

Indophenol Method

Method 10269

0.05 to 0.50 mg/L as NH₃-NChemkey[®] Reagents

Scope and application: For drinking water.



Test preparation

Before starting

Analyze the samples immediately. The samples cannot be preserved for later analysis.

Open the sample valve or spigot and let the water flow for at least 5 minutes.

Make sure that the sample is colorless and the turbidity value is less than 20 NTU.

Use a new Chemkey for each measurement.

Do not touch the Chemkey with hands.

Do not move the Chemkey after it is installed in the meter.

The display shows a progress bar with the time that remains until the measurement is completed. Different parameters have different reaction times.

The meter automatically identifies the type of Chemkey(s) that is installed.

Refer to the meter documentation for additional information.

Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

The Chemkeys are articles and have no MSDS/SDS.

Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Items to collect

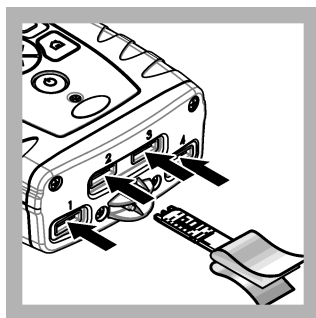
| Description | Quantity |
|------------------------|----------|
| Free Ammonia Chemkey | 1 |
| Monochloramine Chemkey | 1 |

Refer to [Consumables and replacement items](#) on page 4 for order information.

Test procedure



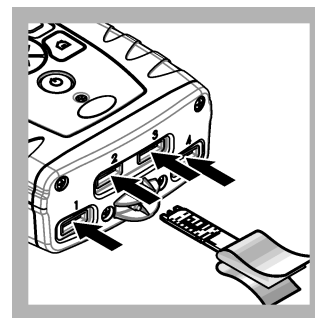
1. Free Ammonia Chemkey: Peel back the packaging to show the end of the Chemkey. Do not touch the Chemkey with hands.



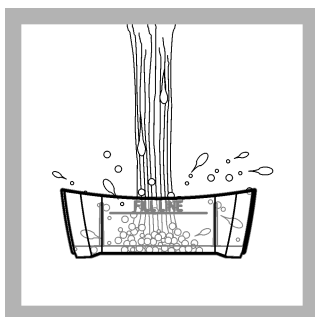
2. Free Ammonia Chemkey: Put the Chemkey slowly in one movement into any slot. Carefully remove the packaging from the Chemkey.



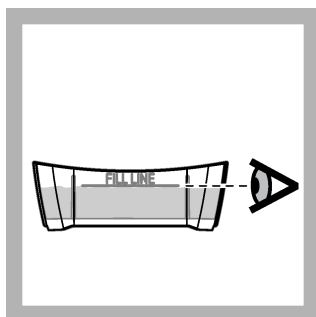
3. Monochloramine Chemkey: Peel back the packaging to show the end of the Chemkey. Do not touch the Chemkey with hands.



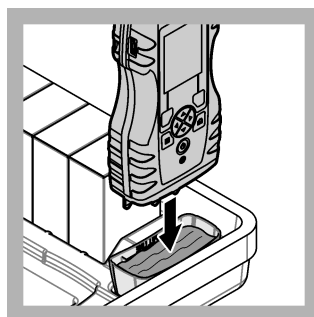
4. Monochloramine Chemkey: Put the Chemkey slowly in one movement into any slot. Carefully remove the packaging from the Chemkey.



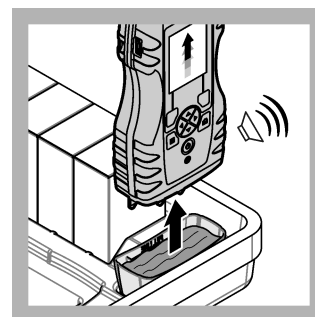
5. Rinse the sample cup with the sample.



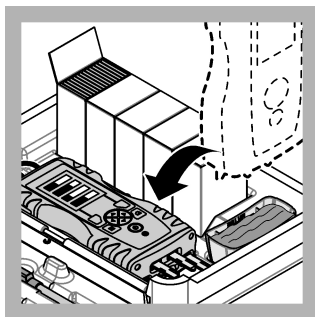
6. Fill the sample cup to the fill-line with sample.



7. Put the meter into the sample cup.



8. Wait for the sound alert and/or the meter removal animation (within 1 to 2 seconds), then immediately remove the meter from the sample cup.



9. Put the meter back into the case. Wait for the measurement to complete.

Interferences

This method is for finished, drinking water samples that have a measurable combined (total) chlorine disinfectant residual. Samples that do not have a disinfectant residual and samples that have a chlorine demand can cause low ammonia test results. Blanks and ammonia standards that are analyzed without a disinfectant residual must be prepared with high quality, reagent grade water.

The substances that are shown in [Table 1](#) do not interfere in the free ammonia determination at or below the given concentration.

Table 1 Non-interfering substances

| Substance | Maximum level tested | Substance | Maximum level tested |
|------------------------------------------|----------------------|-------------------------------------------|----------------------|
| Iron (Fe ²⁺) | 0.3 mg/L | Alkalinity (as CaCO ₃) | 1000 mg/L |
| Aluminum (Al ³⁺) | 0.2 mg/L | Chloride (Cl ⁻) | 1200 mg/L |
| Calcium (Ca ²⁺) | 1000 mg/L | Magnesium (Mg ²⁺) | 250 mg/L |
| Copper (Cu ²⁺) | 1.0 mg/L | Nitrate (NO ₃ ⁻ -N) | 10.0 mg/L |
| Manganese (Mn ²⁺) | 0.2 mg/L | Zinc (Zn ²⁺) | 5.0 mg/L |
| Sulfate (SO ₄ ²⁻) | 500 mg/L | | |

Accuracy check

Standard solution method

Use the standard solution method to validate the test procedure, the reagents and the instrument.

Items to collect:

- 10.0 mg/L NH₃-N Ammonia Standard Solution
- 200-mL volumetric flask, Class A
- Pipet, adjustable volume, 1.0–5.0 mL and pipet tip
- Deionized water

1. Prepare a 0.35-mg/L ammonia standard solution as follows:
 - a. Use a pipet to add 7.0 mL of the 10.0-mg/L ammonia standard solution into the volumetric flask.
 - b. Dilute to the mark with deionized water. Mix well. Prepare this solution daily.
2. Use the test procedure to measure the concentration of the prepared standard solution.
3. Compare the expected result to the actual result.

Note: The factory calibration can be adjusted slightly with the standard adjust option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then used for all test results. This adjustment can increase the test accuracy when there are small variations in the reagents or instruments.

Method performance

The method performance data that follows was derived from laboratory tests during ideal test conditions. Users can get different results under different test conditions.

Method detection limit (MDL)¹ = 0.05 mg/L

| Standard | Precision (95% confidence interval) | Sensitivity Concentration change per 0.010 Abs change |
|------------------------------|--------------------------------------|----------------------------------------------------------|
| 0.28 mg/L NH ₃ -N | 0.27 to 0.29 mg/L NH ₃ -N | 0.01 mg/L NH ₃ -N |

Summary of method

Monochloramine (NH₂Cl) and free ammonia (NH₃ and NH₄⁺) can be in the same water sample. Added hypochlorite combines with free ammonia to form more monochloramine. In the presence of a cyanoferrate catalyst, monochloramine in the sample reacts with a

¹ The U.S. Environmental Protection Agency (USEPA) method detection limit (MDL) is described as the minimum concentration of a substance that can be measured and reported with 99-percent confidence that the analyte concentration is greater than zero.

substituted phenol to form an intermediate monoimine compound. The intermediate couples with excess substituted phenol to form a green-colored indophenol, which is proportional to the amount of monochloramine in the sample. Free ammonia is determined by comparing the color intensities, with and without added hypochlorite.

Consumables and replacement items

| Description | Quantity/Test | Unit | Item no. |
|--------------------------------------------------------------------------------|---------------|-------------|----------|
| Kit, Monochloramine Chemkey [®] and Free Ammonia Chemkey [®] | 1 | 25/pkg (2x) | 9429600 |
| Sample cup | 1 | each | 9418100 |

Recommended standards

| Description | Unit | Item no. |
|----------------------------------------------------------------|--------|----------|
| Nitrogen Ammonia Standard Solution, 10-mg/L NH ₃ -N | 500 mL | 15349 |

Optional reagents and apparatus

| Description | Unit | Item no. |
|--------------------------------------|--------|----------|
| Flask, volumetric, Class A, 200 mL | each | 1457445 |
| Pipet, adjustable volume, 1.0–5.0 mL | each | BBP065 |
| Pipet tips, for 1.0–5.0 mL pipet | 75/pkg | BBP068 |
| Water, deionized | 4 L | 27256 |



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