Meter, Mix and Dispensing Equipment Key to Multiple Connector Assembly Case Study

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The Background

The perfect computer environment entails a controlled temperature, an even humidity and protection from contact and airborne contaminants. Now, put those same sensitive computer parts under the hood of an automobile. Subject those very delicate parts to wide swings in temperature, salt, humidity, engine fluids and vibrations, and the duplication of the perfection of a clean room environment would seem like an automotive engineer’s worst nightmare.

But it’s all in a day’s work for Augat Automotive (acquired by Thomas & Betts), a leading supplier of precision terminals, fasteners, connectors and assemblies for automotive applications. In this case, a module consolidates all the connections between the vehicle’s controls and its computer. The module plugs into the computer, trying all the peripherals to it. Some 80 wires come together in the plug-in device that becomes the main connection in the computer network.

Encapsulation of the connectors by something impervious to assault, obviously, is required. Designing a manufacturing system to achieve the demanding production rates of 720 connectors per hour and maintaining the quality was the challenge.

Nordson Sealant Equipment in Wixom, Ml., has supplied the meter, mix and dispense equipment for this application to a number of major automotive OEMs, enabling them to enhance their ability to meet the increasingly strict quality standards of the “Big Three” automakers. The Augat Automotive application is an example of how encapsulating-material suppliers, automated-conveyor-system designers and manufacturers of dispense equipment can cooperate closely to satisfy the demanding requirements of customers.

How important is the meter, mix and dispense equipment?

At the very heart of Augat Automotive’s highly efficient production line lies four SEE-FLO 690 meter/mix/Dispense units made by Nordson Sealant Equipment. Specializing in fully integrated production systems since 1967, Nordson Sealant Equipment’s potting operation is smooth and predictable, allowing a single operator to produce 4 80-pin power train connectors every 20 seconds.

A two-component polyurethane material formulated by Biwax Corp., Des Plaines, Ill., is dispensed exactly to the volumetric mix ratio (2:1) by positive-displacement metering pumps. As the rods are forced into the displacement metering cylinders, outlet valves open to permit the proportioned volumes of resin and hardener to flow through to the Snuf-Bak™ mix-at-the-nozzle dispense valve. There is no dripping or wasted material. A special SEE-FLO disposable, static-mixer nozzle eliminates the need for solvent flushing...friendly to the environment and to the worker. Should production need to be halted for any reason, the nozzle will automatically purge itself of mixed material after its potting life of five minutes and refresh itself with new material.

The fast-setting material (5 min./100 grams) when cured remains pliable at temperatures as low as -40°C, and yet maintains stability at temperatures of up to +125°C. The viscosity of the material was formulated to prevent seepage through the connector’s pin holes. The A and B components are fed to the 4 SEE-FLO 690 systems via transfer pumps that are gravity fed from 4 55-gallon drums utilizing special "breathers" and hoses to prevent atmospheric moisture from contacting the polyurethane material.

Prior to potting, aluminum pallets, containing 4 80-pin power train connector assemblies each consisting of 2 40-pin chambers, are loaded onto the conveyor. Preheated in an oven (consisting of medium-wave quartz emitters and aluminized walls for maximum conductivity), they arrive at Nordson Sealant Equipment’s potting station at approximately 185°F. This preheated stage allows for elimination of any ambient moisture, improves the flow of the potting material and enhances the polyurethane-to-part bond.

At the potting station, dispensing may be controlled manually or automatically. In this application, PLC-based controllers integrate the meter/mix/Dispense equipment with the manufacturing automation. Nordson Sealant Equipment’s engineered AirDrulic™ power-drive feature ensures a controlled, constant dispense flow rate.

After potting four connectors simultaneously, the state-of-the-art conveyor system carries the connectors to the infrared oven containing short-wave emitters and, again, aluminized walls for greater efficiency. This oven heats the parts to the precise given temperature necessary to obtain the proper cure. The pallets then enter a chilled cooling section where parts reach a temperature of 125°F, low enough for a gloved worker to remove them from the line and pack them for shipment.
A Win, Win Solution

Increased production efficiency, a minimum of manpower and high-quality production standards were the objectives of the project. A space-age potting material, the ingenuity of the oven/conveyor system designers and customer input have produced a successful manufacturing process. The heart of the operation will continue to be the contributions of the meter/mix/dispense operation. Every facet of the process is working together for a common goal: to manufacture high-quality products for the end user.

Nordson Sealant Equipment Facility
28775 Beck Road in Wixom, Michigan

Nordson Sealant Equipment Staging Area

Why choose Nordson

In highly competitive manufacturing markets, productivity is vital and performance is essential. That’s why we apply both to everything we do, whether it’s our products, expertise or outstanding customer service. We’ll always be there to help maintain the new standards you’ve set, with expert service and support delivered through our teams working across the globe.

This unique Nordson approach helps you reach new levels of production, while working more accurately, efficiently and competitively than ever. Precisely why manufacturers who demand quality, can rely on Nordson.

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