

CaseHistory

Hydropel® Inclusion Aids Hatteras Infusion



Hatteras quality and performance achieve a new high with Hydropel® resin technology and AOC technical support.

Resin:	Hydropel® vinyl ester
Manufacturing Process:	Resin Infusion
Composite Applications:	Hulls, decks, bulkheads, athwartships and other parts
Hull Lengths:	60 feet and 72 feet (18.3 meters and 21.9 meters)

The extraordinary performance of Hatteras Yachts continues to reach new heights as the boat builder expands its resin infusion operations to motoryacht hulls up to 72 feet (21.9 meters) in length. The legendary company's progression into resin infusion is getting help from team-oriented technical support and Hydropel® high performance resin technology from AOC.

"Compared to hand-laid fiberglass, the resin infusion process gives us more consistent part quality," said Chris Walker, Manager of Structural and Composite Engineering for Hatteras Yachts.

"Improved part-to-part consistency ensures a more precise fit of bulkheads, stringers and other structural components. And the higher glass-to-resin ratios associated with resin infusion increases component strength while lowering overall part weight."

"All these factors translate into a winning combination of better performance and fuel efficiency for the customer,"

Hatteras Yachts, continued

Walker continued. “And because resin infusion is a closed molded process, emissions in the workplace and into the environment are almost completely eliminated.”



During resin infusion, 29 inches vacuum of mercury is pulled under a polymer film.

Hatteras Yachts is a licensee of SCRIMP® (Seeman Composites Resin Infusion Molding Process) technology* from TPI Technology. Hatteras's initial experience with the process started with bulkheads, athwartships, soles (decks), and other parts. Before transferring its resin infusion experience to hulls, the largest infused part was a 265 square foot (24.6 square meter) deck.

A newly designed 60-foot (18.3 meters) sportfishing convertible was selected for the first resin-infused Hatteras hull. A large-flanged female mold was built specifically for the infusion technique. In addition to being larger than previously infused parts, the hull is much more complex because it incorporates various design features that achieve a unique combination of speed, comfort and a dry ride.

In the shop & on the water

For the hull structure, a Hydropel high performance vinyl ester resin met two primary sets of specifications - one for processing in the shop, the other for performance on the water.

Stringent processing specifications reflect Hatteras Yacht's resolve to create rugged hulls of the highest structural integrity. The bottom of every Hatteras Yacht hull is a solid, armor-like fiberglass-reinforced composite, which is even stronger when made by the infusion process. PVC foam cores are incorporated in the hull sides and superstructure to deliver high stiffness at a lower weight.

Hull infusion at Hatteras begins with the application of clear gel coat and a vinyl ester skin coat into the female mold.

Next, fiberglass roll goods cut to precise patterns are laid down, along with PVC foam coring in select sidewall areas. The reinforcement and core are covered with the SCRIMP resin-flow medium.

A layer of polymer film is applied over the dry fiber-core build-up and sealed over the large flanges on the edge of the mold. During resin infusion, 29 inches vacuum of mercury (1 bar) is pulled to draw resin through the fiberglass reinforcement and create the desired fiber-reinforced composite shape between the mold surface and film. When the entire part has been infused, the resin cures to create a highly densified and repeatable composite structure. The SCRIMP cloth and polymer film are removed after the parts cures because nothing superfluous is left in a Hatteras laminate.



Primary PVC foam cored longitudinal stringers are infused into the hull.

*SCRIMP® is a registered trademark of TPI Technology

Hatteras Yachts, continued

Optimum viscosity & low exotherm

“It took a significant amount of developmental work to identify and qualify our infusion resin,” said Walker. “We needed optimum viscosity and open times for filling the 60-foot hull in one shot. We also needed to keep the exotherm low for cosmetics while retaining our required structural properties when the part cured.”

Walker added: “Our dedicated team was able to do all this with the help of our primary AOC contacts - Berk Pleasants and Bob Reese. They took a real hands-on approach to helping us. They followed every step during development and were here for our initial hull infusions to make sure our requirements were met.”

To validate the end-use performance of the Hydropel vinyl ester, Hatteras went beyond the readily available data on resin coupons. Using in-house Instron equipment, Hatteras technicians build their own database of flexural, compression and tensile properties on "real world" fiber-resin laminates.

After establishing resin infusion experience with the 60-foot hull, engineers and the work crew were ready to infuse the hull of a 72-foot motoryacht. The constant thickness and dimensions provided by infusion ensure a precise fit with resin-infused structural components. After the infused hull shell is prepared for secondary bonding, the primary PVC foam cored longitudinal stringers are infused into the hull.

“Since its inception almost 50 years ago, Hatteras Yachts has been uncompromising in its pledge to build boats of the highest integrity and quality,” said AOC Business Manager Emilio Oramas. “AOC is proud to contribute technology and support that help the people of Hatteras exceed their already superior standards.”

About Hatteras Yachts

Along with Albemarle Boats and Cabo Yachts, Hatteras Yachts, New Bern, NC, USA, is one of three brands that comprise The Hatteras Collection, a unit of Brunswick Corporation, Lake Forest, IL, USA. The Hatteras Collection is recognized as a world leader in the construction of quality offshore fishing boats, sportfishing convertibles and luxury motoryachts. The Collection includes sportfishing boats ranging from 24 to 90 feet and luxury motoryachts from 64 to 100 feet. For more information, visit www.albemarleboats.com, www.caboyachts.com and www.hatterasyachts.com.



Using a clear gel coat allows the finished hull to be inspected after it is pulled from the mold and before an exterior marine coating is applied.

About AOC

AOC is the world leader in resins, gel coats, colorants, additives and synergistic material systems for composites and cast polymers. AOC is at the forefront of the marine industry's conversion to closed molding for lower emissions, increased productivity and greater consistency. Exclusive AOC technologies for resin transfer molding, RTM light, infusion and related processes are backed by the industry's most knowledgeable technical support. For more information, phone Steve Martin at (901) 854-2847, e-mail SMartin@aoc-resins.com or go to www.aoc-resins.com.


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