

# Mechanical Plating is a Simple, Reliable Process

**The mechanical plating process, according to PS&T's recommendations, is conducted as follows:**

1. Parts are usually cleaned in a hot alkaline soak cleaner, then dipped in an acid pickle, then rinsed.
2. Clean parts which are free from oil and scale are loaded to a urethane lined plating barrel, usually hexagonal in shape. Plating barrels may have capacities as low as 1.5 cubic feet of parts and as high as 30 cubic feet.
3. Parts can also be cleaned in the barrel using one of PS&T's Cleaner/Descalers specifically designed for cleaning parts in the barrel prior to mechanical plating. Some parts may be plated without cleaning, using the cleaning capability of the PS&T Starter chemistry.
4. With the parts, impact media is loaded to the barrel. Impact media is a mixture of varying sizes of spherical glass beads ranging from 4 mesh up to 60 mesh. Normally equal quantities by volume of glass beads and parts are loaded to the barrel, although heavier parts or heavier coatings of more difficult parts require a higher media-to-parts ratio.
5. The amount of water level in the barrel is then adjusted to an appropriate level for the parts to be plated. For most parts, the water level should be approximately 1 to 2 inches ahead of the media/parts/water mix when the barrel is rotating at the proper speed.
6. The temperature of the media/parts/water mix should be 70°F. to 80°F., although PS&T's processes will operate somewhat outside this range. Lower temperatures result in slower plating; higher temperatures will result in more rapid and sometimes spongy plating.
7. Next, Starter is added to provide the correct chemical environment for the plating process. PS&T manufactures a variety of different Starters as well as Starter Concentrates and SuperConcentrates, which are used with separate acid sources.
8. The barrel is allowed to rotate for approximately two minutes, allowing the complete distribution of the Starter into the mix.
9. Next, a proprietary Coppering formulation is added to the barrel. In combination with the Starter, this formula produces a tightly adherent copper colored coating on the parts, providing a uniform, predictable base for subsequent mechanical plating. PS&T manufactures a variety of coppering formulations (power or liquid). Usually this step requires from 4 to 8 minutes.
10. Once the coppering step has been completed, a proprietary Promoter chemical (powder or liquid) is added (PS&T makes a variety of Promoters for specific applications). This compound promotes the plating of the mechanical plating metal.
11. Next, a small quantity of Zinc Dust is added to the barrel to produce a 'flash' coating that provides a sound base for the subsequent addition of plating metal.
12. Once the parts have achieved a silvery hue, plating metal is added to the barrel in an appropriate quantity for the surface area of parts in the barrel and the thickness of coating desired. Plating metal is extremely fine dust, 3 to 20 microns in diameter; the much larger size of the impact media 'cold welds' the metal plating powder to the parts. PS&T chemistry provides the correct chemical environment for this mechanical plating process to occur.
13. Normally, the metal to be plated is split into a number of separate additions. Increasing the number of separate additions provides a more uniform coating and reduces the part-to-part variation.
14. pH is monitored carefully by the plating operator during the process. The pH is not allowed to rise above a value of 2.0, since plating ceases above that value.
15. Once all of the metal additions have been made, the operator checks the coating thickness. It is important at this point to plate out the metal powder remaining in the barrel, providing for a more tightly consolidated coating and more efficient utilization of the plating metal.
16. Once the parts have achieved the target plating thickness, they are rinsed and separated from the plating media.
17. After the parts are rinsed, they may be treated with a conventional yellow, olive drab, or clear chromate or with PS&T's Hyperguard™ 326™, a trivalent passivate which can be dyed.
18. Following the optional application of chromates or passivates, Hyperseal® may be applied to the surface of the parts. This can significantly extend the corrosion protection of the coating system. PS&T offers a wide variety of Hyperseal® Products.

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