

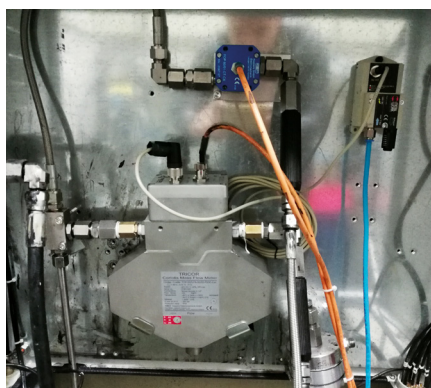


APPLICATION SPOTLIGHT

Electrostatic Paint Spray Systems – Custom Flow Solution



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APPLICATION:

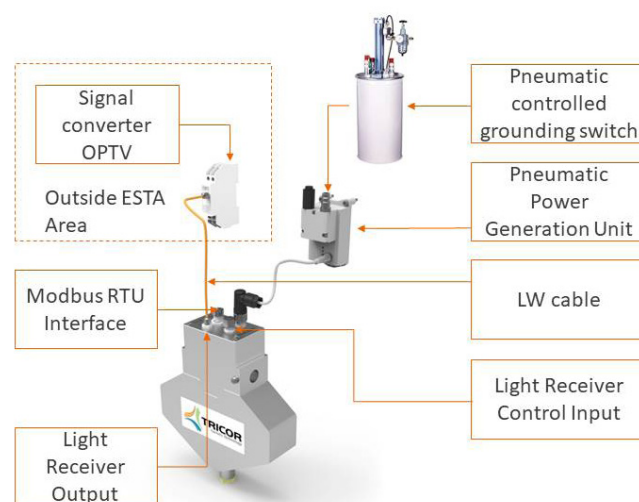
Today's automotive coatings are very different than legacy, solvent-based paints and coatings. To reduce VOC (volatile organic compounds) in meeting environmental compliance, paint companies now produce water-based paints. While safer for the environment, these water-based paints pose a challenge in achieving maximum coating transfer efficiency. Due to the water content in the new paints, these coatings are highly conductive.

As high-efficiency electrostatic bells and spray guns used in coating line systems directly charge the paint with 50 to 90KV, the negatively-charged paint is attracted to positive-grounded parts. When painted, these parts attract paint on all sides. As more paint goes onto the part, less coating is wasted in the form of over spray, reducing costs. However, this efficiency is unachievable if the highly-conductive coating causes a direct short to ground. To solve this potential problem, the paint supply is isolated from the ground. While it still becomes charged, the high voltage of the paint is maintained at the applicator due to its isolation.

Existing high-precision gear meters used for flow feedback with traditional solvent-based paints and coatings are unsuitable for the new water-based paints due to their low lubricity. For this application, a new measurement solution was needed that could operate with the charged water-based paints and download output to a programmable logic controller.

PRODUCT SUPPLIED:

- Coriolis Mass Flow Meter designed for Electrostatic applications
 - Medium: water borne and some 2 components/hardener.
 - Temperature: 68°F to 86°F (20°C-30°C).
 - Pressure: Up to 2,900 psi (200 bar).
 - Measuring range: 50 to up to 1,000 cc/min).
 - Viscosity: 50-1,000 cP (varies depending on coating material and temperature).
 - Density 1.1 – 1.3 kg/l (2.42 – 2.86 lb/l)
 - Certifications: ATEX/CSA: Zone 2, II 3G Ex nA IIC T4, Class I Div 2 Group A-D T4.





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CHALLENGE:

As traditional solvent based paints/coatings are resistive and don't require isolation, standard high-precision gear meters were adequate for flow feedback. Due to the lack of lubricity of most water-based paints, the gear meters became unsuitable, requiring a new flow measurement solution that posed two challenges:

1. Flow technology must be compatible with high-friction paints/coatings.
2. A method was needed to send flow rate data to a programmable logic controller for remote monitoring.

SOLUTION:

AW-Lake developed the world's first Coriolis meter system compatible with electrostatic water-borne paints and coatings. The Coriolis meter is used within an Electrostatic application (ESTA) system at the same voltage potential as the paint supply, regardless if the high voltage is active or the system is grounded.

The four primary components of the system include:

1. A Model TCM 0325 Coriolis Mass Flow Meter (TRICOR Specialty Classic Series) with fiber optics for pulse output/input
2. Light receiver module
3. Pneumatic-driven 24 V DC power supply
4. Pneumatically-controlled grounding switch to isolate or ground the conductive paint supply.

In addition to the Coriolis Mass Flow Meter, AW-Lake sourced key components of the ESTA system that included the fiber optic amplifier, fiber optic cable, and light receiver. The system was delivered quickly and offered at a well-balance price-to-performance ratio.

OPERATIONAL ADVANTAGES:

- Mass or volume based measurement independent of density and viscosity.
- Measurement accuracy up to 0.1% of reading (depending on flow dynamics).
- Repeatability better than 0.05%.
- Fast response times for painting applications.
- Compact, wear-free and low maintenance.
- Especially suitable for particle-loaded paint compounds.