

Air gap setup

⚠ CAUTION



Chemical exposure hazard. Obey laboratory safety procedures and wear all of the personal protective equipment appropriate to the chemicals that are handled. Refer to the current safety data sheets (MSDS/SDS) for safety protocols.

NOTICE

Before use with hazardous substances, find out the relevant hazards, protective measures and what to do in an emergency.

Overview

An air gap setup holds an ammonia ISE probe above a dirty water sample to keep the probe membrane clean. Samples that contain substances that are known to cause membrane failure (e.g., surfactants, oils, fats) can be measured with an air gap setup.

An air gap setup contains the air above the sample in a closed space, where the partial pressure of ammonia comes to equilibrium with the sample. The calibration slope, absolute mV values and response times are different in the closed air space than in the solution. Thus, make sure to use the air gap setup for calibrations, measurements and verifications.

Note: The air gap setup is not applicable to ISE probes that measure ammonium.

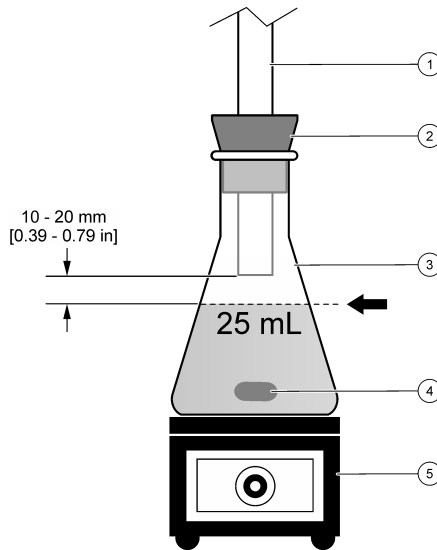
Assemble an air gap setup

The items that follow are recommended to hold the ammonia ISE probe and contain the air above the sample. The user supplies the flask and stopper. Other flask and stopper combinations are possible.

Items to collect:

- Ammonia ISE probe
 - Erlenmeyer flask, 125-mL
 - Stopper, size 5, with one hole
1. Add 25 mL of water and a stir bar to the Erlenmeyer flask.
 2. Increase the hole in the size 5 stopper to approximately 13 mm (0.5 inches) in diameter.
 3. Put the ammonia ISE probe through the hole in the stopper.
 4. Put the stopper and probe on the flask. Make sure that the stopper holds the probe tightly.
 5. Adjust the height of the probe so that the probe tip is approximately 1–2 cm (0.4–0.8 inches) above the liquid. Refer to [Figure 1](#).

Figure 1 Air gap setup example



1 Ammonia ISE probe	4 Stir bar
2 Stopper, size 5, with 13 mm (0.5 inches) hole	5 Stir plate
3 Erlenmeyer flask, 125 mL	

Preparation for use

Refer to the probe user manual to prepare the ammonia ISE probe for use. Refer to [Ammonia calibration with air gap setup](#) on page 2 to calibrate an ammonia ISE probe with the air gap setup. Refer to [Sample measurement with air gap setup](#) on page 3 to measure samples with the air gap setup. Use a slow to moderate stir speed. Keep the temperature, stir speed and read time the same during calibration, measurement and verification for best results.

Items to collect:

- Air gap setup
- Ammonia standard solutions: 1, 10 and 100 mg/L $\text{NH}_3\text{—N}$
- Sample water
- Hach Ammonia Ionic Strength Adjustor (ISA) Powder Pillows (one powder pillow per 25 mL standard or sample)
- Stir plate
- Stir bars

Ammonia calibration with air gap setup



1. Add 25 mL of the lowest concentration standard solution to the clean flask.

2. Add the contents of one Ammonia ISA Powder Pillow.

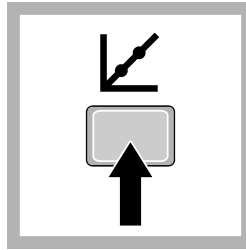
3. Add a stir bar.

4. Put the stopper on the flask.

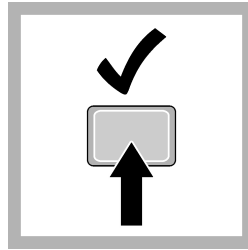
5. Put the probe through the hole in the stopper.



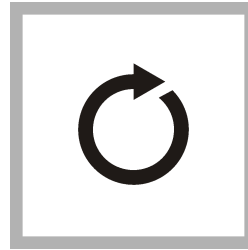
6. Put the flask on a magnetic stirrer. Stir at a moderate rate. Do not let the probe touch the solution.



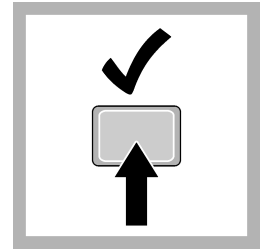
7. Push **Calibrate**. The standard solution value is shown.



8. Push **Read**. A progress bar is shown. When the measurement is stable, the lock icon is shown.



9. Measure the remaining standard solutions. Make sure to rinse the flask with the next standard solution, or start with multiple clean flasks.

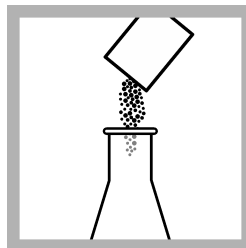


10. Push **Done**. The calibration summary shows.

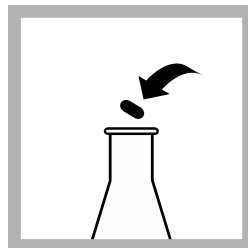
Sample measurement with air gap setup



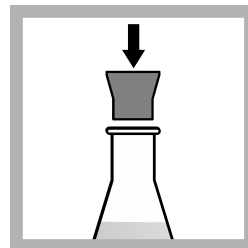
1. Add 25 mL of sample to the clean flask.



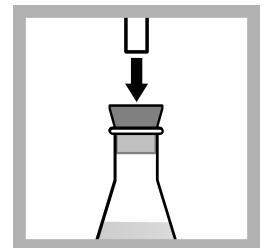
2. Add the contents of one Ammonia ISA Powder Pillow.



3. Add a stir bar.



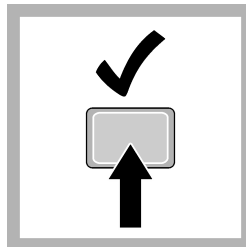
4. Put the stopper on the flask.



5. Put the probe through the hole in the stopper.



6. Put the flask on a magnetic stirrer. Stir at a moderate rate. Do not let the probe touch the solution.



7. Push **Read**. A progress bar is shown. When the measurement is stable, the lock icon is shown.

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