ABCO AUTOMATION

CASE STUDY

PRIMER CELL

FOR A LEADING

AUTOMOTIVE PARTS MANUFACTURER

PRIMER CELL FOR A LEADING AUTOMOTIVE PARTS MANUFACTURER

INTRODUCTION

A large mid-western automotive company manufactures and provides automotive original equipment manufacturers (OEMs) with sealing systems for doors, windows, trunks, lift gates, sunroofs, and hoods. The company also supplies the automotive market with anti-vibration products, such as suspension strut mounting, spring pads, stabilizers, control arm bearings, and bushings, as well as encapsulated glass, and other rubber components.

As a leading supplier to virtually all the world's largest automotive manufacturers, this mid-western automotive company has vowed that its main quality objective is to constantly strive for manufacturing excellence through continual improvement.

With that goal always in the forefront, the company identified a process improvement opportunity for one of its German-based customers. The automotive company needed to address how it manufactured/encapsulated the customer's rear quarter glass. The current manufacturing process had two prevalent problems: first, it was very labor intensive and second, and more importantly, the process was prone to delivering quality variations. And, in an industry where it is critical to meet performance and product specifications, it was clear that the company needed to automate the process in order to ensure consistency and reliability.

APPROACH

ABCO designed and built a "Primer Cell" that met all the requirements for a comprehensive automated glass encapsulating production line. The primary function of the cell was to automatically apply a pre-mixed primer on the perimeter of the glass, then process the glass through several phases, including pre-curing, final curing, pre-heat, and post-molding cool down.

At the beginning of the production line, an operator places a pair of glass on the loading station that includes a pneumatically actuated shuttle plate and positioning tooling. ABCO included two festo-guided air cylinders to position the glass and non-marring roller tooling to move the cylinders; this would ensure that the glass is accurately positioned for robotic pickup. ABCO specified a KR16 robot to remove a single piece of glass from the loading station and present it to the primer system. The KR16 robot rotates the glass under the primer applicator; this step ensures that the exact amount of primer is spread along the glass perimeter.

As part of the designed process, the KR16 robot places the glass in a horizontal orientation onto a staging table. ABCO added a second robot, KR30

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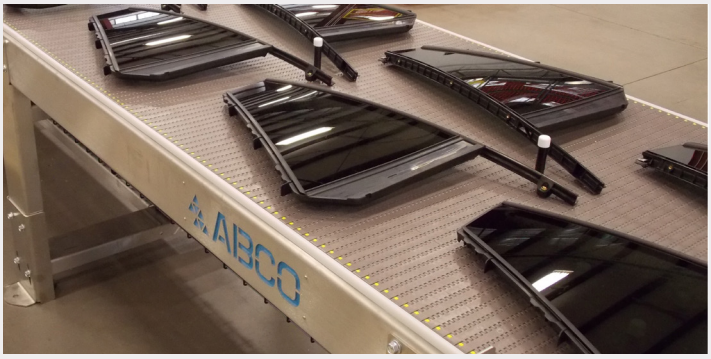
APPROACH continued

to pick up the window glass from the staging table and place it into a carousel magazine where the glass will cure for approximately 60 minutes. ABCO programmed the KR30 to pick up the glass after curing and place it into one of the three heating station shuttle drawers. The glass heats to 120 °C and when the heating cycle is completed the KR30 robot removes the glass from the drawer and places it on a heating station location table. ABCO added a third robot, KR90, to remove the window from the heating station location table and place it into the encapsulation press. During the encapsulation process, the glass piece/part is inserted into a mold where a polymeric material is injected around the perimeter of the glass, creating a molded gasket around the periphery. With ready-to-mount glass parts, automotive production lines eliminate a tedious step in the automobile manufacturing and assembly process.

The KR90 robot also removes the window assembly from the encapsulation press and inserts it into a laser marking station that includes a fume extraction system. For quality control purposes, a CO2 laser marker marks a code, which contains the part number and date/time stamp, onto the encapsulated molding of the window assembly. The final production process step includes the KR90 robot placing the glass in a horizontal orientation onto an ABCO custom designed and built Hedgehog cool down conveyor.



To ensure an accurate post-mold cool down, ABCO strategically positioned and bolted Delrin® support posts with PVC caps on the face of the conveyor material. The support posts allow the glass to cool properly without having to rest the glass directly on the conveyor belt.

COMPONENTS

- Operator's loading station
- Three 6 axis robots
- Sampling chute
- Primer dispenser system (client supplied)
- Carousel magazine
- Three heating station location tables
- Four infrared temperature sensors
- Three diffuse photoeyes (for glass detection)
- Encapsulation press (client supplied)
- Laser marking station
- Fume extraction system
- ABCO Hedgehog cool down conveyor
- Rockwell Automation ControlLogix L72 PAC system

PRODUCT BENEFITS

- Enhanced sealing between the glass and vehicle's bodywork
- Noise reduction from airflow passing between the glass and vehicle's bodywork
- Improved safety and aesthetics of glass

AUTOMATION SYSTEM BENEFITS

- Turnkey system ensures all components work together from the onset
- Single contact point for design, build, and services of machines keeps the project on track, on budget
- Fully automated operations maintain product standards, increases throughput, and reduces labor
- Customized solution meets all production process criteria, allows specialized equipment to be integrated into process

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