1.0 Purpose

The purpose of this procedure is to define the steps necessary to determine the level of Chloride by Silver Nitrate Titration.

2.0 Scope

This procedure applies to liquid loads. All Chloride testing is performed in the Quality Assurance laboratory.

3.0 Responsibility

QA Lab personnel are responsible for performing this procedure.

4.0 Safety Considerations

Safety Glasses, Chemical Resistant Gloves, and Lab Coat should be worn.

Safety is a condition of employment. Employees are not authorized to work in an unsafe manner and are prohibited from harming the environment of the facility or community.

5.0 Materials/Equipment

- 125 ml or 250 ml Erlenmeyer flask
- 2 - Class A -10 ml Volumetric Pipettes
- Class A – 1 ml Volumetric Pipette
- Class A- 10 ml or 25 ml Volumetric Burette with stand
- Pipette Bulb
- DI Water
- 100 ml beaker
- 5% Potassium Chromate Solution
- 0.1N Silver Nitrate Standardized Solution

6.0 Procedure

1. Pipette 10 ml of Liquid Magnesium Sulfate with unknown concentration into a clean, dry 125 ml or 250 ml Erlenmeyer Flask
2. Pipette 20 ml of DI H20 into a same Flask
3. Pipette 1 ml of 5% Potassium Chromate Solution into flask.
4. Swirl flask for about five seconds to mix the solution
5. Fill 10 ml or 25 ml volumetric burette with 0.1N Silver Nitrate
6. Write down the initial volume mark. For example, the initial volume mark is 2.5 ml

7. Titrate with 0.1N Silver Nitrate until you see a formation of red precipitate At that point, where no chloride ions (Cl-) are left, an excess of silver nitrate starts to react with indicator according to the equation 2AgNO3 + K2CrO4 = Ag2CrO4+2KNO3. Swirl flask consistently while titrating.
8. Record the volume mark of the solution in the burette. For example, the final volume mark is 26.4 ml.
9. Subtract the initial volume mark (Step 6) from the final one (Step 9) to calculate the volume of silver nitrate solution used for the titration. In this example, the volume is 26.4 ml – 2.5 ml = 23.9 ml

The ppm of Chloride in sample solution is calculated using the following formula:

$$\frac{\textbf{ml AgNO3 x 3550}}{\textbf{ml of sample solution}} = \textbf{ppm (parts per million)}$$

Calculation Derivation

.1N AgNO3 = .1M AgNO3 = .1 moles/liter

(.1moles/ L AgNO3) (_____L AgNO3) = _____ moles AgNO3 = moles Cl-

(_____moles Cl-) ÷ (_____L samples solution) = _____ M Cl-

(_____ moles / L Cl-)* (35.5 g / mole) *(1000mg/g) = _____ mg/L = ppm

7.0 Reference Documents

Chloride Titration Form (L12-PR-100-F040)

8.0 Change Information

Updated using *SOP Template Instructions (Q12-PR-100-004)* and *Document Numbering (Q12-PR-100-003)*