



AMMONIA GAS SENSING ION SELECTIVE ELECTRODES (ISE)



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AMMONIA GAS-SENSING ELECTRODE QUICK START INSTRUCTIONS

Required Equipment & Solutions

1. An Ion Meter.
2. Deionized or Distilled water for standard preparation.
3. Ammonia Gas Sensing Electrode #NH3I501-XXXX (supplied in electrode box).
4. Ammonia Membranes (10 supplied in electrode box).
5. Ammonia Electrode Filling Solution, (30ml supplied in electrode box).
6. Ammonia Standard, 1000 ppm NH₃.
7. Ammonia Ionic Strength Adjuster (ISA) Solution, 500ml, 10 M NaOH.
8. Tweezers (supplied in electrode box).
9. Plastic syringe (supplied in electrode box).
10. Pipets for preparing standards and samples.

Ammonia Accessories

Internal Fill Solution	ISA Solution 475ml	1000ppm Standard 475ml
NH3IF01	10 M NaOH	NH3AS02

Electrode Preparation

Remove the black shipping cap from the bottom of the electrode. Before using, grasp the black outer body with one hand and unscrew the cap at the top of the electrode with the other hand. Remove the inner pH glass electrode from the outer body. Rinse the glass electrode with deionized water to remove any KCl crystals.

Fill the outer body with 2 to 3 ml of Electrode Filling Solution using the plastic syringe provided. **While holding the black outer body steady**, insert the inner glass electrode back into the outer black body, and screw on the large cap until finger tight.

Note: Twisting of the black outer body after the glass inner body is inserted could result in the membrane being damaged. Be sure to screw the cap onto the body instead of screwing the body into the cap.

Checking Membrane

A hole of any size in the white Teflon membrane or breakage of the membrane will cause failure of the electrode. It is recommended to check the membrane on every newly assembled electrode.

Measuring Hints

1. Samples should be measured immediately after collection. Samples should be stored in sealed containers if immediate measurement is not possible.
2. Beakers containing the samples or the standards should be kept covered between measurements.
3. The ISA should be added just before measurement.
4. All samples and standards should be at the same temperature for precise measurement, preferably 25°C. A difference of 1°C in temperature will result in approximately a 2% error.
5. Always rinse the electrode with distilled water and blot dry between measurements. Use a clean, dry tissue to prevent cross contamination. Do not wipe or rub the sensing membrane.
6. Constant, but not violent, stirring is necessary for accurate measurement.
7. Always check to see that the membrane is free from air bubbles after immersion into a standard or sample. Agitate the electrode gently to remove air bubbles.
8. Use fresh standards for calibration.
9. Re-calibrate every few hours for routine measurement.
10. All samples and standards must be aqueous. They must not contain organic solvents.

Measurement using an Ion Meter (in the concentration mode)

1. Connect the electrode to the meter.
2. By serial dilution of the 1000 ppm standard, prepare two standards whose concentration is near the expected sample concentration. For example, to make a 100 ppm standard, pipet 10 ml of the 1000 ppm standard into a 100 ml volumetric flask and dilute to volume with deionized water. Next to make a 10 ppm standard, pipet 10 ml of the newly-made 100 ppm standard into a 100 ml volumetric flask and dilute to volume with deionized water. A 1 ppm standard is made by further dilution of the 10 ppm standard. Measure out 100 ml of each standard into individual 150 ml beakers.
3. Assure that the meter is in the concentration mode and set for a 2-point calibration.
4. Lower the electrode tip into the least concentrated solution. Begin stirring at a constant rate. Add 2ml of ISA to the solution and continue stirring.
5. After 1 minute, fix the value in the memory according to the meter manufacturer's calibration instructions.
6. Rinse the electrode tip with distilled water and blot dry.
7. Lower the electrode tip into the more concentrated solution. Begin stirring at a constant rate. Add 2ml of ISA to the solution and continue stirring.
8. After 1 minute, fix the value in the memory according to the meter manufacturer's calibration instructions.
9. Add 100 ml of the sample and 2 ml of ISA into a 150 ml beaker. Lower the electrode tip into the solution. Begin stirring at a constant rate.
10. After 1 minute, read the concentration directly from the meter display.
11. The electrode should be re-calibrated every 2-3 hours. Simply repeat Steps 2-7 above.

Interferences

Electrode drift and slow response could indicate the presence of high interferences. See **SPECIFICATIONS**. Soak the electrode in deionized water for five minutes, then soak for five minutes in 100 ppm standard solution, with ISA added, to restore proper response.

Temperature Influences

Samples and standards should be at the same temperature, since electrode readings are influenced by changes in temperature. The electrode can be used at temperatures from 0° - 50°C. Room temperature measurements are recommended, since measurements at temperatures quite different from room temperature may require equilibrium times up to one hour.

Electrode Response

The electrode response time, varies from one minute for solution concentrations greater than 10 ppm to several minutes for solution concentration less than 10 ppm.

pH Effects

The electrode has a specific pH range in order for it to work properly. Use at other pH values will lower the Ammonia concentration present in solution. See **SPECIFICATIONS**.

Electrode Life

The electrode should last one year in normal laboratory use. On-line measurement might shorten operational lifetime. In time, the response time will lengthen and the calibration slope will decrease to the point calibration is difficult and membrane replacement is required. See **CHANGING MEMBRANE**.

Electrode Storage

The electrode may be stored in 10 ppm standard for short periods of time. For storage more than two weeks, the outer black plastic body should be drained of Electrode Filling Solution, See **ELECTRODE PREPARATION**.

TROUBLESHOOTING

Remember to remove the black protective shipping cap on the bottom of the electrode and fill the outer body with internal fill solution.

Out of Range Reading

- Defective meterCheck meter with shorting strap (see meter instruction manual)
- Electrode not plugged in properlyUnplug electrode from meter and reseat
- Electrode outer body not filledFill black outer body as instructed in **ELECTRODE PREPARATION**
- Air bubbles on membraneRemove air bubble by re-dipping electrode
- Electrode not in solutionPut electrode in solution

Low Slope or No Slope

- Standards contaminated orPrepare fresh standards incorrectly made
- Air bubble on membraneRemove air bubble by re-dipping electrode
- Electrode exposed to interferencesSoak electrode in deionized water for 5 minutes and repeat calibration
- Defective electrodeFollow instructions closely as outlined in “**Changing Membrane**”

Drift (reading changing in one direction)

- Samples and standards at differentAllow sample and standards to come to the same temperature before temperatures measurement
- Electrode exposed to interferencesSoak electrode in deionized water for 5 minutes and repeat calibration
- Incorrect pHAdjust to correct pH with ISA

Noisy or Unstable Readings (readings randomly changing)

- Defective meterCheck meter with shorting strap (see meter instruction manual)
- Air bubble on membraneRemove air bubble by re-dipping electrode
- Meter or stirrer not groundedGround meter or stirrer
- Electrode exposed to interferencesSoak electrode in deionized water for 5 minutes and repeat calibration
- Defective electrodeFollow instructions closely as outlined in “**Changing Membrane**”

Changing Membrane

1. Grasp the black outer body with one hand. Unscrew the cap at the top of the electrode with the other hand. Remove the inner pH glass body from the epoxy outer body. Carefully place the glass body aside.
2. Unscrew the bottom cap from the outer body. Remove the old white Teflon membrane from around the threads and electrode tip opening.
3. Using the tweezers provided, grab a new piece of white membrane material by the edge and remove from the separator paper. Then, with the other hand, hold the electrode body. Place one edge of the membrane against the threads and hold in place with your thumb. Place the new membrane lengthwise across the electrode opening so that it smoothly covers the opening. Place the other edge of the membrane against the threads and hold in place with your forefinger.
4. Place the bottom cap gently over the membrane onto the threads and screw the bottom cap on until fingertight. Check that the membrane is free of wrinkles and holes or else repeat the above steps.
5. Using the syringe provided, fill the outer body with approximately 2-3ml of Electrode Filling Solution.
6. While holding the black outer body, insert glass inner body into black outer body containing the electrode filling solution and screw on the upper cap until finger tight.

Note: Twisting of the black outer body after the glass inner body is inserted could result in the membrane being damaged. Be sure to screw the cap onto the body instead of screwing the body into the cap.

SPECIFICATIONS

Ion	Concentration Range (mol/L)	Concentration Range (ppm)	Interferences	pH Range	Slope (mV) 10-100ppm
Ammonia NH ₃	5 x 10 ⁻⁷ to 1 M	0.01 to 17,000	Volatile amines	above 11	53 - 59

Custom designs are available upon request please contact our Customer Service department at info@alpha-measure.com