

Process Controls SalesNet

pH Applications

Improving pH Measurements in Milk Processing: On-Line Capabilities Eliminate Grab-Sampling

Background

Engineers need to know the physical properties of products so that they can design appropriate equipment and processes for their manufacture. Operators must have accurate and reliable physical property data to ensure product quality and process efficiency.

Measurements based on reliable and accurate data are important in any production, but in food processing, measurements must be taken under sanitary conditions with sanitary instrumentation.

Following is one example of how sanitary Durafet® pH electrodes can improve your on-line measurements and ensure process quality.

The process

Certain physical properties of milk, such as color and viscosity, affect consumer acceptance. Other physical properties—such as specific gravity, surface tension and pH—determine the validity of the process.

Milk pasteurization is based on a heat treating process. This thermal processing determines the milk's acceptability for the consumer. However, there are other measurements that determine milk quality.

Raw cow's milk is slightly acidic, normally ranging in pH from 6.3 to 6.9. Mixed herd milk that is delivered for processing is usually pH 6.6, ranging from 6.4 to 6.8. Microbial souring can be related to as slight a pH change as 0.02 to 0.05. Early detection of a pH change can provide useful processing information and ensure the quality of the milk throughout

processing.

Results of titrating milk with base to obtain a titratable acidity value have been used in the past as a quality control measurement.

Because of the tighter pH control, there is less waste and certifiable quality measurements. This enables you to know exactly the quality measurement of your processed milk.

The pH of raw milk is below the end point of phenolphthalein (pH 8.3). Base is used to change the pH from 6.6 to the 8.3 end point. The titration volume is proportional to the buffering capacity of the components of the milk.

Advanced in-line process control

Off-line sampling is slow, unresponsive, cumbersome and costly. Now you can perform in-line sampling and on-line pH analysis with sanitary Durafet pH electrodes. The solid-state Ion-sensitive Field Effect Transistor (ISFET) sensor is virtually unbreakable and its design meets sanitary standards for the food and dairy industry. Sanitary Durafet electrodes are accurate in a wide pH range (0-14), providing reliable measurements throughout the pasteurization process.

In-line sampling and on-line analysis enables you to correct process drift and protect product quality. The in-line sanitary Durafet electrode increases productivity, ensures product quality, saves time and increases process profitability.

On-line pH analysis

Now you can perform pH analysis on line without disrupting your process for time-consuming pH lab analysis. Durafet electrodes remain accurate under the most demanding conditions over a wide range of temperatures (-10° to +110°C). Sanitary Durafet electrodes feature a fast-responding temperature sensor for better control of food and dairy processes.

Simple solution

Reliable sanitary Durafet pH electrodes provide a simple solution to a complex technology challenge.

Durafet pH electrodes are a series of rugged pH electrodes, featuring a fast responding, ion-sensitive, field-effect transistor that provides increased system accuracy, stability and reliability. The Sanitary Durafet pH electrode employs the ISFET technology in a sanitary design that meets 3 A Sanitary standards and can be mounted in line to provide on-line pH measurements. This capability increases productivity, speeds up control, improves product quality and lowers installed costs.

The traditional glass membrane is fragile and delicate. When it breaks, it is costly and time consuming to replace. A solid-state sensor makes Durafet electrodes virtually unbreakable. Longer electrode life not only adds up to lower maintenance costs but also provides increased reliability for even the most critical processes.

Six models of the Sanitary Durafet electrode range from 1.5-inch to 2-inch to 3-inch flange sizes with either deep or shallow immersion lengths.

Where Durafet helps your process the most

Tomorrow's standards that Honeywell is setting today include:

- The solid-state ISFET sensor is virtually unbreakable.
- No sodium ion error or ORP interference.
- Built-in counter electrode increases measurement stability.
- The electrode meets sanitary standards for the food and dairy industry and is authorized to display the 3A symbol.
- A complete selection of housings for in-line or immersion mounting is offered.

The in-line Sanitary Durafet pH electrode is another example of powerful Honeywell technology, giving you a simple solution that increases productivity, ensures product quality, saves time and increases process profitability.

Recommended equipment:

- 7794 Sanitary Durafet pH electrode mounting
- 9782 pH Analyzer/Controller