

# METTLER TOLEDO APPLICATION NOTE

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## pH Measurement In Yogurt Processing

### THE PROCESS

Milk is heated to 194 °F, then cooled down to 113 °F, and finally inoculated with bacteria. After approximately 4 hours of fermentation, the milk contains 0.8 - 1% lactic acid and has a pH value of 4.4 - 4.6. Fermentation is then stopped by cooling the tank down to 41 °F. After each process run, the tank is cleaned with an aqueous solution of 1% NaOH followed by 1% HNO<sub>3</sub> and hot water. The pH value is used to control this entire process.

Due to the required continuous batch processing, the pH electrode must be able to withstand the cleaning process, showing a drift of less than 0.1 pH unit/ week.

### INSTRUMENTATION

When measuring pH in dairy products, the reference diaphragm tends to be contaminated by the reaction between the albumins of the milk and AgCl/ KCl originating from the reference system in the pH electrode. The resulting sparingly soluble compounds precipitate and clog the diaphragm, leading to substantial measurement errors. Therefore, selecting the appropriate pH electrode that can withstand harsh cleaning and resist diaphragm contamination is critical to accurate measurement. The InPro® 2000 pH electrode

with FRISCOLYT-B™ electrolyte is recommended. The InPro 2000 has a silver ion barrier in the reference system which prevents the formation of the precipitates which can clog the diaphragm. This electrode is recommended for use with the InFit® 764-50CIP stationary pressurizable housing and Model 2100 pH analyzer. Applying an overpressure on the housing ensures an outflow of electrolyte, keeping the diaphragm clean and clog-free.

#### *Calibration*

Calibrate the measuring assembly with buffer solution pH 7 and pH 4 according to the transmitter instructions. Calibration should be repeated weekly prior to a new production run.

#### *Maintenance*

When not in use, store the electrode in reference electrolyte FRISCOLYT-B. During tank cleaning and overnight, the pH housing remains mounted in the tank. Every two months the ceramic diaphragm should be cleaned by immersing it in METTLER TOLEDO diaphragm cleaner until the diaphragm becomes white again (1 – 3 hours). Replace the electrolyte and rehydrate by soaking the electrode in the reference electrolyte for 15 minutes before recalibration.

## 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<sup>®</sup> 2000 Combination pH Electrode

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

### InFit<sup>®</sup> 764-50CIP Stationary Housing

- For highest standards of hygiene
- EHEDG and 3A Certificate for CIP Applications
- Ease of installation provides reduced maintenance
- In-situ sterilizable for hygienic applications