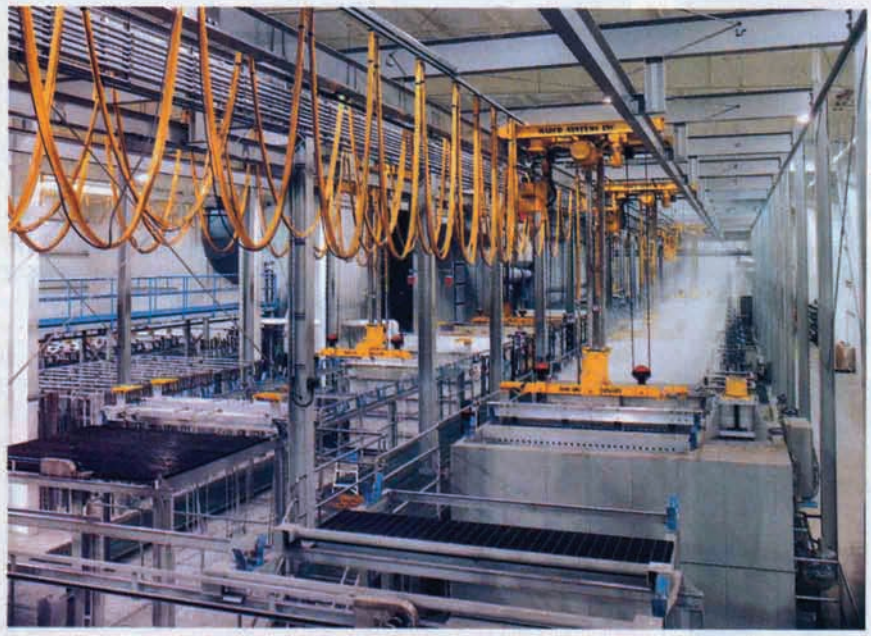
# Automated anodizing meets automotive specs

PC controlled line produces "nearly absolute" repeatability; eliminates operator tweaking.



▲ **Walgren's 290 ft. anodizing line, installed at Pioneer Metal Finishing's Monroe, Michigan, operation, has 73 stations and 48 tank positions.** ***Walgren Co. photos***

Three personal computers automate a recently commissioned anodizing line at the Monroe, Michigan, plant of Pioneer Metal Finishing. The Minneapolis, Minnesota-based custom finisher installed the line to serve Detroit and Toledo area automotive customers, and the automation aids compliance with QS 9000 requirements and internal quality standards specified by the auto industry.

The 290-ft line was engineered by Walgren Co., Grand Rapids, Michigan, and includes 73 stations and 48 tank positions. The process cycle is one to two hours, depending on the anodizing recipe.

One PC contains random software that operates the hoist control. The recipe for each part number is entered in Windows format into this computer. A second PC provides programs that match rectifier recipes to each part recipe, and data is collected for compiling workbar history by the third computer.

## Standardizing the process

Computerization standardizes the anodizing process, according to Scott Turner, general manager of the Monroe operation.

"Where once you would give the job to your key operator and have him develop the first article, now the process is set before the first item is run," he stated. "The advantage, of course, is that once you move through all the steps, repeatability is nearly absolute, and the precision of repeat orders is exceptional."

The four fixed load stations in the racking area are designed for ergonomically correct part handling. The workbars can be lowered below grade to eliminate stretching and bending, and to accommodate employees of all heights. Six racking transfer carts move loads on floor-mounted tracks. Variable-speed transfer motors and two-speed lift motors operate the six 4000-lb. capacity automatic top-running hoists, which move at up to 200 ft./minute.

A manual overhead bridge crane moves workbars individually from the rack area to the automated line. The crane eliminates the risk of workers being struck by carts carrying loads that weigh up to 2 tons.

The 10-ft. long x 6-ft. deep tanks are of varying width. Construction is primarily 1-in. thick polypropylene with stainless steel exterior bracing, and other tanks are 10-gauge alloy 314 and 316 stainless steel.

▲ **A wastewater neutralization section, duplex deionized water system and acid purification unit are key to the waste treatment process.**

▲ **Parts on titanium racks are moved down the line on one of six 4000 lb. capacity automatic hoists.**

## Five colors

Process steps include alkaline clean, etch, desmut, hard coat anodize, sulfuric acid anodize, nitric acid dip, color dye (black, blue, green, gold and red), nickel seal, deionized water seal and dry. An off-line strip and rinse sequence cleans the racks.

Rectifiers rated at 8000 amps and 80 volts power the three hard coat tanks, and the sulfuric anodize has a 5000 amp, 24 volt power supply. The hard coat tanks are cooled by three 200-ton glycol LWT chillers. The water-cooled chillers maintain 30F in the hard coat tanks, and condenser water is supplied by two 440-ton cooling towers.

Sulfuric acid electrolyte from each tank is pumped through one side of a stainless steel plate and frame heat exchanger. The glycol solution is pumped countercurrent to the acid through the other side of the exchanger to maintain the required temperature.

A fiberglass enclosure above and between the two desmut tanks (including the etch) captures fumes generated while the workbars are in the tanks and during transfer between tanks. A 46,600 cfm cross-flow scrubber constructed of polypropylene exhausts the fumes through PVC ductwork.

A push-pull ventilation system with alloy 316 stainless steel exhaust hoods serves the four anodize tanks. PVC ducts exhaust fumes through two fan/separator units—also PVC—with a total volume of 27,000 cfm.

Although the automated line was engineered for high part volumes and long runs, it is not limited to those applications, Turner concluded. "In reality . . . the control built into this system allows it to be used efficiently for small-lot work."■

*Want more information? Circle numbers on reader service card.*
**Pioneer Metal Finishing,** Minneapolis, Minnesota. Circle 301.
**Walgren Co.,** Grand Rapids, Michigan. Circle 302.