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## Sampling of Vision Projects

### A. Clutch Plate Stack Assembly Verification

**Customer:** Automotive/Off-Road Vehicle Transmissions

**Description:** A clutch pack assembly that was manually built up was verified by counting the alternating plates. Detection of missing or duplicate plates were made as well as measuring the overall stack height to ensure assembly was within spec. A second camera verified that a central hub was present and properly inserted.

**Platform:** Cognex Insight (2 cameras) with ring light and back light

**Additional:** The inspection station was built on a strapping machine that would strap the final assembly once verified. Additional mods to the machine included two-hand tie down initiation of the inspection and strapping process. All control logic was performed by the camera processor.

### B. Clutch Pack Disk Inspection

**Customer:** Automotive/Off-Road Vehicle Transmissions

**Description:** Inspection of automatic transmission clutch plates was required after a grinding to dimension. It was required to detect flaws such as chips, gouges, discolorations and excess adhesive on both sides while the parts moved past the cameras at 100 parts per minute. This required 2 cameras, lights, PC and Ethernet communications for the inspection process as well as a PLC, VFD and encoder for the motion control.

**Platform:** DVT Smart Cameras (2 cameras) w/ 8" ring lights

**Additional:** The inspection station was built as a custom self-contained conveyor module with a PLC, touch screen panel PC, cameras and lighting. A magnetic conveyor section allowed inspection of the underside of the part as it passed over a second camera.

### C. Color Vial Inspection machine

**Customer:** Pharmaceutical Manufacturer

**Description:** Inspection machine was designed to be added to an already existing line. Inspection was required to count colored vial jars in each tray, verify the color caps were correct for the product being inspected, and verify the vial jars were upright and oriented correctly for further downstream processing. Inspection time for two trays was 3 seconds. Trays consisted of 400 vials with product specific color caps. Our machine would inspect 2 trays simultaneously using Cognex vision systems.

**Platform:** Cognex Vision Systems

**Additional:** After Lab testing, it was determined a custom housing would need to be built to house the Cognex Cameras due to the dynamics of fluorescent lighting in the production testing environment. Being a color application, controlled ambient lighting was a must in order to obtain the highest accuracy reading and manipulating of RGB values for the color inspection.

#### **D. Product Label Inspection**

**Customer:** Pharmaceutical Distributor

**Description:** Label Inspection was implemented in a new labeling line. Acuity PC based vision hardware was used to inspect the lot/Date codes and product identification barcodes at a rate of 3jars/sec. Product failed by the inspection would be tracked and rejected.

**Platform:** Acuity Vision Systems

**Additional:** After full implementation of the line and inspection equipment, the line was validated by an outside validation specialist and performed flawlessly after a few minor tweaks and changes.

#### **E. Vehicle Windshield Glass Checking**

**Customer:** Automotive Glass Supplier

**Description:** An inspection station was added to the glass production line after the glass came out of the mold furnace. Glass was formed on a mold to the appropriate curvature for the car body. As the glass passed through the inspection booth, the camera observed a pattern on the glass which was a warped reflection of an array of fluorescent tubes located above. The curved patterns of the reflection from the straight light tubes were checked for the proper curvature and dimensions of the finished window.

**Platform:** Industrial Computer with dedicated vision processing card and custom software

**Additional:** Defects in the glass could be caught by looking dead on at the glass, but the proper curvature could only be measured indirectly via the reflections.