the electrode by rubbing the glass face against the disc in a circular motion (10-20 cycles). Rinse with distilled water, pat dry, and place new membrane filled with electrolyte onto electrode.

When using the electrode in solutions containing protein, the electrode should be soaked in an enzyme cleaning solution such as Terg-a-zyme, by Alconox Inc, or a chromic/sulfuric acid glass cleaning solution after each use for a few minutes to remove the protein from the glass and the reference junction. This will prolong the useful life of the electrode.

Storing: Always clean and rinse the electrode before storing.

Long-term (over 1 week): Remove the membrane housing from the electrode. Rinse the internal electrode with distilled water and pat dry. Place a new, unfilled membrane housing over the internal electrode and attach loosely (do not seat completely). This membrane will keep the dust off the electrode tip.

Short-term: The sensing tip of the electrode, with membrane housing still attached, can be left soaking in a small amount of the 740 electrolyte. Because of the high water vapor transport rate of the membrane, storing of the assembled electrode in air overnight will cause the membrane housing to dry out completely.

Troubleshooting

A. *Little or No Response*

1. Inspect the electrode for visible cracks (usually occurring around the tip of the electrode). If any exist, the electrode cannot be repaired and must be replaced.
2. Inspect electrolyte level for sufficient amount. If low, remove and replace membrane housing with a new one, filled with electrolyte.

B. *Sluggish Response*

If the electrode becomes sluggish in responding to changes in ammonia levels, do the following, re-testing after each step (when readings normalize, no further action is required):

1. Replace the membrane housing with a new one.
2. Clean the glass face of electrode as described earlier.
3. Check electrode slope and response time as a pH electrode

To test the internal pH electrode, the following procedure must be used:

1. Add 5.84 g of NaCl to 100 ml of pH 4 buffer. Also add 5.84 g of NaCl to 100 ml of pH 7 buffer.
2. Remove membrane housing and rinse the internal electrode with distilled water and dab dry.
3. Connect the electrode into the modified pH 7 buffer far enough to cover the Ag-AgCl coating of the electrode. Record the millivolt value after a stable reading is obtained. The reading will normally be in the -50 mv to -100 mv range.
4. Rinse the electrode with distilled water and place it into the modified pH 4 buffer. Record the millivolt reading. The reading will normally be in the 50 mv to 150 mv range.
5. Alternate between the buffers several times to determine response time.
6. The millivolt difference between the two buffers must be a minimum of 150 mv. The response time should be in the 30 to 60 second range. If the electrode meets these two tests, then continue with the following steps. If not, please call our Customer Service Department.
7. Rinse the electrode thoroughly with distilled water and pat dry (do not wipe).
8. Assemble with new membrane.

Sample Handling

The electrode measures dissolved ammonia gas. Therefore, handling of the sample is critical for accurate measurement. Samples should be measured immediately after collection and treatment with the 10 N NaOH to minimize exposure of the sample to room air. When samples need to be stored for a time before measurement, acidify the sample to a pH of 5 or 6. When ready for measuring, then add several drops of the 10 n NaOH supplied to adjust the pH to 11 or 12 to convert the ammonium ion to dissolved ammonia gas.

For additional assistance, call our Customer Service Department at 1-(603) 668-0692.

For Faster Service When Calling!

Please have the following information available:

1. Model Number of the electrode (Ex. MI-740)
2. Serial Number (located on green sleeve on the electrode cable).
3. Millivolt readings of the electrode in treated 0.1 n NH_4Cl, 0.01 N NH_4Cl, and 0.001 n NH_4Cl

Microelectrodes, Inc.

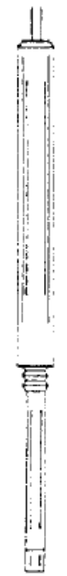
40 Harvey Road

Bedford, NH 03110-6805 USA

Tel 1-(603)-668-0692 Fax 1-(603)-668-7926

NH_3

MI-740
Operating Instructions



Microelectrodes, Inc.

40 Harvey Road

Bedford, NH 03110-6805 USA

Tel 1-(603)-668-0692 Fax 1-(603)-668-7926

Website: www.Microelectrodes.com

Email: Info@Microelectrodes.com

MI-740 Micro-Ammonia Electrode Operating Instructions

Contents

The MI-740 Electrode Kit contains the following:

1	Ammonia Electrode w/ Membrane Housing
6	Replacement Membrane Housings
1	Bottle of Electrolyte
1	Bottle of 10 N NaOH
1	Bulb Pipette
1	Set of Instructions
5	Polishing Pads

Specifications:

Concentration Range (M)	10^{-6} to 1
Concentration Range (ppm)	0.04 to 40,000
Temperature Range	0°C to 50°C
Interferences	Volatile Amines

Electrode Assembly and Preparation

1. Remove the acrylic housing from the Ammonia electrode by unscrewing the housing from the electrode body. This housing, with affixed teflon membrane, does not contain the necessary 740 electrolyte solution.
2. Add 740 Electrolyte solution to the acrylic housing. This is done by first filling the included Bulb Pipette with electrolyte. Then, the electrolyte solution is added to the housing to a minimum height of 6 mm by gently placing the bubble-free end of the filling tip against the teflon membrane surface and releasing electrolyte to the minimum height. To ensure that no air bubbles are trapped in the solution, shake the housing in short, vigerous, and abrupt motions while grasping the threaded end of the housing.
3. Connect the housing to the Ammonia electrode, being careful not to trap air bubbles near the electrode tip. Screw the housing clockwise into the body of the electrode until it stops. Check the tip of the electrode for proper seating of the housing against the electrode. The electrode is properly seated if the electrode protrudes slightly beyond the end of the housing.

Calibration

Calibration of the electrode requires the use of ammonium chloride standards that bracket the concentrations range expected in your samples. A working calibration curve must be constructed using semilog graph paper. *NOTE: Following the calibration procedure is an example of a working calibration curve.*

Meter requirement: Any research-grade pH meter with millivolt mode capability. Set meter to millivolt mode.

The MI-740 is standardized using ammonium chloride (NH_4Cl) solutions. A 55 mv difference (approximate) will occur between each tenfold change in concentration. *For example, test in 0.0001 N NH_4Cl, 0.001 N NH_4Cl, 0.01 N NH_4Cl, and 0.1 N NH_4Cl.*

A. Calibration for Liquid Samples

The use of 1 dram vials is probably the simplest way to calibrate the MI-740 Micro-Ammonia Electrode.

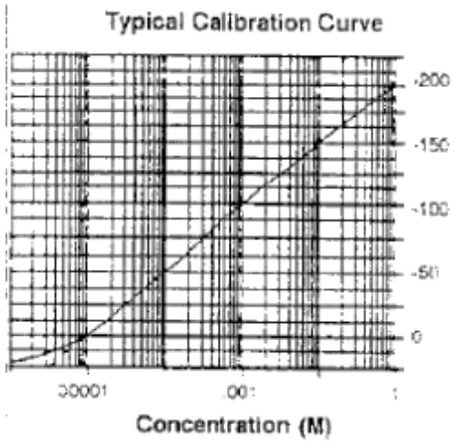
1. Fill each of four vials to the neck of the bottle with ammonium chloride solutions listed above and label the vials (Ex. 0.0001, 0.001, 0.01, etc.).
2. Place 2 to 3 drops of the 10 N NaOH in the first vial. Cap the vial immediately and shake vigorously for a few seconds. Do the same for each remaining vial.
3. Take the vial labeled 0.1 and remove the cap. Place the electrode into the solution immediately and record the millivolt reading once it stabilizes (approximately 2 to 3 minutes).
4. Remove the electrode from the 0.1 vial, dab the excess solution from the electrode using a paper towel, and place it into the 0.01 vial. Re-cap the 0.1 vial. Record the millivolt reading after stabilization. Repeat this step for the 0.001 and the 0.0001 standards.
5. The 0.001 and the 0.0001 vials tend to lose ammonia easily, once opened. Therefore, the standards in these vials may need to be replaced after each 2 to 3 minute calibration check.
6. Repeat this procedure until the millivolt readings are reproducible (usually about 3 repetitions).
7. Soak the electrode in the treated standard that is closest to the ammonia level expected in your samples between calibration and samples.
8. Because the membrane is permeable to water vapor, the electrode voltage may drift slightly (1 to 2 mv) over time. We recommend a 1 point calibration check between samples in the standard that is closest to your expected concentration levels in your samples. This will allow you to compensate for any voltage shifts in your calibration curve.

B. Calibration for Gas Samples

When calibrating for gas samples, use the above procedure with one exception—place the tip of the electrode in the headspace directly above the liquid in the vials.

For best results:

1. Always use standards that bracket the concentration range that you expect to have in your samples.
2. Always mix standards to closely match the composition of your samples.
3. After calibrating, always keep the tip of the electrode in a treated standard between samples.



Handling, Cleaning, and Storing the Electrode

Handling: Always handle with care, as glass electrodes are fragile. When necessary, the membrane of the electrode can be replaced by following the assembly procedure above. When removing and replacing a membrane, as well as when calibrating or making measurements, be careful not to apply pressure against the internal electrode. Any excessive pressure against the internal electrode can cause the electrode to crack, rendering it useless and unrepairable.

Cleaning: To clean the glass face of the electrode, remove membrane housing and rinse internal electrode with distilled water. Place polishing pad on a flat surface. Place a drop of the included Carbon Dioxide electrolyte onto the abrasive side of the disc. Grasping the sides of electrode around the exposed glass (below the electrode body), hold the electrode vertically with the face flat against the pad. Gently polish the face of