

# Hanna Titration Procedure

## Quaternary Ammonium Salts



### Description

Method for the determination of the percent active material in disinfectants by titration with sodium lauryl sulfate (SLS). The results are expressed as % quaternary ammonium ( $\text{NH}_4^+$ ).

### Reference

ASTM D5806-95(2017), Standard Test Method for Disinfectant Quaternary Ammonium Salts by Potentiometric Titration, ASTM International

### Meter

- Automatic Potentiometric Titrator - [HI932](#)

### Electrodes

- Advanced Automatic Potentiometric Titrator - [HI932](#)
- Combination Nitrate ISE - [HI4113](#)

### Reagents

- 0.005 M Sodium Lauryl Sulfate
- Reagent Grade Boric Acid
- Reagent Grade Sodium Tetraborate Decahydrate
- 2 N Sodium Hydroxide Solution
- Reagent Grade Isopropanol (IPA)
- Triton X-100 Reagent
- Deionized water (DI)

### Accessories

- Storage Solution (500mL) - [HI70300L](#)
- Prepare Borate Buffer Solution. \*May be purchased
  - Dissolve 1.5 g sodium borate decahydrate and 1.0 g Boric Acid in approximately 200 mL of DI water.
  - While stirring, adjust to pH 9.5 with 2N NaOH.
  - Transfer to 1000 mL volumetric flask and fill to line with DI. Mix well.
- Prepare 1% Triton solution
  - Transfer 1 mL of Triton X-100 to a 100 mL volumetric flask and fill to line with DI.

### Electrode Preparation

- Attach nitrate membrane module to combination electrode handle and assemble per instructions.
- Rinse the inside the electrode with DI and electrolyte solution.
- Fill electrode with electrolyte solution.

*\* If desired, the calculations may be changed to reflect eq/kg of active compound, or the % by mass of your active compound. If this is the case, change the calculations to reflect this.*

### Reagent Preparation

- Prepare a 0.005 M sodium lauryl sulfate titrant solution.
  - \*May be purchased pre-made
  - Dissolve 0.72095 g of sodium lauryl sulfate in a 500 mL volumetric flask and fill to line with DI.
- Prepare Borate Buffer Solution. \*May be purchased pre-made
  - Dissolve 1.5 g sodium borate decahydrate and 1.0 g Boric Acid in approximately 200 mL of DI water.
  - While stirring, adjust to pH 9.5 with 2N NaOH.
  - Transfer to 1000 mL volumetric flask and fill to line with DI. Mix well.
- Prepare 1% Triton solution
  - Transfer 1 mL of Triton X-100 to a 100 mL volumetric flask and fill to line with DI.

### Titration Preparation

- Connect the nitrate ISE to the titrator.
- Install a 25-mL burette filled with 0.005M sodium lauryl sulfate on pump one. For the determination of the exact concentration of the titrant, standardize with Hyamine 1622.
- Press "Select Method" from the main screen. Use the arrow keys to highlight 'Quaternary Ammonium Salts' and press "Select".

### Sample Preparation

- Introduce sample into a 150 mL beaker and fill to approximately 100 mL with DI water.
  - \*Use enough sample to yield 5-7 mL titrant consumption.
- Record the exact weight of the sample, this is entered into the titrator.
- Add 10 mL of borate buffer solution, 2 mL of isopropyl alcohol, and 2 mL of 1% Triton solution.
- Submerge the electrode, temperature sensor, and dosing tip.

### Analysis

- Press "Start". The titration will begin.
- At the end of the titration, when the equivalence point is reached, 'titration complete' will appear with the result. The result is expressed as % quaternary ammonium.