

PolymerPlace Notes

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Process Developments

- Spirex Corporation of Youngstown Ohio has launched a website, <http://www.spirex.com> designed to quickly assimilate the processing parameters of plasticating systems so that proven recommendations for maximizing profits through process optimization can be provided.

[The NPE \(National Plastic Exposition\)](#) was held in Chicago June 23-27, 2003. Although attendance was down by about 25-30% vs. 2000 at the show, most exhibitors felt that the quality of the attendees was excellent. Another development at the show is that there were more foreign exhibitors. Some notable material companies were missing: Dow and Eastman but others like DuPont and GE had very large booths and Asahi Kasei's booth made clear that they are putting a stake in the North American market.

Another event of note was the SPI and Injection molding Magazine breakfast on Manufacturing in China. The morning program consisted of a keynote speaker and a panel of executives from the industry who discussed the growing role of China in manufacturing and the impact it is having on the plastics market in NA. Small to medium size plastic processors and tool builders have been adversely affected by the growing influence of China in manufacturing. The SPI along with other trade associations like the Tooling Manufacturers Association and the National Association of Manufacturers are exploring ways to work together to make a case to the Federal government for support of a reasonable level of manufacturing to maintain a healthy balance between manufacturing and services in our economy.

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In recent project work we have become more involved in doing [market research in China](#). As a result of this work we have gained access to import data for China for various resins such as HDPE, LDPE (and LLDPE), U-PVC,F-PVC, and virgin PVC, EPS, PS, ABS, PC, POM, etc. also for chemicals. If you have any interest in the data please let us know or visit the website at <http://www.polymerplace.com> for a sample of the data for Polystyrene (PS)-GP PS and HIPS. The total import of PS (excluding EPS) of China was 1453kt in 2002 and there are about 1000 importers trading PS. The importers include indicated trading companies (import/export company), distributors and processors.

This information would be useful way to learn of some end users and distribution channels in China.

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[Strategic Management for the Plastics Industry](#) was written by Roger F. Jones, one of Polymerplace.com's founding partners. It was published in September 2002 by CRC Press. Endorsed by the Society of Plastics Engineers, this book covers all of the bases in the plastics industry, from polymer manufacturing, through compounding, distributing, processing – even machinery and additive suppliers are included – in a thoughtful, down-to-earth discussion of the particular problems faced by managers in this industry in running their businesses. Worried about globalization? Can't decide how to staff and organize your business? Do general management texts fail to cover your special problems? Look no further – it's all in here. Order your copy today – use our link to <http://www.amazon.com>.

We've been showing highlights from each chapter in our monthly newsletters. This issue will cover Chapter Seven – Tools for Management. This chapter starts out by dissecting the commonly accepted idea of obtaining maximum profitability through market dominance, and how to determine when new product introductions are really successful or not. The chapter goes on to show how to evaluate your product lines and predict the effect of reallocating resources among them. The method used was first conceived by management guru Peter Drucker, and he personally reviewed the author's use of his work in this book before approving it, as fairly representing what he (Drucker) advocates. This methodology is more operations-oriented than typical accounting methods and the results can be quite surprising. Examples and charts abound; a hypothetical molder is shown how to improve earnings by focusing more on some product lines, putting others on milking status, and even abandoning others.

Next, the chapter shows financial benchmarks for different segments of the industry, so that the reader can compare his or her own company to others. The rest of the chapter deals with how measure results in the company's business plan, determining customer satisfaction, and obtaining commercial intelligence by widely available – and legal – means.

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Polymer Markets

Medical/Dental

The Dental Products Business of Eastman Kodak Company has put an end to the discomfort experienced by patients getting dental X-rays by developing a [cushioned intraoral x-ray film product](#). Using Apex (R) 3208-80-NT flexible vinyl compound from Teknor Apex, Kodak insert molds a bead around the perimeter of the film packet for a new product line that is aptly named SureSoft (R).

The company sandwiches x-ray film, paper, and foil between protective outer layers of vinyl film; from the resulting multi-layer sheet, Kodak then seals and die-cuts individual film packets. For SureSoft products, Kodak allows a tiny border of the vinyl film to extend outside of the seal and serve as an adhesion site for the cushioning bead. The company uses a robot to place the packets into a multi-cavity insert mold, then injection molds the Apex vinyl over the vinyl film border.

One challenge met by the product development team was to secure a vinyl molding compound that would form a strong bond with the vinyl film evaluated several compound suppliers, including Teknor Apex.

The Delicate Vinyl Cushion Weighs Just 0.27 Grams and Is Only 1.1 mm in diameter Kodak took other measures to ensure that the vinyl bead would remain firmly attached around the perimeter of the packet. Also critical was the need for handling the packets throughout the injection molding process without damaging the film inside, and for getting a good balance of material flow to the different cavities so that they filled uniformly.

The SureSoft cushioned packets are available only with Kodak's newest and fastest dental x-ray film, Insight (R), which the company says provides the additional patient benefit of reducing radiation exposure by 20 to 60% in comparison with its other grades of film.

For more information about Kodak's dental products, visit www.kodak.com/go/dental.

For more information on Teknor Apex visit the web site:

www.teknorapex.com.

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The MedTech Group, Inc., a leading contract medical device manufacturer, and Ticona, the technical polymers business of Celanese AG (NYSE: CZ; FSE: CZZ), have joined forces to develop and promote the use of [Topas® cyclic olefin copolymer \(COC\) as a replacement for glass in medical and diagnostic devices](#), as well as in drug packaging and delivery products. Topas COC combines optical transparency, high moisture barrier, and greater fracture resistance than glass. It prolongs the shelf life of moisture-sensitive drugs and prepared solutions in prefilled primary packaging, such as vials, ampoules, bottles and syringes, by keeping moisture out or by holding solution concentration steady. Other

Topas COC healthcare applications include microtiter plates, needleless injectors, contrast media containers, and lenses and other optical components. Topas COC also offers high stiffness and dimensional stability, low hydrolytic degradation and moisture absorption, and resistance to heat, acids, alkalis and polar solvents. It has excellent biocompatibility and is low in extractables.

For information on MedTech and its services, contact: The MedTech Group, Inc. Phone: 1-908-561-0717. Or visit: <http://www.medtech-grp.com>.

For information on Topas® COC and its use in medical applications, contact:

Ticona, Phone: 1-800-833-4882 or 1-908-522-7500. In Europe, contact: Ticona GmbH, Phone: (DE) +49-(0)18-0584-2662

Or visit <http://www.ticona.com>.

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Automotive

Suppliers of Automotive Interiors are being forced to develop and adopt new technologies in order to cut costs and meet the demands of automakers.

Among the approaches being developed are techniques which combine processes and/or materials, e.g. Two-shot molding of skin and substrate in a single mold (Ube); Direct compounding/fabrication being used by Johnson Controls Inc. and Faurecia for the Mercedes C-Class Instrument panel upper substrate molding; JCI's CraftTec process which provides improved craftsmanship for textile/plastic parts such as door trim medallions.

These are some of the technologies discussed in NAFTA and Europe in a study entitled, *Automotive Interior Soft Trim: skins, foams, coated fabrics, textiles and acoustic barriers*. The report offered by Robert Eller Associates of Akron Ohio also covers the growing use of thermoplastic polyolefins (TPOs) as skins and foams in automotive Interior trim components. The study covers a broad range of interior modules including instrument panels, door trim, seating, floor/acoustics and is quantitative in detail including module fabrication technologies, processes and costs, as well as process substitution trends.

Material coverage includes demand shares, supplier descriptions and market shares as well as key materials substitution trends.

The report also contains an analysis of the industry's structure, dynamics and drivers including profiles of one hundred suppliers.

The study offers a comprehensive basis for competitive analysis.

For more information and pricing information for the study visit <http://www.robertellerassoc.com>.

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Electrical/Electronic

Cybershield developed its Exact™ technology to allow precise, selective, plating of plastic materials for the electronics industry. Originally performed for decorative purposes, the metallization of plastics is now seen as the key to providing the effective shielding and conductivity required in modern electronic devices. [Cybershield uses a variety of platable systems from RTP Company to provide custom engineered solutions for the electronics industry.](#) Cybershield's technology enables antenna, circuitry, interconnection, shielding, and thermal management solutions to be integrated into thermoplastic housings and substrates. For example, circuit patterns can be applied directly onto plastic housings and components in two and three dimensions. 3-D patterns can be applied with lines and spaces down to 0.005 inch (0.127 mm) with a resolution of 0.001 inch (0.025 mm).

The Exact™ process enables designers to integrate electrical and mechanical functionality into a single plastic part. The net result is reduced lines in the Build of Materials (BOM), increased reliability and enhanced function and performance of electronic devices."

RTP has expertise with a wide range of materials and its experience in customizing those materials is key.

RTP Company's line of specialty compounds that are compatible with plating and coating processes includes: syndiotactic polystyrene (SPS), polypropylene (PP), polyphthalamide (PPA), polycarbonate/ABS alloys (PC/ABS), polyetherimide (PEI), and liquid crystal polymers (LCP). In addition, RTP Company can customize substrates with exact combinations of glass or mineral reinforcements, flame retardants, and flow enhancers.

Cybershield, Inc. is a subsidiary of Elk Corporation. Based in Dallas, TX, Cybershield is an industry leader in the design and manufacture of metallized plastic engineered solutions for electronic equipment OEMs. For more information, visit their website at <http://www.cybershieldinc.com>; contact: Kenwood Martin.

RTP Company, headquartered in Winona, Minnesota, USA, is a global leader in specialty compounding. For more information call (800)433-4787 or (507) 454-6900, or visit the website at <http://www.rtpcompany.com>.

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Industrial

When Toftejorg A/S of Denmark, a leading manufacturer of industrial cleaning equipment, wanted a [material for the helical gear wheels](#) in their equipment's spray heads, they chose VICTREX® PEEK® polymer because of its superior chemical resistance and high mechanical strength. The PEEK® polymer was chosen because of its resistance to virtually all organic and inorganic solvents, and because it delivers the required high mechanical fatigue strength over a wide range of temperatures and pressures. The cleaning equipment is used in a variety of demanding environments including cargo ship containers for transporting crude oil, chemicals or solid bulk products. The containers are cleaned after the cargo has been unloaded to prevent contamination of the new cargo. Depending on the applied pressure and nozzle system used, the equipment can completely clean a tank within a few minutes.

The gear wheels are manufactured in a custom mold specially designed for co-injecting an unfilled PEEK® polymer resin onto a pre-heated metal insert. Using the polymer gives the wheels the ability to resist high mechanical loads and provide long-term resistance to both cleaning agents and aggressive residual media in the storage tanks. And, because unfilled PEEK® polymer complies with FDA regulations for repeated food contact, Toftejorg can also market its products to the food and beverage industry.

For more information on the properties and performance advantages of VICTREX® PEEK® polymer call (800) VICTREX or visit the Victrex website at <http://www.victrex.com>

Polymer Developments

[The market for continuous fiber reinforced thermoplastic composites has experienced growth of 105% in the last 5 years.](#) The Growth rate in 2002 was 93%, according to E-Composites, Inc., a Michigan based market research and business consulting firm.

Continuous fiber reinforced thermoplastic composites include a variety of products, including unidirectional and fabric based prepregs, narrow tapes, commingled fiber in roving and fabric forms, sheets and rods. Historically, continuous fiber reinforced thermoplastic composite materials were used in niche applications in aerospace and defense markets. But in recent years, the market has exploded in automotive, sporting, transportation, industrial and other applications. Common reinforcements used with thermoplastic composites are E-glass, carbon and aramid. Resins typically selected are polypropylene (PP), Nylon, PPS, PEEK, PC, and PEI.

Demand has been driven by a variety of aerospace, automotive, industrial and truck applications. However, continuous fiber reinforced thermoplastic composites are even finding their way into furniture, fastener, medical, marine, and other applications.

The market for fabricators/end users of continuous fiber reinforced thermoplastics composites is crowded with smaller and emerging producers to large corporations such as Airbus, Boeing and Peguform. Suppliers of thermoplastic composites are mostly based in North America and Europe with small to big names such as Cytec, Saint Gobain, and Hexcel. In the worldwide continuous fiber reinforced thermoplastic composites market, North America plays an important role and about 67.2% (little more than 2/3) of total continuous fiber reinforced thermoplastics composites shipment was in North America. Europe ranked second with total shipment of 31.8% as shown in Fig. 1.

CFRTPC consumption by region

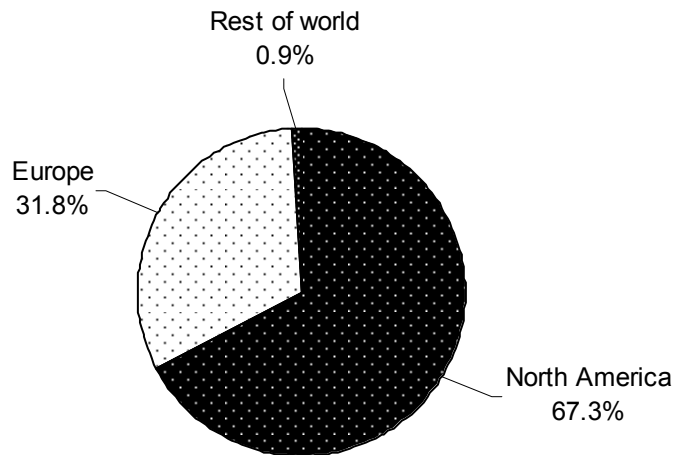


Fig. 1 Continuous fiber reinforced thermoplastic composites consumption by region for year 2002.

The market study, "Opportunities in Continuous Fiber Reinforced Thermoplastic Composites 2003-2008" assesses the current and forecast market for almost all types of material forms such as prepregs, commingled fiber in roving and fabric forms, sheets and rods. The thermoplastic composites market breakdown by type of material forms (prepregs, commingled fibers, etc.), resins, reinforcements, region and by applications are discussed in this 240-page market study. The study also profiles molders and leading producers of thermoplastic composites.

For more information on this study, contact Patrick Keeley at E-Composites, Inc. at Tel.: 616-532-4076 or by e-mail at Patrickk@e-composites.com or visit <http://www.e-composites.com>.

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GLS Corporation of Mc Henry Il. has introduced the newest member of the VERSOLLAN™ TPU elastomer alloy product line (made exclusively with BASF urethanes). With a 45 Shore A hardness, VERSOLLAN RU 2203 is one of the [softest injection moldable TPU elastomers available](#) in the industry, and offers a soft touch, rubbery feel and look.

In October 2002, GLS introduced a new class of fast cycle time TPU elastomers that have a rubbery, matte surface, with the high performance properties of TPUs. The first grades introduced were the VERSOLLAN 2004 and 2005 products - they are available in grades of Shore A 55 and 65. All VERSOLLAN TPU elastomers contain high performance urethanes from BASF Corporation, according to an exclusive licensing agreement between the two companies.

Some of the advantages of these rubberized urethanes are: exceptional oil resistance, excellent adhesion to PC, ABS, and PC/ABS blends; improved flexibility (low flexural modulus); fast set-up rates during processing for reduced cycle times; and spiral flow similar to styrenic TPEs. Some benefits include the ability for processors to achieve a more rubbery, tactile feel for grip and overmolding applications; a dull, matte finish; excellent tensile strength and good impact resistance. The VERSOLLAN thermoplastic urethane line further expands the options of product

designers, processors and manufacturers to offer soft touch grips that require unique and/or enhanced performance over standard TPEs.

GLS Corporation has supplied elastomeric raw materials to the industry since 1979. For more information on the new VERSOLLAN grades of thermoplastic urethanes offering rubbery, soft touch feel, contact: GLS Corporation, Telephone: (815) 385-8500 or (800) 457-8777.

E-mail: info@glscorp.com Web Site: <http://www.glscorp.com>

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After [DelStar Technologies, Inc.](#) switched the polymer used in its Naltex® filter support netting from polyethylene terephthalate (PET) to Celanex® polybutylene terephthalate (PBT), [it reduced material cost 34 percent](#). DelStar also found that Celanex® PBT, made by Ticona was easier to process and improved the netting thermal and chemical resistance compared to PET. Naltex® biplanar netting holds and protects pleated and spiral-wound nonwoven media in filter cartridges used for hydraulic fluid, gasoline and other hydrocarbons, and many aggressive chemicals. The changeover to Celanex® PBT extended the netting's temperature rating by 40° to 50°F and expanded its chemical resistance range to include methyl alcohol, ethylene glycol and palmitic acid. Naltex® netting has a diamond-shaped mesh with strand counts as high as 60 per inch and a thickness ranging from 6 to 200 mils (the width of two strands at their crossover point). When formed into spacers and sleeves in filter cartridges, it protects supports and contains the delicate filter media. It also keeps the media from shifting as fluid flows through it, so turbulence is minimized and the 0.0015-in. to 0.003-in. flow channels that form in the filter media remain open. One more advantage is that the material is FDA and NSF approved. DelStar manufactures Naltex® netting products using slotted, counter-rotating dies. The strands in the netting are thermally bonded at their intersections, which occurs when the molten polymer passes through the die slots as they meet in rotation. Strand angle can vary from 30° to 105°, which alters netting look, feel, strength, porosity and other characteristics. Celanex® PBT forms a smooth, lint-free net that can replace metal screening in many filter applications. The bonded structure forms a cleaner unit than woven nets, which shed loose fibers and can unravel when they are die cut.

For information on Celanex® PBT and its use in netting and other products, contact: Ticona, Phone: 1-800-833-4882 or 1-908-522-7500. Email: proinfo@ticona.com. In Europe: Ticona GmbH, Phone: +49-(0)180-584-2662 (DE); Email: infoservice@ticona.de. Or visit <http://www.ticona.com>

For information on DelStar Technologies, Inc. and its Naltex® filter netting, contact: Marjorie Wilcox, 220 East Saint Elmo Road, Austin, Texas, 78745, USA. Phone: 1-800-531-5112. Email: info@DelStarInc.com. Or visit: <http://www.DelStarInc.com>

Process Developments/Innovations

Spirex Corporation of Youngstown Ohio has launched a website, www.spirex.com, designed to quickly assimilate the processing parameters of plasticating systems so that proven recommendations for maximizing profits through process optimization can be provided. Because users approach websites with a variety of interests Spirex offers an easy pathway to explore the many elements that make up the plasticating process.

The Spirex site provides an easy-to-use Process Optimizer form for processors to complete and return online to Spirex. Information gathered via this form includes factors such as machine specifications, existing screw data, and processing conditions. Those details establish a foundation of knowledge necessary for Spirex to reply with a comprehensive recommendation for optimizing the plasticating process on virtually any injection molding\or extrusion system.

The form also features cost justification analysis. Companies providing information about part quantity, cycle time, resin costs, machine cost per hour, efficiency uptime and more, can learn how quickly the Spirex process optimization recommendations can be justified, and what profitability levels and competitive advantage the molder can achieve.

Spirex recently implemented process optimization with an automotive parts molder running a quantity of 125,000 parts. The company utilized the optimization analysis process and chose to replace the existing screw and valve with a Spirex Z-Mixer Screw. Other components were recommended, based on the molder's application and as a result, resin cycle time was improved by almost 15 percent, generated scrap decreased from 7 percent to 1 percent, and price per part dropped from \$2.21 to \$1.81. The profit margin jumped from an estimated 15 percent to 30 percent. The difference in cost for the replacement components was paid for in just seven production days!

Spirex Corporation is also the exclusive worldwide manufacturer of Twinshot™ Systems, an innovative co-injection technology which is growing rapidly among injection molding equipment OEMS.

Van Dorn Demag became the first OEM, this past year, to incorporate the Twinshot multimolding technology in new machines, from its Cadence Series to its large tonnage Caliber Series.

Already during 2003 Negri Bossi has announced that it will make the multimaterial molding system available on all their new injection molding presses. Toshiba Machine has also agreed to make Twinshot™ available on all its hydraulic and electric injection molding machines.

The Twinshot™ process enables a conventional machine with a single barrel and screw to inject two materials in one operation, with one material totally enclosing the other. Plasticizing occurs on the single screw with a two-stage design. Starve-feeding controls the ration of materials in one or both of the screw stages. Materials can be commodity resins, engineering resins, or a combination.

Among the many benefits of the Twinshot™ process is its ability to:

- Encapsulate low cost material, including off-spec, regrind or recycled material with up to a 30% savings on material costs.
- Encapsulate foamed material, thus reducing sink and warp and improving strength-to-weight ratio.
- • Produce soft touch parts in a single molding operation.
- • Encapsulate reinforced materials within a cosmetic surface.
- • Easily convert to single-material mode, by simply supplying the same material to all feeder hoppers.

Other advantages of the Twinshot™ design include simultaneous material extrusion, leading to extremely fast recovery time; independent heat control on the two melting zones; a rugged design; and easy screw and barrel installation and removal.

For more information about [Twinshot™ Systems](#), [Process Optimization](#), or any [Spirex](#) product or service, contact Mark Colella, Vice President of Sales, Spirex Corporation Phone: 330-726-4000; Fax: 330-726-9437; or Email: sales@spirex.com. Website at: <http://www.spirex.com>.

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References: The stories in *PolymerPlace Notes* come from a variety of sources including Company Press Releases, Interviews, and trade publications, e.g. *Plastics News* and newswires. <http://www.PolymerPlace.com>

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