



Low Range Chlorine Standard Voluette® Cat. No. 26300

Preparation

These standards were prepared by generating and dissolving chlorine gas in slightly alkaline, high purity water of zero chlorine demand. The standard is packaged into clean ampules and sealed under argon. After preparation, ampules are assayed and stored between 2° - 8° C prior to shipment.

Standardization

From a practical standpoint, it is impossible to prepare an accurate chlorine standard by direct weighing chlorine added to water. It is necessary to prepare the chlorine standard and then determine the actual chlorine content.

Analyses are performed on 10 ampules taken at random from the production lot. The analyses are performed spectrophotometrically, using a method calibrated versus titration with standard sodium thiosulfate. The sodium thiosulfate is standardized against NIST's SRM 83d, primary standard arsenic trioxide.

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Storage and Life Expectancy

Chlorine exists in solution with pure water as hypochlorous acid and hypochlorite ion, the relative amounts depending on the pH of the solution. Research by Hach Company has shown that dilute solutions of hypochlorite are quite stable when protected from light and temperature excesses.

It is recommended that the low range chlorine ampules be stored under refrigeration between 35° - 45° F, (2° - 10° C), immediately upon receipt. Minimize exposure to sunlight by keeping unopen ampules in its closed box. When stored under these conditions, the expected stability at the stated concentration is at least one year.

Using Voluette Ampule Standards for Chlorine Analysis

1. Perform a chlorine determination by adding the DPD reagent (10-mL pillow size) to a 10-mL sample. Swirl to mix.
2. Measure the color and read the mg/L chlorine. Record the value.
3. Snap off the top of a LR Chlorine Voluette Ampule Standard. Using the TenSette Pipet, add 0.1 mL of standard to the prepared sample. Swirl to mix.
4. Read the mg/L chlorine and record.

5. Calculate the concentration of chlorine added to the sample:

$$\frac{\text{mL of standard added}}{\text{mL of standard added} + \text{mL of sample}} \times \text{label Value of Voluette (mg/L)}$$

For example:

The label shows the average free chlorine concentration of the ampules to be 25.5 ± 0.3 mg/L.

Using 0.1 mL standard added and 10mL sample, the concentrations of free chlorine added to the sample is calculated according to the equation in step 5:

$$\frac{0.1 \text{ mL}}{0.1 \text{ mL} + 10 \text{ mL}} \times 25.5 \text{ mg/L} = 0.25 \text{ mg/L chlorine}$$

Therefore, the addition of 0.1 mL ampule standard should increase the chlorine content by 0.25 mg/L (Step 4 - Step 2). If less is recovered, begin a systematic check to locate and correct the problem. See the general booklet, *Standard Additions for Analytical Quality Control*.

Notes:

The use of the LR Chlorine Voluette standards for standard additions performs entirely satisfactorily when there is a chlorine residual already in the sample and the standard additions are made to the sample after the DPD reagent is added to the sample.

It will not work if there is a chlorine demand, such as excess reducing agents (sulfur dioxide, sulfite, etc.) present and if the standard is added to the sample before addition of the reagent. In this case, some of the chlorine added from the standard addition will be consumed by the chlorine demand species before reagent is added.

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Instructions Cat. No. 26300-88

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