

°C/°F pH



pH / Temperature Meter for Yogurt

with Application Specific Probe



Application Importance

Monitoring pH is crucial in producing consistent, quality yogurt. Yogurt is made by the fermentation of milk with live bacterial cultures. Following pasteurization and compositional adjustment, milk is homogenized for a consistent texture, heated to the desired thickness, and cooled before inoculation. Most yogurt is inoculated with a starter culture consisting of *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. Once the live culture is added, the mixture of milk and bacteria is incubated, allowing for fermentation of lactose to lactic acid. As lactic acid is produced, there is a correlating drop in pH. Due to the more acidic mixture, the casein protein in milk coagulates and precipitates out, thickening the milk into a yogurt-like texture.

Yogurt producers cease incubation once a specific pH level is reached. Most producers have a set point between pH 4.0 and 4.6 in which fermentation is stopped by rapid

cooling. The amount of lactic acid present at this pH level is ideal for yogurt, giving it the characteristic tartness, aiding in thickening, and acting as a preservative against undesirable strains of bacteria.

By verifying that fermentation continues to a predetermined pH endpoint, yogurt producers can ensure their products remain consistent in terms of flavor, aroma, and texture. A deviation from the predetermined pH can lead to a reduced shelf life of yogurt or create a product that is too bitter or tart. Syneresis is the separation of liquid, in this case whey, from the milk solids; this can occur if fermentation is stopped too early or too late, resulting in yogurt that is respectively too alkaline or too acidic. Consumers expect yogurt to remain texturally consistent, so ensuring fermentation is stopped at the appropriate pH is vital to consumer perception.



HI99164

pH / Temperature Meter for Yogurt

with Application Specific Probe

- Waterproof
- Application specific electrode
- Automatic Temperature Compensation
- Automatic one or two-point calibration
- Multi-level LCD display
- On-screen tutorial for calibration and set up
- Stability indicator for accurate data recording
- Battery Error Prevention System
- Battery life displayed on startup
- Supplied as a complete kit

The Hanna Instruments HI99164 is a durable, waterproof, and portable pH and temperature meter designed specifically for yogurt analysis. Automatic calibration is done at one or two points with two sets of buffers. All calibration and measurement readings are automatically compensated for temperature measurements. The split-level LCD displays both pH and temperature readings, along with indicators for reading stability, battery percentage, and calibration instructions.



Calibrate and measure samples right in the case

Our custom carrying case features a beaker holder for calibration on the production floor.

On-screen Features



- **Temperature**
 - °C and °F measurement modes



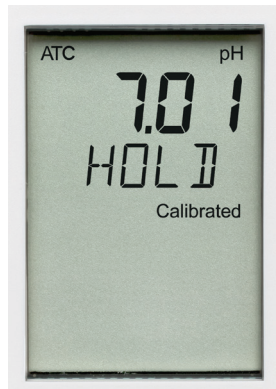
- **Buffer sets**
 - Calibrate to standard (pH 4.01, pH 7.01, pH 10.01) or NIST (pH 4.01, pH 6.86, pH 9.18) buffers



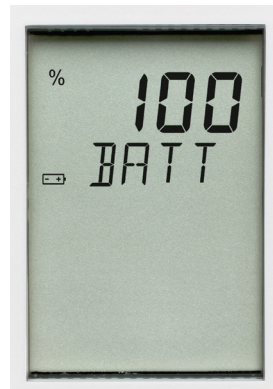
- **Calibration prompts**
 - On-screen prompts during the calibration process



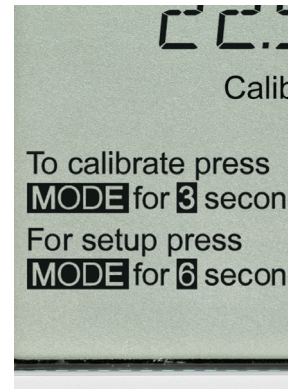
- **Stability indicator**
 - "Not Stable" tag disappears when the reading is stable for accurate data recording



- **Freeze readings**
 - Press the SET/HOLD button to hold readings on the display



- **Battery percentage**
 - Battery percentage is displayed at startup



- **On-screen guides**
 - On-screen quick guides for entering calibration and set up

Specifications

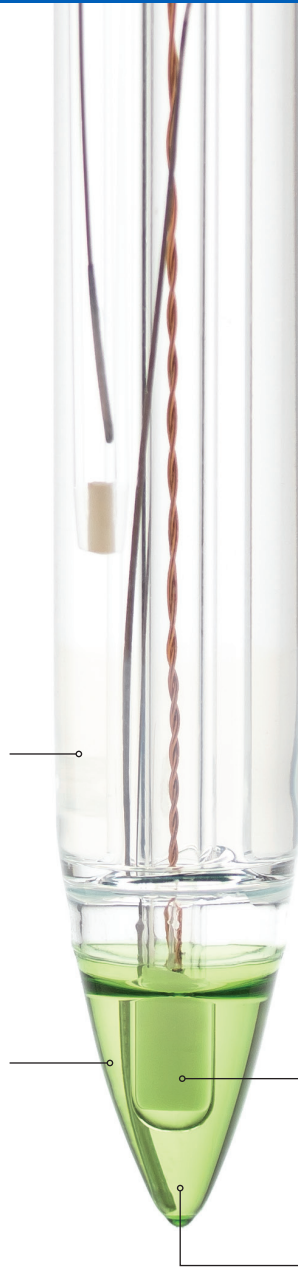
pH	Range*	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.02 pH
	Calibration	automatic, one or two-point calibration with two sets of standard buffers (standard pH 4.01, 7.01, 10.01 or NIST pH 4.01, 6.86, 9.18)
	Temperature Compensation	automatic from -5.0 to 105.0°C (23 to 221°F)
Temperature	Range*	-5.0 to 105.0°C / 23.0 to 221.0°F
	Resolution	0.1°C/0.1°F
	Accuracy	±0.5°C (up to 60°C); ±1.0°C (outside) / ±1°F (up to 140°F); ±2.0°F (outside)
Additional Specifications	Probe (included)	FC213D pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
	Battery Type/Life	1.5V AAA (3) / approximately 1200 hours of continuous use
	Auto-off	auto-off after 8 minutes of non-use
	Environment	0 to 50°C (32 to 122°F); RH max. 100%
	Dimensions / Weight	152 x 58 x 30 mm (6.0 x 2.3 x 1.2") / 205 g (7.2 oz)

* Limits will be reduced to actual sensor limits

FC213D pH / Temperature Probe for Yogurt

- Glass body
- Conic glass tip
- Low temperature glass
- Open Junction reference
- Built-in temperature sensor

- **Glass body**
 - The glass body of the FC213D allows standards and samples to more quickly reach thermal equilibrium while also providing chemical resistance.
- **Low temperature glass**
 - The FC213D electrode uses Low Temperature (LT) glass for the sensing bulb. The LT glass tip is a lower resistance glass formulation. As the temperature of the sensing glass decreases, the resistance of the LT glass will increase approaching that of standard glass at ambient temperatures. The FC213D is suitable to use with samples that measure from 0 to 50°C.



- **Viscolene electrolyte**
 - The viscolene electrolyte offers a hard gel interface between the inner electrode components and the sample being measured. The electrolyte is silver-free for use in yogurt and is maintenance-free.
- **Open junction reference**
 - Clogging of the reference junction is a common challenge faced by yogurt producers as the milk solids and proteins can easily build up on the electrode. The open junction design of the FC213D resists clogging and continues to provide accurate, stable readings.
- **Built-in temperature sensor**
 - A thermistor temperature sensor is in the tip of the indicating pH electrode. A temperature sensor should be as close as possible to the indicating pH bulb in order to compensate for variations in temperature.
- **Conic tip shape**
 - This design allows for penetration into semisolids and emulsions for the direct measurement of pH in yogurt products.

Specifications

Description	pre-amplified pH / temperature probe
Reference	double
Junction	open
Electrolyte	viscolene
Max Pressure	0.1 bar
Range	pH: 0 to 12
Recommended Operating Temperature	0 to 50°C (32 to 122°F)
Tip /Shape	conic
Temperature Sensor	yes
Amplifier	yes
Body Material	glass
Cable	coaxial; 1 m (3.3')
Connection	DIN



HI99164 includes:



FC213D
pre-amplified pH
probe with internal
temperature sensor



100 mL plastic
beaker



HI70004
pH 4.01 buffer
solution sachet



HI70007
pH 7.01 buffer
solution sachet



HI700643
electrode cleaning
and disinfection
solution for yogurt
products sachet (2)



1.5V AAA batteries
(3)



instruction manual
and visual quick
start guide



rugged carrying
case with custom
insert

Accessories

Code	Description
FC213D	FC213D pre-amplified pH probe with internal temperature sensor, DIN connector and 1 m (3.3') cable (included)
HI70004P	pH 4.01 buffer solution, 20 mL sachets (25)
HI7004L	pH 4.01 buffer solution, 500 mL bottle
HI70007P	pH 7.01 buffer solution, 20 mL sachets (25)
HI7007L	pH 7.01 buffer solution, 500 mL bottle
HI700643P	electrode cleaning and disinfection solution for yogurt products, 20 mL sachets (25)
HI70643L	electrode cleaning and disinfection solution for yogurt products, 500 mL bottle
HI70300M	electrode storage solution, 230 mL bottle
HI710023	shockproof boot (orange)
HI710024	shockproof boot (blue)
HI98501	Checktemp® digital thermometer



HI98501
Checktemp® digital
thermometer



HI70643L
electrode cleaning and
disinfection solution for
yogurt products, 500 mL
bottle



HI710023
shockproof rubber
boot (orange)



HI710024
shockproof rubber
boot (blue)