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COMPOSITES+POLYCON 2009 Showcase

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Despite the deepening recession, composites pros returned to the show in its new time slot to explore the wealth of products and services collected here. ...

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The American Composites Manufacturers Assn.'s (ACMA, Arlington, Va.) COMPOSITES+POLYCON trade show took its first turn in its new winter time frame, Jan. 15-17, in Tampa, Fla. It was the show's first outing since a 2008 hiatus that resulted from ACMA's decision to vacate its show's traditional fall time slot. For several years, the ACMA and *Professional BoatBuilder's* IBEX shows had been held within the same 30-day period, so the move was intended to spare marine-oriented exhibitors and visitors the inconvenience of back-to-back exhibitions. The timing of the show was unfortunate, however, coming so soon on the heels of the late 2008 revelations about the global credit crisis, and as a result, attendance was down compared to figures reported in recent years. Indeed, some of the 180 exhibitors and ~2,600 attendees wondered aloud how soon the economic downturn might end and how, in the meantime, the composites industry would fare. But the general sentiment of those present was "soon" and "well," respectively.

Evidence in the exhibit hall suggested that the poor economy has many composites professionals thinking outside the box and looking intently at new applications and markets. Several *CT* readers encountered in the aisles indicated that exploration of applications in what many speculated would be recession-resistant markets — renewable energy, particularly wind energy, and ballistic protection — might help some processors and suppliers see themselves through the downturn. Additionally, the array of products and technology on display demonstrated that even though the economy is on idle, the composites industry is not one to sit idly by.

Appropriately, the event keynote, given by Roger Tutterow of Mercer University (Macon, Ga.), examined the roots of the current economic crisis and offered statistics in support of various economic indicators. His conclusions: It may look bad now, but cautious optimism is in order because the credit crunch, in his opinion, will start to ease in the second quarter of this year. Although housing starts are way down, particularly in coastal Florida, California, Las Vegas and along the East Coast, he pointed out that other markets "aren't so bad," noting that the remodeling market will provide some opportunities. He also believes that infrastructure projects will grow, providing some momentum, and that bond market trends show signs of recovery. Tutterow told attendees to look for signs of recovery in the stock market first, followed a few months later by the overall economy — with the latter coming in late 2009 or early 2010.

Educational opportunities

At COMPOSITES+POLYCON 2009, several papers and presentations focused on life cycle analysis (LCA), a substantially complex process of quantifying, via the 14040 ISO standard on environmental management, a part's total impact on the environment. According to Michael Lepech of Stanford University (Palo Alto, Calif.), LCA takes into account everything that goes into a product (power needs, raw materials, etc.) and everything that comes out (solid waste, emissions, etc.), enabling engineers to identify often unexpected energy-consumption "hot spots." In one example, students conducted and compared LCAs of a large composite fish tank for an aquarium and a concrete version. Somewhat surprisingly, the concrete tank, despite its much lower cost, created more environmental issues

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ACMA's first exhibition in its new time slot drew 180 exhibiting companies and about 2,600 attendees. Source: ACMA

Consultant Gordon Brown accepts the ACE "Best of Show" award on behalf of Berry Plastics. Source: ACMA

Bayer MaterialScience LLC (Pittsburgh, Pa.) and personal watercraft (PWC) supplier Camoplast Inc. (Roxton Falls, Quebec, Canada) showcased a new urethane formulated to delay cure and widen the process window during manufacture of this PWC boat hull, using long-fiber injection (LFI) technology. Source: Bayer MaterialScience

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- Akzo Nobel Polymer Chemicals LLC
- American GFM Corp.
- AOC LLC
- Arkema Inc.
- Ashland Inc.
- Bayer MaterialScience LLC
- Bedford Reinforced Plastics
- Berry Plastics Corp.
- CCP - Cook Composites & Polymers
- Composites One
- CompuDAS
- Dustcontrol Inc.
- Eastman Machine Co.
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- Evonik Degussa Corporation
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- Tricel Honeycomb Corp.
- WichiTech Industries Inc.
- Wisconsin Oven Corporation
- Zeon Chemicals LP
- Zund America Inc.

Pultrusion specialist Bedford Reinforced Plastics (Bedford, Pa.) featured in its booth a utility pole that it manufactures for customer Duratel (Chicago, Ill.). Source: Bedford Reinforced Plastics

because of the greater energy and transport costs incurred when working with concrete. Ashland Performance Materials (Dublin, Ohio) contributed resources for the Stanford LCA study.

An array of other technical papers was available, including an examination of CompForm, a reportedly ultrafast automated method for preforming multiaxial fabrics using light-curable binder. Offered by American GFM Corp. (Chesapeake, Va.), the method has been implemented successfully for structural automotive components. Other highlights included a description of an all-composite residence successfully constructed by Kreysler & Assoc. (American Canyon, Calif.) and a report on the current status of a melt-spun, high-modulus polypropylene fiber produced by Greer, S.C.-based Innegrity LLC (see Innegrity's "Product Showcase" item below).

ACE awards highlights

Awards for Composites Excellence (ACE) nominees were impressive. They ran the gamut from composite utility poles and rapid preforming technologies to a pultrusion process that incorporates structural core material, and uniquely flexible composites. Among the standouts was Ershigs' (Bellingham, Wash.) entry, a mast system developed for NASA to provide lightning strike protection. It involves poles 104 ft/31.7m tall and 7 ft/2.1m in diameter, with a multi-inch-thick laminate in each that weighs more than 50,000 lb (22 metric tonnes). The Best of Show award went to Berry Plastics Corp. (Franklin, Mass.), reportedly the world's largest manufacturer of duct tape, for its hand-applicable peel-and-stick building wall-blast reinforcement system, which comprises a ±45° aramid fiber scrim in an extruded polyurethane matrix.

By show's end, ACMA had announced yet another departure from its previous bicoastal regimen. Next year, the show won't return to the West Coast after its stop this year in Miami. Instead, COMPOSITES+POLYCON 2010 will head for Las Vegas, Nev., opening Feb. 9 at the Mandalay Bay Resort and Casino.

C+P 2009 Showcase

CT editorial staffers were on hand for the show, and — for the benefit of those not able to be at the Miami event — collected the following sampling of the technologies and services spotlighted by exhibiting suppliers, listed below in alphabetical order. To pursue more information about these companies or their products and services, click on the links provided under "Related Suppliers," at right.

New name, doubled capacity

Ahlstrom Glass Nonwovens LLC (formerly Ahlstrom Specialty Reinforcements LLC, Bishopville, S.C.) reinforced the company's recent name change, which was made to better reflect the diverse fiberglass products manufactured by the company and now offered to the North American marketplace. Products include multiaxial knits, woven roving, chopped strand mat and fiberglass veil. The company also announced that it is doubling its manufacturing capacity and adding multiaxial and stitch bonding equipment at the Bishopville site.

Initiators & curing agents

Akzo Nobel Polymer Chemicals LLC (Chicago, Ill.), a provider of a wide range of organic peroxides, highlighted its strong technical support to customers who purchase its trademarked Trigonox, Perkadox and Cadox initiators and curing agents. The company also recently announced the availability of Perkalite, a synthetic, layered, double-hydroxide nanoscale organoclay material that is suitable as a flame retardant synergist in plastics and composites that must comply with flame retardant regulations.

Cultured marble casting resin

AOC LLC (Collierville, Tenn.) spotlighted Vicast A830, a casting resin for cultured marble applications, designed to accommodate more filler and, therefore, displace 10 to 20 percent more resin, allowing the user to reduce material costs. Engineered for use with marble-quality calcium carbonate or specific lightweight fillers, the nonthixotropic, low-shrink resins incorporate dicyclopentodiene (DCPD) chemistry. They are prepromoted for room-temperature cure using methyl ethyl ketone peroxide (MEKP) initiator.

Polyester resin additives

Arkema Inc. (Philadelphia, Pa.) exhibited its chemical additives for improving composite processes and allowing fabricators greater control of unsaturated polyester resin cure. Featured was its trademarked BlocBuilder RC 50 resin additive, a controller and initiator combined into one compound, targeted to compression molding processes that use SMC and BMC as well as pultrusion processes with cure times above 140°F/60°C. The compound reportedly extends pot-life stability for increased storage and shipping times, reduces scrap material and cleanup time, and improves consistency and quality, says the company. Bob Dixon, market manager, explained that this reactivity controller affects the rate of cure and stability of unsaturated polyester combined with organic peroxides during gelation and through final cure. “Composite fabricators want a slower rate of resin reaction before molding, while still maintaining similar cure conditions, and a faster rate at the elevated in-press temperatures to increase production efficiency. BlocBuilder RC 50 prevents premature gelling and is very effective in closed molding applications.” Environmental and sustainability benefits include the potential to transport it without the need for refrigerated trucks and less waste associated with premature gelling. From a processing standpoint, line speeds and compression time can be improved, resulting in greater throughput and lower cost per part.

Cure monitoring, life cycle analysis, pultrusion bio-resin

Ashland Performance Materials (Dublin, Ohio) featured the SmartTrac technology at its booth, a technology recently acquired from Signature Control Systems Inc. (Denver, Colo.). SmartTrac impedance monitoring probes, placed within a tool, determine the exact moment of cure in a thermoset resin system, which helps improve cycle time and reduce scrap.

The company also played an integral part in the publication of several sustainability and life cycle analysis (LCA) papers presented at the show conference, contributing resources for LCA studies performed at Stanford University, which showed that composites can have positive environmental impacts.

Ashland also introduced the new version of its ENVIREZ bio-based resin technology, ENVIREZ 50380, formulated in part with soy oil, for pultrusion applications (one of the products covered in this issue’s "Resin Systems Update," click the link under "Editor's Picks").

Polyurethane cure control, EPA-approved carbon nanotubes

Because polyurethane cures quickly, there is a small window of time for part sprayup/layup before the onset of cure. Historically, this has restricted part size. With this challenge in mind, Bayer MaterialScience LLC (Pittsburgh, Pa.) spent the last several years working with personal watercraft (PWC) supplier Camoplast Inc. (Roxton Falls, Quebec, Canada) to develop a new urethane formulated to delay cure and widen the process window during manufacture of a PWC boat hull using long-fiber injection (LFI) technology (see photo #3, at right). New Baydur STR 814 polyurethane allows time enough for four automated Krauss-Maffei (Munich, Germany) spray heads to deliver material into the 12-ft/3.6m long, 3-ft/0.9m wide hull in a nickel-shell female tool prior to mold closure and cure initiation. The Krauss-Maffei long-fiber system increases glass output from 180 g/sec to 300 g/sec. The new boat requires only four molds and is 25 percent lighter than previous versions that comprised 60 parts, each individually compression molded from polyester sheet molding compound. A new gel coat that provides its Class A surface is provided by Sogel (Longueuil, Quebec, Canada) and was designed specifically for use with polyurethane (see Sogel item below).

Bayer also announced that its Baytubes multiwalled carbon nanotubes have received regulatory approval from the U.S. Environmental Protection Agency (EPA). This allows Bayer to sell the nanotubes in the U.S. Bayer is targeting thermosets and thermoplastics for the material, mainly in aircraft, transportation, sporting goods and building and construction applications. Reported benefits of the Baytubes include improved mechanical strength and antistatic properties. Diameters range from 5 nm to 20 nm, in lengths from 1 to >10 microns. The nanotubes, says Bayer, are recommended for use with letdown ratios of 0.5 to 1.5 percent (by weight) in thermosets and 3 to 5 percent in thermoplastics. Currently, Baytubes are made in Germany at an annual rate of 60 metric tonnes (132,280 lb), but additional capacity of

200 metric tonnes (444,925 lb) is expected to come online later this year.

Pultruded utility poles

Pultrusion specialist Bedford Reinforced Plastics (Bedford, Pa.) featured in its booth a utility pole that it manufactures for customer Duratel (Chicago, Ill.). In development for several years and introduced to the market in early 2008, the poles were pultruded with E-glass provided by Owens Corning (Columbus, Ohio) and polyester resin from Ashland (Dublin, Ohio). The charcoal gray poles range in length from 35 ft to 55 ft (10.7m to 16.7m) and weigh about two-thirds less than traditional wood poles (300 lb/136 kg vs. 1,000 lb/220 kg for a 40-ft/12m pole). Bedford employs a UV additive in the resin and a UV matting on the surface of the pole, which are nonconductive and accept existing hardware used on wood poles. Other features include a 80-year life span (vs. 25 to 30 years for wood), no corrosive or toxic additives, tree conservation and recyclability at end of use. Duratel says it is in the process of installing its poles in several metropolitan locations as a demonstration of their capability and suitability.

Closed molding education

Composites One (Arlington Heights, Ill.) emphasized its participation in the Closed Mold Alliance, an industry group that also includes Magnum Venus Plastech (MVP, Clearwater, Fla.), RTM North (Vonastra, Ontario, Canada) and FormaShape (Kelowna, British Columbia, Canada, a div. of WhiteWater Composites Ltd.). The Alliance aims to offer composites manufacturers closed mold education, expert consultation, tooling assistance and start-up training. Closed Mold University is the group's series of educational programs offered at locations across the U.S. and Canada over the next several months.

Process control collaboration

CompuDAS (Shelton, Wash.), shared booth space with collaborator Wisconsin Oven (East Troy, Wis., see item below), to demonstrate its expertise in data acquisition, process control and turnkey systems for controlling and documenting autoclave, press and oven processes, noting that more than 500 CompuDAS systems are in place worldwide.

Gel coat & barrier coat alternatives

CCP - Cook Composites & Polymers (Kansas City, Mo.) featured several new products at its booth, including IMEDGE Polymer Coating Technology (PCT), a new alternative to traditional gel coats and barrier coats. The in-mold coating sprays on like gel coat and is MACT-compliant but reportedly delivers superior blister and crack resistance and is extremely resistant to weathering and fading. Also on display was new NuTack-BLU, a reactive tackifier spray for infusion processing that chemically reacts with the infusion resin for better interlaminar adhesion of reinforcement plies.

"Smart" vacuum system

Dustcontrol Inc. (Wilmington, N.C.) showed off its new vacuum system, which is designed to sense and then measure demand for vacuum by monitoring the number of system users. A finalist in the "Innovation in Green Composites Technology" category during this year's ACMA ACE awards competition, the system can throttle back the vacuum producer accordingly, reportedly reducing power usage in the shop by as much as 75 percent, says the company.

Cutting system software

Eastman Machine Co. (Buffalo, N.Y.), a manufacturer of fabric cutting systems, demonstrated its cutPRO software. During the show, the software operated a cutting machine in the exhibit booth, cutting a glass fiber fabric. The company reported that it has been very active in developing cutting and nesting software and reportedly has placed several machines into the wind turbine blade manufacturing market.

Polyisocyanurate & polyurethane foam

Elliott Co. of Indianapolis Inc. (Indianapolis, Ind.) reported that its rigid polyisocyanurate and polyurethane foam products are specified worldwide in diverse applications, including coolers and freezers, architectural panels, chemical storage tanks, truck and trailer bodies, boats, pipe insulation and more. The company emphasized that its polyisocyanurate (or polyiso) foam panel sheets have improved physical performance properties and greater dimensional stability over a wider temperature range than its original polyurethane-based products.

Epoxy hardener chemistry

Evonik Degussa Corp. (Parsippany, N.J.) distributed information on its specialty crosslinker chemicals, formulated specifically for wind turbine blade manufacturers. Its isophorone diamine VESTAMIN IPD, one component of the hardener used to cure epoxy resins, imparts good mechanical properties, higher stiffness and better thermal stability when added to epoxies for wind blades, claims the company.

Cast polymer products

Gruber Systems Inc. (Valencia, Calif.) reported high visitor traffic at its booth, which featured new products for the cast polymer industry. President and CEO John Hoskinson spotlighted a new vanity bowl mold, termed the Winston Oval Floating Bowl, which gives cultured marble manufacturers an innovative and distinctive contemporary product option. Also on display were Gruber's latest Granatex granite-effect fillers for solid surface and cast polymer manufacturing applications. The company also offers a full line of Seamless-brand adhesives and accessories.

Environmental responsibility program

Henkel Corp. (Rocky Hill, Conn.) showed its well-known Loctite brand adhesives and Frekote mold releases and touted its recently launched, broad-based, global sustainability initiative under the banner of "Quality and Responsibility." Under the initiative, the company provides comprehensive information to customers and consumers, explaining how, by using Henkel's branded products, they can conserve resources.

Nonhalogenated flame retardant

Huber Engineered Materials (Atlanta, Ga.), citing increased sensitivity to emerging regulations that restrict the use of halogen-based fire retardants in composite and plastic products, introduced its MoldX line of optimized alumina trihydrate (ATH) flame retardant. Designed to comply with European mandates against the use of halogenated retardants, MoldX has been modified by Huber to provide high loadings and low viscosity. High viscosity has historically been a challenge of high ATH loadings, Huber says, and the chemistry of MoldX is formulated to address those challenges. The company reports that the ATH thermally decomposes to water and offers a slow-burn profile with less smoke. Huber notes that, historically, regulations were more concerned with flame spread, but now the emphasis is tighter restrictions on smoke toxicity — thus halogens are the target. ATH is recommended for thermosets, including styrenated polyesters, polyurethanes and epoxies, and it is now suitable for use in sheet molding compound (SMC) and bulk molding compound (BMC) applications. Huber cautions users to take greater care when using ATH in thermoplastics (compared to thermosets) because mechanical properties can be more easily affected. Use with high-temperature thermoplastics is not recommended because ATH decomposes at 230°C/446°F.

Nanotoughened epoxy resin systems

Huntsman Advanced Materials (The Woodlands, Texas) featured its full range of resins, hardeners and formulated systems for fabricating composite parts used in aerospace, transportation, recreation and wind power applications. In the spotlight were new, patented nanotoughened epoxy systems for infusion processing and prepreg manufacturing along with nanotoughened, chemically thixotropic adhesives for assembly of composite wind energy products and sporting goods. The company was an ACE Award finalist with its highly flexible composite (HFC) concept, which is a proprietary fiber-reinforced resin system with the flexibility of an elastomer but, according to the company, much easier and less expensive to process.

High-modulus polypropylene fiber

Innegrity LLC (Greer, S.C.) demonstrated its very-low-density, melt-spun, high-performance Innegra S polypropylene fiber. Developed to exhibit superior toughness, the lightweight fiber is targeted to economical application in ballistic protection products as well as weight reduction in mass transit applications. The material, intended as an aramid replacement at a much lower cost, recently won an InnoVision Technology Award from the state of South Carolina.

Cutting & kitting programs

Mahogany Co. of Mays Landing Inc. (Mays Landing, N.J.) showcased its fabric and core kitting expertise. The company supplies precision, premanufactured composites kits, utilizing advanced plotting and cutting technologies to duplicate custom configurations. The company currently supplies kitted materials for marine, transportation and wind applications.

Honeycomb core materials

Plascore Inc. (Zeeland, Mich.) showed its extensive range of metallic, composite and thermoplastic honeycomb core products, sandwich panels and assemblies. One example was the company's polypropylene Honeycomb Infusion Grade. According to the company, the product makes a tough and ductile core, providing performance that makes it a suitable replacement for balsa, plywood or foam in cored sandwich structures. When composite skins seal the core cells, keeping resin out, the material can be used in Light RTM, closed bag or other infusion processes.

Reinforced PET for structural laminates

Polystrand (Montrose, Colo.) introduced PET Polystrand, a continuous glass fiber-reinforced polyethylene terephthalate (PET) matrix that reportedly delivers performance properties similar to those achieved with thermoset epoxies, with good impact resistance, a paintable and bondable surface, and improved fire resistance. The company says the PET used in the formulation contains glycol, which allows the material to self-bond better than nonglycol PETs. Further, it's amenable to postprocessing and bonds well with glass, steel and wood. Glass loading of the PET is 60 to 70 percent (by weight), and its density is slightly less than but comparable to epoxy. The company has been working with Fiberforge (Glenwood Springs, Colo.) and other processors to test mechanical properties and identify potential uses.

Industrial curing ovens

Precision Quincy Corp. (Woodstock, Ill.) highlighted its expertise in the design, engineering, fabrication, assembly and installation of industrial ovens for composite part curing, as well as prefabricated shelters and electrical equipment bungalows. With a full-scale oven on display, the company emphasized that it can produce a custom oven — with combination vertical/horizontal airflow, digital temperature controller, thermocouple jack panels, wall ports for vacuum lines, ramp-soak programmers, removable carts and much more — that meets or exceeds all NFPA, OHSA and UL requirements.

Soy-based polyester resin

Reichhold Inc. (Research Triangle Park, N.C.) has entered the bio-resins market with the introduction of Polylite 31325-00, a nonpromoted, unsaturated polyester molding resin derived in part from renewable resources, characterized by low viscosity and medium reactivity and suitable for use in SMC, BMC and pultrusion. (Read more about it in *CT's* "Resin Systems Update." Click the link in "Editor's Picks," at right.)

Diamond & carbide cutting tools

Starlite Industries Inc. (Rosemont, Pa.) exhibited its array of diamond and carbide tools for cutting, drilling and trimming of composite materials. New at the show: drills with solid carbide bodies, targeted to the drilling of carbon fiber laminates. The lips of the drills are polycrystalline diamond (PCD). Drill point geometries can be customized for specific end-uses, reports the company, and used drills can be resharpened.

Reusable vacuum bags

First-time ACMA exhibitor SWORL (a div. of Prairie Technology Group, Hutto, Texas) demonstrated a unique sprayable silicone material used to create durable, multi-use vacuum bags for closed cavity bag molding. The liquid can be sprayed or applied by hand to create a custom, reusable and repairable bag, with optional features, such as molded-in resin flow channels. What's new is the Integral Reusable Vacuum Bag Seal (IRVBS), essentially a preformed wax extrusion, which is molded into the underside of the reusable bag as the bag is fabricated to eliminate vacuum leaks along the tool edge. The bag withstands processing temperatures of 350°F/176°C and can be re-used up to 100 times, claims the company.

Kraft paper honeycomb core

Tricel Honeycomb Corp. (Gurnee, Ill.) demonstrated its product line of cost-effective phenolic-impregnated and unimpregnated kraft paper sine-wave honeycomb cores for marine, automotive, architectural, furniture and other applications. The company's products are found in storage tank stiffeners, truck caps and tonneau covers, automotive interior parts, showers and tubs and mass transit vehicles.

Solvent replacement

21st Century Composites (Opa Locka, Fla.) showcased its SURFASOLVE solvent replacement for tool cleaning and for assembly, stripping and cleaning applications. The product is a specially formulated, nonhazardous, nonflammable and self-recycling liquid. The product is not a solvent, that is, it does not dissolve materials, such as resin, as they are removed from surfaces but acts instead to release the material from a surface and suspend it in the cleaning liquid. Wiped clear of the surface, the removed material can be washed from the rag in a container of SURFASOLVE, where it falls out of solution as a floc. The floc then can be strained out of the spent liquid, permitting the liquid's reuse. The company says that the liquid residue that remains on a cleaned surface will not affect resin cure or degrade laminate properties. Wrokers who clean rollers and other tools can safely go back to work without waiting for rollers and tools to dry.

Hot-bonding equipment

WichiTech Industries Inc. (Baltimore, Md.) showed its complete line of explosion-proof hot bonders, or portable composite repair equipment, with built-in electric vacuum pumps that meet the requirements of MIL-STD-810F. On display was the dual zone model P/N F4HB2005E, which is capable of facilitating repairs of glass, carbon, aramid or boron fiber-reinforced composite parts.

Batch curing oven

Wisconsin Oven Corp. (East Troy, Wis.) showcased an electrically heated batch oven to cure composite parts and structures. With a chamber 10 ft wide by 25 ft long by 9 ft high (3m by 7.6m by 2.7m) and a maximum operating temperature of 500ºF/260ºC, the oven features 4-inch/102-mm-thick tongue-and-groove panel assemblies and 20-gauge aluminized steel interiors and ductwork. Its heating system uses incoloy sheathed heating elements (240 kW heat input) and a 29,000-cfm, 25-hp recirculation blower. The exhaust system features motorized dampers on the fresh air inlet and the exhaust outlet for enhanced heating and cooling capabilities. Four interior vacuum stubs are located on the side of the oven and are piped to the main vacuum manifold.

Also available are a 16-position Type J thermocouple jack panel, transducers and solenoids. Temperature uniformity is +3.9°F/-6.8°F at 350°F (+2.2°C/-13.8°C at 176.7°C).

The company also touted its recently announced "E-Pack" oven upgrade program, which includes thicker wall panels, higher efficiency motors and other energy-saving items that result in considerable cost savings if an oven is operated more than 2,000 hours per year.

DCPD resin system

Zeon/Rimtec (Louisville, Ky.) brought its Telene dicyclopentodiene (DCPD), a two-component resin for reaction injection molding applications. The material is targeted toward use in small wind blades, tractor hoods, engine covers, truck bumpers and side fairings. The material can be filled or unfilled and is suitable for volumes of 500 to 15,000 parts annually. It is said to offer good rigidity, impact strength, high density, corrosion resistance and unlimited thickness. The company, established in Europe and Asia, is looking for applications and customers in the U.S.

Flatbed digital cutter

Zund America Inc.'s (Franklin, Wis.) booth featured a full-size flatbed cutter. The G3 M-2500 digital cutter, recently introduced, is available in nine different sizes, says the company, and can be easily customized to meet customer requirements thanks to its modular design. It reportedly delivers ease of operation, faster processing speed and readily changed modular tool heads that include rotary or oscillating knife blades or routers. Together with its cutters, Zund also offers GTK "Autonester" nesting software for efficient ply cutting to minimize waste, which the company claims is one-third the cost of competing software programs.