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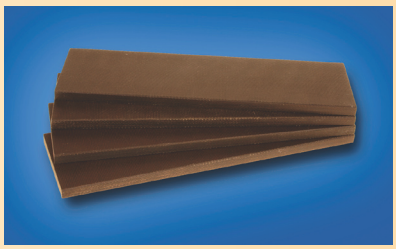
Hybrid glass/aramid prepreg beats heat in heavy industrial pump



In demanding environments like cement plants, rotary compressor pumps are used to move heavy fluids that contain significant amounts of particulate. Pumps have a rotating core fitted with sliding blades or "vanes," which fits within a static cylinder — as the rotor spins during operation, centrifugal force causes the vanes to slide outward into contact with the cylinder walls, effectively creating an airtight seal that easily moves thick and messy materials. While the pumps are liberally lubricated during operation, they must stand up to abrasion, chemical attack and frictional heat that can reduce service life.

The vanes are typically made with aramid and fiberglass composites. **Norplex-Micarta** (Postville, Iowa) now offers an improved composite material for this market that incorporates a lubricating additive into the resin that reduces friction, extending vane service life. NP193PM is prepregged in a solvent impregnation process, using woven E-glass in which the glass strands are individually wrapped with aramid filaments. The glass/aramid reinforcement is wet out with high-temperature-resistant phenolic resin supplied by Ashland Performance Materials, Composite Polymers (Columbus, Ohio) and modified in-house by Norplex-Micarta. Multiple prepreg plies are combined and cured in a high-temperature/high-pressure press. The result is a fully cured sheet, available in thicknesses from 0.125 inch/3.2 mm to 2.0 inches/50.8 mm and approximately 4 ft by 5 ft (about 1.2m by 1.5m) in size, with average hot flexural strength of 33,000 psi/225 MPa, average compressive strength of 39,000 psi/270 MPa and maximum service temperature of 200°C/392°F. Norplex-Micarta's Alan Johnson, director of business development, says that wear testing of the new composite showed average wear was about one-half that observed with conventional composite vanes.

American Industrial Components (Breckinridge, Texas) manufactures rotary compressor pump vanes using NP193PM sheet. The sheet stock is first heated for several hours to dimensionally stabilize the material, says Johnson. Then the sheet is machined and cut to final shape on a flat table grinder to a tolerance of ±0.0005 inch (±0.01 mm). In a recent trial, a rotary compressor pump's interior operating temperature was 25°C/77°F less than pumps with conventional composite vanes.

For product info, visit **www.compositesworld.com/ct/apr/2007**

About Norplex-Micarta

Norplex-Micarta is the leading manufacturer of high performance thermoset composites. Norplex-Micarta's vast product line of tubing, sheet, pre-preg, and rod products serves power generation, military/aerospace, oil & gas, medical device, electrical device, electronics assembly, construction, heavy industry, and transportation industries throughout Asia/Pacific, Europe, and the Americas.

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