DERAKANE™ SIGNIA™

MODERNIZING VINYL ESTER RESINS FOR ELEVATED PERFORMANCE

INEOS Composites

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WATER
BASE MUD
WATER
BASE MUD

Collaborating with industry leaders to assure modern performance, Derakane™ Signia™ resins were developed to bring value to fabricators and end users of FRP equipment. The results speak for themselves: less environmental impact, better quality and efficiency – all contained within an identifiable resin system.

Signature (sig'ne-tyur) n. – 1. a badge or distinguishing mark of honor 2. a distinctive characteristic or set of characteristics by which a structure is recognized

Signia™ (sig-nē-ə) n. – 1. our signature formula 2. the promise of authenticity for assured performance of epoxy vinyl ester resins

Description

Introduced in the 1960s to combat corrosion in hot, wet chlorine environments, Derakane™ epoxy vinyl ester resins (EVER) have become the industry standard for corrosion-resistant fiber-reinforced polymer (FRP) equipment. High performing derivatives have been introduced over the years to provide vinyl ester solutions for expanded chemical environments, high temperature performance and areas requiring improved toughness. With the introduction of Derakane™ Signia™, INEOS Composites has leveraged new production capabilities to modernize resin features and benefits including improved environmental performance, better workability and increased worker satisfaction. All Derakane™ Signia™ features are built on a consistent polymer backbone and encompass the industry's first identifiable resin system.

Low Styrene Emission

Reduction of styrene emissions has gained importance in the FRP composites industry over the past several years, with increasing regulations around the globe regarding human exposure to styrene. Derakane™ Signia™ resins contain a unique vapor suppression technology that greatly reduces styrene emissions upon curing.

The Derakane™ Signia™ vapor suppressant film is air activated. Therefore, the fabrication method used affects suppression performance of the resin system. Derakane™ Signia™ resin contains 44% styrene, but the vapor suppression technology allows it to perform the same as resins with far less styrene. As shown in Figure 1, this results in a minimum 30% reduction in styrene emissions, depending on the fabrication method.

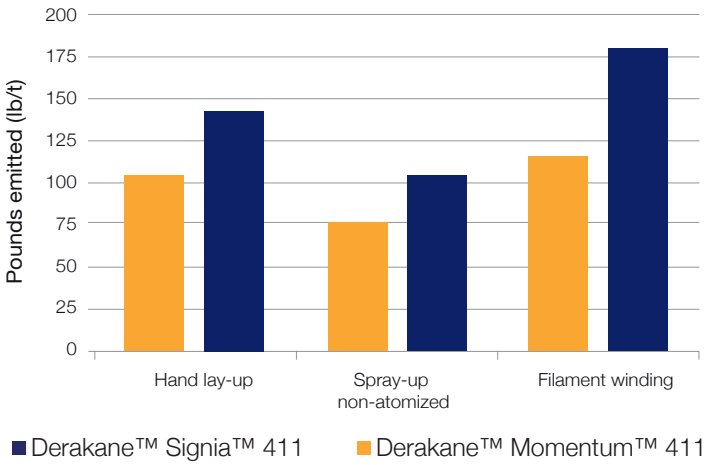

Figure 1: pounds of styrene emitted per ton of resin

Extend your permits with 30% less styrene emission, a cleaner work environment and increased worker satisfaction.

Making the best even better—faster fabrication and less time on mold for more shop throughput and profitability.

Improved Processing Efficiency

FRP fabricators count on Derakane™ epoxy vinyl ester resins for proven performance backed by decades of documented in-service reliability. Derakane™ Signia™ resins bring modernized features and benefits to minimize labor and maximize performance. Derakane™ Signia™ resins deliver improved productivity with faster laminate consolidation, lower foaming (Figure 2) and reduced sanding for application of secondary laminations. Comparisons between sanded and unsanded specimens fabricated with Derakane™ Signia™ are evaluated in Figure 3.

Reducing fabrication steps is one of the shortest paths to improving shop efficiency. To increase throughput on the shop floor, Derakane™ Signia™ resins offer higher reactivity, a reduction in gel-to-cure interval, faster green strength development and reduced stress cracking. These improvements allow fabricators to eliminate downtime between layers and create thicker parts. The combined benefits of shorter cycle times, reduced sanding and faster green strength development reduce fabrication time by as much as 30%.

Additional benefits include reduced styrene emissions, low odor and innovative cure packages that can eliminate production steps when making thick parts. All of these characteristics lead to greatly improved shop efficiency and cleanliness, resulting in a much more desirable workplace.

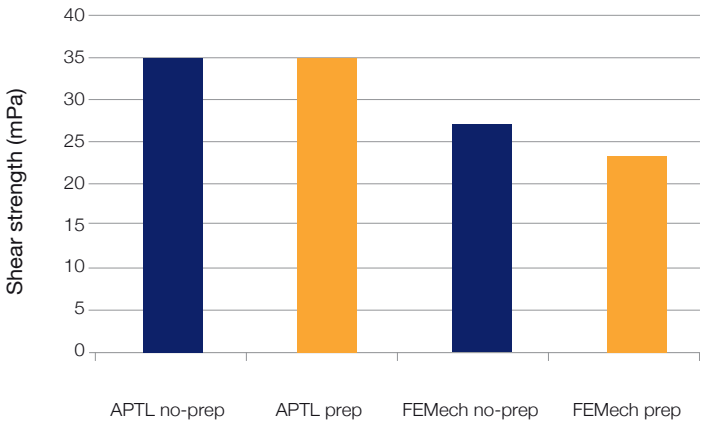

Figure 3: ASME RTP-1 Appendix M5 secondary bonding shear strength for sanded (prep) and unsanded (no-prep) test specimens.

Figure 2: Comparison of foaming in promoted and initiated Derakane™ Signia™ 411 (left) and Derakane™ Momentum™ 411 (right) resin 90 seconds after initiation.

When constructing equipment to a manufacturing standard such as RTP-1 or an end user-specific specification where sanding is mandated between secondary overlays, surface preparation should be performed as directed by the standard or specification.

Longer Shelf Life

Derakane™ Signia™ resins also provide a 50% longer commercial warranty versus current epoxy vinyl ester resins (see Figure 4). This means Derakane™ Signia™ performs well in all parts of the world. Better material utilization for fabricators and better inventory control for distributors — two more reasons Derakane™ Signia™ resins are worth selecting for your operation.

Same mechanical properties, corrosion properties — all with better processing.

Consistent Polymer Backbone

Assurance of corrosion performance is critical to users and specifiers of FRP equipment. Derakane™ Signia™ resins were built on the same polymer backbone as previous generations of Derakane™ products and validated through direct chemical structure evaluation. Properties such as tensile and flexural strength, modulus and heat distortion temperature directly measure the characteristics of the cured polymer matrix crosslinking.

Derakane™ Signia™ resins retain the same mechanical properties and chemical resistance as previous generations of Derakane™ resins. Fabricators, asset owners and engineers can be assured that all previous Derakane™ corrosion studies, historical data and field case histories remain relevant to demonstrate performance for their design requirements.

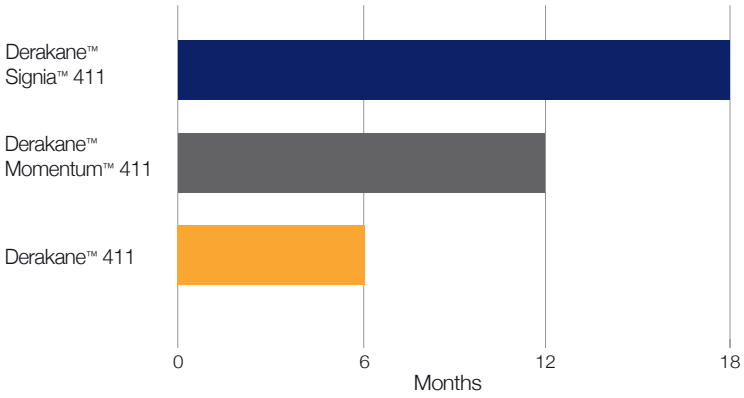

Figure 4: Derakane™ commercial warranty (months)

Identifiable Resin System

Derakane™ Signia™ provides a unique, proprietary detection system to now verify the integrity of your design wherever corrosion-resistant FRP pipes and tanks are specified. Derakane™ Signia™ resins are the first identifiable resin technology for FRP applications. By sending a cutout of the final part to our lab for analysis, engineers can assure the design performance by validating the parts supplied were manufactured with the intended materials (resins) of construction. Because FRP equipment often contains harsh chemicals, using the correct resins greatly impacts service life, maintenance and reliability of the equipment.

Allows engineers and asset owners to verify the materials supplied are the materials specified.

Let Derakane™ Signia™ Work for You

With Derakane™ Signia™ resins, INEOS Composites demonstrates how our innovation continues to build confidence in FRP equipment and fabrication. While maintaining the proven performance and reliability of Derakane™, Derakane™ Signia™ provides less environmental impact, more efficient processing and improved stability versus our traditional resin systems. Whether you are a fabricator, engineer or asset owner, Derakane™ Signia™ brings landmark improvements that elevate the quality, production and supply of high quality FRP equipment.

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