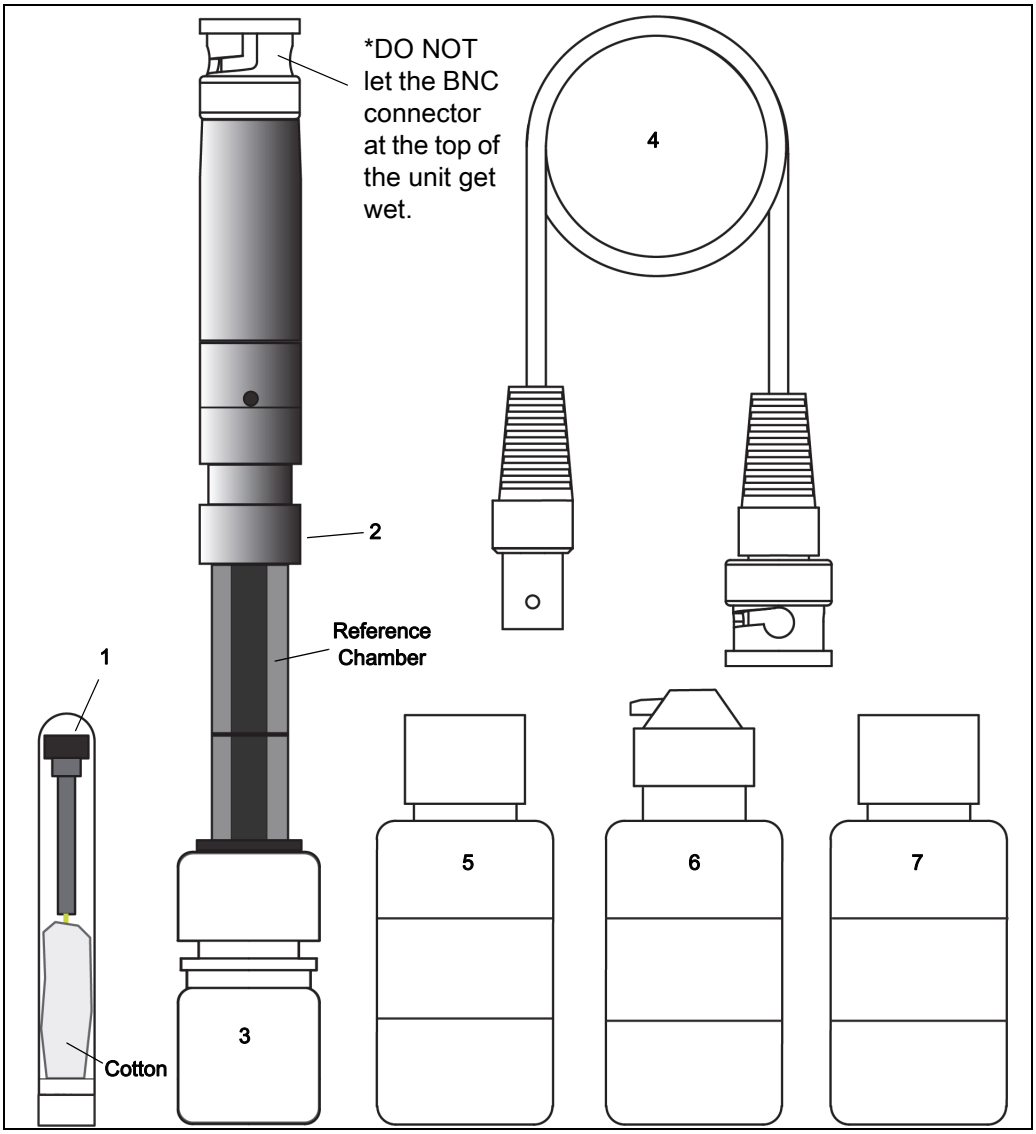
Nitrate ISE Probe

PS-3521



Included Equipment	Item	Included Equipment	Item
Nitrate ISE Replacement Module	1	Nitrate Standard Solution 1000 ppm	5
Nitrate ISE (Cl^-) Probe	2	Nitrate Reference Fill Solution	6
Storage Bottle	3	Nitrate Ionic Strength Adjuster (ISA)	7
BNC Male-to-Female Cable	4		

Introduction

This Nitrate Ion Selective Electrode (ISE) Probe is a combination electrode that includes both reference and sensing half cells in one body housing. It is used for measuring nitrate ion (NO_3^+) activity in aqueous samples.

Technology: Replaceable Polymer/PVC Membrane (Nitrate ISE Replacement Module PS-3552)

Overview

Size and Material	Body (Epoxy): 12 mm OD x 155 mm Length Cap (ABS): 16 mm OD x 57 mm Length
Reference	Double-junction Ag/AgCl, ceramic pin junction, refillable, sodium chloride electrolyte
Features	Replaceable Sensor Module
Range	0.4 to 62,000 mg/L
Reproducibility	±2%
Slope	-54 to -59 mV/decade @ 25°C typical
pH Range	2.5 to 11
Operating Temperature	0 to 50°C
Interferences	ClO_4^-, ClO_3^-, I^-, F^-
Application/Notes	Very popular for environmental, industrial, agriculture, food/beverage

Required Equipment

- PASCO Wireless pH/ISE/ORP Sensor (PS-3204)

  or

- PASPORT High Precision pH/Temperature with ISE/ORP Amplifier (PS-2107) with a PASCO interface (see www.pasco.com for information)

  or

- Ion meter or pH/mV meter
- PASCO data collection software (see www.pasco.com)
- Wash bottle filled with distilled or de-ionized water
- Lab wipes
- Pipettes: 1 mL, 10 mL and 100 mL
- Clean beakers*

*SE-7287 100 ml Beakers (12 pack) or SE-7288 1000 ml Beakers (6 pack)

Included Required Solutions*

- Reference Fill Solution
- 1000 ppm Nitrate Standard Solution
- Ionic Strength Adjuster (ISE)

(*SC-3536 Nitrate ISE Solutions)

Electrode Preparation

Replace the Module Blank

This electrode performs better when the reference junction is kept wetted during transit and storage. However, the sensor module is best stored and transported dry. Therefore, the electrode is shipped with a plastic Module Blank inside that must be removed prior to use.

1. Unscrew the cap of the storage solution bottle (also known as “Soaker Bottle”) and remove the electrode. Unscrew the plastic Module Blank from the end of the electrode. Replace the blank with the included Nitrate ISE Replacement Module.

- The Module Blank can be retained for long term storage.
- **Caution: Do not touch the PVC sensor membrane on the end of the Nitrate ISE Replacement Module with your fingers.**

2. Thoroughly rinse the electrode with distilled water. Wipe carefully with a clean lab wipe.
3. Return the electrode to the storage bottle when it is not in use.

Fill the Electrode with Electrolyte

The reference (outer) chamber must be filled with Reference Fill Solution and remain open during testing:

1. Slide the sleeve of the electrode FastFil cap down to uncover the fill hole. (see fig. 1)

2. Shake the electrode downward like a thermometer to remove any air bubbles trapped inside.

- The surface of the Reference Fill Solution in the reference chamber must be above the inner junction. This is approximately 3" from the electrode tip.

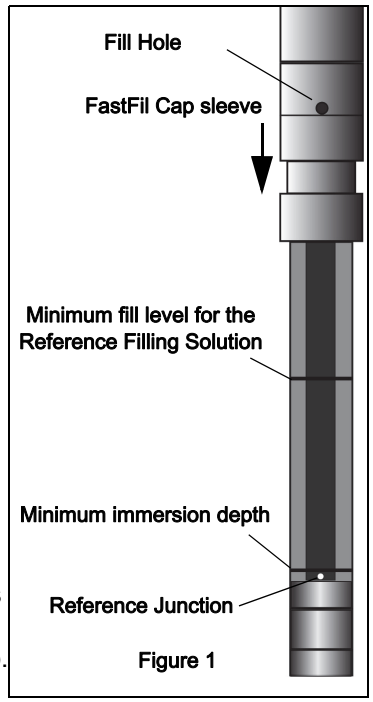


Figure 1

3. Rinse the electrode with DI water, blot dry. Do not rub dry.

4. Soak the electrode in DI water for 10 minutes, then in a diluted Nitrate Standard Solution for two hours prior to calibration or use.

Software Help

See the SPARKvue Help or PASCO Capstone Help for information about collecting, displaying, and analyzing data.

- In SPARKvue, select the HELP button in any screen including the Home Screen.

- In PASCO Capstone, select PASCO Capstone Help from the Help menu, or press F1.

Checking Electrode Operation (Slope)

1. Connect your electrode to the input connector on the Wireless pH /ISE/ORP Sensor (or other measuring device). Place 100 mL of DI water into a 150 mL beaker. Add 2 ml Nitrate ISA to the DI water and stir throughly.

2. Rinse the electrode with DI water, blot dry, and place in the beaker with the prepared solution.

3. Pipet 1 mL of 1000 ppm Nitrate Standard Solution into the beaker. Stir thoroughly, then record the potential (E_1) in mV when a stable reading is displayed.

4. Pipet 10 mL of the same standard solution into the beaker. Stir thoroughly. When a stable reading is displayed, record the potential (E_2) in mV.

5. The difference between the first and second potential readings, (E_2-E_1), is defined as the electrode slope. The normal range for the slope is -56±4 mV at 25°C.

Troubleshooting

If the electrode slope is not within the normal range, the following procedure may restore the electrode.

1. Soak the electrode in a diluted standard solution for 2 hours before use.

2. Repeat "Checking Electrode Operation" procedure again. **Note**: All standard solutions should be prepared fresh. For best performance use ISA in all solutions.

Periodically check the Reference Fill Solution level in the reference chamber of the electrode. The solution level must be higher than the inner junction which is visible as a white ceramic pin on the inner body.

If the electrode slope is still outside the normal range after this procedure, you must replace the sensing module.

Reading a Sample with the Electrode

Various procedures may be used to determine the concentration of a sample. The most common is the Direct Calibration method, which is described below. Contact PASCO's Technical Support department for details of other methods.

In Direct Calibration a series of standard solutions of differing concentrations is used to calibrate the electrode. Then each sample requires only a single measurement device reading, which is compared with the calibration readings to obtain the sample concentration. ISA is added to all solutions to ensure the samples and the standards have the same ionic strength.

Set up:

1. Prepare the electrode as described in "Electrode Preparation" and "Checking Electrode Operation". Connect the electrode to the sensor or measuring device.

2. Prepare two standard solutions that differ in concentration by a factor of ten and bracket the

expected sample concentration range. For example, if your expected sample concentration is 5 mg/L Calcium, you should use a 1 mg/L low Standard Solution and a 10 mg/L high Standard Solution.

- NOTE: Temperature compensation is not typical of ISE measurements - for best performance, try to ensure that the standards are within 5 to 10°C of the sample.

Measurement:

If using a measuring devicewith direct concentration reading capability see the software on-line help or the measuring device's instruction manual for specific information:

1. Place 100 mL of the low standard into a 150 mL beaker. Add 2 mL of ISA. Stir thoroughly.
2. Rinse electrode with DI water, blot dry and place in the beaker. Wait for a stable reading, and then adjust the measuring device to display the value of the standard. Refer to the software on-line help or the measuring device's instruction manual for the adjustment procedure.
3. Measure 100 mL of the high standard into a second 150 mL beaker. Add 2 mL of ISA and stir.
4. Rinse electrode with DI water, blot dry and place in the second beaker. Wait for a stable reading, and then adjust the measuring device to display the value of the second standard.
5. Pipette 100 mL of sample into a 150 mL beaker. Add 2 mL of ISA. Stir thoroughly.
6. Rinse electrode with DI water, blot dry and place in the sample beaker. Wait for a stable reading and the sample concentration will be displayed on the measuring device.
7. Determine the sample concentration using the data analysis tools in the software.

Electrode Storage

Short Term (over night or the weekend):

Rinse the electrode thoroughly with DI water and place the tip in a diluted standard solution between measurements. Slide the FastFil sleeve upward to close the fill hole.

Refill the reference before putting the electrode back into service

Long Term

Refill the electrode with Reference Filling Solution and close the fill hole. Remove the sensing element and store in the glass vial or replace the cap to protect the sensing element.

Follow procedures in "Electrode Preparation" and "Checking Electrode Operation" before using the electrode again.

Electrode Cleaning

Cleaning should only be attempted if troubleshooting methods fail. The PVC membrane is a delicate sensor and should not be brushed or otherwise contacted. It can be rinsed vigorously under warm water to remove debris. Soaking for 10-15 minutes in DI water might be useful in extracting other contaminants.

Recondition the electrode by soaking in a low standard solution immediately after any cleaning method.

Replacement Items

- SC-3527 Nitrate ISE Solutions: 60 mL Standard Solution, 30 mL Reference Fill Solution, 30 mL ISA Solution
- PS-3552 Nitrate ISE Replacement Module

Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific
10101 Foothills Blvd.
Roseville, CA 95747-7100

Phone: 916-462-8384 (worldwide)
800-772-8700 (U.S)

Email: techsupp@pasco.com

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Product End of Life Disposal Instructions:

This electronic product is subject to disposal and recycling regulations that vary by country and region. It is your responsibility to recycle your electronic equipment per your local environmental laws and regulations to ensure that it will be recycled in a manner that protects human health and the environment. To find out where you can drop off your waste equipment for recycling, please contact your local waste recycle/disposal service, or the place where you purchased the product.

The European Union WEEE (Waste Electronic and Electrical Equipment) symbol (to the right) and on the product or its packaging indicates that this product must not be disposed of in a standard waste container.