

Biotech Facility Increases Throughput on Fermentation Vessel with Electronic Remote Sensor Technology

RESULTS

- Improved batch quality
- Increased enzyme production on fermentation vessels
- Decreased operations costs

APPLICATION

Level measurement on enzyme fermentation vessel

APPLICATION CHARACTERISTICS

- 60 ft. vessel (18 m)
- Process agitation
- Sterile environment

CUSTOMER

Agricultural Enzyme Facility - USA

CHALLENGE

A biotech facility located in the Midwest was experiencing reoccurring problems with a vessel used for enzyme fermentation. In particular, the vessel was producing inconsistent batches.

These issues stemmed from the inability to get a repeatable level measurement on the vessel. Measurement errors often exceeded 3-5% of span with frequent spiking. Additionally, time response was extremely slow and was suboptimal for level control. Engineers at the facility had chosen to use a pressure-based solution to measure the level in the vessel because of agitators in the tank that would turn the process over in 3-5 minutes. A differential pressure transmitter with a remote diaphragm seal was installed on the bottom of the vessel. Impulse piping with a pneumatic repeater went from the top of the vessel to the low-pressure side of the differential pressure transmitter. Ultimately, the use of the mechanical repeater on such a tall vessel was the cause of the 3-5% measurement errors.



“This vessel went from being our worst performing to our best performing”

Plant Instrument Technician

The lack of a repeatable level measurement in the vessel continued to be a source of frustration. Because of this, engineers were unable to calculate the yield of the fermentor. Engineers also had to back-check and forward-check all measurements in the process, resulting in increased operations costs. The level measurement in the fermentor would never match with the rest of the checks. Because of this, achieving consistent batch quality and throughput was difficult to achieve.

SOLUTION

The biotech facility updated the existing installation on the fermentor with a 3051S Electronic Remote Sensor system. The 3051S ERS system consisted of two pressure sensors linked together digitally. Differential Pressure was computed in one of the two sensors and sent back to the control system via a 4-20 mA / HART signal. This digital DP architecture allowed for the elimination of the impulse piping and mechanical repeater which was proving to be the cause of many of the problems.

Engineers were able to easily install the 3051S ERS system in the same manner as a traditional pressure transmitter. Once the measurement was up and running, engineers noticed a drastic improvement in time response, and they were able to accurately and quickly track changes in the level of the tank that were previously unnoticed. Additionally, engineers estimate that the accuracy of the measurement improved from 3-5% to less than 0.5%. By consistently being able to measure the level in the vessel, the facility now is able to produce more enzymes in the fermentors. An instrument technician at the facility stated, "This application used to be our biggest headache, but now the fermentor is used as our first choice depending on the quality of product needed."



Rosemount 3051S ERS™ System

RESOURCES

Emerson Process Management - Life Sciences Industry

<http://www.emersonprocess.com/solutions/lifesciences/>

Rosemount 3051S Series

<http://www.emersonprocess.com/rosemount/products/pressure/m3051s.html>

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