
	<b>GILES CHEMICAL ~ PREMIER MAGNESIA</b>		
	<b>Company Procedure</b>		
	Title: <b>Chloride Titration</b>	Number: <b>L12-PR-100-040</b>	
	Owner: <b>Deborah Durbin</b>	Revision: <b>03</b>	
	Effective Date: <b>11/09/15</b>	Page: <b>1 of 2</b>	

## 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 H<sub>2</sub>O into the 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. Record the initial volume on *Chloride Titration (L12-PR-100-F040)*.

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Page: **2 of 2**



7. Titrate solution with 0.1N Silver Nitrate, swirling constantly, until a formation of a red precipitate occurs. (*Note: This reaction occurs when all Chloride Ions,  $Cl^-$ , have reacted and the excess Silver Nitrate begins to react with the indicator as follows:  $2AgNO_3(\text{yellow}) + K_2CrO_4(\text{red}) = Ag_2CrO_4 + 2KNO_3$ . The final endpoint color should be a light orange.*)
8. Record the volume mark of the solution in the burette as the final volume on *Chloride Titration (L12-PR-100-F070)*.
9. Subtract the initial volume mark (Step 6) from the final volume (Step 8) to calculate the volume of silver nitrate solution used for the titration and record titrant volume.

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

$$\frac{\text{Titrant Volume (ml AgNO}_3\text{)} \times 3550}{30\text{ml (of sample solution)}} = \text{Chlorides ppm (parts per million)}$$

### Calculation Derivation

$0.1N AgNO_3 = 0.1M AgNO_3 = 0.1 \text{ moles/liter}$

$(.1\text{moles/ L AgNO}_3) (\text{ } \text{L AgNO}_3) = \text{ } \text{moles AgNO}_3 = \text{moles Cl}^-$

$(\text{ } \text{moles Cl}^-) \div (\text{ } \text{L samples solution}) = \text{ } M \text{ Cl}^-$

$(\text{ } \text{moles / L Cl}^-) * (35.5 \text{ g / mole}) * (1000\text{mg/g}) = \text{ } \text{mg/L} = \text{ppm}$

### 7.0 Reference Documents

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

### 8.0 Change Information

Updated to new SOP template. Added reference to *Chloride Titration Form (L12-PR-100-F040)*.

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