*The high-volume rack line is designed specifically for plating lock components for National Cabinet Lock. The company has found that other industries also have components that can be processed efficiently on the system.*

# Captive Shop Uses Automation To Increase Efficiency & Reduce Overhead

***National Cabinet Lock Company has been in business almost 100 years. Trends and demands have caused the company to make major changes, and because of some wise investments and innovative manufacturing techniques, the company is still producing high-quality locks and lock components.***

Starting in 1902 in a shop in Rockford, IL, National Cabinet Lock expanded through the years, and eventually opened manufacturing plants in other states. With the opening of a new, modern plant at Mauldin, SC, in 1982, the company was operating manufacturing facilities at four separate locations—Illinois, Missouri, and two sites in South Carolina.

The Mauldin plant was designed as a high-volume, automated, turn-key facility fully capable of handling all manufacturing needs for the company. Shortly after the 140,000 $ft^2$ plant opened, properties at the other three locations were sold, and all plant operations were combined at the Mauldin site.

Bob Carlson, manager of plating operations, says the Mauldin plant took some getting used to. Moving to the plant from the Missouri facility, Carlson said the operations were larger, faster, much more automated, and more complicated than other National Cabinet Lock plating shops. "We are able to process a much larger volume of parts with a lot fewer people, and the lines are configured so that we can process parts for different finishes without causing delay," Carlson said.

## The Mauldin Plant

The Mauldin plant employs about 250 people for manufacturing a variety of locks and components, including cabinet locks, locking handles and safe handles. The plating shop has 38 employees for staffing two shifts a day, five days a week. The shop provides finishing services for all lock components manufactured at the plant, except keys. Some of the keys are made and plated on-site, but a majority are sent out for finishing by outside platers.

The plating shop is captive, but has taken in some outside work in recent years, and plans to do more in the future. Currently, the shop is finishing parts for screwdrivers for one client. "The screwdriver components are compatible with our own, and that works out well for us," said Carlson.

## High-volume Finishing

National Cabinet Lock has two automated lines—one rack and one barrel. The high-volume rack line is used for bright brass, decorative chromium, bright and antique copper, bright and satin nickel, and zinc

*A multi-stage washer cleans parts before the surface finishing process. Pretreatment is one of the most important operations in finishing lock components. The use of solvents was discontinued when this unit was installed.*

finishing. The barrel plating line is used to process antique brass, brass, copper, nickel and zinc finishes. All are custom processes for finishing lock components.

Carlson says the ideal part size for rack plating at the shop is 2 in. by 4 in. by 8 in., or smaller. Plating tanks are 48 in. by 60 in. The racks are 15 in. by 42 in., and the automatic hoist delivers four racks per tank.

A computerized system controls the processes. Specifications are entered in the control center for each process to be completed. An on-line monitor is available for the line operator to help ensure that all systems are working properly.

In normal operation, the automated rack line delivers four racks per bin, and finishes 76 racks of parts per hour. The rack line processes about 40 million parts each year, while the barrel line finishes a much larger volume of smaller parts, probably more than 10 times the number processed on the rack line.

A fully equipped and staffed laboratory monitors plating solutions and continuously checks the quality of plating results.

## Other Services

The plating department also provides polishing, abrasive blasting and buffing (manual and automatic); vibratory finishing; clear, yellow and black chromate; lacquer coating; and pickling. Automatic buffing machines are used on most parts in the preparation process, with manual buffing and polishing performed as necessary.

## Waste Treatment

The automatic waste treatment system includes batch treatment and continuous processing. Heavy metals are removed through filtration, and the sludge is pressed and dried. Dried sludge is sent off-site to a metal recycling operation. The wastewater is treated and cleaned before it is released to the publicly owned treatment works (POTW).

## Looking Ahead

Carlson said National Cabinet Lock's finishing division plans to offer services to more outside companies. "We have the capacity, and there are a lot of businesses that have a need for a jobshop to finish parts similar to what we already process. Those are the customers we want."

An additional finishing process is also in the plans for the company. Carlson says powder coating is a process that has many applications in finishing lock components. It also has less impact on the environment, so the company plans to install a powder line in the near future. "We will still have a lot of business for our plating operations," says Carlson, "but a powder coating line would give us even more diversity, and allow us to do more outside processing."

Change has been a continuous process for the National Cabinet Lock Company, and it will continue to influence the direction the company takes in the future. Producing a high-quality product more efficiently is the priority, says Carlson, and it requires continuous change to remain successful in meeting the company's goals. *P&SF*