INTERVIEW

"Advances in Binder Technology Have Significantly Improved Corrosion Resistance"

A look at what's trending in industrial and direct-to-metal coatings

Self-healing coatings, smart-multifunctional coatings and reduction in VOCS are key areas of research and development for industrial coatings, says Atman Fozdar, project leader at Chemical Dynamics. Fozdar shares his thoughts on these areas, as well as functionalities and direct-to-metal (DTM) coatings.

What are some exciting areas in industrial coatings R&D? *Several research institutions, including National Labs, are currently focusing on reductions in VOCs, smart-multifunctional coatings technologies, and improved performance and durability that results in the longer service life of coated objects. In terms of new developments, self-healing coatings, which release a catalyst or curing agent when a coated object's surface is scratched, are drawing interest, as well as new low-temperature or ambient crosslinking technologies that can perform like high-temperature baking systems. It's challenging to strike a balance between price and performance for sustainable and bio-based coatings, especially when performance is of the utmost importance. Even so, there's a lot of research in this area, especially in Europe and the United States.*

There has been a significant shift from metal to plastic composites in several industry applications – especially automotive, where plastic composites support the "lightweight philosophy" that is crucial to improving fuel efficiency. Because of this shift, coatings such as low-temperature-cure powder coatings and UV-curable powder coatings are being tested as potential substitutes for multicoat, liquid-coatings on automotive parts. Recent advancements in electrostatic application allow for a higher transfer efficiency, which means powder coatings can be applied on substrates other than metal, such as wood, plastics, composites, glass, ceramics, etc.

What functionalities are top priority for today's customers? *Industrial coatings are often exposed to harsh chemical environments, mechanical wear and tear, and environmental elements that cause corrosion, so a coating's performance is determined by the application's functionalities, such corrosion resistance, adhesion, abrasion resistance, and/or its exterior durability and weather resistance. And while most industrial applications are judged for their performance and durability rather than aesthetics, coatings formulators continue to seek a balance between "substance and style" because the aesthetics sometimes provide a certain value-add for applications. In addition to the high-performance attributes previously mentioned, there is growing demand among end-users and applicators for similar performance and a shorter process/cycle time in thinner film applications.*

Atman Fozdar

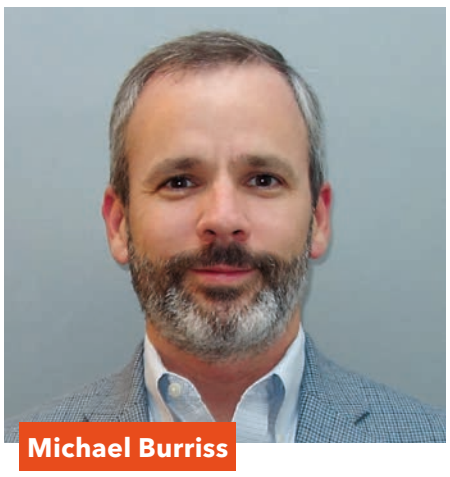
Chemical Dynamics

What are the most important fields of application for DTM coatings? What are the remaining challenges? *Water-borne,direct-to-metal coatings are being used more often in industrial maintenance coatings. Advances in binder technology have significantly improved corrosion resistance; however, wet adhesion, consistent barrier properties, and low VOCs present challenges as we try to maintain applications' durability and performance. Also, some of the newer concepts using self-healing technology are more expensive than conventional DTM and industrial coatings.*

"We Are Seeing Many Exempt Solvents Coming Under Pressure"

High-solid formulations have been increasing in demand over the years

Michael Burriss, industry manager for Industrial at DSM Coating Resins, explains the benefits of high-solid systems, which have both environmental and financial advantages. Nevertheless, Burriss also identifies the current challenges for high-solid solutions.



Michael Burriss

DSM Resins & Functional Materials

What is the current trend regarding high-solid formulation in the paint and coatings industry? *High-solid formulations have been increasing in demand over the years, stemming from environmental concerns aiming to reduce the impact on the environment through the lowering of Volatile Organic Compounds (VOCs). Higher solid formulations have the advantage of reducing waste since a higher percentage of paint is being applied to the substrate instead of evaporating into the air. Increasing solids by reducing solvent demand and VOC content is the right thing to do for the environment and for consumers as well. We are now seeing many exempt solvents coming under pressure as well.*

Solvent-borne systems have reached very high-solids in recent years, but still have their own challenges. DSM has focused on replacing VOCs with water as it is clearly better for the environment. Water-borne systems have not approached the solids level of the solvent-borne systems, but the gap is closing.

The financial driver has become a highly influential aspect in coatings formulations, especially considering the large consolidations this industry has experienced. Increasing solids also improves the coverage area of the coating, while also reducing dry times. This can mean less overall volume sold, but it is higher value to apply less, faster. High-solids coatings also allow for thicker coats and better hiding as well, with the same volume applied. This has the additional benefit of using less coats and therefore a faster return to service or ability to pack-out the product quicker.

For what applications do you see further potential for high-solids? *There is potential in all markets and applications for high-solids, since the key benefits to this trend are both environmental and financial for the paint producers and OEMs. With the primary driver now being the financial benefits, the applications where there is a focus on increasing the solids content is growing at a very high rate. In every sector, saving time means saving money – and generally speaking, high-solid formulations make that possible by requiring less time spent applying the coating.*

What are the current challenges for high-solid systems? *High-solid systems biggest challenge is application with flow and levelling, which is highly dependent on the rheology of the coating. Using solvents was not only aimed at helping to reduce costs, but also altered the application properties of paint. Removing the solvents requires application behavior solutions presented in different ways, such as controlling the morphology of polymers and using various additives to achieve the required flow, levelling, and sag properties.*

All solvents, including water, reduce the viscosity of the resins to allow of easier application whether it be by brush, spray or other means. This is a critical element in paint formulation and resin manufacturing. Without these viscosity reducing agents to depend upon, the resins themselves would need to be much lower in viscosity. This is where the critical challenge lies for the industry.

Most polymers used to make resins are inherently very high in viscosity. Therefore, going to high-solids means there is a smaller pool of polymeric options to choose from to make resins. With limited options also comes more restricted performance attributes. This fact coupled with standards and tougher performance properties create today's challenges for resin manufacturers in our industry.