Thermo Scientific Orion Ion Selective Electrodes

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

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

Efficient and Economical

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

Measurement Techniques

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

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

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

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

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

Half Cell Ion Selective Electrodes

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

Combination Ion Selective Electrodes

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

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

Various ISE Applications

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

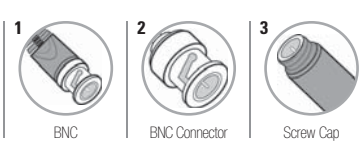
Thermo Scientific Orion Ion Selective Electrode Selection Guide

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

EPA Compliant with EPA testing method

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

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



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

Thermo Scientific Orion Fluoride Ion Selective Electrodes

The standard in fluoride ion analysis – EPA compliant

Approved ASTM Method for Fluoride in Drinking Water and Wastewater

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

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

Other Applications for Fluoride Electrodes

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

Accessories and Solutions

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

Convenient combination with reference

Combination fluoride ISE with Sure-Flow reference

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

Half cell reference design provides flexibility

Half cells – Fluoride ISE and Sure-Flow™ reference

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

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

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

Thermo Scientific Orion Ammonia Ion Selective Electrodes

Compliant with EPA testing methods

EPA Approved ASTM D1426 Method for Ammonia in Wastewater

Measurements are quick, simple, accurate and economical.

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

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

Other Applications for Ammonia Electrodes

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

Accessories and Solutions

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

High performance ammonia electrode

BEST

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

Standard ammonia electrode

BETTER

Provides reliable results at mid to high ammonia levels

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

HP Electrode

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

Standard Electrode

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

BNC Waterproof

Thermo Scientific Orion Nitrate Ion Selective Electrodes

Compliant with EPA testing methods

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

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

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

Other Applications for Nitrate Electrodes

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

Accessories and Solutions

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

Convenient combination electrode with replaceable module

Combination nitrate ISE with Sure-Flow™ reference

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

Half cell reference design provides flexibility

Half cells – Nitrate ISE and Sure-Flow™ reference

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

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

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


BNC Waterproof


Pin Tip

Thermo Scientific Orion Chloride Ion Selective Electrodes

Compliant with EPA testing methods

Approved ASTM Method for Chloride in Wastewater

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

Other Applications for Chloride Electrodes

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

Accessories and Solutions

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

Convenient combination with Sure-Flow reference

Combination chloride ISE with Sure-Flow® reference

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

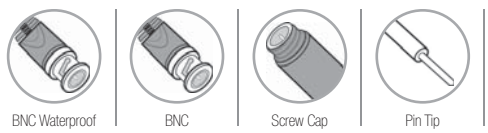
Half cell reference design provides flexibility

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

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

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

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



Thermo Scientific Orion ROSS® Sodium Ion Selective Electrodes

ROSS Fast Response and Stability

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

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

Applications for Sodium Electrodes

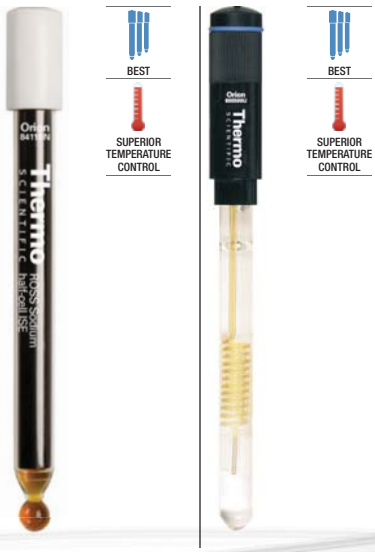
The sodium electrode is commonly used to measure samples such as food, beverages and animal feed.

Accessories and Solutions

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

Convenient combination with Sure-Flow reference

Half cell reference design provides flexibility with choice of ROSS references



Combination Ross Sodium ISE with Sure-Flow® reference

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

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

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

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

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


BNC Waterproof


BNC


Pin Tip

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

All ISE Standards are NIST traceable

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

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

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

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

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

ISE Accessories, Membranes and Modules

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

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