Trends in Electrocoating: Largest Contract Coating System In North America to Go On-line This Fall

new 225,000 ft<sup>2</sup> Electro-Coat Technologies (ECT) plant, now under construction in Elkhart, IN, is the largest capacity general industrial electrocoating (e-coat) system in North America. ECT is the newest division of Banks Lumber, Inc. The plant and its 80,000 ft<sup>2</sup> e-coat system and support area will be completed this fall. The system is designed to e-coat large industrial, automotive, truck and trailer, recreational vehicle (RV) and military chassis and frames—or any large industrial building or machine components.

The system has the capacity to handle parts 4 ft by 8 ft-6 in. by 40 ft long and up to 8,000 lb per load bar. The fully automated system has the phenomenal capability to cycle 20 8,000-lb loadbars of produce per hr— 900 ft<sup>2</sup> of surface area per loadbar.

The facility is being built at a cost of \$12 million. If features an 18-stage treatment process that applies proprietary cathodic epoxy and cathodic acrylic processes<sup>1</sup> from two 55-ft, 35,000-gal tanks.

The plant is designed with monitoring and testing features to meet ISO 9000 requirements. Process and coating conformance is designed to meet the corrosion protection requirements of Ford, Chrysler, General Motors, Honda, Toyota, Mazda, Subaru-Isuzu and Nissan, as well as U.L. 1332 and Military P-53084.

The highly advanced plant is built to be environmentally safe with its own closed system, waste treatment plant and process control laboratory, so that it produces virtually no waste. The e-coat staging and processing line is fully automated to run with only 12 people per shift, including control technicians and handlers.

#### Opportunities Offered

"We look at this new facility as a technology oil field," said the

<sup>1</sup>PPG Industries, Inc., Pittsburgh, PA



project's general manager, Dick Sweet, of the opportunity the new plant brings to industries previously unable to e-coat extremely large parts. Sweet, a 24-year veteran of the painting, powder coating and ecoating industries, explained the impact the new plant will have: "With Electro-Coat Technologies, the Banks Lumber Company approached the design with an 'identify a demand and fill it' philosophy. In this case, the demand is for very large components that, up until now, were too big for existing e-coating facilities. If you've been told it can't be e-coated because it's too big, too long or too heavy, we want your business.'

Sweet says the new line has the capacity to e-coat 900 ft<sup>2</sup> of surface area per loadbar; 18,000 ft<sup>2</sup> per hr; 396,000 ft<sup>2</sup> per day; 118,800,000 ft<sup>2</sup> per year; or 1,056,000,000 lb of steel per year. The large capacities are possible because of process tanks with horizontal measurements of 55 ft in length, 12 ft-6 in. tall and 7 ft-6 in. wide.

ECT's ability to finish parts of this size at these capacities opens e-coat opportunities to a large number of tier-one suppliers that have never before realized the benefits of ecoating.

#### Synergistic Manufacturing

Venture Welding, another subsidiary of Banks Lumber, Inc., will be occupying 140,000 ft<sup>2</sup> of the 225,000 ft<sup>2</sup> plant. The company will have eight welding lines.

Venture specializes in producing welding and assembly of RV frames, power slideouts, steps, bumpers and pin-boxes. Venture currently manufactures more than 300 frames per day and performs work for Holiday Rambler, Dutchman, Thor, Lancaster, Crossroads, Forest River, Gulfstream, Sun Lite and Sunny Brook. The company plans to consolidate three welding facilities and one painting facility into the new ECT facility, without displacing or adding to its current staff.

The plant will allow Venture and ECT to store raw steel out of the weather in a heated warehouse to better control the quality of the steel.

"When Venture Welding reaches 700 to 750 chassis a week, that will constitute less than 30 percent of the new Electro-Coat Technologies e-coat system's production capacity," said William P. Banks, chairman of the board and CEO of the Banks Companies.

# Staging & Warehousing

The first element of ECT's quality control begins with staging both raw steel and parts out of the weather in climate-controlled warehouses and staging areas to prevent corrosion before processing begins. Parts are then loaded onto a power-free, overhead conveyor system and moved to a pretreatment area to begin the 18step process. Only parts that have been through the pretreatment, e-coat, cure and inspection are staged in the 20-acre paved staging area outside the plant, unless clients request otherwise.

### Cleaning & Pretreatment

Components enter the e-coat line and production areas unobstructed under a 200-ft, clear-span ceiling that reaches 35 ft at its peak. As the components move from the product loading area, the eight-stage pretreatment process begins:

- 1. Heated spray clean with aggressive alkaline.
- 2. Heated immersion cleaned with aggressive alkaline.
- 3. Ambient immersion rinse.
- 4. Ambient immersion rinse/activator.
- 5. Heated immersion zinc phosphate.
- 6. Ambient immersion rinse.
- 7. Ambient immersion sealer.
- 8. Immersion DI rinse.
- 9. Drain area before charged e-coat application begins.

At each stage of the process, automatic rack tipping devices are used to assure trapped air is released for a more precise cleaning and e-coat application. Components are now completely cleaned, automatically electrically charged and ready for a four-stage process of either cathodic acrylic or cathodic epoxy finish.

### Cathodic Acrylic E-coating

ETC's cathodic e-coat process begins with a uniform immersion coating of specially formulated<sup>2</sup> cathodic acrylic in stage 10. This is followed by:

- A spray post rinse in stage 11.
- An immersion post rinse in stage 12.

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- A second immersion post rinse in stage 13.
- A blow-off cell in stage 14 where excess liquids are blown off the parts to eliminate water spotting prior to the thermal cure oven stage of the process.

## Cathodic Epoxy E-coating

Parts bound for the cathodic epoxy ecoat stages cycle past stages 10–14 for full epoxy immersion at stage 15, followed by:

- Spray post rinse (stage 16).
- Immersion post rinse (stage 17).
- A second and final immersion post rinse (stage 18) before draining and moving on to the thermal cure oven.

### Thermal Curing Oven

ECT's computer automated thermal curing oven is used to get a uniform, baked-on finish with temperatures up to 450 °F. The oven is 54 ft wide by 85 ft long and has an overall height of 22 ft for handling large loadbars of coated materials. Heat is generated by two gas-fired units designed to provide precise temperature control. Loadbars cycle off the line and into the oven at 40 ft/min, automatically kicking off the power indexing to the power and free mode for about 40 min of curing time.

# Cool Down Tunnel

Parts come out of the oven automatically into an 80-ft long cool-down tunnel where the temperature is slowly lowered to about 200 °F to assure the e-coat finish is properly cured. Coated parts then go automatically to the unloading and inspection area for packaging, value added services and shipping.

ECT also offers a variety of added services for customers, according to Sweet. They include product staging, warehousing, special shipping and handling with eight shipping and receiving docks, and other custom service process areas. "We intend to offer sub-assembly, color coding, final packaging and other special services in the near future," he said. **PESF** 

<sup>&</sup>lt;sup>2</sup>PPG Cathodic Acrylic E-coating