AW-LAKE
PROCESS FLOW MEASUREMENT

APPLICATION SPOTLIGHT

Density Control for Automotive Headlamp Coatings

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APPLICATION:

A Tier-1 automotive supplier contacted AW-Lake seeking to improve product quality and material efficiency in their polycarbonate lens hard-coating process for headlamp assemblies. In this precision finishing operation, a thin, protective coating is sprayed onto molded polycarbonate lenses to provide UV resistance, scratch protection, and long-term durability. The customer's goal was to reduce waste from overspray and achieve tighter control of coating consistency to enhance first-pass yield and overall production efficiency. To accomplish this, they needed a way to verify and maintain the correct density of the coating material being recirculated through the process.

PRODUCT SUPPLIED:

- AW-Lake TCM-28K Coriolis Mass Flow Meters

CHALLENGE:

During the coating operation, a portion of the applied polymer overspray is collected, filtered, and blended back into the system with virgin material. The challenge lay in maintaining the exact ratio of reclaimed to virgin hard coat, as even small variations in concentration or density could lead to inconsistent coating thickness, haze, or surface finish issues—factors that are unacceptable in automotive lighting applications subject to stringent OEM appearance and performance standards.

Traditional flow and level sensors could not accurately detect small density differences in the mixed material, making it difficult to control the blend ratio automatically. The customer required a high-accuracy density verification system capable of detecting density changes down to the thousandth of a gram (g/cc). The solution also needed to integrate with the plant's PLC-based automation system, enabling real-time feedback control of the blend process.

SOLUTION:

After reviewing the process and consulting with the customer's corporate paint application specialist, AW-Lake recommended integrating a TRICOR TCM-28K Coriolis Mass Flow Meter into the circulation loop connected to the day tank feeding the spray system.

Coriolis flow meters are recognized throughout the coating and chemical industries as the gold standard for precision mass flow and density measurement. Unlike volumetric meters, which can be affected by viscosity, temperature, or entrained air, Coriolis meters directly measure the mass flow and density of the fluid in real time, providing unmatched accuracy and repeatability.

By continuously monitoring the density of the blended coating material, the TCM-28K enables the customer's PLC to automatically adjust system valves and maintain the target specific gravity of

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1.13 g/cc—which corresponds to the ideal 80:20 blend ratio of reclaimed to virgin polymer. This automated feedback loop ensures that every batch remains within specification, eliminating manual sampling, guesswork, and waste caused by off-ratio material.

In addition to delivering ±0.1% flow accuracy and density resolution to the nearest 0.001 g/cc, the compact TCM-28K meter offers the robustness required for continuous industrial operation. Its all-stainless-steel construction and high-frequency, dual-tube design resist coating buildup and maintain calibration stability over time.

AW-Lake's engineering and applications team provided integration support, assisting the customer's controls engineers with communication setup and calibration validation to ensure seamless operation with their existing control system.

RESULTS:

The implementation of AW-Lake's Coriolis solution provided immediate process improvements. By continuously verifying density and automatically maintaining the precise blend ratio, the customer achieved consistent coating thickness and optical clarity across every headlamp lens. Material efficiency improved through optimized use of reclaimed polymer, reducing waste and saving thousands of dollars annually in raw material costs. Process automation minimized operator intervention and virtually eliminated rework associated with coating inconsistencies.

Beyond improving quality and cost efficiency, the project also demonstrated how AW-Lake partners closely with customers to deliver innovative, data-driven solutions for modern manufacturing challenges. The success of this installation has since prompted the customer to evaluate the TRICOR Coriolis technology for additional coating and mixing applications within their global operations.