Lightweight Automotive Materials in North America

Industry Study with Forecasts for 2018 & 2023

Study #3153 | June 2014 | $5100 | 375 pages
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Demand in North America to rise 5.2% annually

Demand for lightweight automotive materials in the North American light vehicle market is anticipated to rise 5.2 percent annually to 22.3 billion pounds in 2018, valued at $31.5 billion. Advances will significantly outpace gains in automotive materials overall, with regulatory pressure being the major force propelling growth. The current race to lighten the automobile is largely being driven by the increasingly strict fuel economy standards being adopted throughout North America. In August 2012, the US issued new corporate average fuel economy (CAFE) standards for model year 2017-2025 light-duty vehicles, with the nominal requirement of 54.5 miles per gallon by 2025. Canada and Mexico have implemented standards aligned with US CAFE requirements in recent years and are expected to continue to do so going forward, seeking to establish continent-wide regulations to ensure that their respective automotive industries remain competitive.

Exterior, structural segment to be fastest growing use

Among applications, the best growth prospects are forecast for the exterior and structural segment, propelled by the ongoing development of lightweight materials suitable for use in structural applications and the substantial weight savings such materials can provide. In fact, this sector will account for nearly three-quarters of total average vehicle weight reduction through 2023, with body and frame applications alone accounting for about half. Interior applications are relatively mature and will see only limited growth going forward, as plastics have long been used in interior components, thus restricting opportunities for further weight reduction.

High-strength steel to be fastest growing material

Aluminum and high-strength steel represent the primary lightweight materials employed in the North American automotive market. Aluminum will enjoy rapid growth in exterior and structural applications, as automakers explore the adoption of this material in place of steel for body components such as closures and panels. High-strength steel is predicted to offer the best opportunities for growth based on its relatively low cost and the ongoing development of new grades that provide a combination of exceptional strength and formability, which will make it the material of choice for structure and frame applications. Engineering plastics will remain the leading polymer type through the forecast period, having successfully supplanted metals in a number of applications based on advantages such as their ability to enhance design freedom. Demand for high-performance composites will rise rapidly from a small base due to the materials’ substantial vehicle weight savings potential.
Nylon -- Demand for nylon used in the production of light vehicles is forecast to increase 3.9 percent per year to 800 million pounds in 2018, valued at $1.8 billion. Nylon will continue to enjoy healthy growth due not only to its strength and light weight, but also to its low thermal conductivity, resistance to heat, chemicals, and corrosion. Nylon’s unique combination of properties has enabled it to supplant die-cast aluminum and other metals in engine and mechanical applications such as air-intake manifolds, valve covers, and fan shrouds. It is also employed in fuel line components and is gaining share at the expense of metals in parts such as engine mounts and pedals. While nylon will continue to gain use on a per vehicle basis, opportunities will be limited to some degree by competition from alternatives, particularly reinforced polypropylene. For example, Volkswagen has adopted reinforced polypropylene in place of glass-reinforced nylon for air intake manifolds on a number of its cars. Bioplastics are also being developed to compete with nylon in underhood applications.

Nylons, also known as polyamides, are the oldest and most widely used type of engineering plastic. Nylons exhibit high strength and stiffness, good chemical- and abrasion-resistance, a low coefficient of friction, and fair electrical properties. In addition, nylons have a high softening point and are durable at low temperatures. These resins demonstrate considerable variation in flexibility and stiffness and can be tailored to meet performance requirements for a variety of applications. The dominant grades of nylon are nylon 6 and nylon 6/6, which account for the bulk of demand because they provide premium stiffness, strength, and heat-resistance properties. Nylon 6 has a lower melting temperature than nylon 6/6 and is more moisture absorbent. The capacity to absorb moisture gives nylons low dimensional stability, although the special grades of nylon 6/6 provide significantly higher flexural strength, stiffness, and warpage resistance than unreinforced grades. Other types include nylon 6/10, 6/12, 6/66, 11, and 115.

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United States Steel Corporation
600 Grant Street
Pittsburgh, PA 15219
412-433-1121
http://www.ussteel.com

Sales: $17.4 billion (2013)
Select Geographic Sales: (2013 as percent of total) North America 83%
Employment: 38,500 (2013)
Key Products: high-strength low-alloy & advanced high strength steel

United States Steel Corporation produces and sells steel mill products, coke, and taconite pellets. The Company also provides real estate development and transportation services. The Company operates in four segments: Flat-Rolled Products, Tubular Products, US Steel Europe, and Other Businesses.

The Company competes in the North American lightweight automotive materials industry via the Flat-Rolled Products segment, which generated sales of $11.6 billion in 2013. The segment manufactures a range of steel sheet products for the automotive, converter, energy and appliance, and construction industries, among others. In 2013, transportation applications, including automotive, accounted for 17 percent of the Flat-Rolled Products segment’s total steel shipments. For lightweight automotive end uses, US Steel manufactures high-strength low-alloy (HSLA) and advanced high strength steel (AHSS), which are both designed to reduce vehicle mass and weight without sacrificing strength and safety performance.

HSLA steel from the Company encompasses hot-rolled, cold-rolled, and hot dip galvanized types. This steel features good welding...
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**Engineering Plastics**
Demand for engineering plastics in the US is expected to rise 2.6 percent per year to 5.1 billion pounds in 2019. Nylon, ABS, and polycarbonate will remain the three largest engineering plastics by volume, with nylon the fastest growing of the three. Smaller-volume engineering plastics such as polyphenylene sulfide, sulfone polymers, and fluoropolymers will grow the fastest. This study analyzes the 4.5 billion pound US engineering plastic industry, with forecasts for 2019 and 2024 by resin and market. The study also evaluates company market share and profiles industry players.

#3242 ………… April 2015 …………… $5300

**World Polyethylene**
Global polyethylene demand will rise 4.0 percent yearly to 99.6 million metric tons in 2018. The Asia/Pacific region will remain the largest and fastest growing market, driven by China. Following a decade of decline, North America will add nine million tons of production capacity through 2023. This study analyzes the 82 million metric ton world polyethylene industry, with capacity, production and demand forecasts for 2018 and 2023 by product, market, world region, and for 27 countries. The study also evaluates company market share and profiles industry players.

#3210 ………… October 2014 …………… $6200

**Coated Fabrics**
US demand for coated fabrics is projected to advance 3.2 percent per year to 680 million square yards in 2018. The large motor vehicle market will drive gains, promoted by a higher number of air bags – usually employing silicone-coated nylon – per light vehicle. Smaller markets such as awnings, canopies and wall coverings will grow the fastest. This study analyzes the 580 million square yard US coated fabric industry, with forecasts for 2018 and 2023 by product, substrate and market. The study also evaluates company market share and profiles industry players.

#3176 ………… July 2014 …………… $5300

**Silicones**
US demand for silicones is forecast to climb 4.7 percent annually to $4.3 billion in 2018, with volume rising 3.2 percent per year to 900 million pounds. Silicone elastomers will grow the fastest, overtaking fluids as the leading product type. The construction and medical markets will be the fastest growing segments, while the industrial market will remain dominant. This study analyzes the $3.4 billion US silicones industry, with forecasts for 2018 and 2023 by product, market and application. It also evaluates company market share and profiles industry players.

#3138 ………… March 2014 …………… $5100

**World Tires**
World demand for tires is forecast to rise 4.3 percent per year to 2.9 billion units in 2017. Gains will continue to be led by developing countries in the Asia/Pacific region, particularly China and India. Growth in the dominant motor vehicle market will be driven by increases in motor vehicle usage in developing countries. This study analyzes the 2.4 billion unit world tire industry, with supply and demand forecasts for 2017 and 2022 by market, world region, and for 26 countries. The study also evaluates company market share and profiles industry competitors.

#3105 ………… January 2014 …………… $6100

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- Water Treatment

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