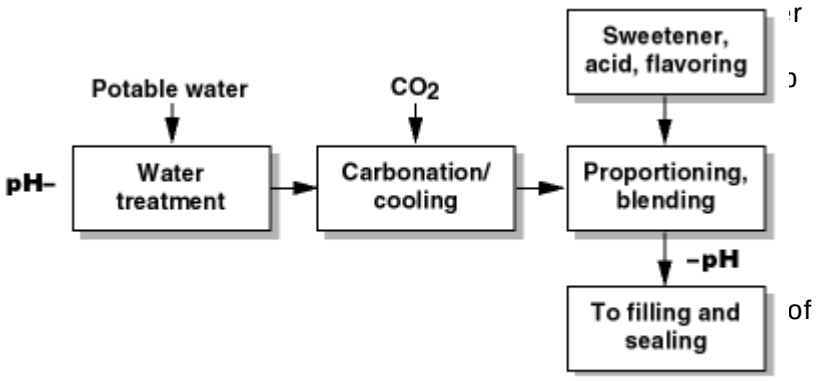
Process Controls SalesNet
pH Applications

Measurements in Soft Drink and Juice Processing: Continuous Monitoring Essential to Product Uniformity

pH Measurements in Soft Drink and Juice Processing Water Treatment

Background
Water quality requirements for soft drinks are more stringent than for typical drinking water supplies. The seasonal variations found in many potable water supplies cannot be tolerated for a bottled beverage. The appearance and taste must be of consistently high quality after mixing with the other ingredients, and the beverage must have very good stability over a long shelf life.

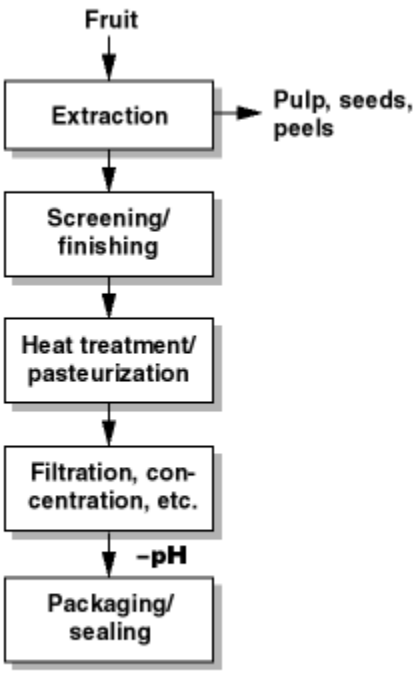


soft drink processing

These may include: chemical addition (typically lime and alum) for thorough coagulation and flocculation, clarification, disinfection, sand filtration, activated carbon, fine filtration, and reverse osmosis. pH control is used to optimize the initial chemical additions in water treatment and also for the pretreatment for reverse osmosis membranes.

Acidity and pH of beverages
Acid in soft drinks imparts several desirable qualities. To the flavor, it adds tartness or sourness, modifies the sweetness of sugar and enhances thirst-quenching characteristics. Citric acid is widely used to sharpen the fruitiness of ginger ale and fruit flavored drinks. Phosphoric acid provides the flat sourness of colas, root beers and other nonfruit drinks.

As a mild preservative, acid extends the beverage shelf life. Some acids have more specific purposes. Ascorbic acid is frequently used in fruit juices as an anti-oxidant to preserve flavor/color. The preservative effectiveness of benzoic acid, a very weak acid itself, is enhanced by the lower pH developed by the stronger acids.



juice processing

In juice processing, the contents of the fruit are extracted by squeezing or crushing. The pulp, seeds and peels are removed with screens in a finishing operation. The juice is then heat treated, filtered/concentrated as required by the particular product.

Several factors can affect acidity—fruit varieties, fertilizers, growing season conditions and ripeness—so monitoring pH is essential to control product uniformity.

Thus, the on-line measurement of pH provides continuous monitoring of free acidity, one of the important characteristics of soft drink and juice products.

pH electrode requirements

pH electrodes must meet sanitary requirements for direct contact with food. The non-glass, Durafet® electrode is a major breakthrough in the availability of pH measurement in this type of application.

Based on new, Ion-sensitive, Field-effect Transistor (ISFET) technology, it eliminates the fragile glass membrane, the associated risk of breakage and liabilities of glass contamination of product and costly downtime.

The Sanitary Durafet electrode design complies with 3-A sanitary standards and is authorized to use the 3-A symbol.

In addition, the Durafet electrode signal level eliminates the high impedance circuitry and vulnerability to insulation breakdown of glass membrane electrode signals. They have no oxidation-reduction potential (ORP) interference and negligible sodium ion error at high pH. They have exceptionally fast pH response—typically within 1 second. This assures close monitoring and control.

Long life of the solid state pH sensor is complemented by a reference electrode section with flush junction and gel electrolyte. The flush junction resists clogging and eases cleaning. No pressurization of the reference electrode is required. The probe also includes an integral temperature compensator to provide a compensated pH signal compatible with a variety of instrumentation.

Sanitary Durafet electrodes can be used with the full line of Honeywell analyzers and two-wire transmitters. In addition, adapter modules are available to electronically interface the Durafet electrode to existing analyzers of nearly any manufacturer.

Tomorrow's standards that Honeywell is setting today with the Durafet pH electrode include:

- The solid-state ISFET sensor is virtually unbreakable.
- Response has no sodium ion error nor ORP interference.
- Flush reference junction and gel electrolyte reduce maintenance costs and increase electrode life.

- Built-in counter electrode improves measurement stability.
- The electrode easily retrofits to existing systems with sanitary flange and choice of insertion depth.

The Durafet electrode is another example of Honeywell's powerful 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

[**Return to Top**] [**Return to Applications Homepage**]