Finisher's Think Tank



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Taking Control: Do It Right ... Do It Once

Finishing processes and cycles can be quick and simple, or sophisticated and diverse. The objective of the job or project directs us to the appropriate course. Doing it right and doing it once not only speeds us along, but gives confidence that the degree of required quality has been met. That's where control of the operation is so important. Let's review some considerations that contribute to effective control.

Finishing Requirements

Even the simplest job, "bright and shiny," defines an objective. More frequently, the finisher and customer will meet to examine the parts and/or engineering diagrams. Concerns such as thickness of deposit(s), masking, and appearance come into focus. Critical areas (threads, openings, geomet-

ric recesses, etc.) and their effect on the objective should be confirmed. The customer usually submits the overall finishing requirements, both qualitative and quantitative. This may include parts already finished to be used as standards. Corporate specifications or acknowledged ones (Military, ASTM, etc.) may sufficiently address the objectives and requirements.

Take Control *How to Run: Rack vs. Barrel*

The size and shape of parts may readily determine if rack or barrel finishing is the way to go. Either method requires consideration of how to run vs. economics and quality.

- Rack—Use the correct materials, based on conductivity and compatibility with chemical solutions. Rack tips should be stripped of excessive deposits. Racks should be serviced, repaired, or replaced, to allow for optimum performance. Contact points will fixture the parts and regulate current distribution. Parts must be positioned to prevent high-current-density burning, yet provide sufficient low-currentdensity deposit characteristics.
- Barrel-Parts loading is critical for optimum current distribution, to avoid nesting or interlocking and abrading. Determine correct barrel rotation speed. Barrel perforations should be sufficiently sized and unplugged, allowing for ample solution throughput while keeping the load intact. Service or replace danglers. Decide whether warped, damaged doors or bodies can be replaced or substituted with new barrels. Be sure equipment is compatible with chemical solutions (e.g., will fluoride-containing solutions come into contact with uncoated titanium barrel clamps?).

Stay in Control Surface Preparation

It may be that the parts delivered to the finisher have already been precleaned or mass finished. A surface free of soils and oxides should be easily cleaned and activated before the plating, painting, or anodizing cycle. Most parts, however, are received with varying degrees of oil, grease, smut, scales, or rust.

It helps to know the nature of what is on the parts. The customer can assist by describing the related manufacturing process and what fluids or atmospheric treatments have been used. Reputable chemical suppliers usually have related surface preparation experience with regard to methods and specific chemistries. Oils could be chlorinated paraffins, sulfurized, mineral types, or any of other various oils and grease. The soak cleaner should effectively remove these soils. Smuts may be conductive or nonconductive, fine metallic or powder. Oxides and scales may have formed during a particular treatment or surface conditioning. The electrocleaner and acid pickling, in conjunction, should provide a cleaned, active surface, ready for the specific finishing cycle. Cleaners and acids should be prescreened and evaluated for effectiveness. The critical parameters for each selected bath-time, temperature, and concentration-should be confirmed and programmed into the appropriate cycle steps (this includes electrocleaning current density).

There is no substitute for effective surface preparation. This first step is, without equal, the most important one—control it.

Main Finishing Process

Whether it's plating, electroless deposition, anodizing, phosphating, or another process, control and maintenance are critical to success. Having confirmed the appropriate chemical system, "care and feeding" become important and timely. Doing it right means not having to do it over. Stripping and refinishing rapidly dissolve reasonable profits. At worst, the parts may be ruined. Therefore, the investment in process control is certainly worth it.

Particular bath(s) require specific operating parameters and maintenance of chemistries. Routine analysis (wet, instrumental, processing test panels or parts) is usually sufficient to keep the bath right-on. Postfinishing tests, such as plating thickness or salt spray, are good measures of the overall cycle integrity. In some applications, the process cycle may adhere to a specification that may itself designate the bath description and related analysis or testing. Chemical maintenance of plating baths may be simplified by automatic dosing, using equipment interfaced with amperehour meters. Reliable analysis equipment rapidly analyzes for the constituents in specific baths. This may range from conductivity to cyclic voltammetry for concentration measurements. There are many fieldtested proprietary finishing baths in use that meet requirements for just about any finishing cycle. Some of them have been specially approved as either meeting or exceeding given specifications. Control the main process.

Equipment

Equipment in the shop should always be well maintained. Mechanical breakdowns or malfunctions don't just hamper productivity, they occur when the system absolutely cannot afford it. Control the equipment to avoid costly problems and downtime.

- Tanks—Walls may become bowed. Welded joints may become worn and cracked. Liners ripple, bubble, or rip. Routine external and internal checks should be conducted for integrity and appropriate repairs or replacement. Be certain the tank is appropriate for the intended solution (chemistry, temperature, density).
- Heaters—Thermostats have a penchant for sticking open. Coils can become worn and corroded. Electric immersion heaters may crack. Is the heating capacity sufficient or properly rated?
- Chillers—Routine maintenance and service keep things chilled out.
- Rectifiers—Sometimes the current selected and set on the unit is not

the actual amperage. Poor or insulated connections, insufficient cable or bus can be suspect, along with the rectifier.

- Filters—These invaluable purification aids need attention. The manufacturer's recommendations indicate types of purifying agents (carbon, filter aid), charging sequence, replacement frequency, and flow rate. Replace worn parts. Is the filter properly sized for the application? Is the unit compatible with the chemistry being filtered?
- Plumbing—Small leaks foretell big ones and pending disaster. Check for corrosion, wear, warping, or attack by solutions. Where appropriate, use industry standard and ASTM-rated plumbing fixtures and seals.

Control is a critical part of any operation. A lack of it leads to breakdown and disarray. The right control keeps things organized and humming along. Take control of your finishing process. You'll be the happy chief of an efficient operation. *Pass*