NEW COALESCENCE MEDIA FOR WATER REMOVAL FROM ULTRA LOW SULFUR DIESEL AND BIODIESEL BLENDS – ELEMENT PERFORMANCE WITH/WITHOUT DUST CONTAMINATION

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ABSTRACT

The practice of blending biodiesel or lubricity additives into diesel fuel has increased diesel fuel surfactancy. 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. Water separation remains possible through the use of multiple media types bundled together in more complex filter systems; however, such systems are increasingly challenged by diminished space allotments in next generation engines. As such, a single media solution for water separation in today's fuels remains a goal of considerable interest. However, any media used for water separation in additized fuels must also provide traditional filtration capability, such as adequate removal of solid contaminants, while maintaining water separation performance. In the past results were reported of coalescing media development efforts that focused on treating fuel-water separation as an adsorption based or liquid-solid separation problem. Stationary phase surface area invariably promotes separation in adsorption based regimes. Media were developed with a 6 fold increase in surface area per unit weight and a 19 fold increase in surface area per unit area relative to commercial separation media currently used for this application. In this study, elements containing the media were tested and demonstrated 95%, 91%, and 87% water removal efficiencies (unadjusted for fuel dissolved water content) when tested in the SAE J1488 Emulsified Water/Fuel Separation Test Procedure with Ultra Low Sulfur Diesel (ULSD) (IFT 12.6 dynes/cm), B2 (IFT 16.5 dynes/cm), and B10 (IFT 14.2 dynes/cm), respectively. Under the same test conditions, unadjusted time weighted average water removal efficiency of conventional coalescence media was 87% (ULSD), 76% (B2), and 61% (B10) and traditional barrier media was 34% (ULSD), 23% (B2), and 16% (B10). Water separation performance of the high surface area media was additionally tested after loading with ISO fine and medium test dust, and compared with traditional counterparts.

BIOGRAPHY

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Bio

Christine Stanfel joined Ahlstrom in 2005 and was given responsibility for R&D efforts targeting media development for North American diesel and biofuel filtration. 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 and a Senior Manufacturing Engineer managing 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) Filter test methods Committee, 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.