Quality Control/Quality Assurance Requirements for the Determination of Total Residual Chlorine (TRC) by the DPD Colorimetric Methodology

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1.0 Scope

This policy outlines the minimum Quality Control/Quality Assurance requirements for the determination of Total Residual Chlorine (TRC) by the DPD Colorimetric methodology as determined by the WV DEP Quality Assurance Office.

2.0 Calibration

2.1 Single wavelength colorimeters such as HACH's Pocket Colorimeter do not require the construction or analysis of a calibration curve. These meters are designed for the detection of TRC and as such only require that the instrument is operating properly. In order to demonstrate this, the analyst must analyze an instrument verification standard. This sample may be a chlorine standard produced by the analyst, a gel standard purchased as a check standard, or a potassium permanganate solution prepared such that the observed absorbance is equivalent to a chlorine solution (see Appendix A of this policy). The instrument verification standard must be in the range of expected sample chlorine concentrations.

2.2 Spectrophotometers such as B & L Spec 20 instruments must have a calibration curve constructed in a range that will encompass the expected concentration of samples. The calibration curve must consist of at least four (4) standards and a blank. The correlation coefficient of the curve must be >0.995. The curve must be verified prior to any sample analysis by analyzing a mid-range standard. This verification must agree with the expected concentration to within ±10%.

3.0 Quality Control

3.1 All analyses will be conducted under a batch concept. A batch consists of a check standard (instrument verification standard), a reagent blank, a matrix duplicate, and 1 to 20 samples.

3.2 A matrix spike is not required to meet the requirements of this office.

Appendix A

Preparation of Potassium Permanganate (KMnO$_4$) solution

Instructions for preparation of Potassium Permanganate (KMnO$_4$) solution to be used to verify instruments prior to analyzing for Total Residual Chlorine (TRC).

1.0. Stock KMnO$_4$ Solution: Dissolve 891 mg of KMnO$_4$ in 1 liter of laboratory pure water.

  1.1. Intermediate KMnO$_4$ Solution: Add 10 ml of Stock solution to a 100 ml volumetric flask and dilute to volume with laboratory pure water.

  1.2. Second intermediate KMnO$_4$ Solution: Add 1 ml of Intermediate solution to a 100 ml volumetric flask and dilute to volume with laboratory pure water.

    1.2.1. The Second intermediate solution exhibits the same absorbance as a 1.00 mg/L chlorine sample when reacted with DPD. Further dilutions of this solution may be necessary in order to comply with Section 2.1 of this policy.

Note: Instructions for calibration of colorimetric equipment may be found in Standard Methods for the Examination of Water and Wastewater, Method 4500–Cl G, Section 4, all editions.