Team of U.S. & U.K. Suppliers Assists Hardware Manufacturer In Establishing E-coat Line

This picture shows the completed protective coating line at the factory in the U.K. Following testing, the line was dismantled into modular units and shipped to the U.S. to be installed at a door hardware manufacturing facility.

By Stewart Hildred

Producing a superior finish that completely protects products from a variety of corrosive elements is a problem for most metal finishers. It is even more of a problem when the products are to be used outside all of the time.

A leading manufacturer of door hardware in the U.S. has been researching this problem for some time, while looking for a suitable method of protecting its products from weathering, handling, ultra-violet (UV) rays, salt, and other forms of airborne pollution.

Find the Right Protective Coating

The company was in search of a hard wearing, long-lasting, cost-effective—but non-solvent-based—protective coating to be used as a final finish for exterior items, such as door hardware. There were only two options available that would provide the degree of protection required:

- Vapor deposition, a very expensive process, and
- Powder coating.

Neither process was found to be able to withstand the rigors of outdoor life for any length of time, and would not allow the company to give a desirable guarantee on the finish.

The search continued until a proprietary coating was found,[1] which enabled the company to upgrade certain production processes and allow it to offer a 10-year guarantee on products.

The patented clear coating is an environmentally friendly e-coat (electrophoretic coating) that was originally introduced to the manufacturer about five years ago by a U.S.-based agency[2] specializing in metal finishing equipment, chemicals and other process equipment.

To make a complete evaluation of the product before investing in a capital equipment purchase, the company decided to install a small pilot line in 1993. After successful trials, an order for a complete production unit[3] was placed in 1995 for a cost of about $350,000. The equipment was shipped, delivered and installed in less than four weeks.

Custom Design

A joint production team from Process Equipment, Clear Clad Coatings and Kerry, Ltd,.[4] manufacturer of the ultrasonic cleaning system, worked together to install the line. Process Equipment designed and manufactured the line in close association with Clear Clad, which supplied the chemistry. These companies were the three key players for developing the successful process.

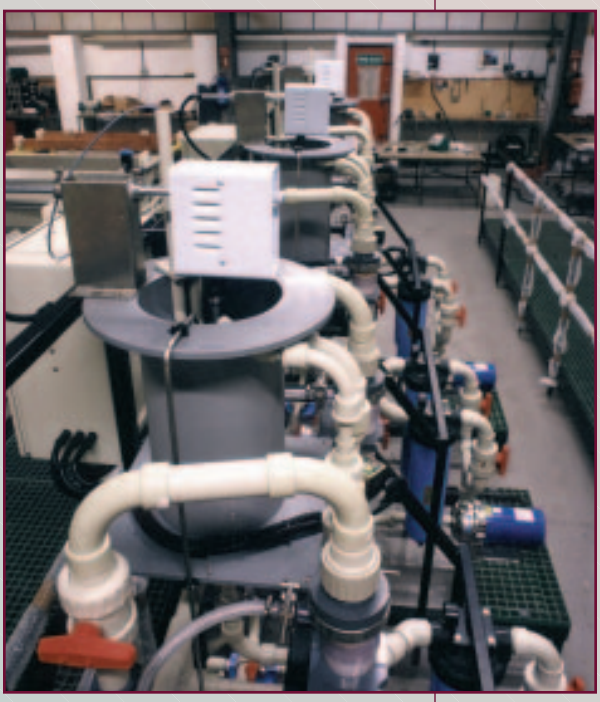
Some of the major components were intentionally purchased from U.S. companies[5–8] so that parts and service would be more convenient.

The new line is ergonomically designed to provide maximum capacity with minimum operator input.

The line was built in a "U" shape with a centralized location for loading and unloading. An integral walkway allows the operator to move along the line.

Unfinished parts are transported with an enclosed overhead hoist, and finished loads are transferred to a conveyorized drying and curing oven. At full capacity, the line is capable of processing 16 flight bars/hr.

Modular construction was used in the design to ensure that all cabling, plumbing and manual valves for each section, located at the rear of the line, can be easily identified.



Controllers for the automatic concentrate mixing and dosing system shown above are located in the center of the line and can be accessed from the walkway. At left is a top view, close-up of the automatic concentrate mixing and dosing system.

All tanks are made of polypropylene construction, except for the cleaner tank, which is stainless steel.

The line also features:

- An automatic concentrate mixing and dosing system for each of the three tanks.
- Automatic conductivity controls and high/low level switches (with alarms) for the rinse aid tanks.
- Ultra-filtration of the coating solution with ion exchange filters and rectifiers with auto-step control.
- Stainless steel cooling coils for the tanks, connected to a chiller unit, which act as the inert anodes.

The line incorporates a reclamation system for the solution, which provides 98 percent utilization of the material, minimizing waste. Filtration is handled by several in-tank systems.

Filtration System Works Well With Design of the Line

The filtration systems are easy to use, adaptable and portable, making them ideal for this type of installation where tank space is at a premium.

Effluent from the pretreatment section is collected in two large floor-standing sumps. P&SF

About the Author

Stewart Hildred is a journalist and photographer who set up his own business 18 years ago, offering technical services to the electronics industry. He worked closely with the surface finishing industry before specializing in this market, with an emphasis on PCB production. He works with some of the leading U.K. equipment and consumables manufacturers. His address is Northern Light Public Relations/Marketing, 7 Wharf Lane, Old Stratford, Milton Keynes, MK19 6AD, U.K.

[1]ClearClad®, LVH Coatings, U.K.
[2]Xontal, Ltd., White Hall, MD
[3]Process Equipment, Ltd. (ProQuip), Aylesbury, England[4] *Kerry, Ltd.,U.K., ultrasonic cleaning system.*
[5]Process Technology, Mentor, OH, heaters
[6]Flo King Filter Systems, Longwood, FL, filtration system.
[7]Darrah Electric Company, Cleveland, OH, high-voltage rectifiers.
[8]Camac Industries, Fairfield, NJ, cooling system and effluent transfer pumps.