Vacuum Coating Helps This Hardware Manufacturer "Meet Mother Nature On Her Own Terms"

Baldwin Hardware Corporation, Reading, PA, has been making some of the world's finest brass door fixtures and accessories for years. When tighter environmental regulations required process changes for the surface finishing industry, Baldwin didn't settle for finding appropriate alternatives; it used the opportunity to make its products even better. By incorporating physical vapor deposition (PVD) into its finishing process, Baldwin developed a proprietary lifetime finish for its products.

aldwin Hardware Corporation specializes in manufacturing high-quality-finished solid brass door fixtures for buildings, and inside trim for rooms, cabinets and closets. Its products are used on the most expensive homes and buildings in America, usually in the \$700,000 and up range. A new, more affordable proprietary line was recently developed for houses in the \$300,000–\$500,000 range.

Catering to an upscale market, Baldwin has always taken pride in its high-quality products that are known for looking good and lasting a long time.

Processes changed over the years, sometimes because it was necessary to produce less waste without producing an adverse effect on the quality of the parts. Change, however, did not come without its problems.

Finding a Better Way

In 1990, the company was experiencing a problem with finished parts. A clear lacquer top-coat being used in the finishing process wasn't lasting under continuous use on its door hardware. "Our customers were





spending a considerable amount of money to put our products on their doors, and they had every right to expect the finish to last," said Rolin Sugg, vice president of engineering and technical services for Baldwin. "The finish just wasn't passing the test of being exposed to Mother Nature for long periods of time."

Sugg called on Steve Moysan, a young chemist working with the plating operation, to find a finish for the company's products that would last a lifetime. "At that time, it was his only assignment. He worked on it full-time," Sugg said. Today, he serves as finishing systems manager.

Moysan conducted extensive research and brought all kinds of finishing techniques into the plant for testing. One of the parts he tested was brass with a PVD coating that was produced by a company in Germany. The part was virtually unaffected by salt spray and performed best of any exposed to the copper accelerated salt spray (CASS) test.

The PVD process was thoroughly researched, and it was decided that the method would be fully integrated into the finishing process at Baldwin.

Twice the Work

For a Lifetime Finish

Much of the preparation work for Baldwin's top-of-the-line hardware and trim, such as polishing and grinding, is still completed by hand,

Baldwin finishes a variety of high quality brass products for the home, using a combination of electroplating and physical vapor deposition. because of the detail required in the finished product. Some components, however, are processed on automated polishing equipment that was recently installed with other upgrades.

The PVD process has given Baldwin products a "lasting finish," according to Sugg, so the products are now guaranteed for life. The shop operates two different processes to produce the tough decorative finish a plating line and a vacuum chamber. The combined processes are more than double the cost of plating alone, but worth the extra expense to those who want high quality door hardware that will last a lifetime.

All parts are brass and produced inhouse through stamping, forging and machining. After extensive grinding and polishing, parts are cleaned in a multi-stage aqueous cleaning process to remove all residual polishing compound. The parts are plated with a nickel-palladium finish. "It has to be nickel-palladium to give the parts a finish that can stand up to a lifetime guarantee and have a mirror-like luster on them," Sugg said.

After the plating process, parts are transferred to a vacuum chamber where the PVD coating is applied. The zirconium nitride (ZrN) coating gives parts a brass color with excellent abrasion resistance.

The Plating Line

An updated plating line has the capacity to produce four times more parts, while generating only 53 percent more wastewater. Sugg gives credit to Moysan for installing sensible conservation practices in the new line to reduce the use of water. "We don't use any complicated techniques to conserve water or eliminate waste," said Moysan. "We just make use of the technology that's available."

Fogging and misting sprays are used on the line to minimize dragout. This also eliminates the need for rinsing in some stages of the operation and reduces the volume of water used in the process. The system also includes counter-flow rinsing and water recycling, with some water reused in other areas of the operation. The waste treatment system is flowthrough metal precipitation.

The Vacuum Process

After plating, parts are transferred to an environmentally controlled room



Providing door hardware that will last a lifetime led Baldwin to use the PVD process for all its brass products. Photos courtesy of Baldwin Hardware Corporation.

housing the vacuum chamber where the PVD coating is applied. The ZrN finish gives the parts a brass color. The surface becomes hard and impenetrable when a PVD coating is deposited over the series of layers of semi-precious materials, giving the parts what Baldwin has trademarked as "The Lifetime Finish From BaldwinTM." The entire finishing process includes six layers, counting the PVD thin film. A computerized quality control system is used to insure a consistent high-quality finish.

Two lines of hardware are manufactured by Baldwin. The top line is the "Estate Series" that consists of solid brass parts that are popular in an upscale market for remodeling. The "Images Series" is a tubular line that is less expensive and is becoming popular with some home builders. Both lines carry the lifetime warranty.

Growing for the Future

A recent addition of 85,000 ft² of production area gives the company a total of 385,000 ft² in its shop. Sugg said the expansion provides room for another rack plating line that will be in operation before the end of 1996. "We could be the largest captive jobshop using the PVD process in the world," he said.

Baldwin manufactures a high quality line of brass products for the home, from the front door to cabinets and bath, and even candlesticks and desk accessories. The company believes in its products and the craftsmen employed to produce them. By using a proven surface finishing process that includes the PVD process, the company is producing a tarnish-free brass guaranteed for a lifetime. They call it "meeting Mother Nature on her own terms." *PASF*