METSTRIP NI

Non-Cyanide Stripper To Remove Nickel From Steel And Copper

DESCRIPTION:

MetStrip Ni is a non-cyanide, alkaline stripper that removes electroplated nickel deposits from steel, copper and copper alloys by simple immersion. It will not attack most soldering or brazing metals.

MetStrip Ni is supplied as two liquid materials, MetStrip Ni Part 1 and MetStrip Ni Part 2, that are mixed with water to make the operating solution. MetStrip Ni Regenerator, a liquid material, may be required to replenish the inhibitors and accelerators.

Equipment requirements for MetStrip Ni are simple, a plain steel tank or drum and, if desired, a steel heating coil. Exhaust ventilation is recommended. The work may be stripped in inexpensive wire baskets, thus eliminating racking costs.

KEY PROPERTIES:

- Cyanide free process - Eliminates use of costly sodium cyanide, eliminates cost of waste treatment to destroy cyanide
- Strips nickel from copper plated zinc die castings, steel and copper alloys - Reduces inventory requirements.
- Used in conventional steel equipment - Eliminates requirements for more costly plastic tanks

RECOMMENDED USE:

NOTE: MetStrip Ni Part 1 can turn turbid or form small precipitate at the bottom with time mainly in winter weather/cold temperature. Please ensure that the drum is shaken well before adding to the tank to get uniform addition.

PREPARATION OF THE SOLUTION

1. Add components in order given
2. Fill tank half full of water
3. Add 20% of final volume MetStrip Ni Part 1 and stir
4. Add 20% of final volume MetStrip Ni Part 2 and stir
5. Add water to bring solution to final operating volume

OPERATING CONDITIONS

Parameter	Unit	Value
MetStrip Ni Part 1	%V/V	20
MetStrip Ni Part 2	%V/V	20
Water	%V/V	60
Temperature	°C	Room to 80
Time	As required	
pH		10.9 0 -11.4

Parts to be stripped should be cleaned in an alkaline cleaner initially. Remove all chromium deposits with either a hydrochloric acid dip or an alkaline electrolytic cleaner. If an alkaline electrolytic cleaner is used, the parts should be dipped in a 30 to 50 percent by volume hydrochloric acid solution for several minutes to activate the nickel surface. Follow with a running water rinse; then immerse the parts in the MetStrip Ni operating solution.

1. Suspend the rack or basket of parts to be stripped into the MetStrip Ni solution. Do not allow the parts to touch the bottom or sides of the tank or come in contact with the heating coils. For most efficient stripping, immerse as many parts as possible in the MetStrip Ni solution. Mechanically agitate the work or solution. AVOID OVERHEATING THE SOLUTION. DO NOT USE AIR AGITATION. Remove all parts from the operating solution as soon as they are fully stripped.
2. Keep the stripping tank covered at all times. Prolonged operation of the solution without a cover will result in some loss of MetStrip Ni Part 2. This loss must be replaced if efficiency is to be maintained. (Refer to section entitled CONTROL.)
3. Ensure that copper, lead, chromium, and cadmium are not introduced into the MetStrip Ni solution. Contamination of the solution with these metals will lower the stripping efficiency. New and used MetStrip Ni solutions must not be heated for long periods without immersing nickel-plated parts into the solution. Metallic and organic contamination or heating without stripping

nickel deactivates the accelerators in the MetStrip Ni solution.

4. After nickel has been stripped from copper or copper alloys, the parts will be covered with a protective inhibitor film. This film can easily be removed by dipping the parts in a solution of one of the following:

OPTION A: 120 g/l of UniPrep E200 at 50°C with periodic reverse current, approximately 7 seconds anodic current, 4 to 5 seconds cathodic current, at 25 to 35 amps/ft^2

OPTION B: 30 to 120 g/l of sodium cyanide.

OPTION C: 30 to 60 g/l of chromic acid.

STRIPPING RATE:

A new MetStrip Ni solution will strip nickel at room temperature at a rate of 6 microns per hour. At 80°C a new MetStrip Ni solution will strip nickel at a rate of 25 microns per hour. As the solution is used, the stripping rate will decrease. One litre of MetStrip Ni operation solution will dissolve approximately 15 - 30 grams of nickel metal.

EQUIPMENT:

1. Steel or stainless steel tanks are recommended for operating solutions of MetStrip Ni. The size of the tank is important; the tank should be deep enough to allow a maximum clearance between the bottom of the parts being stripped and the bottom of the tank to allow for any sludge accumulations. The stripping tank should be in a well-ventilated area. Exhaust ventilation is recommended.
2. Plain steel or stainless steel plate coils are recommended for heating MetStrip Ni solutions. Teflon heating coils may also be used. Racks, hooks or baskets should be made of steel or stainless steel. Do not use brass or copper racks, hooks or baskets. Mechanical agitators are recommended for solution agitation. Mixer shaft and propeller should be steel or stainless steel. A plastisol coating may be used to eliminate galvanic cells.
3. Tanks should be equipped with a steel, stainless steel or PVC plastic cover; or polyethylene balls may also be used to blanket the surface of the solution. A temperature controller is recommended. The parts to be stripped, and heating coils, must be electrically insulated from the tank. All other equipment such as mechanical agitators and temperature sensors, in contact with the stripping solution must be free from stray potential current capable of setting up a galvanic cell within the stripping solution.

CONTROL:

1. MetStrip Ni is chemically balanced so that if the solution is prepared and used as directed, all components will be exhausted and can be discarded simultaneously. However, continuous heating of the MetStrip Ni solution without a cover or with a loose fitting cover will result in evaporation of some MetStrip Ni Part 2. This loss must be made up by additions of MetStrip Ni Part 2 premature exhaustion of the entire solution will occur.
2. Additions of MetStrip Ni Part 2 must be accompanied by additions of Metstrip Ni Part 1. Also additions of MetStrip Ni Regenerator may have to be made.
3. It is important to replenish MetStrip Ni Part 2 and MetStrip Ni Part 1 before testing for the MetStrip Ni Regenerator.
4. The following procedures are recommended for proper analysis and replenishment of the MetStrip Ni operating solution. Perform the analysis in the following order.

ANALYSIS FOR METSTRIP Ni Part 2

Equipment Needed:

- 5 ml pipette
- 50 ml burette
- 250 ml beaker
- 250 ml Erlenmeyer flask
- Filter paper, Whatman #41

Reagents Needed:

- 1% Methyl Orange Indicator Solution - dissolve 1 gram of methyl orange salt in 100 ml deionised or distilled water.
- 1.0 N Sulphuric Acid (H_2SO_4) Solution - purchase from local laboratory supply house.

Procedure:

- Adjust the volume of the Metstrip Ni operating solution to the original make-up volume by adding water. Mix well.

- Take a 150ml sample of the adjusted operating solution, cool to room temperature and filter to remove particulate matter.
- Pipette a 5ml aliquot of the filtered solution into an Erlenmeyer flask and add 75ml of deionised or distilled water and several drops of 1% methyl orange indicator solution.
- Using a white background, titrate to the endpoint using 1.0N H_2SO_4 solution; colour change is from yellow to pink. A pH meter can be used if difficulty exists in seeing endpoint. calibrate pH meter with 7.0 and 4.01 buffers and then titrate to a pH of 4.0.

Calculation:

ml H_2SO_4 titrated x Normality H_2SO_4 x 1.13= % by volume MetStrip Ni Part 2 in solution.

Replenishment:

Restore solution to original make-up of 20% by volume MetStrip Ni Part 2; for each volume MetStrip Ni Part 2 replenished add an equal volume of MetStrip Ni Part 1.

ANALYSIS FOR pH

a) After analysing and replenishing the operation solution for **MetStrip Ni Parts 1 & 2** check the pH of the operating solution by taking a 100 mL sample of the solution and cooling it to room temperature. Then, make the pH measurement electrometrically using a pH meter and standardised reference electrode (pH 10 buffer).

b) If the pH of the operating solution is below 10.9 it must be adjusted with ammonium hydroxide to within the recommended pH range (10.9 to 11.4).

ANALYSIS FOR METSTRIP Ni REGENERATOR

Equipment Needed:

- 1 mL pipette - Mohr pipette graduated in 0.1 ml units
- 2 mL pipette - dropper type
- 5 mL pipette - Mohr pipette graduated in 0.5 ml units
- 10 mL pipette
- 20 mL pipette
- 10 ml graduated cylinder
- 100 ml volumetric flask (2 required)
- 11t volumetric flask 20 ml test tubes, stoppered (6 required)
- 1 White background

Reagents Needed:

- Copper Sulphate Solution - add 5 ml of 26° Be ammonium hydroxide (NH^OH) to 75 ml of water and then dissolve 1.5 grams of reagent grade copper sulphate pentahydrate ($CuSO_4$.5HgO). Add water to bring to exactly 100 ml. Ensure that chemicals are added in order given or a solid will precipitate.
- 1, 1, 2 - Trichlorethylene - purchase from local laboratory supply house.
- Standard **MetStrip Ni Regenerator** Solution - into a one litre volumetric flask pipette 0.70 ml of **MetStrip Ni Regenerator** and dilute to exactly one litre with water.

Procedure:

1. Number the test tubes 1 to 6.
2. Into each test tube place 10ml of trichlorethylene and 2mL of copper sulphate solution. This results in the formation of two layers, blue on top and clear on the bottom.

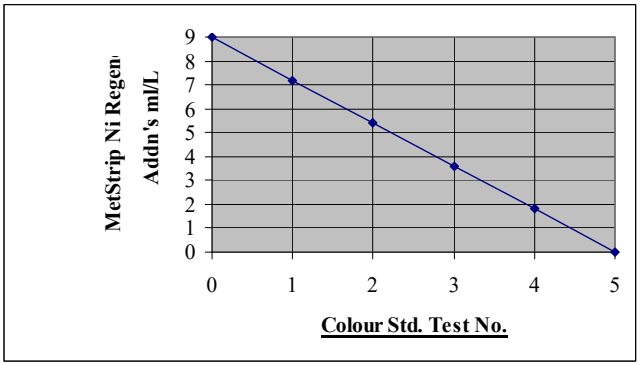
Test Tube Number	ml Standard **MetStrip Ni Regenerator**
1	None
2	1.0
3	1.5
4	2.0
5	2.5

3. Make the following additions to test tubes 1-5
4. Stopper each test tube and shake well. The bottom layers will take on varying shades of amber yellow, the top will remain blue.
5. Take a 150 mL sample of the **MetStrip Ni** operating solution. Ensure that the operating solution has been adjusted to recommended concentration of **MetStrip Ni Part 1** and **MetStrip Ni Part 2** as outlined under "Analysis for **MetStrip Ni Part 2** ".
6. Allow sample to cool to room temperature; then filter to remove particulate matter.
7. Pipette 20ml of the filtered **MetStrip Ni** operating solution into a 100 ml volumetric flask and dilute to exactly 100 ml with water.

8. Pipette l ml of the diluted MetStrip Ni operating solution into test tube number 6 stopper and shake well.
9. Using a white background, compare the amber yellow colour of the bottom layer of test tube number 6 against colour standards number 1 through 5.
10. Use Graph 1 to determine the amount of MetStrip Ni Regenerator to add to the MetStrip Ni operating solution.

GRAPH 1

Determining replenishment additions of MetStrip Ni regenerator for MetStrip Ni operating solutions



Procedure:

1. Determine colour standard that best matches test tube number six. Read vertically to diagonal line then read horizontally (left) to determine g/l of MetStrip Ni Regenerator required.

   Example:

   Colour test tube standard number 4 best matches test tube number six. Reading vertically and left, the operating solution should be replenished with 2.3 ml of MetStrip Ni Regenerator per litre of operating solution.

SAFE HANDLING & STORAGE CONDITIONS:

Before handling, the Safety Data Sheet (SDS) should be read and understood by all personnel in contact with this product. Keep away from extreme temperatures.

DISPOSAL:

MetStrip Ni is an ammoniacal solution and must be neutralised after treatment for nickel metal removal and prior to disposal in an approved manner. Any disposal of this product should be in compliance with all federal, state, and local regulations. Please refer to the Safety Data Sheet (SDS) for instructions regarding proper disposal of this product.

PRECAUTIONS:

KEEP OUT OF THE REACH OF CHILDREN.

Please refer to the label and Safety Data Sheet (SDS) for all warnings, recommendations for safety equipment, and other regulatory information. Copies of the SDS can be ordered by calling +61 3 9768 3860