Disinfectant & Antimicrobial Chemicals

US Industry Study with Forecasts for 2017 & 2022

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INDUSTRY STRUCTURE
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A rebound in building construction activity, in conjunction with an improving US economy, will drive strong increases in industrial markets such as paint and coatings, and plastics.

**US demand to rise 6.1% annually through 2017**

Demand for disinfectant and antimicrobial chemicals in the US is forecast to rise 6.1 percent annually to $1.6 billion in 2017. A rebound in building construction activity, in conjunction with an improving US economy, will drive strong increases in industrial markets such as paint and coatings, and plastics. In institutional and consumer applications, anxieties about disease -- foodborne, health care-associated (HAI), and antibiotic-resistant -- will lead to gains amid increasing regulatory scrutiny and intensifying cleaning regimens. Rising public concern about microbial pathogens will also support growth in some industrial markets as disinfectant and antimicrobial additives are used in a broader array of products. Overall, strong volume growth will offset moderate price increases and shifts toward lower cost disinfectants.

**Housing rebound to benefit key markets**

Substantial growth in residential construction activity, led primarily by a housing rebound, will result in the increased production of antimicrobial-containing products such as water-based architectural paint, floor coverings, home textiles, and other construction materials. Organosulfur compounds will see significant growth in these applications, particularly in paint, thanks to performance advantages and environmental concerns about competing products.

**More thorough disinfection regimens to spur gains**

Several factors will result in more thorough disinfection regimens among food and beverage processors, hospitals and other health care providers, restaurants, and hotels. Heightened public apprehension about foodborne illnesses such as *E. coli* and *Salmonella*, increased regulatory scrutiny following the Food Safety Modernization Act of 2011, and growing liability concerns will contribute to increased disinfectant demand in the food and beverage processing and the restaurant and lodging markets. In the medical and health care market, concerns about HAIs such as *C. difficile* and antibiotic-resistant pathogens such as MRSA, changes in Medicare and Medicaid reimbursement rules, pressure from insurers, and extensive coverage of deadly outbreaks by the mass media will continue to drive disinfectant and antimicrobial consumption. Phenolic compounds are projected to capture most of the growth in health care applications in value terms, owing to their efficacy and ease of use.

**Demographics, consumer trends to influence demand**

An older population will spend more money at restaurants and hotels, driving disinfectant use in those environments. Aging baby boomers will also require more medical care, necessitating more disinfectants for health care settings. Rising consumer spending will support sales of specialty disinfectant cleaners and value-added consumer products imbued with antimicrobial properties, such as odor-resistant athletic apparel and degradation-resistant plastic products.

**Study Coverage**

This industry study, *Disinfectant & Antimicrobial Chemicals*, presents historical demand data (2002, 2007, 2012) and forecasts for 2017 and 2022 by market, function, and product. The study also considers market environment factors, details industry structure, evaluates company market share, and profiles 20 industry players such as BASF, Dow Chemical, and Lonza Group.
MARKETS

Industrial

Demand for disinfectant and antimicrobial chemicals in industrial markets is projected to increase 7.5 percent per year to $870 million in 2017, faster than the overall average in terms of both volume growth and value growth. Advances will be led by the coatings market, due to gains in paint and coatings production resulting from the housing recovery; factors related to the housing rebound will drive similarly strong showings for textiles and plastics. Increasing concern about the health risks and liability issues related to foodborne pathogens will support continued growth in the food and beverage processing market.

While overall manufacturing activity is expected to increase over the next five years, the single factor with the biggest impact on the industrial markets discussed here (namely paint and coatings and plastics and textiles) will be rising construction spending -- especially residential construction. As the housing market recovers, demand for paints and coatings -- especially water-based architectural paints, which require antimicrobial additives -- will exhibit strong growth; demand for plastics used in construction such as PVC, which tend to require antimicrobial additives, will similarly climb; textiles related to residential construction, such as floor coverings and other home textiles, will also see demand growth.

Paint and coatings and plastics together will account for 60 percent of total demand for disinfectant and antimicrobial chemicals in industrial markets in 2017. The coatings market will remain by far the largest in value terms, due to renewed growth in coatings production resulting from the housing rebound and the recovering economy, but also the ongoing shift to greater use of waterborne formulations in the industrial coatings segment, and the generally higher priced antimicrobials used in coatings products. Growth in demand for PVC, which

<table>
<thead>
<tr>
<th>Item</th>
<th>2002</th>
<th>2007</th>
<th>2012</th>
<th>2017</th>
<th>2022</th>
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<tbody>
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<td>Gross Domestic Product (bil 2005$)</td>
<td>11543</td>
<td>13206</td>
<td>13593</td>
<td>15450</td>
<td>17500</td>
</tr>
<tr>
<td>lb phenolics/mil $ GDP</td>
<td>4.3</td>
<td>4.4</td>
<td>4.7</td>
<td>4.4</td>
<td>4.1</td>
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<tr>
<td>Phenolic Demand (mil lb)</td>
<td>660</td>
<td>925</td>
<td>1175</td>
<td>1580</td>
<td>2010</td>
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<tr>
<td>$/lb</td>
<td>4.12</td>
<td>5.09</td>
<td>5.81</td>
<td>6.62</td>
<td>7.50</td>
</tr>
<tr>
<td>% phenolics</td>
<td>31.1</td>
<td>31.9</td>
<td>31.4</td>
<td>28.5</td>
<td>26.9</td>
</tr>
</tbody>
</table>

Disinfectant & Antimicrobial Demand

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Sample Profile, Table & Forecast

COMPANY PROFILES

Troy Corporation
8 Vreeland Road
Florham Park, NJ 07932
973-443-4200
http://www.troycorp.com

Annual Sales: $70 million (estimated)
Employment: 360 (estimated)

Key Products: biocides

Troy manufactures and markets such performance materials as powder coatings, preservatives, wood protection chemicals, performance additives, metalworking fluids, plastics and metal carboxylates. The privately held company, which sells its products in over 100 countries, operates a US manufacturing facility at its headquarters complex in Florham Park, New Jersey, plus plants in five additional countries.

The Company is active in the US disinfectant and antimicrobial chemicals market through the manufacture of biocides used as broad spectrum preservatives and antimicrobials in a broad range of products to protect against the growth of bacteria, algae, fungi, mildew, and other deleterious microorganisms. These biocides are sold under the TROYSAN, TROYSAN POLYPHASE, POLYPHASE, GROTAN, 2PC, MERGAL, POLYPHASE BIONYL and TROYSHIELD brand names. Furthermore, Troy manufactures MICROPEL biocides through the Micropel division.

The TROYSAN range of organic biocides includes liquid bactericide, fungicide, liquid fungicide/mildewcide, and aqueous dispersion fungicide mildewcide/algaece types. For example, TROYSAN 1050

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TABLE IV-3

<table>
<thead>
<tr>
<th>Item</th>
<th>2002</th>
<th>2007</th>
<th>2012</th>
<th>2017</th>
<th>2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nondurable Goods Shipments (bil 2005$)</td>
<td>2065</td>
<td>2238</td>
<td>2052</td>
<td>2215</td>
<td>2345</td>
</tr>
<tr>
<td>lb chemicals/mil $ nondurable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimicrobial Additive Demand (mil lb)</td>
<td>69.3</td>
<td>73.9</td>
<td>64.0</td>
<td>86.0</td>
<td>99.0</td>
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<tr>
<td>$/lb</td>
<td>4.03</td>
<td>5.09</td>
<td>6.56</td>
<td>7.37</td>
<td>8.34</td>
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<tr>
<td>Antimicrobial Additive Demand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paint &amp; Coatings</td>
<td>165</td>
<td>235</td>
<td>260</td>
<td>415</td>
<td>545</td>
</tr>
<tr>
<td>Plastics</td>
<td>55</td>
<td>65</td>
<td>75</td>
<td>105</td>
<td>135</td>
</tr>
<tr>
<td>Textiles &amp; Other</td>
<td>59</td>
<td>76</td>
<td>85</td>
<td>114</td>
<td>146</td>
</tr>
<tr>
<td>% antimicrobials</td>
<td>42.3</td>
<td>40.6</td>
<td>35.7</td>
<td>40.1</td>
<td>41.1</td>
</tr>
<tr>
<td>Disinfectant &amp; Antimicrobial Demand</td>
<td>279</td>
<td>376</td>
<td>420</td>
<td>634</td>
<td>826</td>
</tr>
<tr>
<td>($mil)</td>
<td></td>
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