PERpH-X sensor features a replaceable reference junction and a refillable reference electrolyte for extended service in difficult applications. These features work very nicely with the predictive diagnostics available in the XMT transmitter that allow the user to schedule preventive maintenance using PlantWeb® and AMS Device Manager. PlantWeb architecture consists of intelligent field devices, scalable platforms and integrated modular software, all working together to capture rich diagnostic data about the health of the device, as well as the process itself. The result is optimal plant performance by getting the right information to the right user, in time to make a difference. For more information on the PERpH-X sensors, go to [www.raihome.com/liquid](http://www.raihome.com/liquid)

**DIRECT SAVINGS CALCULATION**

Previous sensor brand expenses over 4 month operation  
 Glass: \$113/electrode /1week life x 16 weeks = \$1808  
 Reference: \$109/electrode / 2 week life x 16 weeks = \$872  
 Sensor Body: \$574/sensor x 6month life x 16 weeks = \$385  
**Total Material = 1808+872+385 = \$3065**  
 per measurement point

Emerson expenses over 4 months life of sensor  
 Glass: no replacement needed = \$0  
 Reference: \$60 reference kit (good for 5 charges) = \$60  
 Sensor : \$593 base sensor price = \$593  
**Total Material = 0+593+60 = \$653**  
 per measurement point

Original Cal time =  
 30 min x 3per week x 7 sensors = 10.5 man-hours  
 Sensor rebuild time = 9.5 man-hours  
 Total Cal and rebuild time 20 man-hours  
 New cal time = 5 min x 3 per week x 7 sensors = 1.75 man-hours  
**Calibration Time Savings of (10.5-1.75) ÷ 10.5 = 83%**  
**Labor cost = \$46/hr**

Original yearly expense = 3065 x 3 x 7 + 20 x 46 x 52 = \$112,205  
 New yearly expense = 653 x 3 x 7 + 1.75 x 46 x 52 = \$17,899  
 Material Savings = 79%  
 Labor Savings = 91%  
**Calculated Yearly Savings = 112,205 – 17,899 = \$94,306**

Separately, FMC estimated they were spending \$50K/year/sensor on the previous sensor and that they could cut that expense by two thirds with Rosemount Analytical sensors. This estimate includes other items that are not presented in this calculation.

**For 6 sensors, expenses would be cut from \$300K/yr to \$100K/yr.**

Emerson Process Management  
 Rosemount Analytical  
 Liquid Division  
 2400 Barranca Parkway  
 Irvine, CA 92606  
 T 949.757.8500  
 T 800.854.8257  
 F 949.474.7250

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