Powder Application
Case Study

DVUV and Keyland Polymer – UV Cured Powder Coating for MDF and Other Substrates
Still Going Strong and Expanding

DVUV and Keyland Polymer – UV-Cured Powder Coating for MDF and Other Substrates

It was in October of 2000 that DVUV (then Decorative Veneer) broke ground for a powder coating operation in Plainwell, MI, adding 10,000 square feet to their 30,000 square foot facility to accommodate a UV-cured powder coating application system from Nordson Corporation. Production on the new UV-cured powder system began in April of 2001, making Decorative Veneer the first UV-cured powder coating on MDF (medium density fiberboard) installation in North America. Decorative Veneer moved to the Cleveland, OH area in 2005, and changed the name of the company to DVUV. In 2006, DVUV established Keyland Polymer to develop, formulate, and manufacture UV-cured powder coatings. Keyland manufactures UV-cured powder coatings for MDF, plastic, composite, ferrous, and non-ferrous metals for DVUV as well as other customers.

Of course, the road has not always been smooth. Within the last fifteen years, DVUV has had to overcome a number of challenges. One such challenge that all MDF powder coaters have had to face is identifying and overcoming the variables inherent within the MDF substrate that are not typical of conductive metal substrates. These variables include moisture content, density profile, material composition, and machinability of the MDF board. Optimum moisture content is typically between 4-7% and needs to be controlled throughout the entire process. Consistency of MDF is the most critical factor. DVUV works with high quality MDF board manufacturers such as Plum Creek. High quality MDF substrate that is machined to tight tolerances using sharp routing tools eliminates or greatly reduces the need for sanding of edges or other intermediate processing prior to finishing.

DVUV continues to build market awareness and market acceptance of UV-cured powder coating. UV-cured powder is not new to the powder coatings market, and the benefits of UV powders are numerous, beginning with faster cycle times than thermal (IR and convection) cured powders. Additionally, UV powder ovens and UV lamps are energy efficient, and UV powder is environmentally friendly. One of the first UV-cured powder systems for conductive substrates was installed at Baldor Motors in Westville, OK in the mid to late 1990’s for powder coating and UV-curing of completely assembled motors. Several powder companies were heavily promoting UV curable powders for MDF throughout the ‘90’s and early to mid 2000’s. However, for all of its process efficient, cost effective, and environmentally friendly benefits, market acceptance has been slow to take hold for UV curable powder process technology. DVUV attributes this delayed market acceptance to challenging global and domestic economic events that occurred since 2000.

In total, DVUV and Keyland Polymer currently employ about 21 people. Total combined revenue is roughly $4 to $5 million USD. DVUV, the MDF side of the business utilizes about 15,000 square feet. DVUV’s UV-cured powder system finishes a part in 20 minutes. This process
includes a 1 minute IR/convection pre-heat followed by coating in a fully automatic Nordson Excel® 2000 powder coating system with an iControl® automatic gun controller. The Nordson application gives DVUV the capability to precisely control the application of powder, eliminating any need for manual reinforcement. Once the powder is applied, it is melted in an IR/convection oven for 1 minute and then instantaneously cured by 600 watt UV lamps. Separation of the melt/flow and cure is the key differentiating characteristic of UV-cured powder coating.

DVUV can finish MDF parts as large as 108” long, 60” wide, and anywhere from 3/8” to 1-1/2” thick. The system can also accommodate three dimensional MDF assemblies up to 7” wide. The finished parts cool as they make their way to the manual unload station where they are unloaded, inspected, and staged for packaging. Quality and production repetition is integral to DVUV’s success. Precise control of UV-cured powder application, responsive and accurate oven control, fast and low preheat and melt/flow, and a certain cure from the UV lamps gives DVUV a first pass process quality of better than 99%.

Keyland Polymer, the UV powder development and manufacturing side of the business covers about 10,000 square feet and is located in a building next to DVUV. Keyland’s business includes development of resins for UV-cured powder coatings, which are the backbone of all coatings. Keyland currently employs two full time chemists for daily operations, and two consulting chemists for resin development. Keyland’s sole focus is developing performance and product specific UV-cured powder coatings for MDF and other materials, including plastics, composites, ferrous, and non-ferrous metals. Keyland can perform a full range of material performance testing in its lab. In addition to its powder manufacturing and testing capacity, Keyland also has a demonstration system for product development on three dimensional parts, and a wire and cable coating line for continuous wire substrates. Keyland is continuously improving their coatings through R&D efforts that center on resin development, powder coating additives, and powder application. Keyland continues to improve powder coatings for both MDF and other substrates by concentrating efforts on key characteristics such as performance durability and smoothness of UV-cured powder coating finishes. Keyland has developed and has commercially available a UV-cured powder coating that passes the ASTM B117 1,000 hour corrosion test.

Over the years, DVUV has proven that it can thrive in the still emerging UV-curable powder market. By continuing to add capabilities such as resin development, powder coating manufacturing, and UV-cured application systems design and engineering – DVUV and Keyland Polymer will continue to grow and expand. As market acceptance is taking hold, UV curable powders are proving to be a cost effective, energy efficient, and environmentally friendly alternative to solvent liquid and thermal cured powder coatings.