

Automated EN Line

Increases Quality & Productivity

For Michigan's Finishing Services

With the installation of a fully automated electroless nickel barrel plating line, Michigan's Finishing Services, Inc. made some changes to do a better job of handling small parts.

Finishing Services, Inc. (FSI) of Ypsilanti, MI, was already running a manual electroless line with a 350-gal tank when the decision was made to design a new automated line with a five-cell, 950-gal tank. The line has helped the jobshop increase production and quality.

According to company management, the automated hoist control system eliminates time from production runs and provides the company with the repeatability that was hard to maintain with a manual line. The company now has the capability of customizing programs to fit different substrates and thicknesses by varying the immersion time in the process tanks. By looking at the touch screen of the hoist control, an operator is able to track the progress of each barrel and identify any potential problems. The new hoist system also has improved safety features built in.

FSI estimates that the addition of the current electroless nickel plating operation, along with the use of some proprietary electroless nickel concentrates*, has eliminated about two days per month of downtime. That gives the shop two days of added productivity and creates additional revenue.

Diversified Operation

FSI is a specialty jobshop that plates a wide variety of automotive parts, as



Larry Burke, former FSI president, examines throttle body shafts following the EN plating process. Since this article was prepared, P&SF has learned that Mr. Burke, who managed the operation for many years, passed away.

well as non-automotive parts, for a number of customers, using both electroless and electroplating processes. The EN operation plates all of Ford Motor Company's steel throttle body shafts. Electroless nickel is especially suited for the shafts, which play a critical role in engine performance. The process assures coating uniformity, corrosion and wear resistance, all of which are important for performance. The company also plates other Ford parts in some of the other seven processes run in the shop.

Seventeen employees work two shifts in FSI's 25,000-ft² plant. In the past, the shop catered to smaller jobs and handled smaller parts. The Ford business, however, has made FSI a high-volume shop.

The throttle body shaft parts are very delicate and have to be perfect,

because they play an important role in how the car engine performs. The company receives more than 9,000 throttle body shafts on a daily basis. Measuring from four-six in. long and 5/16 in. in diameter, they include slotted and non-slotted shafts. On the EN line, FSI also plates ball bearings that are used in various games and toys.

Flawless Parts

Because of the delicacy of the shafts, they have to be free of nicks and burrs on the sensor (flat) tip. The tip is where the fuel sensor goes on to adjust the car's choke, and the choke plate goes into one of the slots. There can be no bumps or damage to the shaft that might cause irregularity in the running of the engine.

A medium phosphorus electroless nickel (8–10 percent P by wt) is being

used to plate the shafts to Ford's 0.004–0.0007 in. specification. An automated controller** continuously monitors the EN bath and will make additions of nickel and hypophosphite replenishers to maintain the solution's strength within very close limits. The unit contains a custom-designed microprocessor to allow close control and maximum flexibility in the new FSI EN line. By maintaining critical bath parameters, such as nickel concentrations, pH and temperature within recommended limits, the microstructure of the EN deposit will be consistent throughout its useful bath life.

When parts arrive at FSI, they are tagged, identified and numbered. The process sequence starts with parts being loaded onto a barrel and put through a soak cleaner to remove oils and soils. From there, they are moved into a reverse current electrocleaner to remove small oxide films and prepare the parts for the next step. Parts are then placed in a mild acid pickling operation to further activate the base material and prepare them for rapid and uniform initiation in the plating bath. Proper pretreatment is critical to achieving a smooth, adherent electroless nickel finish.

The shafts remain in the EN bath for about one hr and are plated to a 0.0005-in. thickness. That puts them right in the middle of the customer's



A barrel filled with parts is shown being lowered into the five-cell, 950-gal EN plating tank at FSI.

specification. The original EN line is relatively small, and is an all-manual operation. The new line is totally automated and runs on a hoist track. It includes a cross-over shuttle at the rear for crossing over to the 950-gal plating tank.

Because of the critical tolerances

required, special handling procedures are needed. The plated parts are placed on a chute that feeds into a water-submerged dryer basket to prevent the shafts from brushing against each other and causing damage. In the final processing step, the shafts are removed from the water and spun-dried. The parts are then ready to be packaged for shipment.

A previous problem with solution plating to the sides of the tank, rather than parts, was eliminated by changing to the new system. Operators had to stop the process, drain the bath, strip the tank and start over. That would cost the shop at least a full day of production, according to company officials. The new system has corrected the problem.

With the new EN operation, FSI has become more productive and has greater control over processes. This has helped the company to produce the kind of quality needed to be able to guarantee excellence to its customers. *P&SF*



As a specialty jobshop handling small parts, much of the work is handled manually. Here, throttle body shafts are loaded into a barrel that will be automatically moved to the EN plating line.

*Fidelity Chemical Products Corp., Newark, NJ

** Fidelity Chemical Products Corp., Model 240