



EDITORIAL BACKGROUNDER

Dow Coating Materials: Enabling Coatings Innovation

“As the world’s largest and most advanced developer of raw materials for the industry, Dow Coating Materials primary focus is to enable the coatings innovations of both today and tomorrow.”

– Luis Fernandez, business vice president, Dow Coating Materials

Formed following Dow’s acquisition of Rohm and Haas, Dow Coating Materials is the premier supplier of raw materials for architectural paints and industrial coatings in the world. The business is now comprised of the many resources and technologies from within both Dow and heritage Rohm and Haas, including the large span of product chemistries, a highly-trained R&D staff and an unparalleled global support infrastructure. These advantages allow Dow Coating Materials to provide the industry with a unique combination of global insight and capabilities coupled with local market expertise and product access.

Markets Served

Dow Coating Materials works closely with formulators across the architectural and industrial coatings industries to provide the innovations needed to remain competitive and meet the growing demands of the markets they serve. To accomplish this goal, the business is fully utilizing the premier assets and market expertise of both Dow and Rohm and Haas, as well as raw materials for:

Architectural Paints and Coatings. This segment includes chemistries designed to improve the performance, aesthetics, manufacturing and application of interior and exterior paints and coatings. Chemistries offered include a wide range of binders, opaque polymers, rheology modifiers, dispersants, solvents and others.

Dow Coating Materials, through existing resources and the acquisition of Rohm and Haas, is directly responsible for many core architectural coating innovations, most significantly water-based emulsions. That innovative spirit continues today – current efforts are focused on existing and new technologies that are environmentally-advanced, durable and versatile, while still easy and cost effective to produce and apply.

Industrial Coatings. Dow Coating Materials develops chemistries for, and works with, many customers across a wide range of industrial market segments, including automotive, marine and container, maintenance and protective, pipeline, rail, appliance, furniture, metals and plastics, traffic paints, packaging, wood, and many more specialty applications. Dow offers several powerful solutions for these applications, including binders, thickeners,

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solvents, acrylic monomers and others.

Dow Coating Materials is continually researching new solutions that meet the many needs of these segments, including minimizing environmental impact, reducing production/application costs and improving environmental durability.

Dow Coating Materials is also employing an aggressive growth strategy and will continue to add the appropriate technologies and resources needed to best serve customers.

Comprehensive Product Lines

Following the acquisition of Rohm and Haas, Dow Coating Materials now has the most complete line of core chemistries for paint and coating applications in the world. Products include:

Binders for Architectural and Industrial Coatings:

Water-based Emulsions. Dow Coating Materials is the world's premier supplier of a wide range of water-based emulsions for interior and exterior architectural paints, including 100% acrylics, vinyl acrylics and styrene acrylics. Brand names include RHOPLEX™, PRIMAL™, ELASTENE™ and AVANSE™.

Epoxy Resins and Related Materials. Dow Coating Materials is a leading manufacturer of epoxy products for industrial coatings, including D.E.R.™ and D.E.N.™ liquid and solid epoxy resins, D.E.H.™ curing agent and intermediates, such as epichlorohydrin. In addition, the company produces several specialty products, such as the recently introduced FORTEGRA™ Epoxy Tougheners, low viscosity materials that minimize the need for select additives in amine, DICY, anhydride and phenolic cured epoxy systems.

Opaque Polymers:

ROPAQUE™ Opaque Polymers. ROPAQUE Opaque Polymers are supplied as an emulsion made up of hollow styrene acrylic spheres. This unique technology allows formulators to develop lower-cost coatings by reducing TiO₂ or, alternatively, to enhance coating performance without added costs.

Rheology Modifiers:

Hydrophobically Modified Alkali Soluble (HASE)/Hydrophobically Modified Ethoxylate Urethane (HEUR) Thickeners. ACRY SOL™ brand rheology modifiers include a wide range of products designed to control the flow of paint and maximize coating performance. Additionally, UCAR Polyphobe™ Rheology Modifiers (Not available in North America) are a family of HASE thickeners that are tailored to meet specific performance needs in interior and exterior paints and coatings.

Hydroxyethyl Cellulose. CELLOSIZE™ Hydroxyethyl Cellulose is a thickener used in latex-based paints that also helps color acceptance and reduces splatter.

Dispersants:

Dow offers a range of polyacid dispersants with both hydrophilic and hydrophobic properties, as well as other tailorable characteristics. Brand names include OROTAN™ and TAMOL™.

Oxygenated Solvents:

Dow Coating Materials offers a broad range of oxygenated solvents, including glycol ethers (ethylene and propylene-based), alcohols, esters (acetic and propionic), and ketones for use in coatings formulations. Brand names and products include Butanol, Butyl CARBITOL™ Solvent, Butyl CELLOSOLVE™ Solvent, Diisobutyl Ketone (DIBK), DOWANOL™ DPM, DOWANOL™ PM, DOWANOL™ PMA, DOWANOL™ PnB, Isophorone, Methyl CARBITOL™ Solvent and Methyl Isobutyl Ketone (MIBK).

Other Dow Raw Materials Used in Coating Formulations:

In addition to the products listed above, The Dow Chemical Company offers many other products that play an important role in the formulation and use of high-quality paints and coatings.

These products include, but are not limited to:

Surfactants. Dow is a leader in the development and production of high quality surfactants for coating applications. Brands include TRITON™, TERGITOL™ and DOWFAX™ Surfactants, as well as the new ECOSURF™ SA Seed Oil-based Surfactants.

Polyurethanes. Dow provides many different high-quality polyurethane products for use as binders in coatings, including copolymers, polyols, MDI and TDI polyurethanes.

Biocides. Dow produces and markets a wide range of biocides for use in paints and coatings during production, storage and use.

Solvents and Intermediates. Dow produces many different solvents and intermediates for paints and coatings that provide properties such as fast drying times, low flammability and excellent solubility.

Research and Technical Service Expertise

Combining the resources of two leading edge raw materials companies (Dow and Rohm and Haas), Dow Coating Materials has the most powerful coatings raw material R&D network in the world, giving formulators access to a new unique product research and development ally. The Dow Coating Materials research team includes members on every major continent served by Dow, ensuring solutions that fit the needs of the application, as well as the requirements of the region (regulatory, environmental, etc.).

Additionally, the company has made significant investments in the tools and processes needed to stay ahead of trends and develop truly innovative solutions. Examples include:

Global R&D Facilities and Technical Service Expertise. Dow Coating Materials operates 13 dedicated R&D labs and application centers:

In the Americas:

- Midland, Michigan
- Freeport, Texas
- Spring House, Pennsylvania
- Toluca, Mexico
- Jacarei, Brazil
- Sao Paulo, Brazil

In Europe:

- Valbonne, France
- Horgen, Switzerland
- Rheinmuenster, Germany

In Asia Pacific:

- Shanghai, The People's Republic of China
- Taloja, India
- Singapore
- Geelong, Australia

High-Throughput Experimentation. High-throughput experimentation (HTE), also known as combinatorial chemistry, uses advanced computer modeling and robotics to identify promising compounds and material solutions. This integrated set of advanced capabilities in hardware and software allows many more experimental variables to be explored and understood than could be achieved with traditional approaches, enabling faster development and commercialization of new chemistries. Dow has implemented HTE methods throughout its global coatings R&D centers.

Bluewave™ Technology. Dow's patented Bluewave technology allows production of waterborne dispersions based on many different chemistries.

Using these and other technologies, Dow Coating Materials is continually developing new product solutions, based on many different chemistries that meet existing and new industry challenges. Currently, efforts are focused on, but not limited to, areas such as:

Improving Sustainability. Dow Coating Materials researchers and product developers believe that the key to successful sustainable chemistries is to develop solutions that meet or exceed environmental standards while still offering improved performance and reduced costs. Specific efforts include:

- Reducing volatile organic compound (VOC) content in paints and other coatings
- Developing polymers and other raw materials from renewable feedstocks, such as vegetable oils
- Increasing the performance of waterborne solutions and reducing solvent content in architectural and industrial coatings

- Enabling low-energy consumption coatings, such as elastomeric, white roof coatings

Enhancing Environmental Durability/Performance. Dow Coating Materials researchers are working on new solutions that will improve the durability and weatherability of coatings used across application areas. Specific efforts include:

- Improving the UV stability of finished coatings
- Improving the environmental resistance of architectural paints and industrial coatings
- Enabling self-cleaning coatings
- Improving damage tolerance
- Enabling better corrosion resistance
- Improving colorfastness
- Enabling self-healing coatings

Reducing Application and Manufacturing/Processing Costs. The business is exploring new methods that reduce the costs incurred during application and throughout the life of the coating. Initiatives include:

- Developing lower energy curing systems
- Enabling shorter cure times
- Eliminating steps from the coatings process
- Reducing the energy demand on the finished product

Enabling “Smart” Coatings. Dow Coating Materials is taking an aggressive approach to smart coating research. Initially, efforts are focused on three areas where the business sees the greatest marketability for formulators. They are:

- Release functionality
- Self-healing materials
- Intelligent self assembly and self stratification

Global Infrastructure

With technical, sales and customer support resources in every major market, Dow Coating Materials is making it easier for formulators to do business with Dow. The business understands the regulatory, environmental and business environments that formulators work in, and can provide the technical support, product stewardship and reliable sources of supply they need.

Dow Coating Materials leverages the manufacturing and management resources of multiple Dow locations and has a significant presence in the Americas, Europe and Asia Pacific, including:

In the Americas:

- Kankakee, Illinois
- Louisville, Kentucky
- Knoxville, Tennessee

- Hayward, California
- Lone Star, Texas
- Charlotte, North Carolina
- Croydon, Pennsylvania
- West Hill, Canada
- Queretaro, Mexico
- Barranquilla, Colombia
- Jacarei, Brazil
- San Lorenzo, Argentina
- Zarate, Argentina

Europe and IMEA

- Hanko, Finland
- Ramenskoye, Russia
- Landskrona, Sweden
- Lauterbourg, France
- Villers-Saint-Paul
- Mozzanica, Italy
- Gebze, Turkey
- Dubai, UAE
- Taloja, India
- Chennai, India
- New Germany, South Africa

Asia Pacific

- Songliang, China
- Beijing, China
- Sanshui, China
- Nagoya, Japan
- Min-Hsuing, Taiwan
- Las Pinas, Philippines
- Maptaphut, Thailand
- Cilegon, Indonesia
- Geelong, Australia
- Auckland, New Zealand

Industry Overview: Enabling Innovation in the Paint and Coatings Market

May, 2009

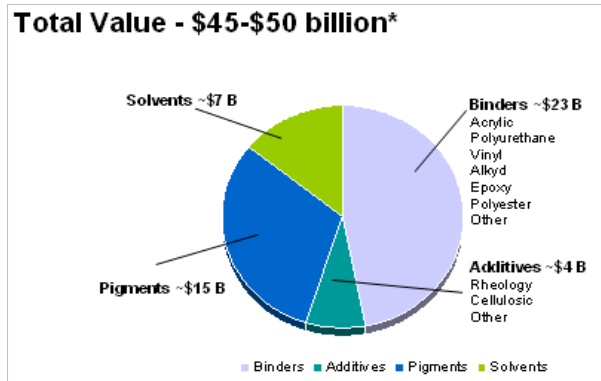


At Dow Coating Materials, we get excited watching paint dry on a living room wall or on the siding on the outside of a house.

We also study paint on cars, ships, washers and dryers – we even scrutinize the yellow and white stripes running down the roads you drive and the runways where planes take off and land.

For us, paint and coatings are a high-technology, big business. How big?

- We serve a global market valued between US\$45 and \$50 billion in sales.
- As the largest supplier to this market, we make about US\$3.5 billion in sales selling the ingredients (binders, additives, solvents, etc.) used to create the world's paints and coatings.
- We operate 33 manufacturing sites and 13 R&D/technical centers, located across five continents.



So what exactly do we do?

We are scientists, engineers, technicians, marketers and sales people who study the chemistry – and culture – of paint around the world in a very wide range of applications.

Things you might not know, but we think are neat:

- **Paint needs to be specially designed/formulated for every kind of surface** – wood, wallboard, plaster, cement, metal, plastic – and for prevalent weather conditions (heat, humidity, cold, arid). If it's not customized for the need, the paint will fail.
- **Most people think of paint as a fashion choice** (and home paint colors *do* follow the color trends you see on high couture runways and car colors, in that order). More important, **paint is a protective device** that extends the life of the materials it's on – and in the case of homes, helps protect the contents that are kept within them.



- Paints and coatings protect against the effects of weather
- Paints and coatings allow you to easily wash off outside dirt and pollution
- Paints and coatings make it easier to scrub off scuffs, marks and crayon trails on inside walls
- Paint and coatings extend the life of the substrate they are on – cars and washing machines last longer, tractors can stay in the field longer; pipelines, towers and shipping containers have longer, safer lives.



- A new coat of paint on a home's exterior is functional – it protects the home from rain, snow, wind and sun damage. And, beyond improving the life of its 'skin,' paint revives curb appeal and pumps up the value of a home.

- **Paint plays an important role in sustainability** – beyond helping extend the lives of the substrates and making existing materials last longer, we have also designed many paint formulations to have low levels of volatile organic compounds, or VOCs. In fact, we have been acknowledged by the American Chemical Society as the company that transformed the architectural paint market from solvent to water-based technology for household paints – and along the way, reduced the pollution associated with the older technology by taking out 20 million tons of VOCs from the environment since 1953 – the equivalent of six pounds of fewer pollutants for every person alive on the planet as of August 2008.



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