



HALO[®]

pH Electrodes with Bluetooth[®]
Smart Technology

 **HANNA**[®]
instruments



HI181 magnetic stirrer with detachable electrode holder sold separately. See page 8 for details.



The world's first pH electrode with Bluetooth® Smart technology

HALO is the world's first professional pH probe with Bluetooth® Smart technology (Bluetooth® 4.0). This technology is energy efficient, allowing for low power consumption to maximize the life of the replaceable battery used in the pH electrode. HALO pH probes feature a built-in temperature sensor and can be used virtually anywhere: in the field, laboratory, or classroom. Their versatility and ease of use will revolutionize the way pH is measured.

HALO Features

- Models for lab, field, and food applications
- Double junction reference design
- Integrated temperature sensor
 - Ensures calibration and measurement are automatically temperature compensated, eliminating error from fluctuations
- Wide pH and temperature range (model dependent)
- Clear the clutter
 - Data is wirelessly transmitted to a compatible smart phone or tablet running the Hanna Lab App
- One button sample tagging
 - Pressing the button on the HALO pH probe or the probe icon in the Hanna Lab App will tag sample data for easy reference
- Stored calibration
 - HALO stores calibration information; no additional calibration is needed when switching to another device
- Battery condition
 - The measurement screen of the Hanna Lab App displays the name, battery life, and condition of the HALO probe



One press connect

Connect to the Hanna Lab App at the press of a button via Bluetooth® wireless technology (10 m range (33')).



Status indicator

Visible from a distance, the LED halo light indicates the probe is active and transmitting.



Easy to replace battery

The HALO's CR2032 lithium ion battery is easily replaced and lasts for approximately 500 hours.



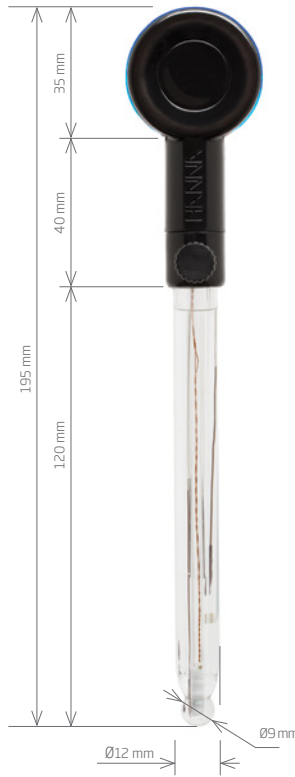
HALO is a Bluetooth® Smart (Bluetooth 4.0) pH and temperature electrode that turns edge blu or a compatible smart phone or tablet running the Hanna Lab App¹ into a professional pH meter.

Hanna's HALO pH electrodes have many advanced features including:

- One button sample tagging
- Integrated temperature sensor
- Stored calibration data
- LED status indicator
- Long battery life
- Application-specific design

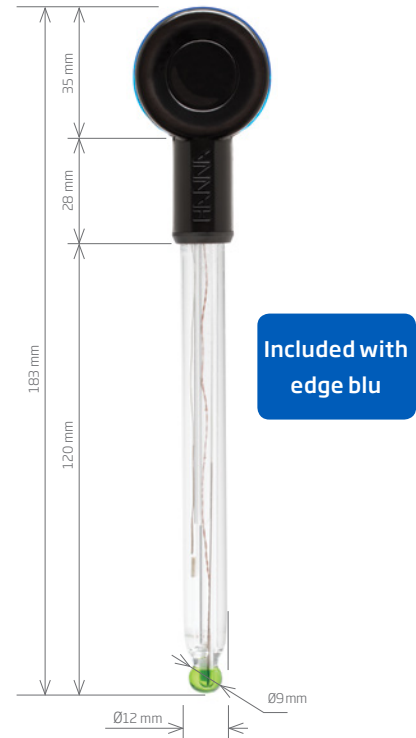
Choose from any of our five models of HALO pH electrodes to experience the next generation in pH measurement technology.

Compatible with:
iOS
Android™
edge blu



HI11312 HALO Refillable pH Electrode

This refillable, glass body electrode has many features that make it ideal for use in a wide variety of applications. These features include high temperature (HT) glass, spheric bulb, integrated temperature sensor, glass body, and double junction reference with silver-free electrolyte.



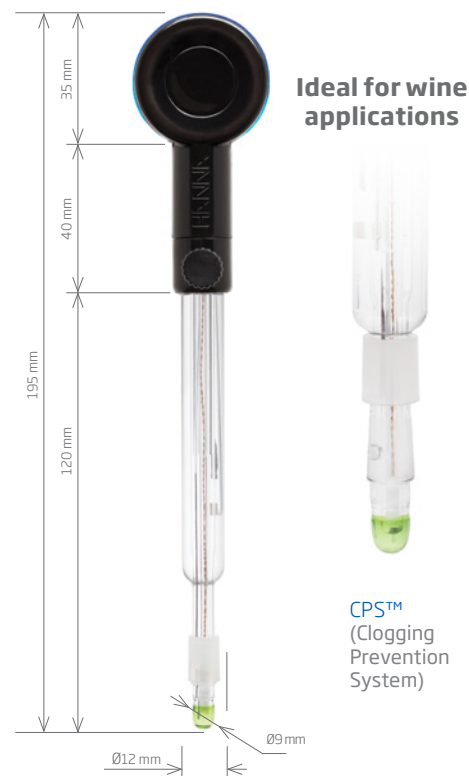
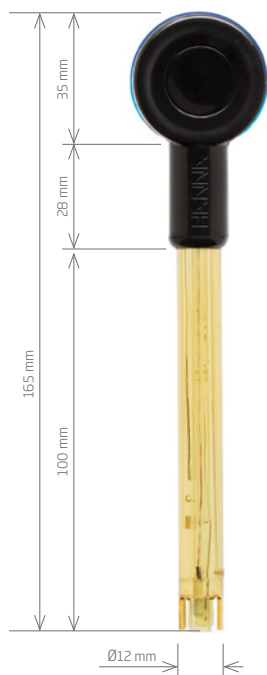
HI11102 HALO Gel Filled pH Electrode

This gel filled, glass body electrode has many features that make it ideal for laboratory use. These features include low temperature (LT) glass, spheric bulb, integrated temperature sensor, and double junction reference.

HALO Specifications

| Reference | HI11312 | HI11102 |
|------------------------|--|----------------------------------|
| Reference | double, Ag/AgCl | double, Ag/AgCl |
| Junction | ceramic | ceramic |
| Electrolyte | KCl 3.5M (refillable) | gel |
| Range | 0.00 to 13.00 pH | 0.00 to 12.00 pH |
| Bulb Shape | spheric | spheric |
| Outer Diameter (glass) | 12 mm (glass) | 12 mm (glass) |
| Overall Length | 195 mm | 183 mm |
| Solution Temperature | -5.0 to 80.0°C (23.0 to 176.0°F) | -5.0 to 80.0°C (23.0 to 176.0°F) |
| Body Material | glass | glass |
| Environment | 0.0 to 50.0°C (32.0 to 122.0°F), electronic module is not waterproof | |
| Temperature Sensor | integrated | |
| Connection | Bluetooth® Smart (Bluetooth® 4.0), 10 m (33') range | |
| Battery Type / Life | CR2032 3V lithium ion / approximately 500 hours | |

¹ HALO™ electrodes can only be used with one compatible device at a time. The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc.



HI12302

HALO PEI Body pH Electrode

This gel filled, PEI body electrode has many features that make it ideal for use in the field or on the production floor. These features include low temperature (LT) glass, dome bulb, integrated temperature sensor, and double junction reference.

FC2022

HALO Foodcare pH Electrode

This gel filled, PVDF body electrode has many features that make it ideal for measuring food related products. These features include: low temperature (LT) glass, conical bulb, integrated temperature sensor, and open junction with viscolene gel electrolyte.

The open junction design resists clogging from solids for fast, stable readings and the probe's conical tip easily penetrates food products including dairy, dough, ground meats, and other semi-solid food samples.

HI10482

HALO pH Electrode with CPS Technology

This refillable, glass body electrode has many features that make it ideal for use in the food and beverage industries including wine. These features include low temperature (LT) glass, dome bulb, integrated temperature sensor, and CPS (Clogging Prevention System) technology.

CPS technology utilizes ground glass coupled with a PTFE sleeve to prevent clogging of the junction. The ground glass allows proper flow of electrolyte, while the PTFE sleeve repels solids in the sample.

HI12302

double, Ag/AgCl

ceramic

gel

0.00 to 12.00 pH

dome

12 mm (plastic)

165 mm

-5.0 to 70.0°C (23.0 to 158.0°F)

PEI

FC2022

double, Ag/AgCl

open junction

viscolene

0.00 to 12.00 pH

conical

12 mm to 8 mm taper (plastic)

134 mm

0.0 to 60.0°C (32.0 to 140.0°F)

PVDF

HI10482

double, Ag/AgCl

open, CPS

KCl 3.5M (refillable)

0.00 to 12.00 pH

dome

8 mm

195 mm

0.0 to 80.0°C (32.0 to 176.0°F)

glass

Hanna Lab App

pH Meter Application for use with HALO



smart device not included.

Hanna Lab App – Available on iOS and Android

Connecting a HALO probe to the Hanna Lab App is simple. Measurement and logging of pH and temperature at one second intervals start as soon as the probe is connected.

- **Connects HALO to a smart device via Bluetooth® 4.0**
- **Up to five-point pH calibration with seven standard preprogrammed pH buffers**
- **Calibration reminder**
 - Alerts users when HALO needs calibration
- **Real-time data**
 - Displays updated pH and temperature every second
- **Basic GLP**
 - Displays date and time of current calibration along with probe offset and average slope
- **Full GLP**
 - Displays date and time of current calibration, probe offset, and average slope along with calibrated buffers, mV values, temperature and slopes between each buffer
- **Fluid, dynamic graphing**
 - Measurement can be displayed with tabulated data or as a graph. The graph axes may be expanded using pinch-to-zoom technology for enhanced viewing
- **Measurement alarms**
 - Alerts users if the measurement threshold is exceeded
- **One button sample tagging**
 - Pressing the button on the HALO pH probe or the probe icon in the Hanna Lab App will tag sample data for easy reference
- **Data-logging with custom annotations**
 - Saved log files may be annotated with measurement specific information
 - Data is automatically saved every hour
- **Share data via email in CSV (comma-separated values) format**
- **Four ways to save and share data:**
 - All data since last auto save
 - Annotations only
 - All data within a timed interval
 - Annotations within a timed interval
- **Help and tutorials:**
 - Demo probe mode to help explore features of the Hanna Lab App
 - General app information
 - General HALO information
 - pH tutorial
 - Maintenance tutorial
 - Contact information

The first app that turns a smart phone or tablet into a full-featured pH meter

Screen features

The Hanna Lab App turns a compatible smart phone or tablet into a full-featured pH meter when used with a HALO pH probe with Bluetooth® Smart technology. Functions include calibration, measurement, data logging, graphing, and data sharing. Measurement and logging of pH and temperature at one second intervals start as soon as the probe is connected. Measurements can be displayed alone on the display, with tabulated data or as a graph. The graph can be panned and zoomed with pinch-to-zoom technology for enhanced viewing.

Connectivity

Connecting a HALO probe to the Hanna Lab App is simple. With a press of the HALO button, a compatible device can quickly discover and connect to the probe. Readings of pH and temperature automatically begin logging at one second intervals once the HALO is paired with your edge blu, Android or iOS device.

Calibration and Measurement

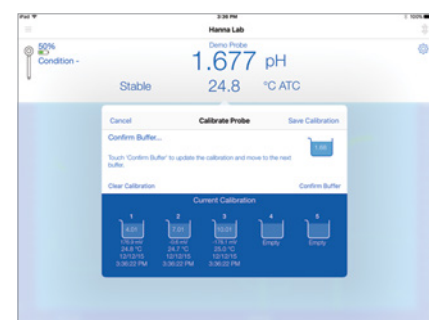
The Hanna Lab App allows for calibration of up to five points. The buffer value is automatically detected and temperature corrected to 25.0°C during calibration.

Readings that exceed user-defined alarm thresholds are highlighted in yellow on the measurement screen, graph, and table. Readings that exceed the probe specifications are highlighted in red.

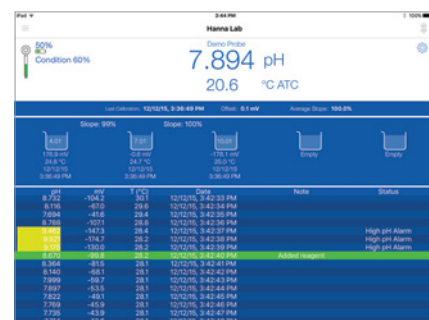
Readings are automatically saved to a history file every hour, limited only by the available memory on the host device. Readings in specific time intervals can also be saved. Saved log files may be annotated with measurement-specific information and also shared via email in CSV format.



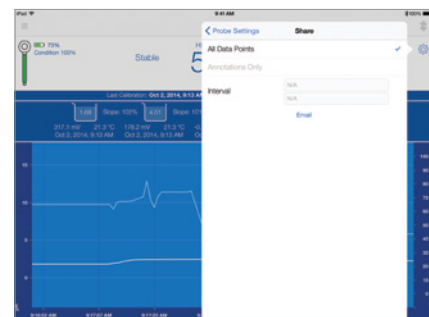
Easily accessible help menu



Clear and concise calibration screens



HALO continuously logs measurements and lets you retrieve the data you want, when you need it



Share data complete with custom annotations via email



Settings

Tap the gear icon in the top right corner of the measurement screen to access the Probe Settings menu for the following options:

- **Measurement**
 - Mode: pH or mV
 - Resolution
 - Temperature compensation: automatic or manual
 - Temperature units
- **Calibration**
 - Perform calibration
 - Calibration buffers: Hanna or NIST
 - Calibration reminder
- **Logging**
 - Clear, save or share
- **Alarms**
 - pH (mV) and temperature
- **Display**
 - Good Laboratory Practice (GLP): on-screen calibration data
 - View: basic, graph, or table
 - Graph display: pH (mV) and/or temperature
 - Stability criteria

Hanna Lab App Specifications*

| | |
|-----------------------------------|--|
| Range** | -2.000 to 16.000 pH ±800 mV -20.0 to 120.0°C (-4.0 to 248.0°F) |
| Resolution | 0.1; 0.01; 0.001 pH 1; 0.1 mV 0.1°C (0.1°F) |
| Accuracy (@25°C/77°F) | ±0.005 pH ±0.3 mV ±0.5°C (±1.0°F) |
| Calibration Points | up to five-point calibration with seven standard buffers (1.68, 3.00 or 4.01, 6.86, 7.01, 9.18, 10.01, 12.45 pH) |
| Temperature Compensation** | automatic from -5.0 to 100.0 °C; 23.0 to 212.0 °F |
| Compatibility/System Requirements | see www.hannainst.com for latest compatibility requirements |

Download Information



*HALO™ required for measurement use. ** Limits will be reduced to actual probe/sensor limits. Apple, the Apple logo, iPhone and iPad are trademarks of Apple Inc., registered in the U.S. and other countries. App Store is a service mark of Apple Inc. The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. Android, Google Play and the Google Play logo are trademarks of Google Inc.



HI181 • HI180

Compact Magnetic Mini-Stirrers

Available With and Without Detachable Electrode Holder

- **Electrode holder**
 - The HI181 series features an electrode holder that fits into the base of the stirrer
- **Round edge**
- **Dynamic design**
 - Easy to handle, these lightweight and compact stirrers need little room and are quickly recognizable on busy benches
- **Built to last**
 - Chemical resistant housing withstands damage by accidental spills

Common stirrers are manufactured with steel and aluminum components. These units are often too large and heavy to fit in the limited space of a laboratory. Hanna HI181 and HI180 models are compact, lightweight, and inexpensive.

Often in the lab, a sample is removed from a stirrer before reducing the speed. Normally, this would cause the motor to accelerate until it is destroyed. Hanna stirrers incorporate electronic controls that allow the user to regulate the speed with greater precision. In addition to speed control, the Speedsafe™ mechanism will assure that the maximum speed is never exceeded. Both models of mini-stirrers are available in eleven colors. The various colors can allow easy sample identification at a distance.

Speedsafe™

| Specifications | HI181 • HI180 |
|---------------------------|--|
| Maximum Stirring Capacity | 1 liter (0.26 gallons) |
| Min. Speed Range | 100 rpm |
| Max. Speed Range | 1000 rpm |
| Power Supply | 110/115 VAC or 220/240 VAC, 50/60 Hz |
| Installation Category | II |
| Cover Material | ABS plastic |
| Environment | 0 to 50°C (32 to 122°F); RH max 95% |
| Dimensions | 137 mm (dia) x 51 mm (h) |
| Weight | 640 g (1.4 lbs.) |
| Accessories | HI731319 Magnetic micro stir bar (10) |

HI181 Ordering Information

All models include detachable electrode holder, micro stir bar and instructions.



HI181-1 Black mini-stirrer (115V)

HI181-2 Black mini-stirrer (230V)



HI181W-1 Arctic white mini-stirrer (115V)

HI181W-2 Arctic white mini-stirrer (230V)



HI181F-1 Blue mini-stirrer (115V)

HI181F-2 Blue mini-stirrer (230V)



HI181M-1 Moss green mini-stirrer (115V)

HI181M-2 Moss green mini-stirrer (230V)



HI181K-1 Orange mini-stirrer (115V)

HI181K-2 Orange mini-stirrer (230V)



HI181L-1 Lavender mini-stirrer (115V)

HI181L-2 Lavender mini-stirrer (230V)



HI181J-1 Charcoal mini-stirrer (115V)

HI181J-2 Charcoal mini-stirrer (230V)



HI181I-1 Ivory mini-stirrer (115V)

HI181I-2 Ivory mini-stirrer (230V)



HI181C-1 Glacier blue mini-stirrer (115V)

HI181C-2 Glacier blue mini-stirrer (230V)



HI181E-1 Green mini-stirrer (115V)

HI181E-2 Green mini-stirrer (230V)



HI181A-1 Yellow mini-stirrer (115V)

HI181A-2 Yellow mini-stirrer (230V)

HI180 Ordering Information

All models include micro stir bar and instructions.



HI180-1 Black mini-stirrer (115V)

HI180-2 Black mini-stirrer (230V)



HI180W-1 Arctic white mini-stirrer (115V)

HI180W-2 Arctic white mini-stirrer (230V)



HI180F-1 Blue mini-stirrer (115V)

HI180F-2 Blue mini-stirrer (230V)



HI180M-1 Moss green mini-stirrer (115V)

HI180M-2 Moss green mini-stirrer (230V)



HI180K-1 Orange mini-stirrer (115V)

HI180K-2 Orange mini-stirrer (230V)



HI180L-1 Lavender mini-stirrer (115V)

HI180L-2 Lavender mini-stirrer (230V)



HI180J-1 Charcoal mini-stirrer (115V)

HI180J-2 Charcoal mini-stirrer (230V)



HI180I-1 Ivory mini-stirrer (115V)

HI180I-2 Ivory mini-stirrer (230V)



HI180C-1 Glacier blue mini-stirrer (115V)

HI180C-2 Glacier blue mini-stirrer (230V)



HI180E-1 Green mini-stirrer (115V)

HI180E-2 Green mini-stirrer (230V)



HI180A-1 Yellow mini-stirrer (115V)

HI180A-2 Yellow mini-stirrer (230V)

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 |
| HI70635L | cleaning solution for wine deposits | 500 mL |
| HI70636L | cleaning solution for wine stains | 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 |
| HI70663L | cleaning solution for soil deposits | 500 mL |
| HI70664L | cleaning solution for humus deposits | 500 mL |
| HI70670L | cleaning solution for salt deposits (industrial processes) | 500 mL |
| HI70671L | cleaning and disinfection solution for algae, fungi and bacteria (industrial processes) | 500 mL |
| HI70681L | cleaning solution for ink stains | 500 mL |



Specific Electrode Cleaning Solutions - Sachets

| Code | Description | Qty/Size |
|-----------|--|------------|
| HI700601P | general purpose cleaning solution for laboratories | 20 mL (25) |
| HI700630P | acid cleaning solution for meat grease and fats | 20 mL (25) |
| HI700635P | cleaning solution for wine deposits | 20 mL (25) |
| HI700636P | cleaning solution for wine stains | 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) |
| HI700661P | general purpose cleaning solution for agriculture | 20 mL (25) |
| HI700663P | cleaning solution for soil deposits | 20 mL (25) |
| HI700664P | cleaning solution for humus deposits | 20 mL (25) |
| HI700670P | cleaning solution for salt deposits (industrial processes) | 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

pH Technical Calibration Solutions

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 | HI5016 | 500 mL |
| 3.00 | HI5003 | 500 mL |
| 4.01 | HI5004 | 500 mL |
| 6.86 | HI5068 | 500 mL |
| 7.01 | HI5007 | 500 mL |
| 9.18 | HI5091 | 500 mL |
| 10.01 | HI5010 | 500 mL |
| 12.45 | HI5124 | 500 mL |

Sachets

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



±0.002 pH Millesimal Calibration Solutions

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 | HI6016 | 500 mL |
| 3.000 | HI6003 | 500 mL |
| 4.010 | HI6004 | 500 mL |
| 6.862 | HI6068 | 500 mL |
| 7.010 | HI6007 | 500 mL |
| 9.177 | HI6091 | 500 mL |
| 10.010 | HI6010 | 500 mL |
| 12.450 | HI6124 | 500 mL |

Sachets

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



Standard Calibration Solutions

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

Bottles

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

Sachets

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



HI11312 HALO includes:



HI11102 HALO includes:



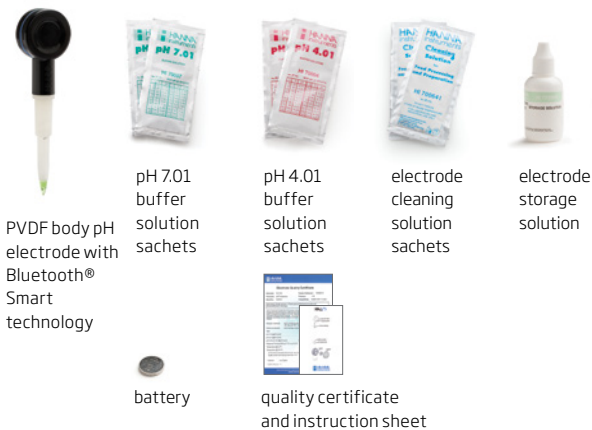
HI12302 HALO includes:




HI10482 HALO includes:



FC2022 HALO includes:



Hanna Lab App



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