

a vacuum. Coating material fills the chamber, coating the piece as it proceeds through the chamber. An air jet removes excess finish. Film thickness is controlled by varying the coating viscosity, vacuum magnitude, and air jet velocity. The technology is limited to pieces with the same silhouette along its entire length. In theory, there is no wasted material as the chamber recycles excess material. Water-based coatings can build up solid coating on reservoir walls and other parts that require cleaning.

Benefits

- ! excellent transfer efficiency (~ 100 percent)
- ! waste coating and VOC emissions essentially eliminated
- ! high production rates
- ! low labor costs

Cautions

- ! piece must have uniform silhouette
- ! primary use for waterborne coatings
- ! thinners and water can be removed from the coating by the vacuum causing viscosity adjustments
- ! some tendency to foam

Dip Coating

Parts are dipped into a tank of coating material. This provides better coverage and causes less waste than conventional air spray systems. Dipping can be manual or pieces can be loaded onto a conveyor that dips the piece into the tank. Excess coating drips off the piece and drains back into the tank. Optimize viscosity for desired coating thickness. If solvent-based coatings are being applied, the system should be enclosed to prevent VOC emissions from escaping the tank.

Benefits

- ! excellent transfer efficiency
- ! reduce wastes
- ! low labor requirements
- ! high production rates

Cautions

- ! finish is viscosity sensitive
- ! not suitable for pieces with hollows or cavities
- ! color change is difficult and slow
- ! appearance is poor to fair compared to spray finishes

Flow Coating

In flow coating, many individual streams (10-80) of coating are directed at the surfaces of the piece as it passes through the flow coating chamber.

Broyhill Furniture Industries Case Study
Conover Plant

In December 1983, Broyhill installed an electrostatic system in their Conover chair plant in order to obtain a better quality finish and reduce material and labor costs. The new system, which uses five electrostatic high speed reciprocating turbo-disks, replaced a conventional spray system. The system also includes a flow coater that applies a sensitizer to make the surface of the chairs stain-conductive, and two non-grain raising stain spray booths.

After the system had been operating for two years, it was determined that material costs were reduced by 25 percent and the new system eliminated the need for six employees, who were relocated into different jobs at the plant. Associated wastes were also reduced and the payback period for the system was less than two years.

Steelcase Inc. Case Study
Fletcher, North Carolina

Steelcase installed a flatline roller coating system in 1985 in order to increase productivity, maintain consistent high quality, and reduce VOC emissions.

Paint was saved through an increased transfer efficiency and by converting to a high solids paint. A 30- 50 percent decrease in rejects and associated touch-up work was achieved, and overall VOC emissions were reduced by 25 percent.