Finisher's Think Tank

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Time Check for Finishing

Time, in itself, defines a quantitative span comprising connective links during activities. Most of us measure periods of time in seconds, minutes, hours, days, weeks, months, and years. In many respects, time can be a capable reference tool—or a formidable adversary. Our industry acknowledges time as a most critical parameter or factor in the processing sequence. There are many examples of time's importance and its relation to quality, specification, service life, and general post-finishing applications. Let's do a time check, reviewing some of them.

The Process Line

Design and implementation strongly emphasize the ability to conduct the required cycles. Treatment and immersion in the various baths and rinses conform to operating parameters, which together meet the finishing objective. Based on trial runs, given specifications and productivity goals, time is factored into the cycle by allocating it as required, in each step. Sometimes, due to existing time constraints, it becomes necessary to modify the line or construct a new one.

Automatic lines incorporate programmed time sequences, based on previous confirmation work. Manual lines offer more flexibility in certain baths, such as cleaners, acids, and rinses. This may certainly benefit surface preparation and critical rinsing.

Manual operators normally set automatic timers, providing the times related to critical treatments, such as electroplating. Transfer time between tanks can also be critical. The distance the work progresses down the line may affect additional finishing treatments, such as chrome plating after nickel. In barrel lines, effective transfer time includes sufficient barrel rotations, draining the load. Designing and maintaining the process line for optimum time allocation is the way to keep it on time, all of the time.

Equipment Selection

Equipment, such as heaters, thermostats, rectifiers, filters, racks, barrels, and baskets, can affect time. Start-up is usually the buzzword used early in each day's shift. It's related to preparation for the work. Anticipated productivity is directly related to use of appropriate equipment and timely operation.

The first operating parameter checked in preparation for the day's run is temperature. The source—heat—is normally thermostatically set somewhat earlier, allowing for time to heat and maintain desired temperatures. Heaters (*e.g.*, electric or steam) are rated and selected for optimum heat-up and temperature maintenance. Boilers should provide adequate steam pressure. Sticking thermostats can lead to deep chills or unwanted boiling. Failure to control desired heating makes time a formidable, unwanted adversary, especially early in the day or shift. Properly sized and serviced rectifiers help avoid violations of Faraday's Law. Amps and square footage of work are directly related to the given deposition of any metal per unit of time. Bus connections (correctly aligned and tight), minimum AC ripple, and correct rectification size keep plating times optimum. Filters purify by removing particles and organic contaminants. Filters recirculate baths, thereby avoiding localized depletions. Manufacturers rate filters for speed and effectiveness. We are familiar with such terms as 1-2 or 2-4 turnovers per hour. Proper maintenance, service, and application of the filter help keep the process bath in a good, timely operating condition. Rack, barrels, and baskets (we'll refer to them as limos) carry the work load. Each limo should be selected for compatibility to process solutions, adequately contain or hold parts, and transfer current appropriately per-total-surface-area of parts. Scheduled tune-ups and replacement of worn parts keep limos operating smoothly, and keep their contribution to time and productivity on the mark. Equipment timeliness is affected by selection, maintenance, and application.

Chemicals

Generic and proprietary chemicals are selected for use in specific cycles and applications. Concentration, time, and temperature are the critical operating parameters (three ops). Previous records, process specifications, vendor recommendations, and literature publications are good sources for bath compositions and the three ops. Customizing or modifying cycles requires sufficient testing when changing chemistry to optimize the three ops. Surface preparation, especially cleaning, maintains a strong bond between the three ops. As a general rule, increasing temperature, while keeping concentration constant, reduces the required cleaning time. Analysis, control, and maintenance of specific chemistries helps keep the process bath operation within the time range.

Service Life

The service life of finished parts is related to how they were processed. Proper use of the three ops, equipment in good working order, and the right chemical purification and maintenance, have a direct bearing on quality. Time is, perhaps, the most important of the critical operating parameters, considering all the contributing factors. A more specific determination of service life is the quantitative measurement of corrosion resistance, and the unit of measure is time.

Time will tell how good finished parts really are. Quality time and the right time spent in any process cycle go a long way to meeting or exceeding requirements.

Several years ago, a retired U.S. admiral, credited with helping develop modern computers, was asked what she felt was most critical to her work. She replied, "Watch your nanoseconds." That's one billionth of a second! ***P&SF***