ChemQuest: Consolidation Continues with Modest Growth
# Table of Contents

- Key Points .............................................................................................................. 5
- Introduction ............................................................................................................ 6
- Paints and Coatings ............................................................................................... 8
  - Market Overview .................................................................................................. 8
  - Leading Producers ............................................................................................ 10
  - Margins and Raw Materials .............................................................................. 13
  - Architectural Coatings ..................................................................................... 16
  - Industrial OEM Coatings .................................................................................. 21
  - Special Purpose Coatings ............................................................................... 25
- Adhesives and Sealants ......................................................................................... 29
  - Market Overview .............................................................................................. 29
  - Industry Margin ............................................................................................... 32
- Macroeconomic Backdrop ................................................................................... 33
- Glossary .................................................................................................................. 37
This page intentionally left blank.
Key Points

• We were pleased to host the ChemQuest Group for our 18th annual Paints, Coatings, & Adhesives conference call. CEO Dan Murad provided insight into the $147B coatings industry, including an overview of market conditions, trends, and growth forecasts, i.e., an estimated 5% compound annual growth rate (CAGR) through 2020. Consolidation continues to be a key theme following two 6/1 events: the SHW-VAL acquisition propelled SHW to be the largest coatings company globally and PPG withdrew its bid for AkzoNobel. As organic growth continues to be challenging given secular and market trends, CQ (and we) wouldn’t be surprised to see further link-ups. In fact, Mr. Murad offered his opinion on an attractive chess board move in relation to transactions involving AkzoNobel and AXTA.

• Margin Holding on with Rising Raws. On raws, CQ painted a picture of shifting 2017 input costs, with resins/latex and TiO2 ticking up slightly (positive for CC, TROX, and soon-to-be VNTR), while containers, solvents, and additives compress, pointing to raws increasing about 2-5% overall. For the near-term horizon, particularly in this consolidated market, Mr. Murad doesn’t sense a great deal of margin compression, though we note that that was a concern in Pittsburgh. Interestingly, when we brought up the 8% price increase announcement in PPG’s European Industrial segment (see our 6/7 PPG Back to the Painting Board), Dan hadn’t heard increases of such magnitudes (neither had we!). Specifically on TiO2, Dan believes pricing may follow an upward trajectory through the end of 2018, but may hit a wall when and if Chinese producers improve their production facilities and enter the playing field as more consistent chloride suppliers. Overall, the margin outlook looks positive, according to CQ.

• Architectural Posting Volumes. Within the $11.5B U.S. Architectural Coatings segment, sales are forecast to rise 3.5% in 2017 (vol +3.4%, price +0.1%). As a result of increased price (mainly) and volumes, the total value of coatings has increased 30% above 2006 peak levels. SHW is the segment leader, followed by PPG. Regarding trends, CQ sees a continued shift toward zero-VOC formulations following regulations on VOC thresholds. Similarly, formulators continue to lessen their dependence on TiO2 given the raw cost implications. Contractor-applied paints continue to outpace, a positive trend for SHW, while convenience paints (2-in-1 paint and primer products, faster dry, etc.) are also performing well. Mr. Murad highlighted that the growth in new single-family home construction is outpacing that of multi-family (up 13.8% and flat, respectively, in 2016), with home ownership at 63.3% (a 25-year low). We note that the aforementioned housing trends slightly digressed from what we observed in recent years, tied to the preferences of millennials; but we may attribute this to rental prices rising rapidly (thereby, driving consumers toward home sales) and interest rate movements.

• Industrial OEM Autos to Plateau? Heavily reliant on auto sales and durable goods, OEM Coatings sales of $7.2 grew 2.7% in 2016 (vol +1.7%, price 1.0%), with similar growth forecast for 2017. Light vehicle sales increased for the sixth year in a row (2016 at 17.55MM), but are forecast to plateau at about 17MM units in 2017. CQ highlighted such major trends as products that create operational efficiencies (increase productivity/ provide wet-on-wet applications), increase sustainability (reduce CO2 footprint), and provide innovation (BPA replacement/infrared reflectance/noise vibration). With such trends as light-weighting, there is an increased need for functionality and fuel efficiency across multiple substrates (i.e., steel, metal alloys, plastics, composites).

• Special Purpose Remains Flat. Lower oil prices have continued to put a dent in O&G activity, leading to flat 2016 Special Purpose sales (vol -1.5%, price +1.5%) of $4.4. After two years of O&G slowing down, Mr. Murad noted that smaller producers are reporting double-digit gains as of late, suggesting that the trend may have bottomed. Auto refinish volumes moved up slightly in 2016, with vehicle-related fatalities (unfortunately) up 14% since 2014. Longer term, autonomous driving technology and new safety systems in cars (collision avoidance) may pose a threat to the segment. For 2017, volumes and pricing are forecast to be up 0.4% and 0.8%, respectively. Aging U.S. infrastructure remains an area of opportunity, especially if the new administration implements its infrastructure spending plans.

• Adhesives and Sealants Looking for Volumes. Adhesives ($47.7B) and Sealants ($6.7B) generated north of $50B in sales during 2016, with Asia, North America, and Europe, each representing about 30%. Construction accounts for the largest end market, at 42%, followed by packaging, at 22%, and transportation, at 11%. In North America, Adhesives volumes and prices were up low single digits, while volumes for Sealants increased about 3%. Although volumes remain below peak levels for both categories, value continues to exceed the 2007 highs. End-market trends during 2016 were fairly positive, as transportation, construction, consumer, and tapes grew, while packaging and product assembly were flat. For 2017, CQ forecast 1-2% higher volumes, with an increase in value of 3% for Adhesives. Sealants demand is expected to see a similar increase (construction and transportation make up about 95% of sealants). While Henkel is the dominant supplier (roughly 3x the size of No. 2 player MMM), we would not be surprised to see further consolidation (see Arkema’s acquisition of Bostik).
Introduction

This report is a more detailed follow-up to our June 8 “quick note” on key takeaways from the ChemQuest conference call. We include further details on Architectural, OEM, and Special Purpose coatings businesses, as well as the Adhesives & Sealants industry.

We were pleased to host the ChemQuest Group for our 18th annual Paints, Coatings, & Adhesives conference call. CEO Dan Murad provided insight into the $147B coatings industry, including an overview of market conditions, trends, and growth forecasts (estimated 5% CAGR through 2020). Consolidation continues to be a key theme following two 6/1 events: the SHW-VAL acquisition propelled SHW to be the largest coatings company globally and PPG withdrew its bid for AkzoNobel. As organic growth continues to be challenging given secular and market trends, CQ (and we) wouldn’t be surprised to see further link-ups. In fact, Mr. Murad offered his opinion on an attractive chess board move in relation to transactions involving AkzoNobel and AXTA (as reported by Bloomberg; management has not commented), which excels in performance coatings and has vastly diversified its portfolio through acquisitions across coil, furniture, other OEMs: (1) AkzoNobel divests its chemical business. (2) AkzoNobel acquires AXTA and returns to its “performance coatings roots”. (3) Spin-off architectural piece, perhaps to SHW.

Overall U.S. coatings volumes have recovered from the 2009 recession, but are still below the absolute peak in 2005. Volume growth has failed to pierce 4% yr/yr growth since 2002. Pricing has been flat for the past 2 years, with nary an expectation of improvement in 2017.


Looking across the three major types of coatings, 2016 sales growth was highest for Architectural Coatings, at 3.5% (vol +3.4%, price +0.1%), followed by OEM, at 2.7% (vol +1.7%, price +1.0%). The former segment is affected by such trends as (1) the shift toward VOC formulations following regulations on thresholds; (2) formulators continue to lessen their dependence on TiO2 given the raw cost implications; (3) Contractor-applied paints continue to outpace, a positive trend for SHW, while convenience paints (2-in-1 paint and primer products, faster dry, etc.) are also performing well.

Mr. Murad also highlighted that the growth in new single-family home construction is outpacing that of multi-family (up 13.8% and flat, respectively, in 2016), with home ownership at 63.3% (a 25-year low). Compared to 2,469 sq. ft. in 2006, the average new single family home has grown 7% over the past decade, to 2,640 sq ft. We note that the aforementioned housing trends slightly digressed from what we observed in 2015, tied to the preferences of millennials. But we may attribute this to rental prices rising rapidly (thereby, driving consumers toward home sales) and interest rate movements.

The latter segment benefits from increased light vehicle sales and is affected by the need for products that create operational efficiencies (increase productivity/ provide wet-on-wet applications), increase sustainability (reduce CO2 footprint), and provide innovation (BPA replacement/infrared reflectance/noise vibration). Special Purpose remained flat (vol -1.5%, price +1.5%), as lower oil prices have continued to put a dent in O&G activity. For 2017E, similar growth rates are expected to repeat for Architectural and OEM, while Special Purpose is forecast to be up 1.1% (vol +0.3%, price +0.8%).
Exhibit 2. Sales Growth Across Coatings Types

Source for both charts: The ChemQuest Group estimates and Wells Fargo Securities, LLC
Paints and Coatings

Market Overview

Since the turn of the century (actually, millennium!), coatings have shown relatively steady growth, at about 2%. The paints and coatings industry can be categorized into three markets: Architectural (aka: decorative), OEM, and Special Purpose. Architectural Coatings have been a clear outperformer, growing at a 3.6% CAGR (2000-2016). OEM and Special Purpose coatings have grown at 1.0% and 1.2% CAGRs, respectively, for the same time period. Architectural and OEM coatings are expected to repeat growth rates similar to those realized in 2016. On Special Purpose, after two years of O&G slowing down, Mr. Murad noted that smaller producers are reporting double-digit gains as of late, suggesting that the trend may have bottomed. Aging U.S. infrastructure remains an area of opportunity, especially if the new administration implements its infrastructure spending plans.


About 60% of the $23.3B U.S. coatings sector is made up of Architectural Coatings. Compared to 2015, 2016 U.S. new home sales increased 12%, while existing home sales increased 4%. New home sales typically contribute just 25% of demand for coatings, while existing home sales really drive Architectural Coatings growth, contributing 75%. OEM is next at about 30%, followed by Special Purpose, near 10%. In terms of its 2017 U.S. outlook, CQ forecast Architectural volumes to reach 797MM gal ($11.9B in value), exceeding the high water mark back in 2006, and OEM volumes to increase to 368MM gal ($7.4B). Special Purpose may continue to recover slightly with volumes relatively flat at 139MM gal ($4.4B).

Exhibit 4. 2016 U.S. Paints & Coatings Segments by Volume, 1.3B gal

Source: The ChemQuest Group and Wells Fargo Securities, LLC
The 2016 global breakdown differed from that of the United States, as Architectural accounted for a smaller piece of the pie in other regions. Specifically, Architectural accounted for 43% of sales on a global basis, less than the 50% it represented in the United States. OEM at 36% accounted for a larger portion of demand worldwide, compared to 31% in the United States. Finally, Special Purpose sales accounted for 21% of global paint sales, but only 19% in the United States.

**Exhibit 5. Paints & Coatings End-Market Breakdown by Value, 2016**

### U.S. $23B
- Architectural: 50%
- OEM: 31%
- Special-Purpose: 19%

### Global $147B
- Architectural: 43%
- OEM: 36%
- Special-Purpose: 21%

Source for both charts: The ChemQuest Group (left), PPG (right), and Wells Fargo Securities, LLC

By region, Asia is the leading coatings consumer, accounting for 46% of global demand, followed by Europe, at 23%, and North America, at 18%.

**Exhibit 6. Global Coatings Regional Breakdown, 2016**

Source: The ChemQuest Group and Wells Fargo Securities, LLC
Leading Producers

Since the early 2000s, the landscape of coatings companies has changed significantly. PPG has gone from being the third-largest global coatings player to a clear leader, with SHW (covered by Senior Equity Analyst Stephen East) beating AkzoNobel for the No. 2 position in 2015. But following the 2017 SHW-VAL acquisition, the landscape is to be shifted again, with SHW taking over the top spot. The top three coatings firms, i.e., SHW (including VAL), PPG, and AkzoNobel, account for 70% of the top 10 coatings firms sales, up from just 48% 10 years ago.

Exhibit 7. Top 10 Coatings Producers, Sales in $B

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PPG</td>
<td>4.8</td>
<td>10.1</td>
<td>14.3</td>
<td>15.3</td>
<td>14.8</td>
</tr>
<tr>
<td>Sherwin Williams</td>
<td>5.4</td>
<td>8.0</td>
<td>11.1</td>
<td>11.3</td>
<td>11.9</td>
</tr>
<tr>
<td>AkzoNobel</td>
<td>6.3</td>
<td>14.2</td>
<td>12.1</td>
<td>11.1</td>
<td>10.5</td>
</tr>
<tr>
<td>Valspar</td>
<td>2.3</td>
<td>3.3</td>
<td>4.5</td>
<td>4.4</td>
<td>4.2</td>
</tr>
<tr>
<td>Axalta</td>
<td>3.7</td>
<td>4.1</td>
<td>4.4</td>
<td>4.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Nippon Paint</td>
<td>1.9</td>
<td>2.0</td>
<td>2.8</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>BASF</td>
<td>2.4</td>
<td>3.3</td>
<td>3.8</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Kansai Paint</td>
<td>-</td>
<td>1.9</td>
<td>2.9</td>
<td>2.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Masco</td>
<td>-</td>
<td>-</td>
<td>2.0</td>
<td>2.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Jotun</td>
<td>-</td>
<td>1.6</td>
<td>2.0</td>
<td>2.0</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Note: Excluding RPM
Source: The ChemQuest Group, Inc. and Wells Fargo Securities, LLC

Consolidation continues to be a popular theme in the coatings industry, changing the landscape and market share of participants over the past decade. Among the more noteworthy transactions are SHW acquiring Comex’s North American assets, DD divesting Performance Coatings to Carlyle, AkzoNobel divesting its North American architectural paints business to PPG, VAL acquiring Ace Hardware’s paint manufacturing assets, PPG acquiring Comex’s Mexican assets, Nippon Paint acquiring Dunn-Edwards, and most recently, SHW acquiring VAL in June 2017.

On the topic, AXTA offers such benefits from consolidation as potential to globalize previously regional products, acceleration of new product introduction plans, and ability to access new markets at appropriate cost structures, among others.


By end market, PPG is the only global player that participates in all major categories. Following the 2012 sale of AkzoNobel’s North American Architectural Coatings business to PPG, AkzoNobel ranks within the top 3 global coatings positions across all markets (except for auto OEM, as it does not participate). Although SHW ended 2016 No. 1 on the architectural front and No. 4+ in most other markets (was not meaningful in auto OEM or packaging), its VAL acquisition should expose it to general industrial and packaging. AXTA remains a market leader in auto, with growth initiatives in Asia.
**Paints, Coatings, & Adhesives**

**Exhibit 9. Global Competitive Positions of Coatings Companies**

<table>
<thead>
<tr>
<th>Global Position</th>
<th>Arch &amp; Specialty $56B</th>
<th>General Industrial $30B</th>
<th>Protective &amp; Marine $16B</th>
<th>Refinish &amp; Collision $8B</th>
<th>Auto OEM $10B</th>
<th>Packaging $3B</th>
<th>Aerospace $1B</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPG</td>
<td>#1</td>
<td>Participation in all end-use markets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AkzoNobel</td>
<td>#2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin Williams</td>
<td>#3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valspar</td>
<td>#5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axalta</td>
<td>#7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BASF</td>
<td>#8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: RPM: Nippon Paint #6

Source: PPG

**SHW** is the No. 1 architectural paint supplier globally, with the highest brand awareness. **PPG** ranks No. 2, with **Olympic** being its most recognizable brand, but the AkzoNobel deal also added the popular **Glidden** brand. Of late, it is expending time and money to promote **PPG Paints**, with the renaming of the Igloo in Pittsburgh just one example. In 1999, Masco acquired Behr, which is sold exclusively at Home Depot. Behr produces interior products (paints, primers, and faux and decorative finishes), as well as exterior products. Berkshire Hathaway owns Benjamin Moore, which participates through a large independent retail network. Prior to being acquired, **VAL** was another industry leader, with its largest customer being Lowe’s.

Comparing the margins of major coatings producers, **PPG** historically has remained the leader among its competitors, sporting a 19% margin in strictly coatings. But AXTA took first place in 2016 with a 20.5% margin. Remaining competitors **SHW, VAL, AkzoNobel**, and **RPM** all ranged between 14% and 17% in 2016.

**Exhibit 10. Coatings Peers’ EBITDA Margin**

Source: PPG and Wells Fargo Securities, LLC
Focusing in on company-specific 1Q sales, PPG’s sales (ex-glass divestitures) increased 1% yr/yr, (vol +2%, price 0%, FX -2%, other +1%), compared to the 7% sales increases at AkzoNobel (vol +4%, price/mix -1%, M&A +2%, FX +2%) and SHW. Whereas AkzoNobel highlighted volume growth in both Decorative Paints and Specialty Chems, SHW’s growth was driven by Architectural volumes, though the company noted higher raw material costs.

Comparing earnings, AkzoNobel’s 13% yr/yr EBIT increase was attributable to such factors as volume growth and cost efficiencies. A common theme for PPG and AkzoNobel has been marine coatings being adversely affected by the slowdown of new Asian (mainly Korean) build and O&G activity, which the latter reported to be improving. SHW same-store sales growth of 7.5% outpaced the approximately 5% reported for PPG, but PPG claims to be closing the gap.

Exhibit 11. Recent Coatings Results, 2012 – Present

In terms of PPG’s outlook, we noted in our 6/7 PPG: Back to the Painting Board that margins are still expected to feel some pressure from raws in 2Q, but will likely improve in 3Q and 4Q, with greater 2018 expectations and further progress along its $100MM cost-reduction plan. Although Protective & Marine continue to drag earnings, Auto Refinish market-share gains remain a bright spot (looking to outperform globally, but not in the United States), as do its wins of “inside-the-can” business with its BPA-NI technology (forecast to capture 1/3 of the $1.2B business).
Margins and Raw Materials

The cost structure for a U.S. coatings company has been relatively unchanged over the past few years. On average, raw materials decreased 1% in 2016, to 43-51% of sales, down from the earlier years of TiO₂ inflation. Other major raw materials include acrylics, phenol, and other pigments. Gross margin was in the low-30% area a decade ago, but is now in the upper 30% area. In 2016, EBIT margin ranged from 9% to 15%, down 500 bps from the high end of 2015.

Exhibit 12. Comparison of Average U.S. Companies’ Cost Structures, 2005-2016

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw Materials</td>
<td>43-51%</td>
<td>44-52%</td>
<td>43-51%</td>
<td>45-53%</td>
<td>45-53%</td>
<td>47-53%</td>
<td>45-49%</td>
<td>50-55%</td>
</tr>
<tr>
<td>Labor</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Energy</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Overhead, Taxes, Ins., Dep., Pkg.</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td>Total</td>
<td>56-68%</td>
<td>57-65%</td>
<td>56-64%</td>
<td>58-66%</td>
<td>58-66%</td>
<td>60-66%</td>
<td>58-62%</td>
<td>65-70%</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>32-44%</td>
<td>35-43%</td>
<td>36-44%</td>
<td>34-42%</td>
<td>34-42%</td>
<td>34-40%</td>
<td>38-42%</td>
<td>30-35%</td>
</tr>
<tr>
<td>SG&amp;A</td>
<td>20-35%</td>
<td>19-34%</td>
<td>19-34%</td>
<td>19-34%</td>
<td>19-34%</td>
<td>19-34%</td>
<td>19-34%</td>
<td>20-30%</td>
</tr>
<tr>
<td>EBIT</td>
<td>9-15%</td>
<td>10-20%</td>
<td>10-17%</td>
<td>8-15%</td>
<td>8-15%</td>
<td>6-15%</td>
<td>11-17%</td>
<td>7-12%</td>
</tr>
</tbody>
</table>

Source: The ChemQuest Group estimates and Wells Fargo Securities, LLC

On raws, CQ painted a picture of shifting 2017 input costs with resins/latex and TiO₂ ticking up slightly (positive for CC, TROX, and soon-to-be VNTR), while containers, solvents, and additives compress, pointing to raws increasing about 2-5% overall. For the near-term horizon, particularly in this consolidated market, Mr. Murad doesn’t sense a great deal of margin compression, though we note that that was a concern in Pittsburgh. Interestingly, when we brought up the 8% price increase announcement in PPG’s European Industrial segment, Dan hadn’t heard increases of such magnitudes (neither had we!). Specifically on TiO₂, Dan believes pricing may follow an upward trajectory through the end of 2018, but may hit a wall when and if Chinese producers improve their production facilities and enter the playing field as more consistent chloride suppliers. Overall, margin outlook looks positive according to CQ, but we note that TiO₂ pricing is up 10-15% off its 2016 trough.

The following exhibit shows the expected breakdown of the various raw materials found in a typical can of paint for 2017. In 2016, resins/latex represented about 40% of the total cost, followed by pigments, at about 25%.

Exhibit 13. Raw Materials Input Per Unit of Coatings (Percentage of Cost), 2016 vs. 2017E

Source: SHW and The ChemQuest Group
During 2012-14, pigments input was driven by mix, as solvent prices declined and new low-VOC resin systems utilized latex binders, driving higher pigment use. A look at the coatings cost structure over time shows that pigments trended upward during 2012-14 despite the considerable decline in TiO$_2$ prices. However, further TiO$_2$ price drops finally depressed cost in 2015, causing the input per unit percentage to drop from 2013-14 levels.

Manufacturing costs and raw material inputs vary for Architectural Coatings and Industrial Coatings. Architectural paints use more TiO$_2$, as decorative paints require more opacity. Industrial Coatings use a larger amount of other such raws as resins, latex, solvents, and pigments. In terms of packaging, Architectural is typically sold in one-gallon paint cans and five-gallon buckets, while Industrial Coatings are mainly sold in 2,000-liter totes.

**Exhibit 14. Coatings Cost Comparison**

![Coatings Cost Comparison Diagram]

Source: PPG

**Exhibit 15. Raw Materials Input Per Unit of Coatings (%), 2010-2016**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resins/Latex</td>
<td>40</td>
<td>38</td>
<td>40</td>
<td>40</td>
<td>37</td>
<td>36</td>
<td>37</td>
</tr>
<tr>
<td>Pigments</td>
<td>25</td>
<td>27</td>
<td>30</td>
<td>34</td>
<td>27</td>
<td>29</td>
<td>27</td>
</tr>
<tr>
<td>Containers</td>
<td>14</td>
<td>14</td>
<td>11</td>
<td>11</td>
<td>16</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Solvents</td>
<td>8</td>
<td>10</td>
<td>9</td>
<td>5</td>
<td>10</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Additives</td>
<td>13</td>
<td>11</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>9</td>
</tr>
</tbody>
</table>

Source: The ChemQuest Group and Wells Fargo Securities, LLC

Historically, price increases typically lagged raw material inputs by 3-6 months, resulting in margin squeezes in inflationary environments. The PPI and PMI for coatings dated back to February 2004 have approximately a 70% correlation. However, we have seen this relationship break down, as the correlation is closer to 16% over the past five years. In 2015, 2016, and 2017 year to date (YTD), the gap averaged 92, 101, and 94, respectively.

Raw material inflation, namely in TiO$_2$, was a major headwind in 2011 (up 39%). However, costs began to moderate in 2012 and reversed course as prices fell 10.5% yr/yr. Price appeared to be stabilizing during 2014, but took another step down on a surplus of Chinese supply and lackluster demand. PPG noted that selling prices are moving up slightly, but 2Q is the hardest raw material comp with TiO$_2$ prices up. Similarly, on its 1Q earnings call, SHW mentioned that it now expects average yr/yr raw material inflation in the mid-single-digit area (compared to the low-single-digit area highlighted in the 4Q call).

However, paint producers have been effective at raising prices, with a significant step-up post 2010 in response to higher raws. Price increases accelerated in 2012 and have since been steady at a moderate level despite more volatile raw materials. The gap between the PPI and PMI reached a 10-year high in March 2016 and has compressed since, with the PPI 59% above that of 2004. Mr. Murad commented that in comparison to the past few years, paint companies have done a good job of keeping pace with inflation in their pricing.
Whereas PPG was primarily focused on organic volumes in 2016, 2017 has seen a shift, with pricing traction the main goal.

Exhibit 17. Year-Over-Year Aggregate PPG Coatings Pricing, 2005-2016
Architectural Coatings

Within the $11.5B U.S. Architectural Coatings segment, sales are forecast to rise 3.5% in 2017 (vol +3.4%, price +0.1%) with volumes to reach 797MM gallons ($11.9B in value).

Exhibit 18. U.S. Architectural Value and Volumes, 2001 to Present

As a result of increased price and volumes, the total value of coatings has increased 25% above 2006 peak levels. Over the past four years, volumes have been the key driver, as pricing has barely moved.


The end-market breakdown in 2016 was similar to that of years past, with interior paints accounting for the bulk of demand at 75% of sales. The exterior paints end market is a distant second, at about 13%. The remainder includes stains, clears, lacquers, varnishes, and other categories.

Source: The ChemQuest Group and Wells Fargo Securities, LLC

According to PPG, the top 4 global Architectural Coatings (**PPG, SHW-VAL, AkzoNobel**) producers take up about 40% of the global market, while the next 15 leading regionals (i.e., Asian Paints, BASF, Masco, etc.) are approximately 20% of the market.

Exhibit 21. Global Architectural Coatings Producers

Source: PPG and Wells Fargo Securities, LLC

Regionally, Asia and the Americas account for roughly a third each of sales. Over the past 7 years, Asia has been growing as a percent of total demand, due to faster economic growth. Consequently, Europe makes up a smaller percentage of the pie today.
Exhibit 22. Architectural Coatings Demand by Region by Percentage of Sales, 2009 vs. 2016

Source for both charts: SHW and Wells Fargo Securities, LLC

Regardless of region, Architectural Coatings sales are largely driven by the residential market. In the United States, the residential market currently accounts for a larger portion of sales as the nonresidential market has yet to show meaningful recovery, though it is improving.

Exhibit 23. Architectural Market Breakdown by Type

Source for both charts: SHW, PPG, and Wells Fargo Securities, LLC

Over the past several years (and punctuated during the recession), there has been a moderate shift back toward higher cost professional contractors, representing about 60% of the market in 2016. The majority of DIY purchases occur through such home centers as Home Depot and Lowe’s. Paint stores are a distant second, at 15%, and mass merchants account for 14% of sales. In contrast, contractors make a majority of their purchases at paint stores.

Source: SHW and Wells Fargo Securities, LLC estimates

Looking more closely at the channels of distribution, the predominance of company-owned paint stores for the contractor market shows why the aforementioned shift has been favorable for SHW.

Exhibit 25. U.S. Channel Share

Source for both charts: SHW and Wells Fargo Securities, LLC

Globally, the Architectural Coatings customer mix is composed mostly of independent distributors (45%), followed by such regional home centers (30%) as Lowe’s, Home Depot, and Bunnings, while mono-branded stores make up the remaining portion.

Exhibit 26. Global Architectural Coatings, Customer Mix

Source: PPG and Wells Fargo Securities, LLC
There has been a continuation of trends in Architectural Coatings, which we have discussed in years gone by. In 2016, the DIY/contractor mix was about 40/60; a reversal from 1980 levels. During the recession, there was a modest shift toward DIY as cost-conscious homeowners chose to forego the higher outlay associated with hiring professionals; but this has since normalized. With Baby Boomers aging and a growing attitude away from DIY, contractor help is increasingly sought after.

Another trend that has been popular is zero-VOC formulations. Despite what the name implies, “zero-VOC” is not completely devoid of VOC, as a small amount is added when color is blended with the base coats at the retailer level. Manufacturers are moving to a zero-VOC colorant/tinting system as they try to stay ahead of industry standards.

Emphasis is also being placed on convenience. Opportunities to save time or the number of painting steps are being developed, with a prime example being “paint and primer in one.” Manufacturers are formulating paints that dry faster or reduce surface preparation to paint. Finally, manufacturers are focusing more on developing specialty product lines. For example, SHW created a “Paint Shield™” formula, which kills bacteria on contact within 2 hours. This trend is linked to the maturity of the industry, creating a need for unique products.

Mr. Murad also highlighted that the growth in new single-family home construction is outpacing that of multi-family (up 13.8% and flat, respectively, in 2016) with home ownership at 63.3% (a 25-year low). Compared to 2,469 sq. ft. in 2006, the average new single-family home has grown 7% over the past decade, to 2,640 sq ft. We note that the aforementioned housing trends slightly digressed from what we observed in 2015, tied to the preferences of millennials (go Aziza!), but one may attribute this to rental prices rising rapidly (thereby, driving consumers toward home sales) and interest rate movements.

All these changes help add value to products beyond what traditional painting provides, lending support to higher average selling prices, regardless of the level of raw material inflation/deflation.
**Industrial OEM Coatings**

Heavily reliant on auto sales and durable goods, OEM Coatings sales grew 2.7% in 2016 (vol +1.7%, price 1.0%) reaching $7.2B in sales (362MM gallons by volume), with a similar growth forecast for 2017. Looking back, it’s not surprising that 2009 was the trough. However, the decline from 2008 was far more severe than for Architectural, which was affected more by the housing slowdown in 2007.

Exhibit 27. U.S. OEM Value and Volumes, 2001 to Present

![Graph showing U.S. OEM Value and Volumes, 2001 to Present](source: The ChemQuest Group and Wells Fargo Securities, LLC)

As of 2016, volume was 13% below the most recent peak seen in 2005. Similar to Architectural, volume has outpaced price of late.


![Graph showing U.S. OEM Yr/Yr Price and Volume Trends, 1997-2017E](source: The ChemQuest Group and Wells Fargo Securities, LLC)

Light vehicle sales increased for the sixth year in a row (2016 at 17.55MM), but are forecast to plateau at about 17MM units in 2017. CQ highlighted such major trends including products that create operational efficiencies (increase productivity/reduce labor/lower cycle times/provide wet-on-wet applications), increase sustainability (reduce CO₂ footprint), and provide innovation (BPA replacement/infrared reflectance/noise vibration/provide insulation/withstand high heat/provide vapor transmission). With such trends as light-weighting, there is an increased need for functionality and fuel efficiency across multiple substrates (i.e., steel, metal alloys, plastics, composites).

Major producers in OEM coatings include PPG, SHW, AXTA, and AkzoNobel. In the past few years, consolidation has been a key theme, with the top six players currently making up nearly 50% of the market, up from 28% in 2005.

Source for both charts: PPG and Wells Fargo Securities, LLC

More than 45% of Industrial Coatings sales are in Asia, followed by nearly 30% in EMEA.

Exhibit 30. Industrial Coatings Demand by Region, 2016

Source: SHW and Wells Fargo Securities, LLC

Much of what drives demand in Industrial Coatings end markets relies on the macroeconomic environment and is fueled by industrial production. Recently, a slowdown in ag and mining has taken the heavy duty equipment market lower. Despite this drag, activity from other end markets, according to AXTA, is expected to drive growth near a 5% CAGR through 2020, reaching $28.8B (based on end markets in which AXTA competes). The fastest growing region is Asia Pacific, as it continues to see bursts of economic and GDP growth.

Exhibit 31. Industrial Coatings Market Outlook by Region, 2016-2020E

Note: this includes only end markets in which AXTA competes
Source: AXTA
Of the industrial applications relevant to coatings, general use is the largest category, sized at more than half of the market, followed by coil, at 16%. O&G has been shrinking as a percentage of the market, due to low oil prices pressuring investments in upstream projects. Meanwhile, growth in electrical insulation could offset some of this via growth in alternative energy sources for the long term (i.e., wind power, electric transportation).

**Exhibit 32. Global Industrial Coatings by Market Opportunity**

<table>
<thead>
<tr>
<th>Market Opportunity</th>
<th>Value (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Industrial</td>
<td>$15.0B</td>
</tr>
<tr>
<td>Coil</td>
<td>$4.5B</td>
</tr>
<tr>
<td>Oil &amp; Gas</td>
<td>$3.5B</td>
</tr>
<tr>
<td>Electrical Insulation</td>
<td>$2.0B</td>
</tr>
<tr>
<td>ACE</td>
<td>$1.5B</td>
</tr>
<tr>
<td>Architectural Extrusions</td>
<td>$1.5B</td>
</tr>
</tbody>
</table>

Source: Axalta and Wells Fargo Securities, LLC

Powder coatings is the largest Industrial OEM category, at about 25% of sales, followed by transportation (auto, truck, etc.), at about 15%. Industrial Coatings can serve functional (hardness, corrosion resistance) and decorative purposes in such household objects as refrigerators, HVAC, fireplaces, microwaves, and vacuum cleaners, and in such automotive parts as bumpers, axles, brake systems, and rigid and flexible exterior trim systems. They can also be used in electronic devices including mobile phones, laptops, and tablets.

**Exhibit 33. Industrial OEM Coatings End Markets, 2016**

<table>
<thead>
<tr>
<th>End Market</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder Coatings</td>
<td>24%</td>
</tr>
<tr>
<td>Auto/ Light Truck/ SUV</td>
<td>14%</td>
</tr>
<tr>
<td>Container &amp; Closure</td>
<td>13%</td>
</tr>
<tr>
<td>Wood Furniture, Cabinet</td>
<td>11%</td>
</tr>
<tr>
<td>Non-Wood Furn &amp; Fixture</td>
<td>7%</td>
</tr>
<tr>
<td>Wood, Comp, Flat Stock</td>
<td>7%</td>
</tr>
<tr>
<td>Machinery &amp; Equip</td>
<td>3%</td>
</tr>
<tr>
<td>Paper, Film &amp; Coil</td>
<td>3%</td>
</tr>
<tr>
<td>Heavy Truck/ Bus/ RV</td>
<td>2%</td>
</tr>
<tr>
<td>Other Trans</td>
<td>2%</td>
</tr>
<tr>
<td>Other Industrial</td>
<td>7%</td>
</tr>
<tr>
<td>Appliance/HVAC</td>
<td>1%</td>
</tr>
<tr>
<td>Elec Insulation</td>
<td>0%</td>
</tr>
</tbody>
</table>

Source: The ChemQuest Group and Wells Fargo Securities, LLC

There are four technology offerings in industrial coatings, including liquid, powder, pretreatment, and electrocoat. Liquid, which consists of traditional primers and topcoats, is by far the largest, accounting for 65%, and continues to outpace competing technologies. Powder, for which a solid coating is applied by electrostatic spray, follows at 25%. Pretreatment and electrocoat are about 5% each; the former includes cleaners and phosphate chemicals to condition metal before paint is applied, while the latter applies coatings by electrically charged immersion.
All major coatings producers offer liquid solutions, many offer powder, a handful offer E-coat, and only PPG offers all four. Pretreatment is a primary technical solution in appliances, auto parts, general finishes, and heavy duty equipment.

Exhibit 35. Competitive Technology Profile

<table>
<thead>
<tr>
<th>Supplier</th>
<th>North America</th>
<th>Europe</th>
<th>Asia Pacific</th>
<th>South America</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AkzoNobel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valspar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherwin-Williams</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axalta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beckers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: PPG
Special Purpose Coatings

Lower oil prices have continued to put a dent in O&G activity, leading to flat 2016 Special Purpose sales of $4.4B (vol -1.5%, price +1.5%). However, after two years of O&G slowing down, Mr. Murad noted that smaller producers are reporting double-digit gains as of late, suggesting that the trend may have bottomed. Auto refinish volumes moved up slightly in 2016, with vehicle-related fatalities (unfortunately) up 14% since 2014.

Exhibit 36. U.S. Special Purpose Value and Volumes, 2001 to Present

For 2017, volumes and pricing are forecast up 0.4% and 0.8%, respectively.

Exhibit 37. U.S. Special Purpose Yr/Yr Price and Volume Trends, 1997-2017E

Special Purpose coatings serve far fewer end markets than those served by industrial OEM coatings, but typically carry higher margins. Major end markets for Special Purpose coatings include automotive refinish, industrial maintenance, and traffic-marking paints. Aerosol and marine paints are the remaining end markets, with the latter seeing particularly subdued demand in recent years with the decline in shipbuilding activity. Key producers include PPG, AXTA, RPM, SHW, AkzoNobel, and BASF.
VMT is an important metric for auto refinish, as repair/refinish activity picks up with increased driving (which means more accidents!). VMT typically slows in the early months of the year, as cold weather curbs travel, partially offset by icy conditions increasing accidents. In 2017, adverse weather limited driving in January and February, with VMT falling 7% and 4% month over month, respectively. With the thawing in March, driving activity has reaccelerated and VMT rebounded 17% over February. While new technology has enabled better safety systems, distracted driving is still a factor (for example, texting while driving; we've previously cited as “OMG” or "HWH" affected). In addition, more SUVs on the road allows for treating bigger surface areas (large vehicles make up about 48% of vehicles on the road).
Over the past few years, growth in *Special Purpose* coatings has been challenged by limited infrastructure spending and slower automotive refinish activity. Longer term, autonomous driving technology and new safety systems in cars (collision avoidance) may pose a threat to the segment. Aging U.S. infrastructure remains an area of opportunity, especially if the new administration implements its infrastructure spending plans. Also, CQ highlighted the renewed interest in solvent-borne coatings.

The protective and marine market is estimated to be about **$12.5B** globally, with the following breakdowns provided by PPG.

**Exhibit 41. 2016 Protective and Marine Industry Segments, $B**

Nearly 60% of sales are from Asia, reflecting the relocation of marine activity to South Korea and elsewhere. PPG and others have stated that marine new-build activity has been weak for the past few years, including lagging Korean shipbuilding activity.

**Exhibit 42. Protective and Marine Sales by Region, 2016**

Source: SHW and Wells Fargo Securities, LLC
According to Wells Fargo Securities analyst Michael Webber, dry bulk fleet growth is decelerating, with 2017E forecast at a modest 1-2% relative to 5% in 2016. Dry bulk ships typically carry large unpackaged loads of cargo and are equipped to handle as much as hundreds of thousands of metric tons. However, the WFS Shipping team also notes that chemical contracting remains weak on a relative basis, with only 26 chemical tankers ordered in 2016, relative to a 20-year average of 86 vessels annually and the 2007 peak of 352 tankers contracted. Assuming 2017 progresses similarly to 2016 reported numbers, we think we may see another dull/below trend year of contracting.

Exhibit 43. Number of Chemical Tankers (10-60,000 dwt) Contracting, 1996-2017E

Source: Clarkson Research Services Limited 2017 and Wells Fargo Securities, LLC
Adhesives and Sealants

Market Overview

In 2016, the global Adhesives and Sealants Industry generated $54.4B in sales, with Adhesives accounting for ~$48B and Sealants for ~$7B. North American sales and volume have trended upward since the 2009 recession, at a 6.0% and 2.1% CAGR, respectively. For 2017, CQ projects overall value for Adhesives to decrease 1.5%, but Sealants to grow 1.0%.


Regionally, Asia, Europe, and North America each represent 31% for adhesives and sealants.
Exhibit 45. Global Adhesives and Sealants Sales by Region, 2016

Source: Company reports and Wells Fargo Securities, LLC

The top adhesives producers are shown below with a comparison between the 2005 and 2016 landscapes. Over the past decade, Henkel has retained its leading position and nearly doubled its revenue. Contrary to the coatings market, where top players have similar market shares, the leader here far outpaces its nearest competitor.

Exhibit 46. Top Adhesives Producers by Sales, 2005 vs. 2016

Source for both charts: The ChemQuest Group and Wells Fargo Securities, LLC

Construction accounts for the largest end market, at 42%, followed by packaging, at 22%, and transportation, at 11%. Transportation and product assembly are the next largest.
Exhibit 47. Adhesives and Sealants Market Sectors, 2016

Source: The ChemQuest Group and Wells Fargo Securities, LLC

In **construction**, improved building standards are among the demand drivers. **Adhesives** in general have been gaining at the expense of metal fasteners, due in part to the light-weighting trend. Finally, **adhesives** also offer such desired traits as flexibility, ease of repair, and strength.

The increasing presence of adhesives and sealants in the **transportation** industry is driven in part by fuel efficiency. Manufacturers continue to replace metals with plastics, composites, and lighter metals. These products cannot be put together with traditional mechanical fastening, and instead require adhesives to assemble various layers. At the same time, these adhesives must provide heat shielding and have enough strength to replace mechanical fasteners, etc. **Adhesives** make up 15% of the market for vehicle assembly, according to DOW, and its **BETAMATE** continues to be an exemplary adhesives product. Since its introduction more than 15 years ago, more than 7B meters of **BETAMATE** have been applied.

End-market trends during 2016 were fairly positive, as transportation, construction, consumer, and tapes grew, while packaging and product assembly were flat. For packaging, the increases in beer and energy drinks were offset by declines in carbonated beverages, while food and beverage remained flat. The transportation end market saw gains from light truck builds, while aerospace was steady. The tapes end market was up on better transportation and construction.

**Exhibit 48. Adhesives End-Market Performance, 2016**

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>TREND</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging</td>
<td></td>
<td>Food and beverage flat, beer and energy drinks up while carbonated beverage continues to decline</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td>Auto and Light Truck builds strong, aerospace flat but moving towards adhesive bonding with composite substrates over aluminum</td>
</tr>
<tr>
<td>Construction</td>
<td></td>
<td>New construction growing albeit slower than 2015/16</td>
</tr>
<tr>
<td>Consumer</td>
<td></td>
<td>Consumer adhesives flat to up slightly</td>
</tr>
<tr>
<td>Tapes</td>
<td></td>
<td>Improvement in transportation, construction tapes, flat in electronics</td>
</tr>
<tr>
<td>Product Assembly</td>
<td></td>
<td>Domestic industrial production under pressure from the strong dollar until recently</td>
</tr>
</tbody>
</table>

Source: The ChemQuest Group
**Industry Margin**

Raw materials are the largest component of costs, representing 51-61% of cost of goods sold, compared to 43-51% in the coatings industry. Adhesives typically use higher molecular weight products, which generally include dependence on crude oil input. Similar to coatings producers, Adhesives producers have been successful in passing through raw material price increases and should benefit with declines in raus. In addition, producers have rationalized and shed less strategic customers, which midsize players have picked up.

**Exhibit 49. Average U.S. Adhesive Company’s Cost Structure, 2005-2016**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sales</strong></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Cost of Goods Sold</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw Materials</td>
<td>51-61%</td>
<td>53-63%</td>
<td>53-63%</td>
<td>53-63%</td>
<td>53-63%</td>
<td>52-60%</td>
<td>53-59%</td>
<td></td>
</tr>
<tr>
<td>Packaging</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Labor</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>2-3%</td>
<td>5-7%</td>
</tr>
<tr>
<td>Energy</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>Overhead, Taxes, Ins., Dep., Pkg.</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>6%</td>
<td>5%</td>
<td>4-7%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>61-71%</td>
<td>63-73%</td>
<td>63-73%</td>
<td>63-73%</td>
<td>63-73%</td>
<td>62-72%</td>
<td>67-75%</td>
<td></td>
</tr>
<tr>
<td><strong>Gross Margin</strong></td>
<td>29-39%</td>
<td>27-37%</td>
<td>27-37%</td>
<td>27-37%</td>
<td>27-37%</td>
<td>27-37%</td>
<td>28-38%</td>
<td>25-33%</td>
</tr>
<tr>
<td>SG&amp;A</td>
<td>16-22%</td>
<td>15-21%</td>
<td>15-21%</td>
<td>15-21%</td>
<td>15-21%</td>
<td>15-21%</td>
<td>19-25%</td>
<td></td>
</tr>
<tr>
<td><strong>EBIT</strong></td>
<td>6-22%</td>
<td>6-22%</td>
<td>6-22%</td>
<td>6-22%</td>
<td>6-22%</td>
<td>6-22%</td>
<td>7-23%</td>
<td>6-14%</td>
</tr>
</tbody>
</table>

Source: The ChemQuest Group and Wells Fargo Securities, LLC

Adhesives pricing increased steadily until 2014, though recent pricing shows flatness, reflecting consumer spending. In 2009, despite the recession, continued pricing momentum, coupled with lower resin costs, helped margin expansion. Resin PPI has typically tracked the adhesives material cost index, especially the declines since 2014.

**Exhibit 50. Adhesives PPI, Resin PPI, and Cost Index (Indexed to 2009)**

Source: The ChemQuest Group and Wells Fargo Securities, LLC
Macroeconomic Backdrop

The global macroeconomic environment has been muted in recent years, with ChemQuest CEO Dan Murad noting, "the global economic outlook has been somewhat lackluster." North America has shown moderate growth since recessionary levels in 2009, while growth in Asia has moderated of late. In the United States, 2016 GDP grew 1.6% and is forecast to increase 2.1% for 2017 (according to Wells Fargo Securities economists). With encouraging signs from construction and income growth for U.S. consumers, 2017 global GDP is forecast at 2.7%.

Major End Markets

Construction

Within the United States, construction continues to recover from trough levels, but is still slightly below peak 2006 conditions, suggesting further growth potential for Architectural Coatings. Total construction spending has been on the rebound since 2011, including yr/yr growth of 7% in 2013, 11% in 2014, another 11% in 2015, and 5% in 2016, reaching approximately $1.16T. This string of increases follows five years of declines that drove activity down 33% from the 2006 peak of about $1.17T.


The recovery in construction continues to be driven by private spending, up 6.4% (in 2016), while public spending decreased 1.0%. Since the biggest annual decline in total construction in 2009, private spending has increased 48% in aggregate, which compares to a 9% decline in public spending.

Exhibit 52. Yr/Yr Change in Construction Spending, 1994-2016
Wells Fargo economists forecast 2017 housing starts to reach 1.26 MM units, up 8% from 1.17MM units in 2016, and increasing to 1.35MM units in 2018. However, these numbers are far from the 2.27MM unit peak number in 2006. The SAAR of housing starts for May rang in at 1.09MM, down 2.4% yr/yr and 5.5% sequentially.

Exhibit 53. Housing Starts and Completions, 1995 to Present

Compared to housing starts, existing home sales are a more relevant indicator and driver of coatings demand; 75-80% of coatings are tied to existing home sales and remodeling, with the balance being new homes. In 1Q17, existing home sales were up 5% yr/yr, compared to new home sales, up 17%. Comparing 2016 to 2015, existing home sales and new home sales increased 4% and 12%, respectively.

Exhibit 54. Existing Home Sales and New Home Sales, 2001 to Present

Remodeling activity continues to advance and is predicted to increase 6.9% by the end of the year and then decelerate a bit to 6.1% in 1Q18E (based on annualized rates), according to the Harvard Joint Center for Housing Studies. Following a share shift to the DIY market during 2006-09, professional contractor share is once again on the upswing, more so benefitting SHW than PPG.
Exhibit 55. Homeowner Improvements, 1996-2018E

Source: Harvard Joint Center on Housing Studies, The ChemQuest Group and Wells Fargo Securities, LLC

Transportation

Infrastructure spending and auto-related trends are important drivers for both the OEM and Special Purpose Coatings segments. For the latter, automotive refinish accounts for more than one-third of sales. Auto and light-truck sales have recovered nicely from a trough of about 9.5MM units in early 2009, having reached a seasonally adjusted rate of about 16.6MM units as of May 2017.

Exhibit 56. Light-Vehicle Sales versus Auto Production, 2007 to Present

Source: Bureau of Economic Analysis and Wells Fargo Securities, LLC
Industrial

IP in the United States continues to improve following the nadir reached in 2009. In 1Q17, IP increased 1% yr/yr, while capacity utilization remained flat at 75.8%. Recovery in this area would bode well for Industrial OEM coatings, which benefits from strength in U.S. manufacturing.

Exhibit 57. Industrial Production and Capacity Utilization, 2001 to Present

Source: U.S. Census Bureau and Wells Fargo Securities, LLC
Glossary

- ag – agriculture
- BPA-NI – bisphenol-A – non intent
- CAGR – compound annual growth rate
- CAI – Color, Additives, & Inks
- CO₂ – carbon dioxide
- CQ – ChemQuest
- DIY – do-it-yourself
- dst – dry short ton
- dwt – deadweight metric ton
- E-coat – electrocoat
- FCF – free cash flow
- FX – foreign exchange
- gal – gallons
- HWH – hey wassup hello
- IP – Industrial Production
- IVC – IVC Industrial Coatings
- JV – joint venture
- KT – thousand tonnes
- LATAM – Latin America
- MT – metric tons
- NA – North America
- NWE – Northwest Europe
- O&G – oil and gas
- OEM – original equipment manufacturer
- P&A – Pigments & Additives
- PC – Performance Coatings
- PMI – purchasing managers index
- PPI – producer price index
- ROI – return on investment
- SAAR – seasonally adjusted annual rate
- SSBR – solution styrene-butadiene rubber
- TiO₂ – titanium dioxide
- vmt – vehicle miles traveled
- VOC – volatile organic compounds
- vol – volume
- YTD – year-to-date