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New SiVance® C2010 Resin for Epoxy-Silicone Formulations Ups Durability of Protective Coatings in Harsh Conditions

Spartanburg, S.C. - SiVance, LLC, a subsidiary of Milliken & Company, today introduced SiVance® C2010 resin, a new reactive silicone technology designed to create highly durable epoxy-silicone hybrid coating formulations. Specifically, this unique, high-performance material helps extend the flexibility and impact resistance of protective coatings used in harsh operating environments such as undersea drilling, hydraulic fracturing and chemical manufacturing. Compared to coatings made with competitive products, hybrid formulations featuring SiVance C2010 resin enable formulators to help their customers avoid the cracking, delamination and blistering that lead to corrosion and failure of metal pipes, tanks and equipment.

“While epoxies for protective coatings have been enhanced over the years, they are approaching their limits,” said Jeff Jones, SiVance business development director. “At the same time requirements for today’s extremely demanding environments are escalating. SiVance C2010 resin gives formulators a powerful new tool for extending the durability of epoxies under the harshest of conditions, helping end customers reduce maintenance, replacement costs and downtime.”

Standing Up to Tough Conditions

Due to their brittle structure caused by a high crosslink density, epoxies are susceptible to cracking and delamination when exposed to heat, chemicals and hot water. Replacing a portion of an epoxy coating system with SiVance C2010 silicone resin - which is more flexible, thermally stable and hydrophobic than epoxy - creates a hybrid that can better absorb stress from reverse impact and thermal shock.

To facilitate formulation of these hybrids, SiVance C2010 resin uses a proprietary structure that makes it broadly compatible with aliphatic epoxies and aromatic epoxies such as bisphenol-A, bisphenol-F and phenol novolacs.

Coatings formulated with an epoxy-silicone hybrid offer increased durability in highly demanding applications, such as immersion coatings, tank linings, thermal insulation and subsea coatings. Industry processes that can benefit include oil and gas exploration and extraction, offshore and marine operations and chemical manufacturing.

Adding Value to Epoxy Coatings

Ever-deeper undersea drilling operations, for example, subject coatings to higher temperatures and pressures. Laboratory tests under these conditions showed that a bisphenol-A epoxy-silicone hybrid formulation made with SiVance C2010 resin far surpassed a bisphenol-A epoxy formulation in flexibility (conical mandrel bend test and a three-point bend test) and reverse impact performance (ASTM D2794). These improvements in flexibility and impact resistance were achieved with only a minor decrease in other critical properties, including hardness and glass transition temperature, and had little to no impact on adhesion.

Although organic modifiers and other reactive silicones provide similar flexibility upon curing, they lose this property more rapidly than SiVance C2010 resin under exposure to demanding environmental extremes.

The new C2010 resin is available globally in commercial quantities and is currently registered under the Toxic Substances Control Act (TSCA) with other global approvals in progress.

About SiVance, LLC

SiVance, LLC is a leader in silicone chemistry, focusing on the development and manufacture of specialty silicone technologies and intermediates required to modify basic silicone polymers. Strategically positioned within the silicone supply chain, SiVance offers silanes, siloxanes and silazanes imparted with various functionalities, including vinyl, hydride, amino groups as well as fluorinated silicones, alkytrialkoxysilanes and custom manufacturing for customers in need of precision performance. Silicone in its most basic form is a fully synthetic polymer with a repeating Si-O (chemical) backbone, a basic starting point from which our silicone experts can synthesize a range of products delivering certain characteristics required in specific customer applications.

About Milliken

Milliken is an innovation company that has been exploring, discovering, and creating ways to enhance people's lives since 1865. Working from our laboratories, application and development centers around the world, our scientists and engineers create coatings, specialty chemicals, and advanced additive and colorant technologies that transform the way we experience products from automotive plastics to children's art supplies. With expertise across a breadth of disciplines that also includes floor covering and performance materials, the people of Milliken work every day to add true value to people's lives, improve health and safety, and make this world more sustainable. For more information, visit www.millikenchemical.com or www.millikenchemical.com/sivance.

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PHOTO: Mandrel Bend Test Comparison After Five Days at 120 C Showing that the Control Sample (left) Cracked and Delaminated, While the SiVance C2010 Resin Sample (right) Passed

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High resolution photography is available by contacting Amy Godfrey at agodfrey@ahminc.com.