

IP67 | Waterproof



## Food Quality pH Meters

Five models to measure the pH and temperature of food, milk, meat, yogurt and cheese.





# Food Quality pH Meters

## Five models designed for food professionals

Hanna food quality pH meters are rugged and portable with the performance and features of a benchtop. Five models are available to measure food, milk, meat, yogurt and cheese. Each model is supplied with an application specific electrode and cleaning solutions. These waterproof meters comply to IP67 standards and can be easily operated with one hand.



### Backlit Graphic LCD Display

These meters feature a backlit graphic LCD with on-screen help. The graphic display allows for the use of virtual keys to provide for an intuitive user interface.

### Waterproof Protection

The meter is enclosed in an IP67 rated waterproof casing and can withstand immersion in water at a depth of 1 m for up to 30 minutes.

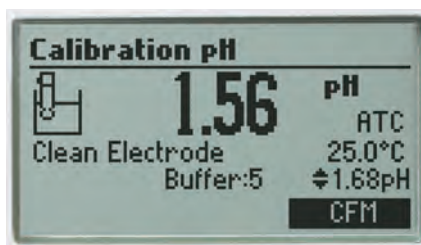


### Quick Connect Probe

Each meter features an application specific pH/temperature probe with a quick connect DIN connector to make attaching and removing the probe simple and easy.

### Calibration Timeout

Alerts when calibration is due at a specified interval.

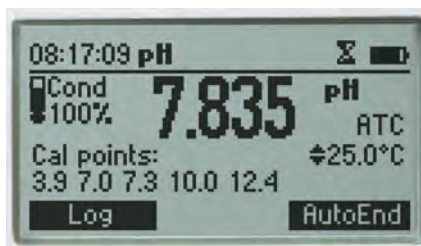


### pH Calibration

Choose from seven standard pH buffers and five custom values to obtain up to five point calibration and achieve high precision readings with a 0.001 pH resolution and a pH accuracy of  $\pm 0.002$ .

### Enhanced Calibration

An "out of calibration range" warning can be engaged to keep the user informed of the current calibration and help to avoid performing measurements that are out of the bracketed range.



### CAL Check™

Hanna's CAL Check™ maintains a history of past calibrations and monitors the pH electrode and buffers during subsequent calibrations for any signs of wide variances due to a dirty or broken electrode or contaminated pH buffers. During calibration, users are alerted to problems should they occur. After calibration, the electrode's overall condition is displayed as a percentage.



### GLP

Comprehensive GLP functions are directly accessible by pressing the GLP key. Calibration data, including date, time and calibration values are stored with logged data for retrieval at a later time.



### Data Logging

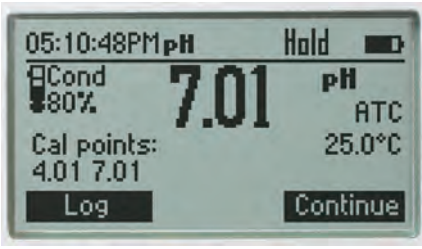
The log-on-demand feature allows users to store up to 200 samples that can be later transferred to a PC with the HI920015 USB cable and HI92000 software.

### Automatic Temperature Compensation

pH sensors incorporate a built-in temperature sensor in the tip of the electrode for a fast and accurate temperature compensated value.

### Intuitive Keypad

The fitted rubber keypad has dedicated keys for many important and often used functions. These meters also feature two virtual soft keys that navigate the user through setup and logging of data. The interface is intuitive for any user's level of experience.



### Auto Hold

Pressing AutoEnd during measurement will automatically hold the first stable reading on the display.



### Dedicated Help Key

Contextual help is always available through a dedicated "HELP" key. Clear tutorial messages and directions are available on-screen to quickly and easily guide users through setup and calibration. The help information displayed is relative to the setting/option being viewed.



### Setup Screen

Our extensive setup screen features a host of configurable options such as time, date, temperature units and language for help screens and guides.



### PC Connectivity

Logged data can be transferred to a Windows compatible PC with the included HI920015 micro USB cable and HI92000 software.

### Long Battery Life

The display of the meter has a battery icon indicator to show the remaining power. The meter uses four 1.5V AA batteries that provide up to 200 hours of battery life.



### Supplied Complete in a Rugged Custom Carrying Case

Each meter is supplied complete with sensor, calibration and cleaning solutions, beakers, PC software and connection cable, instruction manual, quick start guide and batteries in a rugged, custom carrying case. The inside compartment of the carrying case is thermoformed to securely hold and protect all of the components.

### General Specifications

|                           |                          |   |
|---------------------------|--------------------------|---|
| pH*                       | Range                    | -2.0 to 20.0 pH; -2.00 to 20.00 pH; -2.000 to 20.000 pH   |
|                           | Resolution               | 0.1 pH; 0.01 pH; 0.001 pH   |
|                           | Accuracy                 | ±0.1 pH; ±0.01 pH; ±0.002 pH  |
|                           | Calibration              | up to five-point calibration, seven standard buffers available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) and five custom buffers |
|                           | Temperature Compensation | automatic or manual from -20.0 to 120.0°C (-4.0 to 248.0°F)   |
| mV                        | Range                    | ±2000 mV  |
|                           | Resolution               | 0.1 mV  |
|                           | Accuracy                 | ±0.2 mV   |
|                           | Relative mV Offset Range | ±2000 mV  |
| Temperature*              | Range                    | -20.0 to 120.0 °C (-4.0 to 248.0°F)   |
|                           | Resolution               | 0.1°C (0.1°F)   |
|                           | Accuracy                 | ±0.4°C (±0.8°F) (excluding probe error)   |
| Additional Specifications | pH Probe                 | varies by model   |
|                           | Slope Calibration        | from 80 to 110%   |
|                           | Log-on-demand            | Up to 200 samples (100 pH, 100 mV)  |
|                           | PC Connection            | opto-isolated USB with HI92000 software and micro USB cable   |
|                           | Input Impedance          | 10 <sup>12</sup> Ω  |
|                           | Battery Type / Life      | 1.5V AA batteries (4) / approximately 200 hours of continuous use without backlight (50 hours with backlight)                       |
|                           | Auto-off                 | user selectable: 5, 10, 30, 60 min, disabled  |
|                           | Environment              | 0 to 50°C (32 to 122°F); RH 100% IP67   |
|                           | Dimensions / Weight      | 185 x 93 x 35.2 mm (7.3 x 3.6 x 1.4") / 400 g (14.2 oz.)  |

\* Limits will be reduced to actual probe/sensor limits.

HI98165

## pH / Temperature Meter for Cheese

HI98165 is a professional portable pH and temperature meter with a probe designed specifically for pH measurement in cheese.

- **Waterproof**
  - IP67 rated waterproof, rugged enclosure
- **CAL Check™**
  - Alerts users to problems during calibration including dirty/broken electrode, contaminated buffer and overall probe condition
- **Automatic or manual temperature compensation**
  - pH sensors incorporate a built-in temperature sensor
- **Calibration**
  - Up to a five-point calibration with seven standard buffers and five custom buffers
- **Approximately 200 hour battery life**
  - Powered by (4) 1.5V AA batteries
- **Clear display**
  - Dot matrix display with multifunction virtual keys
- **Auto hold**
  - Automatically holds the first stable reading on the display
- **Calibration timeout**
  - Alerts when calibration is due at a specified interval
- **Connectivity**
  - PC connectivity via opto-isolated micro-USB with HI92000 software
- **GLP**
  - GLP data provides data from previous calibration to ensure Good Laboratory Practices are met
- **Intuitive keypad**
  - Important and often used functions such as GLP information, help, range, calibration and backlight have a dedicated button
- **Supplied complete**
  - Each meter is supplied complete with sensor, calibration and cleaning solutions, beakers, PC software and connection cable, instruction manual, quick start guide and batteries in a rugged, custom carrying case



FC2423

## pH / Temperature Probe for Cheese

FC2423 electrode has a stainless steel sheath and conical tip to ensure quick, easy measurements and fast response. FC2423 pH electrode features a built-in temperature sensor and is ideal for measurements in semi-solid samples such as cheeses.

- **Low temperature glass**
  - The FC2423 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 FC2423 is suitable to use with samples that measure from 0 to 50°C.
- **AISI 316 stainless steel body**
  - The metal body offers durability in the production facility and can withstand chloride concentrations that cause corrosion in other types of alloys.
- **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 cheese products and is maintenance-free.
- **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 solids, semi solids, and emulsions for the direct measurement of pH in cheese products.



## Application Importance

pH is an essential measurement throughout the entire cheesemaking process. From the initial measurements of incoming milk to the final measurements of ripened cheese, pH is the most important parameter for cheese quality and safety control.

Acidification of milk begins with the addition of bacterial culture and rennet. The bacteria consume lactose and create lactic acid as a byproduct of fermentation, lowering the pH of the milk. Once the milk reaches a particular pH, the rennet is added. The enzymes in rennet help to speed up curdling and create a firmer substance. For cheesemakers that dilute their rennet, the pH of the dilution water is also critical; water that is near pH 7 or higher can deactivate the rennet, causing problems with coagulation.

Once the curds are cut, stirred, and cooked, the liquid whey must be drained. The pH of whey at draining directly affects the composition and texture of the final cheese product. Whey that has a relatively high pH contributes to higher levels of calcium and phosphate and results in a stronger curd. Typical pH levels at draining can vary depending on the type of cheese; for example, Swiss cheese is drained between pH 6.3 and 6.5 while Cheddar cheese is drained between pH 6.0 and 6.2.

The next stages of milling and salting are affected by pH as well. During milling, curds are cut into smaller pieces to prepare the cheese for salting. Curds with a lower pH at milling result in a harder cheese. A low pH will also result in higher salt absorption during the salting stage.

When curds are pressed into a final, solid form, the pH directly affects how well the curds fuse together. If the pH is too high during pressing, the curds will not bind together as well and the final cheese will have a more open texture.

During brining, the cheese soaks up salt from the brine solution and loses excess moisture. The pH of the brine solution should be close to the pH of the cheese, ensuring equilibrium of ions like calcium and hydrogen. If there is an imbalance during brining, the final product can have rind defects, discoloration, a weakened texture, and a shorter shelf life.

Cheeses must fall within a narrow pH range to provide an optimal environment for microbial and enzymatic processes that occur during ripening. Bacterial cultures used in ripening are responsible for characteristics like the holes in Swiss cheese, the white mold on Brie rinds, and the aroma of Limburger cheese. A deviation from the ideal pH is not only detrimental to the ecology of the bacteria, but also to the cheese structure. Higher pH levels can result in cheeses that are more elastic while lower pH levels can cause brittleness.

| Specifications                    | FC2423                               |
|-----------------------------------|--------------------------------------|
| Description                       | pre-amplified pH / temperature probe |
| Reference                         | single, Ag/AgCl                      |
| 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                     | AISI 316 stainless steel             |
| Cable                             | coaxial; 1 m (3.3')                  |
| Connection                        | quick connect DIN                    |

# Food Quality pH Meters Ordering Information



HI98161 pH Meter for Food includes:



HI98162 pH Meter for Milk includes:



HI98163 pH Meter for Meat includes:



FC2023 PVDF body, pH electrode with internal temperature sensor, quick DIN connector and 1m (3.3' cable)



HI700641 electrode cleaning solution sachet for dairy deposits (2)



FC1013 PVDF body, pH electrode with internal temperature sensor, quick DIN connector and 1m (3.3' cable)



HI700640 electrode cleaning solution sachet for milk deposits (2)



FC2323 PVDF body, pH electrode with internal temperature sensor, quick DIN connector and 1m (3.3' cable)



FC099 meat piercing stainless steel blade



HI700630 electrode acid cleaning solution sachet for meat grease and fat deposits (2)

All meters are also supplied with:



rugged carrying case with custom insert

HI98164 pH Meter for Yogurt includes:

HI98165 pH Meter for Cheese includes:



FC2133 glass body, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)



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



FC2423 pre-amplified pH and temperature probe with stainless steel sheath, pH electrode with internal temperature sensor, quick DIN connector and 1 m (3.3' cable)



HI700642 electrode cleaning solution sachet for cheese residues (2)



HI7004M pH 4.01 buffer solution (230 mL)



HI7007M pH 7.01 buffer solution (230 mL)



100 mL plastic beaker (2)



HI92000 PC software



HI920015 micro USB cable



1.5V AA batteries (4)



quality certificate



instruction manual



quick start guide

# Cleaning, Storage and Refilling Solutions

## General and Specific Use Electrode Cleaning Solutions

Clean the sensing portion of your electrodes weekly to prevent fouling and to maintain accuracy. Immerse the electrode in the proper cleaning solution for at least 15 to 20 minutes and rehydrate in storage solution before use.

### General Use Electrode Cleaning Solutions

| Code     | Application          | Package           |
|----------|----------------------|-------------------|
| HI70000P | rinsing              | 20 mL sachet (25) |
| HI7061L  | general purpose      | 500 mL bottle     |
| HI7073L  | proteins             | 500 mL bottle     |
| HI7074L  | inorganic substances | 500 mL bottle     |
| HI7077L  | oil and fats         | 500 mL bottle     |
| HI8061L  | general purpose      | 500 mL FDA bottle |
| HI8073L  | proteins             | 500 mL FDA bottle |
| HI8077L  | oil and fats         | 500 mL FDA bottle |



### Specific Electrode Cleaning Solutions - Bottles

| Code     | Description  | Size   |
|----------|--|--------|
| HI70630L | acid cleaning solution for meat grease and fats        | 500 mL |
| HI70631L | alkaline cleaning solution for meat grease and fats    | 500 mL |
| HI70632L | cleaning and disinfection solution for blood products  | 500 mL |
| HI70640L | cleaning solution for milk deposits                    | 500 mL |
| HI70641L | cleaning and disinfection solution for dairy products  | 500 mL |
| HI70642L | cleaning solution for cheese residues                  | 500 mL |
| HI70643L | cleaning and disinfection solution for yogurt products | 500 mL |

### Specific Electrode Cleaning Solutions - Sachets

| Code      | Description  | Qty/Size   |
|-----------|--|------------|
| HI700630P | acid cleaning solution for meat grease and fats        | 20 mL (25) |
| HI700640P | cleaning solution for milk deposits                    | 20 mL (25) |
| HI700641P | cleaning and disinfection solution for dairy products  | 20 mL (25) |
| HI700642P | cleaning solution for cheese residues                  | 20 mL (25) |
| HI700643P | cleaning and disinfection solution for yogurt products | 20 mL (25) |

## Electrode Storage Solutions

To minimize junction clogging and ensure fast response time, always keep the glass bulb and the junction of your pH electrode moist. Store the electrode with a few drops of HI70300 or HI80300 storage solution in the protective cap.



| Code     | Description                | Package           |
|----------|----------------------------|-------------------|
| HI70300L | electrode storage solution | 500 mL bottle     |
| HI80300L | electrode storage solution | 500 mL FDA bottle |

## Electrode Fill Solutions

The electrolyte level in refillable electrodes should be checked before performing any measurement. If the level is low, refill with the proper electrolyte solution to ensure the correct electrode performance. This simple maintenance helps guarantee adequate head pressure to keep the liquid junction flowing.



| Code    | Description                    | Package              |
|---------|--------------------------------|----------------------|
| HI7082L | electrolyte solution, 3.5M KCl | 500 mL bottle        |
| HI8082  | electrolyte solution, 3.5M KCl | 30 mL FDA bottle (4) |

# Calibration Solutions



## Technical Calibration Solutions $\pm 0.01$ pH

To obtain precise and valid pH measurements, the pH meter and electrode must be calibrated at a minimum of two different points, close to the value of the sample to be tested. These solutions are dedicated to applications that require extremely accurate pH monitoring, and come with a **certificate of analysis** prepared by comparison against NIST standards.

### Bottles

| pH Value @25°C | Code          | Package |
|----------------|---------------|---------|
| 1.68           | <b>HI5016</b> | 500 mL  |
| 3.00           | <b>HI5003</b> | 500 mL  |
| 4.01           | <b>HI5004</b> | 500 mL  |
| 6.86           | <b>HI5068</b> | 500 mL  |
| 7.01           | <b>HI5007</b> | 500 mL  |
| 9.18           | <b>HI5091</b> | 500 mL  |
| 10.01          | <b>HI5010</b> | 500 mL  |
| 12.45          | <b>HI5124</b> | 500 mL  |

### Sachets

| pH Value @25°C | Code              | Package    |
|----------------|-------------------|------------|
| 1.68           | <b>HI50016-02</b> | 20 mL (25) |
| 3.00           | <b>HI50003-02</b> | 20 mL (25) |
| 4.01           | <b>HI50004-02</b> | 20 mL (25) |
| 6.86           | <b>HI50068-02</b> | 20 mL (25) |
| 7.01           | <b>HI50007-02</b> | 20 mL (25) |
| 9.18           | <b>HI50091-02</b> | 20 mL (25) |
| 10.01          | <b>HI50010-02</b> | 20 mL (25) |
| 12.45          | <b>HI50124-02</b> | 20 mL (25) |



## Millesimal Calibration Solutions $\pm 0.002$ pH

The millesimal accuracy line of buffers has been prepared to meet the increasing need for assured accuracy in pH measurements. Each bottle in the line is provided with a **certificate of analysis**, prepared by comparison with NIST standards.

### Bottles

| pH Value @25°C | Code          | Package |
|----------------|---------------|---------|
| 1.679          | <b>HI6016</b> | 500 mL  |
| 3.000          | <b>HI6003</b> | 500 mL  |
| 4.010          | <b>HI6004</b> | 500 mL  |
| 6.862          | <b>HI6068</b> | 500 mL  |
| 7.010          | <b>HI6007</b> | 500 mL  |
| 9.177          | <b>HI6091</b> | 500 mL  |
| 10.010         | <b>HI6010</b> | 500 mL  |
| 12.450         | <b>HI6124</b> | 500 mL  |

### Sachets

| pH Value @25°C | Code              | Package    |
|----------------|-------------------|------------|
| 1.679          | <b>HI60016-02</b> | 20 mL (25) |
| 4.010          | <b>HI60004-02</b> | 20 mL (25) |
| 7.010          | <b>HI60007-02</b> | 20 mL (25) |
| 10.010         | <b>HI60010-02</b> | 20 mL (25) |

## Standard Calibration Solutions

Hanna standard pH buffers are carefully prepared and are standardized with high precision meters calibrated with NIST standards.

### Bottles

| pH Value @25°C | Code           | Package           |
|----------------|----------------|-------------------|
| 1.68           | <b>HI7001L</b> | 500 mL            |
| 4.01           | <b>HI7004L</b> | 500 mL            |
| 4.01           | <b>HI8004L</b> | 500 mL FDA bottle |
| 6.86           | <b>HI7006L</b> | 500 mL            |
| 6.86           | <b>HI8006L</b> | 500 mL FDA bottle |
| 7.01           | <b>HI7007L</b> | 500 mL            |
| 7.01           | <b>HI8007L</b> | 500 mL FDA bottle |
| 9.18           | <b>HI7009L</b> | 500 mL            |
| 9.18           | <b>HI8009L</b> | 500 mL FDA bottle |
| 10.01          | <b>HI7010L</b> | 500 mL            |
| 10.01          | <b>HI8010L</b> | 500 mL FDA bottle |

### Sachets

| pH Value @25°C | Code            | Package    |
|----------------|-----------------|------------|
| 4.01           | <b>HI70004P</b> | 20 mL (25) |
| 6.86           | <b>HI70006P</b> | 20 mL (25) |
| 7.01           | <b>HI70007P</b> | 20 mL (25) |
| 9.18           | <b>HI70009P</b> | 20 mL (25) |
| 10.01          | <b>HI70010P</b> | 20 mL (25) |





# WolfLabs

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The specifications listed in this brochure are subject to change by the manufacturer and therefore cannot be guaranteed to be correct. If there are aspects of the specification that must be guaranteed, please provide these to our sales team so that details can be confirmed.

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