

## **Fuel-Water Separation Challenges in High Surfactant Content Ultra Low Sulfur Diesel and Biodiesel Blends – New Coalescence Media for Reliable Water Separation**

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### **ABSTRACT**

Emergence of fatty acid methyl esters (biodiesel) as a diesel fuel blend component, as well as fuel additization for management of mandated fuel sulfur reductions, have resulted in dramatic increases in fuel surfactant levels. This step change in fuel surfactancy has given rise to consistent failures of conventional separation and coalescence media used for separation of water from diesel fuel. The loss of water separator activity is not reflected in current industry standards which continue to specify testing in low surfactancy fuels. Variation in biodiesel quality also implicates surfactancy sources beyond fatty acid methyl esters. Reported here are results of coalescing media development efforts that focused on treating fuel-water separation as an adsorption based or liquid-solid separation problem. SAE J1488 tests were run with developed media and traditional coalescing media in tandem elements within identical housings in 20% biodiesel blends (IFT=13.5). Developed media yielded 86% water removal efficiency uncorrected for dissolved water content of the fuel. Also reported are results of flat sheet studies in 20% biodiesel evaluating water removal efficacy of superabsorbent polymer (SAP)-containing media typically used for fuel de-watering in dispensing filters. In these studies, SAP-containing media passed 40% of emulsified water to the accepts side of the media before reaching terminal pressure drop.

### **Bio Sketch**

*Christine Stanfel has been with Ahlstrom Filtration since 2005 with a primary focus on filtration media development for the changing North American diesel market.*

*Before joining Ahlstrom, Christine was a Senior Scientist with EXXON Chemical Company with development responsibility for Heavy Duty Diesel lubricant soot control additive packages. She joined Weyerhaeuser in 1999 and worked as a Senior Scientist in Fine Paper Operations Support at Weyerhaeuser's Technology Center in Federal Way, WA. In 2000, she accepted a Senior Manufacturing Engineer role and managed product development, process optimization, and cost reduction at Weyerhaeuser facilities in Wisconsin, North Carolina, and Kentucky.*

*She represents Ahlstrom with the Society of Automotive Engineering (SAE), and participates in the American Filtration Society (AFS), Association of the Nonwoven Fabrics Industry (INDA), and the American Chemical Society (ACS).*

*Christine has a PhD in Physical Inorganic Chemistry from Stanford University.*