Flame Retardants

US Industry Study with Forecasts for 2016 & 2021

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Robust gains in building construction -- particularly for new housing -- as well as in other closely associated markets such as wire and cable, and home furnishings, will drive advances.

US demand to expand 6% annually through 2016

US demand for flame retardants will expand 6.0 percent per year to 1.1 billion pounds in 2016. Robust gains in building construction -- particularly for new housing -- as well as in other closely associated markets such as wire and cable, and home furnishings, will drive advances. Stringent fire codes and flammability requirements, especially in building materials and consumer products, will also support flame retardant sales. However, health concerns about some flame retardant chemicals will limit faster increases, particularly for halogenated flame retardants, some of which are being voluntarily phased out by the industry despite their effectiveness.

Construction markets to show best opportunities

One of the most important factors affecting flame retardant demand in the US is building construction spending, with the construction market alone accounting for 38 percent of total flame retardant demand by volume in 2011. Double-digit annual growth in both residential and nonresidential building spending through 2016 will lead to robust gains for flame retardants in insulation materials such as cellulose, foamed polyurethane, and polystyrene, as well as PVC and other materials used in flooring, panels, piping, and other construction products. Other flame retardant markets are also heavily impacted by building construction, including textiles (e.g., carpets, curtains, and rugs), insulated wire and cable (e.g., building wiring, connectivity wiring), and furniture and mattresses.

The ongoing rebound in the US motor vehicle industry will also have a positive impact on flame retardant demand. Rising vehicle production levels, the increased use of lighter weight plastic and composite materials that offer improved fuel efficiency, and elevated temperatures in under-the-hood applications due to smaller, hotter running engines will all contribute to increasing motor vehicle flame retardant demand. Efforts by Boeing and Airbus to improve airplane fuel efficiency through the increased use of composites and other plastics, along with the industry’s strict flame retardance standards, will drive gains in the aerospace market.

Boron compounds to register fastest growth

With new residential building construction driving rapid increases in cellulosic insulation demand, boron compounds will register the fastest growth going forward. Alumina trihydrate will achieve strong gains as well and remain the most significant flame retardant by volume, representing 39 percent of demand in 2016. Non-halogenated phosphorus compounds and other types with more environmentally friendly profiles will benefit from industry efforts to forestall increased regulatory scrutiny.
Flame Retardants
US Industry Study with Forecasts for 2016 & 2021

Sample Text, Table & Chart

MATERIALS

Acrylonitrile-Butadiene-Styrene

Demand for flame retardants in acrylonitrile-butadiene-styrene (ABS) is forecast to reach 1109 million pounds in 2016, valued at $55 million. Demand in electronics housings and blends are increasing, being used in multiple applications, boosting demand in ABS. Further advancements will be threatened by competition from less expensive or higher performing resins such as polypropylene and thermoplastic elastomers, particularly in flame retardant applications such as automotive under-hood parts and appliance housings.

Brominated compounds accounted for 55 percent of flame retardant demand in ABS in 2011. The most widely used brominated flame retardants in ABS are tetrabromobisphenol-A (TBBA) products and their derivatives, along with antimony trioxide as a synergist. Although TBBA is most often used as a reactive flame retardant, such as in epoxy formulations, TBBA use in ABS is in an additive capacity. DecaBDE has also been employed in flame retardant ABS systems to a lesser extent. With the phasing out of decaBDE for most uses by the end of 2012, and all uses by the end of 2013, the fastest growth for flame retardants in ABS will occur in ATO compounds.

Flame retardant ABS is predominantly used in the electrical and electronics market. Key commercial applications include housings, trays, and other parts for business equipment such as personal computers and laptop computers, printers and other computer peripherals, copiers, fax machines, and telephone and other telecommunications equipment. These products mainly use some flame retardant ABS and polycarbonate/ABS blends. ABS/PVC blends are used to a lesser extent in these applications. In transportation equipment, flame retardant ABS continues to be used in the manufacture of automotive under-hood parts.

Table: Flame Retardant Demand by Product

<table>
<thead>
<tr>
<th>Item</th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
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<td>12959</td>
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<td>15200</td>
<td>17200</td>
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<tr>
<td>lb FR/mil $ GDP</td>
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<td></td>
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<td>Flame Retardant Demand</td>
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<tr>
<td>Alumina Trihydrate</td>
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<td>0.97</td>
<td>1.06</td>
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<tr>
<td>Flame Retardant Demand (mil $)</td>
<td>718</td>
<td>897</td>
<td>790</td>
<td>1150</td>
<td>1450</td>
</tr>
</tbody>
</table>

Sample Profile, Table & Forecast

COMPANY PROFILES

Nabaltec AG
Alusträße 50-52
92421 Schwandorf
Germany
49-9431-53-0
http://www.nabaltec.de

Revenues: $179 million (2011)
US Revenues: $23 million (2011)
Employment: 400 (2011)

Key Products: aluminum hydroxide, aluminum oxide hydrate, and magnesium hydroxide flame retardant fillers

Nabaltec is a manufacturer of flame retardant fillers for the plastics industry, and base materials for use in technical ceramics, catalysis, and the refractory industry. The Company functions in two segments: Functional Fillers and Technical Ceramics.

The Company is active in the US flame retardant industry through the Functional Fillers segment, which generated revenues of $118 million in 2011. Via this segment, Nabaltec manufactures a range of functional fillers, including non-toxic and environmentally friendly aluminum hydroxide, aluminum oxide hydrate, and magnesium hydroxide flame retardant fillers. These non-halogenated flame retardant fillers, which are marketed under the APYRAL and APYMAG brand names, are used in the manufacture of such products as adhesives, coatings, printed circuit boards, cable compounds, conveyor belts, hoses, carpet backing, polyurethane foams, and cast resins.

Nabaltec’s APYRAL aluminum hydroxide flame retardant fillers have a very high chemical purity of at least 99.5 percent, with the

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“Demand for flame retardants in construction products is projected to grow 8.7 percent per annum to 465 million pounds in 2016, valued at $455 million. This will represent a rebound from the double-digit annual declines between 2006 and 2011 caused by the housing crisis and economic recession. Best opportunities are expected for flame retardants in insulation, based on good growth in residential building construction expenditures and resultant demand for insulation.”
--Section V, pg. 129

TABLE V-3
CONSTRUCTION PRODUCTS MARKET FOR FLAME RETARDANTS BY APPLICATION
(million pounds)

<table>
<thead>
<tr>
<th>Item</th>
<th>2001</th>
<th>2006</th>
<th>2011</th>
<th>2016</th>
<th>2021</th>
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<td>Building Construction (bil 2005$)</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>550</td>
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<td>FR Demand in Construction Products</td>
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<td></td>
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<td>Insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>580</td>
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<tr>
<td>Roofing Material</td>
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<td></td>
<td></td>
<td>48</td>
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<tr>
<td>Wood Panel Binder Resins</td>
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<td></td>
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<td>29</td>
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<tr>
<td>Other Construction Products</td>
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<td>365</td>
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<td>$/lb</td>
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<td>0.62</td>
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<td>FR Demand in Construction (mil $)</td>
<td>285</td>
<td>380</td>
<td>270</td>
<td>455</td>
<td>610</td>
</tr>
<tr>
<td>% construction products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flame Retardant Demand (mil $)</td>
<td>718</td>
<td>897</td>
<td>790</td>
<td>1150</td>
<td>1450</td>
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</table>
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