

# Hanna Titration Procedure

## Nickel in Finishing Baths



### Description

Method for the determination of nickel in finishing baths by indirect automatic titration with EDTA. The results are expressed **as g/L nickel**.

### Reference

Paunovic, M., & Schlesinger, M. (2010). Modern Electroplating. Hoboken, NJ: Wiley.

### Meter

- Automatic Potentiometric Titrator - [HI932](#)

### Electrode

- Cupric ion-selective electrode (ISE) - [HI4108B](#)

### Reagents

- 0.102 M EDTA - [HI70449](#)
- $\text{NH}_4\text{Cl}/\text{NH}_4\text{OH}$  Ammonia buffer solution (1%  $\text{NH}_4\text{Cl}$  / 4%  $\text{NH}_4\text{OH}$ )
- 0.02 M CuEDTA solution
- 1.0 M  $\text{KNO}_3$  - [HI7072](#)
- Deionized Water - [HI70436](#)

### Accessories

- Graduated cylinder
- Plastic dropper pipette
- Automatic adjustable pipette
- 150 mL beakers

### Electrode Preparation

- Disassemble the ISE by unscrewing the cap and sliding the outer body up towards the BNC connector.
- Unwrap plastic film seal found over ceramic junction on inner stem and discard.
- Rinse inner stem with deionized water making certain to wet the O-ring found on the inner stem.
- Reassemble the electrode by gently pushing the inner assembly into the outer body, sliding spring down cable, and screwing the cap into place
- Using the dropper pipette, fill the ISE with HI7072 electrolyte so that the level is within 2 cm of the fill hole.
- Connect the ISE to the analog board of the titrator

### Device Preparation

- Install a 25 mL burette filled with 0.021 M EDTA on pump one.
- Prime the burette pump with the titrant three times. To do so, press "Burette" then "Prime Burette".

### Sample Preparation

- Add approximately 50 mL of distilled water to a beaker.
- Using the adjustable pipette, pipette 0.52 mL of sample into the beaker.
- Using the graduated cylinder, add 10 mL of  $\text{NH}_4\text{OH}+\text{NH}_4\text{Cl}$  buffer solution.
- Using a plastic pipette dropper, add 105 drops of 0.02 M CuEDTA.

### Sample Titration

- Press "Select Method" and select the method "Nickel Plating Bath".
- Press "Start". The titration will proceed automatically.
- At the end of the titration, "Titration Complete" will appear. The value for nickel is displayed directly on the titrator.
- Remove electrode and stirrer from the sample and rinse them thoroughly with deionized water.
- The cupric ISE may be stored dry with the fill solution in the electrode.
- For long-term storage (>1 month), remove the fill solution by pressing down on the top of the electrode. Wrap the ceramic junction on the inner stem with Parafilm® or other sealing wrap.