

# Monochloramine & Free Ammonia Demo

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## Topics

- Reviews
- Monochlor-F Method
- Sampling
- Testing Demo
- Conclusion

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## Quick Review

Chlorine that has reacted with ammonia to form:

1. monochloramine,  $\text{NH}_2\text{Cl}$
2. dichloramine,  $\text{NHCl}_2$
3. trichloramine,  $\text{NCl}_3$

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### These chloramines:

1. Are much weaker disinfectants but are more stable in water compared to free chlorine.
2. Do not form THMs in the distribution system.
3. Can be difficult to analyze for.

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### Total Chlorine is also known as Total Residual

- In drinking waters both free and combined chlorine can exist at the same time and are measured as total chlorine.

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### Total Chlorine =

Free + Combined

- Monochloramine (NH<sub>2</sub>Cl) and “free ammonia” (NH<sub>3</sub> and NH<sub>4</sub><sup>+</sup>) can exist in the same water sample.

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## HACH Monochlor F Reaction

- Added hypochlorite combines with free ammonia to form more monochloramine.
- In the presence of a cyanoferrate catalyst, monochloramine in the sample reacts with a substituted phenol to form an intermediate monoimine compound.

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## Reaction Cont'd.

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

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## Sampling

- Collect samples in clean glass bottles. Results are most reliable from samples analyzed as soon as possible after collection.
- Don't use the same sample vials for analyzing free and total.
- Allow tap to run for 5 minutes or more.

Demo

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## Temperature

- Test results are strongly influenced by sample temperature. **Both reaction periods in the procedure are the same and depend on the temperature of the sample.** The reaction periods indicated in the procedure are for a sample temperature of 18-20 °C (64-68 °F). Adjust both reaction periods according to Table 1.

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| Sample Temperature |    | Reaction Period<br>(Minutes) |
|--------------------|----|------------------------------|
| °C                 | °F |                              |
| 5                  | 41 | 10                           |
| 7                  | 45 | 9                            |
| 9                  | 48 | 8                            |
| 10                 | 50 | 8                            |
| 12                 | 54 | 7                            |
| 14                 | 57 | 7                            |
| 16                 | 61 | 6                            |

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## Calibration Checks

- Standard solutions for monochloramine are difficult and time-consuming to prepare. Errors can occur if attention to detail is not addressed during preparation of the standards. Hach Company prepares the calibration curve under rigorous analytical laboratory conditions. Hach recommends using the factory calibration.

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## HOWEVER

- Insure Quality Assurance & Control
- Secondary Standards
- Primary Standards for Ammonia
- Duplicates and Blanks

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## Future?

- A user calibration or a user-prepared monochloramine standard may be required by a regulatory official or agency. Two options are available on the Pocket Colorimeter™ II to meet this requirement.
- Follow the guidelines as described in the manual.

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## Questions?

Thank You!

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