Globalization and consolidation in the paint and coatings industry, raising raw material and energy costs, and increasing regulatory pressures each independently can have dramatic effects on the additives market. Today, producers face all of these issues in combination. Innovation, industry players say again and again, is imperative for maintaining competitive advantage.

Additives used in paints and coatings serve to enhance the performance of formulations and generally provide characteristics otherwise not possible. Numerous classes of additive types based on a whole host of chemistries interact with resins, solvents, or water and other additives to improve such properties as adhesion, open time, flow, foaming, as well as resistance to microorganisms, corrosion, and UV damage.

The global market for additives used in paints and coatings is estimated to be $4.8-$5.0 billion by the consulting and market research firm, The ChemQuest Group, Inc. This sector is growing slowly overall at 1-2% per year, with most types of additives only experiencing demand increases between 0-1%. Deformers, wetting agents, and adhesion promoters show the greatest potential, with growth rates of 4-5%.

Sales in North America total $1.3 billion, while in Europe they are valued at $1.2 billion and the rest of the world accounts for the remainder.

Regional growth rates differ widely, with emerging markets experiencing the greatest increase in demand. The Asian additives market, including biocides, rheology modifiers, foam control agents, dispersants, wetting agents, UV stabilizers, and slip/turb agents is valued at $1.5 billion and growing at 9% annually, according to a market research study by Kunمرا, Nethi & Growney (KNG) that was published in May 2008 (title: Asian Coating Additives). By 2012, total sales of these additives into paint and coating applications will be worth $2.25 billion in Asia.

Countries covered in the study include China, India, Japan, Korea, and others such as Indonesia, Malaysia, Vietnam, and the Philippines. Not surprisingly, demand for additives is growing the faster in China (13% per year) and slowest in the mature Japanese market (1% per year). According to Steven Neele, a principle consultant with KNG, about 20 companies in this market have sales between $20 and $150 million, but there are many, many smaller players vying for market share.

EMERGING MARKETS

"There has been an explosion in China. Manufacturers are utilizing technology developed in the rest of the world and have not needed to go through a process of evolution like Western industry did," Neele notes. "All of the major global players have developed a presence in China, with manufacturing sites and technical support, R&D, and sales centers—which has also contributed to the advanced technology in place.” These companies are positioning themselves to serve the growing market for paint additives in China, India, and other developing countries in Asia as per capita income increases and people have money to spend.

The growth potential of emerging markets such as China, India, Eastern Europe, and Latin America is the next hot trend for the paint and coatings industry overall, including additive suppliers. The growing number of players in these emerging markets, however, presents a challenge to established producers.

"The U.S. and European markets are being flooded with products from other parts of the world," says Dat Murad, president and CEO of The ChemQuest Group. "Domestic producers are facing new competitors and reduced profit margins. In particular, we are seeing increased competition and pricing pressure. In particular, new Asian suppliers, with product offerings across all additive categories, are developing distribution networks in Western markets." "At the time of writing, the Asian coatings industry is in its infancy, with major companies like Akzo Nobel, Dow, and Nippon Paint vying for market share. "The impact of an additive on the performance of a coating is critical," Marshall says, "and companies with expertise would benefit from formulating longer-lasting products, and at appropriate levels."

GLOBALIZATION AND CONSOLIDATION OF THE CUSTOMER BASE

The shift to a focus on emerging markets is only one aspect of the globalization of the paint and coatings industry. Additive producers are finding that formulators are looking for suppliers that can provide consistent quality and competitive pricing to locations around the world.

Sandeep Cool, North American specialty additives marketing manager for paints and coatings materials for Rohm and Haas Company, believes that "in addition to finding ways to reduce both 'product' costs and the 'formulated' costs of their customers' geographic diversity and greater participation in rapidly developing economies will enable suppliers to better align themselves with customer trends towards globalization. This will also help offset the lower demand in North America." Just Read Air Products' section manager for applied technology in Asia, agrees emphatically that the ability to work as a global supplier to multi-national is a vital new competency required of additive suppliers.

As globalization has occurred in the paint and coatings industry, consolidation of the sector has taken place at a rapid pace. "Consolidation has become a fact in the coatings industry," says Kevin R. Lassila, Ph.D., director of technology at Rohm and Haas, Inc. "The net effect on additives suppliers is that it has raised the stakes of the game. As smaller companies are acquired, larger ones generally standardize formulations, resulting in greater sales for additives products and providing greater access to a broader range of low-priced additives in global markets," adds Andre Ronco, industry manager, Business Line Coatings, with Ciba Corporation.

Leading Additive Suppliers to the Asian Coatings Market

Adeka Al alloy (BOK Additives & Instruments)
American Chemet (Only cuprate oxide)
Arch Chemicals Ciba Degussa Elements Evonik Hercules Incorporated Kuraray Nippon Nippon Nohsok Rohm and Haas Co (Source: Kunمرا, Nethi & Growney)
Additive Suppliers
Focus on Innovation for Future Growth

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"The U.S. and European markets are being flooded with products from other parts of the world," says Dari Mural, president and CEO of The ChemQuest Group. "Developing markets in Asia, South America, and Eastern Europe provide the most value, and less for those who don't. The winners often end up with a much deeper relationship with the customer and the opportunity to enter into preferred supplier or joint development arrangements."

Leading Additive Suppliers to the Asian Coatings Market

Adexa
Altaan (BYK Additives & Instruments)
American Chemet (only cuprous oxide)
Arch Chemicals
Ciba
deCham<br>
Elemonis<br>
Evonik
Heracles Incorporated
Kisanoto
Korea
Nordox
Rohm and Haas Company
Source: Kunsum, Nerth & Gromwey

Part of the challenge is due to the fact that much less consolidation has taken place in the additive supplier base, according to Laurie Marshall, North American marketing manager at Air Products. "Formulators looking to gain as much value as possible while still maintaining performance are enabling the entrance of these new players, who are breaking price paradigms," Marshall further notes. The trend could lead to the commoditization of some additives, which would benefit formulators as long as quality and performance remain consistent and at appropriate levels.

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Sales of Additives for Paints and Coatings in Asia

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Source: Kusshinger, Neth & Cooswya

in surface science and the ability to understand the impact of additives on primary performance properties, such as wetting, retraction, hiding, durability, and water sensitivity, are positioned to provide the level of technical support coating manufacturers are looking for.

Some additive types are more affected than others. For biocides, according to David Suntix, North American marketing manager for industrial biocides at Rohm and Haas Company, customer consolidation is a critical issue. "As the customer base shrinks and becomes more concentrated, it will put tremendous pressure on products, price, and service requirements on biocide suppliers. A focus on development of sustainable biocide treatments and a global supply and regulatory support capability to meet customer needs is absolutely necessary."

REGULATORY PRESSURES

Sustainability, "green" technology, and regulatory compliance also top the list of key issues for the additives industry. "Regulatory and societal pressure to reduce the environmental impact of coatings systems is driving the coatings industry to reformulate to compliant systems, resulting in the need for new additive technologies," says Lasilla. The environmental characteristics of the additives themselves are now also being scrutinized, even though it is only a very minor part of the composition of paint.

Michael Hoppe, product manager for coatings additives with Cognis Corporation Functional Products, notes that "in 2008 and beyond, as companies try to comply with evolving regulations while being faced with increasing costs for fossil fuel, there will be an increasing need to come up with higher performance "green" additives and coating formulations. Suppliers are also facing with increasing costs associated with the regulations themselves. These growing ex-

penses could in some cases result in the withdrawal of products from the market and may also reduce new product development efforts. Some small additive companies will find it challenging to meet the requirements of regulatory programs such as REACH in Europe, and will need to decide whether or not the benefits of supplying products to those regions outweigh the cost of compliance. This is critically important as energy and raw material prices continue to spiral. Volatile raw material prices have changed the cost scenario for many additives, according to Don Pouhear, vice president, sales and marketing, DOW Coatings. "Historically, raw materials have been a relatively fixed portion of the cost equation. In recent months, however, raw material pricing has been marked by dramatic and rapid changes. Coatings customers accustomed to firm pricing for additives are now faced with the kind of fluctuating pricing that is reserved for commodity chemicals."

The rising cost of crude oil and natural gas also places significant pressure on additive manufacturers. "Many suppliers have difficulty passing these cost hikes on to downstream customers due to the soft spot in the coatings market conditions in the U.S.," notes Ning Chen, North American business director with Rhodia Novacure. The cost pressure is higher for those additives that are most sensitive to crude oil price movement and refinery capacity. Additives, which require longer production times, are more expensive to produce than raw materials with few producers, are most at risk according to Andre Beno. However, all additives are affected by the general energy supply situation in the market.

INNOVATING FOR SUCCESS

For each of the challenges faced by additive suppliers, companies are looking for additives that enable coatings formulators to differentiate their products, while keeping costs low and providing regulatory compliance, seems to be the best solution. "With changing legislation and technology advancements, new functional additives are constantly in demand," Beno stresses.

"New product development is crucial to stay ahead of the game—in particular, developing raw materials that are environmentally friendly paired with high performance," states Susanne C. Kuester, market segment manager—coatings for Grace Davison. "The coatings market is a mature market, and it has become more difficult to differentiate products nowadays. Paint manufacturers may not be trying more and more to achieve unique and special effects through additives."

RISING RAW MATERIAL AND ENERGY PRICES

Finding areas of opportunity that enable additive producers provide added value is critically important as energy and raw material prices continue to spiral. Volatile raw material prices have changed the cost scenario for many additives, according to Don Pouhear, vice president, sales and marketing, DOW Coatings. "Historically, raw materials have been a relatively fixed portion of the cost equation. In recent months, however, raw material pricing has been marked by dramatic and rapid changes. Coatings customers accustomed to firm pricing for additives are now faced with the kind of fluctuating pricing that is reserved for commodity chemicals."

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As the number of additive suppliers and competitive prices has increased, successful producers have turned to innovation to maintain their market position. "This situation has led to a positive impact on the industry, with additive suppliers developing more customized products to meet the specific requirements of their customers," says Seattle Cool.

For long-term success, though, additive suppliers must show the value-added benefit of any new technology introduced to the marketplace, according to Beno. "Market driven additives exhibiting improved performance and value will ensure quick adoption," he notes. This is increasingly true as competition from lower-cost producers in emerging regions continues to grow. "Existing suppliers need to differentiate their offerings to improve value products and shift the market towards higher performance," he adds.

Improved functionality is a key criterion for success. "Formulation optimization in light of numerous regulatory constraints is multi-faceted, and the role of the additive in providing the desired performance characteristics is of ever-increasing importance," Marshall remarks.

Emphasis is also being placed on multi-functionality as a means for reducing the number and quantity of additives necessary for a given formulation. "With higher solids formulations, dual, non-functional additives will have an increased impact with new technology that addresses a number of goals," says Poucher.

Developing new additives based on alternative raw materials will also play a role in this industry. "The desire for diminished environmental impact will continue to be the dominant trend driving change in the coatings industry," assesses Lasilla. "There is also likely to be increasing emphasis on sustainability with increased utilization of bio-based raw materials in coatings formulations and in the manufacture of additives."

The additive market will continue to face the challenge of raw material costs and short supply situations in the next few years, according to Chen.

Suppliers are actively seeking new ways to minimize their exposure to key raw materials. Development of next-generation products based on alternative raw materials and technologies is one approach. Many companies are placing an emphasis on developing additives that allow customers to create new water-based products that are compliant with international regulations. The key is to de-

North American Coatings Additives Market—1.3 Bn

Source: The Chemical Group, Inc.

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Source: Kuehninger; North & Grouzy

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develop these products without compromising any performance properties," says Hoppe. "It is also very important to use natural raw materials for producing both existing and novel additives where it makes sense to do so."

Speeding up innovation will also be important. "In the long run, improving the product development process must occur in order to increase efficiency and address performance, regulatory, and cost issues all together," Chen adds.

Gaining a better understanding of how additives interact with one another and other ingredients in the formulation will be crucial for developing more effective products. "We have specifically included additives as part of our Dow Coating Solutions business because they are an important component of any coating," says Hoping.

Developing new coatings requires a mix of technology and formulary experience, and learning how to use different additives together and with different resins will help us identify potential new solutions and functionalities," Honig says.

Some are concerned, though, about the level of basic research being carried out in the industry. "Many suppliers are focusing on functional improvements that have a higher probability of short-term success, rather than investment in basic research, which has a longer payback period," worries Shaw. How this change in emphasis will impact the industry will not be known for some time.

In the next five years, though, Troy expects that additive companies that capitalized on technology will become the major suppliers to the market. "To be able to successfully navigate the challenging environment of today's marketplace, companies must be driven by a combination of product technology and regulatory expertise," Shaw believes.

**EXAMPLES OF INNOVATION**

**All Products**
- Dynol 607 acrylonitrile-based alternative for environmentally persistent fluorochemical surfactants that offers surface tension reduction, improved flow and leveling, and reduced surface defects
- ZeusPense range of low-VOC, APE-free, and HAPS-free pigment dispersions
- Carbowett 106 and 109 APE-free wetting agents

**BYK Chemie USA**
- NANOBYK® 3810 and 3812 UV stabilizers based on ceria nanoparticle dispersions that offer protection against UV-B radiation and complement other BYK nano zinc oxide-based products that provide UV-A protection
- DISPERS BYK® 2009, 2030, and 2025 wetting/dispersing agents that provide improvements in the performance of silica-based matting agents in high-solids solventborne or 100% solids systems, waterborne systems, and solventborne systems, respectively, based on Controlled Polymization Technology
- DISPERS BYK® 2163 and 2164 cost-effective alternative to caprolactone-based wetting and dispersing additives for solventborne coatings and pigment concentrates
- BYK® 4500 and 4510 adhesion promoters

**Ciba Corporation**
- Ciba® TINUVIN® DW series of zero-VOC encapsulated UV absorbers and hindered amine light stabilizers (HALS) for water-based formulations; allows removal of co-solvents while providing improved coating protection
- Ciba® EFKA® 4585 waterborne dispersant for improved waterborne dispersions of inorganic and organic pigments, especially carbon black, allowing higher pigment loadings based on Controlled Vored Radical Polymization

**Cognis Corporation**
- Lexanol EFC series of low-VOC, low-odor coalescents allow paint application at lower temperatures and high humidities while still providing improved scrub resistance, gloss enhancement, and improved rheology modifier efficiency; based on renewable materials
- FoamStar A-45 low-VOC, mineral oil-free defoamer effective against microfoam without reducing gloss; provides fast bubble-break and effective in highly tinted systems
- DXS 3220 high-performing, solvent-free, VOC-free associative thickener designed for premium coatings, launching in the second quarter of 2008
- Expansion of global technical support centers in the U.S., Germany, and China

**Dow Coating Solutions**
- ECOSURF® S77 and S99 low-foam surfactants based on seed oils
- Acquired IPBC (3-iodo-2-propynyl) butyl carba-mate) technology (through Dow Biocides) and developing new antimicrobial products based on this technology

**Market Update**
- CANGUARD Ultra RIT 20 low-color, low-pH, formaldehyde-free in-can preservative based on benzothiazoline (BIT) and formulated for low-VOC coatings; to be introduced in North America in late 2008
- ANGUS AEP® V0X 1000 non-VOC, multi-func-tional amine for low-odor, non-yellowing water-based paints that have low vapor pressure; allows for improved open time and set edge without compromising scrub resistance
- Expanding coatings laboratories in the U.S. and China, including high throughput research capabilities in both locations

**Grace Davison**
- SYLOID® C 2006 matting agent with additional functionality that improves mar and scratch resistance and also provides chemical resistance in certain paint systems

**Rhodia Novacare**
- Rhodafac® phosphate ester-based surfactants
- Rhodoline® phosphate ester-based dispersants
- Low-VOC, APE-free, and FDA-approved Rhodoline® phosphate ester-based defoamers
- Rhodoline additives designed to improve freeze-thaw stabilities, open time, and gloss
- Established new paint lab Center for Research & Technology (Bristol, PA) for customer support and new product development

**Böhm and Haas Compoly**
- Rocima® 586 zero-VOC, dual action biocide containing KATHON® and Bronopol

**Dosemater** biocide dosing systems providing greater options for safe handling of biocides
- Acrysol® RM-495™ solvent-free, hydrophobically-modified ethylene oxide urethane (HEUR) rheology modifier for enhanced viscosity stability to colorant addition and improved sag resistance
- Acrysol® RM-3000 solvent-free, nonionic, HEUR rheology modifier with uniquely Newtonian viscosity versus shear rate profile that provides good film build and flow and leveling
- Tamol® 945 low-forming polyacrylic acid pigment dispersant supplied at 45% solids in the sodium form for waterborne formulations; compatible with a variety of rheology modifiers' chemistries and provides heat age and viscosity stability; efficiently disperses mineral slurries

**Southern Clay Products**
- Optiflo® FVS VI for stabilization of viscosity upon addition of tint in VOC-compliant formulations
- Cloisite® nanoclay are lightweight replacements for commodity fillers and additives such as talc, calcium carbonate, and fumed silica that offer improved surface characteristics

**Tensar Corporation**
- Zero-VOC Polynaphase® 800 broad spectrum dry film series biocides offering combined fungicide/algaecide performance; launched in the EU and Asia
- Formaldehyde-free Merga® 700 range of broad spectrum biocides
- Trosnap® 1050 cost effective, high performing antibacterial product
develop these products without compromising any performance properties,” says Hoppe. “It is also very important to use natural raw materials for producing both existing and novel additives where it makes sense to do so.”

Speeding up innovation will also be important. “In the long run, improving the product development process must occur in order to increase efficiency and address performance, regulatory, and cost issues all together,” Chen adds.

Gaining a better understanding of how additives interact with one another and other ingredients in the formulation will be crucial for developing more effective products. “We have specifically included additives as part of our Dow Coating Solutions business because they are an important component of any coating,” says Hoernig.

Some are concerned, though, about the level of basic research being carried out in the industry. “Many suppliers are focusing so functional improvements that have a higher probability of short-term success, rather than investment in basic research, which has a longer payback period,” worries Shaw. “How this change in emphasis will impact the industry will not be known for some time.

In the next five years, though, Troy expects that additive companies that capitalized on technology will become the main suppliers to the market. “To be able to successfully navigate the challenging environment of today’s marketplace, companies must be driven by a combination of product technology and regulatory expertise,” Shaw believes.

EXAMPLES OF INNOVATION

All Products

• Dynol 607 acrylonitrile-based alternative for environmentally persistent fluorocarbon surfactants that offers surface tension reduction, improved flow and leveling, and reduced surface defects
• Zentise® range of low-VOC, APE-free, and HAPS-free pigment dispersants
• Cabotone 106 and 109 APE-free wetting agents

BYK Chemie USA

• NANOBYK® 3810 and 3812 UV stabilizers based on ceria nanoparticle dispersions that offer protection against UV-B radiation and complement other BYK nano zinc oxide-based products that provide UV-A protection
• DISPERBYK® 2009, 2030, and 2025 wetting/dispersing agents that provide improvements in the performance of silica-based coating agents in high-solids solventborne or 100% solids systems, waterborne systems, and solventborne systems, respectively, based on Controlled Polymerization Technology
• DISPERBYK 2163 and 2164 cost-effective alternative to caprolactone-based wetting and dispersing additives for solventborne coatings and pigment concentrates
• BYK® 4500 and 4510 adhesion promoters

Cibao Corporation

• Cibachrom® TVI®/TIV®-D series of zero-VOC encapsulated UV absorbers and hindered amine light stabilizers (HALS) for water-based formulations; allows removal of co-solvents while providing improved coating protection
• Cibafork® 4585 waterborne dispersant for improved waterborne dispersions of inorganic and organic pigments, especially carbon black, allowing higher pigment loadings based on Controlled Viscosity Radical Polymerization

Cognis Corporation

• Lexanol EFC series of low-VOC, low-odor coalescents allow paint application at lower temperatures and high humidities while providing improved scrub resistance, gloss enhancement, and improved rheology modifier efficiency; based on renewable materials
• Foamstar A-45 low-VOC, mineral oil-free defoamer effective against microfoam without reducing gloss; provides fast bubble-break and effective in highly tinted systems
• DSX 3220 high-performing, solvent-free, VOC-free associative thickener designed for premium coatings; launching in the second quarter of 2008
• Expansion of global technical support centers in the U.S., Germany, and China

Dow Coating Solutions

• ECOSURF® SAT and SA9 low-foam surfactants based on seed oils
• Acquired IPBC (3-isooctyl-2-propynyl) butyl carbamate technology (through Dow Biocides) and developing new antimicrobial products based on this technology

• CANGUARD Ultra RIT 20 low-color, low-pH, formaldehyde-free in-can preservative based on benzothiazolone (BIT) and formulated for low-VOC coatings to be introduced in North America in late 2008
• ANCIUS AEPI VOX 1000 non-VOC, multi-functional amine for low-odor, non-yellowing water-based paints that have a low vapor pressure; allows for improved open time and wear edge without compromising scrub resistance
• Expanding coatings laboratories in the U.S. and China, including high throughput research capabilities in both locations

Grace Davison

• SYLOID® C 2006 matting agent with additional functionality that improves mat and scratch resistance and also provides chemical resistance in cement paint systems

Rhodia Newcage

• Rhodafac® phosphate ester-based surfactants
• Rhodoline® phosphate ester-based dispersants
• Low-VOC, APE-free, and FDA-approved Rhodoline® phosphate ester-based defoamers
• Rhodoline additives designed to improve freeze-thaw stabilities, open time, and gloss
• Established new paint lab Center for Research & Technology (Bristol, PA) for customer support and new product development

Bohm and Haas Company

• Rocima® S86 zero-VOC, dual action biocide containing KATHON® and Bronopol

• Dosemaster® biocide dosing systems providing greater options for safe handling of biocides
• Acrysol® RM-495® solvent-free, hydrophobically-modified ethylene oxide urethane (HEUR) rheology modifier for enhanced viscosity stability to colorant addition and improved sag resistance
• Acrysol® RM-3000 solvent-free, nonionic, HEUR rheology modifier with uniquely Newtonian viscosity versus shear rate profile that provides good film build and flow and leveling
• Tamos® 545 low-foaming polymeric acrylic acid pigment dispersant supplied at 45% solids in the sodium form for waterborne formulations, compatible with a variety of rheology modifiers' chemistries and provides heat age and viscosity stability; efficiently disperses mineral slurries

Southern Clay Products

• Optifine® EVS VI for stabilization of viscosity upon addition of tint in VOC-compliant formulations
• Cloisite® nanoclay is lightweight replacements for commodity fillers and additives such as talc, calcium carbonate, and fumed silica that offer improved surface characteristics

Toyocast Corporation

• Zero-VOC Polyphose® 800 broad spectrum dry film series biocides offering combined fungicide/algaecide performance; launched in the EU and Asia
• Formaldehyde-free Megafl® 700 range of broad spectrum biocides
• Troyan® 1050 cost effective, high performing antibacterial product