

Thermoforming Machine

Design, Build project by Nuway Engineering



Nuway Engineering produced a complete system for automating the production of thermoformed vinyl porch posts for one of the largest manufacturers of vinyl railing, fencing, and decking. The process involved heating 4" round extruded vinyl and forming the shape into colonial and traditional style post contours. With a capacity to form three 6 x 6 posts per cycle the press forces involved in the forming process were significant. Nuway developed a custom 1/2 million pound press as the heart of this thermoforming station. 12" thick aluminum molds with coupled with a cooling system allowed for continuous production of the porch posts.



Detailed design and analysis of the various structures and systems was performed by a team of mechanical, automation, and hydraulic designers. The systems included:

- Two speed hydraulic circuit on clamping press
- Pneumatic system for thermoforming and ejection
- Vacuum system for product handling
- Sensors and monitors for tight control and feedback
- Power system with VFDs on feed conveyors and circuits for pumps, saws, and cleanout vacuums



Fabrication and development of each component in the thermoforming system was performed at the Nuway facility. On site integration and testing of each system allowed for the addition of enhancements and improvements along the way. On previous machines, the impact of mechanical push plates or indexing legs would mar the soft surface of the heated vinyl with marks or lines that could remain after the low pressure forming process. Nuway developed a two level heating bed with gentle feed and advancing rollers to eliminate this problem.

A control system with a touch screen interface provided the ability to monitor various phases of the process, provide necessary interlocks, and provide a safe operator environment. The ability to control and monitor the temperature of the heated vinyl is critical for successful production, and the control system allowed for easy selection of temperature levels and gradients custom suited to the size and thickness of vinyl product.

This massive thermoforming station was developed to work seamlessly with the existing extrusion line. The cycle times of the thermoforming were synchronized with the extrusion rate to maintain a continuous flow of product. Formed porch posts were fed through the automated cut-off saw station and ready to send to packaging. Cut-off waste was automatically channeled to recycling bins.

