



Accurate measurements for your applications

Thermo Scientific™ Orion™ Ion Selective Electrodes



Ion Selective Electrodes

Thermo Scientific Orion ISEs offer outstanding performance and reliability

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

Efficient and economical

Electrode measurements are simpler and faster than other analytical techniques. Time consuming sample steps such as filtration and distillations are rarely needed. Sample preparation and analysis time is typically 1 to 3 minutes. Compared to other methods such as atomic absorption or ion chromatography, there is a small setup cost and it does not require additional expensive readout equipment. Additionally, sample color or turbidity do not affect the measurement.

Measurement techniques

Direct measurement is a simple procedure for measuring a large number of samples. Each sample only requires one reading. Only a small sample volume is required, typically 50 mL or less can suffice. Calibration is performed on a series of standards. The concentration is then determined by comparison to the standards. Ionic strength adjustor is added to all solutions to help ensure samples and standards have similar ionic strength, proper pH and reduce the effect of interfering ions. Orion ISE meters calculate and store the calibration curves.



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

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

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

Various ISE applications

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

Combination Ion Selective Electrodes

Sure-Flow reference makes electrodes easy-to-clean and long lasting

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

Half-Cell Ion Selective Electrodes

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



Fluoride

The standard in fluoride ion analysis – EPA compliant

Approved ASTM method for fluoride in drinking water and wastewater

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

Choose the Thermo Scientific™ Orion™ Ionplus™ Sure-Flow™ Combination Fluoride Electrode, or the Thermo Scientific™ Orion™ Fluoride Half-Cell or Sure-Flow Fluoride Half-Cell Electrodes. Each fluoride ISE features lanthanum fluoride pellet sensors. The fluoride half-cell electrode requires a separate half-cell reference electrode.

Other applications for fluoride electrodes

Fluoride in pharmaceutical products: Assay or impurity testing by direct or known addition ISE measurement.

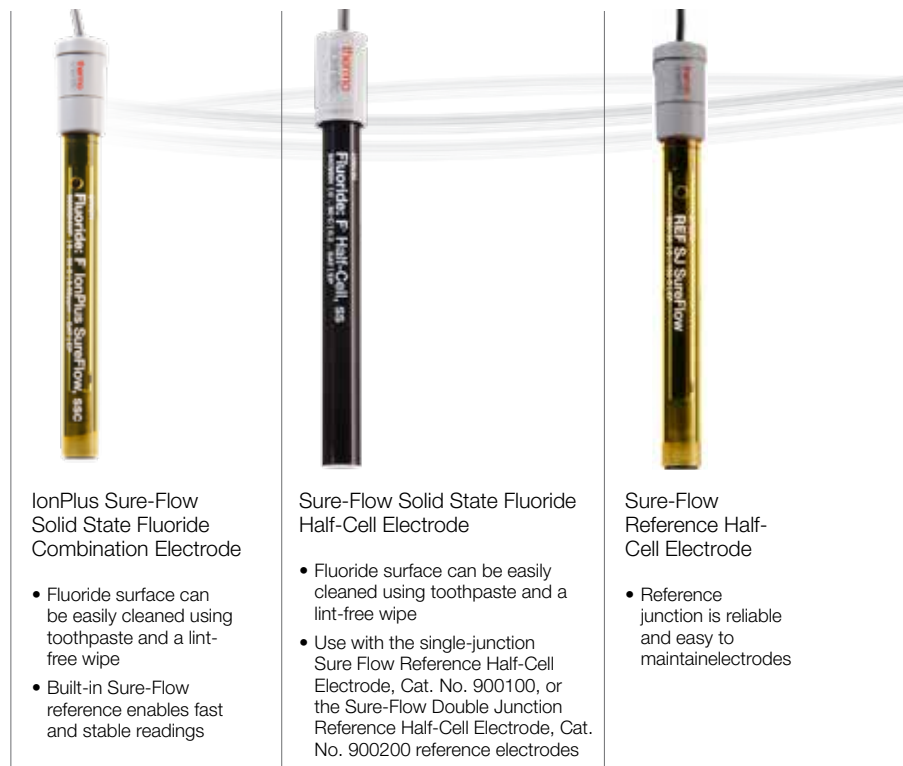
Ammonium bifluoride: Multiple known addition (MKA) titration method determines levels without need of removing interfering heavy metal ions.

Fluoride in dental products: Free, total, and bioavailable forms of fluoride by direct ISE measurement.

Accessories and solutions

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

Cat. No.	Recommended accessories
F40904	0.5 ppm fluoride standard with TISAB II, 475 ml
F40905	5.0 ppm fluoride standard with TISAB II, 475 ml
940906	0.1M NaF (1900 ppm F) standard, 475 mL
940907	100 ppm fluoride standard, 475 mL
040906	1 ppm fluoride standard with TISAB II, 475 mL
040907	2 ppm fluoride standard with TISAB II, 475 mL
040908	10 ppm fluoride standard with TISAB II, 475 mL
940909	TISAB II, 1 gallon
940999	TISAB II, 4 x 1 gallon
940911	TISAB III concentrate, 475 mL
900061	Optimum results A electrode fill solution for 9609BNWP, 5 x 60 mL
900001	Fill solution for 900100 used with 9409BN/9409SC, 5 x 60 mL
9609BNLSLN	Fluoride Ion Selective Electrode and Reagent Kit
9609BNLSLN	Low Level Fluoride Ion Selective Electrode and Reagent Kit



IonPlus Sure-Flow Solid State Fluoride Combination Electrode

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

Sure-Flow Solid State Fluoride Half-Cell Electrode

- Fluoride surface can be easily cleaned using toothpaste and a lint-free wipe
- Use with the single-junction Sure Flow Reference Half-Cell Electrode, Cat. No. 900100, or the Sure-Flow Double Junction Reference Half-Cell Electrode, Cat. No. 900200 reference electrodes

Sure-Flow Reference Half-Cell Electrode

- Reference junction is reliable and easy to maintain electrodes

Cat. No.	9609BNWP	9409BN 9409SC	900100
Measurement range	1 x 10 ⁻⁶ M to saturated 0.02 ppm to saturated	1 x 10 ⁻⁶ M to saturated 0.02 ppm to saturated	–
Temp. range	0 to 80 °C	0 to 80 °C	0 to 100 °C
Connector type	BNC Waterproof	BNC Screw Cap	Pin Tip

Ion Plus Sure-Flow Fluoride Electrode and reagent kits

9609BNLSLN Fluoride Electrode and Reagent Kit:		9609BNLSLN Low Fluoride Electrode and Reagent Kit:	
9609	Combination Fluoride Electrode with BNWP Sure-Flow Reference	9609	Combination Fluoride Electrode with BNLSLN Sure-Flow Reference
940907	100 ppm Fluoride Standard, 475 ml	F40904	0.5 ppm Fluoride Standard with TISAB II, 475 ml
040906	1 ppm Fluoride Standard with TISAB II, 475ml	040906	1 ppm Fluoride Standard with TISABII, 475ml
040907	2 ppm Fluoride Standard with TISAB II, 475 ml	F40905	5 ppm Fluoride Standard with TISAB II, 475 ml
040908	10 ppm Fluoride Standard with TISAB II, 475ml	040908	10 ppm Fluoride Standard with TISAB II, 475ml
940909	TISB II, 1 gallon	940909	TISAB II, 1 gallon

Ammonia

Compliant with EPA testing methods

EPA approved ASTM D1426 method for ammonia in wastewater

Measurements are quick, simple, accurate and economical.

Both the Thermo Scientific™ Orion™ High-Performance Ammonia Electrode and the Orion Ammonia Electrode feature time-tested membrane technology.

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.

Ammonia in aquaculture: By direct or known addition measurement.

Urea in milk: Urea is enzyme-catalyzed to ammonium and measured directly.

Accessories and solutions

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

High Performance Electrode

Cat. No.	Recommended accessories
951214	Loose membranes for HP electrodes, box of 20
951215	Pre-assembled outer body and membrane cap assembly for HP electrodes, 3 pack
951210	Low level ISA with pH-indicating blue dye. Suitable for samples with no metallic ions, 475 mL
951211	ISA with pH-indicating blue dye. Suitable for a wide range of samples that may contain metallic ions
951011	ISA without pH-indicating dye. For high or low levels with no metallic ions, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951209	HP ammonia electrode filling solution, 60 mL
951006	0.1 M NH ₄ Cl (1400 ppm as N) standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL

Standard Electrode

Cat. No.	Recommended accessories
951204	Loose membranes for standard electrodes, box of 20
951205	Bonded membranes for standard electrodes, pack of 3
951210	pH adjusting ISA, for samples with no metallic ions, 475 mL
951211	pH adjusting ISA, for samples containing metallic ions, 475 mL
951011	ISA without pH-indicating dye. For high or low levels with no metallic ions, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951202	Standard ammonia electrode filling solution, 60 mL
951006	0.1 M NH ₄ Cl (1400 ppm as N) standard, 475 mL
951007	1000 ppm ammonia as nitrogen standard, 475 mL



Orion High Performance Ammonia Electrode

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



Orion Gas Sensing Ammonia Electrode

- Facilitates reliable results at mid to high ammonia levels and stable readings

Cat. No.	9512HPBNWP	9512BNWP
Measurement range	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm
Temp. range	0 to 50 °C	0 to 50 °C
Connector type	BNC Waterproof	BNC Waterproof

Ammonia ISE and reagent kits

9512HPBNSLN	High-performance Ammonia ISE and reagent kit
9512BNSLN	Standard Ammonia ISE and reagent Kit



Nitrate

Compliant with EPA testing methods

The easy way to measure nitrate levels in drinking water, wastewater and soils

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

Choose an Orion Ionplus Sure-Flow Combination Nitrate Electrode or either an Orion Nitrate Half-Cell or Sure-Flow Half-Cell Electrode. The nitrate half-cell electrode requires a separate half-cell reference electrode.

Other applications for nitrate electrodes

Nitric acid: Known addition (KA) titration method determines levels without need of removing interfering heavy metal ions.



Nitrate in soil and plant samples: Dried samples are extracted into aqueous solution and measured directly.

Nitrate in food: Samples are extracted into aqueous solution and measured directly or by known addition.

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.

Cat. No.	Recommended Accessories
900046	Optimum results F electrode fill solution, 5 x 60 mL. For 9707BNWP and outer fill solution for 900200
900002	Inner chamber fill solution for 900200, 5 x 60 mL
920706	0.1 M NaNO ₃ (1400 ppm as N) standard solution, 475 mL
920707	1000 ppm nitrate as nitrogen standard, 475 mL
930707	100 ppm nitrate as nitrogen standard, 475 mL
930711	Nitrate ionic strength adjustor (ISA), 475 mL
930710	Nitrate interference suppressor solution (NISS), 475 mL
970701	Replacement module for 9707BNWP (1 each)
930701	Replacement module for 9307BNWP (pack of 3)
930702	Replacement module for 9307BNWP (1 each)

			
<p>IonPlus Sure-Flow Nitrate Combination Electrode</p> <ul style="list-style-type: none"> • Sure-Flow reference enables stable readings and is easy to clean • Convenient with small sample sizes • Module replacements available 	<p>Sure-Flow Nitrate Half-Cell Electrode</p> <ul style="list-style-type: none"> • Reference junction is reliable and easy to maintain • Replaceable module for convenience 	<p>Sure-Flow Double Junction Reference Half-Cell Electrode</p> <ul style="list-style-type: none"> • Reference junction is reliable and easy to maintain • For use with ISE half-cell or pH electrodes 	
Cat. No.	9707BNWP	9307BNWP	900200
Measurement Range	7 x 10 ⁻⁶ to 1.0 M 0.1 to 14,000 ppm as N	7 x 10 ⁻⁶ to 1.0 M 0.1 to 14,000 ppm as N	–
Temp. Range	0 to 40 °C	0 to 40 °C	0 to 100 °C
Connector Type	BNC Waterproof	BNC Waterproof	Pin Tip

Chloride

Compliant with EPA testing methods

Approved ASTM method for chloride in wastewater

Easily and reliably analyze free chloride ions in aqueous solutions with the Orion Ionplus Sure-Flow Combination Chloride Electrode, or the Orion Chloride Half-Cell or Sure-Flow Chloride Half Cell ISE. Supports quick, accurate and economical measurements. Rugged epoxy body design helps ensure durability of electrode.

Other applications for chloride electrodes

Salt: Known addition can be used to determine salt levels in food samples.

Hydrochloric Acid: First derivative titration can determine HCl concentrations.

Chlorine in fuels and solid waste: Sample is combusted in oxygen, dissolved in aqueous solution and measured directly.

Accessories and solutions

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

Cat. No.	Recommended accessories
940011	Chloride ionic strength adjustor (ISA), 475 mL
941709	Chloride CISA reagent pack, 2 x 2 L
941706	0.1 M NaCl (3550 ppm as Cl) standard, 475 mL
941708	1000 ppm chloride standard, 475 mL
941707	100 ppm chloride standard, 475 mL
900062	Optimum results B fill solution for 9617BNWP, 5 x 60 mL
900017	Chloride electrode fill solution, 5 x 60 mL, for samples more concentrated than 10 ⁻² M
900003	Outer chamber fill solution for 900200, 5 x 60 mL
900002	Inner chamber fill solution for 900200, 5 x 60 mL
948201	Polishing strips, pack of 24



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

IonPlus Sure-Flow Solid State Chloride Combination Electrode

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

Orion Solid State Chloride Half-Cell Electrode

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

Sure-Flow Double Junction Reference Half-Cell Electrode

- Reference junction is reliable and easy to maintain
- For use with ISE half-cell or pH electrodes

Sodium

Fast response and stability

Comes with complete solution kit containing standards, reagents, ISA and more!

Select between the Thermo Scientific™ Orion™ ROSS™ Sure-Flow™ Combination Electrode or a Thermo Scientific™ Orion™ ROSS Ultra™ Sure-Flow™ Half-Cell or ROSS Sure-Flow Half-Cell Electrode options for quick, accurate and economical measurements of free sodium ions in aqueous solutions. Chemical resistant glass body.

Applications for sodium electrodes




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

Accessories and solutions

You'll receive all the accessories you need for sodium measurement when you purchase a ROSS sodium electrode. Each electrode comes with electrode fill solution, sodium ionic strength adjustor, three different sodium standards, sodium electrode reconditioning solution and sodium electrode storage solution.

Cat. No.	Recommended accessories
941706	0.1 M NaCl (2300 ppm as Na) standard, 475 mL
941107	100 ppm sodium standard, 475 mL
941105	10 ppm sodium standard, 475 mL
650700	Known addition kit – 3 x 475 mL of 1 M NaCl standard with ISA and 1 x 475 mL ISA
900012	Sodium electrode fill solution for low sodium levels (below 10 ⁻⁵ M or 0.2 ppm)
The following solutions are included with the purchase of a ROSS Sure-Flow Sodium Combination Electrode, and may also be purchased separately	
841108	1000 ppm sodium standard, 475 mL
841109	Known addition standard, 1000 ppm as Na ⁺ with ISA, 475 mL
841111	Sodium ionic strength adjustor (ISA), 475 mL
841113	Sodium electrode reconditioning solution, 475 mL
841101	Sodium electrode storage solution, 475 mL
900010	Sodium electrode fill solution, 5 x 60 mL*

*Three packages included with the purchase of a ROSS Sure-Flow Combination Electrode (Cat. No. 8611BNWP)

		
ROSS Sure-Flow Sodium Combination Electrode	ROSS Sodium Half-Cell Electrode	ROSS Ultra Reference Half-Cell Electrode
<ul style="list-style-type: none"> • Unique redox ROSS internal system facilitates fast response, better stability and accuracy than conventional sodium electrodes • Sure-Flow reference prevents clogging while giving fast, stable readings • Sold with solutions included (see details in accessories chart to the left) 	<ul style="list-style-type: none"> • ROSS Ultra reference provides extended life comes with 2 year warranty • Measures sodium in aqueous solution quickly, accurately, and economically 	<ul style="list-style-type: none"> • Glass body offers chemical resistance • Leverages the unique redox internal system with ROSS electrode for increased accuracy and stability, and quick response time

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



Specialty titration electrodes

Achieve accurate and reliable halide titrations by using the Orion Silver Billet Combination Electrode or the Orion Silver/Sulfide Ion Selective Electrode as the endpoint indicator. Applications include the determination of chloride in water and solutions, chloride in cement, and the determination of salt in food.

For simple, single-phase titrations, use the Orion Surfactant Ion Selective Electrode as the endpoint indicator. Applications include the determination of quaternary ammonium compound (QAC) surfactants by automatic titration.

Potentiometric titrations using silver billet electrodes

The Thermo Scientific™ Orion Star™ T930 Ion Titrator Salt Content Kit benefits from the use of the Orion Silver Billet electrode to identify salt in foods. Titration techniques include equivalence point titrations and preset mV endpoint.

Read the methods: Determination of salt content in prepared food by automated titration and Determination of chloride in water, and find out more about Orion Star Automated Titrators at thermofisher.com/titrator



Ion Plus Sure-Flow Silver Sulfide Electrode

- Top performance for demanding samples, such as food, concrete
- Dual electrodes measure silver and sulfide ions in aqueous solutions and perform low-level halide titrations
- Sure-Flow reference junction prevents electrode clogging and provides fast and stable readings



Orion Surfactant Half-Cell Electrode

- For surfactant titrations
- Use with reference half-cell



Orion Silver Billet Combination Electrode


- General purpose for accurate and reliable halide titrations in clean samples



Cat. No.	9616BNWP	9342BN	9780SC
pH Range	Endpoint Indicator	Endpoint Indicator	Endpoint Indicator
Temp. Range	0-80 °C	0-40 °C	0-80 °C
Internal Reference	Ag/AgCl	n/a - use Cat. No. 900020	Ag/AgCl
Junction	Sure-Flow	-	Ceramic
Fill Solution (Cat. No.)	Optimum Res B (900062)	-	4 M KCl w/ Ag/AgCl (900011)
Dimension D (Dia) L (Length)	L - 110 mm D - 13 mm	L - 110 mm D - 12 mm	L - 150 mm D - 12 mm
Connector Type	BNC Waterproof	BNC	Screw Cap


Select from the full line of Orion ISEs

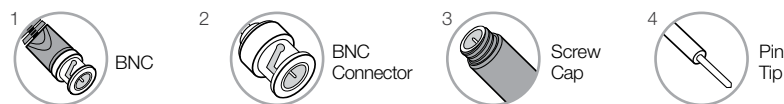
Species	Cat. No.	Construction	Measurement range	Optimum temperature range		Required reference electrode	Reference filling solution	Calibration standards	Required ISA
Ammonia standard (NH ₃)	9512BNWP ¹	Gas sensing combination	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm	0 to 50 °C	✓	Included	951202	0.1 M NH ₄ Cl / 951006	951211
Ammonia high performance	9512HPBNWP ¹	Gas sensing combination	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm	0 to 50 °C	✓	Included	951209	0.1 M NH ₄ Cl / 951006	951210
Ammonium (NH ₄ ⁺)	931801 ⁸	Plastic membrane half-cell	5 x 10 ⁻⁷ to 1.0 M 0.01 to 17,000 ppm	0 to 40 °C		900200	900002 inner/ 900018-WA outer	1000 ppm as N / 951007	-
Bromide (Br) ionplus Design*	9635BNWP ¹	ionplus sure-flow solid state combination	5 x 10 ⁻⁶ to 1.0 M 0.40 to 79,900 ppm	0 to 80 °C	✓	Included	900063	0.1 M NaBr / 943506	940011
Bromide (Br)	9435BN ²	Solid state half-cell	5 x 10 ⁻⁶ to 1.0 M 0.40 to 79,900 ppm	0 to 80 °C	✓	900200	900002 inner / 900003 outer	0.1 M NaBr / 943506	940011
Cadmium (Cd ²⁺) ionplus Design	9648BNWP ¹	ionplus sure-flow solid state combination	1 x 10 ⁻⁷ to 0.1 M 0.01 to 11,200 ppm	0 to 80 °C		Included	900061	Consult user guide	940011
Calcium (Ca ²⁺) ionplus Design*	9720BNWP ^{1,5}	ionplus sure-flow plastic membrane combination	5 x 10 ⁻⁷ to 1.0 M 0.02 to 40,100 ppm	0 to 40 °C	✓	Included	900061	0.1 M CaCl ₂ / 922006 100 ppm CaCO ₃ / 923206	932011
Calcium (Ca ²⁺)	9320BN ^{2,5}	Plastic membrane half-cell	5 x 10 ⁻⁷ to 1.0 M 0.02 to 40,100 ppm	0 to 40 °C	✓	900100	900011	0.1 M CaCl ₂ / 922006 100 ppm CaCO ₃ / 923206	932011
Carbon Dioxide (CO ₂)	9502BNWP ^{1,4}	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 ³	Solid state half-cell	5 x 10 ⁻⁵ to 1.0 M 1.8 to 35,500 ppm	0 to 80 °C	✓	900200	900002 inner / 900003 outer	0.1 M NaCl / 941706 100 ppm Cl / 941707 1000 ppm Cl / 941708	940011 or 941709 / CISA
Chlorine (Cl ₂)	9770BNWP ¹	Solid state combination	1 x 10 ⁻⁷ to 3 x 10 ⁻⁴ M 0.01 to 20 ppm	0 to 50 °C		Included	None required	100 ppm as Cl ₂ / 977007	977010 / iodide reagent 977011 / acid reagent
Cupric (Cu ²⁺) ionplus Design*	9629BNWP ¹	ionplus sure-flow solid state combination	1 x 10 ⁻⁸ to 0.1 M 6.4 x 10 ⁻⁴ to 6350 ppm	0 to 80 °C		Included	900063	0.1 M Cu(NO ₃) ₂ / 942906	940011
Cupric (Cu ²⁺)	9429BN ² 9429SC ³	Solid state half-cell	1 x 10 ⁻⁸ to 0.1 M 6.4 x 10 ⁻⁴ to 6350 ppm	0 to 80 °C		900200	900002 inner / 900003 outer	0.1 M Cu(NO ₃) ₂ / 942906	940011
Cyanide (CN) ionplus Design*	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	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	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 0.5 ppm F w/TISAB II F40904 1 ppm F w/ TISAB II / 040906 2 ppm F w/ TISAB II / 040907 5.0 ppm F w/TISAB II F40905 10 ppm F w/ TISAB II / 040908 100 ppm F / 940907	940909 / TISAB II 940911 / TISAB III
Fluoride (F)	9409BN ² 9409SC ³	Solid state half-cell	1 x 10 ⁻⁶ M to saturated 0.02 ppm to saturated	0 to 80 °C	✓	900100	900001	0.1 M NaF / 940906 0.5 ppm F w/TISAB II F40904 1 ppm F w/ TISAB II / 040906 2 ppm F w/ TISAB II / 040907 5.0 ppm F w/TISAB II F40905 10 ppm F w/ TISAB II / 040908 100 ppm F / 940907	940909 / TISAB II 940911 / TISAB III

 Compliant with EPA testing method

* Indicates a Thermo Scientific Orion Ionplus Sure-Flow ISE

** Indicates a Thermo Scientific Orion ROSS ISE

Species	Cat. No.	Construction	Measurement range	Optimum temperature range		Required reference electrode	Reference filling solution	Calibration standards	Required ISA
Fluoroborate (BF ₄ ⁻)	9305BN ²	Plastic membrane half-cell	7 x 10 ⁻⁶ to 1.0 M 0.6 to 86,800 ppm	0 to 40 °C		900200	900002 inner / dilute ISA outer	Consult user guide	930711
Iodide (I ⁻) ionplus Design*	9653BNWP ¹	ionplus sure-flow solid state combination	5 x 10 ⁻⁸ to 1.0 M 5 x 10 ⁻³ to 127,000 ppm	0 to 80 °C		Included	900063	0.1 M NaI / 945306	940011
Iodide (I ⁻)	9453BN ² 9453SC ³	Solid state half-cell	5 x 10 ⁻⁸ to 1.0 M 5 x 10 ⁻³ to 127,000 ppm	0 to 80 °C		900200	900002 inner / 900003 outer	0.1 M Na / 945306	940011
Lead (Pb ²⁺) ionplus Design*	9682BNWP ¹	ionplus sure-flow solid state combination	1 x 10 ⁻⁶ to 0.1 M 0.2 to 20,700 ppm	0 to 80 °C		Included	900062	0.1 M Pb(ClO ₄) ₂ / 948206 0.1 M Na ₂ SO ₄ / 948207	Consult instruction manual
Lead (Pb ²⁺)	9482BN ² 9482SC ³	Solid state half-cell	1 x 10 ⁻⁶ to 0.1 M 0.2 to 20,700 ppm	0 to 80 °C		900200	900002 inner / 900003 outer	0.1 M Pb(ClO ₄) ₂ / 948206 0.1 M Na ₂ SO ₄ / 948207	Consult instruction manual
Nitrate (NO ₃ ⁻) ionplus Design*	9707BNWP ^{1,6}	ionplus sure-flow plastic membrane combination	7 x 10 ⁻⁶ to 1.0 M 0.1 to 14,000 ppm as N	0 to 40 °C	✓	Included	900046	0.1 M NaNO ₃ / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
Nitrate (NO ₃ ⁻)	9307BNWP ^{1,6}	Plastic membrane half-cell	7 x 10 ⁻⁶ to 1.0 M 0.1 to 14,000 ppm as N	0 to 40 °C	✓	900200	900002 inner / 900046 or ISA outer	0.1 M NaNO ₃ / 920706 1000 ppm N / 920707 100 ppm N / 930707	930711 or 930710 / nitrate ISS
Potassium (K ⁺) ionplus Design*	9719BNWP ¹	ionplus sure-flow plastic membrane combination	1 x 10 ⁻⁶ to 1.0 M 0.04 to 39,000 ppm	0 to 40 °C		Included	900065	0.1 M KCl / 921906	931911
Potassium (K ⁺)	9319BN ²	Plastic membrane half-cell	1 x 10 ⁻⁶ to 1.0 M 0.04 to 39,000 ppm	0 to 40 °C		900200	900002 inner / dilute ISA outer	0.1 M KCl / 921906	931911
Silver/Sulfide (Ag ⁺ /S ²⁻) ionplus Design*	9616BNWP ¹	ionplus sure-flow solid state combination	1 x 10 ⁻⁷ to 1.0 M 0.01 to 107,900 ppm as Ag ⁺ 0.003 to 32,100 ppm as S ²⁻	0 to 80 °C	✓	Included	900062 for Ag ⁺ /S ²⁻ 900067 for Ag ⁺ 900061 for S ²⁻	Consult user guide	940011 for Ag ⁺ 941609 for S ²⁻
Silver/Sulfide (Ag ⁺ /S ²⁻)	9416BN ²	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		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
Surfactant	9342BN ²	Plastic membrane half-cell	Endpoint indicator	0 to 40 °C		900200	900002 inner / 810007 outer	0.5 M Hyamine titrant / 654201	654203 / sample additive
Thiocyanate (SCN ⁻)	9458BN ²	Solid state half-cell	5 x 10 ⁻⁶ to 1.0 M 0.29 to 58,100 ppm	0 to 50 °C		900200	900002 inner / 900003 outer	Consult user guide	940011



Key Information

1 BNC Waterproof Connector 2 BNC Connector 3 Screw Cap Connector, requires separate cable
4 17 mm diameter 5 for hardness titrations 6 Three month module warranty

8 Module only, requires separate 93 series electrode handle (9300BNWP or 9300SC)

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

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

Review the below tables to find the compatible Thermo Scientific Orion Standard, Reagent, Strength Adjuster, or Solution for your Ion Selective Electrode based on the measurement species. All ISE standards are NIST traceable.

Cat. No.	Description
Ammonia	
951006	0.1 M NH ₄ Cl (1400 ppm as N) Ammonia, 475 mL
951007	1000 ppm Ammonia as Nitrogen (N) standard, 475 mL
951207	100 ppm Ammonia as Nitrogen (N) standard, 475 mL
951211	Ammonia Ionic Strength Adjuster (ISA) with pH-indicating blue dye, 475 mL
951210	Ammonia low level Ionic Strength Adjuster (ISA) with pH-indicating blue dye, 475 mL
951011	Ammonia Ionic Strength Adjuster (ISA), alkaline reagent without indicating dye, 475 mL
951213	Ammonia electrode storage solution, 475 mL
951209	Ammonia high perform electrode fill solution, 60 mL
951202	Ammonia standard electrode fill solution, 60 mL
Ammonium	
951007	1000 ppm Ammonium as Nitrogen (N) standard, 475 mL
900018-WA	Ammonium electrode fill solution, 5 x 60 mL
Bromide	
943506	0.1 M NaBr (7990 ppm as Br) Bromide standard, 475 mL
940011	Bromide Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Bromide electrode, 5 x 60 mL
Cadmium	
940011	Cadmium Ionic Strength Adjuster (ISA), 475 mL
900061	Optimum results A fill solution for Cadmium electrode, 5 x 60 mL
Calcium	
922006	0.1 M CaCl ₂ (4000 ppm as Ca) Calcium standard, 475 mL
923206	100 ppm as CaCO ₃ Calcium standard, 475 mL
932011	Calcium Ionic Strength Adjuster (ISA), 475 mL
900061	Optimum results A fill solution for Calcium electrode, 5 x 60 mL
700012	1000 ppm as CaCO ₃ , calcium hardness and alkalinity standard, 475 mL
Carbon Dioxide	
950206	0.1 M NaHCO ₃ (4400 ppm as C) Dioxide standard, 475 mL
950207	1000 ppm as CaCO ₃ Carbon Dioxide standard, 475 mL
950210	Carbon Dioxide Ionic Strength Adjuster (ISA), 475 mL
950202	Carbon Dioxide electrode fill solution, 60 mL
Chloride	
941706	0.1 M NaCl (3550 ppm as Cl) Chloride standard, 475 mL
941708	1000 ppm Chloride standard, 475 mL
941707	100 ppm Chloride standard, 475 mL
940011	Chloride Ionic Strength Adjuster (ISA), 475 mL
941709	Chloride Complexation Ionic Strength Adjuster (CISA) reagent pack, 2 x 1 L
900062	Optimum results B fill solution for Chloride electrode, 5 x 60 mL
900017	Chloride electrode fill solution, 5 x 60 mL

Cat. No.	Description
Ammonia, Standard and High Performance	
977007	100 ppm as Cl ₂ Residual Chlorine standard, 475 mL
977011	Residual Chlorine acid reagent, 475 mL
977010	Residual Chlorine iodide reagent, 5 x 50 mL
Cupric (Copper)	
942906	0.1 M Cu(NO ₃) ₂ (6350 ppm as Cu) Cupric (copper) standard, 475 mL
940011	Cupric Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Cupric electrode, 5 x 60 mL
Cyanide	
951011	Alkaline reagent, 10 N NaOH, 475 mL
900062	Optimum results B fill solution for Cyanide electrode, 5 x 60 mL
Fluoride	
940906	0.1 M NaF (1900 ppm as F) Fluoride standard, 475 mL
F40904	0.5 ppm Fluoride STD W/TISAB II colorless, 475ml
F40905	5.0 ppm Fluoride STD W/TISAB II orange, 475ml
940907	100 ppm Fluoride standard, 475 mL
40908	10 ppm Fluoride standard premixed with TISAB II, color coded blue, 475 mL
40907	2 ppm Fluoride standard premixed with TISAB II, color coded red, 475 mL
40906	1 ppm Fluoride standard premixed with TISAB II, color coded green, 475 mL
940916	Fluoride standard bulk pack – 4 x 475 mL each of 1 ppm Fluoride standard premixed with TISAB II (040906) and 10 ppm Fluoride standard premixed with TISAB II (040908)
940909	TISAB II for Fluoride ISE, 1 gallon
F940914	Bulk pack (4 each of 0.5 & 5.0 pp, W/TISAB)
940999	TISAB II for Fluoride ISE, 4 x 1 gallon
940911	TISAB III (concentrated) for Fluoride ISE, 475 mL
900061	Optimum results A fill solution for Fluoride electrode, 5 x 60 mL
Fluoroborate	
930711	Fluoroborate Ionic Strength Adjuster (ISA), 475 mL
Iodide	
945306	0.1 M NaI (12,700 ppm as I) Iodide standard, 475 mL
940011	Iodide Ionic Strength Adjuster (ISA), 475 mL
900063	Optimum results D fill solution for Iodide electrode, 5 x 60 mL
Lead	
948206	0.1 M Pb(ClO ₄) ₂ (20,700 ppm as Pb) Lead standard, 475 mL
900062	Optimum results B fill solution for Lead electrode, 5 x 60 mL
Nitrate	
920706	0.1 M NaNO ₃ (1400 as N) Nitrate standard, 475 mL
920707	1000 ppm Nitrate as Nitrogen (N) standard, 475 mL
930707	100 ppm Nitrate as Nitrogen (N) standard, 475 mL
930711	Nitrate Ionic Strength Adjuster (ISA), 475 mL
930710	Nitrate Interference Suppressor Solution (NISS), 475 mL
900046	Optimum results F fill solution for Nitrate electrode, 5 x 60 mL

Cat. No.	Description
Nitrite	
900046	Optimum results F fill solution for Nitrite electrode, 5 x 60 mL
Nitrogen Oxide	
956410	Nitrogen Oxide acid buffer, 475 mL
Perchlorate	
930711	Perchlorate Ionic Strength Adjuster (ISA), 475 mL
Potassium	
921906	0.1 M KCl (3900 ppm as K) Potassium standard, 475 mL
931911	Potassium Ionic Strength Adjuster (ISA), 475 mL
900065	Optimum results E fill solution for Potassium electrode, 5 x 60 mL
Silver	
940011	Silver Ionic Strength Adjuster (ISA), 475 mL
900062	Optimum results B fill solution for Silver/Sulfide electrode, 5 x 60 mL
900067	Optimum results C fill solution for Silver electrode (when sample temperatures vary), 5 x 60 mL
Sodium	
941706	0.1 M NaCl (2300 ppm as Na) Sodium standard, 475 mL
841108	1000 ppm Sodium standard, 475 mL
941107	100 ppm Sodium standard, 475 mL
941105	10 ppm Sodium standard, 475 mL
841111	Sodium Ionic Strength Adjuster (ISA), 475 mL
841113	Sodium electrode reconditioning solution, 475 mL
841101	Sodium electrode storage solution, 475 mL
650700	Sodium KAP analysis kit – 3 x 475 mL of 1 M NaCl with ISA and 475 mL of Sodium ISA (841111)
841109	Sodium KAP standard, 1000 ppm with ISA, 475 mL
900010	Sodium electrode fill solution, 5 x 60 mL
900012	Sodium electrode (low level) fill solution, 5 x 60 mL
900004	Sodium micro electrode fill solution, 5 x 60 mL

Cat. No.	Description
Sulfate	
948207	0.1 M Na ₂ SO ₄ (9600 ppm as SO ₄) Sulfate standard for lead electrode, 475 mL
Sulfide	
941609	Sulfide SAOB reagent pack, 4 x 475 mL
900061	Optimum results A fill solution for Sulfide electrode (when sample temperatures vary), 5 x 60 mL
900062	Optimum results B fill solution for Silver/Sulfide electrode, 5 x 60 mL
Surfactant	
654202	Anionic Surfactant standard, 0.01M SLS, 1 x 60 mL
654201	Anionic Surfactant titrant, 0.05M Hyamine, 475 mL
654205	Non-ionic Surfactant titrant, 0.02m Sodium Tetraphenyl Borate, 475 mL
654203	Surfactant sample additive, tritonX-100, 475 mL
810007	Surfactant electrode fill solution, 5 x 60 mL
Thiocyanate	
940011	Thiocyanate Ionic Strength Adjuster (ISA), 475 mL
Water Hardness	
922006	0.1 M CaCl ₂ (10,000 ppm as CaCO ₃) Water Hardness standard, 475 mL
923206	100 ppm as CaCO ₃ Water Hardness standard, 475 mL
700012	1000 ppm as CaCO ₃ Alkalinity and Water Hardness standard, 475 mL



ISE Accessories

Ordering Information for membranes, modules, and more compatible with Orion ISEs

Cat. No.	Description
951214	20 loose membranes
Ammonia, High Performance (9512HPBNWP)	
951214	20 loose membranes
951215	3 pre-assembled bodies and membrane caps
Ammonia, Standard (9512BNWP)	
951204	20 loose membranes
951205	3 bonded membranes
Carbon Dioxide (9502BNWP)	
950204	4 membranes with o-rings
97 Series Plastic Membrane Calcium, Nitrate and Potassium Combination Electrode Accessories	
9700BNWP	97 series electrode body with waterproof BNC connection
972001	Replacement module for calcium combination electrode (9720BNWP)
970701	Replacement module for nitrate combination electrode (9707BNWP)*
971901	Replacement module for potassium combination electrode (9719BNWP)
93 Series Plastic Membrane Ammonium, Calcium, Chloride, Fluoroborate, HF Resistant pH, Nitrate, Perchlorate, Potassium and Water Hardness Half-Cell Electrode Accessories	
9300BNWP	93 series electrode body with waterproof BNC connection
900100	Single junction reference electrode with pin tip connection
900200	Double junction reference electrode with pin tip connection
931801	Replacement module for ammonium half-cell electrode
932001	Replacement module for calcium half-cell electrode (9320BN)
930501	Replacement module for fluoroborate half-cell electrode (9305BN)
930702	Replacement module for nitrate half-cell electrode (9307BNWP)
930701	Replacement modules (3) for nitrate half-cell electrode (9307BNWP)
931901	Replacement module for potassium half-cell electrode (9319BN)

*Indicates 3-month warranty



Thermo Scientific Orion storage sleeve and base

If you ever have had an electrode drop on a lab bench and break you will want to use the storage sleeve and base, 810017.

Features and benefits

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



A small red square icon with a white diagonal line running from the top-left to the bottom-right.

Learn more at thermofisher.com/ise

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