Please visit **www.thermoscientific.com/waterlibrary** for more product information.

Thermo Scientific Orion pH Electrode Features

Select features to meet the needs of your applications

The Thermo Scientific Orion electrode line offers a wide variety of quality pH electrodes to choose from. There are many different factors to consider when you selecting a pH electrode to ensure you select the electrode that will suit your needs. You will need to consider body materials, body styles, and sample requirements. Below is a quick guide to help you choose the correct pH electrode. If you still require assistance, please contact our technical service department at 800-225-1480 or 978-232-6000.

Body Materials

Glass Body	Epoxy Body
	
Compatible with virtually any sample, including solvents	Extremely durable, rugged body prevents breakage
Easy to clean	Electrode bulb protected by bulb guard
Can handle higher temperature	Low-maintenance gel-filled can be used in higher temperatures than glass low-maintenance electrodes

pH Body Style

Standard	Semi-Micro
	
12 mm diameter	6-8 mm diameter
Used in a wide variety of samples	For small samples sizes down to 200 µL

Micro	Rugged Bulb
	
1-5 mm diameter	Glass body
For samples as small as 0.5 µL and containers as small as 384 well plates	Extra durable pH bulb to prevent breakage

Spear Tip	Flat Surface
	
For piercing solid or semi-solid samples	For measuring surfaces of solid or gel samples
Can be used for small volumes	For use with small volumes

Fill Type

Refillable (Glass or Epoxy Body)	Polymer Filled (Sealed Glass or Epoxy Body)	Gel Filled (Sealed Epoxy Body)
Filling solution required	No filling solution needed	No filling solution needed
Easy maintenance, periodic filling and draining needed	Low maintenance, sealed reference	Low maintenance, sealed reference
Longer expected life	Easy to use	Easy to use
For use in a wide variety of applications	For use in a wide variety of applications	General purpose for everyday use
Best precision, 0.01 to 0.02 pH	0.02 pH precision	0.05 to 0.1 pH precision
Most rapid response time	Better response time	Good response time
Longest warranty, 1-2 years (6 months for Ag/AgCl micro electrodes)	1 year warranty	3-6 month warranty (18 months for ROSS 8107 models)

Reference Styles

ROSS Ultra®/ ROSS Reference®	Double Junction Ag/AgCl	Single Junction Ag/AgCl
0.01 pH precision	0.02 pH precision	0.02 to 0.1 pH precision
Best measurement response time	Better measurement response time	Good measurement response time
Best temperature response	Good temperature response	Good temperature response
Ideal for TRIS, protein and sulfide samples	Ideal for TRIS, protein and sulfide samples	General purpose for everyday use
Variety of body styles and types	Variety of body styles and types	Variety of body styles and types
Refillable or gel filled design	Refillable, polymer or gel filled design	Refillable or gel filled design

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

Sure-Flow®, Sleeve and Open	Ceramic and Glass Capillary	Wick and Glass Fiber
Best junction for dirty, difficult samples and demanding lab use	Better junction for routine lab use in a variety of samples	Good junction for routine lab use or field use in buffers and aqueous samples
Junction is clog free, easy to clean and has longest use life	Junction is high quality and durable	Good junction with durability
Ideal for thick or viscous samples, compatible with all sample types	Ideal for most lab applications and sample types	Ideal for basic lab applications and aqueous samples

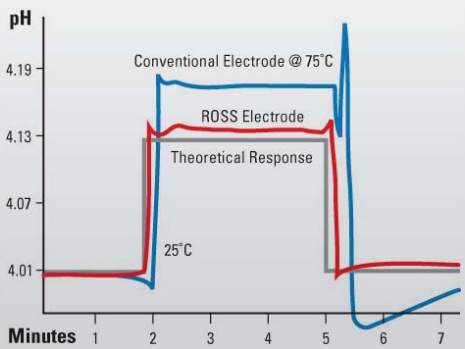
Thermo Scientific Electrode Styles

Thermo Scientific Orion Electrode Families and Types
Thermo Scientific Orion pH electrodes have a variety of different family of electrodes available to help with your measurements needs. They are designed to meet all your measurement needs.

Triodes
Combination pH electrode with built-in temperature sensor. Convenience with being able to measure pH and temperature with one electrode. BNC connector for pH measurement and alternative connector for temperature measurement. Compatible with only Thermo Scientific Orion pH meters as temperature connector and temperature element are unique to meter model.

ROSS Ultra® and ROSS® Electrodes
The best electrode available anywhere! Has the fastest response, best accuracy and reproducibility despite sample composition. Exhibits unmatched response to temperature variations. Double junction reference for complex samples such as biological media, foods, pharmaceuticals, TRIS, sulfides and proteins. Available in all body styles. ROSS Ultra electrodes have an industry best warranty.

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.



Temperature Response of the ROSS Ultra® and ROSS® Electrodes vs. Conventional Electrodes

AquaPro Professional pH Electrodes
Low maintenance polymer filled double junction electrode. For use in TRIS, sulfides, proteins and biological media. Has 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.

Double Junction
Isolated Ag/AgCl reference system which prevents silver from coming in contact with the sample. Great for measuring TRIS buffer, sulfide and protein samples. Available in standard and micro body styles.

No Cal®
Unique reference system that provides quick and accurate measurements. Great for measuring TRIS buffers sulfide and protein samples. No calibration required and accurate to 0.1 pH without calibration. Has the benefit of having a ceramic junction in an epoxy body and also a built-in temperature sensor.

Standard
A large variety of electrodes for a wide range of applications. Includes specialty pH electrodes for unique or challenging pH measurements. Available in most body styles. Micro electrodes capable of measuring samples as small as 0.5 µL in containers as small as 384 well plates.

KNIpHE®
The pH electrode is housed in a body with a stainless steel blade for measuring meat, cheese and sludge samples.

Economy or Low-Maintenance
Good performance, valued priced, durable and low maintenance gel-filled pH electrodes. Available in standard, semi-micro and flat surface body styles.

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

ATC Probes
Automatic temperature compensation probes measure sample temperatures and adjust pH measurements by correcting the electrode slope according to the measured temperature.

Thermo Scientific Orion pH Electrode Selection Guide

Sample Type	Electrode Recommendations
pH Precision	
Biological/Pharmaceutical – TRIS buffer, proteins, enzymes	Electrodes should have a ROSS or double junction Ag/AgCl reference (no sample contact with silver)
Education/Student Use	Electrodes should have an epoxy body for added durability
Emulsions – Foods, cosmetics, oils	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging
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
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)
Flat Surfaces – Paper	Electrodes should have a flat-surface tip
General Purpose – Most sample types	All electrodes are suitable for general purpose measurements
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
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
Large Sample Sizes – Tall flasks	Electrodes should have a long body that fits the container
Low Ionic Strength – Treated effluent, deionized water, distilled water	Electrodes should be refillable for better contact with the sample and more stable measurements
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
Semi-solids – Fruit, meat, cheese	Electrodes should have a spear tip for piercing samples and a ROSS or double junction Ag/AgCl reference
Small Sample Size – Micro-titer plates	Electrodes should have a small diameter that fits the container
Small Sample Size – NMR tubes	Electrodes should have a small diameter that fits the container
Small Sample Size – Test tubes, small flasks and beakers	Electrodes should have a small diameter that fits the container
Small Sample Size – TRIS buffer, proteins, sulfides	Electrodes should have a small diameter that fits the container and a ROSS or double junction Ag/AgCl reference
Titration	Electrodes should have a Sure-Flow or sleeve junction for better contact with the sample and more stable measurements
Viscous Liquids – Slurries, suspended solids sludges	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging
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
Waters – Drinking water, tap water	Electrodes should have an epoxy body for added durability
Waters – Wastewater, seawater	Electrodes should have a ROSS or double junction Ag/AgCl reference and have an epoxy body for added durability

Electrode Rating — BEST | BETTER | GOOD

ROSS Ultra®	ROSS®	AquaPro	Standard Ag/AgCl	Green	Micro Ag/AgCl	Double Junction	Economy/Basic
0.01	0.01	0.02	0.02	0.02 to 0.05	0.02	0.02	0.05 to 0.1
8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN 8104BN 815600 8165BNWP 8172BNWP	9102AP 9104APWP 9107APMD 9156APWP		GD9106BNWP GD9156BNWP		9102DJWP 9156DJWP	
8107BNUMD 8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
	8165BNWP 8172BNWP	9104APWP 9107APMD	9165BNWP 9172BNWP				
	8172BNWP	9102AP 9104APWP	9172BNWP				
8135BNUWP	8135BN	9135APWP					
8135BNUWP	8135BN	9135APWP					913600
8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN 8104BN 815600 8165BNWP 8172BNWP	9102AP 9104APWP 9107APMD 9156APWP	9102BNWP 9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP GS9156BNWP GD9156BNWP		9102DJWP 9156DJWP	9106BNWP
8107BNUMD		9107APMD 9156APWP	9107BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
	8165BNWP 8172BNWP	9104APWP 9107APMD 9102AP	9165BNWP 9172BNWP				
							912600
8102BNUWP 8156BNUWP 8157BNUMD	8102BN 815600 8165BNWP 8172BNWP		9165BNWP 9172BNWP	GS9156BNWP GD9156BNWP		9102DJWP	
	8172BNWP		9172BNWP				
	8163BNWP					9120APWP	
	8220BNWP				9810BN		
					9826BN		
8103BNUWP 8115BNUWP	8103BN 8115BN 8175BNWP	9103APWP 9115APWP	9103BNWP		9810BN 9826BN	9110DJWP	911600 912600
8103BNUWP 8115BNUWP	8103BN 8115BN 8175BNWP	9103APWP 9115APWP				9110DJWP	
	8162SC 8165BNWP 8172BNWP						
	8165BNWP 8172BNWP	9104APWP 9107APMD	9165BNWP 9172BNWP				
8102BNUWP 8156BNUWP 8157BNUMD	8102BN 815600 8165BNWP 8172BNWP		9165BNWP 9172BNWP	GS9156BNWP GD9156BNWP		9102DJWP	
8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9156BNWP 9165BNWP	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
8156BNUWP 8157BNUMD	815600 8165BNWP	9107APMD 9156APWP	9165BNWP	GD9106BNWP GD9156BNWP		9156DJWP	

Thermo Scientific Orion ROSS pH Electrodes

The Best Choice For Superior Stability, Rapid Response, Accurate and Reproducible pH Measurements

ROSS pH electrodes offer unmatched benefits that you will not find in any other pH electrode. For more than 30 years, ROSS pH electrodes have been providing the best accuracy, stability and response you will find in a pH electrode. Before selecting an electrode, consider the advantages you will have if you choose a ROSS electrode.

Rapid Response and Superior Stability

Compared to conventional electrodes, the proven ROSS reference system exhibits superior stability in measurements, faster response, greater accuracy and precision when measuring samples that vary in temperature or when calibrating in temperatures that differ from your samples.

ROSS electrodes are much more stable over time and avoid the long term drift that other electrodes exhibit. 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 ºC and show rapid response and stability even when measuring samples that differ by as much as 50 ºC. 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 are still trying to equilibrate and provide the correct reading after 3 minutes. The graph on page 63 illustrates this response.

No Sample Contamination

Standard silver chloride electrodes leach metal into the fill solution and eventually into the sample. ROSS electrodes do not contain any silver or mercury to react with the sample or to clog the electrode junction which causes sluggish response or inaccurate readings while also reducing electrode life. 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 more control over an important variable. In order to minimize errors caused by junction potential, you can use a solution that is similar to the sample. The user also has the ability to change filling solutions to minimize contamination when potassium or chloride in the sample are undesirable.

ROSS electrodes have two main families to choose from. Each family has a variety of electrode options to choose from to ensure you have the correct electrode for your measurement needs. All contain the advantages mentioned previously.

ROSS Ultra®

ROSS Ultra electrodes offer the best stability and drift free measurements of all ROSS electrodes. The reference system is designed to provide an enhanced life. We are so confident of it that the warranty is double that of standard ROSS electrodes. Refillable ROSS Ultra electrodes have a 2 year warranty while the low-maintenance triode™ has an 18 month warranty.

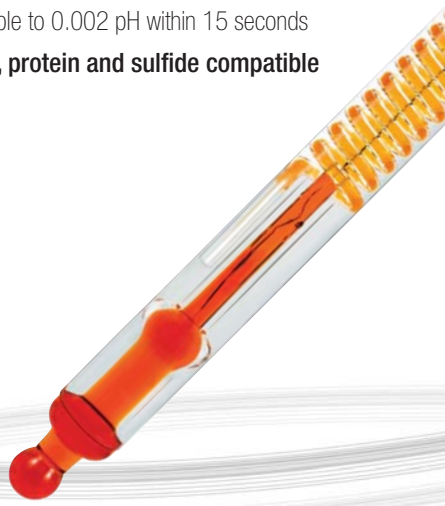
The ROSS Ultra line features glass or epoxy electrodes, refillable or low-maintenance design, flat surface and semi-micro designs. ROSS Ultra Triodes include a built-in temperature sensor and provide faster temperature response that other 3-in-1 electrodes.

ROSS®

Standard ROSS electrodes provide the same rapid response, accuracy and temperature response of all ROSS electrodes. The reference system provides excellent stability. These electrodes provide 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.

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 ºC:** Accurate within 0.03 pH for buffer at any temperature between 0-100 ºC using automatic temperature compensation
- **Speed of Response in 6.86 buffer going from 25 to 75 ºC:** Response stable to 0.01 pH within 30 seconds
- **Speed of Response between 6.86 and 4.01 buffers at 25 ºC:** Response stable to 0.002 pH within 15 seconds
- **Mercury free, TRIS, protein and sulfide compatible**



Thermo Scientific Orion Sure-Flow pH Electrodes

Clog Free Long Lasting Junction

Sure-Flow® Junction

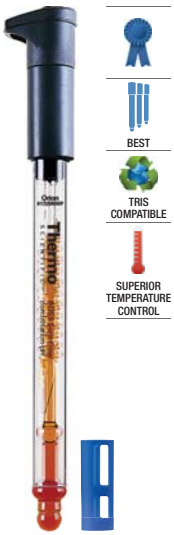
The unique, free-flowing liquid-to-liquid junction assures you of the most stable, drift-free measurements. The easy-to-clean junction never clogs, simply press the cap and flush the junction area. Release the cap and the junction is reset. Now even the most problematic, dirty or viscous samples can be easily measured without a clogged junction! The Sure-Flow junction has proven reliability and extends the electrode life.

ROSS electrodes provide unmatched accuracy and response to extreme temperature changes. They are compatible with samples containing organic compounds, proteins, heavy metals, and other compounds that react with silver such as bromides, iodides, cyanides and sulfides.

Silver chloride sure-flow electrodes can be used on tough samples that do not require a double junction electrode to prevent contact with silver.

ROSS Sure-Flows are also available as semi-micro pH and reference half cell electrodes on pages 75 and 80.

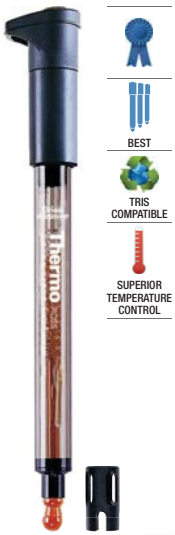
High performance in all samples



ROSS® Sure-Flow® combination pH electrode with glass body

- Sure-Flow junction prevents clogging
- For soil, sludge, colloids, viscous material and organic solvents

Fast response – even in difficult samples



ROSS® Sure-Flow® combination pH electrode with epoxy body

- Ideal for soil samples
- Durable epoxy design
- For TRIS, sulfides and proteins

For all samples including solvents

Sure-Flow® combination pH electrode with glass body

- For soil, sludge, colloids, and viscous material
- Chemical resistant glass body

Fast response in difficult samples & soils

Sure-Flow® combination pH electrode with epoxy body

- Rugged, durable epoxy design
- Has removable bulb guard

Cat. No.	8172BNWP	8165BNWP 8165DN	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.)	3 M KCl (810007)	3 M KCl (810007)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	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 EDIN Waterproof	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories
810001	ROSS storage solution
810007	ROSS fill solution
900011	Ag/AgCl fill solution
910001	Ag/AgCl storage solution


BNC Waterproof


EDIN Waterproof

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

Thermo Scientific Orion Triode pH Electrodes

Measures pH and Temperature with One Electrode

All Thermo Scientific Orion Triodes™ have built-in temperature sensors allowing you to measure pH and temperature with one electrode. There are a variety of electrodes based on your sample and application.

The ROSS Ultra Triodes offer such great stability and drift that the warranty period is double other electrodes.The refillable electrodes have a two year replacement warranty. The gel-filled ROSS Ultra Triode electrodes have an 18 month warranty.

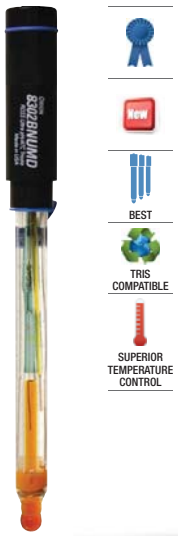
Complex samples, such as biological media, foods and pharmaceuticals, can be measured easily. All ROSS Ultra electrodes can be used in samples that contain TRIS, sulfides or proteins.

ROSS Ultra electrodes offer the best temperature performance of all other electrodes in repeated, varying temperatures.

The AquaPro Triode has the advantage of having an open junction that does not clog and double junction reference. For use in samples with TRIS, protein and sulfides.

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

Top performance with glass body



ROSS Ultra® pH/ATC Triode with glass body

- High performance for QC and research
- Chemical resistant glass body

Low maintenance with extended life

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

- Low maintenance gel
- Rugged epoxy body

Refillable, convenience and durable

ROSS Ultra® pH/ATC Triode with epoxy body

- General purpose, high performance
- Rugged epoxy body

Cat. No.	8302BNUMD (Star)	8107BNUMD (Star)* 8107UWMMD (Star)	8157BNUMD (Star)* 8157UWMMD (Star)
pH Range	0-14	0-14	0-14
pH Precision	0.01	0.01	0.01
Temp. Range	0-100 °C	0-80 °C	0-100 °C
Temp. Accuracy	±1.0 °C	±1.0 °C	±1.0 °C
Internal Reference	ROSS	ROSS	ROSS
Junction	Ceramic	Glass capillary	Glass fiber
Fill Solution (Cat. No.)	3 M KCl (810007)	–	3 M KCl (810007)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 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 Waterproof - MiniDIN (Star)* 3 m

Cat. No.	Recommended Accessories
810001	ROSS storage solution
810007	ROSS fill solution
900001	Ag/AgCl fill solution
910001	Ag/AgCl storage solution

Electrode maintains calibration for one year

BEST

TRIS COMPATIBLE

SUPERIOR TEMPERATURE CONTROL

No Cal® combination pH electrode with epoxy body and built-in ATC

- Designed for stable, high performance pH analysis in the field
- Accurate to 0.1 pH without calibration

5107BNMD (Star)
5107NC (A+ Series)

0-14	
0.01	
0-100 °C	
±1.0 °C	
Platinum	
Ceramic	
No Cal (510011)	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)	

Rugged design with clog free open junction

BETTER

TRIS COMPATIBLE

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

- Low maintenance for Star meters

9107APMD (Star)

0-14	
0.02	
0-60 °C	
±2.0 °C	
Ag/AgCl Double junction	
Open	
–	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star)	

Low maintenance

BETTER

pH/ATC Triode™ with epoxy body, low maintenance gel

- Low maintenance gel
- Epoxy body for ruggedness

9107BNMD (Star)*
9107WMMD (Star)*
9107WLMD (Star)*
9107BN (A+ Series)
9107WP†

0-14	
0.02	
0-80 °C	
±2.0 °C	
Ag/AgCl	
Wick	
–	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)†	

Low maintenance

BETTER

pH/ATC Triode™ with epoxy body, low maintenance

- Low maintenance gel
- Epoxy body for ruggedness

9109WP
9109WL

0-14	
0.02	
0-80 °C	
±2.0 °C	
Ag/AgCl	
Wick	
–	
L - 120 mm D - 12 mm Cap D - 22 mm	
EDIN Waterproof Banana Plug	

Refillable and durable

BETTER

pH/ATC Triode™ with epoxy body, refillable

- Long-lasting
- Epoxy body for ruggedness

9157BNMD (Star)
9157BN (A+ Series)

0-14	
0.02	
0-90 °C	
±2.0 °C	
Ag/AgCl	
Glass fiber	
4 M KCl w/ Ag/AgCl (900011)	
L - 120 mm D - 12 mm	
BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)	

Low maintenance and reliable

GOOD

pH/ATC Triode™ with epoxy body, low maintenance gel

- General purpose
- For Russell RL060P meter

9147BN

0-14	
0.1	
0-50 °C	
±2.0 °C	
Ag/AgCl	
HDPE pin	
–	
L - 120 mm D - 12 mm	
BNC 2.5 mm Phono Tip	


BNC Waterproof


BNC


2.5 mm Phono Tip


MiniDIN (Star)


8 Pin (A+ Series)


Banana Plug


EDIN Waterproof

Key Information

Cable lengths range from 1 to 6 meters WMMD = 3 meters, WLMD = 6 meters, 9109WL = 6 meters

9109 cap is for intrinsically safe meters

Thermo Scientific Orion Glass Refillable pH Electrodes

Chemical Resistant Glass Bodies

Glass body electrodes offer superior chemical resistance. They are also able to withstand higher temperatures than epoxy electrodes, with some models able to be used up to 100 °C. Glass electrodes are also easy to clean as they are compatible with most solvents and inorganic materials.

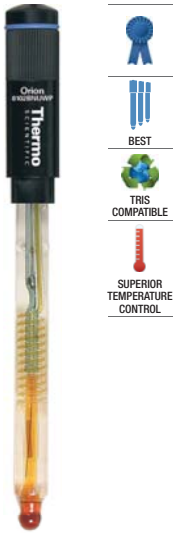
ROSS Ultra and ROSS electrodes provide unmatched ROSS accuracy and rapid response to temperature extremes. All are TRIS compatible. ROSS Ultra glass electrodes have an industry best 2 years warranty.

AquaPro refillable electrodes are TRIS compatible and have a open junction that does not clog.

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

Single junction electrodes provide a reliable option for routine pH measurement.

Top performance for QC and research



ROSS Ultra® combination pH electrode with extended life

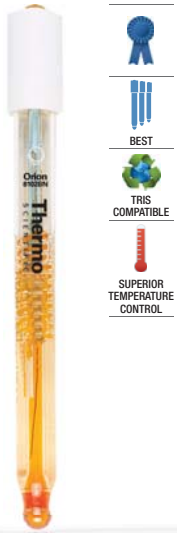
- For precise pH determinations
- General purpose, high performance

Precise yet durable, for QC and research

ROSS Ultra® combination pH electrode with rugged bulb, extended life

- Toughened bulb for rugged lab use

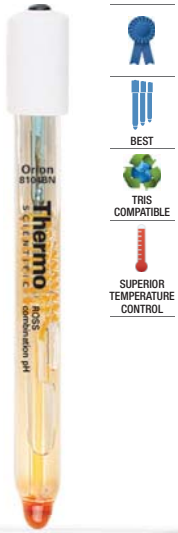
For precise and reproducible pH determinations



ROSS® combination pH electrode

- General purpose, high performance
- For QC and research applications

Durable, for precise pH analysis



ROSS® combination pH electrode with glass body, rugged bulb

- Toughened bulb for rugged lab use
- For QC and research applications

Cat. No.	8102BNUWP	8104BNUWP	8102BN 8102SC	8104BN 8104SC
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.01	0.01
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Internal Reference	ROSS	ROSS	ROSS	ROSS
Junction	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)
Dimension D (Dia) L (Length) T (Tip)	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 Screw Cap	BNC Screw Cap

Cat. No.	Recommended Accessories
910001	Ag/AgCl storage solution
900011	Ag/AgCl fill solution
910008-WA	3 M KCl double junction fill solution

Cat. No.	Recommended Accessories
810001	ROSS storage solution
810007	ROSS fill solution

For accurate pH analysis and titrations

ROSS® combination pH electrode with 14/15 standard taper

- For titrators or vessels that require a standard taper joint

8162SC

0-14	
0.01	
0-100 °C	
ROSS	
Sleeve	
3 M KCl (810007)	
L - 120 mm D - 12 mm	
Screw Cap	

Accurate and reliable

Double Junction combination pH electrode

- General purpose
- Easy-to-clean design

9102DJWP

0-14	
0.02	
0-60 °C	
Ag/AgCl Double junction	
Ceramic	
3 M KCl (910008-WA)	
L - 120 mm D - 12 mm	
BNC Waterproof	

General purpose for everyday use

Combination pH electrode

- For routine or research applications

9102BNWP
9102SC

0-14	
0.02	
0-90 °C	
Ag/AgCl	
Ceramic	
4 M KCl w/ Ag/AgCl (900011)	
L - 120 mm D - 12 mm	
BNC Waterproof Screw Cap	

Durable and reliable

Combination pH electrode with rugged bulb

- Toughened bulb for rugged lab use

9104BNWP
9104SC

0-14	
0.02	
0-90 °C	
Ag/AgCl	
Ceramic	
4 M KCl w/ Ag/AgCl (900011)	
L - 120 mm D - 12 mm	
BNC Waterproof Screw Cap	

General purpose and reliable

Combination pH electrode

- General purpose
- Easy-to-clean design

9142BN

0-14
0.1
0-90 °C
Ag/AgCl
Ceramic
4 M KCl w/ Ag/AgCl (900011)
L - 120 mm D - 12 mm
BNC


BNC Waterproof


BNC


Screw Cap

Key Information

All cap diameters are 16 mm

All cable lengths are 1 meter

Thermo Scientific Orion Epoxy Refillable pH Electrodes

Rugged Epoxy Body Prevents Breakage

Epoxy body electrodes are ideal for field measurements or situations where they will be exposed to rugged handling. The electrode body surrounds the glass pH bulb providing further protection.

ROSS Ultra and ROSS electrodes exhibit unmatched accuracy and rapid response to extreme temperature variations. All are TRIS compatible. The ROSS Ultra electrode has an unprecedented 2 year warranty.

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.

Silver chloride epoxy electrodes provide excellent response and performance in routine samples.

Top performance – precise pH analysis with durability

ROSS Ultra® combination pH electrode with epoxy body

- Top accuracy and rapid response to temperature extremes
- General purpose, high performance
- Extended life

Durable for precise pH applications

ROSS® combination pH electrode with epoxy body

- Top accuracy and rapid response to temperature extremes
- General purpose, high performance

Refillable, double junction

Green combination double junction refillable pH electrode with epoxy body

- Ideal for routine or research applications
- Use in dirty water or TRIS, sulfide and protein samples
- Contains no lead

Refillable, rugged epoxy body

Green combination refillable pH electrode with epoxy body

- Ideal for routine or research applications
- Contains no lead

General purpose and reliable

Combination pH electrode with epoxy body

- For routine or research applications
- Reliable and durable

Cat. No.	8156BNUWP	815600 8155SC	GD9156BNWP	GS9156BNWP	9156BNWP 9156SC
pH Range	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.02	0.02	0.02
Temp. Range	0-100 °C	0-100 °C	0-90 °C	0-90 °C	0-90 °C
Temp. Accuracy	–	–	–	–	–
Internal Reference	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl
Junction	Glass fiber	Glass fiber	Glass fiber	Glass fiber	Glass fiber
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (910008-WA)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	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 Screw Cap	BNC Waterproof	BNC Waterproof	BNC Waterproof Screw Cap

Cat. No.	Recommended Accessories
900011	Ag/AgCl fill solution
810007	ROSS fill solution
910008-WA	3M KCl double junction fill solution


Screw Cap


BNC Waterproof


BNC

Thermo Scientific Orion Micro pH Electrodes

Delicate Electrode for Small Volumes, Fits 384 Microwell Plates

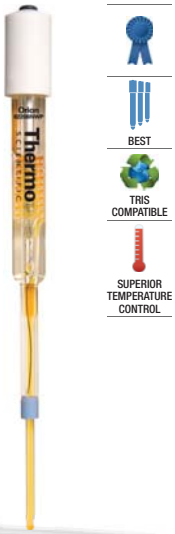
Micro electrodes are designed to measure small volumes down to 0.5 µL. These are extremely delicate electrodes because of their size and should be treated as such. The small stem and bulb diameter allow the electrode to be inserted into small devices such as 384 microwell plates. There are are a variety to choose from based on your measurement needs.

The ROSS 8220BNWP micro electrode provides the best accuracy and response time of the micro electrodes. It can be used in biological samples. The 8220BNWP is more durable than the silver chloride electrodes.

Silver chloride micro electrodes are single junction electrodes. They are avaiable to measure samples as small as 0.5 µL, for use in NMR tubes and available with a stainless steel needle tip over the glass stem and bulb.

The double junction micro electrode is for moderate size samples. The double junction design is good for use when measuring TRIS samples, proteins, sulfides or biologicals.

Accurate in extremely small samples



PerpHecT® ROSS® combination pH electrode with glass body, micro

- Measures samples as small as 15 µL in 384 well plates
- Minimum depth of immersion is 4.5 mm
- Durable tip design

Measure samples as small as 0.5 µL

Micro combination pH electrode with glass body, small tip

- Designed for gels and small sample volumes
- Measure samples as small as 0.5 µL

For use in NMR tubes

Micro combination pH electrode with glass body, long length

- Ideal for measurements in extremely small vessels

For piercing septa

Micro combination pH electrode with needle tip

- 16 gauge stainless steel bevel tip

For samples with size limitations

Double Junction combination pH electrode with glass body, semi-micro tip

- Measure samples as small as 0.2 mL
- Easy-to-clean refillable design

Cat. No.	8220BNWP	9810BN	9826BN	9863BN	9110DJWP
pH Range	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.02	0.02	0.02	0.02
Temp. Range	0-100 °C	0-80 °C	0-80 °C	0-80 °C	0-60 °C
Temp. Accuracy	±0.5 °C	–	–	–	–
Internal Reference	ROSS	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl Double junction
Junction	Sleeve	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	3 M KCl (910008-WA)
Dimension D (Dia) L (Length) T (Tip)	L - 155 mm T - 3 mm x 40 mm L	L - 120 mm T - 1.3 mm x 37 mm L	L - 228 mm T - 2.5 mm x 2.5 mm L	L - 137 mm T - 1.7 mm x 40 mm L	L - 150 mm T - 4.5 mm x 90 mm L
Depth of Immersion	4.5 mm	1 mm	2 mm	3 mm	–
Connector Type	BNC Waterproof	BNC	BNC	BNC	BNC Waterproof


BNC Waterproof


BNC

Key Information

All cap diameters are 16 mm at bottom of cap except 9810BN, 9826BN & 9863BN

All cable lengths are 1 meter

Thermo Scientific Orion Glass Semi Micro pH Electrodes

Measures Samples As Small As 0.2 mL. Fits Test Tubes and Small Containers

Glass body semi-micro pH electrodes provide superior chemical resistance and can withstand high temperatures extremes. There are a variety of options to choose from.

ROSS Ultra and ROSS semi-micro pH electrodes 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.

AquaPro semi-micro electrodes have a clog free open junction and are TRIS compatible.

Silver chloride semi-micro electrodes are durable and provide reliable and accurate measurements of routine samples.

Ideal for QC samples with size limitations

BEST

ROSS Ultra® combination pH electrode with glass body, semi-micro tip

- Extended life
- TRIS compatible
- Fast response at temperature extremes

Fast, reliable results in small samples

BEST

ROSS® combination pH electrode with glass body, semi-micro tip

- TRIS compatible
- Fast response at temperature extremes

Fast response in small samples

BETTER

AquaPro combination pH electrode with low maintenance polymer, glass body, semi-micro tip

- TRIS compatible
- Open junction prevents clogging

For samples with size constraints

BETTER

Combination pH electrode with glass body, semi-micro tip

- For routine or research applications

Cat. No.	8103BNUWP	8103BN 8103SC	9103APWP	9103BNWP 9103SC
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	Open	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	–	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 165 mm T - 6 mm x 95 mm L	L - 165 mm D - 6 mm x 95 mm L	L - 165 mm T - 6.5 mm x 100 mm L	L - 165 mm T - 6.5 mm x 100 mm L
Connector Type	BNC Waterproof	BNC Screw Cap	BNC Waterproof	BNC Waterproof Screw Cap

Cat. No.	Recommended Accessories
910001	Electrode storage solution
900011	Ag/AgCl fill solution
810001	ROSS storage solution
810007	ROSS fill solution


Screw Cap


BNC Waterproof


BNC

Key Information
All cap diameters are 16 mm
All cable lengths are 1 meter

Thermo Scientific Orion Epoxy Semi Micro pH Electrodes

Rugged Body for Small Samples or Narrow Containers

Epoxy body semi-micro pH electrodes provide a rugged design. They are available in double junction or single junction designs as well as refillable or low-maintenance options.

ROSS electrodes offer optimum accuracy and temperature response. AquaPro electrodes provide maintenance-free use. Silver chloride electrodes are for routine measurements.

For difficult samples with size limitations

ROSS® Sure-Flow® combination pH electrode with epoxy body, semi-micro tip

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

For aqueous samples with size constraints

ROSS Ultra® combination pH electrode with epoxy body, semi-micro tip

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

Dependable results in small samples

ROSS® combination pH electrode with epoxy body, semi-micro tip

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

Fast response in small samples

AquaPro combination pH electrode with low maintenance polymer, epoxy body, semi-micro tip

- TRIS compatible
- Open junction prevents clogging

For everyday use in small samples

Combination pH electrode with epoxy body, low maintenance gel, semi-micro tip

- Measure samples as small as 0.2 mL

For everyday use in tall containers

Combination pH electrode with epoxy body, low maintenance gel, flask length

- Designed for use in long-necked flasks

Cat. No.	8175BNWP	8115BNUWP	8115BN 8115SC	9115APWP	911600	912600
pH Range	0-14	0-14	0-14	0-14	0-12	0-12
pH Precision	0.01	0.01	0.01	0.02	0.1	0.1
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-60 °C	0-80 °C	0-80 °C
Internal Reference	ROSS	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl
Junction	Sure-Flow	Glass fiber	Glass fiber	Open	Wick	Wick
Fill Solution (Cat. No.)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	–	–	–
Dimension D (Dia) L (Length) T (Tip)	L - 165 mm T - 8 mm x 95 mm L	L - 165 mm T - 8 mm x 95 mm L	L - 165 mm T - 8 mm x 95 mm L	L - 160 mm T - 8 mm x 90 mm L	L - 145 mm D - 6 mm	L - 305 mm D - 8 mm
Connector Type	BNC Waterproof	BNC Waterproof	BNC Screw Cap	BNC Waterproof	BNC	BNC


Screw Cap


BNC Waterproof


BNC

Key Information

All cap diameters are 16 mm except 911600

All cable lengths are 1 meter

Thermo Scientific Orion Low Maintenance pH Electrodes

Never Requires Fill Solution

Low maintenance pH electrodes are easy to use and require minimal maintenance. Since the reference chamber is sealed, you never need to replace fill solution or clean and rinse the reference chamber. You may choose from many styles such as AquaPro, Green electrodes, double junction or silver chloride electrodes to suit your 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.

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

Double junction electrodes are TRIS compatible and you do not have to worry about interfering substances.

Silver chloride electrodes offer low maintenance as well as reliable measurements for everyday use.

Reliable and accurate

BETTER

TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, glass body

- General purpose, high performance

Precise and durable

BETTER

TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, glass body, rugged bulb

- Toughened bulb for rugged lab use

Rugged and accurate

BETTER

TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, epoxy body

- General purpose, high performance

Low maintenance, double junction

BETTER

TRIS COMPATIBLE

LEAD FREE

Green combination double junction pH electrode, gel with epoxy body

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

Cat. No.	9102AP	9104APWP	9156APWP	GD9106BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.02	0.02	0.02	0.02
Temp. Range	0-60 °C	0-60 °C	0-60 °C	0-90 °C
Internal Reference	Ag/AgCl Double junction	Ag/AgCl Double junction	Ag/AgCl Double junction	Ag/AgCl Double junction
Junction	Open	Open	Open	Glass capillary
Dimension D (Dia) L (Length) T (Tip)	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	BNC Waterproof	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories
910001	Electrode storage solution
910199	All-in-one pH buffer kit

Low maintenance, rugged epoxy body

BETTER

LEAD FREE

Green combination pH electrode, gel with epoxy body

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

Durable and low maintenance

BETTER

TRIS COMPATIBLE

Double Junction combination pH electrode with epoxy body, low maintenance gel

- Low maintenance gel with durable epoxy body

For rugged, everyday use

GOOD

Combination pH electrode with epoxy body, low maintenance gel

- Ideal for field, plant, or educational applications

Reliable every day use

GOOD

Combination pH electrode with epoxy body, low maintenance gel

- General purpose use
- Removable bulb guard makes cleaning easy

GS9106BNWP	9156DJWP	9106BNWP	9146BN
0-14	0-14	0-14	0-14
0.05	0.02	0.05	0.1
0-90 °C	0-60 °C	0-80 °C	0-80 °C
Ag/AgCl	Ag/AgCl Double junction	Ag/AgCl	Ag/AgCl
Glass capillary	Wick	Wick	Wick
L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm	L - 120 mm D - 12 mm
BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC

BNC Waterproof

BNC

Key Information
All cap diameters are 16 mm
All cable lengths are 1 meter

Thermo Scientific Orion Flat Surface pH Electrodes

Measure Moist Surfaces Such As Agar Gel Plates, Meats and Cheese

Flat surface electrodes are epoxy body electrodes with a flat pH bulb that allow you to measure moist solid samples or small volumes. They can be uses on samples such as meats, 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, sulfides or other compounds that react with silver. You may also choose from refillable or low maintenance designs.

Thermo Scientific Orion ROSS Ultra and ROSS flat surface electrodes provide optimum accuracy and stability while being TRIS compatible. 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. The 9135APWP AquaPro flat surface electrode is a low maintenance model never requiring fill solution.

The silver chloride 913600 flat surface electrode is a low maintenance electrode that is ideal for routine measurements.

Ideal for soft solid and semi-solid samples

BEST
TRIS COMPATIBLE
SUPERIOR TEMPERATURE CONTROL

ROSS Ultra® combination pH electrode with epoxy body, flat surface

- Extended life and 2 year warranty
- Rapid response to temperature extremes

For soft solid and semi-solid samples

BEST
TRIS COMPATIBLE
SUPERIOR TEMPERATURE CONTROL

ROSS® combination pH electrode with epoxy body, flat surface

- Premium performance
- Rapid response to temperature extremes

For soft solids and semi-solids

BETTER
TRIS COMPATIBLE

AquaPro combination pH electrode with low maintenance polymer, epoxy body, flat surface

- Clog free junction for tough samples

For solids and semi-solids

GOOD

Combination pH electrode with epoxy body, low maintenance gel, flat surface

- For routine flat surface measurements

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.)	3 M KCl (810007)	3 M KCl (810007)	–	–
Dimension D (Dia) L (Length) T (Tip)	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

Cat. No.	Recommended Accessories
910001	Electrode storage solution
900011	Ag/AgCl fill solution
810007	ROSS fill solution
910008-WA	3 M KCl fill solution


Screw Cap


BNC Waterproof


BNC

Key Information
All cable lengths are 1 meter

Thermo Scientific Orion Spear Tip pH Electrodes

For Piercing Fruits, Cheese and Meats

Spear tip pH electrodes can be used for piercing soft samples like cheese or fruit or cutting through tougher samples such as meat. All have refillable designs. They are available in single junction or double junction deigns which can be used with TRIS samples, proteins or sulfides.

The ROSS spear tip electrode offers the proven accuracy and response that ROSS electrodes are know for and is a double junction electrode. It is suited for semi-solid samples

The 9163SC is suited for routine measurements and is for use in semi-solid samples.

The KNIpHE electrode has a glass electrode that is encased in a stainless steel housing with a cutting blade at the tip. It is used for tough samples such as meat. It has a double junction design.

The 9162BNWP can be used for soft samples or routine clean water measurements. It has a single junction design.

For piercing semi-solid samples

BEST

TRIS COMPATIBLE

SUPERIOR TEMPERATURE CONTROL

ROSS® combination pH electrode with glass body, spear tip

- For cheese, meat, and fruit samples
- Measure samples as small as 100 µL
- Double junction for TRIS samples

For piercing soft samples

BETTER

Combination pH electrode, glass body, spear tip

- For cheese, meat, and fruit samples
- Measure samples as small as 100 µL

For meat, cheese and sludge samples

BETTER

TRIS COMPATIBLE

KNIpHE® Double Junction combination pH electrode with stainless steel cutting blade

- For meat, cheese and sludge where glass alone may break
- Replacement electrode Cat. No. 9121APWP
- Replacement blade Cat. No. 712001
- Replacement sheath Cat. No. 712002

Rugged with an easy-to-clean bulb

BETTER

Low resistance combination pH electrode with glass body, rugged bulb

- For routine or clean water measurements
- For soft samples

Cat. No.	8163BNWP 8163SC	9163SC	9120APWP	9162BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.02	0.02	0.02
Temp. Range	0-100 °C	0-90 °C	0-60 °C	0-90 °C
Internal Reference	ROSS	Ag/AgCl	Ag/AgCl Double junction	Ag/AgCl
Junction	Ceramic	Ceramic	Ceramic	Ceramic
Fill Solution (Cat. No.)	3 M KCl (810007)	4 M KCl w/ Ag/AgCl (900011)	3 M KCl (910008-WA)	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 110 mm T - 4.5 mm x 20 mm L	L - 95 mm D - 6.5 mm x 25 mm L	L - 215 mm D - 16 mm	L - 120 mm D - 12 mm
Connector Type	BNC Waterproof Screw Cap	Screw Cap	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories
900011	Ag/AgCl fill solution
810007	ROSS fill solution
910008	3M KCl fill solution

Screw Cap

BNC Waterproof

Key Information
All cap diameters are 16 mm
All cable lengths are 1 meter

Thermo Scientific Orion pH Half Cell and Reference Half Cell Electrodes

pH half cells require the use of a reference half cell electrode.

Reference half cells are for use with either a pH half cell sensing electrode or an ISE half cell reference electrode. They are available as single or double reference designs. Clog free Sure-flow junctions are also available extending the life of your electrode.

Ross half cells should be paired together. 900100 and 900200 are silver chloride references for pH and ISE electrodes.

Accurate, ROSS rapid response in a half-cell design

ROSS® pH half-cell with glass body

- Use with 800300 ROSS Sure-Flow or 800500U ROSS Ultra reference electrodes

Accurate results in a half-cell

pH half-cell with glass body

- Use with 900100 single junction or 900200 double junctions reference electrodes

Top performance and long life

ROSS Ultra® reference half-cell with glass body

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

For all samples including solvents

ROSS® Sure-Flow® reference half-cell with glass body

- Sure-Flow junction prevents clogging
- Use with 8101BNWP or 8101SC ROSS pH half-cell or 8411BN ROSS sodium half-cell electrodes

For use with ISE half-cell or pH electrodes

Double Junction Sure-Flow® reference half-cell with epoxy body

- Sure-Flow junction prevents clogging
- Double junction allows a variety of filling solutions to be used

For routine pH and many ISE measurements

Single Junction Sure-Flow® reference half-cell with epoxy body

- Use with 9101BN and 9101SC pH half-cell electrodes
- Compatible with several ISEs

Cat. No.	8101BNWP 8101SC	9101BN 9101SC	800500U	800300	900200	900100
pH Range	0-14	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.02	–	–	–	–
Temp. Range	0-100 °C	0-90 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Internal Reference	ROSS	Ag/AgCl	ROSS	ROSS	Ag/AgCl Double junction	Ag/AgCl
Junction	–	–	Ceramic	Sure-Flow	Sure-Flow	Sure-Flow
Fill Solution (Cat. No.)	–	–	3 M KCl (810007)	3 M KCl (810007)	Equitransferent solution (900002) outer (900003)	Equitransferent solution w/ Ag/AgCl (900001)
Dimension D (Dia) L (Length) T (Tip)	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 - 110 mm D - 13 mm	L - 110 mm D - 13 mm
Connector Type	BNC Waterproof Screw Cap	BNC Screw Cap	Pin Tip	Pin Tip	Pin Tip	Pin Tip

Cat. No.	Recommended Accessories
810007	ROSS fill solution
900001	Single junction reference fill solution
900002	Double junction reference inner fill solution
900003	Double junction reference outer fill solution


Screw Cap


BNC Waterproof


BNC


Pin Tip

Key Information

All cap diameters are 16 mm at bottom of cap

All cable lengths are 1 meter

Thermo Scientific Orion ATC Probes

Accurate Temperature Measurement

ATC probes will measure the temperature of your sample quickly and accurately. They are extremely durable. There are a variety of options available to you to use depending on your application. Choose from a micro ATC probe, stainless steel, glass or epoxy body probe. The connector must be compatible with the meter you are using.

Fastest temperature response

BEST

Micro ATC probe with stainless steel tip and epoxy body

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

Rugged stainless steel

BEST

ATC probe with stainless steel body

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

Solvent-resistant glass

BETTER

ATC probe with glass body

- For solutions that contain organic solvents

Durable epoxy

BETTER

ATC probe with epoxy body

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

Small diameter rugged stainless steel

GOOD

ATC probe with stainless steel body

- Extremely durable body
- For field, plant, and food applications
- For use with Russell meters

Cat. No.	928007MD (Star)	927007MD (Star) 917007 (A+ Series) 927007 (PerpHecT)	927006MD (Star) 917006 (A+ Series) 927006 (PerpHecT)	927005MD (Star) 917005 (A+ Series) 927005 (PerpHecT) 917001 (Older Orion Meters)	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 for 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 Russell meters

2.5 mm Phono Tip | Dual Banana Plug | Phono Tip (PerpHecT) | MiniDIN (Star) | 8 Pin DIN (A Series)

Key Information

All cap diameters are 16 mm except 928007MD

All cable lengths are 1 meter

Thermo Scientific Orion Redox/ORP and ORP Triode Electrodes

Reliable Redox Measurements

ORP measurements are easily made with your choice or ORP electrodes. Use our reliable ORP standard and compare your results to the Standard Hydrogen Electrode.

The 9678BNWP is an durable epoxy body electrode with a non-clog Sure-Flow junction. The 9778BNWP offers a chemical resistant glass body. ORP triodes have a durable epoxy body and can measure temperature also. They are available in refillable design or low-miantenance gel filled styles.

Durable and clog-free

Sure-Flow® combination redox/ ORP electrode with epoxy body

- For use in water, wastewater, metal plating, and biotech samples
- Sure-Flow junction prevents clogging

Solvent-resistant glass body

Combination redox/ ORP electrode with glass body

- For use in water, wastewater, metal plating and organic solvent samples

Easy-to-clean with built-in ATC

ORP/ATC Triode™ with epoxy body, refillable

- For use in water and wastewater
- Epoxy body for ruggedness and durability

Low maintenance with built-in ATC

ORP/ATC Triode™ with epoxy body, low maintenance gel

- For use in water and wastewater
- Epoxy body for ruggedness and durability

Cat. No.	9678BNWP	9778BNWP	9180BNMD (Star) 9180BN (A+ Series)	9179BNMD (Star) 9179BN (A+ Series)
pH Range	–	–	–	–
Temp. Range	0-90 °C	0-100 °C	0-90 °C	0-80 °C
Temp. Accuracy	–	–	±2.0 °C	±2.0 °C
Internal Reference	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl
Junction	Sure-Flow	Ceramic	Glass Fiber	Wick
Fill Solution (Cat. No.)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	–
Dimension D (Dia) L (Length) T (Tip)	L - 110 mm D - 13 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 - MiniDIN (Star) BNC Waterproof - 8 Pin (A+ Series)	BNC Waterproof - MiniDIN (Star) BNC Waterproof - 8 Pin (A+ Series)

Cat. No.	Recommended Accessories
900011	Ag/AgCl fill solution
967901	ORP standard 475 mL
967961	ORP standard 5 x 60 mL


BNC Waterproof


MiniDIN (Star)


8 Pin DIN (A Series)

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

Thermo Scientific Orion Silver Billet and Karl Fischer Electrodes

Electrodes for Titrations and Speciality Applications

The 977900 is a double platinum chemical resistant glass electrode for use with Karl Fischer titrations. It has a ground glass joint on the body to fit into titration vessels.

The 9780SC is a glass silver billit electrode used in halide titrations.

Thermo Scientific Orion Storage Sleeve and Base

If you ever have had an electrode drop on a lab bench and break you will want to use the storage sleeve and base, 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

Storage Sleeve and Base 810017

For Karl Fischer titrations

BEST

Karl Fischer double platinum electrode with glass body

- For accurate Karl Fischer titrations

For halide titrations

BETTER

Silver Billet combination electrode

- For accurate and reliable halide titrations

Cat. No.	977900	9780SC
pH Range	Endpoint Indicator	Endpoint Indicator
Temp. Range	0-40 °C	0-80 °C
Internal Reference	Platinum	Ag/AgCl
Junction	–	Ceramic
Fill Solution (Cat. No.)	–	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L - 120 mm D - 12 mm	L - 150 mm D - 12 mm
Connector Type	Dual Pin Tip	Screw Cap

Screw Cap

Dual Pin Tip

Key Information
Environmentally-safe mercury-free
All cap diameters are 16 mm at bottom of cap
All cable lengths are 1 meter

Thermo Scientific Orion Star Stirrer Probe

Ideal for laboratory pH and ISE measurements

Orion Star Automatic Stirrer Probe

Thermo Scientific Orion Star Stirrer probes are the answer to economical and convenient stirring.

- Use with the following Orion benchtop meters for automatic control and stirring:
  - Orion VERSA STAR
  - Orion DUAL STAR
  - Orion Star A210-series
  - Orion 3-, 4- and 5-Star/Star Plus benchtop
- Eliminates the hassles of magnetic stir plates and stir bars
- No heat transfer from stir plate
- No need to capture & wash stir bars
- No potential electrode bulb damage from stir bars
- Competitive pricing allows you to take advantage of the stirrer probe benefits at half the price of similar models
- Conveniently plugs into the back panel of the compatible benchtop meters for stirrer power, speed and control

It is so easy-to-use! Plug the stirring probe into the back panel of an Orion VERSA STAR, DUAL STAR, Star A210-series or benchtop 3-, 4- and 5- Star/Star Plus meter and place it into an electrode stand with the measuring electrode. 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.

Stirring Probes with Paddles

Cat. No.	Description
096019	Orion Star Stirrer probe with paddle
096021	Replacement paddles, 3 pack

Accessories

Orion DUAL STAR™

Pages 10-11

For easy ISE testing, pair the automatic stirrer probe with an Orion DUAL STAR meter.

Thermo Scientific Orion 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 Star Series electrodes to a wide variety of other meters.

New

Electrode Adapter Cables

Cat. No.	Meter Input	Electrode Connector	Adapter Needed
090033	BNC	U.S. standard	US standard to BNC adapter
91CBNC	BNC	Screw cap	Detachable cable to BNC connector
090048	BNC	Karl Fischer double pin tip	Karl Fischer adapter
090032	U.S. standard	BNC	BNC to U.S. standard adapter
91USCB	U.S. standard	Combination electrode with screw cap	Detachable cable to U.S. standard connector
91USHC	U.S. standard	Half-cell electrode with screw cap	Detachable cable to half-cell U.S. std. connector
090036	F LEMO (Metrohm)	BNC	BNC to F LEMO adapter
090035	LEMO miniature (Mettler)	BNC	BNC to LEMO miniature adapter
91CLMO	LEMO miniature (Mettler)	Screw cap	Detachable cable to LEMO connector
090034	E DIN (Knick, Schott, WTW)	BNC	BNC to E DIN adapter
91CDIN	E DIN (Knick, Schott, WTW)	Screw cap	Detachable cable to E Din connector
090037	Radiometer no. 7	BNC	BNC to radiometer adapter
91USRF	2 mm pin tip	Screw cap	Detachable cable to 2.5 mm pin tip connector
91CBNT	Other	Screw cap	Detachable cable to stripped end

Electrode Extension Cables

Cat. No.	Description
910026-WA	15 ft. extension cable, pin tip connector
910027	15 ft. extension cable, BNC connector
910028	15 ft. extension cable, 8 pin DIN connector for 917005, 917006 and 917007 ATC probes
910029-WA	15 ft. extension cable, 3.5 mm phono tip connector for 927005, 927006 and 927007
910030	15 ft. extension cable, BNC and 3.5 mm phono tip connectors for 9207BN pH/ATC Triode
910031	15 ft. extension cable, banana jack connector for 917001 and 917002 ATC probes
910032	15 ft. extension cable, 8 pin mini DIN for ATC probes for star series meters

Adapter Cables (For Star Series Electrodes to Older Meters)

Cat. No.	Description	Meter Capabilities
1010050-WA	MiniDIN ATC probe to 3.5 mm phono tip meter	Use on 310 320, 330, 350 370, 555A 550A, 535A and 162A meters
1010051	MiniDIN ATC probe to 8 pin DIN meter	Use on 210A+, 230A+ 250A+, 290A+ 410A+, 420A+ 520A+, 525A+ 710A+, 720A+ and 920A+ meters
1010800	MiniDIN DO probe to 8 pin waterproof DIN DO meter	Use on 830A 835A and 862A meters
1010801	MiniDIN DO probe to 8 pin DIN DO meter	Use on 805A+, 810A+ and 850A+ meters
1010900-WA	MiniDIN conductivity probe to 8 pin waterproof DIN conductivity meter	Use on 555A 550A, 162A 135A, and 130A meters
1010901	MiniDIN conductivity probe to 8 pin DIN conductivity meter	Use on 150A+, 145A+ 125A+, 115A+ and 105A+ meters

Thermo Scientific Orion pH Buffers and Solutions

We have the pH buffers, storage solutions, cleaning solutions, kits and pH electrode filling solutions 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

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

pH Buffers in 5 x 60 mL (5 x 2 Oz) Bottles

Perfect for field measurements, occasional pH analysis or limited lab space

Cat. No.	Description
916099	**All-in-One 60 mL pH Buffer Kit** 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)
9116860	pH 1.68 buffer, NIST traceable, 5 x 60 mL
910460	pH 4.01 buffer, color coded red, NIST traceable, 5 x 60 mL
916860	pH 6.86 buffer, DIN standard, NIST traceable, 5 x 60 mL
910760	pH 7.00 buffer, color coded yellow, NIST traceable, 5 x 60 mL
9191860	pH 9.18 buffer, DIN Standard, NIST traceable, 5 x 60 mL
911060	pH 10.01 buffer, color coded blue, NIST traceable, 5 x 60 mL
911260-WA	pH 12.46 buffer, NIST traceable, 5 x 60 mL

pH Buffers and Rinse Solution in Individual Use Pouches

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

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

pH Buffers in 19 L (5 Gallon) Cubitainers with Easy-Pour Spout

Excellent for large laboratories and multiple users

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

pH Electrode Storage Solution and ROSS pH Electrode Storage Solution

Get the fastest, most reliable performance from your pH electrode

Cat. No.	Description
810199	**ROSS All-in-One pH Buffer Kit** 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
910199	**Standard All-in-One pH Buffer Kit** 475 mL each of pH 4.01, 7.00 and 10.01 buffers; 475 mL of pH electrode storage solution (910001); and 12 mm diameter electrode storage bottle
916099	**All-in-One 60 mL pH Buffer Kit** 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)
810001	**ROSS pH Electrode Storage Solution** 475 mL
910001 910060 9100CB	**pH Electrode Storage Solution** 475 mL 5 x 60 mL 19 L (5 gallon) cubitainer

pH Electrode Cleaning Solutions

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

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

pH Specialty Solutions and ORP Standards

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

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 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 $CaCO_3$ from the included pH conversion chart.

Thermo Scientific Orion Electrode Fill Solutions and Accessories

pH Electrode and Reference Electrode Fill Solutions

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

Cat. No.	Description	Use With Electrodes
810007	ROSS electrode fill solution, 3 M KCl, 5 x 60 mL	**ROSS Ultra, ROSS and Micro ROSS Electrodes** 800300, 800500U, 8102BN, 8102BNUWP, 8103BN, 8103BNUWP, 8104BN, 8104BNUWP, 8115BN, 8115BNUWP, 8135BN, 8135BNUWP, 815600, 8156BNUWP, 8157BNU, 8157BNUMD, 8157UWMMD, 8163BNWP, 8165BNWP, 8172BNWP, 8175BNWP, 8220BNWP, 8302BNUMD
900011	Silver Chloride pH electrode fill solution, 4 M KCl with Ag/AgCl, 5 x 60 mL	**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, GS9156BNWP
900004	Silver Chloride pH electrode (low level) fill solution, 2 M KCl with Ag/AgCl, 5 x 60 mL	**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, GS9156BNWP
910008-WA	Double junction pH electrode fill solution, 3 M KCl, 5 x 60 mL	**Double Junction, Double Junction Refillable Green and KNIpHE Electrodes** 9102DJWP, 9110DJWP, 9120APWP, GD9156BNWP
510011	No Cal pH electrode fill solution, 5 x 60 mL	**No Cal Electrodes** 5107BNMD, 5107NC
610001	pHuture pH electrode fill solution, 5 x 60 mL	**pHuture Electrodes**
900001	Single junction reference electrode fill solution, equitransferent solution with Ag/AgCl, 5 x 60 mL	**Single Junction Reference Electrode** 900100
900002	Double junction reference electrode inner fill solution, equitransferent solution with Ag/AgCl, 5 x 60 mL	**Double Junction Reference Electrode** 900200
900003	Double junction reference electrode outer fill solution, 10 % KNO_3, 5 x 60 mL	**Double Junction Reference Electrode** 900200

pH Accessories

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

⚠ Signifies a hazardous solution.
See terms and conditions for important shipping information at www.thermoscientific.com/water.

Visit the WAI Online Library on **www.thermoscientific.com/water** for the most up-to-date MSDS and Certificate of Analysis files for Orion solutions.

Please visit **www.thermoscientific.com/waterlibrary** for more product information.

Thermo Scientific Orion Ion Selective Electrodes

Ion Selective Electrodes (ISE) are easy to use and provide you the best performance and reliability

Measurement by ISE can be performed in virtually every laboratory. ISEs measure ion concentrations in samples such as water, food, pharmaceuticals and biological samples. There have been many analytical methods that have been developed and published world-wide for the use of ISEs. The variety of methods available is the main advantage of using ISE technology.

Efficient and Economical

Electrode measurements are simpler and faster than other analytical techniques. Time consuming sample steps such as filtration and distillations are rarely needed. Analysis time is typically under 1 minute. Typically the cost per test is only a few cents. Compared to other methods such as atomic absorption or ion chromatography, there is a small setup cost and it does not require additional expensive readout equipment. Sample color or turbidity do not affect the measurement.

Measurement Techniques

Direct Measurement is a simple procedure for measuring a large number of samples. Each sample only requires one reading. Only a small sample volume is required. Calibration is performed on a series of standards. The concentration is then determined by comparison to the standards. Ionic strength adjustor is added to all solutions to ensure samples and standards have similar ionic strength, proper pH and reduce the effect of interfering ions. Orion ISE meters calculate and store the calibration curves.

Low Level Measurement is a similar method to direct measurement. It is recommended when the sample is not in the linear response range. A minimum 3 point calibration is recommended to compensate for the non-linear response. Calibration is performed in one beaker reducing the chance of cross contamination of the standards.

Know Addition is a useful method for measuring samples since calibration is not required. This method is recommended when measuring only a few samples, when samples have a high ionic strength (>0.1 M) or when there is a complicated background matrix. An aliquot of standard solution containing the measured species is added to the sample. The sample concentration is determined by the changes in potential before and after the addition. Orion ISE meters automatically calculate the result.

Analate Subtraction is also a useful method for measuring samples since calibration is not required. The electrodes are immersed in a reagent solution that contains a species that the electrode senses and then it reacts with the sample. It is useful when sample size is small, for samples for which a standard is difficult to prepare, and for viscous or very concentrated samples. The method is not suited for very diluted samples. It is also necessary to know the stoichiometric ration between sample and standard.

Titrations are quantitative analytical techniques for measuring the concentration of a species by incremental addition of a reagent (titrant) that reacts with the sample species. Sensing electrodes can be used for determination of the titration end point. Ion selective electrodes are useful as end point detectors because they are unaffected by sample color or turbidity.

Half Cell Ion Selective Electrodes

Solid-State Half-Cell ISE Epoxy body Require separate reference Temperature range 0-80 °C	Fluoride, Chloride, Cyanide, Silver-Sulfide, Lead, Bromide, Cadmium, Cupric, Iodide, Thiocyanate
Plastic Membrane Half-Cell ISE PVC body Require separate reference Temperature range 0-40 °C	Nitrate, Potassium, Calcium, Ammonium, Fluoroborate
ROSS® Half-Cell ISE Glass body Requires ROSS half-cell reference Temperature range 0-100 °C	Sodium

Combination Ion Selective Electrodes

Sure-Flow® Reference makes electrode easy to clean and long lasting

Ionplus® Sure-Flow® Combination ISE Epoxy body Temperature range 0-80 °C	Fluoride, Chloride, Cyanide, Silver-Sulfide, Lead, Bromide, Cadmium, Cupric, Iodide
Ionplus Sure-Flow Combination Plastic Membrane ISE PVC body Temperature range 0-40 °C	Nitrate, Potassium, Calcium
ROSS Sure-Flow® Combination ISE Glass body Temperature range 0-100 °C	Sodium

Various ISE Applications

Agriculture	Nitrate, chloride, ammonia, potassium, calcium, iodide, cyanide in soil, fertilizer and fedstuffs
Biomedical	Calcium, carbon dioxide and ammonia in biological cultures (not in vitro or in vivo)
Dairy Products	Chloride, fluoride, iodide, calcium, potassium
Dental	Fluoride, calcium in teeth and toothpaste
Education	Various ISEs in teaching and research labs
Food & Beverage	Chloride, nitrate, sodium, calcium, potassium
Geology	Fluoride and calcium in rocks
Metal Plating	Fluoride, copper, cyanide, chloride
Plant Tissue	Nitrate, chloride, fluoride, iodide, cyanide, calcium, potassium and sodium
Power, Steam Generators	Chloride, sodium and residual chlorine in boiler feeds
Pulp and Paper	Sodium, chloride, sulfide and calcium in liquors
Soil	Nitrate, calcium, sodium, potassium, bromide, chloride, ammonia, fluoride
Water, Drinking	Nitrate, residual chlorine, fluoride, cyanide, sulfide, ammonia
Water, Sea	Sodium, chloride, fluoride, nitrate, ammonia
Water, Waste	Nitrate, ammonia, residual chlorine, sulfides
Wine	Potassium, sodium, fluoride, calcium

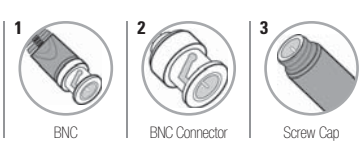
Thermo Scientific Orion Ion Selective Electrode Selection Guide

Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA
Ammonia standard (NH_3) EPA	9512BNWP [1]	Gas sensing combination	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	0 to 50 °C	Included	951202	0.1 M NH_4Cl / 951006	951211 ⚠
Ammonia high performance EPA	9512HPBNWP [1]	Gas sensing combination	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	0 to 50 °C	Included	951209	0.1 M NH_4Cl / 951006	951210 ⚠
Ammonium (NH_4^+)	931801 [8]	Plastic membrane half-cell	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	0 to 40 °C	900200	900002 inner/ 900018-WA outer	1000 ppm as N / 951007	–
Bromide (Br^-) ionplus Design	9635BNWP [1]	ionplus sure-flow solid state combination	5 x 10^{-6} to 1.0 M 0.40 to 79,900 ppm	0 to 80 °C	Included	900063	0.1 M NaBr / 943506	940011
Bromide (Br^-)	9435BN [2] 9435SC [3]	Solid state half-cell	5 x 10^{-6} to 1.0 M 0.40 to 79,900 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M NaBr / 943506	940011
Cadmium (Cd^{2+}) ionplus Design	9648BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-7} to 0.1 M 0.01 to 11,200 ppm	0 to 80 °C	Included	900061	Consult user guide	940011
Cadmium (Cd^{2+})	9448BN [2] 9448SC [3]	Solid state half-cell	1 x 10^{-7} to 0.1 M 0.01 to 11,200 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	Consult user guide	940011
Calcium (Ca^{2+}) ionplus Design	9720BNWP [1]	ionplus sure-flow plastic membrane combination	5 x 10^{-7} to 1.0 M 0.02 to 40,100 ppm	0 to 40 °C	Included	900061	0.1 M $CaCl_2$ / 922006 100 ppm $CaCO_3$ / 923206	932011
Calcium (Ca^{2+})	9320BN [2]	Plastic membrane half-cell	5 x 10^{-7} to 1.0 M 0.02 to 40,100 ppm	0 to 40 °C	900100	900011	0.1 M $CaCl_2$ / 922006 100 ppm $CaCO_3$ / 923206	932011
Carbon Dioxide (CO_2)	9502BNWP [1]	Gas sensing combination	1 x 10^{-4} to 1 x 10^{-2} M 4.4 to 440 ppm	0 to 50 °C	Included	950202	0.1 M $NaHCO_3$ / 950206 1000 ppm as $CaCO_3$ / 950207	950210
Chloride (Cl^-) ionplus Design EPA	9617BNWP [1]	ionplus sure-flow solid state combination	5 x 10^{-5} to 1.0 M 1.8 to 35,500 ppm	0 to 80 °C	Included	900062	0.1 M NaCl / 941706 100 ppm Cl^- / 941707 1000 ppm Cl^- / 941708	940011 or 941709 / CISA ⚠
Chloride (Cl^-) EPA	9417BN [2] 9417SC [3]	Solid state half-cell	5 x 10^{-5} to 1.0 M 1.8 to 35,500 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M NaCl / 941706 100 ppm Cl^- / 941707 1000 ppm Cl^- / 941708	940011 or 941709 / CISA ⚠
Chlorine (Cl_2) EPA	9770BNWP [1] 9770SC [3]	Solid state combination	1 x 10^{-7} to 3 x 10^{-4} M 0.01 to 20 ppm	0 to 50 °C	Included	None required	100 ppm as Cl_2 / 977007	977010 / iodide reagent 977011 / acid reagent ⚠
Cupric (Cu^{2+}) ionplus Design	9629BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-8} to 0.1 M 6.4 x 10^{-4} to 6350 ppm	0 to 80 °C	Included	900063	0.1 M $Cu(NO_3)_2$ / 942906	940011
Cupric (Cu^{2+})	9429BN [2] 9429SC [3]	Solid state half-cell	1 x 10^{-8} to 0.1 M 6.4 x 10^{-4} to 6350 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M $Cu(NO_3)_2$ / 942906	940011
Cyanide (CN^-) ionplus Design EPA	9606BNWP [1]	ionplus sure-flow solid state combination	8 x 10^{-6} to 1 x 10^{-2} M 0.2 to 260 ppm	0 to 80 °C	Included	900062	Consult user guide	951011 ⚠
Cyanide (CN^-) EPA	9406BN [2] 9406SC [3]	Solid state half-cell	8 x 10^{-6} to 1 x 10^{-2} M 0.2 to 260 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	Consult user guide	951011 ⚠
Fluoride (F^-) ionplus Design EPA	9609BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 80 °C	Included	900061	0.1 M NaF / 940906 100 ppm F^- / 940907 1 ppm F^- w/ TISAB II / 040906 2 ppm F^- w/ TISAB II / 040907 10 ppm F^- w/ TISAB II / 040908	940909 / TISAB II 940911 / TISAB III
Fluoride (F^-) EPA	9409BN [2] 9409SC [3]	Solid state half-cell	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 80 °C	900100	900001	0.1 M NaF / 940906 100 ppm F^- / 940907 1 ppm F^- w/ TISAB II / 040906 2 ppm F^- w/ TISAB II / 040907 10 ppm F^- w/ TISAB II / 040908	940909 / TISAB II 940911 / TISAB III

EPA Compliant with EPA testing method

⚠ Signifies a hazardous solution. See terms and conditions for important shipping information at www.thermoscientific.com/water

Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA
Fluoroborate (BF_4^-)	9305BN [2]	Plastic membrane half-cell	7 x 10^{-6} to 1.0 M 0.6 to 86,800 ppm	0 to 40 °C	900200	900002 inner / dilute ISA outer	Consult user guide	930711
Iodide (I^-) ionplus Design	9653BNWP [1]	ionplus® sure-flow® solid state combination	5 x 10^{-8} to 1.0 M 5 x 10^{-3} to 127,000 ppm	0 to 80 °C	Included	900063	0.1 M NaI / 945306	940011
Iodide (I^-)	9453BN [2] 9453SC [3]	Solid state half-cell	5 x 10^{-8} to 1.0 M 5 x 10^{-3} to 127,000 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M Na / 945306	940011
Lead (Pb^{2+}) ionplus Design	9682BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-6} to 0.1 M 0.2 to 20,700 ppm	0 to 80 °C	Included	900062	0.1 M $Pb(ClO_4)_2$ / 948206 0.1 M Na_2SO_4 / 948207	Consult instruction manual
Lead (Pb^{2+})	9482BN [2] 9482SC [3]	Solid state half-cell	1 x 10^{-6} to 0.1 M 0.2 to 20,700 ppm	0 to 80 °C	900200	900002 inner / 900003 outer	0.1 M $Pb(ClO_4)_2$ / 948206 0.1 M Na_2SO_4 / 948207	Consult instruction manual
Nitrate (NO_3^-) ionplus Design EPA	9707BNWP [1]	ionplus sure-flow plastic membrane combination	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	0 to 40 °C	Included	900046	0.1 M $NaNO_3$ / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
Nitrate (NO_3^-) EPA	9307BNWP [1]	Plastic membrane half-cell	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	0 to 40 °C	900200	900002 inner / 900046 or ISA outer	0.1 M $NaNO_3$ / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
Potassium (K^+) ionplus Design	9719BNWP [1]	ionplus sure-flow plastic membrane combination	1 x 10^{-6} to 1.0 M 0.04 to 39,000 ppm	0 to 40 °C	Included	900065	0.1 M KCl / 921906	931911
Potassium (K^+)	9319BN [2]	Plastic membrane half-cell	1 x 10^{-6} to 1.0 M 0.04 to 39,000 ppm	0 to 40 °C	900200	900002 inner / dilute ISA outer	0.1 M KCl / 921906	931911
Silver/Sulfide (Ag^+/S^{2-}) ionplus Design	9616BNWP [1]	ionplus sure-flow solid state combination	1 x 10^{-7} to 1.0 M 0.01 to 107,900 ppm as Ag^+ 0.003 to 32,100 ppm as S^{2-}	0 to 80 °C	Included	900062 for Ag^+/S^{2-} 900067 for Ag^+ 900061 for S^{2-}	Consult user guide	940011 for Ag^+ 941609 for S^{2-} ⚠
Silver/Sulfide (Ag^+/S^{2-})	9416BN [2] 9416SC [3]	Solid state half-cell	1 x 10^{-7} to 1.0 M 0.01 to 107,900 ppm as Ag^+ 0.003 to 32,100 ppm as S^{2-}	0 to 80 °C	900200	900002 inner / 900003 outer	Consult user guide	940011 for Ag^+ 941609 for S^{2-} ⚠
Sodium (Na^+)	8611BNWP [1]	ROSS® sure-flow combination	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 100 °C	Included	900010 or 900012 for low level Na^+	10 ppm Na^+ / 941105 100 ppm Na^+ / 941107 1000 ppm Na^+ / 841108 KA standard kit, 1 M NaCl with ISA / 650700 0.1 M NaCl / 941706	841111 841113 / reconditioning solution
Sodium (Na^+)	8411BN [2]	ROSS half-cell	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 100 °C	800300 or 800500U	900010 or 900012 for low level Na^+	10 ppm Na^+ / 941105 100 ppm Na^+ / 941107 1000 ppm Na^+ / 841108 KA standard kit, 1 M NaCl with ISA / 650700 0.1 M NaCl / 941706	841111 841113 / reconditioning solution
Sodium (Na^+)	9811BN [2]	Micro combination	1 x 10^{-6} M to saturated 0.02 ppm to saturated	0 to 80 °C	Included	900004	0.1 M NaCl / 941706	841111
Surfactant	9342BN [2]	Plastic membrane half-cell	Endpoint indicator	0 to 40 °C	900200	900002 inner / 810007 outer	0.5 M Hyamine titrant / 654201	654203 / sample additive
Thiocyanate (SCN^-)	9458BN [2]	Solid state half-cell	5 x 10^{-6} to 1.0 M 0.29 to 58,100 ppm	0 to 50 °C	900200	900002 inner / 900003 outer	Consult user guide	940011



Key Information
1 BNC Waterproof Connector **2** BNC Connector
3 Screw Cap Connector, requires separate cable
8 Module only, requires separate 93 series electrode handle (9300BNWP or 9300SC)
All cap diameters are 16 mm at bottom of cap
All cable lengths are 1 meter

Thermo Scientific Orion Fluoride Ion Selective Electrodes

The standard in fluoride ion analysis – EPA compliant

Approved ASTM Method for Fluoride in Drinking Water and Wastewater

Analyze free fluoride ions in aqueous solutions reliably at low limits of detection. Measurements are quick, simple, accurate and economical.

Thermo Scientific Orion fluoride electrodes feature high quality lanthanum fluoride pellet sensors. Choose from combination electrodes or half cell designs. The fluoride half cell electrode requires a separate half cell reference electrode.

Other Applications for Fluoride Electrodes

- **Phosphate:** Gran plot titration can determine phosphate in applications from animal feed to cleaning solutions to food and beverage
- **Ammonium Bifluoride:** Multiple known addition (MKA) titration method determines levels without need of removing interfering heavy metal ions
- **Aluminum:** Gran plot titration can determine micro and semi micro levels of aluminum

Accessories and Solutions

A full line of supporting accessories is offered to meet your measurement needs. A variety of calibration standards are available. Low level standards have the added convenience of being pre-made with total ionic strength adjustor (TISAB) and requiring that TISAB be added only to your samples. TISAB II requires a 50:50 dilution with the sample and is available in gallon bottles. TISAB III is a concentrate and requires a 1:10 dilution.

Convenient combination with reference

Combination fluoride ISE with Sure-Flow reference

- Fluoride surface can be easily cleaned using toothpaste and a lint-free wipe
- Built-in Sure-Flow reference provides fast and stable readings

Half cell reference design provides flexibility

Half cells – Fluoride ISE and Sure-Flow™ reference

- Fluoride surface can be easily cleaned using toothpaste and a lint-free wipe
- Use with the 900100 single junction or 900200 double junction reference electrodes

Cat. No.	9609BNWP	9409BN 9409SC	900100
Measurement Range	1 x 10^{-6} M to saturated 0.02 ppm to saturated	1 x 10^{-6} M to saturated 0.02 ppm to saturated	–
Temp. Range	0 to 80 °C	0 to 80 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC Screw Cap	Pin Tip

Cat. No.	Recommended Accessories
940906	0.1 M NaF standard, 475 mL
940907	100 ppm fluoride standard, 475 mL
040906	1 ppm fluoride standard with TISAB II, 475 mL
040907	2 ppm fluoride standard with TISAB II, 475 mL
040908	10 ppm fluoride standard with TISAB II, 475 mL
940909	TISAB II, 1 gallon
940999	TISAB II, 4 x 1 gallon
940911	TISAB III concentrate, 475 mL
900061	Optimum results A electrode fill solution for 9609BNWP, 5 x 60 mL
900001	Fill solution for 900100 used with 9409BN/9409SC, 5 x 60 mL

Thermo Scientific Orion Ammonia Ion Selective Electrodes

Compliant with EPA testing methods

EPA Approved ASTM D1426 Method for Ammonia in Wastewater

Measurements are quick, simple, accurate and economical.

Thermo Scientific Orion ammonia electrodes feature time-tested membrane technology. Choose from high performance and standard designs.

The high performance ammonia electrode offers linear response down to the lower limits of detection. The electrode can detect down to 0.01 ppm. The high performance ammonia electrode can achieve response times of 1 minute in samples of 1 ppm or higher. It is rugged and meets the rigorous requirements of waste water and drinking water operators. Supplied with pack of 20 loose membranes, 1 pre-assembled outer body and 2 bottles of fill solution.

Other Applications for Ammonia Electrodes

- **Ammonium or Nitrogen:** Measure ammonium after conversion to ammonia or nitrogen after Kjeldahl digestion of sample

Accessories and Solutions

A full line of supporting accessories is offered to meet your measurement needs.

High performance ammonia electrode

BEST

Pre-assembled body and membrane simplifies use and achieves optimum performance

Standard ammonia electrode

BETTER

Provides reliable results at mid to high ammonia levels

Cat. No.	9512HPBNWP	9512BNWP
Measurement Range	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm	5 x 10^{-7} to 1.0 M 0.01 to 17,000 ppm
Temp. Range	0 to 50 °C	0 to 50 °C
Connector Type	BNC Waterproof	BNC Waterproof

HP Electrode

Cat. No.	Recommended Accessories
951214	Loose membranes for HP electrodes, box of 20
951215	Pre-assembled outer body and membrane cap assembly for HP electrodes, 3 pack
951210	pH adjusting ISA, for samples with no metallic ions, 475 mL
951211	pH adjusting ISA, for samples containing metallic ions, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951209	HP ammonia electrode filling solution, 60 mL
951006	0.1 M NH_4Cl standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL

Standard Electrode

Cat. No.	Recommended Accessories
951204	Loose membranes for standard electrodes, box of 20
951205	Bonded membranes for standard electrodes, pack of 3
951210	pH adjusting ISA, for samples with no metallic ions, 475 mL
951211	pH adjusting ISA, for samples containing metallic ions, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951202	Standard ammonia electrode filling solution, 60 mL
951006	0.1 M NH_4Cl standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL

BNC Waterproof

Thermo Scientific Orion Nitrate Ion Selective Electrodes

Compliant with EPA testing methods

The Easy Way to Measure Nitrate Levels in Drinking Water, Wastewater and Soils

Analyze free nitrate ions in aqueous solutions reliably at low limits of detection. Measurements are quick, simple, accurate and economical.

Choose from combination electrodes or half cell designs. The nitrate half cell electrode requires a separate half cell reference electrode.

Other Applications for Nitrate Electrodes

- **Nitric Acid:** Multiple known addition (MKA) titration method determines levels without need of removing interfering heavy metal ions.

Accessories and Solutions

A full line of supporting accessories is offered to meet your measurement needs. A variety of calibration standards are available. Replacement modules are available individually or in convenient three packs.

Convenient combination electrode with replaceable module

Combination nitrate ISE with Sure-Flow™ reference

- Sure-Flow reference provides stable readings and is easy to clean
- Convenient with small sample sizes

Half cell reference design provides flexibility

Half cells – Nitrate ISE and Sure-Flow™ reference

- Reference junction is reliable and easy to maintain
- Replaceable module provides convenience

Cat. No.	9707BNWP	9307BNWP	900200
Measurement Range	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	7 x 10^{-6} to 1.0 M 0.1 to 14,000 ppm as N	–
Temp. Range	0 to 40 °C	0 to 40 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC Waterproof	Pin Tip

Cat. No.	Recommended Accessories
900046	Optimum results F electrode fill solution, 5 x 60 mL. For 9707BNWP and outer fill solution for 900200
900002	Inner chamber fill solution for 900200, 5 x 60 mL
920706	0.1 M $NaNO_3$ standard solution, 475 mL
920707	1000 ppm nitrate as nitrogen standard, 475 mL
930707	100 ppm nitrate as nitrogen standard, 475 mL
930711	Nitrate ionic strength adjustor (ISA), 475 mL
930710	Nitrate interference suppressor solution (NISS), 475 mL
970701	Replacement module for 9707BNWP (1 each)
930701	Replacement module for 9307BNWP (pack of 3)
930702	Replacement module for 9307BNWP (1 each)


BNC Waterproof


Pin Tip

Thermo Scientific Orion Chloride Ion Selective Electrodes

Compliant with EPA testing methods

Approved ASTM Method for Chloride in Wastewater

Easily and reliably analyze free chloride ions in aqueous solutions. Provides quick, accurate and economical measurements. Rugged epoxy body design ensures durability of electrode.

Other Applications for Chloride Electrodes

- **Salt:** Multiple known addition can be used to determine salt levels in food samples
- **Hydrochloric Acid:** First derivative titration can determine HCl concentrations

Accessories and Solutions

Thermo Scientific offers a full line of accessories to enhance your measurements. These include calibration standards, two ionic strength adjustors – one to adjust background ionic strength (ISA) and another to minimize complexation interferences and adjust background ionic strength (CISA), and choice of fill solutions depending on sample composition.

Convenient combination with Sure-Flow reference

Combination chloride ISE with Sure-Flow® reference

- Durable reference pellet which can be polished to restore electrode performance
- Sure-Flow reference provides easy maintenance and optimum performance

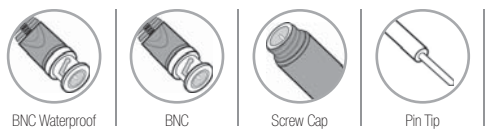
Half cell reference design provides flexibility

Half cells - Chloride ISE and double junction Sure-Flow reference

- Double junction reference isolates inner reference from sample
- Designed for precision measurements

Cat. No.	9617BNWP	9417BN 9417SC	900200
Measurement Range	5 x 10^{-5} to 1.0 M 1.8 to 35,000 ppm	5 x 10^{-5} to 1.0 M 1.8 to 35,000 ppm	–
Temp. Range	0 to 80 °C	0 to 80 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC Screw cap	Pin Tip

Cat. No.	Recommended Accessories
940011	Chloride ionic strength adjustor (ISA), 475 mL
941709	Chloride CISA reagent pack, 2 x 2 L
941706	0.1 M NaCl standard, 475 mL
941708	1000 ppm chloride standard, 475 mL
941707	100 ppm chloride standard, 475 mL
900062	Optimum results B fill solution for 9617BNWP, 5 x 60 mL
900017	Chloride electrode fill solution, 5 x 60 mL, for samples more concentrated than 10^{-2} M
900003	Outer chamber fill solution for 900200, 5 x 60 mL
900002	Inner chamber fill solution for 900200, 5 x 60 mL
948201	Polishing strips, pack of 24



Thermo Scientific Orion ROSS® Sodium Ion Selective Electrodes

ROSS Fast Response and Stability

Comes with Complete Solution Kit Containing Standards, Reagents, ISA and More!

Quick, accurate and economical measurements of free sodium ions in aqueous solutions. Chemical resistant glass body.

Applications for Sodium Electrodes

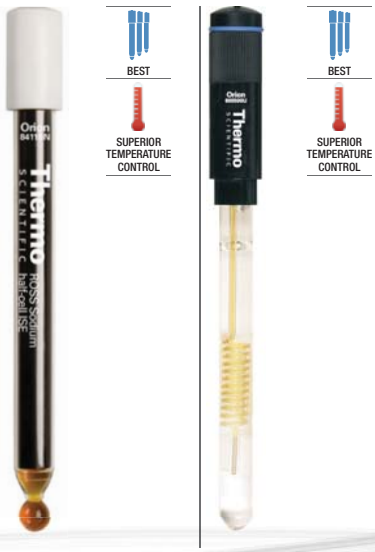
The sodium electrode is commonly used to measure samples such as food, beverages and animal feed.

Accessories and Solutions

Thermo Scientific provides you all the accessories you need for sodium measurement when you purchase a ROSS sodium electrode. Each electrode comes with electrode fill solution, sodium ionic strength adjustor, 3 different sodium standards, sodium electrode reconditioning solution and sodium electrode storage solution.

Convenient combination with Sure-Flow reference

Half cell reference design provides flexibility with choice of ROSS references



Combination Ross Sodium ISE with Sure-Flow® reference

- Unique redox ROSS reference system provides fast response, better stability and accuracy than conventional sodium electrodes
- Sure-Flow reference prevents clogging while giving fast, stable readings

Half cells - Chloride ISE and double junction Sure-Flow reference and optimum performance

- Choice of ROSS reference systems: ROSS Sure-Flow reference (800300) with easy to clean and reliable junction
- ROSS Ultra® reference (800500U) with ROSS performance and extended life with 2 year warranty

Cat. No.	8611BNWP	8411BN	800300 800500U
Measurement Range	1 x 10^{-6} M to saturated 0.02 ppm to saturated	1 x 10^{-6} M to saturated 0.02 ppm to saturated	–
Temp. Range	0 to 100 °C	0 to 100 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC	Pin Tip

Cat. No.	Recommended Accessories
941706	0.1 M NaCl standard, 475 mL
841108	1000 ppm sodium standard, 475 mL
941107	100 ppm sodium standard, 475 mL
941105	10 ppm sodium standard, 475 mL
650700	Known addition kit – 3 x 475 mL of 1 M NaCl standard with ISA and 1 x 475 mL ISA
841109	Know addition standard, 1000 ppm as Na^+ with ISA, 475 mL
841111	Sodium ionic strength adjustor (ISA), 475 mL
841113	Sodium electrode reconditioning solution, 475 mL
841101	Sodium electrode storage solution, 475 mL
900010	Sodium electrode fill solution, 5 x 60 mL
900012	Sodium electrode fill solution for low sodium levels (below 10^{-5} M or 0.2 ppm)


BNC Waterproof


BNC


Pin Tip

ISE Calibration Standards, Ionic Strength Adjusters (ISA), Reagents and Fill Solutions

All ISE Standards are NIST traceable

Cat. No.	Description
Ammonia, Standard and High Performance	
951006	0.1 M NH_4Cl Ammonia standard, 475 mL
951007	1000 ppm Ammonia as Nitrogen (N) standard, 475 mL
951207	100 ppm Ammonia as Nitrogen (N) standard, 475 mL
951211 ⚠	Ammonia Ionic Strength Adjuster (ISA) with pH-indicating blue dye, 475 mL
951210 ⚠	Ammonia low level Ionic Strength Adjuster (ISA) with pH-indicating blue dye, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951209	Ammonia high perform electrode fill solution, 60 mL
951202	Ammonia standard electrode fill solution, 60 mL
Ammonium	
951007	1000 ppm Ammonium as Nitrogen (N) standard, 475 mL
900018-WA	Ammonium electrode fill solution, 5 x 60 mL
Bromide	
943506	0.1 M NaBr Bromide standard, 475 mL
940011	Bromide Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Bromide electrode, 5 x 60 mL
Cadmium	
940011	Cadmium Ionic Strength Adjuster (ISA), 475 mL
900061	Optimum results A fill solution for Cadmium electrode, 5 x 60 mL
Calcium	
922006	0.1 M $CaCl_2$ Calcium standard, 475 mL
923206	100 ppm as $CaCO_3$ Calcium standard, 475 mL
932011	Calcium Ionic Strength Adjuster (ISA), 475 mL
900061	Optimum results A fill solution for Calcium electrode, 5 x 60 mL
Carbon Dioxide	
950206	0.1 M $NaHCO_3$ Carbon Dioxide standard, 475 mL
950207	1000 ppm as $CaCO_3$ Carbon Dioxide standard, 475 mL
950210	Carbon Dioxide Ionic Strength Adjuster (ISA), 475 mL
950202	Carbon Dioxide electrode fill solution, 60 mL
Chloride	
941706	0.1 M NaCl Chloride standard, 475 mL
941708	1000 ppm Chloride standard, 475 mL
941707	100 ppm Chloride standard, 475 mL
940011	Chloride Ionic Strength Adjuster (ISA), 475 mL
941709 ⚠	Chloride Complexation Ionic Strength Adjuster (CISA) reagent pack, 2 x 1 L
900062	Optimum results B fill solution for Chloride electrode, 5 x 60 mL
900017	Chloride electrode fill solution, 5 x 60 mL

Chlorine, Residual	
977007	100 ppm as Cl_2 Residual Chlorine standard, 475 mL
977011 ⚠	Residual Chlorine acid reagent, 475 mL
977010	Residual Chlorine iodide reagent, 5 x 50 mL
Cupric	
942906	0.1 M $Cu(NO_3)_2$ Cupric standard, 475 mL
940011	Cupric Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Cupric electrode, 5 x 60 mL
Cyanide	
951011 ⚠	Cyanide alkaline reagent, 10 N NaOH, 475 mL
900062	Optimum results B fill solution for Cyanide electrode, 5 x 60 mL
Fluoride	
940906	0.1 M NaF Fluoride standard, 475 mL
940907	100 ppm Fluoride standard, 475 mL
040908	10 ppm Fluoride standard premixed with TISAB II, color coded blue, 475 mL
040907	2 ppm Fluoride standard premixed with TISAB II, color coded red, 475 mL
040906	1 ppm Fluoride standard premixed with TISAB II, color coded green, 475 mL
940916	Fluoride standard bulk pack – 4 x 475 mL each of 1 ppm Fluoride standard premixed with TISAB II (040906) and 10 ppm Fluoride standard premixed with TISAB II (040908)
940909	TISAB II for Fluoride ISE, 1 gallon
940999	TISAB II for Fluoride ISE, 4 x 1 gallon
940911	TISAB III (concentrated) for Fluoride ISE, 475 mL
900061	Optimum results A fill solution for Fluoride electrode, 5 x 60 mL
Fluoroborate	
930711	Fluoroborate Ionic Strength Adjuster (ISA), 475 mL
Iodide	
945306	0.1 M NaI Iodide standard, 475 mL
940011	Iodide Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Iodide electrode, 5 x 60 mL
Lead	
948206	0.1 M $Pb(ClO_4)_2$ Lead standard, 475 mL
900062	Optimum results B fill solution for Lead electrode, 5 x 60 mL
Nitrate	
920706	0.1 M $NaNO_3$ Nitrate standard, 475 mL
920707	1000 ppm Nitrate as Nitrogen (N) standard, 475 mL
930707	100 ppm Nitrate as Nitrogen (N) standard, 475 mL
930711	Nitrate Ionic Strength Adjuster (ISA), 475 mL
930710	Nitrate Interference Suppressor Solution (NISS), 475 mL
900046	Optimum results F fill solution for Nitrate electrode, 5 x 60 mL

Nitrate Test Kit	
700005 ⚠	Nitrate test kit for Ammonia ISE – 2 x 50 mL electrode fill solution (951203), 2 x 475 mL alkaline reagent (951011), 475 mL 100 ppm Nitrate as Nitrogen (N) standard (930707), 475 mL 100 ppm Ammonia as Nitrogen (N) standard (951207), 475 mL reducing reagent (700006) and 2 pipets
700006 ⚠	Nitrate test kit reducing reagent refill, 475 mL
951203	Nitrate test kit electrode fill solution, 50 mL
Nitrite	
954606	0.1 M $NaNO_2$ Nitrite standard, 475 mL
934610	Nitrite interference suppressor solution, 475 mL
900046	Optimum results F fill solution for Nitrite electrode, 5 x 60 mL
Nitrogen Oxide	
954606	0.1 M $NaNO_2$ Nitrogen Oxide standard, 475 mL
956410 ⚠	Nitrogen Oxide acid buffer, 475 mL
954602	Nitrogen Oxide electrode fill solution, 50 mL
Perchlorate	
930711	Perchlorate Ionic Strength Adjuster (ISA), 475 mL
Potassium	
921906	0.1 M KCl Potassium standard, 475 mL
931911	Potassium Ionic Strength Adjuster (ISA), 475 mL
900065	Optimum results E fill solution for Potassium electrode, 5 x 60 mL
Silver	
940011	Silver Ionic Strength Adjuster (ISA), 475 mL
900062	Optimum results B fill solution for Silver/Sulfide electrode, 5 x 60 mL
900067	Optimum results C fill solution for Silver electrode (when sample temperatures vary), 5 x 60 mL
Sodium	
941706	0.1 M NaCl Sodium standard, 475 mL
841108	1000 ppm Sodium standard, 475 mL
941107	100 ppm Sodium standard, 475 mL
941105	10 ppm Sodium standard, 475 mL
841111	Sodium Ionic Strength Adjuster (ISA), 475 mL
841113	Sodium electrode reconditioning solution, 475 mL
841101	Sodium electrode storage solution, 475 mL
650700	Sodium KAP analysis kit – 3 x 475 mL of 1 M NaCl with ISA and 475 mL of Sodium ISA (841111)
841109	Sodium KAP standard, 1000 ppm with ISA, 475 mL
900010	Sodium electrode fill solution, 5 x 60 mL
900012	Sodium electrode (low level) fill solution, 5 x 60 mL
900004	Sodium micro electrode fill solution, 5 x 60 mL

Sulfate	
948207	0.1 M Na_2SO_4 sulfate standard for lead electrode, 475 mL
Sulfide	
941609 ⚠	Sulfide SAOB reagent pack, 4 x 475 mL
900061	Optimum results A fill solution for Sulfide electrode (when sample temperatures vary), 5 x 60 mL
900062	Optimum results B fill solution for Silver/Sulfide electrode, 5 x 60 mL
Surfactant	
654202	0.01 M SLS Surfactant standard, 1 x 60 mL
654201	0.05 M hyamine Surfactant titrant, 475 mL
654205	Non-ionic Surfactant titrant, 475 mL
654203	Surfactant sample additive, tritonX-100, 475 mL
810007	Surfactant electrode fill solution, 5 x 60 mL
Thiocyanate	
940011	Thiocyanate Ionic Strength Adjuster (ISA), 475 mL
Water Hardness	
922006	0.1 M $CaCl_2$ Water Hardness standard, 475 mL
923206	100 ppm as $CaCO_3$ Water Hardness standard, 475 mL

⚠ Signifies a hazardous solution.
See terms and conditions for important shipping information at www.thermoscientific.com/water

ISE Accessories, Membranes and Modules

Cat. No.	Description
948201	Polishing strips for solid state electrodes
Ammonia, High Performance (9512HPBNWP, 9512HP01)	
951214	20 loose membranes
951215	3 pre-assembled bodies and membrane caps
Ammonia, Standard (9512BNWP, 951201)	
951204	20 loose membranes
951205	3 bonded membranes
Carbon Dioxide (9502BNWP)	
950204	4 membranes with o-rings
Nitrogen Oxide (9546BN)	
954604	20 loose membranes
950015	Spare electrode parts kit
97 Series Plastic Membrane Calcium, Nitrate and Potassium Combination Electrode Accessories	
9700BNWP	97 series electrode body with waterproof BNC connection
972001	Replacement module for calcium combination electrode (9720BNWP)
970701	Replacement module for nitrate combination electrode (9707BNWP)
971901	Replacement module for potassium combination electrode (9719BNWP)
93 Series Plastic Membrane Ammonium, Calcium, Chloride, Fluoroborate, HF Resistant pH, Nitrate, Perchlorate, Potassium and Water Hardness Half-Cell Electrode Accessories	
9300BNWP	93 series electrode body with waterproof BNC connection
930000	93 series electrode body with U.S. standard connection
9300SC	93 series electrode body with screw cap, separate cable required
900100	Single junction reference electrode with pin tip connection
900200	Double junction reference electrode with pin tip connection
931801	Replacement module for ammonium half-cell electrode
932001	Replacement module for calcium half-cell electrode (9320BN)
931701	Replacement module for chloride half-cell electrode
930501	Replacement module for fluoroborate half-cell electrode (9305BN)
930702	Replacement module for nitrate half-cell electrode (9307BNWP)
930701	Replacement modules (3) for nitrate half-cell electrode (9307BNWP)
938101	Replacement module for perchlorate half-cell electrode
930101	Replacement module for HF-resistant pH half-cell electrode
931901	Replacement module for potassium half-cell electrode (9319BN)
933201	Replacement module for water hardness half-cell electrode (9332BNWP)

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