HN-504 ACTIVATOR IMMERSION PROCESS

INTRODUCTION

HN-504 is the heart of the OS TECH Direct Plating System. It provides the constituents that render non-conductive surfaces conductive. HN-504 is packaged as a two-component system. HN-504A Carrier is the aqueous stabilizer solution and HN-504B Catalyst is the precious metal-containing suspension. When HN-504B is mixed with HN-504A they form the HN-504 activator bath.

OPERATING CONDITIONS

Concentration	94.5 to 95.5% by volume HN-504A 4.5 to 5.5% by volume HN-504B
Temperature	104 to 110 F
Time	7 to 10 minutes

MAKE UP & OPERATING PROCEDURES

Fill freshly cleaned and dried tank about 3/4 full with HN-504A Carrier. Add 5 gallons HN-504B Catalyst for each 100 gallons of finished HN-504 activator solution desired. Stir to disperse the HN-504B. Add more HN-504A carrier to bring bath to operating level and mix well. Use a water jacket around the tank or a heat exchanger in the tank. Heat the HN-504 bath to 104 to 110 F by warming the water in the water jacket or by circulating warm (less than 130 F) water through the coils of the heat exchanger. Do **not** use direct contact immersion heaters in the HN-504 bath. Do **not** use steam or water heated above 130 F in the heat exchanger. Do **not** inject steam directly into the HN-504 bath.

Using parts freshly processed through HN-503 pre-dip, immerse parts into the HN-504 bath for 7 to 10 minutes. Agitate parts horizontally so that HN-504 solution is forced through the holes and into blind vias. A rack agitator with a 1 to 2 inch stroke operating at 12 to 15 strokes per minute is satisfactory. After soaking for 7 to 10 minutes, remove parts from the HN-504 bath. Allow excess solution to drain back into the tank, but do not allow HN-504 solution to dry on the surface. Rinse parts immediately by dipping in a dual cascade counter-flow tap water rinse at 65 to 110 F. Soak parts in first rinse station for 10 to 20 seconds. Soak parts in second rinse station for 20 to 40 seconds. Remove parts from rinse tanks and proceed immediately to HN-505 accelerator.

NOTES

Do not remove parts from HN-504 solution and then re-immerse in HN-504. If parts are inadvertently removed from HN-504 bath before the desired cycle is complete, rinse parts well and rework through the whole process starting with HN-501.

HN-504A Carrier is saturated with inorganic salts. Crystals are usually present in the bottom of the containers. When transferring HN-504A from the containers, the crystals can be left in the container or added to the bath. However, do not use water to rinse the crystals out of the containers and into the HN-504 bath.

CONTROL DATA

Shop Level Control

Check temperature of the HN-504 bath at least once every shift. Adjust temperature of the water in the water jacket or feed water to the heat exchanger so that the HN-504 bath temperature remains 104 to 110 F.

Replace drag-out losses with a mixture of 95% by volume HN-504A and 5% by volume HN-504B.

Never add tap water or deionized or distilled water to the HN-504 bath. All additions to the HN-504 bath used in dip processing **must** be made with HN-504A, HN-504B, or mixtures of HN-504B with HN-504A.

Immersing parts processed in HN-504 into the rinse tank causes the rinse water to immediately become cloudy. Adequate water flow into the counter-flow rinse tanks must be provided to keep the second tank free from cloudiness. The water flow must also be adequate to clear all cloudiness from the first rinse tank before the next basket of parts processed in HN-504 is ready to be rinsed.

Laboratory Control

ANALYSIS

Concentration of HN-504B

1. Using an atomic absorption spectrophotometer (A.A.), analyze the HN-504 bath for palladium using suitable standards to calibrate the instrument.
2. Calculations: Milligrams per liter palladium x 0.019 = % HN-504B in the bath.

Estimation of HN-504B

If an atomic absorption spectrophotometer is not available, the concentration of HN-504B may be estimated using the following procedure.

1. Immediately prior to performance of analysis, prepare standard solutions as follows: In separate 100 ml volumetric flasks place 3 ml, 4 ml, 5 ml and 6 ml of HN-504B Catalyst. Dilute to the mark

with HN-504A only. Do **not** dilute with tap water or deionized or distilled water. Mark standards 3%, 4%, 5% and 6% respectively.

2. Into a 100 ml, volumetric flask place 10 ml of bath solution. Fill flask to mark with HN-504A or HN-504AP and mix well. Do **not** dilute with tap water or deionized or distilled water.
3. Place 10 ml of each of the standard solutions into separate 100 ml volumetric flasks. Fill flasks to mark with HN-504A or HN-504AP and mix well.
4. Using Nessler color comparison tubes (Scientific Products catalog number C6701-2 or equivalent) place the diluted bath sample and each of the diluted standard solutions in separate tubes.
5. Using a light source below the tubes, compare the color of the diluted bath sample with the color of the diluted standard solutions and estimate the concentration of the bath sample.

NOTE: The color of standard solutions of HN-504B changes rapidly. The standard solutions should be prepared the same day the color comparison is to be performed.

Replenishment

Replace drag-out and evaporation losses with a mixture of 95% HN-503 and 5% HN-504B.

Bath Recharging Cycle

HN-504 baths that are properly protected by changing the HN-503 pre-dip at the specified frequency rarely need to be discarded and recharged. Periodic analysis and addition of HN-504A and/or HN-504B to replace drag-out losses and evaporation will keep the bath in balance indefinitely.

EQUIPMENT

Tanks fitted with water jackets or heat exchangers to provide indirect heat are required for HN-504. Direct contact immersion heaters are **not** acceptable. Heat exchanges should be heated with water no hotter than 130 F. Do **not** inject steam or hot water directly into HN-504 solutions. Tanks make of polyethylene, polypropylene, PVC, or CPVC are acceptable. Heat exchangers made of Teflon or titanium are recommended for HN-504 baths heated with warm water.

HANDLING & SAFETY

HN-504A, and HN-504B are irritating to skin and eyes. Protective clothing such as impervious gloves, apron, boots and chemical goggles should be worn when handling these materials. In case of accidental skin contact, flush immediately with water. Remove contaminated clothing and wash before wearing again. For eye contact, flush with water for 15 minutes and seek medical attention. HN-504A, and HN-504B may be harmful if swallowed or inhaled. Avoid breathing vapors or mist.