

## **Field Testing & Reporting Chlorine Residuals**

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Many operators that collect distribution system samples are familiar with conducting a chlorine residual test.

The presence of a detectable chlorine residual in the distribution system is viewed as providing some level of protection for bacterial contamination due to leaks, breaks, biofilm and backflow events. The Surface Water Treatment Rule (SWTR) also requires that the distribution system have a detectable chlorine residual in 95% of the samples for two consecutive months. You can view MassDEP's monthly chlorine/chloramine reporting form [HERE](#) . The chlorine residual is typically measured at the same time and location as the Total Coliform samples.

The most common type of handheld chlorine residual test kits uses a DPD (N,N-diethyl-p-phenylenediamine) reagent, that when added to water that contains chlorine, will turn the water sample a shade of pink. The intensity of the pink is directly proportional to the amount of chlorine present in the water. The deeper the pink – the more chlorine that is present. The DPD reagent can be in the form of a tablet, powder or liquid and the reagent is specific for measuring either the 'free' chlorine residual or the 'combined' chlorine residual. Free chlorine has the most disinfecting power because it has not reacted with other compounds in water such as ammonia or organics. Combined chlorine, as the term implies, is measuring the chlorine in the sample that has reacted with other compounds in the water. The "total chlorine" residual is the sum of both free and combined chlorine. For regulatory compliance purposes the monthly chlorine residuals from the distribution system can be reported as either free, combined or total.

It is important that operators know how to properly use their specific chlorine test kit by following the manufacturer's instructions. This video provides an overview of proper sampling and measurement of chlorine residuals: [RCAP Video](#)

1. Which of the following are reasons for getting an inaccurate chlorine residual measurement?
  - a. Improper calibration of the instrument
  - b. Air bubbles in the sample vial
  - c. Scratch on the sample vial
  - d. All of the above
2. True or False? If the result of a free chlorine analysis is 0.0 it means that there is no chlorine in the water sample
  - a. True
  - b. False
3. What is the correct order of proper chlorine residual measurement?
  - a. Run the cold water tap, fill sample vial, add DPD reagent, zero the instrument, insert sample and record the reading
  - b. Run the cold water tap, fill sample vial, zero the instrument, add the DPD reagent, insert sample and record the reading

- c. Zero the instrument, run the cold water tap, fill the sample vial, add the DPD reagent, insert sample and record the reading.
  - d. Zero the instrument, add the DPD reagent, run the cold water tap, fill the sample vial, insert sample and record the reading
4. Measurement of chlorine residuals in the distribution system are typically taken from \_\_\_\_\_?
- a. Lead and copper sampling sites
  - b. Total Coliform bacteria sampling sites
  - c. Hydrants used during routine flushing
  - d. All of the above
5. What is the total chlorine residual in a water sample if the measured free chlorine residual is 0.15 mg/L and the measured combined chlorine residual is 0.35?
- a. 0.15 mg/L
  - b. 0.2 mg/L
  - c. 0.35 mg/L
  - d. 0.5 mg/L

Solution:

***Total Chlorine Residual = Free Chlorine Residual + Combined Chlorine Residual***

***Total chlorine residual = 0.15 mg/L + 0.35 mg/L = 0.5 mg/L***