



Thermo Scientific Orion Laboratory Products Catalog

pH | ISE | Dissolved Oxygen | Conductivity | Colorimetry



A letter of introduction from
Pekka Ronka, *Vice President and General Manager*
to our valued customers.

Dear Valued Customer,

I would like to take this opportunity to welcome you to the NEW 2009 Thermo Scientific Orion Laboratory Products Catalog, and to introduce myself as the new Vice-President & General Manager of Water Analysis Instruments.

For over 40 years Thermo Scientific Orion products have set the standard for innovation and quality in electrochemistry. Today, Water Analysis Instruments continue to meet all your electrochemistry needs with the highest quality products, service, and support.

In this catalog you will find a comprehensive selection of meters, electrodes, solutions and accessories for pH, ion selective electrodes (ISE), conductivity and dissolved oxygen. We also feature innovative new products for water analysis, including:

- **Orion Star™ RDO® Meters**, *pages 50-51*
Introducing rugged optical dissolved oxygen technology for maintenance-free, better accuracy measurements.
- **Orion DUAL STAR™ Meters**, *pages 48-49*
The next generation of Orion 720A/920A meters make it easier than ever to simultaneously measure pH and ISE.
- **Colorimetry and Turbidity Meters**, *pages 74-85*
Ideal for EPA monitoring and reporting of critical water analysis parameters.
- **Green Electrodes**, *page 18*
Go green with environmentally-friendly electrodes that meet RoHS compliance and contain no lead, mercury or hazardous materials.
- **ROSS® pH/ATC Triode™ Electrodes**, *page 8*
Providing the convenience of built-in temperature with the performance and accuracy of ROSS technology.

We are excited about the new products and welcome you to contact our technical experts at (800) 225-1480 or fax (978) 232-6015 with your product questions.

Thank you for your continued support of Thermo Scientific Orion products. I am excited to be a part of this world-class organization, and look forward to leading the company into a future of innovation and excellence.

Sincerely,

Pekka Ronka
Vice President & General Manager
Water Analysis Instruments

Thermo Scientific Orion Laboratory Products

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Water Quality Specialist Tip

The following icons are designed to help you locate the best product for your application.

Best, Better, Good

Electrode ratings based on the electrode precision



Best Seller

Our most popular customer products



Mercury-Free

Environmentally safe, mercury-free pH electrodes



TRIS Compatible

pH electrodes for use with TRIS, protein and sulfide samples (calomel replacements)



Superior Temperature Control

pH electrodes that respond exceptionally well to sample temperature changes



Lead-Free

Environmentally safe electrodes that use lead-free glass, which exceeds the requirements of RoHS



Compliant with EPA testing methods



Compliant with USP requirements



Hazardous Materials

Additional shipping charges may apply



Thermo Scientific Orion pH Electrode Families

The best selection of pH electrodes

	Page		Page
	ROSS Ultra® Premium pH Electrodes 8		No Cal® pH Electrodes 20
	The best of the best! The fastest response, highest accuracy and best reproducibility that you can get with a pH electrode – plus an industry best warranty.		Unique reference system that provides quick, accurate measurements. Great for measuring TRIS buffer, sulfide and protein samples. No calibration required.
	ROSS® Premium pH Electrodes 10		KNipHE® pH Electrodes 20
	Precise pH measurements with unmatched stability, reliability and rapid response regardless of temperature or sample composition.		The pH electrode is surrounded by a stainless blade for measuring meat, cheese, and sludge samples.
	PerpHecT® pH Electrodes 13		Double Junction pH Electrodes 20
	Designed to provide the best pH and temperature measurements when used with the 320, 350 or 370 PerpHecT digital LogR™ meters. Includes the PerpHecT ROSS micro pH electrode, which can measure samples as small as 15 µL in 384 well plates; is TRIS buffer, protein and sulfide compatible; and can be used on any pH meter with a BNC connection.		Isolated Ag/AgCl reference system that prevents silver from coming in contact with the sample. Great for measuring TRIS buffer, sulfide and protein samples.
	AquaPro Professional pH Electrodes 15		Economy/Basic pH Electrodes 21
	Low maintenance polymer-filled double junction electrodes with an extended life, fast response and clog-resistant junction.		Value-priced, durable and low maintenance gel-filled pH electrodes.
	Standard Ag/AgCl pH Electrodes 16		Redox/ORP 22
	A large variety of quality electrodes for a wide range of applications. Includes specialty pH electrodes for unique or challenging pH measurements.		The ideal choice for measuring the oxidation-reduction potential of samples and performing redox titrations.
	Green pH Electrodes 18		ATC Probes 24
	Green pH electrodes contain no lead, mercury or other hazardous substance, which makes these electrodes environmentally friendly, allows for easy and hassle-free electrode disposal and meets all the requirements of RoHS.		Automatic temperature compensation probes measure sample temperatures and adjust pH measurements by correcting the electrode slope according to the measured temperature.
	Micro Ag/AgCl pH Electrodes 19		Stirrer Probe 25
	Electrodes designed to measure samples as small as 0.5 µL in containers as small as 384 well plates.		Convenient and economical answer to sample stirring. Powered by Star benchtop meters.

Thermo Scientific Orion pH Electrode Features

Select features to meet the needs of your applications

Electrode Styles



Standard Size

12 mm electrode diameter for use in a wide variety of sample sizes



Semi-micro

6 to 8 mm electrode diameter for sample sizes down to 200 μL



Micro

1 to 5 mm electrode diameter for samples as small as 0.5 μL & containers as small as 384 well plates



Rugged Bulb

When glass is required, the extra durable pH bulb prevents breakage



Spear Tip

For piercing solid or semi solid samples and measuring small volume samples



Flat Surface Tip

For measuring surfaces of solid or gel samples and measuring small volume samples

Electrode Body Materials

Glass Body

- Easy to clean
- Compatible with virtually any sample, including solvents

Epoxy Body

- Extremely durable and rugged to prevent breakage
- Value-priced

Electrode Fill Types

Refillable

- Easy maintenance, filling solution required
- Periodic filling and draining needed
- Long expected life span
- Suited for a wide range of applications
- 0.01 to 0.02 pH precision
- Best response time
- 1 to 2 year warranty (6 months for Ag/AgCl micro electrodes)

Polymer Filled (Sealed)

- Low maintenance, no filling solution needed
- Sealed reference
- Easy to use
- Suited for a wide range of applications
- 0.02 pH precision
- Better response time
- 1 year warranty

Gel Filled (Sealed)

- Low maintenance, no filling solution needed
- Sealed reference
- Easy to use
- General purpose for everyday use
- 0.05 to 0.1 pH precision
- Good response time
- 3 to 6 month warranty

Electrode References

ROSS® Reference

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

Double Junction Ag/AgCl Reference

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

Single Junction Ag/AgCl Reference

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

Electrode Junctions

Sure-Flow®, Sleeve and Open

- Best junction for dirty, difficult samples and demanding lab use
- Junction is clog-free and easy to clean
- Ideal for thick or viscous samples, compatible with all sample types

Ceramic and Glass Capillary

- Better junction for routine lab use in a variety of samples
- Junction is high quality and durable
- Ideal for most lab applications and sample types

Wick and Glass Fiber

- Good junction for routine lab or field use in buffers, water and aqueous samples
- Junction with rugged epoxy electrodes
- Ideal for basic lab applications and aqueous samples

Thermo Scientific Orion pH Electrode Selection Guide



BEST



BETTER



GOOD

Sample Type	Electrode Recommendations	ROSS Ultra®	ROSS®
Electrode Rating			
pH Precision		0.01	0.01
Biological/Pharmaceutical – TRIS buffer, proteins, enzymes	Electrodes should have a ROSS or double junction Ag/AgCl reference (no sample contact with silver)	8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN, 8104BN 815600, 8165BNWP 8172BNWP
Education/Student Use	Electrodes should have an epoxy body for added durability	8107BNUMD 8156BNUWP 8157BNUMD	815600 8165BNWP
Emulsions – Foods, cosmetics, oils	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging		8165BNWP 8172BNWP
Emulsions – Petroleum products, paint	Electrodes should have a glass body that resists damage from the sample and a Sure-Flow or open junction to prevent the electrode from clogging		8172BNWP
Extreme pH – Acid with fluoride	Electrodes must be resistant to hydrofluoric acid *930101 module requires 9300BNWP handle and 900200 reference electrode		
Flat Surfaces – Cheese, meat, agar	Electrodes should have a flat-surface tip and ROSS or double junction Ag/AgCl reference (no sample contact with silver)	8135BNUWP	8135BN
Flat Surfaces – Paper	Electrodes should have a flat-surface tip	8135BNUWP	8135BN
General Purpose – Most sample types	All electrodes are suitable for general purpose measurements	8102BNUWP 8107BNUMD 8156BNUWP 8157BNUMD	8102BN, 8104BN 815600, 8165BNWP 8172BNWP
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	8107BNUMD	
High Ionic Strength – Acids, bases, brines, pH > 12 or pH < 2	Electrodes should have a Sure-Flow or open junction for better contact with the sample and more stable measurements		8165BNWP 8172BNWP
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	8102BNUWP 8156BNUWP 8157BNUMD	8102BN, 815600 8165BNWP 8172BNWP
Non-aqueous – Solvents, alcohols	Electrodes should have a glass body that resists damage from the sample and a Sure-Flow junction for better contact with the sample and more stable measurements		8172BNWP
Semi-solids – Fruit, meat, cheese	Electrodes should have a spear tip for piercing samples and a ROSS or double junction Ag/AgCl reference		8163BNWP
Small Sample Size – Micro-titer plates	Electrodes should have a small diameter that fits the container		
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	8103BNUWP 8115BNUWP	8103BN, 8115BN 8175BNWP
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	8103BNUWP 8115BNUWP	8103BN, 8115BN 8175BNWP
Titration	Electrodes should have a Sure-Flow or sleeve junction for better contact with the sample and more stable measurements		8162SC, 8165BNWP 8172BNWP
Viscous Liquids – Slurries, suspended solids sludges	Electrodes should have a Sure-Flow or open junction to prevent the electrode from clogging		8165BNWP 8172BNWP
Waters – Acid rain, boiler feed water, distilled water, rain water, well water	Electrodes should have a ROSS or double junction Ag/AgCl reference and be refillable for better contact with the sample	8102BNUWP 8156BNUWP 8157BNUMD	8102BN, 815600 8165BNWP 8172BNWP
Waters – Drinking water, tap water	Electrodes should have an epoxy body for added durability	8156BNUWP 8157BNUMD	815600 8165BNWP
Waters – Wastewater, seawater	Electrodes should have a ROSS or double junction Ag/AgCl reference and have an epoxy body for added durability	8156BNUWP 8157BNUMD	815600 8165BNWP

PerpHecT®	AquaPro	Standard Ag/AgCl	Green	Micro Ag/AgCl	Double Junction	Economy/ Basic
						
0.01 to 0.05	0.02	0.02	0.02 to 0.05	0.02	0.02	0.05 to 0.1
8202BN, 8207BNU 8256BN, 8257BNU 8272BN	9102AP, 9104APWP 9107APMD 9156APWP		GD9106BNWP GD9156BNWP		9102DJWP 9156DJWP	
8207BNU, 8256BN 8257BNU, 9206BN 9207BN, 9256BN	9107APMD 9156APWP	9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
8272BN 9272BN	9104APWP 9107APMD	9165BNWP 9172BNWP				
8272BN 9272BN	9102AP 9104APWP	9172BNWP				
		930101*				
8235BN	9135APWP					
8235BN	9135APWP	9167SC				913600
8202BN, 8207BNU 8256BN, 8257BNU 9202BN, 9206BN 9207BN, 9256BN	9102AP, 9104APWP 9107APMD 9156APWP	9102BNWP 9107BNMD 9156BNWP 9157BNMD	GS9106BNWP GD9106BNWP GS9156BNWP GD9156BNWP	9802BN	9102DJWP 9156DJWP	9106BNWP
8207BNU, 9206BN 9207BN	9107APMD 9156APWP	9107BNMD	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
8272BN 9272BN	9104APWP 9107APMD 9102AP	9165BNWP 9172BNWP				
						912600
8202BN, 8256BN 8257BNU, 8272BN 9256BN, 9272BN		9165BNWP 9172BNWP	GS9156BNWP GD9156BNWP		9102DJWP	
8272BN 9272BN		9172BNWP				
					9120APWP	
8220BNWP				9802BN, 9803BN 9810BN		
8220BNWP				9826BN		
8203BN, 9203BN 8220BNWP	9103APWP 9115APWP	9103BNWP 9167SC		9802BN, 9803BN 9810BN, 9826BN	9110DJWP	911600, 912600
8203BN 8220BNWP	9103APWP 9115APWP				9110DJWP	
8272BN 9272BN		9166SC				
8272BN, 9272BN	9104APWP 9107APMD	9165BNWP 9172BNWP				
8202BN, 8256BN 8257BNU, 8272BN		9165BNWP 9172BNWP	GS9156BNWP GD9156BNWP		9102DJWP	
8256BN, 8257BNU 9256BN	9107APMD 9156APWP	9156BNWP 9165BNWP	GS9106BNWP GD9106BNWP		9156DJWP	9106BNWP
8256BN, 8257BNU 9256BN	9107APMD 9156APWP	9165BNWP	GD9106BNWP GD9156BNWP		9156DJWP	

Thermo Scientific Orion pH Electrode Maintenance, Storage and Cleaning

pH Electrode Maintenance

On a weekly basis, inspect the pH electrode for scratches, cracks, salt build-up, or membrane/junction deposits.

Rinse off any salt build-up with distilled water. Remove any membrane/junction deposits by soaking the electrode in a 0.1 M HCl or 0.1 M HNO₃ solution for 15 minutes or soaking the electrode in a 0.1 M KCl solution heated to 55 °C for 15 minutes. If the electrode is dirty, clogged or coated, refer to the pH Electrode Cleaning section for a more thorough electrode cleaning procedure.

If a refillable electrode is used, drain the reference chamber, flush it with distilled water until all of the salt build-up inside of the electrode is removed, flush it with fresh filling solution and fill the reference chamber with fresh filling solution.

Soak electrode in ROSS pH electrode storage solution, Cat. No. 810001, or standard pH electrode storage solution, Cat. No. 910001, for 1 to 2 hours or overnight. The ROSS pH electrode storage solution is recommended for enhanced electrode performance.

pH Electrode Storage

To ensure a quick electrode response and unclogged electrode junction, the electrode should never be stored dry and the pH-sensing bulb and reference junction must not dry out. Always store the pH electrode in pH electrode storage solution.

Short Term Electrode Storage (up to one week)

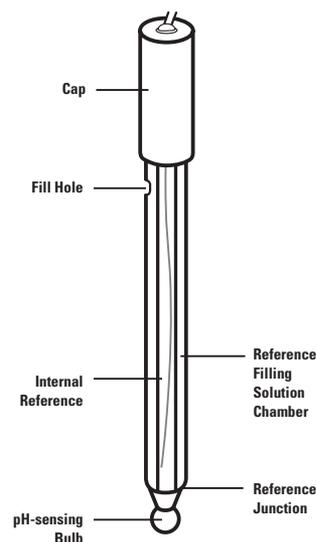
Soak the electrode in ROSS pH electrode storage solution, Cat. No. 810001, or standard pH electrode storage solution, Cat. No. 910001. For enhanced electrode performance, use ROSS pH electrode storage solution.

To minimize the chance of breakage, the pH electrode should be attached to an electrode stand and suspended in a beaker that contains storage solution. The electrode should not touch the sides or bottom of the beaker.

Long Term Electrode Storage (more than one week)

If the electrode is refillable, fill the reference chamber up to the fill hole with the appropriate electrode filling solution and securely cover the fill hole with parafilm. Cover the pH-sensing bulb and reference junction with a protective cap, sleeve or storage bottle that contains storage solution. Before returning the electrode to use, prepare it as a new electrode.

Typical pH Electrode Components



Cat. No.	Description
810001	ROSS® pH electrode storage solution, 475 mL bottle
910001	Standard pH electrode storage solution, 475 mL bottle
910003	Storage bottles for electrodes with a 12 mm diameter, 3 pack
910004	Storage bottles for electrodes with an 8 mm diameter, 3 pack (semi-micro epoxy pH electrodes)
910006	Storage bottles for electrodes with a 6 mm diameter, 3 pack (semi-micro glass pH electrodes)
090043	Swing arm electrode stand

pH Electrode Cleaning

One of the most common reasons for a pH electrode to not work properly is because it is dirty, clogged or coated with sample. Cleaning a dirty, clogged or coated electrode restores proper electrode performance and prolongs the useful life of the electrode.

The Thermo Scientific pH electrode cleaning solutions are designed to simplify pH electrode maintenance. The ready-to-use cleaning solutions include a small beaker to hold the cleaning solution and a plastic pipet for removing the electrode filling solution.

Optimal cleaning procedures are dependent upon the sample type, extent of build-up or clogging and the type of electrode. The following instructions provide a starting point for developing an effective cleaning procedure.

1. Choose an appropriate cleaning solution. Cleaning solution D is a mild cleaning solution. If a stronger cleaning solution is required, use cleaning solution C. Cleaning solution A is for removing protein deposits and cleaning solution B is for removing bacterial contaminants.
2. Shake the cleaning solution. Pour enough of the cleaning solution into the beaker to cover the reference junction.
3. Soak the electrode for five to ten minutes in the cleaning solution while moderately stirring the solution. Electrodes with wick and fiber junctions may require more cleaning time.
4. Remove the electrode from the cleaning solution and rinse it thoroughly with distilled water to remove all traces of the cleaning solution.
5. If the electrode is refillable, remove the filling solution from the electrode using the pipet that is included with the kit and add fresh filling solution to the electrode. Repeat this step two or three times for optimal electrode performance.
6. If the electrode is a Sure-Flow® electrode, flush a few drops of filling solution through the reference junction by pressing down on the electrode cap. Ensure that the junction resets properly. Refill the electrode with filling solution.
7. Rinse the electrode thoroughly with distilled water and measure samples as usual. If the electrode response is slow or the electrode does not calibrate correctly, repeat the cleaning procedure. Viscous samples and samples that contain solid materials often require additional cleaning and additional filling solution changes.

Good Laboratory Practices (GLP)

For the most accurate measurement results, follow good laboratory practices.

- **Proper Maintenance, Storage and Cleaning** – Proper electrode maintenance, storage and cleaning maximizes the electrode performance and extends the electrode life.
- **Fill Hole Cover and Filling Solution Level** – If a refillable electrode is used, uncover the fill hole during calibration and measurement and cover the fill hole during storage. The filling solution level must be at least 1 inch higher than the sample level.
- **Rinsing and Stirring** – Rinse the electrode with distilled water between buffers and samples to prevent contamination and blot the electrode with a lint-free tissue (do not wipe or rub the electrode) to remove excess water. Stir all buffers, standards and samples at a moderate, uniform rate for accurate measurements and improved response time.
- **Temperature** – The pH value of a solution will change if the temperature of the solution changes. To account for pH slope and pH buffer value changes due to temperature variations, use an automatic temperature compensation (ATC) probe or manual temperature compensation.
- **pH Buffers** – Keep pH buffer bottles tightly sealed and always pour fresh aliquots of buffers into clean beakers for calibration. Verify that buffers are within the expiration date before using them – unopened buffers have a two year shelf life and open buffers have a 2 to 3 month shelf life (1 month for pH 10 buffer).
- **Calibration** – Electrode calibration verifies the slope and proper function of the electrode. Calibrate the electrode daily with at least two buffers that bracket the expected sample pH range and are one to four pH units apart.



Cat. No.	Description
900020	pH electrode cleaning solution kit, includes 1 x 30 mL bottle each of cleaning solution A and C, 1 x 60 mL bottle each of cleaning solution B and D, beaker and pipet
900021	pH electrode cleaning solution A, for removing protein contaminants, includes 4 x 30 mL bottles, beaker and pipet
900022	pH electrode cleaning solution B, for removing bacterial contaminants, includes 4 x 60 mL bottles, beaker and pipet
900023	pH electrode cleaning solution C, for general cleaning, includes 4 x 30 mL bottles, beaker and pipet
900024	pH electrode cleaning solution D, for removing oil and grease contaminants, includes 4 x 60 mL bottles, beaker and pipet

Thermo Scientific Orion ROSS Ultra® Premium pH Electrodes

Superior stability, measurement speed, accuracy and reproducibility under temperature variation

The Best of the Best!

The benefits in the ROSS Ultra line cannot be found in any other pH electrode line. Consider the advantages before you purchase your next pH electrode.

ROSS Ultra electrode technology offers such great stability and drift improvements 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. ROSS technology can be used where metallic reference electrodes would contaminate the sample. 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.

- Precise, durable and low maintenance with built in temperature
- Top performance, with a rugged design and built in temperature



BEST



MERCURY FREE



TRIS COMPATIBLE



SUPERIOR TEMPERATURE CONTROL

Accurate, rapid results in a half-cell design



ROSS Ultra® reference half-cell with glass body

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

Convenience with built in ATC



ROSS Ultra® pH/ATC Triode with epoxy body

- Built-in ATC with rapid response
- General purpose, high performance

Low maintenance with built in ATC



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

- Low maintenance gel with built-in ATC
- Rugged epoxy body

Cat. No.	800500U	8157BNUMD (Star)* 8157BNU (A+ Series) 8257BNU (PerpHecT)	8107BNUMD (Star)* 8107BNU (A+ Series) 8207BNU (PerpHecT)
pH Range	0-14	0-14	0-14
pH Precision	-	0.01	0.01
Temp. Range	0-100 °C	0-100 °C	0-100 °C
Temp. Accuracy	-	± 1.0 °C	± 1.0 °C
Internal Reference	ROSS	ROSS	ROSS
Junction	Ceramic	Glass Fiber	Glass Capillary
Fill Solution	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	Pin Tip	BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series) BNC - PhonoTip (PerpHecT)	BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series) BNC - PhonoTip (PerpHecT)

Cat. No.	Recommended Accessories
810001	ROSS Storage Solution
810007	ROSS Fill Solution
810199	All-in-One ROSS pH Buffer Kit

Top performance for QC and research



ROSS Ultra® combination pH electrode with glass body

- For precise pH determinations
- General purpose, high performance

Ideal for QC samples with size limitations



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

- Measures samples as small as 0.2 mL
- Fits test tubes and small containers

Precise yet durable, for QC and research



ROSS Ultra® combination pH electrode with glass body, rugged bulb

- Toughened bulb for rugged lab use

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

Ideal for soft solid and semi-solid samples



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

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

Top performance – precise pH analysis with durability



ROSS Ultra® combination pH electrode with epoxy body

- Epoxy body for ruggedness
- General purpose, high performance



BEST



MERCURY FREE



TRIS COMPATIBLE



SUPERIOR TEMPERATURE CONTROL

8102BNUWP	8103BNUWP	8104BNUWP	8115BNUWP	8135BNUWP	8156BNUWP	Cat. No.
0-14	0-14	0-14	0-14	0-14	0-14	pH Range
0.01	0.01	0.01	0.01	0.01	0.01	pH Precision
0-100 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C	Temp. Range
-	-	-	-	-	-	Temp. Accuracy
ROSS	ROSS	ROSS	ROSS	ROSS	ROSS	Internal Reference
Ceramic	Ceramic	Ceramic	Glass Fiber	Glass Fiber	Glass Fiber	Junction
3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	Fill Solution
L- 120 mm D- 12 mm	L- 165 mm T- 6 mm x 95 mm L	L- 120 mm D- 12 mm	L- 165 mm T- 8 mm x 95 mm L	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	Dimension D (Dia) L (Length) T (Tip)
BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof	Connector Type



BNC Waterproof



Pin Tip



MiniDIN (Star)



8 Pin (A+ Series)



Phono Tip (PerpHect)

Key Information

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 unless specified.

We offer more connector options; contact your local sales office for information.

*8157UWMMMD and 8107UWMMMD electrodes have 3 meter cable lengths and BNC - MiniDIN connectors for Star meters.

Thermo Scientific Orion ROSS® pH Electrodes

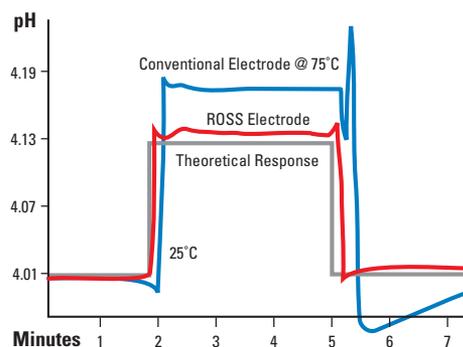
The standard for accurate, reproducible pH measurements

ROSS Specifications :

- **Slope:** 92-102% of theoretical Nernst slope
- **Isopotential point:** pH 7
- **Accuracy of measuring a pH 6.86 buffer after standardization at 25 °C:** Accurate within 0.03 pH for buffer at any temperature between 0-100 °C using automatic temperature compensation.
- **Speed of response in 6.86 buffer going from 25 °C to 75 °C:** Response stable to 0.01 pH within 30 seconds
- **Speed of response between 6.86 and 4.01 buffers at 25 °C:** Response stable to 0.002 pH within 15 seconds
- **Mercury free, TRIS, protein and sulfide compatible**

Temperature Response

The graph below 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



Accurate, rapid results in a half-cell design



ROSS® pH half-cell with glass body

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

For precise and reproducible pH determinations



ROSS® combination pH electrode with glass body

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

Cat. No.	8101BNWP	8102BN
pH Range	0-14	0-14
pH Precision	0.01	0.01
Temp. Range	0-100 °C	0-100 °C
Internal Reference	ROSS	ROSS
Junction	-	Ceramic
Fill Solution	-	3 M KCl (810007)
Dimension D (Dia) L (Length) T (Tip)	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm
Connector Type	BNC Waterproof*	BNC*

Cat. No.	Recommended Accessories
810001	ROSS Storage Solution
810007	ROSS Fill Solution
810199	All-in-One ROSS pH Buffer Kit

Fast, reliable results in small samples



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

- Measures samples as small as 0.2 mL
- Fits test tubes and small containers

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

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

For soft solid and semi-solid samples



ROSS® combination pH electrode with epoxy body, flat surface

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

Durable for precise pH applications



ROSS® combination pH electrode with epoxy body

- Epoxy body for ruggedness
- General purpose, high performance

For piercing semi-solid samples



ROSS® combination pH electrode with glass body, spear tip

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



BEST



MERCURY FREE



TRIS COMPATIBLE



SUPERIOR TEMPERATURE CONTROL

8103BN	8104BN	8115BN	8135BN	815600	8163BNWP	Cat. No.
0-14	0-14	0-14	0-14	0-14	0-14	pH Range
0.01	0.01	0.01	0.01	0.01	0.01	pH Precision
0-100 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C	Temp. Range
ROSS	ROSS	ROSS	ROSS	ROSS	ROSS	Internal Reference
Ceramic	Ceramic	Glass Fiber	Glass Fiber	Glass Fiber	Ceramic	Junction
3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	Fill Solution
L- 165 mm D- 6 mm x 95 mm L	L- 120 mm D- 12 mm	L- 165 mm T- 8 mm x 95 mm L	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	L- 110 mm T- 4.5 mm x 20 mm L	Dimension D (Dia) L (Length) T (Tip)
BNC*	BNC*	BNC*	BNC*	BNC*	BNC Waterproof*	Connector Type

Key Information

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.

* We offer more connector options; contact your local sales office for information.



BNC Waterproof

BNC

Thermo Scientific Orion ROSS® Sure-Flow® pH Electrodes

Easy to clean junction never clogs

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!



BEST



MERCURY FREE



TRIS COMPATIBLE



SUPERIOR TEMPERATURE CONTROL

Fast response—even in difficult samples



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

- Sure-Flow junction prevents clogging, ideal for soil samples
- Durable epoxy design

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

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

Accurate, rapid results in a half-cell design



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

Cat. No.	8165BNWP	8172BNWP	8175BNWP	800300
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.01	-
Temp. Range	0-100 °C	0-100 °C	0-100 °C	0-100 °C
Temp. Accuracy	-	-	-	-
Internal Reference	ROSS	ROSS	ROSS	ROSS
Junction	Sure-Flow	Sure-Flow	Sure-Flow	Sure-Flow
Fill Solution	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- 165 mm T- 8 mm x 95 mm L	L- 120 mm D- 12 mm
Connector Type	BNC Waterproof*	BNC Waterproof*	BNC Waterproof	Pin Tip

Cat. No.	Recommended Accessories
810001	ROSS Storage Solution
810007	ROSS Fill Solution
810199	All-in-One ROSS pH Buffer Kit

Thermo Scientific Orion PerpHecT® ROSS® pH Electrodes

The ideal electrodes for PerpHecT® meters for LogR™ temperature measurements

Ideal for precise and reliable pH analysis



PerpHecT® ROSS® combination pH electrode with glass body

- For QC and research applications

Precise measurements of small samples



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

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

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

For soft solid and semi-solid samples



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

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

Durability and reliability for precise pH



PerpHecT® ROSS® combination pH electrode with epoxy body

- Epoxy body for ruggedness and durability

High performance in all samples



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

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



BEST



MERCURY FREE



TRIS COMPATIBLE



SUPERIOR TEMPERATURE CONTROL

View our selection of refillable and gel-filled PerpHecT ROSS Ultra pH/ATC Triode electrodes; see page 8.

8202BN	8203BN	8220BNWP	8235BN	8256BN	8272BN	Cat. No.
0-14	0-14	0-14	0-14	0-14	0-14	pH Range
0.01	0.01	0.01	0.01	0.01	0.01	pH Precision
0-100 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C	0-100 °C	Temp. Range
± 0.5 °C	± 0.5 °C	± 0.5 °C	± 0.5 °C	± 0.5 °C	± 0.5 °C	Temp. Accuracy
ROSS	ROSS	ROSS	ROSS	ROSS	ROSS	Internal Reference
Ceramic	Ceramic	Sleeve	Glass Fiber	Glass Fiber	Sure-Flow	Junction
3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	3 M KCl (810007)	Fill Solution
L- 120 mm D- 12 mm	L- 165 mm T- 6 mm 95 mm L	L- 155 mm T- 3 mm 40 mm L	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	Dimension D (Dia) L (Length) T (Tip)
BNC	BNC	BNC Waterproof	BNC	BNC	BNC	Connector Type



BNC Waterproof



BNC



Pin Tip

Key Information

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.

* We offer more connector options; contact your local sales office for information.

Thermo Scientific Orion PerpHecT[®] pH Electrodes

Measure temperature with LogR™ technology



Feature	9202BN	9203BN	9206BN	9207BN	9256BN	9272BN
Ideal for everyday use						
For samples with size limitations						
Easy to use and low maintenance						
Low maintenance plus built-in ATC						
For reliable pH measurements						
For analysis of difficult samples						

PerpHecT[®] combination pH electrode with glass body

- General purpose
- For routine or research applications

PerpHecT[®] combination pH electrode with glass body, semi-micro tip

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

PerpHecT[®] combination pH electrode with epoxy body, low maintenance gel

- Low maintenance gel electrode
- For rugged field, plant, or educational use

PerpHecT[®] pH/ATC Triode™ with epoxy body, low maintenance gel

- Low maintenance gel with built-in ATC
- pH and ATC connectors for PerpHecT meters

PerpHecT[®] combination pH electrode with epoxy body

- Epoxy body for ruggedness and durability
- Ideal for routine or research applications

PerpHecT[®] Sure-Flow™ combination pH electrode with glass body

- Sure-Flow junction prevents clogging
- For samples such as soil, colloids, viscous material, and organic solvents

Cat. No.	9202BN	9203BN	9206BN	9207BN	9256BN	9272BN
pH Range	0-14	0-14	0-14	0-14	0-14	0-14
pH Precision	0.01	0.01	0.05	0.02	0.01	0.01
Temp. Range	0-90 °C	0-90 °C	0-80 °C	0-80 °C	0-90 °C	0-100 °C
Temp. Accuracy	± 0.5 °C	± 0.5 °C	± 0.5 °C	± 0.1 °C	± 0.5 °C	± 0.5 °C
Internal Reference	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl
Junction	Ceramic	Ceramic	Wick	Wick	Glass Fiber	Sure-Flow
Fill Solution (Cat. No.)	4 M KCl with Ag/AgCl (900011)	4 M KCl with Ag/AgCl (900011)	-	-	4 M KCl with Ag/AgCl (900011)	4 M KCl with Ag/AgCl (900011)
Dimension D (Dia) L (Length) T (Tip)	L- 120 mm D- 12 mm	L- 165 mm T- 6.5 mm x 100 mm L	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	BNC	BNC - Phono Tip (PerpHecT)	BNC	BNC

Cat. No.	Recommended Accessories
900011	Ag/AgCl Fill Solution
910199	All-in-One pH Buffer Kit
910001	Electrode Storage Solution

Thermo Scientific Orion AquaPro Professional pH Electrodes

Ideal for environmental and field testing of water and wastewater samples

Reliable and accurate



AquaPro combination pH electrode with low maintenance polymer, glass body

- General purpose, high performance

Fast response in small samples



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

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

Precise and durable



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

- Toughened bulb for rugged lab use

Rugged with built-in ATC



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

- Low maintenance with built-in ATC probe for Star meters

For soft solids and semi-solids



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

- Flat surface for measurements of moist surfaces such as agar gel plates, meat, and cheese

Rugged and accurate



AquaPro combination pH electrode with low maintenance polymer, epoxy body

- General purpose, high performance



BEST



MERCURY FREE



TRIS COMPATIBLE

9102AP	9103APWP	9104APWP	9107APMD	9135APWP	9156APWP	Cat. No.
0-14	0-14	0-14	0-14	0-14	0-14	pH Range
0.02	0.02	0.02	0.02	0.02	0.02	pH Precision
0-60 °C	0-60 °C	0-60 °C	0-60 °C	0-60 °C	0-60 °C	Temp. Range
-	-	-	± 2.0 °C	-	-	Temp. Accuracy
Ag/AgCl Double Junction	Ag/AgCl Double Junction	Ag/AgCl Double Junction	Ag/AgCl Double Junction	Ag/AgCl Double Junction	Ag/AgCl Double Junction	Internal Reference
Open	Open	Open	Open	Open	Open	Junction
-	-	-	-	-	-	Fill Solution
L- 120 mm D- 12 mm	L- 165 mm T- 6.5 mm x 100 mm L	L- 120 mm D- 12 mm	Dimension D (Dia) L (Length) T (Tip)			
BNC	BNC Waterproof	BNC Waterproof	BNC - MiniDIN (Star)	BNC	BNC	Connector Type

Key Information

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.
We offer more connector options; contact your local sales office for information.



BNC Waterproof



BNC



MiniDIN (Star)



Phono Tip (PerpHect)

Thermo Scientific Orion pH Electrodes

Ideal for all routine pH measurements



• **Accurate results in a half-cell**



• **pH half-cell with glass body**

- Use with 900100 or 900200 reference electrodes

• **Easy-to-clean bulb in a half-cell design**



• **Low resistance pH half-cell with glass body, rugged bulb**

- For routine or clean water measurements
- Use with 900100 reference electrode

• **General purpose for everyday use**



• **Combination pH electrode with glass body**

- For routine or research applications

• **For samples with size constraints**



• **Combination pH electrode with glass body, semi-micro tip**

- Measure samples as small as 0.2 mL
- Fits test tubes and small containers

• **Durable and reliable**



• **Combination pH electrode with glass body, rugged bulb**

- Toughened bulb for rugged lab use

• **Low maintenance with built-in ATC**



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

- Low maintenance gel with built-in ATC
- Epoxy body for ruggedness

Cat. No.	9101BN	9161BN	9102BNWP	9103BNWP	9104BNWP	9107BNMD* 9107WMMD* 9107WLMD (Star)* 9107BN (A+ Series)
pH Range	0-14	0-14	0-14	0-14	0-14	0-14
pH Precision	0.02	0.02	0.02	0.02	0.02	0.02
Temp. Range	0-90 °C	0-90 °C	0-90 °C	0-90 °C	0-90 °C	0-80 °C
Internal Reference	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl
Junction	-	-	Ceramic	Ceramic	Ceramic	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- 120 mm D- 12 mm	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	L- 165 mm T- 6.5 mm x 100 mm L	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm
Connector Type	BNC†	BNC†	BNC Waterproof†	BNC Waterproof†	BNC Waterproof†	BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)†

Cat. No.	Recommended Accessories
900011	Ag/AgCl Fill Solution
910199	All-in-One pH Buffer Kit
910001	Electrode Storage Solution

• **Low maintenance with built-in ATC**



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

- Low maintenance gel with built-in ATC
- Epoxy body for ruggedness

• **General purpose and reliable**



• **Combination pH electrode with epoxy body**

- Epoxy body for ruggedness and durability
- For routine or research applications

• **Durable with built-in ATC**



• **pH/ATC Triode™ with epoxy body, refillable**

- Long-lasting with built-in ATC
- Epoxy body for ruggedness

• **Rugged with an easy-to-clean bulb**



• **Low resistance combination pH electrode with glass body, rugged bulb**

- For routine or clean water measurements

• **Fast response in difficult samples & soils**



• **Sure-Flow® combination pH electrode with epoxy body**

- Sure-Flow junction prevents clogging
- Rugged, durable epoxy design

• **For all samples including solvents**



• **Sure-Flow® combination pH electrode with glass body**

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



9109WP 9109WL*	9156BNWP	9157BNMD (Star) 9157BN (A+ Series)	9162BNWP	9165BNWP	9172BNWP	Cat. No.
0-14	0-14	0-14	0-14	0-14	0-14	pH Range
0.02	0.02	0.02	0.02	0.02	0.02	pH Precision
0-80 °C	0-90 °C	0-90 °C	0-90 °C	0-100 °C	0-100 °C	Temp. Range
Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Internal Reference
Wick	Glass Fiber	Glass Fiber	Ceramic	Sure-Flow	Sure-Flow	Junction
-	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	Fill Solution
L- 120 mm D- 12 mm Cap D- 22 mm	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	L- 120 mm D- 12 mm	Dimension D (Dia) L (Length) T (Tip)
E DIN Waterproof Banana Plug	BNC Waterproof†	BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)	BNC Waterproof†	BNC Waterproof	BNC Waterproof	Connector Type



BNC Waterproof

BNC

MiniDIN (Star)

8 Pin DIN (A+ Series)

Key Information

Environmentally-safe mercury-free.

All cap diameters are 16 mm at bottom of cap. All cable lengths are 1 meter except where noted.

† We offer more connector options; contact your local sales office for information.

* 9107BNMD— 1.5 meter cable | 9107WMD— 3 meter cable
9107WLMD— 6 meter cable | 9109WL— 6 meter cable

Thermo Scientific Orion Green Electrodes

No lead or mercury – the world's most environmentally friendly glass-containing pH electrode

The Green electrode line is the world's first glass-containing pH electrode to be free of mercury or lead. Typically, glass pH electrodes have up to a 20% lead content in the glass. Green electrodes use glass that is lead free, which exceeds the requirements of RoHS.

The rugged epoxy body provides durability in tough applications. Green electrodes are easy to use and are available in low maintenance gel or refillable designs. Double junction versions allow measurements in tough dirty water samples or samples with TRIS, sulfides and proteins.

There is no loss of performance with a Green electrode. They perform as well or better than standard pH electrodes. In fact, low maintenance green electrodes have a wider temperature range than standard gel electrodes.

Green electrodes provide fast, accurate, repeatable results while eliminating the hassle of hazardous material disposal.



BETTER



MERCURY
FREE



LEAD FREE

<p>Low maintenance, rugged epoxy body</p> <p>NEW</p>  <p>Green combination pH electrode, gel with epoxy body</p> <ul style="list-style-type: none"> Ideal for education, plant or field use 	<p>Low maintenance, double junction</p> <p>NEW</p>  <p>Green combination double junction pH electrode, gel with epoxy body</p> <ul style="list-style-type: none"> Ideal for education, plant or field use Use in dirty water or TRIS, sulfide and protein samples <p>TRIS COMPATIBLE</p>	<p>Refillable, rugged epoxy body</p> <p>NEW</p>  <p>Green combination refillable pH electrode with epoxy body</p> <ul style="list-style-type: none"> Ideal for routine or research applications 	<p>Refillable, double junction</p> <p>NEW</p>  <p>Green combination double junction refillable pH electrode with epoxy body</p> <ul style="list-style-type: none"> Ideal for routine or research applications Use in dirty water or TRIS, sulfide and protein samples <p>TRIS COMPATIBLE</p>
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Cat. No.	GS9106BNWP	GD9106BNWP	GS9156BNWP	GD9156BNWP
pH Range	0-14	0-14	0-14	0-14
pH Precision	0.05	0.02	0.02	0.02
Temp. Range	0-90 °C	0-90 °C	0-90 °C	0-90 °C
Temp. Accuracy	-	-	-	-
Internal Reference	Ag/AgCl	Ag/AgCl Dbl. Junction	Ag/AgCl	Ag/AgCl Dbl. Junction
Junction	Glass Capillary	Glass Capillary	Glass Fiber	Glass Fiber
Fill Solution	-	-	4 M KCl w/ Ag/AgCl (900011)	3 M KCl (910008)
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
Depth of Immersion	-	-	-	-
Connector Type	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories		
910001	Electrode Storage Solution	910199	All-in-One pH Buffer Kit
900011	Ag/AgCl Fill Solution	910008	3 M KCl Fill Solution

Thermo Scientific Orion Micro pH Electrodes

Ideal for small samples; fits 384 microwell plates

• **Measure samples as small as 5 μ L**



• **Micro combination pH electrode with glass body**

- Designed for test tubes and small containers
- Measure samples as small as 5 μ L

• **For small test tubes and micro-titer plates**



• **Micro combination pH electrode with glass body, small length**

- Measure samples as small as 5 μ L

• **Measure samples as small as 0.5 μ L**



• **Micro combination pH electrode with glass body, small tip**

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

• **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

• **Accurate in extremely small samples**



• **PerpHecT[®] ROSS[®] combination pH electrode with glass body, micro**

- Measures samples as small as 15 μ L in 384 well plates
- Minimum depth of immersion is 4.5 mm



9802BN	9803BN	9810BN	9826BN	9863BN	8220BNWP	Cat. No.
0-14	0-14	0-14	0-14	0-14	0-14	pH Range
0.02	0.02	0.02	0.02	0.02	0.01	pH Precision
0-80 °C	0-80 °C	0-80 °C	0-80 °C	0-80 °C	0-100 °C	Temp. Range
-	-	-	-	-	± 0.5 °C	Temp. Accuracy
Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	ROSS	Internal Reference
Ceramic	Ceramic	Ceramic	Ceramic	Ceramic	Sleeve	Junction
4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	4 M KCl w/ Ag/AgCl (900011)	3 M KCl (810007)	Fill Solution
L- 150 mm T- 2.5 mm x 18 mm L	L- 83 mm T- 2.5 mm x 48 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- 155 mm T- 3 mm x 40 mm L	Dimension D (Dia) L (Length) T (Tip)
2 mm	2 mm	1 mm	2 mm	3 mm	-	Depth of Immersion
BNC	BNC	BNC	BNC	BNC	BNC Waterproof	Connector Type



BNC Waterproof



BNC

Key Information

Environmentally-safe mercury-free.

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

We offer more connector options; contact your local sales office for information.

Thermo Scientific Orion No Cal®

Thermo Scientific Orion Double Junction pH Electrodes



• *Electrode maintains calibration for one year*



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

- Designed for stable, high performance pH analysis in the field
- Replacement electrode filling solution Cat. No. 510011

• *For meat, cheese and sludge samples*



• **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

• *Accurate and reliable*



• **Double Junction combination pH electrode with glass body**

- General purpose
- Easy-to-clean refillable design

• *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

• *Durable and low maintenance*



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

- Low maintenance gel with durable epoxy body

Cat. No.	5107BNMD (Star) 5107NC (A+ Series)	9120APWP	9102DJWP	9110DJWP	9156DJWP
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	0-60 °C	0-60 °C	0-60 °C	0-60 °C
Temp. Accuracy	± 1.0 °C	-	-	-	-
Internal Reference	Platinum	Ag/AgCl Dbl. Junction	Ag/AgCl Dbl. Junction	Ag/AgCl Dbl. Junction	Ag/AgCl Dbl. Junction
Junction	Ceramic	Ceramic	Ceramic	Ceramic	Wick
Fill Solution	No Cal (510011)	3 M KCl (910008)	3 M KCl (910008)	3 M KCl (910008)	-
Dimension D (Dia) L (Length) T (Tip)	L- 120 mm D- 12 mm	L- 215 mm D- 16 mm	L- 120 mm D- 12 mm	L- 150 mm T- 4.5 mm x 90 mm L	L- 120 mm D- 12 mm
Connector Type	BNC - MiniDIN (Star) BNC - 8 Pin (A+ Series)†	BNC Waterproof	BNC Waterproof	BNC Waterproof	BNC Waterproof

Cat. No.	Recommended Accessories	
910008	3 M KCl Fill Solution	900011 Ag/AgCl Fill Solution
910001	Electrode Storage Solution	910199 All-in-One pH Buffer Kit

Thermo Scientific Orion Economy pH Electrodes

Thermo Scientific Specialty Electrodes



• *For rugged, everyday use*



• **Combination pH electrode with epoxy body, low maintenance gel**

- Ideal for field, plant, or educational applications

• *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

• *For solids and semi-solids*



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

- Flat surface for analysis of moist surfaces

- **9163SC**
Combination pH electrode with glass body, piercing spear tip (screw cap)
- **9166SC**
Combination pH electrode with glass body, sleeve junction (screw cap)

- **9167SC**
Combination pH electrode with glass body, semi-micro, flat surface (screw cap)
- **930101**
HF resistant pH module for samples with hydrofluoric acid

Thermo Scientific Basic Electrodes



- **9142BN**
Refillable combination pH electrode with glass body, 900011 fill solution (BNC)
- **9145BN**
Low maintenance gel combination pH electrode with epoxy body (BNC)
- **9146BN**
Low maintenance gel combination pH electrode with epoxy body and removable bulb guard (BNC)

- **9147BN**
Low maintenance gel combination pH electrode with epoxy body and built-in ATC (BNC and 2.5 mm phono jack connections, for use with Russell RL060P meter)
- **917004**
Stainless steel ATC probe (2.5 mm phono jack, for use with Russell meters)

Visit www.thermo.com/water for information on Russell meters.

9106BNWP	911600	912600	913600	Cat. No.
0-14	0-12	0-12	0-12	pH Range
0.05	0.1	0.1	0.1	pH Precision
0-80 °C	0-80 °C	0-80 °C	0-80 °C	Temp. Range
-	-	-	-	Temp. Accuracy
Ag/AgCl	Ag/AgCl	Ag/AgCl	Ag/AgCl	Internal Reference
Wick	Wick	Wick	Wick	Junction
-	-	-	-	Fill Solution
L- 120 mm D- 12 mm	L- 145 mm D- 6 mm	L- 305 mm D- 8 mm	L- 110 mm D- 12 mm	Dimension D (Dia) L (Length) T (Tip)
BNC Waterproof	BNC	BNC	BNC	Connector Type



BNC Waterproof



BNC



MiniDIN (Star)



8 Pin DIN (A Series)



Screw Cap

Key Information

Environmentally-safe mercury-free; double junction are compatible with TRIS, protein and sulfide.

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

† We offer more connector options; contact your local sales office for information.

Thermo Scientific Orion Redox/ORP and ORP Triode™ Electrodes



Feature	9678BNWP	9778BNWP	9180BNMD (Star) 9180BN (A+ Series)	9179BNMD (Star) 9179BN (A+ Series)
Durable and clog-free				
Sure-Flow® combination redox/ORP electrode with epoxy body	<ul style="list-style-type: none"> For use in water, wastewater, metal plating, and biotech samples 	Combination redox/ORP electrode with glass body	ORP/ATC Triode™ with epoxy body, refillable	ORP/ATC Triode™ with epoxy body, low maintenance gel
		<ul style="list-style-type: none"> For use in water, wastewater, metal plating and organic solvent samples 	<ul style="list-style-type: none"> For use in water and wastewater Epoxy body for ruggedness and durability 	<ul style="list-style-type: none"> 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
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 - MiniDIN (Star) BNC - 8 Pin (A+Series)	BNC - MiniDIN (Star) BNC - 8 Pin (A+Series)

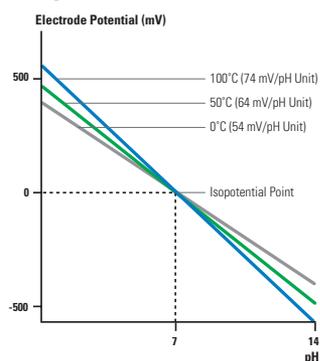
Cat. No.	Recommended Accessories
900011	Ag/AgCl Fill Solution
967901	ORP Standard 475 mL
967961	ORP Standard 5 x 60 mL

Thermo Scientific Orion ATC Probes

Water Quality Specialist Tip

Temperature is the number one source for pH error! The ideal solution is an ATC probe – now your pH measurement is accurate and EPA compliant.

Change of pH Slope with Temperature



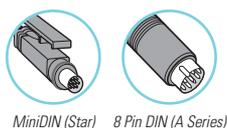
pH Value versus Temperature

25 °C	0 °C	10 °C	20 °C	40 °C
1.68	1.67	1.67	1.67	1.69
4.01	4.00	4.00	4.00	4.03
6.86	6.98	6.95	6.87	6.84
7.00	7.11	7.08	7.01	6.97
9.18	9.46	9.40	9.23	9.07
10.01	10.32	10.25	10.06	9.89
12.46	13.42	13.21	12.64	11.99



<p>Fastest temperature response</p> 	<p>Rugged stainless steel</p> 	<p>Durable epoxy</p> 	<p>Solvent-resistant glass</p> 
<p>Micro ATC Probe with Stainless Steel and Epoxy Body</p> <ul style="list-style-type: none"> For critical temperature monitoring Measures samples as small as 10 µL Minimum depth of immersion is 3 mm 	<p>ATC Probe with Stainless Steel Body</p> <ul style="list-style-type: none"> Extremely durable body For field, plant, and food applications 	<p>ATC Probe with Epoxy Body</p> <ul style="list-style-type: none"> General purpose For aqueous samples, intermittent use in methanol or ethanol 	<p>ATC Probe with Glass Body</p> <ul style="list-style-type: none"> For solutions that contain organic solvents

Cat. No.	928007MD (Star)	927007MD (Star) 917007 (A+ Series)	927005MD (Star) 917005 (A+ Series)	927006MD (Star) 917006 (A+ Series)
Temp. Range	0-100 °C	0-100 °C	0-80 °C	0-100 °C
Temp. Accuracy	± 1 °C	± 1 °C	± 1 °C	± 1 °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- 6 mm	L- 120 mm D- 8 mm
Connector Type	MiniDIN for Star	MiniDIN (Star) 8 Pin DIN (A+ Series)†	MiniDIN (Star) 8 Pin DIN (A+ Series)†	MiniDIN (Star) 8 Pin DIN (A+ Series)†



Key Information

Environmentally-safe mercury-free.

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

†We offer more connector options; contact your local sales office for information.

Thermo Scientific Orion Stirrers

Ideal for laboratory pH and ISE measurements



**NEW
PRICE**

Automatic Stirrer Probe

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

- Powered by Orion DUAL STAR and 3-, 4- and 5- Star benchtop meters
- 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
- New price breakthrough - half the price of similar models
- Conveniently plugs into the back panel of DUAL STAR and benchtop Star meters for stirrer power, speed and control

It is so easy-to-use! Plug the stirring probe into the back panel of an Orion DUAL STAR or benchtop 3-, 4- and 5- Star 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	Automatic stirring probe with paddle
096021	Replacement paddles, 3 pack



ionplus™ Stirrer

- Stirrer easily attaches to electrode body to mix sample
- Works with any magnetic stirring plate
- Ideal for small volume samples

ionplus Stirrer

Cat. No.	Description
900060	ionplus stirrer stirrer easily attaches to the electrode body to mix sample



Accessories

Orion DUAL STAR™ pages 48-49

For a winning combination, pair the automatic stirrer probe with an Orion DUAL STAR meter.

Thermo Scientific Orion pH Buffers, Solutions and Test Kits



Our pH and ORP buffers are designed to meet all end user requirements, including laboratory grade NIST traceability and DIN standards.

To maximize the life of your electrodes, we offer pH electrode cleaning kits as well as filling, storage and rinse solutions for proper electrode care.

pH Electrode Filling Solutions

All bottles are 5 x 60 mL

Cat. No.	Description	For the following pH Electrodes
810007	3 M KCl ROSS	ROSS Ultra, ROSS and PerpHecT ROSS Electrodes
910008	3 M KCl	Double Junction, Double Junction Refillable Green and Double Junction KNIpHE Electrodes
900011	4 M KCl with Ag/AgCl or 2 M KCl with Ag/AgCl (For low ionic strength samples)	Standard, Specialty, and PerpHecT Ag/AgCl Electrodes, and Single Junction Refillable Green Electrodes
900004	2 M KCl with Ag/AgCl (For low ionic strength samples)	Standard, Specialty, and PerpHecT Ag/AgCl Electrodes, and Single Junction Refillable Green Electrodes used in low ionic strength samples
900011	4 M KCl with Ag/AgCl	Micro pH Electrodes and ORP Electrodes
900001	Equitransferent Solution with Ag/AgCl	Single Junction Sure-Flow Reference Electrode
900002	Inner Chamber–Equitransferent Solution with Ag/AgCl	Double Junction Sure-Flow Reference Electrode
900003	Outer Chamber–10% KNO ₃	
510011	No Cal Electrode Filling Solution	No Cal pH Electrodes
610001	3 M KCl with Ag/AgCl	pHuTure electrodes

pH Buffers

NIST

Cat. No.	Description
910199	All-in-One pH Buffer Kit – 475 mL each of 4.01, 7.00, 10.01 buffers and pH electrode storage solution (910001), pH electrode storage bottle
810199	All-in-One ROSS pH Buffer Kit – 475 mL each of 4.01, 7.00, 10.01 buffers and ROSS pH electrode storage solution (810001), 30 mL bottle of general cleaning solution (900023), pH electrode storage bottle
NEW	
911110	pH Rinse Solution – PerpHecT Individual Rinse Pouch 10 pack
911125	25 pack
910168	pH 1.68 Buffer – 475 mL
9116860	5 x 60 mL
910104	pH 4.01 Buffer (red) – 475 mL
910460	5 x 60 mL
9104CB	19 L (5 gallon) cubitainer
910410	PerpHecT Individual Buffer Pouch, 10 pack
910425	PerpHecT Individual Buffer Pouch, 25 pack
910105	pH 5.00 Buffer (orange) – 475 mL
910686	pH 6.86 Buffer – 475 mL
916860	5 x 60 mL
910107	pH 7.00 Buffer (yellow) – 475 mL
910760	5 x 60 mL
9107CB	19 L (5 gallon) cubitainer
910710	PerpHecT Individual Buffer Pouch, 10 pack
910725	PerpHecT Individual Buffer Pouch, 25 pack
910918	pH 9.18 Buffer – 475 mL (1 pint)
9191860	5 x 60 mL
910110	pH 10.01 Buffer (blue) – 475 mL
911060	5 x 60 mL
9110CB	19 L (5 gallon) cubitainer
911010	PerpHecT Individual Buffer Pouch, 10 pack
911025	PerpHecT Individual Buffer Pouch, 25 pack
910112	pH 12.46 Buffer – 475 mL
911260	5 x 60 mL

ORP Standards

NIST

Cat. No.	Description
967901	475 mL
967961	5 x 60 mL

Storage Solutions

Cat. No.	Description
910001	pH Electrode Storage Solution – 475 mL
910060	5 x 60 mL
9100CB	19 L (5 gallon) cubitainer
810001	ROSS pH Electrode Storage Solution – Optimize ROSS and ROSS Ultra pH electrode performance and life, 475 mL



Total Alkalinity Test Kit

- Direct Reading 0-200 ppm as CaCO_3
- Requires No Special Equipment
- No Interference from Color or Turbidity

Total alkalinity is as easy as pH! The total alkalinity test kit is a two-step direct measurement for total alkalinity and pH. Calibrate for pH as usual, add the alkalinity reagent and read total alkalinity in ppm CaCO_3 from the enclosed pH conversion chart. Saves time by eliminating additional equipment set-up, tedious titrations and calculations.



Pure Water® pH Test Kit

- Increases Measurement Accuracy
- Reduces Electrode Drift
- Eliminates Contamination of Sample

Many laboratories take pH measurements of "pure water" with low levels of acid, base or dissolved salts. The low conductivity and limited buffering capacity of low ionic strength pure water causes pH electrodes to drift, producing non-reproducible and inaccurate results. Using the Pure Water pH Test Kit provides fast, accurate pH results in high purity waters. This kit contains special low ionic strength buffers for calibration and an additive, called pHISA Adjustor, to increase sample ionic strength without changing its pH. Recommended for samples such as well water, rain water, distilled/deionized water, boiler feed water, and process water. For best results, a high quality pH electrode such as the 8102BNUWP ROSS Ultra pH electrode is recommended.

pH Testing Kits

Cat. No.	Description
700010	Total Alkalinity Test Kit —Alkalinity reagent, 475 mL (700011); alkalinity standard/control, 475 mL (700012); total alkalinity conversion chart; application procedure 517 "Total Alkalinity in Natural Waters"
700001	Pure Water pH Test Kit —pH 6.97 buffer, 4 x 475 mL (700702); pH 4.10 buffer, 2 x 475 mL (700402); pHISA adjuster, 2 x 50 mL (700003), application procedure 501 "pH Measurement in Low Ionic Strength Solutions"
700702	Pure Water pH 6.97 Buffer A —4 x 475 mL
700402	Pure Water pH 4.10 Buffer B —4 x 475 mL
700902	Pure Water pH 9.15 Buffer C —4 x 475 mL
700003	pHISA Pure Water Ionic Strength Adjustor —5 x 60 mL; one syringe dispenser

pH Electrode Cleaning

Cat. No.	Description
900020	pH Electrode Cleaning Solutions—pH Cleaning Solution Kit —Includes 1 x 30 mL each of cleaning solutions (A and C) and 1 x 60 mL each of cleaning solutions (B and D), beaker and pipet
900021	pH Cleaning Solution A —For removing protein contaminants, includes 4 x 30 mL bottles, beaker and pipet
900022	pH Cleaning Solution B —For removing bacterial contaminants, includes 4 x 60 mL bottles, beaker and pipet
900023	pH Cleaning Solution C —For general cleaning, includes 4 x 30 mL bottles, beaker and pipet
900024	pH Cleaning Solution D —For removing oil and grease contaminants, includes 4 x 60 mL bottles, beaker and pipet

pH Accessories

Cat. No.	Description
910005	Bulb guard for glass pH electrode, 5 pack
910003	12 mm electrode storage bottles, 3 pack
910004	8 mm electrode storage bottles, 3 pack
910006	6 mm electrode storage bottles, 3 pack
020017	No Cal electrode storage chamber
510015	Stain lifter solution, 60 mL

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

Thermo Scientific Orion Electrode Connectors and Cables

Connectors that stay dry and connected



If you have ever lost data – or even 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.

Electrode Extension Cables

Cat. No.	Description
910032 NEW	15 ft. Extension Cable, 8 PIN Mini DIN for ATC Probes for STAR series meters
910026	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	15 ft. Extension Cable, 3.5 mm Phono Tip connector for 927005, 927006, and 927007 ATC probes
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

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
91CLFO	F LEMO (Metrohm)	Screw Cap	Detachable Cable to F LEMO Connector
090035	LEMO Miniature (Mettler)	BNC	BNC to LEMO Miniature Adapter
91CLMO	LEMO Miniature (Mettler)	Screw Cap	Detachable Cable to LEMO Connector
91CBBR	British (Kent EIL)	Screw Cap	Detachable Cable to British 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
91CBRA	Radiometer No. 7	Screw Cap	Detachable Cable to Radiometer Connector
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

Adapter Cables

Cat. No.	Description	Meter Capabilities
1010050	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	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 Ion Selective Electrode Theory

Measurements using an ion selective electrode (ISE) are applicable in virtually every laboratory. ISEs can be used to measure ion concentrations in water, food, pharmaceuticals and biological samples. Many analytical methods using ISEs have been developed and published worldwide. The main advantage of ion selective electrode technology is the variety of analytical methods that are available. Ion selective electrodes can be used as endpoint indicators or to perform direct measurements and incremental techniques.

Electrode measurements are simpler and faster than other analytical techniques. Time-consuming sample preparation steps such as filtration and distillations are rarely needed. Analysis time is typically under one minute. In comparison to methods such as atomic absorption or ion chromatography, the setup cost is less and does not require expensive equipment. Methods are adaptable to the lab or field. Sample color or turbidity does not affect the measurement. A variety of analytical techniques are available to the analyst.

Choosing the right measurement technique

	Within Linear Response Range	Within Non-Linear Response Range	Increased Precision	Occasional Sampling	Small Sample Volume	Large Number of Samples	Reduce Chemical Usage	Field Measurement	Ionic Strength > 0.1 M	Non-specific Ion Measurement
Direct Measurement	✓				✓	✓		✓		
Known Addition	✓			✓		✓	✓		✓	
Titration	✓		✓							
Low Level Measurement		✓				✓		✓		
Analate Subtraction				✓	✓	✓	✓		✓	
Indicator Titration										✓

Direct measurement is a simple procedure for measuring a large number of samples. Only one meter reading is required for each sample. Calibration is performed in a series of standards. The concentration of the samples is determined by comparison to the standards. Orion ISE meters calculate and store the calibration curves, saving you time in analysis and ensuring an accurate result. Ionic strength adjustor is added to all solutions to ensure that samples and standards have similar ionic strength, proper pH, and to reduce the effect of interfering ions.

Low level measurement is a similar method to direct measurement. This method is recommended when the expected sample concentration is within the non-linear response range of the electrode. A minimum 3 point calibration is recommended to compensate for the electrodes non-linear response at the concentrations. Calibration is performed in one beaker, reducing the chance of cross contamination of the solutions.

Known addition is a useful method for measuring samples, since calibration is not required. This method is recommended when measuring only a few samples, or when samples have a high (>0.1 M) ionic strength, or when there is complicated background matrix. The electrodes are immersed in the

sample solution and an aliquot of standard solution, containing the measured species, is added to the sample. The original sample concentration is determined from the changes in potential before and after the addition. As in direct calibration, any convenient concentration unit can be used. Many Orion ISE meters automate this measurement, by performing the additions and automatically calculating the result.

Analate subtraction is also a useful for 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 that reacts with the sample. It is useful when sample size is small, for samples for which a stable 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 ratio between standard and sample.

Titration 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.

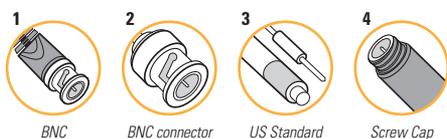
Thermo Scientific Orion Ion Selective Electrode Selection Guide

	Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA	
	Ammonia standard (NH₃)	9512BNWP ¹ 951201 ³	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 ₄ Cl / 951006	951211	
	Ammonia high performance	9512HPBNWP ¹ 9512HP01 ³	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 ₄ Cl / 951006	951011	
	Ammonium (NH₄⁺)	931801 ⁸	Plastic membrane half-cell	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm	0 to 50 °C	900200	900002 inner / 900018 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 ⁴	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 (Cd²⁺) 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 (Cd²⁺)	9448BN ² 9448SC ⁴	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 (Ca²⁺) 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 (Ca²⁺)	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 (CO₂)	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	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⁻)	9417BN ² 9417SC ⁴	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	
	Chloride (Cl⁻)	931701 ⁸	Plastic membrane half-cell	5 x 10 ⁻⁶ to 1.0 M 0.18 to 35,500 ppm	0 to 50 °C	900200	900002 inner / 0.1 M KCl outer	0.1 M NaCl / 941706 100 ppm Cl ⁻ / 941707 1000 ppm Cl ⁻ / 941708	None required	
	Chlorine (Cl₂)	9770BNWP ¹ 9770SC ⁴	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 (Cu²⁺) 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 (Cu²⁺)	9429BN ² 9429SC ⁴	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	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⁻)	9406BN ² 9406SC ⁴	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	9609BNWP ¹ 960900 ³	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⁻)	9409BN ² 940900 ³ 9409SC ⁴	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	
	Fluoroborate (BF₄⁻)	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	

Species	Cat. No.	Construction	Measurement Range	Optimum Temperature Range	Required Reference Electrode	Reference Filling Solution	Calibration Standards	Required ISA
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 ⁴	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 NaI / 945306	940011
Lead (Pb²⁺) 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 ₂ SO ₄ / 948207	Consult instruction manual
Lead (Pb²⁺)	9482BN ² 9482SC ⁴	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 ₂ SO ₄ / 948207	Consult instruction manual
EPA Nitrate (NO₃⁻) ionplus Design	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
EPA Nitrate (NO₃⁻)	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
Nitrogen Oxide (NO_x)	9546BN ²	Gas sensing combination	4 x 10 ⁻⁶ to 5 x 10 ⁻³ M 0.18 to 230 ppm	0 to 50 °C	Included	954602	0.1 M NaNO ₂ / 954606	956410 
Perchlorate (ClO₄⁻)	938101 ⁸	Plastic membrane half-cell	7 x 10 ⁻⁶ to 1.0 M 0.7 to 99,500 ppm	0 to 40 °C	900200	900002 inner / dilute ISA outer	Consult user guide	930711
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⁺/S²⁻) 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⁺/S²⁻)	9416BN ² 9416SC ⁴	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
Water Hardness (X²⁺)	9332BNWP ¹	Plastic membrane half-cell	6 x 10 ⁻⁶ to 1.0 M	0 to 50 °C	900100	900011	100 ppm CaCO ₃ / 923206 0.1 M CaCl ₂ / 922006	None required

 Compliant with EPA testing method

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



Key Information

1). BNC Waterproof connector **2).** BNC connector **3).** US Standard connector
4). Screw Cap connector, requires separate cable **8).** Module only, requires separate 93 Series electrode handle (9300BNWP, 930000, 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

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 ionic strength adjustor (ISA) and requiring that TISAB ISA 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.



BEST



MERCURY FREE



TRIS COMPATIBLE

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 960900	9409BN 940900 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 US Standard	BNC US Standard Screw Cap	Pin Tip

Cat. No.	Recommended Accessories				
940906	0.1 M NaF standard, 475 mL	040907	2 ppm standard as F ⁻ , with TISAB II, 475 mL	940999	TISAB II, 4 x 1 gallon
940907	100 ppm standard as F ⁻ , 475 mL	040908	10 ppm standard as F ⁻ , with TISAB II, 475 mL	940911	TISAB II concentrate, 475 mL
040906	1 ppm standard as F ⁻ , with TISAB II, 475 mL	940909	TISAB II, 1 gallon		

Thermo Scientific Orion Ammonia Ion Selective Electrodes

Compliant with EPA testing methods

High performance ammonia electrode



NEW



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
951211	pH adjusting ISA, 475 mL for samples greater than 10 ppm
951011	pH adjusting ISA, 475 mL for samples less than 10 ppm
951209	Electrode filling solution, 60 mL
951006	0.1 M NH ₄ Cl standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL

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

Cat. No.	9512HPBNWP 9512HP01
Measurement Range	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm
Temp. Range	0 to 50 °C
Connector Type	BNC US Standard

Standard ammonia electrode



Cat. No.	Recommended Accessories
951204	Loose membranes for standard electrodes, box of 20
951205	Bonded membranes for standard electrodes, pack of 3
951211	pH adjusting ISA, 475 mL
951202	Electrode filling solution, 60 mL
951006	0.1 M NH ₄ Cl standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL

Provides reliable results at mid to high ammonia levels

Cat. No.	9512BNWP 951201
Measurement Range	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm
Temp. Range	0 to 50 °C
Connector Type	BNC US Standard



BEST



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MERCURY FREE



TRIS COMPATIBLE

Approved ASTM method for ammonia in wastewater and drinking water

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.

Thermo Scientific Orion Nitrate Ion Selective Electrodes

Compliant with EPA testing methods



BEST

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 reference



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 × 10 ⁻⁶ to 1.0 M 0.1 to 14,000 ppm as N	7 × 10 ⁻⁶ to 1.0 M 0.1 to 14,000 ppm as N	-
Temp. Range	0 to 80 °C	0 to 80 °C	0 to 100 °C
Connector Type	BNC	BNC	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	930707	1000 ppm as nitrogen, 475 mL	930701	Replacement module for 9307BNWP (pack of 3)
900002	Inner chamber fill solution for 900200, 5 x 60 mL	930711	Nitrate ionic strength adjustor (ISA), 475 mL	930702	Replacement module for 9307BNWP (1 each)
920706	0.1 M nitrate standard solution, 475 mL	930710	Nitrate interference suppressor solution, 475 mL		
920707	1000 ppm as nitrogen, 475 mL	970701	Replacement module for 9707BNWP (1 each)		

Thermo Scientific Orion ISE Solutions and Accessories

ISE Ionic Strength Adjusters (ISA) and Special Reagents

Cat. No.	Description
951211	 Ammonia – pH Adjusting ISA
700005	 Nitrate Analysis Test Kit for Ammonia Electrode – Alkaline Reagent (951011); Reducing Reagent (700006); Electrode Filling Solution, 2 x 50 mL (951203); 100 ppm as N Nitrate Standard (930707); 100 ppm Ammonia Standard (951207); Application Procedure No. 115 “Nitrate Measurement in Environmental Samples”
700006	 Nitrate Analysis Test Kit – Reducing Agent
940011	Bromide, Cadmium, Chloride, Cupric, Iodide, Silver, Thiocyanate – ISA
932011	Calcium – ISA
950210	Carbon Dioxide – ISA
941709	 Chloride – Complexation Ionic Strength Adjuster (CISA) Reagent Pack, 2 x 475 mL
977011	 Chlorine – Acid Reagent
977010	 Iodide Reagent, 5 x 50 mL
951011	 Cyanide – Alkaline Reagent, 10 M NaOH
940909	Fluoride – TISAB II 1 gallon, 3.8 L
940999	TISAB II 4 gallon, 4 x 3.8 L
940911	TISAB III Concentrate
930711	Fluoroborate, Nitrate, and Perchlorate – ISA
930710	Nitrate – Nitrate Interference Suppressor Solution (NISS)
934610	Nitrite – ISA
956410	 Nitrogen Oxide – Acid Buffer
931911	Potassium – ISA
941609	 Sulfide – Sulfide Anti-Oxidant Buffer (SAOB) Reagent Pack, 4 x 475 mL
841111	Sodium – ISA
841113	Reconditioning Solution
841101	Storage Solution
654203	Surfactant – Sample Additive
654204	Non-Ionic Surfactant Reagent
654205	Non-Ionic Surfactant Titrant

ISE Accessories

Cat. No.	Description
9300BNWP	93 Series Handle – BNC Waterproof Connector
930000	U.S. Std. Connector
9300SC	Screw Cap, Requires Separate Cable
9700BNWP	97 Series ionplus Handle – BNC Waterproof Connector
948201	Polishing Strips for Solid State Electrodes
900060	ionplus Stirring Accessory

ISE Filling Solutions

Cat. No.	Description
951202	Ammonia, 1 x 60 mL (for 9512BNWP and 951201)
951209	Ammonia, 1 x 60 mL (for 9512HPBNWP and 9512HP01)
900018	Ammonium
950202	Carbon Dioxide, 1 x 60 mL
900017	Chloride
900001	Fluoride
954602	Nitrogen Oxide, 1 x 50 mL
900061	ionplus Series– Optimum Results A – Cadmium, Calcium, Fluoride, Sulfide
900062	Optimum Results B – Chloride, Cyanide, Lead, Silver/Sulfide
900067	Optimum Results C – Silver
900063	Optimum Results D – Bromide, Cupric, Iodide
900065	Optimum Results E – Potassium
900046	Optimum Results F – Nitrate, Nitrite
900002	Double Junction Reference – Inner Filling Solution
900003	Outer Filling Solution
900010	Sodium – 2 M NH ₄ Cl
900012	0.1 M NH ₄ Cl for low sodium levels
900004	Sodium – Micro Electrode

ISE Membrane and Modules

Cat. No.	Description
951204	Standard Ammonia – 9512BNWP and 951201
951205	20 Loose Membranes
951214	High Performance Ammonia – 9512HPBNWP and 9512HP01
951215	20 Loose Membranes
950204	Carbon Dioxide – 4 Membranes with O-rings
954604	Nitrogen Oxide – 20 Loose Membranes
931801	Plastic Membrane Half-Cell Modules – Ammonium
932001	Calcium
931701	Chloride
930501	Fluoroborate
930702	Nitrate
930701	Nitrate – 3 Pack
938101	Perchlorate
930101	pH – HF Resistant
931901	Potassium
933201	Water Hardness
972001	Plastic Membrane Combination Modules – ionplus Calcium
970701	ionplus Nitrate
971901	ionplus Potassium

ISE Calibration Standards

Cat. No.	Description
951006	Ammonia – 0.1 M NH ₄ Cl
951207	100 ppm as N
951007	1000 ppm as N
943506	Bromide – 0.1 M NaBr
922006	Calcium – 0.1 M CaCl ₂
950206	Carbon Dioxide – 0.1 M NaHCO ₃
950207	1000 ppm as CaCO ₃
941706	Chloride – 0.1 M NaCl
941707	100 ppm as Cl ⁻
941708	1000 ppm as Cl ⁻
977007	Chlorine – 100 ppm as Cl ₂
942906	Cupric – 0.1 M Cu(NO ₃) ₂
940906	Fluoride – 0.1 M NaF
940907	100 ppm as F ⁻
040906	1 ppm as F ⁻ with TISAB II
040907	2 ppm as F ⁻ with TISAB II
040908	10 ppm as F ⁻ with TISAB II
040916	Bulk Pack– 4 x 475 mL each of 1 ppm as F ⁻ with TISAB II (040906) and 10 ppm as F ⁻ with TISAB II (040908)
945306	Iodide – 0.1 M NaI
948206	Lead – 0.1 M Pb(ClO ₄) ₂ Lead
948207	0.1 M Na ₂ SO ₄ Sulfate
920706	Nitrate – 0.1 M NaNO ₃
930707	100 ppm as N
920707	1000 ppm as N
954606	Nitrite and Nitrogen Oxide – 0.1 M NaNO ₂
921906	Potassium – 0.1 M KCl
941104	Sodium – 5% NaCl
941706	0.1 M NaCl
941105	10 ppm as Na ⁺
941107	100 ppm as Na ⁺
841108	1000 ppm as Na ⁺
841109	Known Addition Standard, 1000 ppm as Na ⁺ with ISA
650700	Know Addition Kit– 3 x 475 mL of 1 M NaCl with ISA and 1 x 475 mL ISA (841111)
654201	Surfactant – 0.05 M Hyamine
654202	0.01 M Sodium Lauryl Sulfate (SLS), 60 mL
923206	Water Hardness – 100 ppm as CaCO ₃
922006	0.1 M CaCl ₂



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

Thermo Scientific Orion Conductivity Cell Families

A wide range of conductivity cells are available for every application. These conductivity cells feature built-in temperature compensation; high, standard, and low conductivity measuring ranges; cell constants from 0.1 to 10 cm⁻¹ and a variety of probe materials including epoxy/graphite, glass/platinum, and stainless steel.



BEST



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DuraProbe™ 4-Electrode Conductivity Cells

DuraProbe 4-electrode cells provide the highest accuracy for demanding laboratory or field applications. The 4-electrode design compensates for electrode fouling, cable and connector resistance, polarization errors, and fringe field interference errors. The epoxy/graphite cell material is extremely durable and chemically resistant. DuraProbe conductivity cells are ideal for high and standard conductivity samples and difficult samples such as wastewater, runoff water, and mud.

2-Electrode Conductivity Cells

The 2-electrode cells are able to measure low, standard, and high conductivity samples, depending on the cell constant. Cells with a 0.1 cm⁻¹ cell constant are ideal for low ionic strength solutions, de-ionized water, and ultra pure water. Glass/platinum cells are the best for chemically reactive conductivity samples, since the cell material is highly chemical resistant.

Rugged DuraProbe 4-electrode conductivity cell



013005MD^A
013010MD^A
013020MD^A
013025MD^A
013005A^F
013010A^F
013005D^B

- Widest conductivity range
- For lab and field applications
- Rugged epoxy/graphite body
- Cable lengths from 1.5 to 10 meters

Reliable DuraProbe 4-electrode conductivity cell



013605MD^A
013610MD^A
013610^F

- Wide conductivity range
- For lab and field applications
- Rugged epoxy/graphite

2-electrode conductivity cell for ultra-pure water



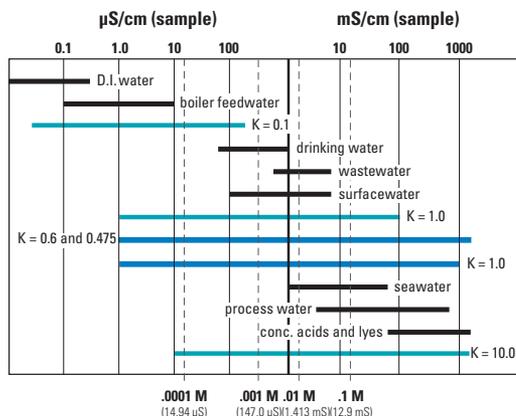
013016MD^A
013016A^F
013016D^B

- Low conductivity range
- For ultra pure water applications
- Includes detachable glass flow cell

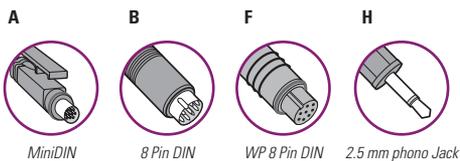
Cell Selection

Sample Conductivity Range

- Conventional 2-Electrode Cells
- Conventional 4-Electrode Cells



<p>● Platinized 2-electrode conductivity cell</p> 	<p>● Chemical resistant 2-electrode conductivity cell</p> 	<p>● Precise 2-electrode conductivity cell</p> 	<p>● Rugged 2-electrode conductivity cell</p> 	<p>● High range 2-electrode conductivity cell</p> 	<p>● Chemical resistant 3-electrode conductivity cell</p> 
<p>● 011020^B 011020A^F</p> <ul style="list-style-type: none"> • Low conductivity range • For ultra pure water applications • Platinized glass/platinum 	<p>● 011010^B 011010A^F</p> <ul style="list-style-type: none"> • Standard conductivity range • For lab applications • Chemical resistant glass body 	<p>● 011050MD^A 011050^B 011050A^F</p> <ul style="list-style-type: none"> • Standard conductivity range • For lab and field applications • Platinized epoxy/platinum 	<p>● 011510MD^A 011510^B</p> <ul style="list-style-type: none"> • Standard conductivity range • For lab and field applications • Rugged epoxy/graphite 	<p>● 018020MD^{A*}</p> <ul style="list-style-type: none"> • High conductivity range • For lab applications • Chemical resistant glass body • Flow through or dip cell 	<p>● 014005^{H**}</p> <ul style="list-style-type: none"> • Rugged epoxy/stainless steel • Removable guard



Key Information

A). MiniDIN connector (Star) **B).** 8 Pin DIN connector (A+ Series) **F).** 8 Pin Waterproof DIN connector (A Series) **H).** BNC and 2.5 mm Phono Jack connector (Russell)

* Conductivity cell does not have temperature compensation
 ** 3-Electrode Conductivity Cell

Thermo Scientific Orion Conductivity Cell Selection Guide

4-Electrode Conductivity Cells

Cat. No.	Cable Length	Meter Compatibility	Measurement Range	Application
013005MD ^A	1.5 m	Star Series	1 µS/cm to 200 mS/cm	Lab and Field
013010MD ^A	3 m			
013020MD ^A	6 m			
013025MD ^A	10 m			
013605MD ^A	1.5 m	Star Series	10 µS/cm to 200 mS/cm	Lab and Field
013610MD ^A	3 m			
013005A ^F	1.5 m	1230, 555A, 550A, 550, 162A, 162, 142, 136S, 135A, 131S, 130A, 128	1 µS/cm to 200 mS/cm	Lab and Field
013010A ^F	3 m			
013005D ^B	1.5 m	150 Aplus, 125 Aplus	10 µS/cm to 200 mS/cm	Lab and Field
013610 ^F	3 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		

2-Electrode Conductivity Cells

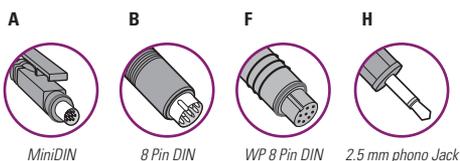
Cat. No.	Cable Length	Meter Compatibility	Measurement Range	Application
013016MD ^A	1.5 m	Star Series	0.01 µS/cm to 300 µS/cm	Boiler feed water, ultra-pure water Includes flow cell
013016A ^F	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		
013016D ^B	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus		
011510MD ^A	3 m	Star Series	10 µS/cm to 200 mS/cm	Lab and Field
011510 ^B	3 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus		
018020MD ^A	1.5 m	Star Series	10 µS/cm to 2000 mS/cm	High electrolyte concentrations,
011050MD ^A	1.5 m	Star Series	1 µS/cm to 20 mS/cm	Lab and Field
011050 ^B	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus		
011050A ^F	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		
011020 ^B	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus	0.1 µS/cm to 100 µS/cm	Boiler feed water, ultra-pure water
011020A ^F	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		
011010 ^B	1 m	150Aplus, 145Aplus, 125Aplus, 115Aplus, 105Aplus	1 µS/cm to 200 mS/cm	Lab
011010A ^F	1 m	555A, 550A, 162A, 136S, 135A, 131S, 130A		
014005 ^{H**}	1 m	RL060C Russell	0 µS/cm to 200 µS/cm	Field

Conductivity Standards and Accessories

Approximate Cell Constant	Cell Material	Dimensions	Min/Max Immersion
0.475 cm ⁻¹	Epoxy/Graphite	Dia - 15 mm Length - 120 mm	35/NA mm
0.55 cm ⁻¹	Epoxy/Graphite	Dia - 12 mm Length- 120 mm	35/NA mm
0.475 cm ⁻¹	Epoxy/Graphite	Dia - 15 mm Length - 120 mm	35/NA mm
0.55 cm ⁻¹	Epoxy/Graphite	Dia - 12 mm Length- 120 mm	35/NA mm

Approximate Cell Constant	Cell Material	Dimensions	Min/Max Immersion
0.1 cm ⁻¹	Steel, V4A	Dia - 13 mm Length - 120 mm Flow Cell Volume 8-12 mL	35/110 mm
1.0 cm ⁻¹	Epoxy/Graphite	Dia - 18 mm Length - 134 mm	35/NA mm
10 cm ⁻¹	Glass/Platinum, Platinized	Dia - 16 mm Length - 115 mm	55/110 mm
1.0 cm ⁻¹	Epoxy/Platinum, Platinized	Dia - 12 mm Length - 120 mm	20/90 mm
0.1 cm ⁻¹	Glass/Platinum, platinized	Tip Dia - 17 mm Tip Length - 22 mm Dia - 13 mm Length - 120 mm	25/120 mm
1.0 cm ⁻¹	Glass/Platinum, Platinized	Dia - 13 mm Length - 120 mm	25/120 mm
1.0 cm ⁻¹	Epoxy/Steel	Dia - 13 mm Length - 120 mm	25/120 mm

Cat. No.	Description
011008	100 µS/cm conductivity/TDS standard, 5 x 60 mL
01100910	147 µS/cm conductivity standard, 10 pouches
011007	1413 µS/cm conductivity/TDS standard, 5 x 60 mL
01100710	1413 µS/cm conductivity/TDS standard, 10 pouches
011006	12.9 mS/cm conductivity/TDS standard, 5 x 60 mL
01100610	12.9 mS/cm conductivity/TDS standard, 10 pouches
011005	111 mS/cm conductivity standard, 5 x 60 mL
01100510	111 mS/cm conductivity standard, 10 pouches
990106	0.1 M KCl conductivity standard, 475 mL
1010001	Conductivity calibration resistor kit for Orion Star Series conductivity meters, MiniDIN
011220	Conductivity calibration resistor kit for 105A+, 115A+, 125A+, 145A+, and 150A+ meters, 8 Pin DIN
011221	Conductivity calibration resistor kit for 130A, 131S, 135A, 136S, 162A, 550A, and 555A meters, 8 Pin Waterproof DIN
011001	Conditioning solution for 011050, 011050A, and 011050MD conductivity cells
0105PK	Platinizing kit, includes fixture and solutions
010010	Platinizing solution and vessel
013017	Replacement flow cell for 013016A, 013016D, and 013016MD
013045	Stainless steel protective probe guard (for 013005MD, 013010MD, 013025MD, 013005A, 013010A, 013030A, 013060A, 013005D, 013010D)
080045	Stainless steel and plastic protective probe guard (for 013005MD, 013010MD, 013025MD, 013005A, 013010A, 013030A, 013060A, 013005D, 013010D)
081045	Plastic protective probe guard (for 013005MD, 013010MD, 013025MD, 013005A, 013010A, 013030A, 013060A, 013005D, 013010D)



Key Information

A). MiniDIN connector (Star) B). 8 Pin DIN connector (A+ Series) F). 8 Pin Waterproof DIN connector (A Series) H). BNC and 2.5 mm Phono Jack connector (Russell)

* Conductivity cell does not have temperature compensation
 ** 3-Electrode Conductivity Cell

Thermo Scientific Orion RDO® Optical Dissolved Oxygen Probes

RDO technology meets the requirements of ASTM D888-05 Method C

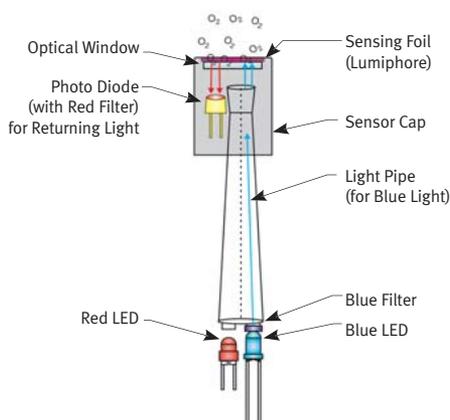
Measuring dissolved oxygen with a luminescence-based sensor

Optical dissolved oxygen is a new technology with many advantages that is rapidly gaining acceptance.

The Thermo Scientific Orion RDO probe provides reliable measurements, no warm up time, no stirring, no maintenance (membranes or solution), no thermal shock and less interferences. The sensor cap requires easy annual replacement. The optical sensor cap is durable, able to withstand harsh environments without degradation or effect on performance. The cap has minimal hydration effects and is not prone to photo bleaching. Calibration information is stored in the sensor cap enhancing the ease of use.

All Thermo Scientific RDO probes come with a stainless steel guard and calibration sleeve and are intended for field use.

Optical Sensor/Luminescence-based Dissolved Oxygen Sensor



Optical Probe/Luminescence-based Dissolved Oxygen (LDO) — Newest technology that monitors time to quench an excited lumiphore, which is inversely proportional to the concentration of oxygen

Rugged, low maintenance field probe



NEW



Cat. No.	Recommended Accessories
087001	Replacement RDO sensor cap
087002	Stainless steel protective guard, for RDO probe
087003	Calibration sleeve for RDO probe

For connector type information, refer to the RDO meter section to determine the correct meter for your application.

**No membranes to change
Sensor cap replaced annually**

Specifications

Probe	
Accuracy	+/- 0.1 mg/L from 0 to 8 mg/mL and +/- 0.2 mg/L from 8 to 20 mg/mL
Response Time	T90, 30 seconds and T95, 60 seconds
Operating Range	0 to 20 mg/L and 0 to 200%
Temperature Range	0 to 50 °C

RDO Probes

Cat. No.	Description
087010MD	Rugged Dissolved Oxygen probe with 3 meter cable
087020MD	Rugged Dissolved Oxygen probe with 6 meter cable
087030MD	Rugged Dissolved Oxygen probe with 10 meter cable
087050MD	Rugged Dissolved Oxygen probe with 15 meter cable
087100MD	Rugged Dissolved Oxygen probe with 30 meter cable



BEST



BETTER



GOOD

Thermo Scientific Orion Dissolved Oxygen Probe Families

Durable and accurate DO probes for the lab or field



- 083005MD^A
- 083010MD^A
- 083025MD^A
- 083060MD^A
- 083005A^F
- 083010A^F
- 083005D^B

- For lab and field applications
- Cable lengths from 1.5 to 20 meters

AUTO-STIR™ probe for BOD applications



- 086030MD^{A, C}
- 086020A^G

- For lab applications
- Self-stirring with One-Touch control

Reliable DO probes for the lab or field



- 081010MD^A
- 081010^B

- For lab and field applications
- Rugged epoxy body

Rugged DO probes plus probe guard



- 080510MD^A
- 081010F^B

- For field applications
- Includes probe guard

Convert any pH meter into a DO meter



- 970899WP¹
- 970800³

- For lab applications
- Works on pH meters with BNC or U.S. Standard connections

A complete line of polarographic dissolved oxygen probes are available for BOD (Biochemical Oxygen Demand) analysis, beer and wine testing, rugged field applications, and water and wastewater analysis. All DO probes feature automatic temperature compensation and convenient screw on membrane caps that reduce probe servicing time and eliminate assembly problems.

The AUTO-STIR probe fits directly into a standard BOD bottle and has a built-in stirrer. This probe offers convenience, quick response, and long life between servicing.

See page 43 for a complete offering of accessories.



Key Information

- 1). BNC Waterproof connector
- 3.) US Standard connector
- A). MiniDIN connector
- B). 8 Pin DIN connector
- C). 3.5 mm Phono Tip Stirrer Jack connector
- F). 8 Pin Waterproof DIN connector
- G). 13 Pin DIN connector

Thermo Scientific Orion Dissolved Oxygen Probe Selection Guide

Polarographic Dissolved Oxygen Probes

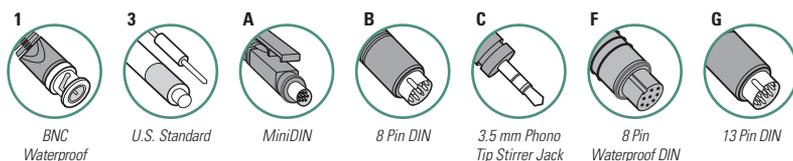
Cat. No.	Cable Length	Meter Compatibility	Application	Response Time	Minimum Sample Flow	Oxygen Consumption	Maximum Allowed Overpressure	Sample Temperature
083005A^F	1.5 m	830A, 835A, 862A	Laboratory / Field	90% of final value in 10 seconds; 95% of final value in 15 seconds; 99% of final value in 60 seconds	10 cm/sec	0.008 µg/h (mg/L) ⁻¹ at 20 °C	6 BAR	0 to 50 °C
083010A^F	3 m	830A, 835A, 862A						
083005D^B	1.5 m	810Aplus, 850Aplus						
083005MD^A	1.5 m	Star Series						
083010MD^A	3 m	Star Series						
083025MD^A	10 m	Star Series						
083060MD^A	20 m	Star Series						
086020A^G	2 m	862A	Laboratory	90% of final value in 10 seconds; 95% of final value in 15 seconds; 99% of final value in 60 seconds	10 cm/sec	0.008 µg/h (mg/L) ⁻¹ at 20 °C	6 BAR	0 to 50 °C
086030MD^{A,C}	2 m	Star Series, Benchtop Models						
081010^B	3 m	805Aplus, 810Aplus, 850 Aplus	Laboratory / Field	90% of final value in 10 seconds; 95% of final value in 16 seconds; 99% of final value in 60 seconds	20 cm/sec	-	-	0 to 50 °C
081010MD^A	3 m	Star Series						
081010F^B	3 m	810Aplus, 850Aplus	Field	90% of final value in 10 seconds; 95% of final value in 18 seconds; 99% of final value in 60 seconds	10 cm/sec	0.008 µg/h (mg/L) ⁻¹ at 20 °C	10 BAR	0 to 50 °C
080510MD^A	3 m	Star Series						
970800^{3*}	1 m	pH meters with US Standard connector	Laboratory	96% response in less than 30 seconds between oxygen-free and air saturated water at 22 °C	-	0.1 mg/hr	-	0 to 45 °C
970899WP^{1*}	1 m	pH meters with BNC connector						

Polarographic Dissolved Oxygen Solutions and Accessories

Temperature Sensor	Drift	Electrolyte lifetime	Storage Temperature	Membrane Cap and Solution	Maintenance Kit
Dual, thermally separated	Approximately 0.1% per day	180 days	-5 to 50 °C	Membrane Cap- 080515 Solution- 080514	080513
Dual, thermally separated	Approximately 0.1% per day	180 days	- 5 to 50 °C	Membrane Cap- 080515 Solution- 080514	080513
Single thermally separated	< 1% per day	180 days	- 5 to 50 °C	Membrane Cap- 081003 Solution- 080514	080113
Dual, thermally separated (080510MD has a single temperature sensor)	Approximately 0.1% per day	180 days	- 5 to 50 °C	Membrane Cap for 080510MD- 081003 Membrane Cap for 081010F & 083010F- 080515 Solution- 080514	Kit for 080510MD- 080113 Kit for 081010F & 083010F- 080513
Dual, thermally separated	-	-	-	Pre-Filled Membrane Cap- 970801	-

Cat. No.	Description
080513	Maintenance Kit, Includes Electrolyte Solution, Polishing Disk and 2 Membrane Caps for 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083005D, 086020A, 081010F
080113	Maintenance Kit, Includes Electrolyte Solution, Polishing Disk and 2 Membrane Caps for 080510MD, 081010MD, 081010
080515	1 Membrane Cap for 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083005D, 086020A, 081010F
081003	3 Membrane Caps for 080510MD, 081010MD, 081010
970801	1 Pre-Filled Membrane Cap for 970899WP, 970800
080514	Polarographic Electrolyte Solution for 083005MD, 083010MD, 083025MD, 083060MD, 086030MD, 083005A, 083010A, 083005D, 086020A, 081010F, 080510MD, 081010MD, 081010
080017	Calibration Sleeve for All DO Probes Excluding AUTO-STIR Probes and RDO Probe
086021A	Calibration Chamber/Stand for 086020A, 086030MD AUTO-STIR Probes
080360	BOD Adapter for 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083010A, 083005D
080160	BOD Adapter for 081010MD, 081010
970802	BOD Stir Funnel for 970899WP, 970800
970803	2 Batteries for 970899WP, 970800
013045	Stainless Steel Protective Probe Guard for 080510MD, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A
080045	Stainless Steel and Plastic Protective Probe Guard for 080510MD, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A
081045	Plastic Protective Probe Guard for 080510MD, 083005MD, 083010MD, 083025MD, 083060MD, 083005A, 083005D, 083010A

* **Accuracy**- ± 0.05 ppm or 2% of reading, whichever is greater
Battery Life- One year based on 4 hours/day operation



Key Information

- 1). BNC Waterproof connector
- 3.) US Standard connector
- A). MiniDIN connector
- B). 8 Pin DIN connector
- C). 3.5 mm Phono Tip Stirrer Jack connector
- F). 8 Pin Waterproof DIN connector
- G). 13 Pin DIN connector

Thermo Scientific Orion Meter Overview

Meters you can count on to deliver accurate, reliable data



Orion DUAL STAR™



3-Star RDO



3-Star pH benchtop meter

The products you know:

Thermo Scientific Orion Star™ Series

- Bright displays and reference guide attached to each meter
- SMART STABILITY™ and SMART AVERAGING™ functions for optimized results
- Store readings with time and date stamp
- The RS232 connection allows for easy data downloading and analysis
- Waterproof design for portable meters
- Universal power adapter for worldwide operation included with benchtop meters
- CE, CSA, TUV, UL and FCC Class A limits approvals
- 3 year meter replacement warranty

Thermo Scientific Orion PerpHecT® LogR™

- Obtain temperature-compensated readings with any pH electrode – no ATC or 3-in-1 electrode needed, no temperature connection compatibility questions
- CE, CSA and UL approvals

Thermo Scientific Orion Intrinsically Safe

- Waterproof and portable
- Approved to meet US intrinsically safe specifications

The best keep getting better:

5-Star, 4-Star and 3-Star meters are now Star Plus meters with the following bonuses:

- Improved stability algorithm for increased calibration and measurement accuracy
- Average slope and slope of segment printed with measurement
- More datalog points with the ability to turn off datalogging function
- Temperature calibration capabilities
- Increased dissolved oxygen benefits including:
 - ▶ separate solution and membrane temperature display
 - ▶ printouts containing DO slope and separate temperature information
 - ▶ BOD stirrer control on benchtop units
- Enhanced conductivity features such as:
 - ▶ expanded reference temperature options
 - ▶ cell constant entry up to 3 decimal points
 - ▶ temperature compensation to 0.01 resolution
- Stirrer probe control (AutoStirrer) and autosampler interface on benchtop meters

Our newest additions:

Thermo Scientific Orion DUAL STAR™

- Benchtop meter with an adjustable backlight display
- Toggle between simultaneous dual channel display or single channel display
- Five language choices – English, Spanish, French, German and Italian
- Informative meter prompts to make this an easy-to-use, advanced meter
- EZ Startup™ and shortcut keys for easy access to meter set-up and features
- Works great for ISE readings with incremental methods and low concentration range features
- Direct stirrer probe control from the meter

Thermo Scientific Orion Star Series RDO®

- Optical dissolved oxygen technology
- No need for membranes or electrolyte
- Waterproof, portable meter design
- Built-in barometric for automatic pressure-corrected readings

Looking for the Right Thermo Scientific Orion Star™ Meter for Your Job?

Location	Job	Ideal Candidate	Applicant	Resume Highlights	
Educational facility or cost-conscious laboratory	Part-time position Measure pH from clean samples Work with multiple users with little lab experience	Easy to work with Not a lot of training to get started	Thermo Scientific Orion 2-Star Meter Cat. No. 111208 Page 68	Includes pull-out reference guide 3 point pH calibration Brings low-maintenance, epoxy-body pH/ATC electrode with TRIS compatible experience	
QA/QC laboratory with accuracy needs	Full-time position Measure pH from samples containing protein/sulfides Involved in product testing and quality batch testing	0.001 pH resolution Temperature calibration capabilities Future growth opportunity to work with an autosampler	Thermo Scientific Orion 3-Star Plus pH Meter Cat. No. 1112001 Pages 62-63	Able to fulfill all requirements of the ideal candidate Brings a ROSS Ultra® pH/ATC Triode™ electrode, pH buffers and electrode stand – ready to start on day 1	
Research laboratory	Full-time position Need to measure pH from a variety of samples Work with various stages of product samples Joint project with ISE periodically	0.001 pH resolution Handles ionic species of even low concentrations Future growth opportunity to work with an autosampler	Thermo Scientific Orion 4-Star Plus pH/ISE Meter Cat. No. 1115001 Pages 56-57	Meets all requirements of the ideal candidate Able to support ISEs and work with autosampler as need arises Temperature calibration capabilities Arrives ready to measure pH with a ROSS Ultra refillable glass pH electrode, epoxy ATC probe, pH buffers and electrode stand	
Wastewater laboratory	Full-time position Measure pH and ammonia from samples throughout the treatment plant at the same time	Good multitasker Attention to detail Easy to work with and quickly shares information May be involved in complex calculations involving known addition/subtraction	Thermo Scientific Orion DUAL STAR pH/ISE Meter Cat. No. 2115001 Pages 48-49	Displays results from 2 channels simultaneously Data storage for up to 1000 points and 20 total methods with calibrations Screen prompts and hot buttons for quick access to popular meter functions Able to handle single and double known addition/subtraction methods This candidate has it all: ROSS Ultra refillable pH glass electrode, stainless steel ATC probe, electrode stand, RS232 cable and buffers	
Research laboratory	Full-time position Measure pH and various ionic species from samples at different testing stages Involved in product developmental, trial testing and quality batch testing				
Wastewater plant or watershed, river, lake or stream	Full-time position Measure dissolved oxygen from multiple sampling locations	Travel 75%+ of the time Able to handle itself in water environments Low-maintenance and durable	Thermo Scientific Orion 3-Star RDO Meter Cat. No. 1213302 Pages 50-51	DO probe uses no membranes or electrolyte Stores up to 1000 data sets with time and date stamp Has its own barometer for automatic pressure-compensated DO readings 6 meter probe cable length reaches far and included case keeps it all together	
Watershed, river, lake, stream or estuary	Full-time position Measure pH, DO, conductivity and temperature from a variety of locations	Travel 75%+ of the time Multitasker a must Able to handle itself in water environments Low-maintenance and durable	Thermo Scientific Orion 5-Star pH/RDO/Conductivity Meter Cat. No. 1213322 Pages 50-51	IP67 rated with 6 meter cable length probes pH electrode includes temperature sensor and is low maintenance DO probe uses no membranes or electrolyte Automatic salinity correction of DO readings with the conductivity probe Stores up to 500 results Well organized – comes with a carrying case and ready to work	

Thermo Scientific Orion Meter Selection Guide

Series	Orion Star™								
Model	DUAL STAR	5-Star Plus	5-Star Plus	5-Star Plus	4-Star Plus	4-Star Plus	4-Star Plus	4-Star Plus	3-Star Plus
Parameters	pH/ORP/ISE	pH/ORP/ISE/ Cond/DO	pH/ORP/ Cond/RDO	pH/ORP/ Cond/DO	pH/ORP/ISE	pH/ORP/Cond	pH/ORP/RDO	pH/ORP/DO	pH/ORP
Page(s) in Catalog	48-49	54-55	50-51	52-53	56-57	58-59	50-51	60-61	62-63
Portable Design		✓	✓	✓	✓	✓	✓	✓	✓
Benchtop Design	✓	✓			✓	✓		✓	✓
pH	-2.000 to 19.999	-2.000 to 19.999	-2.000 to 19.999	-2.000 to 19.999	-2.000 to 19.999	-2.000 to 19.999	-2.000 to 19.999	-2.000 to 19.999	-2.000 to 19.999
mV/Rel mV/ORP	± 1999.9	± 1999.9	± 1999.9	± 1999.9	± 1999.9	± 1999.9	± 1999.9	± 1999.9	± 1999.9
ISE	0 to 19,999	0 to 19,999			0 to 19,999				
Conductivity		0.000 to 3000 mS	0.000 to 3000 mS	0.000 to 3000 mS		0.000 to 3000 mS			
Resistivity		0.0001 to 100 Mohm	0.0001 to 100 Mohm	0.0001 to 100 Mohm		0.0001 to 100 Mohm			
Salinity		0.1 to 80.0 ppt NaCl	0.1 to 80.0 ppt NaCl	0.1 to 80.0 ppt NaCl		0.1 to 80.0 ppt NaCl			
TDS		0 to 19,999	0 to 19,999	0 to 19,999		0 to 19,999			
DO		0.00 to 90.0 mg/L, 0.0 to 600%		0.00 to 90.0 mg/L, 0.0 to 600%				0.00 to 90.0 mg/L, 0.0 to 600%	
RDO (Optical DO)			0.00 to 20.0 mg/L, 0.0 to 200%				0.00 to 20.0 mg/L, 0.0 to 200%		
Temperature (RDO only)			0 to 50.0 °C				0 to 50.0 °C		
Temperature	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C
Number of Electrode Probe Connections									
pH/ORP and where available ISE – BNC	2	1	1	1	1	1	1	1	1
Conductivity/Resistivity/ Salinity/TDS		1*	1*	1*		1*			
DO		1		1				1	
RDO			1				1		
Temperature	2	1*	1*	1*	1	1*	1	1	1
Benchtop Versions with AutoStirrer	✓	✓			✓	✓		✓	✓
Method Storage	20	10	10	10	10	10	10	10	10
Datalog Points	1000	500	500	500	750	750	750	750	1000
GLP	✓	✓	✓	✓	✓	✓	✓	✓	✓
Star/Star Plus Navigator Software	N/A	Included	N/A	Included	Optional	Optional	N/A	Optional	Optional
Outputs	RS232, USB	RS232	RS232	RS232	RS232	RS232	RS232	RS232	RS232

Orion Star™				PerpHecT® LogR™			Intrinsically Safe™			
3-Star Plus	3-Star Plus	3-Star Plus	2-Star Plus	370	350	320	266S	261S	136S	131S
Cond	RDO	DO	pH/ORP	pH/ORP	pH/ORP	pH/mV	pH/mV	pH/mV	Cond	Cond
64-65	50-51	66-67	68	70	70	70	71	71	71	71
✓	✓	✓					✓	✓	✓	✓
✓		✓	✓	✓	✓	✓				
			0.000 to 14.999	0.000 to 14.999	0.000 to 14.000	0.000 to 14.000	-2.00 to 16.00	-2.00 to 16.00		
			± 1999.9	± 1999.9	± 1999.9	± 1999 mV only	± 1300.0 mV only	± 1300.0 mV only		
				0.000 to 19900						
0.000 to 3000 mS									0.00 to 500 mS	0.00 to 500 mS
0.0001 to 100 Mohm										
0.1 to 80.0 ppt NaCl									0 to 45.0	0 to 45.0
0 to 19,999									0 to 1999 mg/L	0 to 1999 mg/L
		0.00 to 90.0 mg/L, 0.0 to 600%								
	0.00 to 20.0 mg/L, 0.0 to 200%									
	0 to 50.0 °C									
-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	-5 to 105.0 °C	0 to 100.0 °C	0 to 100.0 °C	0 to 100.0 °C	20.0 to 120.0 °C	20.0 to 120.0 °C	20.0 to 120.0 °C	20.0 to 120.0 °C
Number of Electrode Probe Connections cont.										
			1	1	1	1	1	1		
1*									1	1
		1								
	1									
1*	1	1	1	1	1	1	1	1	1	1
✓		✓								
10	10	10								
1000	1000	1000	50				100		100	
✓	✓	✓					✓		✓	
Optional	N/A	Optional	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
RS232	RS232	RS232	RS232 – printer format only	RS232, recorder output	RS232, recorder output	None	RS232	None	RS232	None

*The conductivity cell and temperature probe use the same connector. Only one can be used at a time, and there is a temperature sensor in the conductivity cell.

Thermo Scientific Orion DUAL STAR™

Dual Channel pH/ISE Benchtop Meter



Making it easy to do two things at once – the Orion DUAL STAR™ combines the best of the Orion 720A+/920A+ and the Orion Star Plus meters

Features and Benefits

- Dual channel with simultaneously displayed measurements
- Low concentration range reading stability
- Known addition and subtraction incremental methods
- 5 language choices: English, Spanish, French, German and Italian
- Meter prompts and shortcut keys
- Thermo Scientific Orion EZ Startup™ for quick and easy meter set-up
- Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ for accurate and fast results
- E_H ORP calibration capability
- 10 methods stored per channel – retains calibrations among multiple electrodes
- 1000 point datalogging with time and date stamping
- Calibration, high point and low point alarms
- Calibration graph with slope data for on-screen viewing
- Star stirrer probe controlled directly from the meter
- Autosampler compatibility*
- 3 year meter replacement warranty



CE | TUV | EPA

Product Specifications		
pH	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
	Calibration Points	1 to 6
	Auto-Buffer Recognition	USA/NIST and EU/DIN
ISE	Range	0 to 19999
	Resolution	1,2 or 3 significant digits
	Relative Accuracy	± 0.2 mV or 0.05%, whichever is greater
	Units	ppm, ppb, M, % or unitless
	Technique Options	Single known addition and subtraction Double known addition and subtraction
	Calibration Points	2 to 6
	Calibration Options	Linear, point to point, non-linear selectable auto-bank
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
	E _H Calibration Capability	Yes
Temperature	Range	- 5 to 105 °C
	Resolution	0.1
	Relative Accuracy	± 0.1 °C

Features

Backlight	5 adjustable levels
Method Storage	20 (10 per channel with calibration data)
Password Protection	Yes
Datalog Points	1000 with time/date stamp
Data Transfer	RS232, USB*
IP Rating	IP54
Power	Universal AC adapter (110V/220V/240V) included with meter
Warranty	36 months replacement

Benchtop Meter Kits

Cat. No.	Description
2115000	<ul style="list-style-type: none"> Orion DUAL STAR pH/ISE meter stainless steel ATC probe (927007MD) swing arm electrode stand (090043) RS232 cable (1010053) universal power adapter user guide
2115101	<ul style="list-style-type: none"> Orion DUAL STAR pH/ISE meter 8102BNUWP ROSS Ultra® pH electrode stainless steel ATC probe (927007MD) RS232 cable (1010053) swing arm electrode stand (090043) universal power adapter user guide
2115102	<ul style="list-style-type: none"> Orion DUAL STAR pH/ISE meter 8157BNUMD ROSS Ultra pH/ATC Triode™ refillable electrode RS232 cable (1010053) universal power adapter user guide
2115001	<ul style="list-style-type: none"> Orion DUAL STAR pH/ISE meter 8102BNUWP ROSS Ultra pH electrode stainless steel ATC probe (927007MD) RS232 cable (1010053) swing arm electrode stand (090043) pint of pH 4.01 buffer (910104) pint of pH 7.00 buffer (910107) pint of pH 10.01 buffer (910110) pint of ROSS® electrode storage solution (810001) universal power adapter user guide

Accessories

Cat. No.	Description
096019	Thermo Scientific Orion stirrer probe with paddle
910104	pH 4.01 buffer, 475 mL
910107	pH 7.00 buffer, 475 mL
910110	pH 10.01 buffer, 475 mL

*Available as a software update for complimentary download. Visit www.thermo.com/water in December 2009.

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion Star RDO® Optical Dissolved Oxygen Meters

RDO technology meets the requirements of ASTM D888 - 05 Method C –
Measuring dissolved oxygen with a luminescence-based sensor

3-Star RDO Meter



3-Star RDO Meters Offer:

- Dissolved oxygen and temperature measurement capabilities
- Data storage for 1000 data sets with time and date stamping

4-Star pH/RDO Meter



4-Star pH/RDO Meters Offer:

- Dissolved oxygen, pH and temperature measurement capabilities
- pH calibration of up to 5 points with calibration alarm and automatic buffer recognition of USA, NIST and DIN buffers
- Data storage for 750 data sets with time and date stamping

5-Star pH/RDO/Conductivity Meter



5-Star pH/RDO/Conductivity Meters Offer:

- Dissolved oxygen, pH, conductivity, salinity, TDS, resistivity and temperature measurement capabilities
- Conductivity / TDS / salinity / resistivity calibration of up to 5 points and reading reference temperatures of 5 °C, 10 °C, 15 °C, 20 °C or 25 °C
- Automatic salinity correction for dissolved oxygen measurements from the conductivity probe reading
- Data storage for 500 data sets with time and date stamping

Advantages of RDO optical/ luminescence-based dissolved oxygen (LDO) technology over first generation LDO technologies on the market:

- **No dehydration concerns, even if the probe is not stored in the included calibration sleeve**
- **Superior abrasion and chemical resistance**
- **Stored data in the RDO optical/luminescence-based cap – no codes to enter or match up**

Features and Benefits for All Versions

- Dissolved oxygen level measurements using optical/luminescence-based dissolved oxygen (LDO) technology
- No membranes to change – once-a-year cap replacement
- Not affected by color, turbidity or sulfides
- RDO probes include calibration sleeve and stainless steel probe guard for use anywhere
- Calibrate for dissolved oxygen using water-saturated air, air-saturated water, zero point, or at a custom point with Winkler titration
- Temperature calibration capability
- Built-in barometer for automatic pressure correction with option for manual correction for dissolved oxygen readings
- RS232 port for easy data downloading and software updates
- IP67-rated housing
- Four AA batteries to provide over 1000 hours of operation in AUTO-READ™ mode
- 3 year warranty on meter and RDO probe body
- 1 year warranty on RDO optical/luminescence-based cap



3-Star, 4-Star and 5-Star Meters

CE | CSA | EPA*

Product Specifications		
DO	Concentration Range	0.00 to 20.0 mg/L
	Resolution	0.1, 0.01 mg/L
	Relative Accuracy	±0.1 mg/L up to 8 mg/L ±0.2 mg/L from 8 to 20 mg/L
	% Saturation Range	0.0 to 200 %
	Resolution	0.1, 1 %
	Relative Accuracy	± 2 %
	Barometric Pressure Correction	450 to 850 mm Hg, automatic or manual
	Calibration Features	Water saturated air, air saturated water, manual (Winkler), and zero point
	Probe Type	RDO optical/luminescence-based
	Temperature	
Range	0 to 50 °C	
Resolution	0.1 °C	
Relative Accuracy	± 0.3 °C	

*Check with your regulatory agency for exact acceptance/approval.

4-Star and 5-Star Meters

Product Specifications		
pH	Range	-2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
mV • Rel mV • ORP	Range	± 1999.9 mV
	Resolution	0.1 mV
	Relative Accuracy	± 0.2 mV or 0.05% of reading, whichever is greater
Temperature (RDO probe not used)	Range	-5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

5-Star Meters

USP

Product Specifications		
Conductivity	Range	0.000 to 3000 mS/cm, auto resolution, cell constant dependent
	Resolution	4 significant digits down to 0.001 µS/cm, cell constant dependent
	Relative Accuracy	0.5 % ± 1 digit or 0.01 µS/cm, whichever is greater
	Cell Constants	0.001 to 199.9 cm ⁻¹
Resistivity	Range	0.0001 to 100 Megohm
	Resolution	Automatic
	Relative Accuracy	0.5 % ± 1 digit
Salinity	Range	0.1 to 80 ppt NaCl equivalent, 0.1 to 42 ppt practical salinity
	Resolution	0.1 ppt
	Relative Accuracy	± 0.1 ± 1 digit
TDS	Range	0 to 19999 mg/L
	Resolution	1 mg/L
	Relative Accuracy	± 0.5% ± 1 digit

Meters Only

Cat. No.	Description
1213300	3-Star RDO meter, batteries and user guide
1213310	4-Star pH/RDO meter, batteries and user guide
1213320	5-Star pH/RDO/Conductivity meter, batteries and user guide

Portable Meter Kits

Cat. No.	Description
1213301	3-Star RDO portable meter, RDO probe with 3 meter cable, stainless steel RDO probe guard, optical/luminescence-based cap, calibration sleeve, batteries and user guide
1213302	3-Star RDO portable meter, RDO probe with 6 meter cable, stainless steel RDO probe guard, optical/luminescence-based cap, calibration sleeve, carrying case, batteries and user guide
1213311	4-Star pH/RDO portable meter, RDO probe with 3 meter cable, stainless steel RDO probe guard, optical/luminescence-based cap, calibration sleeve, pH/ATC Triode™ with 3 meter cable (9107WMMD), batteries and user guide
1213312	4-Star pH/RDO portable meter, RDO probe with 6 meter cable, stainless steel RDO probe guard, optical/luminescence-based cap, calibration sleeve, pH/ATC Triode with 6 meter cable (9107WLMD), carrying case, batteries and user guide
1213321	5-Star pH/RDO/Cond portable meter, RDO probe with 3 meter cable, stainless steel RDO probe guard, optical/luminescence-based cap, calibration sleeve, pH/ATC Triode with 3 meter cable (9107WMMD), DuraProbe™ 4-electrode conductivity cell with 3 meter cable (013010MD), batteries and user guide
1213322	5-Star pH/RDO/Cond portable meter, RDO probe with 6 meter cable, stainless steel RDO probe guard, optical/luminescence-based cap, calibration sleeve, pH/ATC Triode with 6 meter cable (9107WLMD), DuraProbe 4-electrode conductivity cell with 6 meter cable (013020MD), carrying case, batteries and user guide

Accessories

Cat. No.	Description
087001	Replacement optical/luminescence-based cap
087010MD	RDO optical/luminescence-based probe with 3 meter cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap
087020MD	RDO optical/luminescence-based probe with 6 meter cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap
087030MD	RDO optical/luminescence-based probe with 10 meter cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap
087050MD	RDO optical/luminescence-based probe with 15 meter cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap
087100MD	RDO optical/luminescence-based probe with 30 meter cable, stainless steel guard, calibration sleeve and optical/luminescence-based cap
087002	Replacement stainless steel RDO optical/luminescence-based probe guard
087003	Calibration sleeve for RDO optical/luminescence-based probes
9107WMMD	pH/ATC Triode, 3 meter cable, epoxy body, low-maintenance gel
9107WLMD	pH/ATC Triode, 6 meter cable, epoxy body, low-maintenance gel
013010MD	DuraProbe conductivity cell, 4-electrode, 3 meter cable, K=0.475 cm ⁻¹
013020MD	DuraProbe conductivity cell, 4-electrode, 6 meter cable, K=0.475 cm ⁻¹

For technical information about RDO optical/luminescence-based dissolved oxygen (LDO) technology; see page 40

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 5-Star Plus

pH/ORP/Conductivity/Dissolved Oxygen Portable Meter



One meter to measure a variety of parameters at once – from a field, stream or any environment

Features and Benefits

- Simultaneous display of pH, mV or ORP; conductivity; dissolved oxygen and temperature measurements on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Temperature calibration capability
- pH calibration of up to 5 points with calibration alarm and automatic buffer recognition of USA, NIST and DIN buffers
- Conductivity / TDS / salinity / resistivity calibration of up to 5 points and reading reference temperatures of 5 °C, 10 °C, 15 °C, 20 °C or 25 °C
- Built-in barometer for automatic pressure correction with option of manual correction for dissolved oxygen measurements
- Automatic salinity correction for dissolved oxygen measurements from the conductivity probe reading
- Separate dissolved oxygen membrane and solution temperature displays and calibrations
- Full complement of GLP-related features including Star Plus Navigator 21 software
- Storage of up to 10 individually password-protected methods for easy retrieval of operation procedures
- Data storage for 500 data sets with time and date stamping
- RS232 port for easy data downloading and software updates
- IP67-rated housing for waterproof and dustproof protection
- Four AA batteries deliver over 2,000 hours of continuous operation
- 3 year meter replacement warranty



Accessories

Field Cases

page 72

Going out? Keep your meter and supplies ready to move with our hard and soft field cases. Perfect for making accurate measurements where you need them.



CE | UL | CSA | TUV | USP | EPA

Product Specifications		
pH	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
Conductivity	Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence
	Resolution	4 significant digits down to 0.001 µS/cm, cell constant dependent
	Relative Accuracy	0.5% ± 1 digit or 0.01 µS/cm, whichever is greater
	Cell Constants	0.001 to 199.9 cm ⁻¹
Resistivity	Range	0.0001 to 100 Megohm
	Resolution	Automatic
	Relative Accuracy	0.5 % ± 1 digit
Salinity	Range	0.1 to 80.0 ppt NaCl equivalent, 0.1 to 42 ppt practical salinity
	Resolution	0.1 ppt
	Relative Accuracy	± 0.1 ± 1 digit
TDS	Range	0 to 19999 mg/L
	Resolution	1 mg/L
	Relative Accuracy	± 0.5 % ± 1 digit
DO	Range	0.00 to 90.0 mg/L
	Resolution	0.1, 0.01 mg/L
	Relative Accuracy	± 0.2 mg/L
	% Saturation Range	0.0 to 600 %
	Resolution	0.1, 1 %
	Relative Accuracy	± 2 %
	Barometric Pressure Correction	450 to 850 mm Hg, automatic or manual
Calibration Features	Water saturated air, air saturated water, manual (Winkler), and zero point	
Probe Type	Polarographic	
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

Meters Only

Cat. No.	Package
1218000	Includes portable meter, batteries and user guide

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1218001	<ul style="list-style-type: none"> 9107WMMD low maintenance epoxy pH/ATC Triode™ electrode with 3 meter cable 083010MD DO probe with 3 meter cable and calibration sleeve 013010MD DuraProbe™ conductivity cell, K = 0.475, includes 3 meter cable, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Meter impact jacket with electrode storage chamber Beaker Star Plus Navigator 21 software with RS232 computer cable pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) DO probe maintenance kit (080513) Protective probe guard 1413 µS/cm conductivity standard (10 x 15 mL pouches) Hard field case
	<ul style="list-style-type: none"> 9107WMMD low maintenance epoxy pH/ATC Triode electrode with 3 meter cable 083010MD DO probe with 3 meter cable and calibration sleeve 013010MD DuraProbe conductivity cell, K = 0.475, includes 3 meter cable, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Meter impact jacket with electrode storage chamber Beaker Star Plus Navigator 21 software with RS232 computer cable pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) DO probe maintenance kit (080513) Protective probe guard 1413 µS/cm conductivity standard (10 x 15 mL pouches) Soft field case

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 5-Star Plus

pH/ORP/ISE/Conductivity/Dissolved Oxygen Meters



One meter with all the parameters, including ISE, to handle every application in the field, the lab, the production floor, anywhere

Features and Benefits

- Simultaneous display of pH, mV, ORP or ISE; conductivity; dissolved oxygen and temperature measurement on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Temperature calibration capability
- pH calibration of up to 5 points with calibration alarm and automatic buffer recognition of USA, NIST and DIN buffers
- ISE calibration of up to 5 points with automatic blank correction feature
- Conductivity / TDS / salinity / resistivity calibration of up to 5 points and reading reference temperatures of 5 °C, 10 °C, 15 °C, 20 °C or 25 °C
- Built-in barometer for automatic pressure correction with option of manual correction for dissolved oxygen measurements
- Automatic salinity correction for dissolved oxygen measurements from the conductivity cell reading
- Separate dissolved oxygen membrane and solution temperature displays and calibrations
- Full complement of GLP-related features including Star Plus Navigator 21 software
- Storage of up to 10 individually password-protected methods for easy retrieval of operation procedures
- Data storage for 500 data sets with time and date stamping
- RS232 port for easy data downloading and software updates
- Benchtop units can control an autosampler and the 096019 stirrer probe (*each sold separately*)
- Benchtop units are splashproof with an IP54-rated housing and include a universal power supply
- Portable units are waterproof with an IP67-rated housing and run for over 2000 hours on 4 AA batteries
- 3 year meter replacement warranty

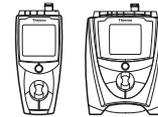


Accessories

Stirrer Probe

page 25

Mix your sample without a separate stirrer and don't worry about a stir bar. The Thermo Scientific Orion stirrer probe connects directly to the Star Plus benchtop meters for sample mixing the easy way.



CE | UL | CSA | TUV | USP | EPA

Meters Only

Cat. No.	Package
1119000	Includes benchtop meter, universal power and user guide
1219000	Includes portable meter, batteries and user guide

Benchtop Meter Kits

Cat. No.	Sensor(s)	Accessories and Solutions
1119001	<ul style="list-style-type: none"> 8102BNUWP ROSS Ultra® refillable glass pH electrode 927005MD epoxy ATC probe 081010MD DO probe with 3 meter cable 013605MD DuraProbe™ conductivity cell, K = 0.55, 10 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Star Plus Navigator 21 software with RS232 computer cable Swing arm electrode stand pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles) DO calibration sleeve BOD reservoir, stirrer and adapter DO probe maintenance kit (080113) 1413 µS/cm conductivity standard (5 x 60 mL bottles)
1010152	<ul style="list-style-type: none"> 8102BNUWP ROSS Ultra refillable glass pH electrode 013016MD conductivity cell, K = 0.1, includes flow cell, 0.01 µS/cm to 300 µS/cm 096019 stirrer probe 	<ul style="list-style-type: none"> Conductivity calibration resistor kit Star Plus Navigator 21 software with RS232 computer cable Swing arm electrode stand pH electrode storage solution (5 x 60 mL bottles) ROSS electrode filling solution (5 x 60 mL bottles) pH 4.01, 7.00, and 10.01 buffers (pint bottles) 100 µS/cm conductivity standard (5 x 60 mL bottles) Method Note - Water Conductivity USP 645
1119201	<ul style="list-style-type: none"> 8102BNUWP ROSS Ultra refillable glass pH electrode 927005MD Epoxy ATC probe 081010MD DO probe with 3 meter cable 013005MD DuraProbe Conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Star Plus Navigator 21 software with RS232 computer cable Swing arm electrode stand DO calibration sleeve BOD reservoir, stirrer and adapter DO probe maintenance kit (080113)

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1219001	<ul style="list-style-type: none"> 9107WMMD low maintenance epoxy pH/ATC Triode electrode with 3 meter cable 083010MD DO probe with 3 meter cable and calibration sleeve 013010MD DuraProbe conductivity cell, K = 0.475, includes 3 meter cable, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Beaker Meter impact jacket with electrode storage chamber Star Plus Navigator 21 software with RS232 computer cable pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) Protective probe guard DO probe maintenance kit (080513) 1413 µS/cm conductivity standard (10 x 15 mL pouches) Hard field case
1219101	<ul style="list-style-type: none"> 9107WMMD low maintenance epoxy pH/ATC Triode electrode with 3 meter cable 083010MD DO probe with 3 meter cable and calibration sleeve 013010MD DuraProbe conductivity cell, K = 0.475, includes 3 meter cable, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Meter impact jacket with electrode storage chamber Star Plus Navigator 21 software with RS232 computer cable DO probe maintenance kit (080513)

Product Specifications		
pH	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
ISE	Range	0 to 19999
	Resolution	1, 2, or 3 significant digits
	Relative Accuracy	± 0.2 mV or 0.05%, whichever is greater
	Units	M, mg/L, %, ppb, or no units
Calibration Features	Linear point to point, non-linear selectable auto-blank, low concentration range stability	
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
Conductivity	Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence
	Resolution	4 significant digits down to 0.001 µS/cm, cell constant dependent
		0.5% ± 1 digit or 0.01 µS/cm, whichever is greater
	Cell Constants	0.001 to 199.9 cm ⁻¹
Resistivity	Range	0.0001 to 100 Megohm
	Resolution	Automatic
	Relative Accuracy	0.5 % ± 1 digit
Salinity	Range	0.1 to 80.0 ppt NaCl equivalent, 0.1 to 42 ppt practical salinity
	Resolution	0.1 ppt
	Relative Accuracy	± 0.1 ± 1 digit
TDS	Range	0 to 19999 mg/L
	Resolution	1 mg/L
	Relative Accuracy	± 0.5 % ± 1 digit
DO	Concentration Range	0.00 to 90.0 mg/L
	Resolution	0.1, 0.01 mg/L
	Relative Accuracy	± 0.2 mg/L
	% Saturation Range	0.0 to 600 %
	Resolution	0.1, 1 %
	Relative Accuracy	± 2 %
	Barometric Pressure Correction	450 to 850 mm Hg, automatic or manual
Calibration Features	Water saturated air, air saturated water, manual (Winkler), and zero point	
Probe Type	Polarographic	
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 4-Star Plus

pH/ISE Meters



Ideal for optimum ISE measurements from any sample

Features and Benefits

- Simultaneous display of pH, mV or ISE and temperature measurements on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Temperature calibration capability
- pH calibration of up to 5 points with calibration alarm and automatic buffer recognition of USA, NIST and DIN buffers
- ISE calibration of up to 5 points with automatic blank correction feature
- Storage of up to 10 individually password-protected methods for easy retrieval of operation procedures
- Data storage for 750 points with time and date stamp
- Average slope and slope of segment printed with measurements
- RS232 port for easy data downloading and software communication
- Benchtop units can control an autosampler and the 096019 stirrer probe (*each sold separately*)
- Benchtop units are splashproof with an IP54-rated housing and include a universal power supply
- Portable units are waterproof with an IP67-rated housing and run for over 2,000 hours on four AA batteries
- 3 year meter replacement warranty

Accessories

Star Plus Navigator Software

page 69

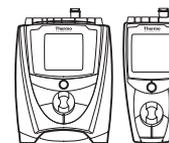
Thermo Scientific Orion Star Plus Navigator software makes it easy to interface your meter with the computer. Generate real-time data graphs, download meter data with one click and perform data analysis the easy way. The data security are ideal for meeting FDA 21 CFR Part 11 compliance



CE | UL | CSA | TUV | EPA

Product Specifications		
pH	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
ISE	Range	0 to 19999
	Resolution	1, 2, or 3 significant digits
	Relative Accuracy	± 0.2 mV or 0.05%, whichever is greater
	Units	M, mg/L, %, ppb, or no units
Calibration Features	Linear point to point, non-linear selectable auto-blank, low concentration range stability	
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

Meters Only



Cat. No.	Package
1115000	Includes benchtop meter, universal power and user guide
1215000	Includes portable meter, batteries and user guide

Benchtop Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1115001	<ul style="list-style-type: none"> 8102BNUWP ROSS Ultra® refillable glass pH electrode 927005MD epoxy ATC probe 	<ul style="list-style-type: none"> Swing arm electrode stand pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)
1115002	<ul style="list-style-type: none"> 9172BNWP Sure-Flow® refillable glass pH electrode 927005MD epoxy ATC probe 	<ul style="list-style-type: none"> Swing arm electrode stand pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)
1115005	<ul style="list-style-type: none"> 8611BNWP ROSS® sodium ion selective electrode 	<ul style="list-style-type: none"> Sodium standards and solutions (pint bottles) Swing arm electrode stand
1010109	 <ul style="list-style-type: none"> 9512HPBNWP ammonia ion selective electrode 096019 stirrer probe 	<ul style="list-style-type: none"> Ammonia standards and solutions (pint bottles) Swing arm electrode stand Method Note - Ammonia in Wastewater
1010103	<ul style="list-style-type: none"> 9609BNWP fluoride ion selective electrode 096019 stirrer probe 	<ul style="list-style-type: none"> Fluoride standards and solutions (pint bottles) Swing arm electrode stand Method Note - Fluoride in Drinking Water
1010108	<ul style="list-style-type: none"> 9707BNWP nitrate ion selective electrode 096019 stirrer probe 	<ul style="list-style-type: none"> Nitrate standards and solutions (pint bottles) Swing arm electrode stand Method Note - Nitrate in Drinking Water
1010102	 <ul style="list-style-type: none"> 9512HPBNWP ammonia ion selective electrode 096019 stirrer probe 	<ul style="list-style-type: none"> Ammonia standards and solutions (pint bottles) Swing arm electrode stand Method Note - Ammonia in Drinking Water

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1215001	<ul style="list-style-type: none"> 9107BNMD low maintenance epoxy pH/ATC Triode™ electrode 	<ul style="list-style-type: none"> pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) Hard field case
1215501	<ul style="list-style-type: none"> 9107BNMD low maintenance epoxy pH/ATC Triode electrode 	<ul style="list-style-type: none"> pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) Soft field case



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

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 4-Star Plus pH/Conductivity Meters



Measure pH and conductivity with one meter, whether it's for water quality or pharmacology

Accessories

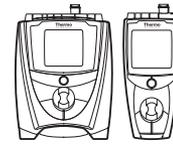
USB Adapter

page 72

Do you have plenty of USB ports, but no open COM ports? The RS232 to USB cable adapter 1010005 can be used to download data from your meter to your computer through a USB connection.

Features and Benefits

- Simultaneous display of pH, conductivity and temperature measurements on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Meet all U.S. Pharmacopeia (USP) requirements
- Temperature calibration capability
- pH calibration of up to 5 points with calibration alarm and automatic buffer recognition of USA, NIST and DIN buffers
- Conductivity / TDS / salinity / resistivity calibration of up to 5 points with reading reference temperatures at 5 °C, 10 °C, 15 °C, 20 °C or 25 °C
- Compatible with 2-electrode and 4-electrode conductivity cells
- Storage of up to 10 individually password-protected methods for easy retrieval of operation procedures
- Datalog up to 750 points with time and date stamp
- Average slope and slope of segment printed with pH measurements
- RS232 port for easy data downloading and software updates
- Benchtop units can control an autosampler and the 096019 stirrer probe (*each sold separately*)
- Benchtop units are splashproof with an IP54-rated housing and include a universal power supply
- Portable units are waterproof with an IP67-rated housing and run for over 2,000 hours on four AA batteries
- 3 year meter replacement warranty



CE | UL | CSA | TUV | USP | EPA

Product Specifications		
pH	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
Conductivity	Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence
	Resolution	4 significant digits down to 0.001 µS/cm, cell constant dependent
	Relative Accuracy	0.5% ± 1 digit or 0.01 µS/cm, whichever is greater
	Cell Constants	0.001 to 199.9 cm ⁻¹
Resistivity	Range	0.0001 to 100 Megohm
	Resolution	Automatic
	Relative Accuracy	0.5 % ± 1 digit
Salinity	Range	0.1 to 80.0 ppt NaCl equivalent, 0.1 to 42 ppt practical salinity
	Resolution	0.1
	Relative Accuracy	± 0.1 ± 1 digit
TDS	Range	0 to 19999
	Resolution	1 mg/L
	Relative Accuracy	± 0.5 % ± 1 digit
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

Meters Only

Cat. No.	Package
1117000	Includes benchtop meter, universal power and user guide
1217000	Includes portable meter, batteries and user guide

Benchtop Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1117001	<ul style="list-style-type: none"> 9157BNMD refillable epoxy pH/ATC Triode™ electrode 013605MD DuraProbe™ conductivity cell, K = 0.55, 10 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Swing arm electrode stand pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (pint bottles) 1413 µS/cm conductivity standard (5 x 60 mL bottles)
1117201	<ul style="list-style-type: none"> 9157BNMD refillable epoxy pH/ATC Triode electrode 013005MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Swing arm electrode stand

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1217001	<ul style="list-style-type: none"> 9107BNMD low maintenance epoxy pH/ATC Triode electrode 013005MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) 1413 µS/cm conductivity standard (10 x 15 mL pouches) Hard field case
1217002	<ul style="list-style-type: none"> 9107WMMD low maintenance epoxy pH/ATC Triode electrode with 3 meter cable 013010MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Beaker pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) 1413 µS/cm conductivity standard (10 x 15 mL pouches) Hard field case
1217501	<ul style="list-style-type: none"> 9107BNMD low maintenance epoxy pH/ATC Triode electrode 013005MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm 	<ul style="list-style-type: none"> Beaker pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) 1413 µS/cm conductivity standard (10 x 15 mL pouches) Soft field case
1217101	<ul style="list-style-type: none"> 9107BNMD low maintenance epoxy pH/ATC Triode electrode 013005MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm 	—

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 4-Star Plus

pH/Dissolved Oxygen Meters



Check pH and dissolved oxygen levels at the same time from a variety of water sources



Accessories

Buffers

pages 26-27

A great calibration requires great buffers and solutions. Make sure what you are using is fresh and the correct range when you perform calibrations. Thermo Scientific Orion buffers and solutions come in a variety of points, volumes and packaging to meet your quality needs.

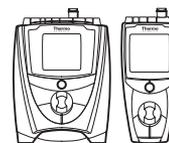
Features and Benefits

- Simultaneous display of pH, dissolved oxygen and temperature measurements on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- pH calibration of up to 5 points with calibration alarm and automatic buffer recognition of USA, NIST and DIN buffers
- Salinity correction and built-in automatic barometric pressure compensation for dissolved oxygen measurements
- Separate dissolved oxygen membrane and solution temperature displays and calibrations
- Dissolved oxygen calibration to the Winkler Titration for BOD analysis
- Storage of up to 10 individually password-protected methods for easy retrieval of operation procedures
- Data storage for up to 750 points with time and date stamp
- Average slope and slope of segment printed with pH measurements
- RS232 port for easy data downloading and software updates
- Portable units are waterproof with an IP67-rated housing and run for over 2,000 hours on four AA batteries
- Benchtop units can control an autosampler and the 096019 stirrer probe (*each sold separately*)
- Benchtop units are splashproof with an IP54-rated housing and include a universal power supply
- 3 year meter replacement warranty

CE | UL | CSA | TUV | EPA

Product Specifications		
pH	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
DO	Concentration Range	0.00 to 90.0 mg/L
	Resolution	0.01, 0.1 mg/L
	Relative Accuracy	± 0.2 mg/L
	% Saturation Range	0.0 to 600 %
	Resolution	0.1, 1 %
	Relative Accuracy	± 2 %
	Barometric Pressure Correction	450 to 850 mm Hg, automatic or manual
	Calibration Features	Water saturated air, air saturated water, manual (Winkler), and zero point
	Probe Type	Polarographic
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

Meters Only



Cat. No.	Package
1116000	Includes benchtop meter, universal power and user guide
1216000	Includes portable meter, batteries and user guide

Benchtop Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1116001	<ul style="list-style-type: none"> 8102BNUWP ROSS Ultra® refillable glass pH electrode 927005MD epoxy ATC probe 081010MD DO probe with 3 meter cable 	<ul style="list-style-type: none"> Swing arm electrode stand pH 4.01, 7.00, and 10.01 buffers (pint bottles) DO calibration sleeve BOD reservoir, stirrer and adapter DO probe maintenance kit (080113)
1116201	<ul style="list-style-type: none"> 9157BNMD refillable epoxy pH/ATC Triode™ electrode 081010MD DO probe with 3 meter cable 	<ul style="list-style-type: none"> Swing arm electrode stand DO calibration sleeve BOD reservoir, stirrer and adapter DO probe maintenance kit (080113)

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1216001	<ul style="list-style-type: none"> 9107BNMD low maintenance epoxy pH/ATC Triode electrode 083005MD DO probe with calibration sleeve 	<ul style="list-style-type: none"> Beaker pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) DO probe maintenance kit (080513) Protective probe guard Hard field case
1216002	<ul style="list-style-type: none"> 9107WMMD low maintenance epoxy pH/ATC Triode electrode with 3 meter cable 083010MD DO probe with 3 meter cable and calibration sleeve 	<ul style="list-style-type: none"> Beaker pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) DO probe maintenance kit (080513) Protective probe guard Hard field case
1216502	<ul style="list-style-type: none"> 9107WMMD low maintenance epoxy pH/ATC Triode electrode with 3 meter cable 083010MD DO probe with 3 meter cable and calibration sleeve 	<ul style="list-style-type: none"> Beaker pH electrode storage solution (5 x 60 mL bottles) pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) DO probe maintenance kit (080513) Protective probe guard Soft field case

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 3-Star Plus pH Meters



**The ideal meter for
measuring pH in water,
process, research and
QA/QC testing**

Features and Benefits

- Simultaneous display of pH, mV or ORP, and temperature measurements on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Temperature calibration capability
- pH calibration of up to 5 points with calibration alarm
- Automatic buffer recognition of USA, NIST and DIN buffers
- Storage of up to 10 individually password protected methods for easy retrieval of operation procedures
- Datalog up to 1000 points with time and date stamp
- Average slope and slope of segment printed with pH measurements
- RS232 port for data downloads and software updates
- Benchtop units can control an autosampler and the 096019 stirrer probe (each sold separately)
- Benchtop units are splashproof with an IP54-rated housing and include a universal power supply
- Portable units are waterproof with an IP67-rated housing and run for over 2,000 hours on four AA batteries
- 3 year meter replacement warranty

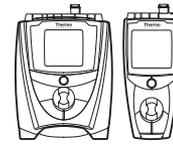
Accessories



Stirrer Probe

page 25

Mix your sample without a separate stirrer and don't worry about a stir bar. The Thermo Scientific Orion stirrer probe connects directly to the Star Plus benchtop meters for sample mixing the easy way.



CE | UL | CSA | TUV | EPA

Product Specifications		
pH	Range	- 2.000 to 19.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05%, whichever is greater
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1212001	• 9107BNMD low maintenance epoxy pH/ATC Triode™ electrode	<ul style="list-style-type: none"> • Beaker • Electrode storage chamber • pH electrode storage solution (5 x 60 mL bottles) • pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) • Hard field case
1212002	• 5107BNMD No Cal® refillable pH/ATC electrode	<ul style="list-style-type: none"> • Beaker • pH electrode storage solution (5 x 60 mL bottles) • pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) • Hard field case
1212501	• 9107BNMD low maintenance epoxy pH/ATC Triode electrode	<ul style="list-style-type: none"> • Beaker • Electrode storage chamber • pH electrode storage solution (5 x 60 mL bottles) • pH 4.01, 7.00, 10.01 buffers (10 x 15 mL pouches) • Soft field case
1212503	• 9179BNMD low maintenance epoxy ORP/ATC Triode electrode	<ul style="list-style-type: none"> • Meter impact jacket with electrode storage chamber • ORP standard (5 x 60 mL bottles) • Soft field case
1212101	• 9107BNMD low maintenance epoxy pH/ATC Triode electrode	—
1010115	• 9107BNMD low maintenance epoxy pH/ATC Triode electrode	<ul style="list-style-type: none"> • Meter impact jacket with electrode storage chamber • Electrode rinse solution (25 x 15 mL pouches) • pH electrode storage solution (5 x 60 mL bottles) • pH 4.01, 7.00 and 10.01 buffers (10 x 15 mL pouches) • Soft field case • Method Note - pH of Salt Water

Meters Only

Cat. No.	Package
1112000	Includes benchtop meter, universal power and user guide
1212000	Includes portable meter, batteries and user guide

Benchtop Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1112001	• 8157BNUMD ROSS Ultra® refillable pH/ATC Triode electrode	<ul style="list-style-type: none"> • Swing arm electrode stand • pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)
1112003	<ul style="list-style-type: none"> • 8102BNUWP ROSS Ultra refillable glass pH electrode • 927005MD epoxy ATC probe 	<ul style="list-style-type: none"> • Swing arm electrode stand • pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)
1112004	<ul style="list-style-type: none"> • 9172BNWP Sure-Flow® refillable glass pH electrode • 927007MD stainless steel ATC probe 	<ul style="list-style-type: none"> • Swing arm electrode stand • pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)
1112006	<ul style="list-style-type: none"> • 8102BNUWP ROSS Ultra refillable glass pH electrode • 927005MD epoxy ATC probe 	<ul style="list-style-type: none"> • Swing arm electrode stand • pH 4.10, 6.97, and 9.15 pure water buffers and pH electrode storage solution (pint bottles) • pHISA adjuster solution (5 x 60 mL bottles)
1112201	• 9157BNMD refillable epoxy pH/ATC Triode electrode	• Swing arm electrode stand
1112202	<ul style="list-style-type: none"> • 8172BNWP ROSS Sure-Flow refillable glass pH electrode • 927006MD glass ATC probe 	• Swing arm electrode stand
1112203	• 9156APWP AquaPro low maintenance epoxy pH electrode	• Swing arm electrode stand
1112204	• 9107BNMD low maintenance epoxy pH/ATC Triode electrode	• Swing arm electrode stand
1112205	<ul style="list-style-type: none"> • 9156BNWP refillable epoxy pH electrode • 927007MD stainless steel ATC probe 	• Swing arm electrode stand
1112102	<ul style="list-style-type: none"> • 8172BNWP ROSS Sure-Flow refillable glass pH electrode • 927006MD glass ATC probe 	—
1112002	—	• Swing arm electrode stand

pH

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ORP

Cond

DO

Temp

Thermo Scientific Orion 3-Star Plus Conductivity Meters



Ideal meter to help meet USP requirements

Features and Benefits

- Simultaneous display of conductivity, resistivity, TDS or salinity and temperature measurements on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Meet all U.S. Pharmacopeia (USP) requirements
- Accept cell constants from 0.001 to 199.9 cm⁻¹
- Compatible with 2-electrode and 4-electrode conductivity cells
- Temperature calibration capability
- Conductivity / TDS / salinity / resistivity calibration of up to 5 points
- Reading reference temperatures of 5 °C, 10 °C, 15 °C, 20 °C or 25 °C
- Storage of up to 10 individually password-protected methods for easy retrieval of operation procedures
- Datalog up to 1000 points with time and date stamp
- RS232 port for easy data downloading and software updates
- Benchtop units can control an autosampler and the 096019 stirrer probe (*each sold separately*)
- Benchtop units are splashproof with an IP54-rated housing and include a universal power supply
- Portable units are waterproof with an IP67-rated housing and run for over 2,000 hours on four AA batteries
- 3 year meter replacement warranty



Accessories

Field Cases

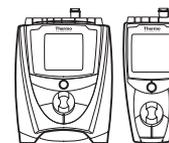
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Going out? Keep your meter and supplies ready to move with our hard and soft field cases. Perfect for making accurate measurements where you need them.

CE | UL | CSA | TUV | USP | EPA

Product Specifications		
Conductivity	Range	0.000 to 3000 mS/cm, auto resolution with cell constant dependence
	Resolution	4 significant digits down to 0.001 µS/cm, cell constant dependent
	Relative Accuracy	0.5% ± 1 digit or 0.01 µS/cm, whichever is greater
	Cell Constants	0.001 to 199.9
	Range	0.0001 to 100 Megohm
	Resolution	Automatic
Resistivity	Relative Accuracy	0.5 % ± 1 digit
	Range	0.1 to 80.0 ppt NaCl equivalent, 0.1 to 42 ppt practical salinity
Salinity	Resolution	0.1
	Relative Accuracy	± 0.1 ± 1 digit
TDS	Range	0 to 19999
	Resolution	1 mg/L
	Relative Accuracy	± 0.5 % ± 1 digit
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

Meters Only



Cat. No.	Package
1114000	Includes benchtop meter, universal power and user guide
1214000	Includes portable meter, batteries and user guide

Benchtop Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1114001	• 013005MD DuraProbe™ conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm	<ul style="list-style-type: none"> • 1413 µS/cm conductivity standard (5 x 60 mL bottles) • Swing arm electrode stand
1114002	• 013016MD conductivity cell, K = 0.1, includes flow cell, 0.01 µS/cm to 300 µS/cm	<ul style="list-style-type: none"> • 100 µS/cm conductivity standard (5 x 60 mL bottles) • Swing arm electrode stand
1114003	• 013016MD conductivity cell, K = 0.1, includes flow cell, 0.01 µS/cm to 300 µS/cm	<ul style="list-style-type: none"> • 100 µS/cm conductivity standard (5 x 60 mL bottles) • Conductivity calibration resistor kit • Swing arm electrode stand

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1214001	• 013005MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm	<ul style="list-style-type: none"> • 1413 µS/cm conductivity standard (10 x 15 mL pouches) • Hard field case
1214003	• 013610MD conductivity cell, K = 0.55, includes 3 meter cable, 10 µS/cm to 200 mS/cm)	<ul style="list-style-type: none"> • 1413 µS/cm conductivity standard (10 x 15 mL pouches) • Hard field case
1214004	• 013016MD conductivity cell, K = 0.1, includes flow cell, 0.01 µS/cm to 300 µS/cm	<ul style="list-style-type: none"> • 100 µS/cm conductivity standard (5 x 60 mL bottles) • Hard field case
1214501	• 013005MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm	<ul style="list-style-type: none"> • 1413 µS/cm conductivity standard (10 x 15 mL pouches) • Soft field case
1214504	• 013016MD conductivity cell, K = 0.1, includes flow cell, 0.01 µS/cm to 300 µS/cm	<ul style="list-style-type: none"> • 100 µS/cm conductivity standard (5 x 60 mL bottles) • Soft field case
1214101	• 013005MD DuraProbe conductivity cell, K = 0.475, 1 µS/cm to 200 mS/cm	—

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 3-Star Plus

Dissolved Oxygen Meters



**Ensure proper oxygen levels
for maximum control**

Features and Benefits

- Simultaneous display of dissolved oxygen and temperature measurements on the backlit LCD
- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Separate dissolved oxygen membrane and solution temperature displays and calibrations
- Salinity correction and built-in automatic barometric pressure compensation for dissolved oxygen measurements
- Dissolved oxygen calibration to the Winkler titration for BOD analysis
- Storage of up to 10 individually password-protected methods for easy retrieval of operation procedures
- Dissolved oxygen slope on printout
- Datalog up to 1000 points with time and date stamp
- RS232 port for easy data downloads and software update
- Portable units are waterproof with an IP67-rated housing and run for over 2,000 hours on four AA batteries
- Benchtop units can control an autosampler and the 096019 stirrer probe (*each sold separately*)
- Benchtop units are splashproof with an IP54-rated housing and include a universal power supply
- 3 year meter replacement warranty

Accessories

Star Plus Navigator Software

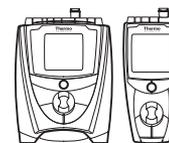
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Thermo Scientific Orion Star Plus Navigator software makes it easy to interface your meter with the computer. Generate real-time data graphs, download meter data with one click and perform data analysis the easy way. The data security are ideal for meeting FDA 21 CFR Part 11 compliance

CE | UL | CSA | TUV | EPA

Product Specifications		
DO	Concentration Range	0.00 to 90.0 mg/L
	Resolution	0.01, 0.1 mg/L
	Relative Accuracy	± 0.2 mg/L
	% Saturation Range	0.0 to 600 %
	Resolution	0.1, 1 %
	Relative Accuracy	± 2 %
Barometric Pressure Correction	450 to 850 mm Hg, automatic or manual	
	Calibration Features	Water saturated air, air saturated water, manual (Winkler), and zero point
Probe Type	Polarographic	
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C

Meters Only



Cat. No.	Package
1113000	Includes benchtop meter, universal power and user guide
1213000	Includes portable meter, batteries and user guide

Benchtop Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1113001	<ul style="list-style-type: none"> 081010MD DO probe with 3 meter cable 	<ul style="list-style-type: none"> DO calibration sleeve BOD funnel / stirrer (970802) BOD adapter (080160) DO probe maintenance kit (080113) Swing arm electrode stand
1010114	<ul style="list-style-type: none"> 086030MD AUTO-STIR™ DO/BOD probe with calibration sleeve 	<ul style="list-style-type: none"> Polarographic electrolyte solution Method Note - BOD of Wastewater

Portable Meter Kits

Cat. No.	Sensor (s)	Accessories and Solutions
1213101	<ul style="list-style-type: none"> 083010MD DO probe with 3 meter cable and calibration sleeve 	<ul style="list-style-type: none"> DO probe maintenance kit (080513)
1213001	<ul style="list-style-type: none"> 083010MD DO probe with 3 meter cable and calibration sleeve 	<ul style="list-style-type: none"> DO probe maintenance kit (080513) Hard field case
1213501	<ul style="list-style-type: none"> 083010MD DO probe with 3 meter cable and calibration sleeve 	<ul style="list-style-type: none"> DO probe maintenance kit (080513) Soft field case
1010121	<ul style="list-style-type: none"> 083010MD DO probe with 3 meter cable and calibration sleeve 	<ul style="list-style-type: none"> Electrode storage chamber Polarographic electrolyte solution Hard field case Method Note - DO in Freshwater
1010138	<ul style="list-style-type: none"> 083010MD DO probe with 3 meter cable and calibration sleeve 	<ul style="list-style-type: none"> Electrode storage chamber Polarographic electrolyte solution Hard field case Method Note - DO in Wine and Beer

pH

ISE

ORP

Cond

DO

Temp

Thermo Scientific Orion 2-Star pH Benchtop Meter

- pH
- ISE
- ORP
- Cond
- DO
- Temp



The Thermo Scientific Orion 2-Star pH benchtop meter is easy to use and value priced for your general purpose pH measurements

Features and Benefits

- The Thermo Scientific Orion SMART STABILITY™ and SMART AVERAGING™ functions for automatically optimized accuracy, precision and response time
- Built-in pullout guide for quick access to calibration instructions
- Up to 3 point pH calibration
- Automatic buffer recognition of USA or EURO buffers
- E_H autocalibration for accurate ORP calibration and readings
- Data storage for up to 50 points with time and date stamp
- RS232 port for printer output
- IP54-rated housing
- Includes universal power supply
- 3 year meter replacement warranty

CE | UL | CSA | TUV | EPA

Product Specifications		
pH	Range	0.000 to 14.999
	Resolution	0.1, 0.01, 0.001
	Relative Accuracy	± 0.002
	Auto-Buffer Recognition	4.01, 7.00, 10.01/ 1.68, 6.86, 9.18, 12.46
	Calibration Points	1, 2 or 3
	Selectable Calibration Sets	USA or EURO
	Custom Buffers Accepted	Yes
mV • Rel mV • ORP	Range	± 1999.9
	Resolution	0.1
	Relative Accuracy	± 0.2 or 0.05% of reading, whichever is greater
Temperature	Range	- 5 to 105 °C
	Resolution	0.1 up to 99.9 °C, 1.0 over 99.9 °C
	Relative Accuracy	± 0.1 °C



Meter Only

Cat. No.	Package
1111000	Includes benchtop meter, universal power and user guide

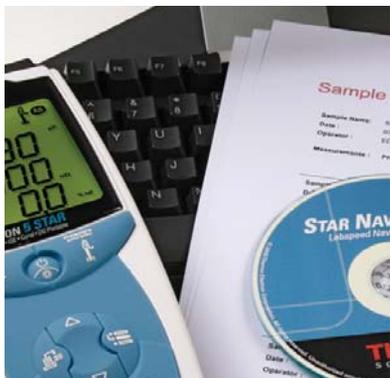
Meter Kit

Cat. No.	Sensor (s)	Accessories and Solutions
1111001	• 9157BNMD refillable epoxy pH/ATC Triode™ electrode	• Swing arm electrode stand • pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)

Meter, Electrode and Stand

Cat. No.	Sensor (s)
1111201	9165BNWP Sure-Flow® refillable epoxy pH electrode
1111202	9157BNMD refillable epoxy pH/ATC Triode electrode
1111203	9156APWP AquaPro low maintenance epoxy pH electrode, TRIS compatible
1111204	9142BN refillable glass pH electrode 927007MD stainless steel ATC probe
1111206	9145BN low maintenance epoxy pH electrode
1111207	9107BNMD low maintenance epoxy pH/ATC Triode electrode
1111208	9107APMD AquaPro low maintenance epoxy pH/ATC Triode electrode, TRIS compatible

Thermo Scientific Orion Star and Star Plus Navigator 21™ Software Packages



Orion Star Navigator 21 Software



Orion Star Plus Navigator 21 Software

The Star Plus Navigator 21 software includes enhancements which take advantage of the Star Plus meter's additional features and allow for:

- Real-time graph of data results
- Automatic date and time synchronization between the computer, meter and software
- One button import of stored meter data into the software
- Autosampler interface for faster data reading and analysis
- Calibration capabilities for temperature readings
- Expanded temperature-reference values for conductivity readings
- Separate temperature viewing of membrane and solution temperatures

Both versions of data-logging and control software enable compliance with auditors and regulatory agencies and set the bar for industry best-practices in the pharmaceutical, food and beverage and environmental industries.

- Provide the tools for FDA 21 CFR Part 11 compliance; on/off mode flexibility.
- Included with select 5-Star Plus meters and meter kits, or available as a stand alone product to upgrade 3-Star and 4-Star meters.
- Works with portable or benchtop meters.
- Compatible with the Windows® XP operating system. The Star Plus Navigator 21 version also works with the Windows Vista® operating system.

Complete control of your meter from your PC

Now you can efficiently edit, create and change methods; take measurements; and perform routine data browsing, retrieval, printing and exporting all with a few key strokes. Microsoft® Windows® operating system defined password protected security parameters enable individual user accounts.

- System Access (Login/Logout) – Login is strictly regulated by entering a valid user name and password. Security measures

include account lockout after a predetermined number of unsuccessful login attempts and automatic password protected screen savers.

- Password Rules and Management – Complex password capabilities may be enforced as a means of extended security.
- Audit Trails – Records important events and includes user, date, time, event importance, application, description of event, and details of the event.
- Electronic Signatures – All changes are recorded with a digital signature and the users must provide reasons for changes.
- Data Security – All data is stored in a database and it is impossible to remove or alter data in an uncontrolled manner. The database can only be accessed with the proper tools and user rights. Data integrity is verified each time data is accessed.

Cat. No.	Description
1010007	Star Navigator 21 software and RS232 computer interface cable; use with 5-Star, 4-Star and 3-Star meters
1010017	Star Plus Navigator 21 software and RS232 computer interface cable; use with 5-Star Plus, 4-Star Plus and 3-Star Plus meters

Features	Benefits
User friendly Windows® interface	Easy to install and operate
Complete control from your computer	Allows quick operation of custom Orion Star Series methods
Convenient report templates	Provide framework for compliance reporting, capability to customize
Electronic records, signatures and audit trails	Provide the tools for FDA 21 CFR Part 11 compliance
Enables paperless record system	Saves time and money in the approval process

Which software is right for my meter?

When you start up your meter, the meter display will show Star or Star Plus corresponding to the software version compatible with the meter.

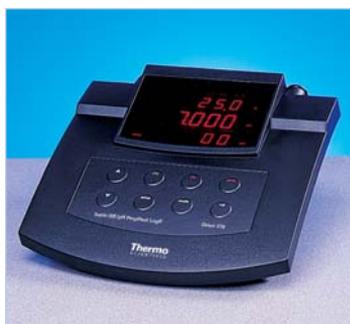
Also, if you have any questions, you can contact our technical support experts at **(800) 225-1480** or **(978) 232-6000**.

Thermo Scientific Orion PerpHecT[®] LogR[™] Meters

LogR temperature compensation from pH bulb – no ATC probe required!

CE | UL | CSA

- pH
- ISE
- ORP
- Cond
- DO
- Temp



Features and Benefits

- All PerpHecT benchtop meters feature exclusive digital LogR technology
- Allows the pH electrode to read temperature – no separate ATC probe and no need to use a 3-in-1 electrode
- 320 PerpHecT benchtop meter performs pH or mV and temperature measurements
- 350 PerpHecT benchtop meter has more advanced features including a clock, an RS232 data output, and 2.5 mm recorder output
- 370 PerpHecT benchtop adds an ISE (concentration) mode to the features of the 350
- Bright LED display shows automatically calculated electrode slope
- Meters accept a separate ATC probe or manual temperature compensation, if desired
- Meter only configuration includes power adapter
- 3 year meter warranty

Meters Only

Meter	Cat. No.		
	110V	220V	240V
320	0320A9	0320A8	0320A7
350	0350A9	0350A8	0350A7
370	0370A9	0370A8	0370A7

Product Specifications		320 Meters	350 Meters	370 Meters
pH	Range	0.00 to 14.00	0.00 to 14.000	0.00 to 14.000
	Resolution	0.1, 0.01	0.1, 0.01, 0.001	0.1, 0.01, 0.001
	Relative Accuracy	± 0.02	± 0.005	± 0.005
	Auto-Buffer Recognition	4.01, 7.00, 10.01	4.01, 7.00, 10.01	4.01, 7.00, 10.01
	Calibration Points	2	3	3
ISE	Range	-	-	± 0 to 19999
	Resolution	-	-	±3 sig digits
	Relative Accuracy	-	-	±0.2 mV or ±0.5% of reading
	Calibration Points	-	-	2
mV	Range	± 1999 mV	± 1999.9 mV	± 1999.9 mV
	LogR Range	±1000	±1000.0	±1000.0
	Resolution	1.0	0.1, 1.0	0.1, 1.0
	Relative Accuracy	±1 or ±0.1% of reading	±0.2 mV or ±0.05% of reading	±0.2 mV or ±0.05% of reading
Temp	Range	0 to 100 °C	0 to 100 °C	0 to 100 °C
	Resolution	0.1	0.1	0.1
	Relative Accuracy	± 0.1 °C	± 0.1 °C	± 0.1 °C
	LogR Relative Accuracy	± 0.5 °C	± 0.5 °C	± 0.5 °C

Benchtop Meter Kits

Cat. No.	Meter	Sensors	Accessories and Solutions
032000 (110V) 032001 (220V)	320	• 9202BN PerpHecT glass pH electrode	-
0320A0 (110V) 0320A1 (220V)	320	• 8202BN PerpHecT ROSS [®] glass pH electrode	-
032004 (110V) 032005 (220V)	320	• 9159APWP AquaPro epoxy pH electrode	• Swing arm electrode stand
032006 (110V) 032007 (220V)	320	• 8220BNWP PerpHecT ROSS Micro pH electrode	• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles)
035000 (110V) 035001 (220V)	350	• 9272BN PerpHecT Sure-Flow [®] glass pH electrode	-
0350A0 (110V) 0350A1 (220V)	350	• 8272BN PerpHecT ROSS Sure-Flow glass pH electrode	-
035003 (110V) 035004 (220V)	350	• 8220BNWP PerpHecT ROSS Micro pH electrode	• pH 4.01, 7.00, and 10.01 buffers and pH electrode storage solution (pint bottles) • Printer and interface cable to PerpHecT meter
0350G0 (110V)	350	• 8272BN PerpHecT ROSS Sure-Flow glass pH electrode	• Printer and interface cable to PerpHecT meter
037000 (110V) 037001 (220V)	370	• 9272BN PerpHecT Sure-Flow glass pH electrode	-
0370A0 (110V) 0370A1 (220V)	370	• 8272BN PerpHecT ROSS Sure-Flow glass pH electrode	-
0370G0 (110V) 0370G1 (220V)	370	• 8272BN PerpHecT ROSS Sure-Flow glass pH electrode	• Printer and interface cable to PerpHecT meter

Thermo Scientific Orion Intrinsicly Safe* Meters



Features and Benefits

- For use where non-sparking equipment is desired, these carry US intrinsicly safe approval rating by Factory Mutual (FM)*
- Waterproof, portable models for basic field measurements
- 266S and 136S meters include RS232 output, advanced GLPdoc 100 point datalogger with time and date stamp and includes software program for simplified data collection and remote operation on a computer
- Accepts Waterproof DIN, dual banana plug connections
- Units use 3 AA batteries
- 131S and 136S meters offer linear and non-linear temperature compensation for natural and ultrapure water applications
- 3 year meter warranty

* Does not meet European Intrinsicly Safe specification.

Accessories

Cat. No.	Description
013655	Electrode clip

Product Specifications		266S/261S	136S/131S
pH	Range	-2.00 to 16.00	-
	Resolution	0.1, 0.01	-
	Relative Accuracy	± 0.01	-
	Auto-Buffer Recognition	Dependent on buffer set (7 pre-programmed sets)	-
	Calibration Points	3	-
mV	Range	± 1300.0	-
	Resolution	±0.1	-
	Relative Accuracy	±0.1% of value +0.3 mV	-
Cond	Range	-	0.00 to 500 mS
	Resolution	-	0.01 up to 99.99 µS/cm 0.1 above 99.99 µS/cm
	Relative Accuracy	-	±0.5% of measured value + 1 count
	Calibration Points	-	1
	Cell Constants	-	0.010 to 199.0 cm ⁻¹
Salinity	Range	-	0 to 45.0 (10 to 30 °C) g/kg
	Resolution	-	0.1
TDS	Range	-	0 to 1999 mg/L (10 to 40 °C)
	Resolution	-	1
Temp	Range	-20 to 120 °C	-20 to 120 °C
	Resolution	0.1	0.1
	Relative Accuracy	± 0.3 °C	± 0.3 °C

pH

ISE

ORP

Cond

DO

Temp

Portable Meter and Electrode

Cat. No.	Meter	Sensor (s)
0261S0	261S	9109WP low maintenance pH/ATC Triode™
0266S0	266S	9109WP low maintenance pH/ATC Triode
0131S0	131S	013010A DuraProbe™ conductivity cell
0136S0	136S	013010A DuraProbe conductivity cell

Portable Meter, Electrode and Field Kit

Cat. No.	Meter	Sensor (s)	Accessories and Solutions
0261S3	261S	9109WP low maintenance pH/ATC Triode	• Neck strap • Field case • Stand • Electrode holder • Beakers • 4, 7 and 10 buffers
0266S3	266S	9109WP low maintenance pH/ATC Triode	• Neck strap • Field case • Stand • Electrode holder • Beakers • 4, 7 and 10 buffers • RS232 cable and software
0131S3	131S	013010A DuraProbe conductivity cell	• Beakers • Standards
0136S3	136S	013010A DuraProbe conductivity cell	• Beakers • Standards • RS232 cable and software

Thermo Scientific Orion Meter Accessories



Automatic Stirrer Probe with Paddle, Cat. No. 096019
and Swing Arm Stand, Cat. No. 090043

To make sure you have everything you need to attain accurate results for your applications, we offer a multitude of accessories for both field and lab applications. From printers to field cases, electrode stands and stirrers, we have it all. Below are the top selling accessories – for complete details, please visit www.thermo.com/water.



Hard Field Case, Cat. No. 1210004



Soft Field Case, Cat. No. 1210005

Aplus™ and PerpHecT® Meter Accessories

Cat. No.	Description
020125	110V Power Adapter
020130	220V Power Adapter
020135	240V Power Adapter
090043	Swing Arm Electrode Stand
090070	Basic Electrode Stand and Holder
910002	Universal Electrode Holder for Basic Electrode Stand
090045	BNC Shorting Cap
0900A0	900A Thermal Printer for Aplus Meters, 110V
0900A1	900A Thermal Printer for Aplus Meters, 220V
0900A7	900A Thermal Printer for Aplus Meters, 240V
0900A4	Paper for 900A Printer
0900A6	Battery Pack for 900A Printer
PRT300	PRT300 Ink Printer and Cable for Aplus and PerpHecT Meters, 110V
PRT301	PRT300 Ink Printer and Cable for Aplus and PerpHecT Meters, 220V
PRT302	Ink Ribbon for PRT300 Printer
OACBL0	RS232 Computer Cable for Aplus and PerpHecT Meters
OPBLSK	Aplus Portable Meter Starter Kit – Includes Field Case, Field Stand, Beaker, 2 x 60mL Bottles Each of pH 4.01, 7.00, and 10.01 Buffers, and 1 x 60mL Bottle of pH Storage Solution
OBCHSK	Aplus Benchtop Meter Starter Kit – Includes Basic Electrode Stand and Holder, 917005 Epoxy ATC Probe, and 1 x 475 mL Bottle Each of pH 4.01, 7.00, and 10.01 Buffers and pH Storage Solution
0607CA	607 Multi-Channel Electrode Switchbox and Cables, 110 V
0607CI	607 Multi-Channel Electrode Switchbox and Cables, 220 V

Orion Star™ Series Meter Accessories

Cat. No.	Description
1010003	Universal Power Adapter
1010004	RS232 Computer and Printer Cable Set
1010005	RS232 to USB Cable Adapter
1010006	Star Series Inkjet Printer, 110 V / 220V and Cable
1010008	Ink Cartridge for Star Series Printer
1010009	Paper for Star Series Printer
1010053	RS232 Computer Cable
1210001	Portable Star Series Electrode Stand
1210002	Meter Impact Jacket and Electrode Storage Chamber
1210003	Electrode Storage Chamber (For Meter Impact Jacket)
1210004	Hard Field Case
1210005	Soft Field Case
096019	Automatic Stirrer Probe with Paddle (For Benchtop Star Series Meters)
096021	Replacement Paddles for 096019 – 3 Pack
090043	Swing Arm Electrode Stand
090045	BNC Shorting Cap
1010050	Adapter– MiniDIN ATC Probe to 3.5 mm Phono Tip Meters (310, 320, 330, 350, 370, 555A, 550A, 535A, and 162A)
1010051	Adapter– MiniDIN ATC Probe to 8 Pin DIN Meters (210Aplus, 230Aplus, 250Aplus, 290Aplus, 410Aplus, 420Aplus, 520Aplus, 525Aplus, 710Aplus, 720Aplus, and 920Aplus)
1010800	Adapter– MiniDIN DO Probe to 8 Pin Waterproof DIN DO Meters (830A, 835A and 862A)
1010801	Adapter– MiniDIN DO Probe to 8 Pin DIN DO Meters (805Aplus, 810Aplus, and 850Aplus)
1010900	Adapter– MiniDIN Conductivity Probe to 8 Pin Waterproof DIN Conductivity Meters (1230, 555A, 550A, 162A, 135A, and 130A)
1010901	Adapter– MiniDIN Conductivity Probe to 8 Pin DIN Conductivity Meters (150Aplus, 145Aplus, 125Aplus, 115Aplus, and 105Aplus)

Thermo Scientific Orion AutoTration™ - 500 Autosampler

High Sample Throughput with Star Plus Benchtop Meters



Features and Benefits

- Performs analyses, calibrations and standardization procedures automatically
- Improves data quality by using up to five rinse stations
- Durable and corrosion resistant, the sealed electronics chassis and coated metal parts protect against the harshest chemical environments
- Compatible with Star Plus meters and 960 Titrator PLUS for automated techniques
- RS232 interface for easy communication
- Available as autosampler only or with meter packages making accurate data from multiple samples easier to obtain
- Available with either a 50 mL or 150 mL beaker rack and accessories

Autosampler

CE

Cat. No.	Package
AT5050	48-position beaker rack for 50 mL beakers, small electrode holder, drip tray, cable management system, BNC extension cable, stirrer extension cable, accessories package, interface cable, line cord, 50 pack of 50 mL plastic beakers, user guide, and warranty card, 115/220V.
AT5150	28-position beaker rack for 150 mL beakers, small electrode holder, drip tray, cable management system, BNC extension cable, stirrer extension cable, accessories package, interface cable, line cord, 50 pack of 150 mL plastic beakers, user guide, and warranty card, 115/220V.

Autosampler and Star Plus Meter Packages

Cat. No.	Autosampler	Benchtop Meter
Autosampler AT5050		
1112000SPA	AT5050 - 48 position	1112000 - 3 Star Plus pH
1114000SPA	AT5050 - 48 position	1114000 - 3 Star Plus conductivity
1115000SPA	AT5050 - 48 position	1115000 - 4 Star Plus pH/ISE
1117000SPA	AT5050 - 48 position	1117000 - 4 Star Plus pH/conductivity
1119000SPA	AT5050 - 48 position	1119000 - 5 Star Plus pH/ISE/Conductivity/Dissolved Oxygen
Autosampler AT5150		
1112000SPB	AT5150 - 28 position	1112000 - 3 Star Plus pH
1114000SPB	AT5150 - 28 position	1114000 - 3 Star Plus conductivity
1115000SPB	AT5150 - 28 position	1115000 - 4 Star Plus pH/ISE
1117000SPB	AT5150 - 28 position	1117000 - 4 Star Plus pH/conductivity
1119000SPB	AT5150 - 28 position	1119000 - 5 Star Plus pH/ISE/Conductivity/Dissolved Oxygen

All packages include beaker rack, electrode holder, drip tray, cable management system, BNC and 8 pin MiniDIN extension cables, stirrer probe, interface cable, power cords, plastic beakers and user guides

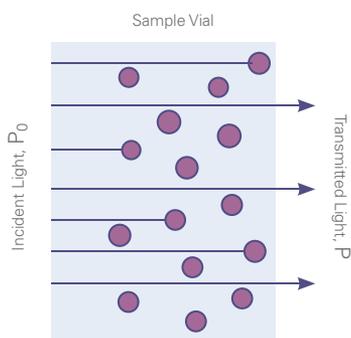
Product Specifications

Accuracy	±1.0 mm in all axes
Travel and Resolution Precision	
Maximum X axis	510 mm
Minimum X axis resolution/precision	Better than 0.1 mm
Maximum Y axis	270 mm
Minimum Y axis resolution/precision	Better than 0.1 mm
Maximum Z axis	160 mm
Minimum Z axis resolution/precision	Better than 0.1 mm
Maximum Z axis clearance	140 mm
Environmental Requirements	5 to 45 °C and 20 to 80% relative humidity

Accessories

Cat. No.	Description
ATA01	Replacement tubing for guide arm
ATA02	RS232 cable for interface between Star Plus meter and autosampler
ATR050	48-position beaker rack for 50 mL beakers
ATR150	28-position beaker rack for 150 mL beakers
ATB050	50 mL plastic beakers for 48-position rack, 50 pack
ATB150	150 mL plastic beakers for 28-position rack, 50 pack
096S22	45 mL plastic beakers for 48-position rack, 50 pack
AT0STD	Electrode holder, standard size for AT5150
AT0050	Electrode holder, small size for AT5050
096019	Replacement automatic stirrer probe

Thermo Scientific Orion Colorimetry Theory Overview



Colorimetry is an optical measurement that uses color to quantitatively determine the concentration of a component in a liquid sample. A chemical reagent for the component of interest is added to the sample being tested. A color will develop that can be measured by a colorimeter.

As depicted in the figure on the left, colorimetry is a chemical measurement based on Beer's Law. Beer's Law describes the relationship between the amount of light transmitted through a sample and the component's concentration in the sample.

$$\text{Transmission} = P/P_0 = 10^{(-abc)}$$

Where:

P_0 is initial power of incident light

P is power of transmitted light

a is a constant - *the ability of a given molecule to absorb a particular wavelength of light*

b is the path length - *the longer the path, the less light gets through*

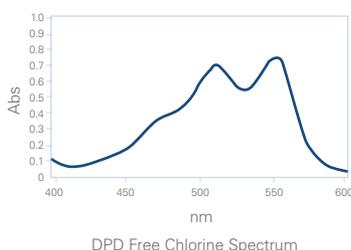
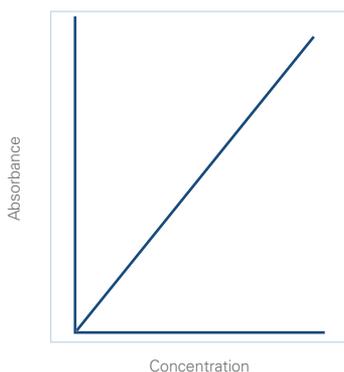
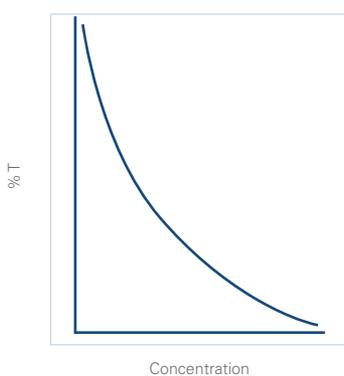
c is the concentration - *the more molecules in the solution, the more light is absorbed*

As expected from Beer's Law, an exponential curve results from plotting the percent transmission versus concentration points, and a linear curve results from plotting the absorbance versus concentration points.

A typical colorimeter has one or more fixed wavelength light emitting diode (LED) sources in the meter. To have the most sensitivity and selectivity to the compound of interest, the wavelength of the LED is chosen to match one of the maxima or peaks, in the visible spectrum of the compound of interest when reacted with the reagent. In the free chlorine DPD spectrum, there is a peak near 520 nm, the wavelength range used for this test. The colorimeter is designed to pass light through a sample and collect the transmitted light through the sample and the vial. By establishing a calibration curve from readings of standards with known concentrations for the component of interest, the concentration of that component in the sample can be determined. For many official colorimetry methods, a wavelength range is specified for the test.

Colorimetry Tips and Techniques

- Colorimetry is often a good technique for low-level readings in the ppb to ppm range.
- Colorimetry is a value oriented test for a specific concentration range that can be measured in either the lab or field.
- Both reagent blank and deionized water zero measurements are important for accuracy and precision. Be sure to review specific steps of the method to see if both are used.
- It is good practice to run a "zero" of deionized water to correct for stray light and to correct for internal reflection of light by vial walls.
- Some methods require or recommend a reagent blank, which uses deionized water instead of the sample. The user adds the test reagent and follows the test method as if it was a sample. When recommended, a reagent blank should be performed.
- Reagent blanks can be used to subtract the amount of color contributed by the reagents and not due to the sample itself. This gives greater accuracy in the sample result. In advanced meters, the subtraction is performed for you.
- Concentrated samples that are above the range of the test method may be diluted with deionized water to meet the concentration range. These results need to be corrected for the dilution amount to obtain the actual sample value.
- Turbidity and color in the sample itself can often be "zeroed (subtracted) out" if the level is not too high.
- Precision depends on concentration and range and is typically between 5-10% in the middle of the method range.
- Be sure to insert the vials so the mark on the vial and the mark on the instrument are aligned for reproducibility.
- Routinely inspect vials before use and discard any with cracks or scratches, as they can affect the results.



Thermo Scientific Orion Colorimetry and Turbidity Markets

You can find colorimetry and turbidity measurements in a wide variety of industries. The tests are quick and easy and often cost less than alternative methods. Thermo Scientific Orion AQUAfast colorimetry and turbidity products have approvals and meet the regulatory requirements

in many industries. We also have several types of tests for common parameters to give you choices of reagent types, ranges and simplicity to fit your requirements. The reagent table on pages 84 and 85 highlights our EPA approved, accepted and equivalent methods.

Commonly Tested Parameters by Market

Agriculture	Beverage	Drinking Water	Environmental	Wastewater	Aquaculture	Boiler/Cooling Water	Chemical
Ammonia	Bromine	Aluminum	Ammonia	Aluminum	Ammonia	Aluminum	Aluminum
Chlorine	Chlorine	Ammonia	Bromine	Ammonia	Bromine	Ammonia	Ammonia
Iron	Chlorine Dioxide	Bromine	Chlorine	Bromine	Chlorine	Bromine	Copper
Nitrate	Copper	Chloride	COD	Chlorine	Copper	Chlorine	Iron
Nitrite	Fluoride	Chlorine	Copper	COD	Nitrate	Chlorine Dioxide	pH
Oxygen	Iron	Chlorine Dioxide	Iron	Copper	Nitrite	Copper	Phosphate
pH	Manganese	Copper	Nitrate	Iron	Oxygen	Hydrazine	Silica
Phosphate	Nitrate	Fluoride	Nitrite	Manganese	Ozone	Iron	Sulfate
Silica	Oxygen	Iron	Ozone	Nitrate	pH	Nitrate	Sulfide
Sulfate	pH	Manganese	pH	Nitrite	Phosphate	Nitrite	Zinc
Turbidity	Phosphate	Nitrate	Silica	Oxygen	Turbidity	Ozone	
	Silica	Nitrite	Sulfate	Ozone		Oxygen	
	Turbidity	pH	Sulfide	pH		Phosphate	
		Phosphate	Zinc	Phosphate		pH	
		Ozone		Sulfate		Silica	
		Silica		Sulfide		Zinc	
		Sulfate		Zinc			
		Sulfide		Turbidity			
		Zinc					
		Turbidity					

Metal Plating	Mining	Pulp & Paper	Solid Waste/Sludge	Petroleum	Pharmaceutical/Biotech	Semiconductor
Copper	Copper	Aluminum	Aluminum	Ammonia	Chlorine	Aluminum
Iron	Iron	Chlorine	Copper	Chlorine	Cyanide	Copper
pH	pH	Chlorine Dioxide	pH	Iron	Ozone	Fluoride
Phosphate	Phosphate	pH	Phosphate	Nitrate	pH	pH
	Zinc	Phosphate	Zinc	pH	Silica	Silica
		Silica		Sulfide		
		Zinc				

Thermo Scientific Orion AQUAfast® IV Advanced Turbidity Meter



AQ4500 Kit

The AQ4500 offers ratiometric range, which will give EPA GLI method 2 equivalent numbers.

The AQ4500 turbidimeter has dual source LED that allows readings that comply with both EPA 180.1 and ISO 7027 methodologies.

- Nephelometric and ratiometric measurements with autoranging
- Data log capacity of up to 100 data points
- Readings in the range of 0 to 1000 NTU with choice of units: NTU, FTU, FNU, ASBC or EBC
- Includes turbidity standards kit, rugged carrying case, and replacement cuvettes
- The AQ4500 is truly IP67 waterproof to a depth of 3 meters

Specifications	Description
Light Source	White LED, IR LED
Temperature Effect	LED temperature compensated
Includes Measurement Modes	EPA 180.1, ISO Nephelometric, ISO Absorbance, IR Ratiometric, % Transmittance, EPA GLI Method 2, EBC (European Brewing Chemists), ASBC (American Society of Brewing Chemists)
Measurement Ranges	0 to 4000 NTU, EPA 0 to 2000 NTU, GLI range 0 to 40 NTU, ISO-7027 0 to 150 FAU, IR Ratio 0 to 4000 NTU, EBC 0 to 24.5, ASBC 0 to 236
Resolution	0.01 (0 to 9.99 NTU), 0.1 (10 to 99.9), 1 (100 to 1000)
Precision	+/- 2% of reading plus 0.01 NTU from 0 to 500 NTU, +/- 3% of reading from 500 to 1000 NTU, +/- 5% of reading from 1000 to 2000 NTU
Calibration Standards	Provided primary SDVB standards
Sample Size Minimum	10 mL
User Interface	Automatic sample measurement for each measurement with simple user interface
RS232	Bidirectional
Datalog	100 points
Real Time Clock	Yes
Power	Long life - low power consumption - about 2500 hours with 4 alkaline AA batteries or about 10000 with lithium batteries
Waterproof Rating	IP67
Warranty	2 years
Regulatory and Safety	CE, FCC part 15
Operating Temperatures	(-40 °C to 60 °C), 90% relative humidity at 30.0 °C max

Ordering Information

Cat. No.	Description
AQ4500	AQUAfast IV Turbidimeter and calibration kit Kit includes meter, 4 primary standards, standard and sample vials, silicone oil and cloth in carrying case
AQ4CBL	RS232 cable for data download and software updates
AC45FZ	Formazin turbidity standard, 4000 NTU, 475 mL
AC45SI	Silicon oil and cloth kit for AQ4500
AC45ST	Primary turbidity calibration kit
AC2T24	24 mm replacement turbidity vials, 12 pack

Thermo Scientific Orion AQUAfast® AQ3010 Turbidity Meter NEW

- Ergonomic IP67 turbidity meter for lab or field use
- Uses Nephelometric principle with 90° detection
- In many locations a separate light cap or shield is not needed
- Meets ISO 7027 and offers consistent light source for greater accuracy
- Easy vial indexing with continuous measurement mode
- No mixing or diluting with polymer bead primary standards for faster calibration
- Three year warranty

The new AQUAfast AQ3010 Turbidity Meter makes it easy to determine the clarity of your sample with one keystroke and without an extra light shield cap in many environments. With autoranging from 0 – 1000 NTUs, this small waterproof portable meter is very easy to use, plus features a large easy-to-read LCD display. The meter is supplied with ready-to-use, highly stable EPA-approved polymer bead primary standards. Calibration is easy with step-by-step prompts with the option to choose which points to calibrate. The standards can be used for a calibration check at any time, verifying that your readings are accurate.

The AQUAfast AQ3010 meter comes with everything you need in a field case for easy storage and transport. This meter is covered by a 3 year warranty!



AQ3010 Meter Kit

Specifications	Description
Display	LCD
Keys	Power, Cal, Scroll Up, Scroll Down, Read/Enter
Automatic Range Selections and Resolution	0.01 to 19.99 NTU with 0.01 NTU resolution
	20.0 to 99.9 NTU with 0.1 NTU resolution
	100-1000 NTU with 1 NTU resolution
Precision	+/- 2% of reading +/- 1 LSD for 0-500 NTU
	+/- 3% of reading +/- 1 LSD for 501-1000 NTU
Response Time	< 6 seconds
Sample Requirement	10 mL
Included Calibration Standards	0.02, 20.0, 100, and 800 NTU
Sample Vials	25 mm diameter with indexing mark
Light Source	IR LED for ISO 7027 Turbidity measurement
Power	4 x AAA > 3000 tests (4 x AAA Lithium > 12000 tests)
Battery conservation feature	Auto shutoff after 20 minutes of inactivity
Ambient Operating Temperature	0 to 50 C (0 to 90% Non-Condensing Relative Humidity at 30 C)
Self Diagnostics	Yes, with troubleshooting error codes
Waterproof rating	IP67
Regulatory Approvals	CE, TUV 3-in-1 for CSA-US, FCC part 15
Warranty	3 year

Ordering Information

Cat. No.	Description	Contents
AQ3010	AQUAfast turbidity meter kit	Meter, set of EPA-approved polymer-based primary turbidity standards, batteries, light shield cover, seven vials, lint-free cloth, silicone oil, MSDS and user guide
AC301S	Replacement set of EPA-approved polymer-based primary turbidity standards	60 mL bottle of 0.02, 20.0, 100, and 800 NTU
AC3SIL	Replacement silicone oil and cloth	1 bottle of silicone oil and one cloth
AC3V25	Replacement 25 mm vials, pack of 3	3 empty 25 mm vials with caps
AC3CBR	Replacement vial cleaning brush	Brush, package of 10

Make you job easier!

Visit our new applications webpage at <http://www.thermo.com/waterapps> for regulatory links, methods, applications and technical information.

Thermo Scientific Orion AQUAfast® AQ3070 Chlorine Meter NEW

Measures free and total chlorine for EPA reporting – and more!



AQ3070 Meter



AQ3070 Meter Kit

- EPA-approved AC4P71 free chlorine and AC4P72 total chlorine methods for drinking water and wastewater
- Single meter programmed for free chlorine, total chlorine, pH, chlorine dioxide and cyanuric acid measurements
- Additional capability for liquid pH test, chlorine dioxide and cyanuric acid – no need to purchase separate meters for additional tests
- Chlorine dioxide and cyanuric acid tablets feature long shelf lives, so they are ready when you need them

Designed with the user in mind, these small rugged IP67 portable meters have a large easy-to-read display with a very simple user interface. The expanded range for free and total chlorine measurements gives you a real number if you are out of the EPA measurement range to quickly recover your process. The results are accurate and repeatable. You save time on measuring by not having to cover and uncover the vial for each measurement. The field case keeps the meter and test supplies always ready for testing.

Specifications	Description
Display	LCD
Keys	Power, mode, zero, read/enter
Sample Requirement	10 mL
Light Shield Cover over Vial for Measuring	Not needed
Power with Auto Shutoff	4 x AAA, > 3000 tests
Regulatory Approvals	CE, TUV for US and Canada, FCC part 15
Warranty	2 years
Operating Range	0 to 50 °C, 0 to 90% relative humidity, non-condensing at 30 °C
Test Parameter Ranges	
Free Chlorine	0.02 to 4.0 mg/L; US EPA range 0.03 to 2.0 mg/L
Total Chlorine	0.02 to 4.0 mg/L; US EPA range 0.03 to 2.0 mg/L
Chlorine Dioxide	0 to 11.4 mg/L
pH	5.9 to 8.2 pH
Cyanuric Acid	5 to 90 mg/L

Ordering Information

Visit www.thermo.com/waterapps for our EPA letters and methods.

Cat. No.	Description	Contents
AQ3070	AQUAfast III chlorine meter kit	Meter, 6 sample vials, AC4P71 free chlorine, AC4P72 total chlorine, batteries, vial cleaning brush, tablet tamping stir rod, user guide, MSDSs, and carrying case.
AC4P71	AQUAfast AC4P71 free chlorine powder packets	100 tests
AC4P72	AQUAfast AC4P72 total chlorine powder packets	100 tests
AC2099	Chlorine dioxide tablets	100 tests
AC3001	pH, 2 x 15 mL dropper bottles	60 tests
AC2098	Cyanuric acid, tablets	100 tests
AC3V25	Replacement 25 mm vials, pack of 3	3 vials
AC3ROD	Replacement tablet tamping stir rod	1 package of 10
AC3CBR	Replacement vial cleaning brush	1 package of 10

Thermo Scientific Orion AQUAfast® AQ3700 Colorimeter NEW

Featuring digestion tests for nitrogen, phosphate and COD

Reagents for AQ3700

Cat. No.	New Test	Range, mg/L	Reagent Type
AC3002AD	Acid demand pH 4.3	0.1 to 4	Tablet
AC3002M	Alkalinity-m	5 to 200	Tablet
AC3002P	Alkalinity-p	5 to 500	Tablet
AC4P27	Aluminum	0.01 to 0.25	Tablet & liquid
ACD012	Ammonia, LR	0.02 to 2.5	Thermal digestion tube
ACD011	Ammonia, HR	1 to 50	Thermal digestion tube
AC3089	Boron	0.1 to 2	Tablet
AC2070LQ	Chlorine	0.02 to 4	Liquid
AC3072	Chlorine total HR	5 to 200	Tablet
AC4P06	Cyanide	0.01 to 0.5	Liquid & powder
AC2098	Cyanuric acid	2 to 160	Tablet
AC3002AD	DEHA	0.02 to 0.5	Liquid & powder
AC4P88	DEHA	20 to 500	Liquid & powder
AC3032C	Hardness, calcium	50 to 900	Tablet
AC3032T	Hardness, total	2 to 50	Tablet
AC3032HR	Hardness, total HR	20 to 500	Tablet
AC4P30	Hydrazine	0.05 to 0.5	Powder & spoon
AC3030LQ	Hydrazine	0.01 to 0.6	Liquid
AC3069	Hydrogen peroxide	0.03 to 3	Tablet
AC3053	Iodine	0.05 to 3.6	Tablet
AC3078	Iron (II, III) soluble	0.02 to 1	Tablet
AC4P54	Manganese, LR	0.01 to 0.7	Powder & liquid
AC3042	Molybdate	1.0 to 50.0	Tablet
ACR007	Nitrate	1.0 to 30.0	Powder pack & reaction tube
AC4P46	Nitrite	0.01 to 0.3	Powder pack
ACD004	Nitrogen, total, LR	0.5 to 25	Powder pack & digestion tube
ACD007	Nitrogen, total, HR	5 to 150	Powder pack & digestion tube
AC4008LR	Oxygen, dissolved	0.01 to 0.8	Ampoule
AC3093	PHMB (biguanide)	2.0 to 60.0	Tablet
ACR095	Phosphate, ortho	0.06 to 5	Powder pack & reaction tube
ACD095AH	Phosphate, acid hydrolyzable	0.02 to 1.6	Powder pack & digestion tube
ACD095	Phosphate, total	0.02 to 1.1	Powder pack & digestion tube
AC3001BP	pH	5.2 to 6.8	Tablet
AC3001	pH	6.5 to 8.4	Liquid
AC3001TB	pH	8.0 to 9.6	Tablet
AC3019	Potassium	0 to 12	Tablet
AC4P60LR	Silica LR	0.1 to 1.6	Powder & liquid
AC3073	Sodium hypochlorite	0.2 to 16	Tablet
AC4P82	Sulfate	5 to 100	Powder pack
AC3013	Urea	0.1 to 3	Tablet & liquid

The AQUAfast 3700 is the newest addition to the colorimetry line. With over 70 pre-programmed method options, this IP67 waterproof portable meter offers liquid, powder and tablet tests for expanded ranges and test options. There are six wavelengths generated by the long life LEDs in the meter. This instrument has a graphical display that is easy to understand and can be used in English, Spanish, German, French, or Italian.

See pages 80-81 and 83-85 for additional AQ3700 reagents.



Specifications	Description
Incident Light Source	6 Light Emitting Diodes (LED)
Wavelengths	430, 530, 560, 580, 610, 660 nm
Photometric Precision	2 % full scale as measured with standard solutions
Photometric Resolution	+/- 0.005 Abs
Software	
Test Methods	Preprogrammed with user prompts and feedback, user's favorite list
Autoranging	Yes
Blank Capability	Per method
Test Reagent Formats	Powder, tablet, liquid, reagent tubes, acid digestion tubes
Datalog Points	Up to 1000, time and date stamp
New Method Upload Capability	Yes, via internal RJ45 port
Meter Hardware	
Display	Backlit, graphic display
Inputs	12 button numeric keypad, plus 3 function keys
Sample Required	10 mL
Sample Cells Accepted	24 mm sample vials and 13 mm ampoules and 16 mm tubes with adapters
Outputs	IRDA (adapter required)
Auto Shut Down	20 min after last key-press, wakes to last location
Power	4 AA batteries (>3000 tests)
Regulatory and Safety	CE
Environmental Conditions	5 to 40 °C (30 to 90% non-condensing at 30 °C)
Meter Waterproof Rating	IP67
Warranty	2 years

Ordering Information

Cat. No.	Description
AQ3700	Meter kit includes AQ3700 meter, 4 batteries, 4 vials (24 mm), 3 vials (16 mm), 1 adapter each for 16 mm and 13 mm vials, carrying case, user guide with test methods, tablet tampering stir rod and brush. Order Starter Kits and/or Reagents and IR Adapter Separately.

See page 80 for AQ3700 accessories.

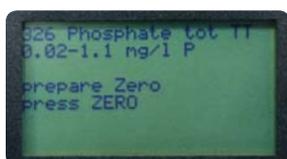
Thermo Scientific Orion Digestion Test Reagents NEW



AQUAfast AQ3700 Meter



Total nitrogen LR test



Total phosphate test

Tube digestions for nitrogen and phosphate nutrient removal process monitoring

The benefit of efficient operation is important to all production facilities, no matter what they make. By optimizing the process in wastewater treatment, the dirty water can move to the next stage of the process at the perfect time – not prior to the being fully treated and not overtreated. Overtreatment wastes chemicals and slows down the processing. Undertreatment can cause problems if the discharge does not meet the permit levels. Typically total nitrogen and total phosphate and other digestions were very long reflux digestion processes with expensive glassware. Now the results can be ready in an hour or so using persulfate digestion tube methods. This greatly improves the turnaround time for the results. These in process checks of the nutrient removal status can ensure you are on track for the final levels you need to attain or give you timely information to correct the process.

With the AQ3700 meter, total nitrogen and total phosphate tube digestion tests are now available. The kit includes the reagents and accessories for the test.

If you are already testing COD levels, you can quickly add these important tests and start reaping the benefits!

Overview of nitrogen and phosphorus methods

- Persulfate digestion for nitrogen; persulfate/ascorbic acid digestion for phosphorus
- Nitrogen tests require two tubes – one for a blank and one for the test; phosphate test needs just one tube for the blank and test
- 100 °C digestion temperature for 30 minutes and let cool about 10 more minutes for additional reagent reaction times
- AQUAfast COD digestors have the temperatures needed for nitrogen and phosphate tests

Nitrogen

Cat. No.	Description	Quantity
ACD004	Total nitrogen LR reagents (0.5 to 25 mg/L)	50 tests
ACD007	Total nitrogen HR reagents (5 to 150 mg/L)	50 tests
AC2V16	16 mm vials	

Phosphate

Cat. No.	Description	Quantity
ACD095	Total phosphorous reagents (0.02 to 1.1 mg/L)	50 tests
AC2V16	16 mm vials	

Accessories for AQ3700 Meter

Cat. No.	Description
AC2V16	Replacement 16 mm vials, package of 10
AC2V24	Replacement 24 mm vials, package of 12
AC37SR24	Sealing ring for 24 mm vial, package of 12
AC37A16	Replacement 16 mm adapter for AQ3700
AC37A13	Replacement 13 mm adapter for AQ3700
AC3ROD	Stir rod, package of 10
AC3CBR	Cleaning brush, package of 10
AC3VSK	Meter verification check standards kit
AQ37IRIM	IR data transfer interface module

Thermo Scientific Orion COD Test Systems

COD testing correlated to BOD readings can save time and money



AQ4000 Meter



COD Reactor, Test Reagents and Standards with AQ4000 Meter

- Ideal for environmental and wastewater monitoring with EPA accepted methods
- Three ranges of COD reagents
- New bulk COD reagent packs for added convenience
- COD reactor can digest up to 25 samples simultaneously in 2 hours or less and meet fast COD temperature requirements
- Works with the new AQ3700 multiparameter colorimeter, the AQ4000 advanced colorimeter or the economical AQ2040 colorimeter kit
- Datalogging and GLP features
- Bidirectional RS232 interface on AQ4000
- IR Interface on AQ3700 (IRDA required)
- Compatibility with 13, 16 and 24 mm diameter vials
- IP67 waterproof housing
- 2 year warranty

The AQ2040 colorimeter offers:

- Low-cost, dedicated colorimeter design for COD testing
- Measures all three COD ranges
- 1 year warranty

Just add the sample to the COD vial, digest sample in the reactor and read results with your AQUAfast colorimeter.

The AQ4000 and AQ3700 colorimeters offer:

- Pre-programmed methods for water quality testing
- Multiple wavelength and more test options

Please visit www.thermo.com/water for more product, methods information and method approval letters from EPA.

The AQ4000 and AQ3700 colorimeters support additional tests, including chlorine, fluoride and ammonia (see pages 79-85).

Select One Meter

Cat. No.	Description
AQ4000	AQUAfast AQ4000 advanced colorimeter with COD
AQ2040	AQUAfast II dedicated COD meter
AQ3700	AQUAfast AQ3700 colorimeter with COD, total nitrogen and total phosphate

Order Digester

Cat. No.	Description
COD125	AQUAfast thermoreactor for digestion methods to 150 °C
COD165	AQUAfast thermoreactor for digestion methods to 165 °C

Select Your Test Reagents by Range and Quantity

Cat. No.	Range	No. of Vials	EPA Approved
CODL00	0 to 150 ppm	25	Yes
CODL00B1	0 to 150 ppm	100	Yes
CODL00B3	0 to 150 ppm	300	Yes
CODH00	0 to 1500 ppm	25	Yes
CODH00B1	0 to 1500 ppm	100	Yes
CODH00B3	0 to 1500 ppm	300	Yes
CODHP0	0 to 15000 ppm	25	No requirement

Select a Standard

Cat. No.	Description
CODS01	AQUAfast 1000 ppm COD standard, 475 mL
CODS10	AQUAfast 10000 ppm COD standard, 475 mL

Thermo Scientific Orion AQUAfast® AQ4000 Colorimeter

The most advanced microprocessor-based LED colorimeter on the market today!



Versatile AQ4000 Meter

The AQ4000 colorimeter stores up to 189 pre-programmed methods and can record 100 data points in the field with a time and date stamp. Download later to a printer or computer in the lab.

The AQ4000 colorimeter takes all the guesswork out of sample preparation with the Auto-Test™ ampoules and the exclusive Auto-ID™ feature.

Quality of the measurement is assured since the ampoules are only opened when a measurement is about to be taken.

- **Auto-ID:** Automatically identifies the species to be measured, selects the method and the wavelength plus initiates the method – no buttons to push!
- **Auto-Test Ampoules:** Pre-measured liquid reagent ampoules are specially designed to work with the AQ4000

Selection of display units is push-button easy

Choose from concentration, absorbance or percent transmittance. The AQ4000 accepts round vials with diameters of 13, 16 or 24 mm. Best of all, the AQ4000 carries a full two year warranty.

Use the AQ4000 with our tablets or powders

- **Tablets:** Quick dissolve tablets that are easy to add to the sample. Tablets can be used with the AQUAfast II and IV colorimeters.
- **Powders:** Pre-measured and ready-to-use packets. Just add the packet to the sample, allow it to dissolve and then take your measurement. Powders can be used with any colorimeter on the market.
- **COD Reagents:** Available in three measurement ranges – low, mid and high range.

Updating the AQ4000 with new methods is simple

The latest software updates are available at www.thermo.com/water. A simple download procedure updates the colorimeter with the most current programs in a few quick, easy steps.

See pages 84 and 85 for reagent chemistries that you can use with the AQ4000 colorimeter.

AQ4000 Colorimeter and Accessories

Cat. No.	Description
AQ4000	AQUAfast IV colorimeter only (order reagents separately)
AQ40FK	Field case to carry AQ4000 meter, accessories and reagents
AQ4EK1 	Choice clean water kit featuring the AQ4000
AQ4CBL	RS232 cable for data download and software updates
AQ4ZER	AQUAfast zero kit
AC2V16	16 mm vials, 10 pack
AC2V24	24 mm vials, 12 pack

AQII Series Accessories

Cat. No.	Description
AC2V16	16 mm replacement vials, 10 pack
AC2V24	24 mm replacement vials, 12 pack
AC2T24	24 mm replacement turbidity vials, 12 pack
AC2073 	Chlorine secondary reference standards kit for AQ2070
AC201S	Turbidity standards for AQ2010



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

Thermo Scientific Orion AQUAfast® Chemistries Overview

For many of the parameters, there are several different choices of reagents in the AQUAfast line. Each offers a variety of beneficial features beyond test range.

Auto-ID™ Ampoules

Auto-ID ampoules for our AQ4000 colorimeter offer minimal user intervention – the vial contains the reagents, the vial pulls the proper amount of the sample into the vial, and the first in a portable colorimeter Auto-ID label selects and starts the test in the AQ4000. When the test is completed, the results are available for viewing and download. No chemical handling or sample pipeting, plus no pushing buttons, which minimizes errors! The liquid remains in the vial for easy transport back to the lab for disposal. What could be simpler! With proper storage, most ampoules have a shelf life of a year or more.

Powder Packets

AQUAfast powder chemistry packs allow for easy and cleaner measurements. We have a wide range of EPA equivalent chemistries

available. Each powder chemistry comes with enough packs to do 100 tests. Powder packs are pre-measured reagents that are ready to use. The steps of the test method are already pre-programmed into the more advanced AQUAfast colorimeters such as AQ4000 and AQ3700. For added convenience, powder packs can be used on other manufacturers' colorimeters. With proper storage, powders have a five year shelf life.

Tablets

Convenient tablets are individually packaged to minimize handling. They can be pushed out of the foil directly into the sample vial so you do not touch the reagent chemical. A tablet crushing stir rod is used to mix and quickly dissolve the tablet for the measurement. The tablets have a long shelf life – many maintain their activity for 10 years.

Liquids

Some reagent methods such as the SPADNS fluoride test kit and pH indicator reagents are liquids that are added to the sample. The

SPADNS test follows the EPA method and our pH reagents are a phenol red indicator to determine the pH quickly. The sample's pH is very important for the formation of the colored species being tested.

Digestion Test Reagents

COD, total nitrogen and total phosphate digestion methods also are liquids that are sold in 16 mm tubes. Just add the sample, digestion in a thermoreactor and after the reaction with the reagent, the measurements are taken in the 16 mm tubes used in the preparation steps. Similar to digestion tubes, reaction tubes do not require a digester to heat the samples for the reaction to occur. We also offer COD and other standards to be used for spiking the samples.

The AQUAfast line of products offers choices for sample preparation to maximize your testing efficiency.

Convenient Reagent Starter Kits for AQUAfast AQ3700

Drinking Water – Chloramines: Cat. No. AC3K01				
Cat. No.	Parameter	Tests	Format	Ranges mg/L
AC3072	Total chlorine HR	100	Tablet	5 to 200
AC4P72	Total chlorine LR	100	Powder pack	0.02 to 2
AC4P29	Copper	100	Powder pack	0.05 to 5
ACR007	Nitrate	100	Reaction tube	1 to 30
AC2046	Nitrite	100	Tablet	0.01 to 0.5
ACD012	Free ammonia LR	100	Thermal digestion tube	0.02 to 2.5
AC2070	Monochloramine	50	Tablet	0.02 to 2
AC2009	Fluoride	50	Reaction tube	0.2 to 1.4

Nutrients Reagents: Cat. No. AC3K04				
Cat. No.	Parameter	Tests	Format	Ranges mg/L
ACD004	Total nitrogen LR	50	Thermal digestion tube	0.2 to 25
ACD095	Total phosphorous LR	50	Thermal digestion tube	0.02 to 1.6
AC4P95	Reactive phosphorous	100	Powder pillow	0.06 to 2.5
ACD011	Free ammonia HR	50	Thermal digestion tube	1 to 50
ACR007	Nitrate	50	Reaction tube	1 to 30
AC2046	Nitrite	100	Tablet	0.01 to 0.5

Wastewater Systems: Cat. No. AC3K03				
Cat. No.	Parameter	Tests	Format	Ranges mg/L
AC3072	Total chlorine LR	100	Tablet	5 to 200
AC2095	Phosphate	100	Tablet	0.05 to 4
AC4P82	Sulfate	100	Powder pack	5 to 100
ACR007	Nitrate	100	Reaction tube	1 to 30
AC2046	Nitrite	100	Tablet	0.01 to 0.5
AC4012	Free ammonia LR	50	Ampoule	0.5 to 7

Drinking Water - Free Chlorines: Cat. No. AC3K02				
Cat. No.	Parameter	Tests	Format	Ranges mg/L
AC4P71	Free Chlorine HR	100	Powder pack	0.02 to 2
AC4P72	Total Chlorine LR	100	Powder pack	0.02 to 2
AC4078	Iron	100	Ampoule	0.2 to 6
ACR007	Nitrate	100	Reaction tube	1 to 30
AC4055	Manganese	100	Ampoule	1.0 to 30
AC2009	Fluoride	50	Reaction tube	0.2 to 1.4

Thermo Scientific Orion AQUAfast® Colorimeter Reagent Chemistries

Parameter	Reagent Type	Catalog Number	Description	Range	Method	Number of Tests	Meter Models	EPA Approved Methods
Alkalinity-m	Tablet	AC2002	AQUAfast II Alkalinity-m	5.0 - 200 mg/L	Acid/Indicator	100	AQ4000, AQ3700, AQ2001	-
Aluminum	Auto-Test Ampoule	AC4027	AQUAfast IV Aluminum	0.04 - 0.25 mg/L	Eriochrome Cyanine R	30	AQ4000	WW Equivalent
	Tablet	AC2027	AQUAfast II Aluminum	0.05 - 0.30 mg/L	Eriochrome Cyanine R	50	AQ4000, AQ3700, AQ2005, AQ2020	WW Equivalent
Ammonia (Nitrogen)	Powder	AC4P12	AQUAfast Ammonia-Nitrogen, Powder	0.1 - 0.50 mg/L	Salicylate	100	AQ4000, AQ3700	-
	Auto-Test Ampoule	AC4010	AQUAfast IV Ammonia (Ultra Low Range)	0.10 - 3.0 mg/L	Salicylate	30	AQ4000	-
	Auto-Test Ampoule	AC4012	AQUAfast IV Ammonia (Low Range)	0.5 - 7.0 mg/L	Nesslerization	30	AQ4000	WW Equivalent
	Auto-Test Ampoule	AC4011	AQUAfast IV Ammonia (High Range)	1.0 - 14 mg/L	Nesslerization	30	AQ4000	WW Equivalent
	Tablet	AC2012	AQUAfast II Ammonia, as Nitrogen	0.05 - 1.0 mg/L; 0.5 - 10.0 mg/L	Indophenole/phenate	50	AQ4000, AQ3700, AQ2004	WW Equivalent
Bromine	Auto-Test Ampoule	AC4035	AQUAfast IV Bromine	0.75 - 9.0 mg/L	DPD	30	AQ4000	No requirement
	Tablet	AC2035	AQUAfast II Bromine	0.1 - 13.5 mg/L	DDPD	100	AQ3700, AQ2005	No requirement
Chloride	Auto-Test Ampoule	AC4017	AQUAfast IV Chloride	2.0 - 40 mg/L	Mercuric Nitrate	30	AQ4000	-
	Tablet	AC2017	AQUAfast II Chloride	0.5 - 25 mg/L	Silver nitrate/turbidity	50	AQ4000, AQ3700, AQ2005	-
Chlorine Dioxide	Auto-Test Ampoule	AC4099	AQUAfast IV Chlorine Dioxide	0.80 - 12 mg/L	DPD	30	AQ4000	No requirement
	Tablet	AC2099	AQUAfast II Chlorine Dioxide	0.04 - 2.8 mg/L	DPD	100	AQ4000, AQ3070, AQ2020	No requirement
Chlorine	Powder	AC4P71	AQUAfast Chlorine, Free, DPD, Powder Packets, EPA-approved Method	0.03 - 2.00 mg/L	DPD	100	AQ4000, AQ3070	DW
	Powder	AC4P71B	AQUAfast Chlorine, Free, Powder Packets Bulk Packaging, EPA-approved Method	0.03 - 2.00 mg/L	DPD	1000	AQ4000, AQ3070	DW
	Tablet	AC2071	AQUAfast II Chlorine, DPD, Free Only	0.05 - 6.0 mg/L	DPD	100	AQ4000, AQ2070	-
	Auto-Test Ampoule	AC4070	AQUAfast IV Chlorine, Free and Total, EPA-approved Method	0.05 - 6.0 mg/L	DPD	30	AQ4000	DW
	Tablet	AC2070	AQUAfast II Chlorine, Free and Total	0.05 - 6.0 mg/L	DPD	50 each	AQ4000, AQ3700, AQ2070, AQ2020	-
	Powder	AC4P72	AQUAfast Chlorine, Total, DPD, Powder Packets, EPA-approved Method	0.03 - 2.00 mg/L	DPD	100	AQ4000, AQ3070	DW & WW
	Powder	AC4P72B	AQUAfast Chlorine, Total, Powder Packets Bulk Packaging, EPA-approved Method	0.03 - 2.00 mg/L	DPD	1000	AQ4000, AQ3070	DW & WW
	Tablet	AC2072	AQUAfast II Chlorine, Total, EPA-approved Method	0.05 - 6.0 mg/L	DPD	50	AQ4000, AQ3700, AQ2070	DW & WW
Copper	Powder	AC4P29	AQUAfast Copper, Bicinchoninate, Powder	0.05 - 5.00 mg/L	Bicinchoninate	100	AQ4000, AQ3700	WW Equivalent
	Auto-Test Ampoule	AC4029	AQUAfast IV Copper (Soluble)	0.5 - 12 mg/L	Bathocuproine	30	AQ4000	WW Equivalent
	Tablet	AC2065	AQUAfast II Zinc/Copper	0.02 - 1.0 mg/L	Zincon	50	AQ4000, AQ3700, AQ2002	-
	Tablet	AC2029	AQUAfast II Copper	0.05 - 5.0 mg/L	Biquinoline	50	AQ4000, AQ3700, AQ2005	-
Cyanide	Auto-Test Ampoule	AC4006	AQUAfast IV Cyanide (Free)	0.20 - 0.50 mg/L	Pyridine-barbituric acid	30	AQ4000, AQ3700	ETV Verified, DW & WW Equivalent
Cyanuric Acid	Tablet	AC2098	AQUAfast II Cyanuric Acid	5 - 90 mg/L	Melamine	100	AQ3070, AQ3700, AQ2003	No requirement
Fluoride	Auto-Test Ampoule	AC4009	AQUAfast IV Fluoride SPADNS	0.20 - 2.0 mg/L	SPADNS	30	AQ4000	DW & WW
	Liquid	AC2009	AQUAfast II Fluoride SPADNS Kit, EPA-approved Method	0.05 - 20 mg/L	SPADNS	50	AQ4000, AQ3700, AQ2009, AQ2020	DW & WW
Hydrazine	Auto-Test Ampoule	AC4030	AQUAfast IV Hydrazine	0.10 - 1.2 mg/L	PDMAB	30	AQ4000, AQ3700	No requirement
	Tablet	AC2030	AQUAfast II Hydrazine Kit	0.05 - 0.50 mg/L	Dimethylamino-benzaldehyde	100	AQ4000, AQ2003	No requirement

Parameter	Reagent Type	Catalog Number	Description	Range	Method	Number of Tests	Meter Models	EPA Approved Methods
Iron	Powder	AC4P79	AQUAfast Iron Total TPTZ, Powder	0 - 1.80 mg/L	TPTZ	100	AQ4000, AQ3700	-
	Powder	AC4P78	AQUAfast Iron Total Ferro, Powder	0 - 3.00 mg/L	1,10 Phenanthroline	100	AQ3700	WW Equivalent
	Auto-Test Ampoule	AC4078	AQUAfast IV Iron 1 (Total & Soluble)	0.45 - 7.0 mg/L	1,10 Phenanthroline	30	AQ4000	WW Equivalent
	Tablet	AC2078	AQUAfast II Iron	0.02 - 1.0 mg/L; 0.2 - 10 mg/L	TPTZ	100	AQ4000, AQ3700, AQ2005	-
Manganese	Powder	AC4P55	AQUAfast Manganese HR, Powder	0.2 - 20.0 mg/L	Periodate Oxidation	100	AQ4000	WW Equivalent
	Auto-Test Ampoule	AC4055	AQUAfast IV Manganese	1.0 - 30 mg/L	Periodate Oxidation	30	AQ4000	WW Equivalent
	Tablet	AC2055	AQUAfast II Manganese	0.05 - 4 mg/L	Formaloxime	50	AQ4000, AQ3700, AQ2003	-
Molybdate	Powder	AC4P42	AQUAfast Molybdenum, Molybdate, HR, Powder	0 - 40.0 mg/L	Mercaptoacetic acid	100	AQ4000, AQ3700	-
	Auto-Test Ampoule	AC4042	AQUAfast IV Molybdate	1.0 - 25 mg/L	Catechol	30	AQ4000	-
Nitrate	Auto-Test Ampoule	AC4007	AQUAfast IV Nitrate 3 (as NO ₃)	5.0 - 50 mg/L	Cadmium reduction	30	AQ4000	DW & WW Equivalent
	Auto-Test Ampoule	AC4005	AQUAfast IV Nitrate 2 (as N)	0.40 - 3.0 mg/L	Cadmium reduction	30	AQ4000	DW & WW Equivalent
	Auto-Test Ampoule	AC4004	AQUAfast IV Nitrate (as N) LR	0.20 - 1.5 mg/L	Cadmium reduction	30	AQ4000	DW & WW Equivalent
	Tablet	AC2007	AQUAfast II Nitrate	1 - 40 mg/L	Zinc reduction	50	AQ4000, AQ2007	-
Nitrite	Powder	AC4P46	AQUAfast Nitrite LR, Powder	0 - 0.350 mg/L	Diazotization (Azo)	100	AQ4000, AQ3700	DW & WW Equivalent
	Auto-Test Ampoule	AC4046	AQUAfast IV Nitrite	0.080 - 0.80 mg/L	Diazotization (Azo)	30	AQ4000	DW & WW Equivalent
	Tablet	AC2046	AQUAfast II Nitrite, EPA-approved Method	0.05 - 0.50 mg/L	Diazotization (Azo)	100	AQ4000, AQ3700, AQ2046	DW & WW
Oxygen	Auto-Test Ampoule	AC4008	AQUAfast IV Oxygen	2.0 - 15 mg/L	Azo dye	30	AQ4000	-
Ozone	Auto-Test Ampoule	AC4048	AQUAfast IV Ozone	0.20 - 2.5 mg/L	DDPD	30	AQ4000	-
	Tablet	AC2048	AQUAfast II Ozone	0.05 - 0.5 mg/L	DPD/Glycine	100	AQ3700, AQ2001	-
pH	Liquid	AC3001	AQUAfast II pH, Dropper bottle	5.9 - 8.2	Phenol red	30	AQ3070, AQ3700	-
	Tablet	AC2001	AQUAfast II pH	6.5 - 8.4	Phenol red	100	AQ4000, AQ3700, AQ2001	-
Phosphate	Powder	AC4P95	AQUAfast Phosphorus 3, Powder	0.07 - 2.5 mg/L	Phosphormolybdic blue/Ascorbic acid	100	AQ4000, AQ3700	DW & WW Equivalent
	Auto-Test Ampoule	AC4096	AQUAfast IV Phosphate 1-HR	5.0 - 80 mg/L	Vanado molybdate	30	AQ4000, AQ3700	-
	Auto-Test Ampoule	AC4095	AQUAfast IV Phosphate 2-LR	0.75 - 8.0 mg/L	Stannous chloride	30	AQ4000, AQ3700	-
	Tablet	AC2096	AQUAfast II Phosphorus HR	10 - 100 mg/L	Phosphormolybdic blue/Ascorbic acid	50	AQ4000, AQ3700, AQ2003	DW & WW Equivalent
	Tablet	AC2095	AQUAfast II Phosphorus LR, EPA Approval Method	0.05 - 4.0 mg/L	Vanado Molybdate	50	AQ4000, AQ3700, AQ2004	DW & WW
Silica	Powder	AC4P60	AQUAfast Silica HR, Powder Packets	1.0 - 75.0 mg/L	Silicomolybdate	100	AQ4000, AQ3700	DW & WW Equivalent
	Auto-Test Ampoule	AC4060	AQUAfast IV Silica	1.0 - 14 mg/L	Heteropoly Blue	30	AQ4000	DW Equivalent
	Powder	AC2061	AQUAfast II Silica Phosphate Removal	NA	NA	100	AQ4000, AQ3700, AQ2002	-
	Tablet	AC2060	AQUAfast II Silica	0.05 - 4.0 mg/L	Silicomolybdate	50	AQ4000, AQ3700, AQ2002	DW & WW Equivalent
Sulfate	Powder	AC4P82	AQUAfast Sulfate 4, Powder Packets	2 - 70 mg/L	Barium sulfate/ Turbidity	100	AQ4000, AQ3700	DW & WW Equivalent
	Auto-Test Ampoule	AC4082	AQUAfast IV Sulfate	8.0 - 100 mg/L	Barium sulfate/ Turbidity	30	AQ4000	DW & WW Equivalent
	Tablet	AC2082	AQUAfast II Sulfate	5 - 200 mg/L	Barium sulfate/ Turbidity	100	AQ4000, AQ3700, AQ2005	DW & WW Equivalent
Sulfide	Auto-Test Ampoule	AC4016	AQUAfast IV Sulfide (Soluble)	0.3 - 3.0 mg/L	Methylene Blue	30	AQ4000	WW Equivalent
	Tablet	AC2016	AQUAfast II Sulfide	0.05 - 0.50 mg/L	Methylene Blue	50	AQ4000, AQ3700, AQ2004	WW Equivalent
Zinc	Auto-Test Ampoule	AC4065	AQUAfast IV Zinc	0.30 - 3.0 mg/L	Zincon	30	AQ4000	WW Equivalent
	Tablet	AC2065	AQUAfast IV Zinc/Copper	0.02 - 1.0 mg/L	Zincon	50	AQ4000, AQ3700, AQ2002	WW Equivalent

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Preventative Maintenance (PM) – contracts and Start-up/Training (SU) are available in N. America only and are represented by Catalog Numbers ending in PM and SU.

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Cat. No.	Star Series Calibration and Validation
111200CAL	3-Star pH Benchtop
121200CAL	3-Star pH Portable
111300CAL	3-Star DO Benchtop
121300CAL	3-Star DO Portable
111400CAL	3-Star Cond Benchtop
121400CAL	3-Star Cond Portable
111500CAL	4-Star pH/ISE Benchtop
121500CAL	4-Star pH/ISE Portable
111600CAL	4-Star pH/DO Benchtop
121600CAL	4-Star pH/DO Portable
111700CAL	4-Star pH/Cond Benchtop
121700CAL	4-Star pH/Cond Portable
121800CAL	5-Star pH/DO/Cond Portable
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