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Finishing with a green touch

Ultraviolet coatings, water-based finishes offer an eco-friendly alternative

By Jeff Linville

HIGH POINT — Using FSC-certified woods is one way to be more ecologically friendly, but the benefits to the world don't go very far when smelly, messy finishes are applied to the raw furniture.

"Green" finishes are nothing new — UV-activated and water-based finishes have been around for decades — but they haven't had much impact in the furniture industry.

Furniture veterans long have said that these alternative coatings just couldn't do the job right. Americans like sophisticated, multi-step finishes and eco-friendly alternatives just don't look right or perform right.

But times have changed, and with more emphasis being placed on global warming and saving the earth, more attention and research has gone into "green" coatings.

RPM's Chemical Coatings division has spent many years improving resin coatings that are activated by ultraviolet light. Drew Shatley, RPM's UV projects manager, said the coatings are a virtually solid product, unlike traditional paints and stains that have moisture in them that must dry out.

In a common application, rollers can smear a thick coating of resin over a flat surface such as wood, plywood and laminate-covered MDF. Because it is thicker than a sprayed-on lacquer, the finish is more durable. To bond the coating with the surface, the board is passed through machine that drowns the surface in light from the UVA, UVB and UVC ranges. When the part comes out the other side, the surface is almost completely dry and ready for assembly or packaging.

Traditional solvent-based finishes have volatile organic compounds that have to evaporate from the wood. In furniture plants, the goods are sprayed with stain and then have to air dry before going into an oven to cure the finish. This air drying is very important because if the stain goes into the oven too soon, there is a possibility of a flash fire.

Shatley said plants can apply multiple UV coatings in rapid succession, but it takes days to complete complex multi-step finishes with solvents. This has taken on greater significance with manufacturers focusing on just-in-time shipping, he noted, not



Resin coatings are thick, durable finishes that can be cured with ultraviolet light. These UV finishes, as they are known, are popular overseas, but not as common in the United States. Youth bedroom producer Flexa brought its UV-finishing system from Europe to the U.S. when opening this new facility in December. In rapid succession, the boards travel down the line, passing through a sander, a coatings applicator and a UV light emitter, taking the wood from a raw board to a finished part in a matter of minutes.

to mention that UV users don't have to acquire the same dispensing permits as solvent users.

Some foreign factories rush their goods through the finish process and don't allow enough drying time, said Jeff Topping, U.S. sales manager for Renner Wood Coatings, a division of Renner Sayerlack, the largest coatings producer in South America.

There are some components to nitrous cellulose stains that take up to a month to fully evaporate, he noted. Renner's High Point headquarters has received many calls from retailers asking for help in fixing damaged finishes. Topping said one retailer told him that 70% of his imports damage is found on the corners where the packaging material rubbed against the furniture before the finish had fully cured.

Other benefits of UV coatings include little or no emissions released into the air and the lower energy needed to cure the finish compared to drying ovens.

UV coatings are continually improving, according to Shatley, with complete color systems available.

Not only can the finish be rolled on, there are hybrid UV/water finishes that can be sprayed on like a solvent. Drying ovens dry out the water portion of the finish, with UV curing at the end.

While UV has come a long way, there are still problems with switching fully from solvent to UV. One of the biggest issues is that the finish will not cure if it doesn't get the proper light exposure. This makes it difficult to use UV coatings on furniture with lots of angles and curves — the UV rays might not hit all surfaces evenly, said Gene Beazlie, a Renner color stylist.

Renner does sell UV, but its big focus these days is a line of water-based finishes. Beazlie said he has seen some early attempts at water-based finishes, and the results were poor. The furniture didn't have the depth and clarity U.S. consumers want. After 30 years in the industry, he wasn't very optimistic when Renner sent him to Bologna, Italy, to work with its research team in developing these new finishes.

Fine furniture has surfaces with light and dark shading instead of a single, uniform color, said Beazlie. The process uses spraying, glazing, waxy hangup, fly-specking and hand-padding.

Beazlie said he came back home last summer as giddy as a school boy after seeing that the labs had found ways to give him everything he needed for complex 12-step finishes. He made several finish panels to put on display in the High Point office for manufacturing customers to see.

Renner doesn't use any VOCs in its finishes, but there is a slight amount of alcohol in the dyes used for coloring, said Beazlie. The finish isn't 100% VOC-free, but it's very close, he said.

Water-based finishes don't spread out as far as UV or solvent coatings, said Shatley, so there is some added cost, but finish is such a small part of the total cost of furniture. UV coatings are more expensive than solvent or water-based finishes, but have the highest efficiency since 95% to 97% of the raw product actually becomes part of the finish.

With all the green buzz at the High Point Market, eco-friendly coatings could be an idea whose time has finally come.

been awarded a total of up to \$25.2 million to increase the production of clean and renewable fuels. The New York-based facilities will use wood chips, which contain nearly 50% cellulose. The two projects will build upon ongoing research at several New York universities and accelerate efforts to make wood ethanol work for commercial use.

Most of the ethanol currently produced is made from corn, but wood can produce ethanol with a lot less energy used — plus, the source

can be wood scraps coming from the furniture, kitchen cabinet and wood flooring industries.

Dr. Thomas Amidon, State University of New York (SUNY), has been conducting research in this field for years. His team has been working to refine the process of getting the polysaccharide xylan out of the cellulose found in plants and trees.

"We know our sources of fossil fuel aren't going to last forever," said Amidon. While this xylan

can come from grasses, too, he noted that grass doesn't grow in the winter, and "the trees are here, and they can provide year-round employment."

Also, he said, "One of the advantages to the process is that it does not use any harsh chemicals. Water is the solvent we use."

For more information on cellulosic ethanol, see the March issue of *Hardwood Matters* at www.nhla.com/pdf/HM_March2007.pdf.