

## Analytical Procedure for Monitoring and Maintaining the Strength of HN502CS Buffer & HN502S Conditioner in the HN502 Conditioner Bath

### HN502CS Buffer Method:

For uniform results and long solution life, the HN502 Conditioner operating solution should be maintained based on regular analysis using the following analytical procedures. It is recommended that this analysis be performed daily in large volume facilities and weekly in medium or small volume facilities for optimum performance and adjustments made (if necessary) before beginning production.

**NOTE:** This analytic procedure is accurate only if the tank is filled to its operating capacity at the time the sample is taken.

**Caution:** The following procedures involve the use of potentially hazardous chemicals: manufacturer's operating instructions should be consulted and appropriate safety precautions followed.

#### I. Reagents Required:

5 ml sample of HN502 Conditioner Bath  
0.10 N sulfuric acid solution  
Indicator: phenolphthalein

#### II. Apparatus Required:

5 ml pipette  
50 ml burette  
250 ml Erlenmeyer flask

#### III. Procedure:

1. Pipette 5 ml of cool HN502 Conditioner operating solution into a 250 Erlenmeyer flask.
2. Add 45 ml of DI water and 3 drops of phenolphthalein indicator solution and mix well.
3. Titrate with 0.1 N sulfuric acid from magenta to a clear endpoint.

#### Calculations:

**% HN502CS Buffer = ml 0.1 N H<sub>2</sub>SO<sub>4</sub> x .08**

#### Addition:

**Grams HN502CS = (0.6% - % HN502CS) x 37.85 x tank volume**

#### IV. MAINTENANCE REQUIREMENT

The bath should contain 0.4 – 0.6% by volume sulfuric acid with the optimum level being 10%.

### HN502S Conditioner Method:

#### I. Reagents Required:

1-ml sample of HN502 Conditioner Bath  
0.25 N Potassium Dichromate in 50% H<sub>2</sub>SO<sub>4</sub>  
20% (w/v) potassium iodide solution  
1% (w/v) starch solution (indicator)  
0.1 N sodium thiosulfate solution

#### II. Apparatus Required:

1 ml volumetric pipette  
20 ml volumetric pipette  
250 ml Erlenmeyer flask  
50 ml burette

#### III. Procedure:

1. Pipette 1 ml of operating bath into a 250 ml Erlenmeyer flask.
2. Pipette 20 ml of potassium dichromate solution into flask and swirl well.
3. Allow sample to sit for at least 30 minutes and no more than 90 minutes.
4. Add 100 ml of deionized water and swirl to mix.
5. Add 5 ml of 20% potassium iodide solution.
6. Add 2 ml of starch solution.
7. Titrate with 0.1 N sodium thiosulfate until a transparent blue-green color appears.
8. Record amount of sodium thiosulfate used.

#### Calculations:

**% HN502S Conditioner = 4.065 – (ml sod. thio. X .0813)**

#### Addition:

**ml HN502S = (1 - %HN502S) x 37.85 x tank volume**

#### IV. MAINTENANCE REQUIREMENT

The bath should contain 0.8 – 1.2% HN502S with the optimum level being 1.0%.

#### Instructions for 0.25 N potassium dichromate reagent:

Add 500 ml of sulfuric acid to 500 ml of deionized water in a volumetric flask. Allow to cool to room temperature. Add 12.25 grams of potassium dichromate crystals and then top up flask to 1000 ml with deionized water. **Store solution in a glass container only.**

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