



POWDER COATINGS:

The Changing Landscape

Participants in the powder coatings market have experienced an exciting journey, traversing both very high peaks and deep valleys. The changing landscape has provided both challenges and opportunities for resin suppliers and powder coatings formulators. Currently, the overall growth rate for powder remains above that of the coatings market in general, and despite several worrying conditions, most players in the market have a positive outlook as the powder coatings adventure continues into the future.

In general, the growth of the powder coatings market mimics the broad economic growth in the various regions of the world. The ChemQuest Group, a management consulting firm located in Cincinnati, OH, valued the 2005 global market for powder coatings at \$4.1 billion based on sales of 1.2 million metric tons. ChemQuest expects the global market to grow 6.4% annually, with the highest growth in Asia (11% per year) and the lowest in Western Europe (1% per year), according to vice president Michael D. Brown. In the U.S., Kusumgar, Nerlfi & Growney (KNG) estimates that sales of powder coatings reached \$1.4 billion in 2005, with the market growing at 4% annually. In Asia, KNG valued the 2005 powder coatings market at \$2 billion, and increasing at a rate of 12% per year.

While there are a multitude of applications for powder coatings, just three main uses—general metal, appliances, and metal auto parts—account for two thirds of the U.S. market, according to Steven Nerlfi, a consultant with KNG. General metal is by far the largest end market and accounts for 55% of sales on a dollar basis and is growing at about 4% per year. Appliances and metal auto parts each make up about 6% of total

Photo courtesy of DuPont.

by Cynthia Challener
JCT COATINGS^{TECH}, Contributing Writer

sales, with annual growth rates of 2% and 3%, respectively. Additional application areas include machinery and equipment, metal finishing, electrical insulation, conformal coatings, and other miscellaneous applications.

Despite the fact that growth rates have significantly declined from the double digit levels experienced in the 1990s, the powder coatings market is still growing at a healthier pace than the overall coatings market and, in general, faster than the average GDP—and this trend is expected to continue. The challenges to be overcome in the developed regions of the world are not insignificant, though. Dramatically increasing raw material and energy costs have impacted this sector of the coatings industry like all others. The shift of manufacturing—particularly of metal fabrication—to lower cost regions of the world has been a large contributor to the decline of the growth rate in North America and Western Europe. And while less than 20% of the liquid OEM coatings market has been converted to powder, step changes in technology will be required before further growth can be achieved via this mechanism.

Both resin producers and powder coating manufacturers can take steps to increase the growth rate in the world's developed regions. The high level of fragmentation in the market—there are over 70 powder coating formulators in North America alone—should be ad-

dressed through consolidation. Rationalization would also help reduce the overcapacity problem. Increased investment in R&D will be required in order to realize the necessary technology advancements that will lead to new application areas for powder coatings. Maintaining an awareness of the needs of customers and providing flexible, responsive, and specialized service will be important as well.

The difficulty will be in changing the current mentality, which is focused largely on differentiation by price and service, rather than on technology, according to one industry expert. It will be difficult to increase R&D investments while conditions remain challenging, with sale prices declining, raw material prices increasing, and the continuing movement of business offshore. Some also question the resolve of formulators that offer both liquid and powder products to grow the powder market, since it could lead to erosion of their liquid business. It may be up to smaller powder coating producers to drive the market forward.

To maximize opportunities in emerging regions of the world—Asia, Southeast Asia, Eastern Europe, South America—the larger players in the market are establishing a presence near their customers. Both coatings formulators and resin suppliers have invested in numerous facilities in China in particular, but in other high growth regions as well. DSM, for example, is expand-

ing its DSM Eternal Resins polyester powder coating resins in Kunshan, China, and is debottlenecking its powder resins production at its DSM Resins Far East plant in Taiwan. Akzo Nobel, Rohm and Haas, DuPont, and Sherwin-Williams have all made investments in growth regions, as have other major resin suppliers.

As the larger companies follow the supply chain distribution channels into emerging regions, opportunities are being created for smaller regional players. These companies are better able to serve local, small volume needs. Often, they can also provide customized products (multiple colors, special effects, etc.) in a minimal amount of time. Many in the industry believe that this type of service will become a required capability in the future.

JCT COATINGSTECH spoke independently with several powder coatings formulators and resin suppliers about these issues. Their individual thoughts about the current condition of the market, the role of technology development, and possibilities for the future are presented below.

The powder coating manufacturers that participated in this survey include: Robert Pennekamp, vice president, finance with Interpon, Akzo Nobel's powder coatings business; John K. Tomlinson, product manager for BASF Automotive OEM Coatings; Trena F. Benson, marketing manager with DuPont Powder Coatings USA; Thomas P. Frauman, global marketing director for Powder Coatings with Rohm and Haas Company; and Bob Cregg, market development director for Powder Coatings with Sherwin-Williams.

Resin suppliers that provided feedback include: Bruce Benda, director of global marketing for Powder Resins, and Thomas Faecke, Head of the Global Technical Group, Bayer MaterialScience; John Jacquin, TS&D manager, Powder

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Coatings Resins—Americas with Cytec Surface Specialties; Cindy Fruth, senior market manager—Coatings with Johnson Polymer; and Eric Dumain, technical manager of Coatings Innovations for Reichhold, Inc.

JCT: *Why is your company involved in the powder coatings market?*

Thomas P. Frauman, Rohm and Haas: OEM product finishing, or industrial coatings, represents a significant portion of the global coatings market. Powder coatings represent a superior solution for environmentally compliant application of factory applied coatings. Today, with the global powder industry occupying only roughly 15% share of total industrial coatings, significant headroom exists for expansion of primary market demand driven from new technology that enables the replacement of solvent and water-borne liquid coating systems.

Robert Pennekamp, Akzo Nobel: Akzo Nobel is the largest coatings company in the world and powder coatings is an important market segment for us. We see good opportunities for growth based on the efficiency, cost benefits, and positive environmental impact of powder coatings (versus traditional liquid coatings).

Trena F. Benson, DuPont: DuPont saw the opportunities in this environmentally friendly alternative to solvent-laden paints. It's great to be in a green business with so much potential.

Bob Clegg, Sherwin-Williams: Sherwin-Williams began offering powder coatings technologies several years ago as part of our strategy to offer a broad range of finishing solutions for our customers, particularly solutions that allow our customers to comply with increasingly stringent government regulations. Of course, because the market for powder coatings was the fastest-

growing segment of the industrial coatings market, we identified it as an area of growth potential.

John K. Timblinson, BASF: Powder coatings represent an important market segment in North America for both automotive OEMs and their tier suppliers of parts. Powder coatings provide an extremely low-VOC option to our customers as they strive to reduce the environmental impact of their operations, so BASF's involvement in powder coatings helps meet our customers' needs.

Bruce Benda, Bayer Material-Science: Participating in the powder coatings sector is a good fit with Bayer's strategy to offer value-added raw materials for the paint and coatings industry overall. We also place a strong emphasis on providing environmentally friendly products, and powder coatings fit naturally with this aspect of our business as well.

Eric Dumain, Reichhold: Serving the powder coatings market is one of the major ways of growing our coating resins business in compliant technologies, as the markets for conventional coating resins such as alkyls are shrinking.

JCT: *How would you describe the current state of the market?*

Trena F. Benson, DuPont: Powder coating consumption saw double digit reductions in 2000 and 2001. There are probably two main reasons for much of those reductions: (1) large market moves to Asia, and (2) liquid applications that were a good fit for powder had already taken place, leaving a mature market. In 2004 and 2005, we experienced moderate increases in consumption and we continue to see this into 2006. We can probably attribute this to a stronger economy and a slowdown in jobs moving to China. In the past year or so, the industry has also experienced un-

precedented raw material price increases. The largest hikes have been in epoxy technology but we continue to also experience increases in the polyester resins. Though DuPont leverages our extensive buying power to maintain raw material costs, we continue to see price increases and with energy and transportation costs hitting all time highs, we see no end in sight. However, we do believe that powder coatings are undervalued in the marketplace. This is largely due to the glut in the market and represents a trend that must change.

Cindy Fruth, Johnson Polymer: The powder market has demonstrated minimal growth over the past several years. Pricing on both the resins and powder coatings have dropped significantly due to excess capacity both on the polyester resin side as well as the powder coatings side.

Eric Dumain, Reichhold: The current market is very cost driven and focused on rationalization of certain raw materials. Securing a stable supply of raw materials has also come into focus after Hurricane Katrina.

Thomas Faecke, Bayer Material-Science: The powder coatings market, although it is not experiencing the double digit growth rates witnessed in the 90s, is still an overall growing market. Powder continues to provide competition for more conventional paint technologies, and continued growth reflects this situation. Asia is of course the fastest growing regional market, but North America is seeing growth at GDP levels, which is still better than liquid technologies.

Thomas P. Frauman, Rohm and Haas: Powder coating remains a highly fragmented industry served by greater than 1,200 producers worldwide, with the greatest number located in China—there are very minimal entry barriers. The top five producers command roughly 47% of total industry revenues, with an-

other six second tier players holding 10% share. Below these companies are some larger regional players like Spraylat, Covesan, Weg, Vitraccoat, Naupao, Frei, Inver, DNT, and Orica, and then the numerous small producers that make up the competitive fringe. In emerging markets it has not been uncommon for smaller players to achieve significant growth rates in the shadow of the larger producers by leveraging basic technology, speed, and low cost.

John K. Tomlinson, BASF: The automotive OEM, tier, and wheels segments, as well as industrial coatings such as appliances, are high-demand industry sectors. In the 1990s, some of the major OEM automotive companies converted their primer layers to powder coatings, driving the growth of powder in that market segment. The growth has since slowed due to the completion of this conversion process. Today, there are few "brown-field" locations remaining for conversion from liquid to powder and, for the most part, only new facilities are adding to powder demand in the OEM segment.

JCT: Have there been any recent company activities that have had a strong impact on the dynamics of the market?

John K. Tomlinson, BASF: BASF's \$470 million acquisition of Johnson Polymer is expected to be completed by July 2006. Through this transaction, BASF gains a much stronger position in water-based resins technology as well as a better position in the North American market. For our powder coatings business, the acquisition provides BASF with the ability to expand its portfolio of products for existing customers and hopefully lead to entrée into new markets.

Robert Pennkamp, Akzo Nobel: There have been no significant Akzo Nobel acquisitions or mergers that

have had a major market impact since 2002, when Akzo Nobel acquired the Ferro powder coatings business. We believe the acquisition and merger activity will pick up again in the coming years. Akzo Nobel, for example, is actively pursuing a number of growth opportunities through acquisition.

Trena F. Benson, DuPont: We continue to see consolidations among raw material suppliers. The number of consolidations among powder producers is few. This creates a difficult market for affixing the level of value that powder coating deserves. Powder manufacturers use such a small percentage of their overall offering and their business is very expensive to enter. All this adds to the complexities of this market. Over the years, powder applicators on the one hand have driven prices lower and lower, leaving, in the middle, the powder producers who must seek out each and every opportunity to differentiate themselves.

JCT: Where are the growth regions of the world for powder coatings? What are the customer industry sectors with the highest demand?

Cindy Fruth, Johnson Polymer: The major growth areas are in Eastern Europe and Asia, with growth rates double of those in North America and Western Europe. Although there is little growth in powder, general metal is still the largest sector, followed by appliance and automotive.

Thomas P. Frauman, Rohm and Haas: Today, roughly 40% of the world powder market is located in North America and Western Europe, and roughly 60% in emerging markets. North America and Western Europe saw market decline in 2005, while there was strong market growth in Asia, Eastern Europe, and

the Middle East. With continued migration of industrial production to lower cost countries, the future in North America and Western Europe will depend more significantly on end products requiring a high degree of customization, that are heavy and difficult to transport, or where the coating appearance is a significant driver of differentiation and represents an insignificant portion of total manufacturing cost.

Robert Pennkamp, Akzo Nobel: Asia, Eastern Europe, and South America are the most attractive new markets for growth right now. Powder coatings are becoming a very strong alternative for traditional liquid markets such as architectural, functional (pipe and valve), and automotive.

Eric Dumain, Reichhold: Turkey, Eastern Europe, China, and India are all growing at rates above the traditional Western European and North American markets. Categories within the general metals market such as store shelving are still strong, while other sectors, such as appliances, continue to struggle.

JCT: What do you see as the key issues for the powder coatings market?

Eric Dumain, Reichhold: There remains nearly 50% overcapacity in the coatings supplier base, which

Photo courtesy of DuPont.

implies a ripe condition for acquisition. This hasn't happened because potential buyers do not see real differentiation between coating suppliers. The powder market, mirroring the overall coatings market, has relatively limited influence on the channel compared to the large feedstock producers and large retailers. Technology progress has slowed compared to that of liquid coatings, as the process of making coatings through melt mix extrusion has inherent limitations in raw material selection. Continued shifts of metal finishing to developing countries will challenge small and mid-size powder suppliers to stay in business.

John K. Tomlinson, BASF: Energy and raw material costs are always a concern, regardless of the coating technology in question. Resin suppliers need to find ways to maintain the quality of their products at reasonable prices. There is constant effort in the industry to drive cost from the process. If one technology develops a significant advantage, there will be a shift in the market to that technology. Currently, powder may have an advantage over liquid materials when waste handling and abatement costs are included in the analysis. However, the largest limitation of powder coatings is that they cannot be directly substituted in a liquid coatings line without substantial capital investment. This can slow the pace of conversion to the rate of replacement—that is, installing powder coatings only as current coating lines reach the end of their useful life.

Cindy Fruth, Johnson Polymer: The excess capacity is a major issue in the industry, driving prices downward. Although there have been many price increases over the past years, pricing is still well below that of 5–10 years ago. We continue to see more resin and powder coatings imported to the U.S., which is adding to the downward trend in pricing. Also, the conversion from solvent to powder has slowed. End

users are looking at alternative chemistry, namely water and UV, to meet regulations, rather than powder. This is mainly driven by the costs associated with converting liquid lines to powder lines.

Thomas P. Frauman, Rohm and Haas: Today, powder coatings stand at a cross roads caught in the middle of the value chain, squeezed between two formidable opposing forces—petrochemicals and mass retail. No longer the “star” of their companies’ portfolio, major producers struggle to build competitive advantage and return the cost of capital to their shareholders. With both current customers and feedstock suppliers wielding more leverage than the powder formulator, manufacturers often respond to the raw material cost/selling price squeeze by slashing research, sales, and service budgets. These actions alone, without continued commitment to innovation and market expansion, may fuel a spiral of decline.

To compound the situation, powder formulators typically have high fixed costs driven from investments that were made 10 years ago. During this time it was assumed that powder coatings’ annual sales volume would continue to grow at double digit rates year after year. Business managers today find themselves caught between needing to raise prices and improve gross profits, while at the same time needing every ton of volume to cover fixed costs.

Trena F. Benson, DuPont: Currently there is more capacity than demand in this market. Approximately 10 powder producers manufacture almost 75% of the U.S. powder consumption. The remaining 60 or so producers, which produce the remaining 25%, may be categorized as regional suppliers. As a result of the overcapacity, many of these regional suppliers have idle equipment which puts them in a position of offering quick turn-

around on made-to-order materials. But, let's face it . . . as a result of the current market conditions, many of these manufacturers are making some desperate and unsustainable offerings to the marketplace.

Robert Pennekamp, Akzo Nobel: Overcapacity is the key issue, and we believe this will correct itself in the future through consolidation of manufacturers. As far as technology is concerned, with powder coatings, we are bound only by our imagination. It is amazing to see the great advances that we have made with colors, effects, functionality, cure temperatures, etc., over the last five years. There is no doubt that the next five years will bring more technological breakthroughs. We do expect that raw material cost increases will continue to be a concern.

Bruce Benda, Bayer Material-Science: Coupled with the overcapacities; Internet auctions first introduced by end users and then implemented by powder coating manufacturers for their raw material suppliers are driving the value out of the market and leading to premature commoditization. There is a downward pressure on prices as a result, which is being paralleled by increasing raw material prices. Suppliers to powder coating formulators are forced to increase efficiency and effectiveness—to do more with less—from a commercial, technological, and operational perspective.

Thomas Faecke, Bayer Material-Science: We have witnessed an emerging trend of increasing demand for service in the powder coatings sector. Local supply is necessary to provide the necessary level of responsiveness and also to have the ability to provide products for specialized applications where customers are looking for special textures, gloss levels, effects, large color variations, etc. This trend is impacting both resin suppliers and coating producers.

Bob Cregg, Sherwin-Williams:

While excess capacity is an issue for the industry overall, we prefer to focus on where there are market needs. We believe growth in powder coatings sales will come from targeting areas of unmet need, both in terms of technology and service; for example, in the ability to meet the needs of various customers with local supply of a broader range of colors, textures, gloss levels, and special effects

JCT: *Given these issues, what are the challenges and opportunities facing powder coating producers?*

Thomas P. Frauman, Rohm and Haas: It is all about attacking that 85% of OEM product finishing that is not powder coated. This takes you into a variety of areas today not finished with powder coatings, including engineered woods and plastics. The road forward is clearly paved by technical innovation to create market expansion at the expense of liquid coatings, plating, laminates, etc.

Trena F. Benson, DuPont: The reality is that overcapacity has stymied growth because the market does not have the technological improvements available for the part of the industrial coatings market not yet converted. Powder manufacturers must move away from competing so much against each other for each piece of business in the marketplace and work harder on developing the technology needed for converting more liquid applications to powder. We must get beyond the fact that we are pursuing the same customers by selling a coating. We provide an aesthetically pleasing and/or protective barrier for products and these formulations could be changed for greater usage in other markets.

Robert Pennekamp, Akzo Nobel: Powder coating producers must find new ways to differentiate powder technologies to prevent the market view of commoditization and to en-

hance the value that the various technologies provide to end users. Clearly our ability to continue to invest in developing new technologies is critical to continue to increase the value that powder technologies provide end users and to replace and/or surpass liquid coatings capabilities. We are also realizing an increase in specialty niche custom color requirements that are usually smaller batch requirements. We must be able to respond more quickly to this increasing demand. We will also need to continue to attract talented personnel to our industry to drive further success in this market.

Bob Cregg, Sherwin-Williams: Opportunities for increased use of powder coating technologies lie in areas where liquid coatings do not provide the necessary level of performance and compliance with in-

creasingly stringent environmental regulations. It's the performance-compliance combination that is key. Aluminum extrusion, government/military, and the heavy equipment industry are a few of the markets where these opportunities lie. The aluminum extrusion market, which in Europe almost exclusively employs powder coatings, also provides opportunities for the North American market. Until recently, the higher line speeds used in North America have precluded the application of powder coatings. Technology has been developed to overcome these issues, so we expect to see growth in this segment. There is also a push to educate architects and other end users and specifiers about the advantages the use of powder can offer manufacturers of windows, doors, and other extruded aluminum based goods.

Eric Dumain, Reichhold: The challenge is to marry advances in resins, the powder coating manufacturing process, and the coating application, which implies cooperation among raw material, coating and equipment suppliers needs to occur to achieve real significant breakthroughs.

Bruce Benda, Bayer Material-Science: The challenge for the powder coatings industry is to find ways to invest time and money on innovation and new product development. Today, everyone must focus their efforts on portfolio management and improving efficiency and effectiveness at the expense of future technology advancements. Some opportunities for providing high cost, value-added products do remain, though. For example, polyurethanes offer enhanced durability, weatherability, and appearance properties that for some applications provide necessary additional value, and therefore can carry a higher price.

Cindy Fruth, Johnson Polymer: For several years, powder coating manufacturers have spent a tremendous amount of time developing lower cost formulations, and not a lot of time on R&D. Resin suppliers are struggling to determine which developments are necessary for future growth. Although there are hints of work being done on lower temperature cure and thinner films, the primary focus is still on making lower cost products. I believe that the entire industry is struggling with how to capture (or recapture) the value of powder coatings.

JCT: It seems as if the market is looking to developments in technology to open doors to new application possibilities, which will in turn provide a means for the market to continue to grow. What new technology is anticipated in the coming years and what impact might it have?

Thomas Faechle, Bayer Material-Science: As a supplier to the powder coatings market, we have noticed that formulators seem to be separating into different groups. Some powder producers have elected to streamline costs, while others are taking the opposite approach and are investing to develop alternative technologies. One of those technologies is lower temperature cure formulations. Bayer is developing new lower temperature thermoset urethane systems. Our goal is to change the paradigm regarding urethane powder, which traditionally requires higher temperatures than other powder coatings. This offering will help our customers differentiate themselves from their competitors as well.

Eric Dumain, Reichhold: New developments in acrylic resins and UV-curable resins are significant—respectively, the OEM automotive market and office furniture market should be impacted by these advancements. The growth of auto topcoat/clearcoat powder coatings in Europe is an excellent example of the impact of continuous technology development. Resin technology that can be applied at liquid-type film thicknesses, with low energy cure requirements, would allow powder coatings to penetrate into markets that were previously not seen as economically feasible for powders, e.g., heat-sensitive substrates and traditional metal finishing markets such as coil.

Robert Pennkamp, Akzo Nobel: Fast change color booths, more efficient spray equipment, lower temperature cure powders, and advanced powder coating technology that will enable a more uniform coating application are some of the new technologies that have already arrived or are on the horizon. New Hyper Durability topcoats have been launched and are now competing against liquid fluoropolymers within the architectural market. We believe you will see powder



coatings expanding beyond application to aluminum and steel substrates, and will become much more prevalent in application to wood and plastics. We also believe that metallics will continue to progress at a very rapid pace. In all cases, these developments have answered growing needs in the market for powder coatings to replace the functionality of liquid coatings.

Thomas P. Frauman, Rohm and Haas: Expanding powder coatings' share in served markets will depend heavily on advancing powder formulations and application technology in the following areas:

- Lower cure temperatures
- Enhanced appearance properties such as spatter finish textures and brighter metallics
- Smoother thin film clear and opaque coatings; improved application at higher rates on both simple and complex parts
- Better solutions for customers requiring numerous colors and frequent color changes



Photo courtesy of Rohm and Haas Co.

- Coatings that provide protective properties with minimal surface preparation
- Repairability

With both served and new markets, liquid to powder conversion requires significant capital investment by customers and, therefore, will gain ground first where driven by the need to achieve regulatory compliance, replace end-of-life equipment, or install new capacity. Developments in the areas of lower cure temperatures, streamlined surface preparation, and improved application could potentially simplify the conversion process and reduce the required conversion investment. Investment in technology development by both powder formulators and key material suppliers will drive market expansion and growth, presenting a much more palatable alternative to solving the industry asset utilization dilemma, without decommissioning installed capacity.

Trena F. Benson, DuPont: Powder usage makes up less than 20% of the industrial coatings market. The remaining 80%+ may fit into cate-

gories where all the needs cannot currently be met with powder, such as the need for more glamorous coatings, specific performance characteristics, large part capacity, and coatings on heat sensitive substrates. All represent growth opportunities for the powder industry.

The industry continues to move forward with advancements in application equipment. Gains in reclaim technology and speed of color changes continue to move the market forward. These new designs increase efficiency, giving manufacturers and coaters greater productivity numbers, which makes them more competitive in this global economy. To name a few: high temperature coatings that withstand 1000°F; products that meet AAMA 2605 for the architectural industry; UV curable powders for heat sensitive substrates; and ultra low bake products for wood, MDF, and plastics. These technologies are still in the embryonic stage, if you will, and so they have only just begun to penetrate the market. We expect more opportunities in these areas on the horizon.

Q: Where do you see the powder coatings market headed?

Bob Cregg, Sherwin-Williams: We see customization and turnaround time becoming increasingly important as powder coatings suppliers focus on serving smaller markets faster, quicker, and better. In the near term we will see more growth in specialty powder coatings such as those that offer high performance and special effects/appearance. We also expect that customers will want a wider variety of color choices in smaller batch sizes. In North America, larger companies will follow metal fabricating businesses to Asia (those that represent single color, large volume operations). Of the smaller, regional companies that remain, those that offer specialized products and customized serv-

ices will be in a better position to offset the threat from emerging markets.

Bruce Benda, Bayer Material-Science: The powder coatings market will continue to grow at a level above that of the general coatings market in developed regions, and much more quickly in emerging markets. Asia Pacific will remain the major center of growth. This growth will come as new technologies are developed that will open the door for new applications, as well as responses to increasing demand.

Robert Pennekamp, Akzo Nobel: Continued growth and opportunity to move liquid coatings customers to powder, due to the advantages this technology offers. There is also a drive to differentiate technologies to increase the value that they provide to the end user.

John K. Tomlinson, BASF: We expect that the use of powder coatings will continue to grow at a rate slightly faster than the total coatings market, thanks to new facilities being designed and built for powder. Color powder primers on the same automotive production line may prove to be a significant advance that will help to expand the market. Powder basecoats and clearcoats are not widely used today, but this could change in the future as powder technology improves.

Eric Dumain, Reichhold: For the short term, formulators will continue to find ways to optimize manufacturing efficiencies and consolidate production where possible. Powders will make in-roads in the finishing markets where they outperform liquid coatings in applied performance and environmental friendliness. Powders for wood and plastics will continue to grow, whether they are thermally cured or energy cured. Markets for powders that are well established in Europe, such as automotive and architectural, will be accepted in North America. Breakthroughs in powder

manufacturing and application will enable penetration into liquid-dominated markets.

JCT: *How will your company ensure its success?*

Trena F. Benson, DuPont: DuPont brings a great brand to the marketplace. Not only do we offer a trustworthy name, but we also offer innovative coatings to meet the needs of our customers, years of product integrity that our customers have come to rely on, a breadth of product line unmatched in our industry, and many years of technical expertise.

We continue, as we always have, to work closely with our customers and their customers to meet market needs. We will continue to bring powder and other industrial solutions such as e-coat to the market along with our valuable services and strategic partnerships with our customers. While we cannot speak specifically to the technology areas we are currently working on, the future will be driven by innovative breakthroughs. We must find ways to use powder coatings in unique and even unconventional ways. Powder is an aesthetically pleasing and/or protective barrier. The question is not where is powder used but where are these attributes needed.

Thomas P. Frauman, Rohm and Haas: Rohm and Haas will maintain its steadfast investment of 3-4% of sales revenue in R&D to develop the products of the future and enable market growth while delivering value to customers needing more specialized high performance coatings and lower applied costs. We are also rebalancing capacity and resources to ensure that Rohm and Haas is poised to follow current customers anywhere on the globe and participate in higher market growth rates in emerging markets.

Rigorous management of our costs is also a primary focus so that we can deliver the most cost-competitive finishing solutions to our

customers and provide as much protection as possible against volatile fluctuations in feedstock costs. This approach includes, but is not limited to, leveraging the full capability of our global supply chain and fully integrated ERP systems. Rohm and Haas will also continue to invest in customer application support to ensure maximum efficiencies and lowest applied costs.

Robert Pennkamp, Akzo Nobel: Akzo Nobel will ensure its success through continued investment in innovative technologies and operational efficiencies, and by leveraging its global capabilities.

Cindy Pruth, Johnson Polymer: Johnson Polymer is a major supplier of acrylic resins, and will continue to focus on promoting them in the marketplace. The unique balance of properties will allow Johnson Polymer's acrylic resins to be marketed in niche segments of the powder coatings market.

Bruce Benda, Bayer Material-Science: Bayer will continue to focus on being as cost effective and as efficient as it can be in all aspects of its powder resins business. We have multipurpose facilities that produce resins for both powder and liquid formulations, and we will leverage the synergies afforded by these capabilities to provide enhanced quality and service as well as technology developments for our customers.

Thomas Faেকে, Bayer Material-Science: As the powder market separates into two sets of business models, Bayer is positioning itself to be a key resin provider to both. Whether a formulator chooses to focus on cost structure or technology development, Bayer can support powder manufacturers with products and services designed to meet their needs.

Eric Dumain, Reichhold: Reichhold is following customers that are transitioning from conventional solventborne coatings to

powder coatings and those that are moving to the developing regions of the globe. In addition, we are developing novel materials and processes that can help these customers grow their businesses. Formulators and raw material suppliers need to understand that long term sustainability will come through continued investment in R&D and technology. Cost reductions can only solve part of the problem.

JCT: *Are there any specific activities your company has recently engaged in that reflect your strategy?*

Robert Pennkamp, Akzo Nobel: Akzo Nobel recently invested \$2.5 million to build a new raw material storage and bulk handling facility at our Nashville, TN, plant. We plan to make significant additional investments to add capacity and efficiency to our North American operations in the coming 12 months. We also recently confirmed our worldwide commitment to the powder coatings market with expansions in Egypt and Russia.

Akzo Nobel has introduced a number of new coatings technologies recently, such as particle management and advanced fluidity technology that control the consistency of the powder applied; zinc rich primers which provide a barrier coating and protection against corrosion in extreme environmental conditions; architectural coatings which meet and exceed all levels of AAMA requirements (2603, 2604, 2605); bright metallic basecoats in powder coatings which allow you to exceed the metallic effects currently seen with liquid coatings on automobiles and appliances; and in-mold powder coating primers and topcoats for plastic substrates. There are product launches currently in process for each of the new technologies listed above and there are several new product launches planned for 2006-2007.

Thomas P. Frauman, Rohm and Haas: Last year Rohm and Haas opened its first plant in Quinpu, China, which is near Shanghai. This plant employs world class production equipment and techniques and is focused on serving the needs of our multi-national customers in the OEM premium segment. The Quinpu plant provides a shorter supply chain and higher levels of support for our customers. As part of this project, Rohm and Haas significantly increased laboratory and formulation resources. Currently, we are opening an additional laboratory and customer support site in South China that will augment this capability and provide our customers with even more responsive color matching and service. It is our plan to expand from this base, leveraging our strength in technology development to deliver value to both the OEM premium and volume segments. No doubt this will involve additional investments over the next few years.

With regard to product development, Rohm and Haas is currently leveraging the broader technology capabilities of the organization as well as relationships with select key industry partners to develop next generation technologies for step-out growth. The technology thrusts of the company include enhanced cost efficiency for current powder applications; opening new applications for powder coatings that were heretofore finished with a competing technology; and changing the fundamentals of powder manufacturing—what the coatings are made from and how they are made.

One example of a new technology from Rohm and Haas is our High Yield (HY) chemistry. Rohm and Haas Powder Coatings has supplied HY outdoor durable powders to the industry for over eight years and will introduce a next generation of this technology later in 2006. Our IY product family offers superior first pass transfer efficiency and application properties allowing customers greater yield (i.e., coated parts per kilo). Coupled with our applications expertise and field technical support, the third generation HY chemistry should give metal finishers the best of both worlds: superior coating performance at the lowest applied cost.

Furthermore, the industry can expect to see Rohm and Haas significantly ramp-up promotion of products that are developed and sold today in one region across our entire global footprint. In other words, expect many of the specialty products we currently sell almost exclusively in Europe or North America to appear in targeted campaigns anywhere we do business.

Irena H. Benson, DuPont: DuPont Powder Coatings Americas completed an acquisition in Mexico last year. We've extended our business into South America and will be moving into the Canadian market this year. Opportunities will continue to increase in Asia, Eastern Europe, and the Middle East. We have introduced a number of specialty finishes for our customers and

plan to make some of them available on our new color card to be printed this fall. We also provide a line of high temperature-resistant coatings for the fireplace and grill markets. We have many things in the works and, as I am sure you will

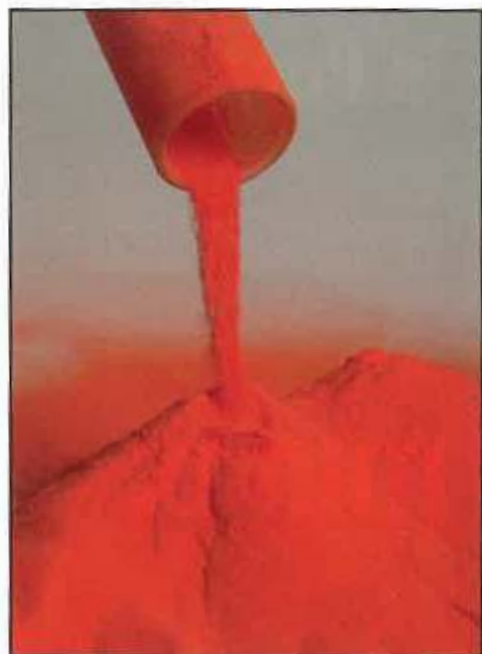


Photo courtesy of DuPont

understand, we need to protect our intellectual properties. However, be assured that we are committed to driving innovation in this marketplace and are making huge investments to drive powder into the new frontier.

Bob Cregg, Sherwin-Williams: Our strategy is to provide powder coatings to customers in various niche markets we choose to serve, such as the market for off-road and heavy equipment, where we have invested a significant amount of resources to develop technologies that provide higher performance at thinner film builds to reduce cure time for customers in this market. We also have invested in developing super-durable powder coatings for the metal building products industry and for the off-road and heavy

equipment industry. These efforts demonstrate our strategy to focus on markets where we believe we can provide product technology and service advantages that differentiate us from our competitors. In China, we have set up our new plant to provide the same formulations and quality that we offer here, extending the same strategy that has worked in North America to the Asia Pacific.

John Jacquin, Cytec: In mid-2005, Cytec Surface Specialties completed the renovation of its powder coatings application lab in Smyrna, GA. With all of our resources now in one location, we have much more flexibility and have enhanced our applications support, reduced commercialization time, and improved overall safety.

With regard to new product development, Cytec is focusing on innovative powder coating technologies such as CRYL-COAT[®] super-durable resins for exterior applications, semi-crystalline polyesters, resins for clearcoat and matte finishes, and UV-cured systems, including our UVECOAT[®] unsaturated resins.

Eric Dumain, Reichhold: Reichhold and Prosim have jointly formed Reichhold Turkey, which will market powder coating resins (and unsaturated polyesters for composites) in the Turkish market. Prosim has been involved in selling Reichhold products since 1999. Reichhold Turkey has signed a manufacturing agreement with Ege Kimya to toll manufacture these products. Ege Kimya will upgrade their resin manufacturing plant in Adapazari, Turkey, to manufacture state-of-the-art Reichhold products.

Our introduction of Fine-Clad M-8230 hydroxylated super-durable

polyester has generated significant interest in the wheel coatings market. Urethane coatings formulated with Fine-Clad M-8230 have outstanding flow and filiform corrosion resistance—performance comparable to acrylic powders at significantly lower formula cost.

Bruce Benda, Bayer Material-Science: Bayer offers its Rucote[®] polyester resins, Crelan[®] urethane crosslinkers, and Crekat[®] catalysts to the powder coatings market. We are currently developing lower temperature curing polyurethane thermoset resins and are engaged in discussions with customers about how the technology can be designed to meet their specific needs.

Cindy Fruth, Johnson Polymer: As noted earlier, JohnsonDiversey has agreed to divest its Johnson Polymer business to BASF so that the company may focus on its core business in the commercial cleaning and hygiene market. The operations of Johnson Polymer will be integrated into BASF's Performance Chemicals Division, which produces a wide range of specialty chemicals. We are excited at the prospect of being part of a world-class organization that understands the chemical industry and is willing to invest in the growth of our business.

On the product side, Johnson Polymer continues to develop new acrylic powder resins with more desirable properties. One of the differences with acrylic technology is that the extrusion process is done at higher temperatures, due to the higher melt viscosity of the acrylics. JONCRYL 825, a carboxylic functional resin, was developed and introduced for improved process capability. The softening point is 20° lower than the standard product, allowing for better incorporation during extrusion. 