

Case Study No. 3 Waterborne Coatings Aspire Furniture San Diego, CA

Background

Aspire Furniture specializes in decorative and faux-finishing techniques. They manufacture furniture in three main styles: faux stone, parchment, and white- or gold-wash. Substrates finished include wood, paper on wood, and fiberboard encased in resin. Their main products include tables and cabinets. Aspire has 15 manufacturing employees. They began using waterborne coatings after their coating usage began to increase and in anticipation of becoming subject to local VOC regulations. Aspire is located in an ozone nonattainment area.

Manufacturing and Coating Processes

The manufacturing facility consists of a milling/assembly area and the finishing area. Wood tables are purchased premade, while the wood cabinet components and faux stone table tops are manufactured on-site. There is one spray booth, one brushing area, and one sanding booth. The majority of the coatings are applied using HVLP guns.



Spray booth

The faux stone table tops are made by encasing a MDF substrate in a resin and cement mixture to achieve a stone texture.

The table tops then are sanded, and a sealer and topcoat are applied. A parchment-type appearance is achieved by gluing pieces of paper to a wood substrate. A sealer is applied, the product is sanded, and a topcoat is applied. Aspire also is developing a “crackle” finish for some of their products. Glue is applied to the substrate and chipped off in places. A casing paint, color coat, and topcoat then are applied to achieve the desired appearance.



Product samples

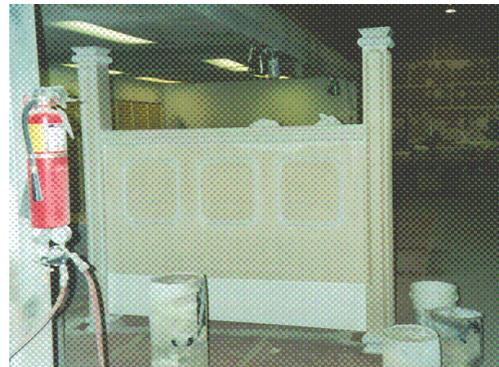
The white- or gold-wash coatings are applied to wood substrates such as bedroom furniture, table bases, and cabinets. A tinted sealer is applied, a topcoat is applied, and then white or gold highlights are applied by hand using a brush. Pieces are allowed to dry at least 48 hours before being packaged and shipped or put

on display in the retail store located on-site. Equipment is cleaned primarily with hot water. Spray gun tips are cleaned once per week with solvent.

Conversion to Waterborne Coatings

Aspire initially used a solvent-borne lacquer to coat the faux stone products, but that coating had a high VOC content, and was not acceptable under local regulations Aspire would have to meet once their coating usage exceeded 500 gallons. They began to investigate waterborne coatings for these products in 1992. Since the faux stone surface is porous, the coating had to be customized to their needs. Occasionally, bubbles would appear in the topcoat or there would be pits in the coating that would cause stains to show. They also had problems with checking and cracking, and replaced many defective table tops that were coated with their initial waterborne coating. Facility personnel also noted that candle wax stains waterborne coatings.

In 1996, Aspire began using waterborne coatings manufactured by Western EcoTec Coatings, and the performance of the waterborne topcoat improved. Although the coating has a longer dry time and the final film is softer than the old lacquer, facility personnel stated that their current waterborne topcoat is much better than the first ones they tried. Aspire continues to investigate high-quality, low-VOC coatings for these products.



Product sample

Aspire also had problems with the first waterborne coatings they tested on their parchment-look products. They stated that they tended to take on a green tint over time. Aspire also incurred replacement costs on these products due to coating problems.

Aspire has had the most success with the waterborne coatings they use on their white- and gold-washed wood products. They have had no problems with this finish; the appearance and performance are the same as the solvent-borne finish they used previously. Facility personnel stated that their clients did not notice any difference when they started using waterborne finishes on these products. Aspire suggested that the reason they did not have problems with these coatings is that so much testing has been done on these types of coatings in the wood furniture industry.

Aspire currently is trying to develop a market for their newest decorative finish. They stated that the appearance is achieved by brushing a small amount of naphtha on the coated piece. However, local regulations prohibit the use of any material with a VOC content of greater than 700 grams per liter. Therefore, since their usage has increased to the point where they are subject to these regulations, they are working with Western EcoTec to develop a waterborne coating that will achieve the same appearance. They stated that the waterborne coatings they have tried to date do not achieve the desired appearance.

When Aspire began using waterborne coatings, they bought HVLP spray guns. The operators had a hard time learning how to apply the new coatings with the new guns. They had to learn the proper application technique for the waterborne coatings and wanted to turn up the pressure on the spray guns since they were used to conventional spray. However, the operators have adjusted, and now have a much healthier work environment.

Costs

The greatest costs incurred were in replacing products due to coating defects. These costs include material, labor, and freight costs. The facility also converted from conventional spray guns (\$200 per gun) to HVLP guns (\$700 per gun). The waterborne topcoat, which accounts for the majority of the coating sprayed at the facility, costs less than the old solvent-borne lacquer (\$20 per gallon versus \$60 per gallon) and has a higher solids content (about 30 percent by weight). Thus, Aspire has experienced a cost savings in coating materials by converting to waterborne coatings and switching to HVLP spray guns.

Emissions

Approximately 95 percent of the materials Aspire uses are waterborne, low-VOC, no-HAP coatings. Coating usage was about 900 gallons in 1997. The majority of the coatings sprayed at the facility are clear topcoats that have a VOC content of about 200 grams per liter. The local standard (San Diego Air Pollution Control District's Rule 67.11) limits the VOC content of clear topcoats to 680 grams per liter. The old solvent-borne topcoat used had a VOC content of about 780 grams per liter. Therefore, they have cut their emissions by about 75 percent as a result of switching to waterborne coatings. Since Aspire's emissions and coating usage are low, they are not subject to the Wood Furniture NESHAP.