Specialty Fuel Additives

US Industry Study with Forecasts for 2016 & 2021

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US demand to grow 4.8% annually through 2016

US demand for specialty fuel additives will grow 4.8 percent per year to $1.6 billion in 2016, with volume demand increasing 1.1 percent annually to 725 million pounds. Advances will be driven by a mild rebound in petroleum fuel demand as the economic recovery continues to strengthen and by an increase in additization rates due to rising biofuel consumption as mandated by the federal government. Additionally, market growth will reflect continued price inflation due to upward pressure on raw material costs as natural gas prices rebound from their 2012 lows.

Cold flow improvers to grow at fastest rate

Cold flow improvers will grow at the fastest rate through 2016 due to the increasing use of biodiesel in the fuel supply, a requirement of the EPA's Renewable Fuel Standard 2 (RFS2). Biodiesel’s reduced functionality in diesel engines in winter conditions requires higher loadings of cold flow improvers, which will help drive demand. However, biodiesel’s high cetane number and excellent lubricating properties will also reduce demand for lubricity improvers and cetane improvers, making them the only additives to experience a decline in volume demand through 2016. Dyes and markers will be mildly impacted by an end to EPA-mandated dyeing of high sulfur fuels, while metal deactivator loadings will decrease slightly due to the use of more metal-free additives in fuel. Demand for antioxidants, corrosion inhibitors, and other additives will all expand at a moderate pace, due to increasing fuel demand.

Deposit control agents will remain the largest product segment. A previous attempt by the EPA to regulate detergent levels in gasoline actually resulted in a decrease in demand, causing deposit-related engine problems. This prompted several automakers to establish the Top Tier Detergent Gasoline standard in 2004. Deposit control demand rebounded quickly as most major gasoline brands adopted the Top Tier standard. Future growth in this segment will be aided by recent retailer efforts to differentiate their products by promoting the high concentrations of detergents in their gasoline.

Blenders, terminals to remain largest market

Blenders and terminals will remain the largest market for fuel additives. Demand in this market will continue to grow as marketers attempt to differentiate their fuel offerings to end-consumers. Aftermarket volume demand will benefit from customers’ efforts to offset rising gasoline costs by increasing fuel efficiency.

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The market for antioxidants used in gasoline and other fuels is forecast to increase 4.6 percent per annum to $110 million in 2016, with volume demand expected to grow just below the overall average to 25 million pounds over the same time period. Higher biodiesel usage, combined with the fact that biodiesel is more unstable and requires more antioxidants, will benefit demand. Some types of antioxidants can reduce NOx emissions when added to biodiesel. Furthermore, as emissions regulations become more stringent, antioxidant consumption will rise. Negatively influencing volume demand will be the production of more effective antioxidants (which will lower additization rates) and better refining. Stricter CAFE standards will cause the amount of fuel consumed to increase only marginally through 2016, which will prevent demand for antioxidants from growing at a faster pace. Rapid chemical price increases will drive dollar value demand.

Antioxidants are used as a stabilizer in fuel and are incorporated into gasoline and other fuels to preserve the product during storage, enabling fuels to be stored for longer periods of time. These chemicals are typically added by the end user or those storing fuels for long periods to prevent fuel components from reacting with oxygen in the air to form peroxides or gums. Antioxidants work by reacting with free radicals, thus inhibiting the propagation of radical oxidation, which generates peroxides. Peroxides can reduce antiknock quality and damage fuel or fuel system parts composed of elastic polymers. They also create soluble and insoluble gums, which can lead to engine deposits, fuel filters, engine system fouling, performance loss, or at worst, engine shutdown. These additives are needed in most fuels, but especially those with high olefin contents, such as gasoline.

Hydrotreating required for ULSD removes natural antioxidants in the fuel. Biodiesel, especially in combination with ULSD, has higher free radical content and is more prone to peroxide formation.

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<td><strong>1268</strong></td>
<td><strong>1600</strong></td>
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</table>
Albemarle Corporation
451 Florida Street
Baton Rouge, LA  70801
225-388-8011
http://www.albemarle.com

Sales:  $2.9 billion (2011)
US Sales:  $1.1 million (2011)
Employment:  4,260 (2011)
Key products:  antioxidant fuel additives

Albemarle is a global supplier of specialty and fine chemicals that enhance consumer products. The Company operates through three segments: Polymer Solutions, Catalysts and Fine Chemistry.

The Company participates in the US fuel additives industry through the Polymer Solutions segment, which posted 2011 sales of $1 billion. The segment produces two main product lines: curatives and stabilizers, and flame retardants. Albemarle’s stabilizers and curatives line includes antioxidant additives for fuels and lubricants. In 2011, curatives and stabilizers accounted for sales of $221 million.

Antioxidant fuel additives from the Company are marketed under the ETHANOX brand name and are designed to extend fuel storage life and protect fuel systems, as well as control the formation of insoluble gum. In addition, ETHANOX antioxidants increase resistance to oxidation and help meet government and original equipment manufacturer guidelines. Albemarle makes ETHANOX additives for aviation and motor gasoline, aviation turbine fuel, diesel fuel oil, and other applications. Specific antioxidant fuel additives from the Company comprise ENTHANOX 4733 noncorrosive types that are engineered to inhibit

“Demand for specialty additives incorporated into regular and midgrade gasoline is projected to advance 4.6 percent annually to $935 million in 2016, with volume growth projected at nearly one percent growth per year, reaching 412 million pounds over the same time span. Growth in volume will primarily stem from increased deposit control additization by gasoline retailers to brand their products as superior, while value growth will be due to an increase in chemical prices.”

--Section V, pg. 119
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Other Studies

World Catalysts
World demand for catalysts will rise 5.8 percent per year to $19.5 billion in 2016. Rapid growth will occur in both Asia and the Middle East. Brazil will lead strong growth in Central and South America. Polymerization catalysts will experience the fastest growth, driven by healthy expansion of polymer resin production. This study analyzes the $14.7 billion world catalyst industry, with forecasts for 2016 and 2021 by material, type, market, world region and for 24 countries. The study also evaluates company market share and profiles industry players.

#2989 .............. February 2013............... $6400

World Fuel Additives
The world fuel additives market will rise 8.0 percent yearly to $59.4 billion in 2016. The rapidly growing fuel market in China will drive gains, especially as China’s fuel standards become stricter and additive treat rates rise. Deposit control additives will see the greatest gains globally, while cold flow improveers grow at the fastest rate. This study analyzes the $40.5 billion world specialty fuel additives industry, with forecasts for 2016 and 2021 by product, application, world region and for 19 countries. The study also evaluates company market share and profiles industry players.

#2977 .............. December 2012 ...... Price: $6100

Synthetic Lubricants & Functional Fluids
Demand for synthetic lubricants and functional fluids is forecast to climb 6.6 percent per year to $7.4 billion in 2015. Engine oil will remain the fastest-growing product type. Group III base oils and polyalphaolefins (PAOs) will be the fastest growing materials. The vehicle and equipment market will remain by far the largest outlet. This study analyzes the $4.9 billion US synthetic lubricant and functional fluid industry, with forecasts for 2015 and 2020 by product, material and market. The study also evaluates company market share and profiles industry competitors.

#2842 .............. February 2012............. $4900

Oilfield Chemicals
US oilfield chemical demand will rise 8.3 percent yearly through 2015, driven by the recovery of oil prices and the development of shale gas resources. Stimulation and cementing chemicals will be the fastest growing products, followed by drilling fluids. Natural gums, polymers, acids and surfactants will be among the best prospects in raw materials. This study analyzes the $9.1 billion US oilfield chemical industry, with forecasts for 2015 and 2020 by product and raw material. The study also evaluates company market share and profiles industry players.

#2821 ............. November 2011 ............... $4900

World Lubricants
World demand for lubricants will rise 2.6 percent annually through 2015. Asia will remain the fastest growing region, followed by the Africa/Mideast region and Central/South America. Manufacturing and other markets will outpace the motor vehicle aftermarket. Hydraulic fluids and process oils will be the fastest growing products. This study analyzes the 37 million metric ton world lubricant industry, with forecasts for 2015 and 2020 by formulation, product, market, world region and for 31 countries. The study also evaluates company market share and profiles industry players.

#2771 .............. July 2011..................... $6100

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