



# Accuracy you can trust

Thermo Scientific Orion pH Electrodes





## Quality, performance, and reliability

In the field, the plant, or in the lab, Thermo Scientific™ Orion™ pH Electrodes can meet your electrochemistry needs. Whether your sample is highly viscous, extremely delicate, complex, or you simply require a reliable electrode that will last, there is an Orion pH Electrode to meet your needs.

# pH electrodes

## Match electrode features and construction to your sample requirements

### Triode Electrodes

Thermo Scientific™ Orion™ Triode™ pH Electrodes have built-in temperature sensors for combined pH and temperature measurements. These electrodes are compatible with only Orion pH meters as the temperature connector and element are unique to these meter models.

### ROSS Electrodes

Thermo Scientific™ Orion™ ROSS™ and ROSS Ultra™ Electrodes provide exceptional accuracy and reproducibility regardless of sample composition or temperature variations. The double junction reference system is available in all body styles and is ideal for complex samples including foods, pharmaceuticals, wastewater, Tris buffers, enzymes, proteins and sulfides.

### Sure-Flow Electrodes

Thermo Scientific™ Orion™ Sure-Flow™ Electrodes are built with a unique free-flowing liquid-to-liquid junction that simplifies measurements of dirty or viscous samples by helping to prevent clogging. These electrodes are easy-to-clean and come with or without Ag/AgCl options, for measuring a wide variety of samples.

### AquaPro Electrodes

Thermo Scientific™ Orion™ AquaPro™ pH Electrodes

are designed as low-maintenance and have polymer-filled double junction reference systems. For use in Tris, sulfides, proteins and biological media. They have an extended life, fast response and clog resistant open junction. Available in standard, semi-micro, rugged bulb and flat surface body styles. The junction must be kept wet when not in use.

### Double-junction Electrodes

Isolated Ag/AgCl reference system which prevents silver from coming in contact with the sample.

Great for measuring Tris buffers, sulfide and protein samples. Available in standard and micro body styles.

### ATC Probes

Automatic temperature compensation probes measure sample temperatures and allow the meter to increase the accuracy of pH measurements by correcting the electrode slope according to the measured temperature.

### No Cal Electrodes

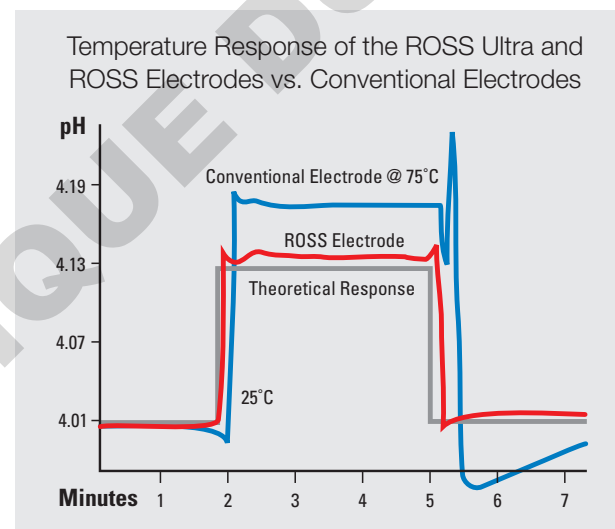
Thermo Scientific™ Orion™ No Cal™ Electrodes offer a unique reference system that provides quick and accurate measurements without the need for calibration. Ideally suited for measuring Tris buffers, sulfide, and protein samples. With No Cal Electrodes, measurements are accurate to 0.1 pH. They are designed with a built-in temperature sensor and a ceramic junction inside an epoxy body.

### Low-maintenance electrodes

Good performance, value priced, durable and low maintenance gel-filled pH electrodes. Available in standard, semi-micro and flat surface body styles.

### Redox/ORP electrodes

The ideal choice for measuring the oxidation-reduction potential of samples and performing redox titrations.



The graph shows how ROSS electrodes respond versus the best of conventional pH electrodes. The ROSS electrode continues to show fast reproducibility and accuracy after many dramatic temperature changes.



## Body materials



### Glass body

- Compatible with virtually any sample, including solvents
- Easy to clean
- Can handle higher temperatures



### Epoxy body

- Extremely durable, rugged body prevents breakage
- Low-maintenance gel-filled can be used in higher temperatures than glass low maintenance electrodes
- Bulb is protected by a permanent guard

## pH body style



### Standard

- 12 mm diameter
- Used in a wide variety of samples



### Semi-micro

- 6-8 mm diameter
- For small samples sizes down to 200  $\mu\text{L}$



### Micro

- 1-5 mm diameter
- For samples down to 0.5  $\mu\text{L}$ , such as 384 well plates and micro centrifuge tubes



### Rugged bulb

- Glass body
- Extra durable pH bulb to prevent breakage



### Spear tip

- For piercing solid or semi-solid samples
- Can be used for small volumes



### Flat surface

- For measuring surfaces of solid or gel samples, in plates or media
- For use with small volumes



## Fill type

### Refillable

#### (Glass or Epoxy Body)

- Filling solution required
- Easy maintenance, periodic filling and draining needed
- Longer expected life
- For use in a wide variety of applications
- Best precision, 0.01 to 0.02 pH
- Fastest response time
- Longest warranty, 1-2 years (6 months for Ag/AgCl micro electrodes)

### Polymer-Filled - AquaPro Electrodes

#### (Sealed Glass or Epoxy Body)

- No filling solution needed
- Low maintenance, sealed reference
- Easy to use
- For use in a wide variety of applications
- 0.02 pH precision
- Fast response time
- 1 year warranty

### Gel-Filled

#### (Sealed Epoxy Body)

- No filling solution needed
- Low maintenance, sealed reference
- Easy to use
- General purpose for everyday use
- 0.05 to 0.1 pH precision
- Good response time
- 3-6 month warranty (18 months for ROSS 8107 models)

## Reference styles

### ROSS Ultra/ROSS Reference

- 0.01 pH precision
- Best measurement response time
- Best temperature response
- Ideal for Tris, protein and sulfide samples
- Variety of body styles and types
- Refillable or gel-filled design

### Double Junction Ag/AgCl

- 0.02 pH precision
- Better measurement response time
- Good temperature response
- Ideal for Tris, protein and sulfide samples
- Variety of body styles and types
- Refillable, polymer- or gel-filled design

### Single Junction Ag/AgCl

- 0.02 to 0.1 pH precision
- Good measurement response time
- Good temperature response
- General purpose for everyday use
- Variety of body styles and types
- Refillable or gel-filled design

## Junctions – Sure-Flow, Open, Ceramic, Sleeve, Wick, Glass Capillary, and Glass Fiber

### Sure-Flow and Open

- Best junction for dirty, difficult samples and demanding lab use
- Fast flowing junction is ideal for titrations
- Junction is clog free, easy to clean and has longest use life
- Ideal for thick or viscous samples, compatible with all sample types
- Refillable or polymer-filled design

### Ceramic, Sleeve, and Glass Capillary

- Better junction for routine lab use in a variety of samples
- Junction is high quality and durable
- Ideal for most lab applications and sample types
- Refillable, polymer- or gel-filled design

### Wick and Glass Fiber

- Good junction for routine lab use or field and plant use in buffers and aqueous samples
- Good junction with durability
- Ideal for basic lab applications and aqueous samples
- Refillable or gel-filled design

## Recommended pH electrodes by application

Sample type	Electrode recommendations	ROSS Ultra	ROSS	AquaPro	Standard Ag/AgCl	Green	Micro Ag/AgCl	Double junction	Economy/basic
pH Precision	Select the level of precision appropriate for your application	0.01	0.01	0.02	0.02	0.02 to 0.05	0.02	0.02	0.05 to 0.1
Biological/Pharmaceutical – Tris buffer, proteins, enzymes	Electrodes should have a ROSS or double junction Ag/AgCl reference (no sample contact with silver)	8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN 8104BN 815600 8165BNWP 8172BNWP	9104APWP 9107APMD 9156APWP		GD9106BNWP GD9156BNWP		9102DJWP 9156DJWP	
Education/Student Use	Electrodes should have an epoxy body for added durability	8107BNUMD 8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
Emulsions – Foods, cosmetics, oils	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging		8165BNWP 8172BNWP	9104APWP 9107APMD	9165BNWP 9172BNWP				
Emulsions – Petroleum products, paint	Electrodes should have a glass body that resists damage from the sample and a Sure-Flow or open junction to prevent the electrode from clogging		8172BNWP	9104APWP	9172BNWP				
Flat Surfaces – Cheese, meat, agar	Electrodes should have a flat-surface tip and ROSS or double junction Ag/AgCl reference (no sample contact with silver)	8135BNUWP	8135BN	9135APWP					
Flat Surfaces – Paper, textile, skin, leather	Electrodes should have a flat-surface tip	8135BNUWP	8135BN	9135APWP					913600
General Purpose – Most sample types	All electrodes are suitable for general purpose measurements	8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN 8104BN 815600 8165BNWP 8172BNWP	9104APWP 9107APMD 9156APWP	9102BNWP 9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP GD9156BNWP		9102DJWP 9156DJWP	9106BNWP
Harsh Environments – Field or plant use, rugged use	Electrodes should have an epoxy body for added durability and be polymer or gel filled for easy maintenance and waterproofing	8107BNUMD		9107APMD 9156APWP	9107BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
High Ionic Strength – Acids, bases, brines, pH > 12 or pH < 2	Electrodes should have a Sure-Flow or open junction for better contact with the sample and more stable measurements		8165BNWP 8172BNWP	9104APWP 9107APMD	9165BNWP 9172BNWP				
Large Sample Sizes – Tall flasks	Electrodes should have a long body that fits the container								912600
Low Ionic Strength – Treated effluent, deionized water, distilled water	Electrodes should be refillable for better contact with the sample and more stable measurements	8102BNUWP 8156BNUWP 8157BNUMD	8102BN 815600 8165BNWP 8172BNWP		9165BNWP 9172BNWP	GD9156BNWP		9102DJWP	
Non-aqueous – Solvents, alcohols	Electrodes should have a glass body that resists damage from the sample and a Sure-Flow junction for better contact with the sample and more stable measurements		8172BNWP		9172BNWP				
Semi-solids – Fruit, cheese	Electrodes should have a spear tip for piercing samples and a ROSS or double junction Ag/AgCl reference		8163BNWP						
Small Sample Size – Micro-titer plates	Electrodes should have a small diameter that fits the container		8220BNWP				9810BN		
Small Sample Size – NMR tubes	Electrodes should have a small diameter that fits the container						9826BN		
Small Sample Size – Test tubes, small flasks and beakers	Electrodes should have a small diameter that fits the container	8103BNUWP 8115BNUWP	8103BN 8115BN 8175BNWP		9103BNWP		9810BN 9826BN	9110DJWP	911600 912600
Small Sample Size – Tris buffer, proteins, enzymes, sulfides	Electrodes should have a small diameter that fits the container and a ROSS or double junction Ag/AgCl reference	8103BNUWP 8115BNUWP	8103BN 8115BN 8175BNWP					9110DJWP	
Titration	Electrodes should have a Sure-Flow or sleeve junction for better contact with the sample and more stable measurements		8165BNWP 8172BNWP						
Viscous Liquids – Slurries, suspended solids sludges	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging		8165BNWP 8172BNWP	9104APWP 9107APMD	9165BNWP 9172BNWP				
Waters – Acid rain, boiler feed water, distilled water, rain water, well water	Electrodes should have a ROSS or double junction Ag/AgCl reference and be refillable for better contact with the sample	8102BNUWP 8156BNUWP 8157BNUMD	8102BN 815600 8165BNWP 8172BNWP		9165BNWP 9172BNWP	GD9156BNWP		9102DJWP	
Waters – Drinking water, tap water	Electrodes should have an epoxy body for added durability	8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9156BNWP 9165BNWP	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
Waters – Wastewater, seawater	Electrodes should have a ROSS or double junction Ag/AgCl reference and have an epoxy body for added durability	8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9165BNWP	GD9106BNWP GD9156BNWP		9156DJWP	



# ROSS pH electrodes

## An excellent choice for exceptional stability, rapid response, accurate and reproducible pH measurement

Since 1981, Thermo Scientific Orion ROSS Electrodes have been helping scientists achieve precise results in pH testing and measurement. The original ROSS pH electrode was the first of its kind to use a redox reference system and this system provides a stable reading within seconds, with increased accuracy by at least 10 times, compared to conventional electrodes.

### Rapid response and superior stability

Compared to conventional electrodes, the ROSS reference system exhibits exceptional stability in measurements, fast response, great accuracy and precision, when measuring samples that vary in temperature or when calibrating in temperatures that differ from that of your samples. ROSS electrodes drift by less than 0.002 pH per day so recalibration is minimized.

### Temperature response

Most ROSS electrodes have a temperature range of 0 to 100 °C and show rapid response and stability even when measuring samples that differ by as much as 50 °C. The readings are much more accurate than standard electrodes in samples with extreme temperature variations. ROSS electrodes provide the correct reading within 30 seconds while standard electrodes may take longer than 3 minutes. The graph on page 2 illustrates this response.

### No metal contamination in samples

ROSS Electrodes do not contain any silver or mercury. Standard Ag/AgCl electrodes leach metal into the fill solution, and eventually, the sample solution. The leaching can clog the electrode junction, causing a sluggish response or inaccurate reading, or even react with the sample. ROSS pH electrodes can be used in samples such as biological media, foodstuffs and pharmaceuticals where trace amount of metals cannot be tolerated.

### Double junction design

This design allows you to help minimize errors caused by junction potential, by using a solution that is similar to the sample. The user also has the ability to change filling solutions to help minimize contamination when potassium or chloride in the sample are undesirable.

### Select from one of two ROSS Electrode families to gain all the benefits of ROSS technology:

#### ROSS Ultra Electrodes

ROSS Ultra electrodes offer the best stability and drift free measurements of all our ROSS electrodes. The reference system is designed to provide an enhanced life and we are so confident of it that ROSS Ultra electrodes have up to a 2 year warranty.

The ROSS Ultra Electrode line features glass or epoxy electrodes, refillable or low-maintenance design, flat surface and semi-micro designs. ROSS Ultra Triode Electrodes include a built-in temperature sensor and provide faster temperature response when compared to Ag/AgCl electrodes.

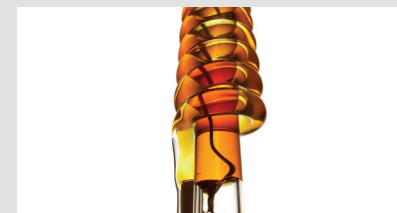
#### ROSS Electrodes

Standard ROSS electrodes provide rapid accuracy and temperature response which goes hand in hand with the excellent stability of this reference system. The reference system provides excellent stability and these electrodes are accompanied by a one year warranty. They are available in a variety of styles such as the clog free Sure-Flow junction, glass or epoxy electrodes, flat surface, semi-micro, micro and spear tip designs. All standard ROSS electrodes have a refillable design and do not contain a built-in-temperature element.

[thermofisher.com/rossph](http://thermofisher.com/rossph)

### ROSS electrode specifications:

- Slope: 92-102 % of theoretical Nernst slope
- Isopotential Point: pH 7
- Accuracy of measuring a pH 6.86 buffer after standardization at 25 °C: Accurate within 0.03 pH for buffer at any temperature between 0-100 °C, using automatic temperature compensation
- Speed of Response in 6.86 buffer going from 25 to 75 °C: Response stable to 0.01 pH within 30 seconds
- Speed of Response between 6.86 and 4.01 buffers at 25 °C: Response stable to 0.005 pH in 30 seconds
- Mercury free, Tris, protein and sulfide compatible



# Sure-Flow pH electrodes

## Clog free, long lasting junction

Attain stable, drift-free measurements using a Sure-Flow Electrode with its unique free-flowing liquid-to-liquid junction. The easy-to-clean junction never clogs, simply press the cap and flush the junction area, then release the cap and the junction is reset. Even the most problematic, dirty or viscous samples can be easily measured without a clogged junction. The Sure-Flow junction has proven reliability and extends the electrode life.

ROSS Electrodes provide improved accuracy and response to extreme temperature changes\*. They are compatible with samples containing organic compounds, Tris buffers, enzymes, proteins, heavy metals, and other compounds that react with silver such as bromides, iodides, cyanides, and sulfides.

Sure-Flow Silver Chloride Electrodes can be used on tough samples that do not require a double junction electrode to prevent contact with silver.

ROSS Sure-Flow Electrodes are also available as semi-micro pH and reference half cell electrodes.

### Key information

- ROSS electrodes are environmentally-safe mercury-free option for Tris buffers, enzymes, protein and sulfide
- All cap diameters are 16 mm at bottom of cap
- All cable lengths are 1 meter

\*When comparing ROSS electrodes to Ag/AgCl electrodes.

### Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH electrode fill solution	900011

 <p><b>ROSS Sure-Flow Combination pH Electrode with glass body</b></p> <ul style="list-style-type: none"> <li>• Sure-Flow junction prevents clogging</li> <li>• For soil, sludge, colloids, viscous material and organic solvents</li> </ul>	 <p><b>ROSS Sure-Flow Combination pH Electrode with epoxy body</b></p> <ul style="list-style-type: none"> <li>• Fast response—even in difficult samples, like soil</li> <li>• Durable epoxy design</li> <li>• For Tris, proteins, enzymes, sulfides</li> </ul>	 <p><b>Sure-Flow Combination pH Electrode with glass body</b></p> <ul style="list-style-type: none"> <li>• For soil, sludge, colloids, and viscous material</li> <li>• Chemical resistant glass body</li> </ul>	 <p><b>Sure-Flow Combination pH Electrode with epoxy body</b></p> <ul style="list-style-type: none"> <li>• Fast response in difficult samples &amp; soils</li> <li>• Rugged, durable epoxy design</li> <li>• Has removable bulb guard</li> </ul>
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Cat. No.	8172BNWP	8165BNWP	9172BNWP	9165BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.02	0.02
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Internal Reference	ROSS	ROSS	Ag/AgCl	Ag/AgCl
Junction	Sure-Flow	Sure-Flow	Sure-Flow	Sure-Flow
Fill Solution Cat. No.	810007	810007	900011	900011
Dimension D (Dia) L (Length)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof







# Triode pH electrodes

## Measure pH and temperature with one electrode

Accurately measure pH and temperature with just one electrode using Triode Electrodes which contain built-in temperature sensors. There are a variety of electrodes available based on your sample and application.

The ROSS Ultra Triode Electrodes offer such great stability and drift that the refillable electrodes have a two year replacement warranty, while gel-filled ROSS Ultra Triode electrodes have an 18 month warranty.

Complex samples, such as biological media, foods and pharmaceuticals, can be measured easily. All ROSS Ultra electrodes can be used in samples that contain Tris, sulfides, enzymes, or proteins.

ROSS Ultra Electrodes offer optimal performance for samples of varying temperatures.

The AquaPro Triode Electrode has the advantage of having an open double junction reference that does not clog. For use in water and wastewater, field and plant, with Tris, protein, enzymes, and sulfides.

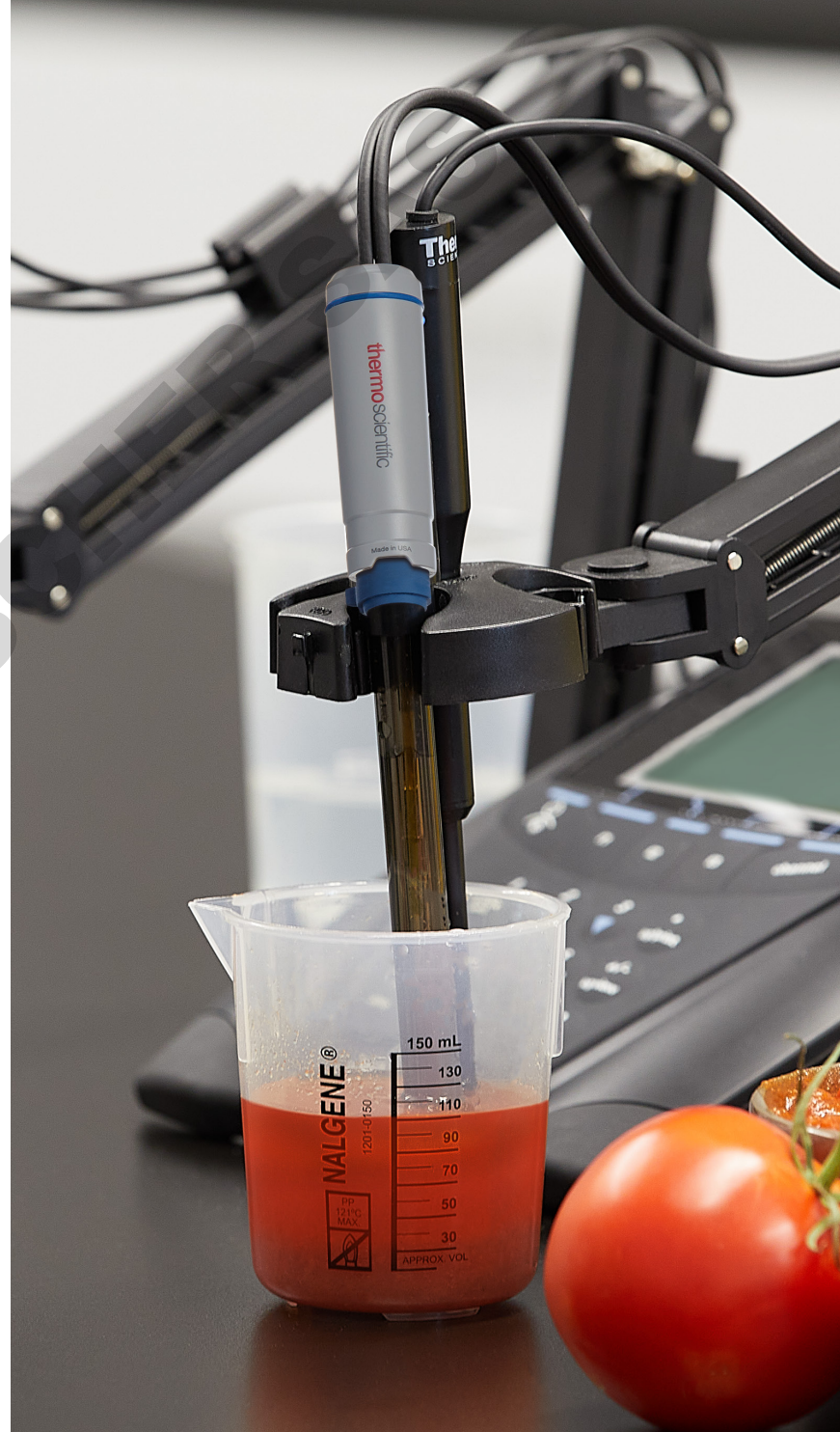
Ag/AgCl Triode Electrodes have good response and are ideal for routine measurements.

### Key information

- Cable lengths range from 1 to 6 meters
- Electrodes with catalog numbers ending in WMMD are 3 meters in length
- The Triode 3-in-1 pH/ATC Electrode (Cat. No. 9109WL) is 6 meters in length

### Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011
No Cal pH Electrode Fill Solution	510011







**ROSS Ultra Triode pH/ATC Electrode with glass body**

- High performance for QC and research
- Chemical resistant glass body
- 2-year warranty



**ROSS Ultra Triode pH/ATC Electrode with epoxy body, low maintenance gel**

- Low maintenance gel with rugged epoxy body
- Capillary junction for fast, stable, accurate readings
- 18 month warranty



**ROSS Ultra Triode pH/ATC Electrode with epoxy body**

- General purpose, high performance
- Rugged epoxy body
- Refillable
- 2-year warranty



**No Cal Combination pH/ATC Electrode with epoxy body**

- Stable, high performance pH testing in the field or on the plant floor
- Accurate to 0.1 pH without calibration, for up to 1 year



**AquaPro Triode pH/ATC Electrode with low maintenance polymer, epoxy body**

- Rugged design, clog-free open junction
- Low maintenance



**Triode pH/ATC Electrode with epoxy body, low maintenance gel**

- Low maintenance gel
- Epoxy body for ruggedness



**Triode 3-in-1 pH/ATC Electrode with epoxy body, low maintenance**

- Low maintenance gel
- Epoxy body for ruggedness



**Triode 3-in-1 pH/ATC Electrode with epoxy body, refillable**

- Long-lasting
- Epoxy body for ruggedness
- Refillable



**Orion Basic pH/ATC Electrode with epoxy body, low maintenance gel**

- General purpose
- For Russell RL60P meter

Cat. No.	8302BNUMD	8107BNUMD 8107UWMMD	8157BNUMD	5107BNUMD	9107APMD	9107BNMD 9107WMMD 9107WLMD 9107BN 9107WP*	9109WP 9109WL	9157BNUMD 9157BN*	9147BN
pH Range	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.1
Temp. Range	0-100 °C	0-80 °C	0-100 °C	0-100 °C	0-60 °C	0-80 °C	0-80 °C	0-90 °C	0-50 °C
Temp. Accuracy	±1.0 °C	±1.0 °C	±1.0 °C	±1.0 °C	±2.0 °C	±2.0 °C	±2.0 °C	±2.0 °C	±2.0 °C
Internal Reference Junction	ROSS	ROSS	ROSS	Platinum	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl
Fill Solution Cat. No.	Ceramic	Glass capillary	Glass fiber	Ceramic	Open	Wick	Wick	Glass fiber	HDPE pin
Fill Solution Cat. No.	810007	—	810007	510011	—	—	—	900011	—
Dimension D (Dia) L (Length)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm Cap - 22 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof - MiniDIN Star	BNC Waterproof - MiniDIN Star BNC Waterproof - MiniDIN Star 3 m	BNC Waterproof - MiniDIN Star	BNC - MiniDIN Star	BNC - MiniDIN Star	BNC - MiniDIN Star BNC - 8 Pin* (A+ Series)	EDIN Waterproof Banana Plug	BNC - MiniDIN Star BNC - 8 Pin* (A+ Series)	BNC 2.5 mm Phono Tip

\* For use with Orion A/A+ Series Meters

# Glass refillable pH electrodes

## Chemical resistant glass bodies

Capture accurate measurements of a variety of samples types, including solvents, with Orion Glass Body pH Electrodes. When compared with epoxy body electrodes, they offer superior chemical resistance at high temperatures; some models can withstand temperatures of up to 100 °C. Glass electrodes are also easy to clean as they are compatible with most solvents and inorganic materials.

ROSS Ultra and ROSS Electrodes provide unmatched ROSS accuracy and rapid response to temperature extremes. All have double junction construction and the benefits that go with that, including use for samples with Tris buffers, biologicals, proteins, enzymes, sulfides, heavy metals, and other compounds that interact with silver. ROSS Ultra glass electrodes have an industry best 2 years warranty.

AquaPro Electrodes are Tris compatible and have a open junction that does not clog.









Double junction electrodes are recommended for samples containing organic compounds, Tris buffers, proteins, enzymes, sulfides, heavy metals and other compounds that interact with silver.

Orion Single Junction Electrodes provide a reliable option for routine pH measurement.

### Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Orion ROSS All-in-One pH Buffer Kit	810199
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011
Double Junction pH Electrode Fill Solution	910008-WA
Orion Standard All-in-One pH Buffer Kit	910199
Orion Standard Colorless pH Buffer Kit	9191860



							
<b>ROSS Ultra Combination pH Electrode</b>	<b>ROSS Ultra Rugged Bulb Combination pH Electrode</b>	<b>ROSS Combination pH Electrode</b>	<b>ROSS Rugged Bulb Combination pH Electrode</b>	<b>Orion Double Junction Combination pH Electrode</b>	<b>Orion Combination pH Electrode</b>	<b>Orion Rugged Bulb Combination pH Electrode</b>	<b>Orion Basic Combination pH Electrode</b>
<ul style="list-style-type: none"> <li>• For precise pH determinations</li> <li>• General purpose, high performance</li> <li>• Refillable</li> <li>• 2-year warranty</li> </ul>	<ul style="list-style-type: none"> <li>• Toughened bulb for rugged lab use</li> <li>• Refillable</li> <li>• 2-year warranty</li> </ul>	<ul style="list-style-type: none"> <li>• General purpose, high performance</li> <li>• For QC and research applications</li> <li>• Refillable</li> </ul>	<ul style="list-style-type: none"> <li>• Toughened bulb for rugged lab use</li> <li>• For QC and research applications</li> <li>• Refillable</li> </ul>	<ul style="list-style-type: none"> <li>• General purpose</li> <li>• Easy-to-clean design</li> <li>• Refillable</li> </ul>	<ul style="list-style-type: none"> <li>• For routine or research applications</li> <li>• Refillable</li> </ul>	<ul style="list-style-type: none"> <li>• Toughened bulb for rugged lab use</li> <li>• Refillable</li> </ul>	<ul style="list-style-type: none"> <li>• General purpose</li> <li>• Easy-to-clean design</li> <li>• Refillable</li> </ul>

Cat. No.	8102BNUWP	8104BNUWP	8102BN	8104BN 8104SC	9102DJWP	9102BNWP	9104BNWP	9142BN
pH Range	0-14	0-14	0-14	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.1
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-100 °C	0-60 °C	0-90 °C	0-90 °C	0-90 °C
Internal Reference	ROSS	ROSS	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl	Ag/AgCl
Junction	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution Cat. No.	810007	810007	810007	810007	910008-WA	900011	900011	900011
Dimension D (Dia) L (Length)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC	BNC Screw Cap*	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC

\*Requires screw cap cable for connection to BNC meter, Cat. No. 91CBNC



# Epoxy refillable pH electrodes

## Rugged epoxy body prevents breakage

Confidently maneuver and measure in the field, on the plant floor, and in the lab when durability is required, with Orion Refillable Epoxy Body Electrodes. These rugged electrodes are built with an epoxy body surrounding a glass pH bulb, providing further protection.

ROSS Ultra and ROSS Electrodes exhibit unmatched accuracy and rapid response to extreme temperature variations. All are compatible with samples containing Tris buffers, biologicals, proteins, enzymes, sulfides, heavy metals, and other compounds that interact with silver. The ROSS Ultra Electrode has an unprecedented 2 year warranty.

Orion Green Electrodes are the first lab electrode to contain no lead, mercury or other hazardous substances and are completely ROHS compliant. They are available in single or double junctions designs.

Orion Silver Chloride Electrodes with epoxy bodies can provide excellent response and performance in routine samples.

### Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011
Double Junction pH Electrode Fill Solution	910008-WA

			
<b>ROSS Ultra Combination pH Electrode</b>	<b>ROSS Combination pH Electrode</b>	<b>Orion Green pH Combination Electrode</b>	<b>Orion Combination pH Electrode</b>
<ul style="list-style-type: none"> <li>• Top accuracy and rapid response to temperature extremes</li> <li>• General purpose, high performance</li> <li>• 2-year warranty</li> </ul>	<ul style="list-style-type: none"> <li>• Top accuracy and rapid response to temperature extremes</li> <li>• General purpose, high performance</li> </ul>	<ul style="list-style-type: none"> <li>• Ideal for routine or research applications</li> <li>• Use in dirty water or Tris, sulfide and protein samples</li> <li>• Contains no lead</li> </ul>	<ul style="list-style-type: none"> <li>• For routine or research applications</li> <li>• Reliable and durable</li> </ul>

Cat. No.	8156BNUWP	815600	GD9156BNWP	9156BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.02	0.02
Internal Reference	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Junction	Glass fiber	Glass fiber	Glass fiber	Glass fiber
Fill Solution Cat. No.	810007	810007	910008-WA	900011
Dimension D (Dia) L (Length)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC	BNC Waterproof	BNC Waterproof

# Low maintenance pH electrodes

## Never requires fill solutions

Confidently measure your sample without worrying about cleaning or even filling the reference chamber when using an Orion Low Maintenance pH Electrode. The reference chamber comes pre-filled and sealed and is available in many styles such as AquaPro, green, double junction, or standard silver chloride, to suit your various measurement needs.

AquaPro Low Maintenance pH Electrodes offer open junctions that do not clog. Choose between chemical resistant glass bodies or durable epoxy bodies. All AquaPro electrodes are Tris compatible. They are suitable for use with interfering substances like sulfides, enzymes, proteins, and any sample where contact with silver is undesirable.

Orion Green Electrodes contain no hazardous substances such as mercury or lead and are ROHS compliant.

Orion Double Junction Electrodes are Tris compatible and are suitable for use with interfering substances like sulfides, enzymes, proteins, and any sample where contact with silver is undesirable.

Orion Silver Chloride Electrodes offer low maintenance as well as reliable measurements for everyday use.

### Key information

- All cap diameters are 16 mm
- All cable lengths are 1 meter

### Recommended accessories

Description	Cat. No.
Storage Sleeve and Base	810017
Ag/AgCl Electrode Storage Solution	910001
Orion Standard All-in-One pH Buffer Kit	910199





**AquaPro Low Maintenance Rugged Bulb Combination pH Electrode, epoxy body, glass body**

- Toughened bulb for rugged lab use
- Polymer-filled reference



**AquaPro Low Maintenance Combination pH Electrode, epoxy body, polymer-filled**

- General purpose, high performance
- Polymer-filled reference



**Orion Green Low Maintenance Double Junction Combination pH Electrode, epoxy body, gel-filled**

- Ideal for education, plant or field use
- Use in dirty water or Tris, sulfide and protein samples
- Contains no lead
- Gel-filled reference



**Orion Green Low Maintenance Combination pH Electrode, epoxy body, gel-filled**

- Ideal for education, plant or field use
- Contains no lead
- Gel-filled reference



**Orion Low Maintenance Double Junction Combination pH Electrode, epoxy body, gel-filled**

- Low maintenance gel with durable epoxy body
- Gel-filled reference



**Orion Low Maintenance Combination pH Electrode, epoxy body, gel-filled**

- Ideal for field, plant, or educational applications
- Gel-filled reference



**Orion Low Maintenance Removable Bulb Guard Combination pH Electrode, epoxy body, gel-filled**

- General purpose use
- Removable bulb guard makes cleaning easy
- Gel-filled reference

Cat. No.	9104APWP	9156APWP	GD9106BNWP	GS9106BNWP	9156DJWP	9106BNWP	9146BN
pH Range	0-14	0-14	0-14	0-14	0-14	0-14	0-14
pH Precision	0.02	0.02	0.02	0.05	0.02	0.05	0.1
Temp. Range	0-60 °C	0-60 °C	0-90 °C	0-90 °C	0-60 °C	0-80 °C	0-80 °C
Internal Reference	Ag/AgCl Double junction	Ag/AgCl Double junction	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl
Junction	Open	Open	Glass capillary	Glass capillary	Wick	Wick	Wick
Dimension D (Dia) L (Length)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC



# Micro pH electrodes

For use with 384 microwell plates, and micro centrifuge, PCR, and cryogenic tubes

Measure small volumes down to 0.5  $\mu\text{L}$  with micro pH electrodes. The small stem and bulb diameter allow the electrode to be inserted into small devices such as 384 microwell plates. There are a variety to choose from based on your measurement needs. Ag/AgCl micro electrodes are extremely delicate electrodes because of their size and should be treated as such.

The rugged ROSS PerpHecT Micro Combination pH Electrode provides the best accuracy and response time of the micro electrodes. It can be used in biological samples, and is much more durable than the silver chloride electrodes. When used in conjunction with our Orion LogR technology, the glass bulb of the electrode will measure both pH and temperature at the same location, which allows for accurate temperature measurement in small volumes.





Orion Silver Chloride Micro Electrodes are single junction electrodes. They are available to measure samples as small as 0.5  $\mu\text{L}$ , for use in NMR tubes and available with a stainless steel needle tip over the glass stem and bulb.

## Key information

- All cap diameters are 16 mm at bottom of cap
- All cable lengths are 1 meter

## Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011

				
	<b>ROSS PerpHecT Micro Combination pH Electrode</b>	<b>Orion Micro Combination pH Electrode</b>	<b>Orion Long Length Micro Combination pH Electrode</b>	<b>Orion Needle Tip Micro Combination pH Electrode</b>
	<ul style="list-style-type: none"> <li>• Measures samples as small as 15 <math>\mu\text{L}</math> in 384 well plates</li> <li>• Minimum depth of immersion is 4.5 mm</li> <li>• Rugged and durable</li> <li>• Sleeve design for fast response</li> </ul>	<ul style="list-style-type: none"> <li>• Designed for gels and small sample volumes</li> <li>• Measure samples as small as 0.5 <math>\mu\text{L}</math></li> </ul>	<ul style="list-style-type: none"> <li>• Ideal for measurements in extremely small vessels</li> <li>• Ideally suited for use in NMR tubes and flasks</li> </ul>	<ul style="list-style-type: none"> <li>• 16 gauge stainless steel bevel tip</li> <li>• Ideally suited for piercing septa</li> </ul>
<b>Cat. No.</b>	<b>8220BNWP</b>	<b>9810BN</b>	<b>9826BN</b>	<b>9863BN</b>
<b>pH Range</b>	0-14	0-14	0-14	0-14
<b>pH Precision</b>	0.01	0.02	0.02	0.02
<b>Temp. Range</b>	0-100 °C	0-80 °C	0-80 °C	0-80 °C
<b>Temp. Accuracy</b>	$\pm 0.5$ °C	–	–	–
<b>Internal Reference</b>	ROSS	Ag/AgCl	Ag/AgCl	Ag/AgCl
<b>Junction</b>	Sleeve	Ceramic	Ceramic	Ceramic
<b>Fill Solution Cat. No.</b>	810007	900011	900011	900011
<b>Dimension D (Dia)</b>	L - 155 mm	L - 120 mm	L - 228 mm	L - 137 mm
<b>L (Length) T (Tip)</b>	T - 3 mm D x 40 mm L	T - 1.3 mm D x 37 mm L	T - 2.5 mm D x 200 mm L	T - 1.7 mm D x 40 mm L
<b>Depth of Immersion</b>	4.5 mm	1 mm	2 mm	3 mm
<b>Connector Type</b>	BNC Waterproof	BNC	BNC	BNC

# Glass semi-micro pH electrodes

Measure samples as small as 0.2 mL,  
fits test tubes and small containers

Measure the pH of test tube and small container samples using ROSS Semi-Micro pH Electrodes. They can provide optimum accuracy and unmatched response in samples of varying temperatures. They are available in chemical resistant glass bodies. All ROSS Electrodes are Tris compatible and suitable for use with biological samples, enzymes, proteins, sulfides, and anywhere sample contact with silver is undesirable.

Orion Silver Chloride Semi-Micro Electrodes are durable and provide reliable and accurate measurements of routine samples.

The Orion Semi-Micro Double Junction Combination pH Electrode is for moderate size samples. The double junction design is good for use when measuring Tris samples, proteins, enzymes, sulfides, or biologicals.

## Key information

- All cap diameters are 16 mm
- All cable lengths are 1 meter

## Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011
Double Junction pH Electrode Fill Solution	910008-WA

			
<b>ROSS Ultra Semi-Micro Combination pH Electrode, glass body</b>	<b>ROSS Semi-Micro Combination pH Electrode, glass body</b>	<b>Orion Semi-Micro Combination pH Electrode, glass body</b>	<b>Combination pH electrode with glass body, semi-micro tip</b>
<ul style="list-style-type: none"> <li>• Extended life</li> <li>• Tris compatible</li> <li>• Fast response at temperature extremes</li> </ul>	<ul style="list-style-type: none"> <li>• Tris compatible</li> <li>• Fast response at temperature extremes</li> </ul>	<ul style="list-style-type: none"> <li>• Measure samples as small as 0.2 mL</li> <li>• Easy-to-clean refillable design</li> </ul>	<ul style="list-style-type: none"> <li>• For routine or research applications</li> </ul>

Cat. No.	8103BNUWP	8103BN 8103SC	9110DJWP	9103BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.02	0.02
Temp. Range	0-100 °C	0-100 °C	0-60 °C	0-90 °C
Internal Reference	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Junction	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution Cat. No.	810007	810007	910008-WA	900011
Dimension D (Dia) L (Length) T (Tip)	L - 165 mm T - 6 mm D x 95 mm L	L - 165 mm T - 6 mm D x 95 mm L	L - 150 mm T - 4.5 mm D x 90 mm L	L - 165 mm T - 6.5 mm D x 100 mm L
Connector Type	BNC Waterproof	BNC Screw Cap*	BNC Waterproof	BNC Waterproof

\*Requires screw cap cable for connection to BNC meter, Cat. No. 91CBNC

# Epoxy semi-micro pH electrodes

Rugged body for small samples  
or narrow containers

Measure solutions in small or narrow containers in challenging environments with rugged epoxy bodied Orion Semi-Micro pH Electrodes. These are available in double junction or single junction designs as well as refillable or low-maintenance options.

ROSS Semi-Micro pH Electrodes with epoxy bodies offer optimum accuracy and temperature response. All ROSS electrodes are Tris buffer compatible and suitable for use with biological samples, enzymes, proteins, sulfides, and anywhere sample contact with silver is undesirable. Orion Silver Chloride Semi-Micro pH Electrodes with epoxy bodies are for routine measurements.

Low-maintenance electrodes have a sealed fill chamber that never needs to be refilled or drained and replaced.

## Key information

- All cap diameters are 16 mm at bottom of cap
- All cable lengths are 1 meter

## Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011



**ROSS Ultra Semi-Micro Combination pH Electrode, epoxy body**

- Measures samples as small as 0.2 mL
- Epoxy body for ruggedness and durability

**ROSS Sure-Flow Semi-Micro Combination pH Electrode, epoxy body**

- Sure-Flow junction prevents clogging
- Measure samples as small as 0.2 mL

**ROSS Semi-Micro Combination pH Electrode, epoxy body**

- Epoxy body for ruggedness and durability
- Measures samples as small as 0.2 mL

**Orion Low Maintenance Semi-Micro Combination pH Electrode, epoxy body**

- Measure samples as small as 0.2 mL
- Gel-filled

**Orion Long Length Low Maintenance Semi-Micro Combination pH Electrode, epoxy body**

- Designed for use in long-necked flasks

Cat. No.	8115BNUWP	8175BNWP	8115BN	911600	912600
pH Range	0-14	0-14	0-14	0-12	0-12
pH Precision	0.01	0.01	0.01	0.1	0.1
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-80 °C	0-80 °C
Internal Reference	ROSS	ROSS	ROSS	Ag/AgCl	Ag/AgCl
Junction	Sure-Flow	Glass fiber	Glass fiber	Wick	Wick
Fill Solution Cat. No.	810007	810007	810007	—	—
Dimension D (Dia) L (Length) T (Tip)	L - 165 mm T - 8 mm D x 95 mm L	L - 165 mm T - 8 mm D x 95 mm L	L - 165 mm T - 8 mm D x 95 mm L	L - 145 mm D - 6 mm	L - 305 mm D - 8 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC	BNC	BNC



# Flat surface pH electrodes

Measure moist surfaces such as agar gel plates, skin, paper, textiles, meat, and cheese

Measure flat, soft, moist, semi-solid or small volume samples with epoxy bodied Flat Surface pH Electrodes. These electrodes are ideally suited for use on samples such as paper, textiles, skin, meat, cheese, or in agar gel plates.

Flat surface pH electrodes are available in single or double junction designs allowing you to measure samples such as Tris buffers or samples containing protein, enzymes, sulfides, or other compounds that react with silver. You may also choose from refillable or low-maintenance designs.

ROSS Ultra and ROSS Flat Surface Electrodes provide optimum accuracy and stability while having the additional advantages of a double junction design. The ROSS Ultra Flat Surface Electrode has a 2 year warranty.

The AquaPro Flat Surface Electrode is Tris compatible and has an open junction that does not clog. This low maintenance electrode never requires fill solution.

The Orion Low Maintenance Flat Surface Electrode is a silver chloride option that is ideal for routine measurements.

## Key information

- All cable lengths are 1 meter

## Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011
Double Junction pH Electrode Fill Solution	910008-WA

			
<b>ROSS Ultra Flat Surface Combination pH Electrode, epoxy body</b>	<b>ROSS Flat Surface Combination pH Electrode, epoxy body</b>	<b>AquaPro Low Maintenance Flat Surface Combination pH Electrode, epoxy body, polymer-filled</b>	<b>Orion Low Maintenance Flat Surface Combination pH Electrode, epoxy body, gel-filled</b>
<ul style="list-style-type: none"> <li>• 2 year warranty</li> <li>• Rapid response to temperature extremes</li> </ul>	<ul style="list-style-type: none"> <li>• Premium performance</li> <li>• Rapid response to temperature extremes</li> </ul>	<ul style="list-style-type: none"> <li>• Clog free junction for tough samples</li> <li>• Polymer-filled reference</li> </ul>	<ul style="list-style-type: none"> <li>• For routine flat surface measurements</li> <li>• Gel-filled reference</li> </ul>

Cat. No.	8135BNUWP	8135BN 8135SC	9135APWP	913600
pH Range	0-14	0-14	0-14	0-12
pH Precision	0.01	0.01	0.02	0.1
Temp. Range	0-100 °C	0-100 °C	0-60 °C	0-80 °C
Internal Reference	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Junction	Glass fiber	Glass fiber	Open	Wick
Fill Solution Cat. No.	810007	810007	–	–
Dimension D (Dia) L (Length)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 110 mm D - 12 mm
Connector Type	BNC Waterproof	BNC Screw Cap*	BNC Waterproof	BNC

\*Requires screw cap cable for connection to BNC meter, Cat. No. 91CBNC

# Spear tip pH electrodes

## For piercing fruits, cheese and meats

Pierce soft and semi-solid samples like cheese, meat, or fruit with a refillable Spear Tip pH Electrode. They are available in single junction or double junction designs. The double junction electrodes can be used with samples containing protein, enzymes, sulfides or other compounds that react with silver.

The ROSS Spear Tip Combination pH Electrode offers increased accuracy and response compared to conventional electrodes. It utilizes a double junction design for longer life in challenging applications. It is suited for semi-solid samples.

The Orion Spear Tip Combination pH Electrode is suited for routine measurements and is for use in semi-solid samples.




The Orion Low Resistance Rugged Spear Tip Combination pH Electrode can be used for soft samples or routine clean water measurements. It has a single junction design.

### Key information

- All cap diameters are 16 mm at bottom of cap
- All cable lengths are 1 meter

### Recommended accessories

Description	Cat. No.
ROSS pH Electrode Storage Solution	810001
ROSS Electrode Fill Solution	810007
Ag/AgCl Electrode Storage Solution	910001
Silver Chloride pH Electrode Fill Solution	900011

		
<b>ROSS Spear Tip Combination pH Electrode, glass body</b> <ul style="list-style-type: none"> <li>• For cheese, meat, and fruit samples</li> <li>• Measure samples as small as 100 µL</li> <li>• Double junction for Tris samples</li> </ul>	<b>Orion Spear Tip Combination pH Electrode, glass body</b> <ul style="list-style-type: none"> <li>• For cheese, meat, and fruit samples</li> <li>• Measure samples as small as 100 µL</li> </ul>	<b>Orion Low Resistance Rugged Spear Tip Combination pH Electrode, glass body</b> <ul style="list-style-type: none"> <li>• Rugged, with an easy-to-clean bulb</li> <li>• For routine or clean water measurements</li> <li>• For soft samples</li> </ul>

Cat. No.	8163BNWP	9163SC	9162BNWP
pH Range	0-14	0-14	0-14
pH Precision	0.01	0.02	0.02
Temp. Range	0-100 °C	0-90 °C	0-90 °C
Internal Reference	ROSS	Ag/AgCl	Ag/AgCl
Junction	Ceramic	Ceramic	Ceramic
Fill Solution Cat. No.	810007	900011	900011
Dimension D (Dia) L (Length) T (Tip)	L - 110 mm T - 4.5 mm D x 20 mm L	L - 95 mm T - 6.5 mm D x 25 mm L	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof	Screw Cap*	BNC Waterproof

\*Requires screw cap cable for connection to BNC meter, Cat. No. 91CBNC





# pH half-cell and reference half-cell electrodes

Orion pH Half-Cell and Reference Half-Cell Electrodes are for use with either a reference electrode, pH half cell sensing electrode, or even an ISE half cell reference electrode. They are available as single or double reference designs. Clog free, Sure-Flow junctions are available for easier measurement.

ROSS Half-Cell Sensing and Reference Electrodes should be paired together. 900100 and 900200 are silver chloride references for ISE electrodes.

## Key information

- All cap diameters are 16 mm at bottom of cap
- All cable lengths are 1 meter
- pH half cells require the use of a reference half cell electrode



**ROSS Ultra reference half-cell Electrode with glass body**

- Use with 8101BNWP or 8411BN ROSS sodium half-cell electrodes



**ROSS Half-Cell pH Electrode, glass body**

- For use with ROSS Ultra Reference Electrode, Cat. No. 800500U



**Sure-Flow Double Junction Reference Half-Cell Electrode, epoxy body**

- Sure-Flow junction prevents clogging
- Double junction allows a variety of filling solutions to be used
- For use with ISE half-cell electrodes



**Sure-Flow Reference Half-Cell Electrode, epoxy body**

- For ISE measurements

## Recommended accessories

Description	Cat. No.
ROSS Electrode Fill Solution	810007
Single Junction Reference Electrode Fill Solution, Equitransferent Solution with Ag/AgCl	900001
Double Junction pH Electrode Fill Solution	910008-WA
Double Junction Reference Electrode Inner Fill Solution, Equitransferent Solution with Ag/AgCl	900002
Double Junction Reference Electrode Outer Fill Solution, 10% KNO <sub>3</sub>	900003

Cat. No.	800500U	8101BNWP	900200	900100
pH Range	0-14	0-14	0-14	0-14
pH Precision	—	0.01	—	—
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Internal Reference Junction	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Fill Solution Cat. No.	810007	—	900002/900003	900001
Dimension D (Dia) L (Length)	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 110 mm D - 13 mm	L - 110 mm D - 13 mm
Connector Type	Pin Tip	BNC Waterproof	Pin Tip	Pin Tip







# ATC probes

## Accurate temperature measurement

Automatically correct pH measurements for variation in electrode slope due to temperature change using Orion Automatic Temperature Compensation (ATC) Probes. They are extremely durable and come in a variety of options available to use depending on your application. Choose from a micro ATC probe, stainless steel, glass or epoxy body probe.

### Key information

- All cap diameters are 16 mm except the Orion Stainless Steel Micro ATC Probe, Cat. No. 928007MD
- All cable lengths are 1 meter
- Ensure the connector is compatible with the meter you are using



**Orion Stainless-Steel Micro ATC Probe, epoxy body**

- For critical temperature monitoring
- Measures samples as small as 10 µL
- Minimum depth of immersion is 3 mm



**Orion Stainless Steel ATC Probe**

- Extremely durable body
- For field, plant, and food applications



**Orion ATC Probe, glass body**

- For solutions that contain organic solvents



**Orion ATC Probe, epoxy body**

- General purpose
- For aqueous samples, intermittent use in methanol or ethanol
- Durable epoxy body



**Orion Stainless Steel Small Diameter ATC Probe**

- Extremely durable body
- For field, plant, and food applications

Cat. No.	928007MD	927007MD (Star) 917007* 927007**	927006MD 917006* 927006**	927005MD 917005* 927005** 917001***	917004****
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-80 °C	0-100 °C
Temp. Accuracy	±1 °C	±2 °C	±2 °C	±2 °C	±2 °C
Dimension D (Dia) L (Length) T (Tip)	L - 117 mm D - 5 mm D - 1 mm x 38 mm L	L - 120 mm D - 6 mm	L - 120 mm D - 8 mm	L - 120 mm D - 6 mm	L - 120 mm D - 3 mm
Connector Type	MiniDIN Star	MiniDIN (Star) 8 Pin DIN (A+ Series)† Phono Tip (PerpHecT)	MiniDIN (Star) 8 Pin DIN (A+ Series)† Phono Tip (PerpHecT)	MiniDIN (Star) 8 Pin DIN (A+ Series)† Phono Tip (PerpHecT) Dual Banana Plug (Older Orion Meters)	2.5 mm Phono Jack

\* For use with A+ Series Meters

\*\* For use with PerpHecT Series Meters

\*\*\* For use with older Orion Meters

\*\*\*\* For use with Russell Meters



# Redox/ORP electrodes

## Reliable redox measurements

ORP measurements are easily made with our selection of ORP electrodes. Use our reliable ORP standard and compare your results to a standard hydrogen electrode.

The Sure-Flow Combination Redox/ORP Electrode has a durable epoxy body with a non-clog Sure-Flow junction.

The Orion Combination Redox/ORP Electrode offers a chemical resistant glass body.

The Triode Combination Redox/ORP/ATC Probes have a durable epoxy body and can measure temperature also. Orion Redox/ORP Electrodes are available in refillable design or low-maintenance gel filled styles.

### Key information

- All cap diameters are 16 mm
- All cable lengths are 1 meter

### Recommended accessories

Description	Cat. No.
Silver Chloride pH Electrode Fill Solution, 4 M KCl with Ag/AgCl	900011
ORP Standard, +420 mV vs. Standard Hydrogen Electrode (EH), 475 mL	967901
ORP Standard, +420 mV vs. Standard Hydrogen Electrode (EH), 5 x 60 mL	967961

				
<b>Sure-Flow Combination Redox/ORP Electrode, epoxy body</b>	<b>Orion Combination Redox/ORP Electrode, glass body</b>	<b>Orion Silver Billet Combination Electrode</b>	<b>Triode Combination Redox/ORP/ATC Electrode, epoxy body, refillable</b>	<b>Triode Low Maintenance Combination Redox/ORP/ATC Electrode, epoxy body, gel-filled</b>
<ul style="list-style-type: none"><li>• For use in water, wastewater, metal plating, and biotech samples</li><li>• Sure-Flow junction prevents clogging</li><li>• Suitable for redox titrations</li></ul>	<ul style="list-style-type: none"><li>• For use in water, wastewater, metal plating and organic solvent samples</li><li>• Suitable for redox titrations</li></ul>	<ul style="list-style-type: none"><li>• General purpose for accurate and reliable halide titrations in clean samples</li></ul>	<ul style="list-style-type: none"><li>• For use in water and wastewater</li><li>• Epoxy body for ruggedness and durability</li><li>• Built-in ATC capabilities for accurate temperature measurements</li></ul>	<ul style="list-style-type: none"><li>• For use in water and wastewater</li><li>• Epoxy body for ruggedness and durability</li><li>• Built-in ATC capabilities for accurate temperature measurements</li></ul>
<b>9678BNWP</b>	<b>9778BNWP</b>	<b>9780SC</b>	<b>9180BNMD 9180BN*</b>	<b>9179BNMD 9179BN*</b>
0-90 °C	0-100 °C	0-80 °C	0-90 °C	0-80 °C
—	—	—	±2.0 °C	±2.0 °C
Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl
Sure-Flow	Ceramic	Ceramic	Glass Fiber	Wick
900011	900011	900011	900011	—
L - 110 mm D - 13 mm	L - 120 mm D - 12 mm	L - 150 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
BNC Waterproof	BNC Waterproof	Screw Cap**	BNC Waterproof - MiniDIN (Star) BNC Waterproof - 8 Pin (A+ Series)	BNC Waterproof - MiniDIN (Star) BNC Waterproof - 8 Pin (A+ Series)

\* For use with A+ Series Meters \*\*Requires screw cap cable for connection to BNC meter, Cat. No. 91CBNC

# Orion Star Automatic Stirrer Probe

Ideal for laboratory pH and ISE measurements

Eliminate the hassle of magnetic stir plates and stir bars with the Thermo Scientific Orion Star Automatic Stirrer Probe for benchtop use. This accessory is intended for use with Thermo Scientific™ Orion™ Versa Star™ Meters and Orion Star Series Meters. The Orion Star Automatic Stirrer Probe is powered and controlled by the meter with five optimized stirring speeds and fits in the electrode stand for easy movement in and out samples and simplified rinsing. Paddles can be replaced to extend its life.

- Conveniently plugs into the back panel of the compatible benchtop meters for stirrer power, speed and control
- Control the on/off function and stirring speed using the meter controls.
- Simply insert the stirring probe into a sample and rinse it between measurements.



## Product information

Description	Cat. No.
Orion Star Stirrer Probe with Paddle	096019
Replacement Paddles, 3 pack	096021

# Electrode connectors and cables

## Connectors that stay dry and connected

If you ever lost an electrode because of a failed connection, you'll appreciate the Orion Star Series proprietary waterproof BNC and MiniDIN locking connectors. Adapter cables can be used to connect Orion electrodes to a wide variety of other meters.

### Electrode Adapter Cables

Meter input	Electrode connector	Adapter needed	Cat. No.
BNC	Screw cap	Detachable cable to BNC connector	91CBNC
U.S. standard	BNC	BNC to U.S. standard adapter	090032
F LEMO (Metrohm)	BNC	BNC to F LEMO adapter	090036
E DIN (Knick, Schott, WTW)	BNC	BNC to E DIN adapter	090034
2 mm pin tip	Screw cap	Detachable cable to 2.5 mm pin tip connector	91USRF
Other	Screw cap	Detachable cable to stripped end	91CBNT

### Electrode Extension Cables

Description	Cat. No.
15 ft. extension cable, BNC connector	910027
15 ft. extension cable, 8 pin mini DIN for ATC probes for star series meters	910032



### Storage sleeve and base

If you ever have had an electrode drop on a lab bench and break, you will want to use the Orion Storage Sleeve and Base, Cat. No. 810017.

### Features and benefits

- Protects electrode from breakage when not in use
- Covers entire glass body of standard size pH electrodes (12 x 120 mm)
- pH bulb stays conditioned when not in use
- Weighted base prevents electrode from tipping
- Sleeve can be removed from base to store in electrode holder





# pH buffers and solutions

Orion pH buffers, storage solutions, cleaning solutions, kits and pH electrode filling solutions are available for every application. All Orion pH buffers and standards are traceable to NIST reference materials. A wide variety of sizes are available from 15 mL single use pouches to large volume 19 L cubitainers.



## pH buffers in 475 mL (1 pint) bottles

Great for standard laboratory applications and everyday use

Description	Cat. No.
<b>ROSS All-in-One pH Buffer Kit</b> 475 mL each of pH 4.01, 7.00 and 10.01 buffers; 475 mL of ROSS pH electrode storage solution (810001); 60 mL of pH electrode cleaning solution; and 12 mm diameter electrode storage bottle	810199
<b>Standard All-in-One pH Buffer Kit</b> 475 mL each of pH 4.01, 7.00 and 10.01 buffers; 475 mL of Ag/AgCl pH electrode storage solution (910001); and 12 mm diameter electrode storage bottle	910199
pH 1.68 buffer, NIST traceable, 475 mL	910168
pH 4.01 buffer, color coded red, NIST traceable, 475 mL	910104
pH 5.00 buffer, color coded orange, NIST traceable, 475 mL	910105
pH 6.86 buffer, DIN standard, NIST traceable, 475 mL	910686
pH 7.00 buffer, color coded yellow, NIST traceable, 475 mL	910107
pH 9.18 buffer, DIN standard, NIST traceable, 475 mL	910918
pH 10.01 buffer, color coded blue, NIST traceable, 475 mL	910110
pH 12.46 buffer, NIST traceable, 475 mL	910112



## pH buffers in 19 L (5 Gallon) cubitainers with easy-pour spout

Excellent for large laboratories and multiple users

Description	Cat. No.
pH 4.01 buffer, color coded red, NIST traceable, 19 L (5 gallon) cubitainer	9104CB
pH 7.00 buffer, color coded yellow, NIST traceable, 19 L (5 gallon) cubitainer	9107CB
pH 10.01 buffer, color coded blue, NIST traceable, 19 L (5 gallon) cubitainer	9110CB



## pH buffers and rinse solution in individual use pouches

Ideal for field measurements, pharma applications or single use buffer requirements

Description	Cat. No.
<b>pH 4.01 Buffer, Color Coded Red, NIST Traceable</b> Individual use pouches, 10 x 15 mL, Individual use pouches, 25 x 15 mL	910410-WA 910425
<b>pH 7.00 Buffer, Color Coded Yellow, NIST Traceable</b> Individual use pouches, 10 x 15 mL, Individual use pouches, 25 x 15 mL	910710 910725
<b>pH 10.01 Buffer, Color Coded Blue, NIST Traceable</b> Individual use pouches, 10 x 15 mL, Individual use pouches, 25 x 15 mL	911010 911025-WA
<b>pH Electrode Rinse Solution</b> Individual use pouches, 10 x 15 mL, Individual use pouches, 25 x 15 mL	911110 911125



## pH buffers in 5 x 60 mL (5 x 2 Oz) bottles

Ideally suited for field measurements, occasional pH analysis or limited lab space

Description	Cat. No.
<b>All-in-One 60 mL pH Buffer Kit</b> 60 mL each of pH 4.01, 7.00 and 10.01 buffers; 60 mL of pH electrode storage solution (910060); and 60 mL of pH electrode cleaning solution (900024)	916099
pH 1.68 buffer, NIST traceable, 5 x 60 mL	9116860
pH 4.01 buffer, color coded red, NIST traceable, 5 x 60 mL	910460
pH 6.86 buffer, DIN standard, NIST traceable, 5 x 60 mL	916860
pH 7.00 buffer, color coded yellow, NIST traceable, 5 x 60 mL	910760
pH 9.18 buffer, DIN Standard, NIST traceable, 5 x 60 mL	9191860
pH 10.01 buffer, color coded blue, NIST traceable, 5 x 60 mL	911060
pH 12.46 buffer, NIST traceable, 5 x 60 mL	911260-WA





## pH electrode storage solution and ROSS pH electrode storage solution

Get fast, reliable performance from your pH electrode

Description	Cat. No.
ROSS pH Electrode Storage Solution, 475 mL	810001



## pH specialty solutions and ORP standards

Description	Cat. No.
<b>Pure Water Low Ionic Strength pH Test Kit</b> – 4 x 475 mL of pH 6.97 buffer, 2 x 475 mL of pH 4.10 buffer, 2 x 60 mL of pHISA adjuster and app note	700001
Pure water pHISA low ionic strength adjuster, 5 x 60 mL	700003
Pure water pH 4.10 buffer B for low ionic strength pH samples, 4 x 475 mL	700402
Pure water pH 6.97 buffer A for low ionic strength pH samples, 4 x 475 mL	700702
Pure water pH 9.15 buffer C for low ionic strength pH samples, 4 x 475 mL	700902
<b>Total Alkalinity Test Kit</b> – 475 mL of alkalinity reagent (700011-WA), 475 mL of alkalinity standard (700012), conversion chart and app note	700010
Total alkalinity reagent refill, 4 x 475 mL	700011-WA
Total alkalinity standard/control refill, 475 mL	700012
<b>ORP Standard</b> , +420 mV vs. standard hydrogen electrode (EH), +220 mV vs. Ag/AgCl electrode using 900011 fill solution, 475 mL	967901
<b>ORP Standard</b> , +420 mV vs. standard hydrogen electrode (EH), +220 mV vs. Ag/AgCl electrode using 900011 fill solution, 5 x 60 mL	967961



## pH electrode cleaning solutions

Specially formulated cleaning solutions for slow, dirty or clogged pH electrodes

Description	Cat. No.
pH Electrode Cleaning Kit – 30 mL of cleaning solution A and C, 60 mL of cleaning solution B and D, beaker and pipet	900020
pH electrode cleaning solution A for protein removal, 4 x 30 mL, beaker and pipet	900021-WA
pH electrode cleaning solution B for bacteria removal, 4 x 60 mL, beaker and pipet	900022-WA
pH electrode cleaning solution C for general cleaning, 4 x 30 mL, beaker and pipet	900023
pH electrode cleaning solution D for general cleaning and oil and grease removal, 4 x 60 mL, beaker and pipet	900024
Stain lifter solution for no cal fill solution and ORP standard stain removal, 60 mL	510015



**Pure Water™ pH Test Kit:** Get fast, accurate pH results in high purity waters such as well, rain, distilled/deionized, boiler feed and process. The kit includes special low ionic strength buffers and pHISA additive that increases sample ionic strength without changing the pH. For best results, a high quality pH electrode such as the ROSS Ultra Combination pH Electrode, Cat. No. 8102BNUWP is recommended (purchase separately).



**Total Alkalinity Test Kit:** A two-step direct measurement of total alkalinity and pH. Calibrate for pH, add alkalinity reagent and read total alkalinity of 0-200 ppm  $\text{CaCO}_3$  from the included pH conversion chart.



# Electrode fill solutions and accessories



## pH electrode and reference electrode fill solutions

Help ensure the proper performance and function from your electrode by using our specially formulated fill solutions

Description	Cat. No.	Use with electrodes
ROSS electrode fill solution, 3 M KCl, 5 x 60 mL	810007	ROSS Ultra, ROSS and Micro ROSS Electrodes 800500U, 8102BN, 8102BNUWP, 8103BN, 8103BNUWP, 8104BN, 8104BNUWP, 8115BN, 8115BNUWP, 8135BN, 8135BNUWP, 815600, 8156BNUWP, 8157BNU, 8157BNUMD, 8163BNWP, 8165BNWP, 8172BNWP, 8175BNWP, 8220BNWP, 8302BNUMD
Silver Chloride pH electrode fill solution, 4 M KCl with Ag/AgCl, 5 x 60 mL	900011	Standard, Specialty, Single Junction Refillable Green, Micro and ORP Electrodes 9102BNWP, 9103BNWP, 9104BNWP, 9156BNWP, 9157BN, 9157BNMD, 9162BNWP, 9165BNWP, 9172BNWP, 9180BN, 9180BNMD, 9678BNWP, 9778BNWP, 9780SC, 9810BN, 9826BN, 9863BN
Silver Chloride pH electrode (low level) fill solution, 2 M KCl with Ag/AgCl, 5 x 60 mL	900004	Standard, Specialty, Single Junction Refillable Green, Micro and ORP Electrodes (low ionic strength samples) 9102BNWP, 9103BNWP, 9104BNWP, 9156BNWP, 9157BN, 9157BNMD, 9162BNWP, 9165BNWP, 9172BNWP, 9180BN, 9180BNMD, 9678BNWP, 9778BNWP, 9780SC, 9810BN, 9826BN, 9863BN
Double junction pH electrode fill solution, 3 M KCl, 5 x 60 mL	910008-WA	Double Junction, Double Junction Refillable and Green 9102DJWP, 9110DJWP
No Cal pH electrode fill solution, 5 x 60 mL	510011	No Cal Electrodes 5107BNMD, 5107NC
Single junction reference electrode fill solution, equitransferent solution with Ag/AgCl, 5 x 60 mL	900001	Single Junction Reference Electrode 900100
Double junction reference electrode inner fill solution, equitransferent solution with Ag/AgCl, 5 x 60 mL	900002	Double Junction Reference Electrode 900200
Double junction reference electrode outer fill solution, 10 % KNO <sub>3</sub> , 5 x 60 mL	900003	Double Junction Reference Electrode 900200

## pH accessories

Description	Cat. No.
No Cal electrode storage chamber	020017
Storage sleeve and base for 12 mm x 120 mm electrodes	810017
12 mm electrode storage bottles, 3 pack	910003
8 mm electrode storage bottles, 3 pack	910004
Bulb guard for glass pH electrode, 5 pack	910005
6 mm electrode storage bottles, 3 pack	910006



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