# Finishers' Think Tank



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## Keep It Clean ... Keep It Right ... Keep It Moving

**E** very commerce enterprise has its own unique game plan for maintaining success and building for the future. Perhaps the most critical and acknowledged contribution is ontime delivery of quality goods and services. Job and captive finishing installations are no exception. Process tanks and cycles should be optimized to meet the specific finishing requirements, be it aesthetic appearance or ASTM type. All facets of the finishing operation must contribute to meet the required quality. The foremost trigger to keep the pressure on the finisher is the necessity to meet specific production demands. In effect-run, run, run!

A general industry survey revealed that most customers are flexible with regard to orders placed, pricing and related items. There is one rigid requirement, however: **on-time delivery**. By adhering to a reasonable maintenance schedule, finishers keep their processes on the mark to keep their customers' valued business. All this can be accomplished, in part, by instituting what I refer to as a "Keep It" strategy. It's broken down into three segments: clean, right and moving.

#### Keep It Clean

Clean parts are more likely to be successfully finished. It's a fact: 50 to 75 percent of processed rejects are traced to insufficient cleaning. That statistic clearly speaks for itself. Be certain the chemistry and solutions are the right ones to use. Is the soil an oil, grease, polishing compound, scale or rust? Perhaps there is a metallic or organic coating to be removed. Identifying what needs to be removed simplifies matching the right solution for the requirement. Concentration, time and temperature determine the punch each bath provides. Are they optimum? Only trial evaluations will confirm it. Sometimes, any one or all three processing conditions can be reduced, providing a cost savings to the finisher.

Other criteria—such as determining appropriate maintenance additions to the particular process baths, testing for concentration, cleaning ability and levels of specific contaminants—are used to determine effective service life. Mechanical aids, such as filtration and skimming, should also be evaluated. Quality of rinsing, racking orientation of parts, type of barrel, perforation hole sizes and drainage rotations over the tank also contribute to quality cleaning.

Equipment considerations include calibrated heaters, overflow dams or weirs in cleaners to help separate oily soils (and in tandem with the mechanical aids mentioned), structurally sound tanks, properly grounded without bipolar conditions in the electrocleaner, saddles that make electrical contact, barrels that don't jump off the saddles, properly functioning gears and motors, and racks that make effective contact.

"Keep it clean" also refers to plating and electroless plating tanks. Insufficient removal of soils, poor rinsing and drainage, and porous base metal condition will all affect the plated finish. Corrective action, where needed, should be instituted. Perhaps the customer can help if the base metal can be improved (raw material quality, manufacturing, etc.). Dragging contaminants and soils into the

plating bath will detrimentally affect the applied coating's appearance and wear resistance. Standard filtration and periodic purification treatments should be identified, scheduled and implemented. Ripped or torn anode bags result in roughness and pitting. Plugged anode bags lead to polarization and speed breakdown of some bath organic additives. Dropped parts are always a nemesis. These should be regularly removed from plating tanks. I know it can be difficult, but until someone invents a zinc or brass magnet, they must be removed, nonetheless.

There is a pool of experienced personnel to help make sure that all chemical baths, mechanical devices and related equipment contribute to "keep it clean." Line operators have a special ability to associate the appearance of solutions, parts, pitch of sound in rotating barrels and other factors to cleaning quality. Most suppliers of cleaning systemsespecially those providing their own developed products-know the capabilities and limitations. Working with the plant chemist, they can supplement the typical product neutralization titration with other chemical tests to measure cleaning effectiveness. Equipment suppliers, knowing the conditions of use, can specify the materials of construction, heaters, barrels, baskets, racks and other items for the required quality service life. Sometimes, any one or group of the processing conditions can be reduced, providing a cost savings to the finisher. Setting up the line with the right process tanks, chemicals and equipment not only adjusts related operating costs, but

produces clean parts, keeping the line moving and helping to meet production demands.

#### Keep It Right

Once the desired or preferred operating parameters have been instituted, the cycle for any given job should be successful. Process control becomes very important to keep it right. Specific analysis data interpretation and quality control testing of test parts should indicate requirements for additions, process bath changes or purification. Timeliness of each analysis should be determined on a required basis. Plating baths should be routinely analyzed for basic salts, those proprietary products that can be quantitatively determined, along with appropriate Hull cell testing. A chromate, operating to provide certain salt spray results, may be replaced after a known surface area of parts has been processed through the bath, based on a previous salt spray determination vs. bath life over ft<sup>2</sup> of parts chromated. Measuring contaminants building in a cleaner (metals or split-out oils), volume or pounds of product added, and sample cleaning performance tests may indicate maximum, safe bath life. An acid bath can be checked for concentration of the main acid and targeted contaminants, along with water break and immersion deposit of a metal, such as copper. Plated Hull cell deposits can be measured for stress; iron buildup in a Watts nickel bath or chloride zinc can indicate a tolerance level of these contaminants, past which a specific bath purification treatment is required.

Equipment should also be serviced, sometimes coinciding with a batch treatment or bath replacement. Tanks can be inspected, plating tank liners can be checked and spark-tested, anode bags replaced, heaters calibrated and checked, air agitation lines should be open and be supplying the desired solution movement effect. Filtration equipment should be evaluated for sufficient seals and operating parts. Racks, barrels and baskets are subjected to a great deal of wear and tear. Corroded parts or excessive buildup of plated deposits may require treatments or appropriate replacement of parts. Cracked and worn liners should be replaced. Scheduled equipment maintenance

should be determined by routine inspection, manufacturer warranty and other determined factors based on past line experience.

### Keep It Moving

The finishing cycle generally proceeds uninterrupted if "Keep It Clean" and "Keep It Right" are in place and followed as predetermined. Moving the parts along takes into account the production throughput required, sizes of tanks and related equipment, parts loading per cycle, efficiency of transfer from tank to tank, and residence time in each process bath. Flexibility permits effective use of the line for more than one job. Computerized and automated control can readily adjust the critical operating parameters to meet the requirements of individual work lots. If you have not identified needed maintenance, implement practical checks now. Perhaps a busy schedule has bypassed planned chemical, equipment and mechanical work. The end of the year is rapidly approaching, with its

accompanying open time slots for quality work to keep it clean, keep it right and keep it moving.

Take a practical approach to keeping the operation fit. In the long run, the sum will be:

Keep It Clean + Keep It Right + Keep It Moving = Keep It Fit

And, by the way, is your computer system Y2K-compliant? PASF

### Finishing Trivia

- Electropolishing is very effective in many industry finishing processes. Did you know it's also popular in the manufacture of medical inserts (pins, screws, etc.), prosthetics and surgical devices?
- Trivalent chromium is a required body nutrient. It is readily purchased in over-the-counter multiple vitamins.
- The CASS test was developed through an industry grant to the AESF Research Sponsors.