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RETURNABLE VALVE TRAYS ON THE JOB AT FORD MOTOR COMPANY

Creative Techniques designed and manufactured a custom returnable packaging tray for engine valves, with automated interface capabilities, for use at Ford Motor Company's Essex Engine Plant (Ontario, Canada). The trays have improved part quality and reduced packaging material and labor costs.

Precision Components Demand Special Handling Requirements

Engine valves are manufactured by first tier automotive suppliers to the exacting requirements of the automotive OEM. Truly precision components, these parts are critical to the performance and long-term life of a car's engine. Any step along the path of an engine valve's method of production and final assembly must not compromise the product quality of the valve.

As a result, when Ford Motor Company began to design and build a new engine facility, virtually all product handling and assembly methods were carefully reviewed and often, re-engineered.



Ergonomically-designed returnable/reusable valve tray segregates each valve during shipping and allows for complete automated interface.

An Old Way and a New Way

Traditionally, engine valves that were manufactured on the outside were most often wrapped in wax-like paper and placed in bulk in cardboard boxes, which were then banded to wooden skids for outbound shipping. Manufacturing plants receiving these components would then de-palletize these boxes and stage them at assembly work stations, where an assembly line worker would unwrap the valves and manually place them in the cylinder head of the engine.

Despite these relatively standard handling and shipping practices, there were a number of potential problems along the route. First, there is a large amount of expendable packaging that would be continually required and used for shipping the valves, despite ever-increasing environmental concerns, legislation, and disposal costs. Second, there was also a tremendous amount of indirect labor hours that were involved in the packaging and handling. Both of these are continual costs that would be spent

each time a valve was manufactured, unlike the one-time, fixed cost of a returnable packaging system.

Next, valves are relatively heavy parts that can be densely packed, causing the cardboard boxes to potentially exceed ergonomic guidelines.

Finally, disposable packaging can cause product contamination with fiber and paper dust, and manual handling leaves opportunities for dropping or damaging valves, both concerns when it comes to product quality.

Returnable Packaging Solves Problems

The solution for the handling of these engine valves was to engineer an injection-molded plastic returnable shipping tray with automated interface capabilities, thereby eliminating excess labor, packaging materials, disposal costs, and eliminating potential quality issues.

Creative Techniques was invited to participate in the early stages of this project, working in a simultaneous engineering approach with Ford Motor Company, the valve supplier (Eaton Corp., Kearney, Nebraska), and the assembly system integrator. The result was a valve tray that was ergonomic in design, fit AIAG (Automotive Industry Action Group) pallet footprint requirements, segregated the valves during transport, and allowed for complete automated interface and valve handling. Not only was the final tray design and material selection cost effective, but they would also allow for the repeated washing and associated temperatures that these trays would see during their return trips to the valve supplier.

Ford's benefits included a faster and more consistent method of valve train assembly, with improved quality, and reduced packaging material and labor costs.