

DIELECTRIC! BOOGIE, OOGIE, OOGIE

BUTLER COUNTY GLASS FIBER OUTFIT HAS OEM DESIGNERS DANCING

The Dielectric Constant: a measure of how fast a signal passes through a circuit board. For Todd Kadar, President and CEO of Butler County-based Dielectric Solutions, it's this factor that holds the key to a revolution in new electronics designs. Essentially, it means faster glass.

"Traditionally, designers have used an off-the-shelf variety of glass fiber product spec'd out to industry standards," says Kadar.

But this standardized product can be a true impediment to achieving faster speeds, reduced size and even enhanced functionality. As Kadar remarks: "Glass drives the design, and today's designers are asking for a better-performing glass."

DIELECTRIC'S CORE

Established in 2000, Dielectric Solutions is an advanced materials manufacturing company specializing in high-performance glass fiber materials for electronics, aerospace and industrial markets.

"The demands for a new and innovative product have not been addressed well," says Kadar. "We saw an opportunity to revolutionize not just the process of lightweight glass fabrication, but the larger structure of the market itself."

The core of Kadar's vision is a streamlined process for making glass fiber yarn. His East Butler organization developed a process that produces an ultra-lightweight glass fiber fabric that is thinner and stronger, with improved electrical and thermal properties, in half the number of fabrication steps of leading competitors' products.

According to Kadar, two key elements distinguish Dielectric's process and end product: the fabric is made with yarns that are twist free, and the final fabric finish is applied before rather than after weaving. Dielectric has accomplished this by producing its own glass fiber, rather than relying on outside suppliers as its competitors do.

"Traditional glass fabric is made from yarns that are twisted like a rope, to give them additional strength," says Kadar. "Dielectric Solutions removes the twisting completely. The result is ribbon-like yarn that yields a very flat fabric where fibers are uniformly distributed."

Flatter fabric is a benefit for applications requiring a thinner, smoother surface. Dielectric's glass fabrics are thin enough to see straight through them.

"The fabric weighs as little as 1 oz. per square yard, containing glass fibers that are only 5 microns in diameter," explains Kadar. "That's about 1/20th the diameter of a normal human hair."

Fibers so small can be quite brittle, which is why traditional glass fabrication processes require that the fibers are coated with a chemical protective coating prior to weaving. This protective coating is then removed and a final finish is applied prior to shipment of the fabric to a customer.

"Typically, this final finish is put on after weaving to ensure compatibility with the customer's process," Kadar points out. At Dielectric Solutions, the final finish the customer wants is applied upfront in the first step, when we form the glass fibers. The change makes for a cleaner, higher-quality product that is also much stronger.

"Dielectric Solutions' process affords greater flexibility and eliminates inefficiencies. It's designed to be more responsive and better adapted for customized products with small volume," says Kadar. "Simply put, it performs better."

GETTING STARTED

But poor start-up timing set Kadar's vision off to a slow start. "We had a difficult time getting started," he recalls. "It took a lot of work just to prove the process could work and to get the product up to quality."

He continues, "We wanted to target electronics manufacturing industries, particularly high-end circuit board makers, as they are likely the biggest market for this kind of fiber."

But just when they started to get some traction, the market fell out and customers pulled back. Kadar recalls, "Many of our direct customers had sales cut back by two thirds to one half in a year's time."

After some scrambling, Dielectric Solutions refocused on industrial applications, finding its product was just as, if not more, suited for industrial applications. The strategic move worked well and the company's sales grew. By fall of 2003, Kadar was ready to revisit his original interest in electronics markets.

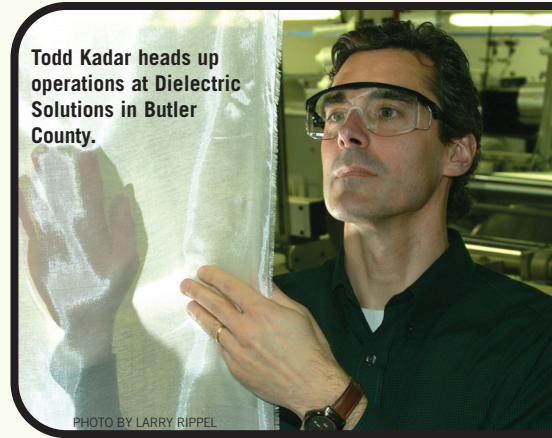
Starting in August, the company began R&D efforts to launch a new line of fabric called LowK. "In our industry LowK means low dielectric constant. The lower the dielectric constant the faster the signal speed," says Kadar. "This fabric will have applications in high-speed Internet backbone products and other high-speed digital devices with fast switching and routing needs."

GREENHOUSE CONNECTION

Assistance from the Pittsburgh Digital Greenhouse (PDG) adds fuel to Dielectric's LowK project. PDG provides access to the latest technology developments in key fields to help further collaborations and research in developing industries.

After presenting its plans for LowK to PDG, Dielectric Solutions was able to apply for critical research funding. Upon approval, the company obtained about 75 percent of the funding necessary to pursue the project.

PDG sponsors mentor and guide projects like LowK through a dialogue structured around quarterly updates. Dielectric's sponsors included Cisco, IBM, Tyco Electronics and Compunetix. As a result



Todd Kadar heads up operations at Dielectric Solutions in Butler County.

PHOTO BY LARRY RIPPEL

of the positive interaction on the LowK project, Compunetix has also become an equity investor in the company.

"Exposure and connection to larger companies through PDG has been key," states Kadar. "Their input has allowed us to address key issues more quickly to provide for better design and development, an understanding of the needs of different technologies and assessment of potential markets."

"Only one other company in the world has introduced a product like LowK, but it has quality issues," says Kadar. "With the input of our sponsors and other PDG members, we've solved those problems—setting a new standard for the high-performance glass product."

Internal testing shows that product prototype meets all of its benchmark performance measures and other criteria. The first commercial samples of LowK were introduced in March.

LOOKING TO THE FUTURE

"Going forward, we will continue to address applications for high-strength composites and other industrial needs; however, we also plan to introduce new products that resolve limitations faced by electronics industries," says Kadar.

In addition to LowK fabric, Dielectric Solutions will also offer a high-performance fabric for advanced Teflon-based wireless and microwave circuitry.

"We anticipate our next biggest challenge to be growth responsiveness," says Kadar. "We went through a difficult market period, now we plan to grow the company quickly and commercialize our new products."

Kadar is also looking forward to establishing strategic partners to accelerate commercialization. He remarks, "Since the product is attractive to many, we hope to carefully select a few key partners in a variety of segments."

But the technical nature of his business will require forethought.

"Given the high growth rate we are anticipating, it will be critical to begin attracting talent now in order to provide for the training time necessary to maintaining the quality level we have thus far established."

Kadar concludes. "It's essential to maintain the integrity of doing what we say and being forthcoming with our customers and partners." ●