Technical Service Bulletin

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Insuring Quality In Mechanical Plating And Mechanical Galvanizing

Mechanical Plating is a process that offers the operator the opportunity to check the process during every step in order to make sure that high quality results are obtained with each run. However, it is an operator-controlled process, and each operator is given a great deal of responsibility because he or she is responsible for obtaining quality results.

Before starting, a run card should be prepared. This calculates the amounts of each component to be used in the process.

The first step in the process is cleaning, by which we mean that the parts to be plated must be: (1) free from any organic contamination and (2) free from any oxide film.

The media in the barrel should have the right proportion of each desired size (paying particular attention to the finest size) and should not have excessive quantities of broken beads. In addition, it should not be contaminated with unplated zinc from the previous load or organic materials (i.e., oils).

The parts are loaded to the plating barrel, where the correct amount of Starter is added. Alternatively, Starter Concentrate Liquid may be used with a Sulfuric Acid.

At this point, the operator should make sure of several things:

(1) There should be neither too much or too little water in the barrel - about 1 inch in from the water/media/parts is one checkpoint; another checkpoint is that the water should go about halfway across the barrel at the "puddle's" widest point.

(2) The barrel should be operating at the correct speed. Speeds that are too fast tend to abrade the coating off edges.

(3) There should be no zinc contamination from previous runs in the barrel - if there is, coppering will be difficult or impossible.

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After the parts have run a few minutes in the Starter solution, they should be both clean and free from any oxide or scale.

To check for freedom from oxide films, make a test solution with about 5% Starter and about 3% BIC 303. (Be sure to add the Sulfuric Acid to the water and not vice versa.) Dip the parts in this solution to test them; if they do not copper quickly, they need additional pickling.

After the Starter cycle (cleaning), the correct amount of BIC Powder No. 303 is added to the barrel, and run until the parts are completely coppered. At this point in the process, the parts should have a copper color. If they do not, more copper sulfate should be added until they do. Failure to get a good copper coating may result in adhesion failures after the parts are plated and dried. Failure to get a good copper is usually due to one of two things: (1) trying to plate dirty parts - either with oil on them or with oxide film on them, or (2) zinc contamination in the barrel. Under no circumstances should the operator proceed until the parts are correctly coppered.

After the parts are coppered, the correct amount of Promoter should be added. This should be weighed out carefully, and not just "eyeballed," since it is expensive, and since adding too much or too little has an adverse effect on the process. This should be allowed one minute to dissolve in the barrel.

Then a small add of zinc is added to the barrel in order to flash the parts. This, too, should be weighed carefully. Either too much or too little will give problems with adhesion.

Before proceeding, the parts should have achieved a silvery hue (the tin flash), with the copper base only slightly visible under the flash. Under no circumstances should the operator proceed until the parts are silvery in color.

Next, the adds of zinc as prescribed in the run card are made. It is very important that these adds be spaced correctly; it is also very important that the adds be added to the barrel using the correct procedure, which is: The zinc must be sprinkled slowly over the liquid part of the mix in the barrel, sprinkling it from the back to the front or vice versa. This will allow the zinc dust to become completely dispersed in the plating solution before it is impacted on to the parts by the impact media. If this is not done, the parts will have a lumpy coating and they will have excess part-to-part variability (in other words, some parts will have a light coating and some will have a heavy coating.)

While these adds are being made, it is important to keep monitoring the pH. It should not be allowed to rise above 2. Add Starter or sulfuric acid to keep the pH below 2 as required.

The parts should not be removed from the barrel until the coating is checked for thickness. If the parts do not have enough coating on them, just make more adds until they do.

The operator in mechanical plating is responsible for the quality. Using the checkpoints above will allow the operator to achieve high quality with each run he or she makes.

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