

METTLER TOLEDO APPLICATION NOTE

pH Control In Starch Slurry

BACKGROUND

Acid or base modification of corn starch is used to obtain semi-finished products for the glue industry, the paper industry, and the packing industry. Accurate pH measurement in each of these industries leads to better production control.

THE

PROCESS

Duration of the batch process is 8 hours under the following conditions:

- pH control with HCl and NaOH
- pH range for acid modification pH 2...7 and for base modification pH 7 ... 11
- Temperature range 45 ... 50 °C
- Slightly under pressure
- High viscosity
- Vessel material: Polypropylene or special duplex steel (high chlorine content)
- Batch cleaning with high pressure tap water at 50 °C

INSTRUMENTATION

The major difficulties with this application concern the high maintenance requirements: manual cleaning every hour and short calibration intervals due to drifting signals caused by unstable reference potentials.

Experience with conventional liquid-filled and gel pH sensors from competitors showed that their

sensors did not have a long lifetime due to scaling (without cleaning); the minimal electrolyte outflow of the gel-type electrode also caused drifting problems. Both competitors' sensors lasted only between one week and two months.

Installation of an in-line liquid-filled pH measuring system with automatic cleaning of the electrode by flushing with water (20 °C) at user-determined intervals reduced maintenance of the sensor to a minimum. Furthermore, by using a liquid-filled sensor in combination with overpressure (2 bar), drifting of the reference electrode is avoided. Because of this, the lifetime of the sensor can increase to ten months! We recommend the InPro[®] 2000 pH electrode in conjunction with an InTrac[®] 776-SL retractable housing. The 2100 pH analyzer is compatible with all Mettler-Toledo pH sensors, including the InPro 2000.

The above system will ensure increased production control with no production stoppage, minimal maintenance, and extended sensor lifetime.

SPECIAL INFORMATION

Other possible applications in starch industry are:

- Food processing
- Glucose molasses
- Fermentation
- Wastewater

PRODUCTS

2100 pH Analyzer

- Detachable front panel and plug-in terminals for ease of installation
- All functions accessible through the keypad for increased ease of use
- Continuous sensor and transmitter diagnostics to monitor performance
- FM certification for Class I, Div 1 & 2 Environments and CSA General Purpose Approval
- 3 year warranty

InPro[®] 2000 Combination pH Electrode

- Refillable for increased electrode lifetime and reduced maintenance
- Liquid-fill design ensures fast response, highest accuracy and reliability
- Silver ion trap to minimize electrode contamination
- Integral RTD for higher measurement accuracy
- Rugged IP67 rated quick connect VarioPin connector

InTrac[®] 776-SL Retractable Housing

- Rugged 316L SS or PVDF construction for maximum chemical resistance
- Flushing chamber for automatic cleaning and calibration reduces overall system downtime
- Patented immersion tube design isolates the sensor on retraction and guarantees complete separation of the process from the outside environment.
- Safety interlocks prevent sensor removal from housing while in measuring position
- Manual or pneumatic operation