OPTIMIZING HIGH-PERFORMANCE ELASTOMER APPLICATIONS WITH A TAILORED APPROACH
The development of high-performance products has always presented unique challenges for manufacturers. With today’s increasingly sophisticated technology and competitive marketplaces, ensuring that these applications meet the required high performance with greater cost-efficiency has become more complex and challenging than ever. Component technologies are smaller, temperatures are more extreme, and end users expect significantly more longevity and durability.

For manufacturers relying on advanced polymers, some of these issues can be handled with standard, off-the-shelf solutions. However, tackling application problems with a tailored approach—one based on collaboration—can deliver benefits that result in even greater performance and value than a standard, one-size-fits-all approach.

Defining high performance
Understanding product development for critical industrial applications first requires a look at the different performance demands for each industry. The definition of high performance can vary according to industry, based on the application—for example, high performance in automotive fuel lines clearly has a different meaning and requirements than high performance in floor mats used in commercial kitchens.

Within industrial polymer-based elastomer applications, common concerns exist, including the ability to withstand specific extremes in temperature, durability and longevity. Yet other issues that arise in application development are typically more dependent upon the industry and the unique situation for each application. For example, fuel and oil resistance can create distinct issues for critical automotive applications, while applications related to oil extraction in harsh environments present their own unique challenges. In the oil drilling industry, exceptionally high temperature resistance, along with minimal extraction to hydrocarbons, requires robust materials.

Partner type key to tailored problem solving
Various chemical manufacturers and partners feature plasticizer and modifier offerings to address high performance issues in critical industrial applications. Yet choosing the right partner for problem solving and product development can present its own concerns. Many potential partners may share characteristics such as deep technical experience, expertise in ester chemistry and a good understanding of their customers’ goals in developing applications. The differentiation between partners often lies between whether they provide standard or more individualized solutions for applications.

Notably, some large suppliers may be more willing to offer a standard product or a handful of prefabricated options rather than tailored solutions or collaborative problem solving. This has more to do with their agility and business model than their expertise. Customers should look for a partner that is nimble, responsive and able to work closely with them, even if the overall volume may be lower. This type of collaboration is key to eliminating problems with critical applications and finding breakthrough solutions.

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“Many chemical companies want to make only a handful of products and produce millions of pounds of those products,” says Steve O’Rourke, technical director, polymer additives. “But tailoring to customers requires the willingness to make 50-plus customized products. That’s the difference.”

Likewise, companies that offer standard solutions may base them on a very limited range of products and raw materials. By comparison, those that create solutions on an as-needed basis may be able to access products and materials that can handle critical requirements for very specific parameters in temperature, resistance and other areas.
THE BENEFITS OF TAILORED VS. STANDARDIZED SOLUTIONS

Time savings

Seeking a tailored solution up front can often save time and speed products to market faster—which means higher profits and return on investment. One reason is that most critical application problems rarely involve a single issue; they might be tied to low temperature, fuel extraction resistance, compatibility and more. A tailored approach will typically be able to address multiple requirements with one new, custom blend or formula. This approach is often more efficient than taking several samples or a standard product back to the laboratory and conducting trial-and-error tests and fixes.

Similarly, within a non-standard approach, manufacturers will receive multiple viable products and solutions. Not every customer will want to pursue several options—but those who do appreciate being able to choose. Multiple tailored solutions also gives manufacturers the benefit of the formulator’s insight and recommendation, saving them even more time in the selection and decision process.

“There are also customers who are willing to try multiple solutions because in many cases, it’s just as easy for them to test two or three things as it is one…yet we’ve already narrowed the options for them,” says O’Rourke. "Receiving guidance and recommendation with these solutions also helps streamline and quicken their process. Often they’ll say, ‘OK, let’s go with that.’”

An opportunity to innovate, differentiate

In addition, if your partner is taking a tailored approach, they can likely leverage a wide range of ingredients and materials kept in house. The ability to source products outside typical offerings allows for full application of ester expertise and more creative solutions. A partner whose business model is based on standard solutions inevitably limits the scope of their expertise by relying on a small base of resources. The freedom to explore the full range of possible solutions often results in higher performance and even innovation, helping to differentiate the customer in their marketplace.
Anticipating production challenges
This approach by necessity depends on a depth of scientific expertise and, in the case of critical industrial applications, a significant understanding of ester chemistry and polymer modification. Only in a tailored approach can performance and post-production problems be anticipated: how will the new formula’s 20 or even 30 properties be affected by a new approach? How will it perform in specific resins, elastomers or plastics? A tailored approach is comprehensive and methodical; in contrast, a standard product may simply be a new assemblage of molecules in a formula rapidly placed in the marketplace. How it will perform, particularly in a unique manufacturing environment outside the formulation laboratory, is unknown.

“Sometimes customers get a product in their manufacturing plant and realize they have an issue—for instance, they may come back and say, ‘We can’t pump this into the mixer,’” says O’Rourke. “They need a lot of different solutions for how to utilize their product in their plant. For example, the viscosity can be lowered in their product by blending something to make it work for them.”

Sharing regulatory and quality expertise
A collaborative process is typical—and even essential—of chemical partners and providers that offer tailored solutions. By having team members share their expertise, partners can deliver upfront problem solving and vet possible solutions with synthesis professionals, engineers, plant manufacturing specialists, and regulatory and compliance professionals before making any presentation to customers. They’re also able to leverage any new learnings in chemistry across different polymers and applications. The result is a more efficient process that reduces costs associated with products that fail to overcome diverse, global regulatory hurdles or quality control and performance pitfalls.

Companies that provide tailored solutions for critical applications may also turn this collaborative energy outward, offering clients consultative help in navigating the regulatory complexities involved in problem solving and product development. Helping customers prepare for various regulatory requirements—providing the appropriate solutions before lab work even begins—can be a special boon for companies looking to break into new regional, national or worldwide markets.

Rightsizing the solutions
This knowledge sharing is further strengthened when internal team members are able to draw upon digitally archived methods, models and designs that may have solved similar problems. Ultimately, it helps ensure that the end products are optimally designed and engineered, delivering the right balance between budget and product performance, while eliminating surprises in manufacturing and sourcing of raw materials.

“Customers shouldn’t buy a Cadillac when a Chevrolet is all they need, but buying a Chevy when you really need the Cadillac can be more problematic,” explains Damian Marshall, director of product marketing, esters. “You don’t want to go with the lower performing product if it’s an exceptionally critical application. You want a product that solves the problem but is not over-engineered, so that you get the best economics possible. A solution tailored to your unique problem will always offer the most value.”

Ultimately, tailored solutions within a collaborative approach can provide key benefits to manufacturers of critical industrial applications. In relying on creative, unique ester solutions for their products, manufacturers can achieve significant time and cost savings while upholding the necessary quality standards during product development—meeting tough application requirements and optimizing their products’ entry into the marketplace.

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