

PolymerPlace Notes
A plastics technology newsletter
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What's new at Polymerplace

We attended the Medical Design and Manufacturing Show and Atlantic Design Show in NYC June 3 –4, 2003. There wasn't a Plastec (processing oriented-show) since there is NPE also in June.

NPE (the National Plastics Exposition is being held this year in Chicago (June 23-27, 2003). The last NPE was in 2000 right near the end of the "boom". Nearly 100,000 people attended- it will be interesting to see if the attendance comes close this year. On June 24, 2003 we will be speaking at the NPE conference sponsored by SPE and SPI. Roger Jones will be speaking on "Managing in Turbulent Times" and Maggie Baumann's presentation is on "Optimizing the Supply Chain". Both presentations are in the Business Management Session- Tuesday, AM. The conference is part of one of the world's largest trade shows. The sessions held during show hours are free to attendees. We hope to see you there.

For more information on the conference and the tradeshow please visit, <http://www.NPE.org> or <http://www.4SPE.org>. In addition to the free conference there are seminars provided by SPE on a variety of topics. Payment is required for the seminars.



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. To order a 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 Six – Staffing for Success](#). This chapter covers the most important part of any company – its people. The discussion begins with recruiting, and while the need for technically educated and experienced personnel is stressed, the author also shows how and where to employ non-technical people to the company's advantage. Methods for successful interviewing and interpretation of an individual's education, experience, and personality traits are described. The author offers suggestions for obtaining worthwhile information from references, despite the relative lack of candor that one usually finds in them due to legal restrictions. Employment agreements can be a valuable tool in safeguarding a company's competitive edge, but need to observe commonsense tradeoffs and limitations in order to make them reasonable, acceptable to prospective employees, and enforceable.

Employees need to maintain and expand their knowledge base in order to contribute to the company's progress. There are a number of ways to do this, without leaving it entirely to chance, and these are described in sufficient detail as to enable management to find an optimum balance of methods. In particular, critical aspects to job rotation and enrichment are discussed with reference to common failings of policies in use at a surprising number of companies.

Next, the chapter takes up performance evaluations, compensation, promotion, and dismissal of personnel. The author draws on his varied experience to advise which policies work best, as well as how to avoid pitfalls that might trap the unwary manager. The use of layoffs is analyzed as to its short and long term effects, as well as how to avoid the use. How to effectively use temporary and contract personnel is reviewed at some length, as is how to retain personnel.

Finally, the unique requirements of the plastics industry for suitable plant and laboratory non-salaried personnel are discussed, how to compensate these people, and how to deal with unions.



Polymer Pricing Update

After strong run-ups in polymer pricing during the first four months of 2003, the market appears to have bottomed out. Polyethylene prices have even dropped about 2 cents/lb during May due to excess production and slack demand. PP and PVC prices are level and PS prices are still inching up.

Engineering plastics attempted several price increases since the 4th quarter of 2002. Although smaller buyers have experienced price increases of up to 10-15%, larger buyers have only accepted small of increases of 3-5 cents at their contract anniversary dates.

If you are interested in a good newsletter that tracks pricing and supply issues with volume polymers consider subscribing to Bill Kuhlke's newsletter which is available through the Polymerplace site. <http://www.polymerplace.com>



The American Plastics Council's main goal for their advertising is to maintain the favorability ratings for plastics in its public opinion polls. The high favorability rating is evidence that media coverage and concerns about environmental and chemical health issues surrounding plastics are not taking root with the general public. They recently ran a poll and determined the overall plastics rating to be 68 which is quite high.

The new ad campaign includes a different mix this time around — more short, 15-second ads and more targeted marketing at cable television shows that reach the chief demographic APC seeks. APC's parent, the American Chemistry Council, seriously is looking at the APC approach to develop a \$40 million-a-year campaign to boost the poor public image of the chemical industry.

All of APC's 23 resin companies are members of ACC. Plastics is more than half the sales for many ACC companies.

Some of the ads planned are a 30-second spot that reviews all the ways plastics protect a child as he grows up. Another tells of a new, dissolvable plastic that is implanted in the brain and delivers medicine to fight tumors, sparing a patient from chemotherapy.

The APC group has conducted research that lets it target the best niche for its message. It includes cable networks like Home and Garden, Lifetime and A&E. APC targets people who are more moved to react either positively or negatively to plastics issues, a group that is more readily identified by philosophical or life outlooks, rather than targeting a traditional age or gender demographic.

POLYMER MARKET DEVELOPMENTS

Industrial

ESAB Welding and Cutting Products of Florence, South Carolina recently started using VICTREX® PEEK polymer in the electrical insulators in their plasma cutting torches. ESAB is one of the world's largest suppliers of welding and cutting consumables and equipment. (<http://www.esab.com>)

Plasma cutting torches are used to cut and fabricate metal parts. They utilize electricity to create an arc between the electrode (torch body) and the work piece. Located in the head of the torch, the PEEK□ polymer insulator electrically insulates two different potentials inside the torch from each other. It is necessary to separate the electrode potential from the nozzle potential. This means having one or more insulators inside the torch body to insulate the two potentials from one another.

Because the insulators are exposed to the high voltage electrical discharge used to start the torch, they must be able to withstand very high temperatures. They had been using Vespel™ which is very expensive and has a complicated manufacturing process. They were looking for a material which would be less expensive but still have all the properties needed.

In addition to good electrical insulative properties and good high temperature properties, we wanted machinability, heat aging and creep resistance. PEEK fulfills those requirements.

VICTREX USA Inc., a division of Victrex plc. is the sole manufacturer and supplier of PEEK□ polymer worldwide. For more information please call (800) VICTREX or visit the Victrex website at www.victrex.com.

* Vespel is a registered trademark of DuPont



Packaging

EVAL Company of America (EVALCA) has introduced its 7-series ethylene vinyl alcohol (EVOH) polymers. This new line of EVAL® EVOH resins demonstrates improved thermal stability, better processing ability and enhanced adhesion without sacrificing barrier or mechanical properties. The next generation 7-series resins include grades for film extrusion, blow molding, injection molding and thermoforming.

The 7-series resins exhibit enhanced thermal stability over conventional EVAL EVOH grades, but they also demonstrate improved processability by reducing die lip build-up and maintaining stable viscosity over extended extrusion times.”

The EVAL 7-series currently includes EVOH grades ranging from 27% - 48% ethylene content. Technical data demonstrating the benefits of the 7-series was presented at the Converting Machine/Materials Conference and Exposition on April 15, 2003 in Chicago and will be presented at the TAPPI conference in August 2003 in Orlando, FL.

For more information regarding the 7-series and other advancements in EVAL EVOH products contact Nicole Herms at (281) 204-4611 or email nlh@evalca.com.



Medical

[Ticona has recently intruded Fortron PPS and Vectra LCP grades for use in medical technology \(MT\) applications](#) such as medical devices, drug packaging and delivery systems, and other healthcare applications.

Ticona MT grades comply with USP 23 Class VI for biocompatibility with skin, blood and tissue, and Ticona maintains active Drug Master Files and Device Master Files for these grades with the U.S. Food and Drug Administration. Ticona's MT grades also meet European Directive 2002/72/EC for food contact applications and BfR standards, respectively. BfR stands for the German Federal Institute for Risk Assessment (formerly BgVV, the German Federal Institute for Consumer Health Protection and Veterinary Medicine).

They include filled and unfilled grades for use in injection molding and extrusion processing, and grades having various flow qualities and additives that yield parts with low friction and wear, improved surface appearance, greater stiffness and other properties. Fortron® PPS MT grades Fortron® MT PPS grades have good dimensional stability, toughness and rigidity. They are capable of withstanding repeated sterilization and resist hydrolysis and strong disinfectants, alkalis and most other chemical media. They are used to replace metal and for precision mechanical elements in drug delivery systems, such as aerosol valves, spring elements and gears, as well as in housings and filter media, among other applications.

The five Fortron® MT grades are:

- Fortron® MT 9140L4, a 40% glass fiber-reinforced grade having high hardness and rigidity.
- Fortron® MT 9140L6, a 40% glass fiber-reinforced grade having high-flow.
- Fortron® MT 9203HS, an unfilled grade with good flow for extrusion and compounding.
- Fortron® MT 9205C4, an unfilled, low melt viscosity grade, for custom compounding and extrusion.
- Fortron® MT 9320C0, an unfilled grade with high melt viscosity for extrusion.

Vectra® LCP MT grades Vectra® LCP MT grades offer excellent strength, stiffness, creep resistance, dimensional stability and high flow in long, thin sections. They have excellent thermal and chemical resistance and withstand numerous sterilization cycles. They can replace metal in medical and dental equipment, provide for finely structured parts in drug delivery systems, and meet the needs of devices for minimally invasive surgery and other areas. The eight Vectra® MT grades are:

- Vectra® 1300MT, an unfilled film grade for medical packaging.

- Vectra® 1310MT, a glass fiber-filled grade with added stiffness.
- Vectra® 1335MT, a glass fiber-filled grade containing PTFE for lower wear and friction.
- Vectra® 1340MT, a mineral-filled grade with good flow, impact resistance and surface finish.
- Vectra® 1345MT, a grade with higher mineral content than 1340MT for improved surface appearance.
- Vectra® 1355MT, a carbon fiber-filled grade with good stiffness and electrical conductivity.
- Vectra® 2310MT, a glass fiber-filled grade with greater stiffness than 1310MT.
- Vectra® 3310MT, a glass fiber-reinforced grade having more stiffness and temperature resistance than 1310MT.

For additional information on medical technology grades of Fortron® PPS, Vectra® LCP and other Ticona polymers, contact: Phone: 1-800-833-4882 or 1-908-598-4000. Email: prodinfo@ticona.com.

In Europe, contact: Ticona has served the medical technology market for many years. In addition to Fortron® PPS and Vectra® LCP, it also offers FDA-compliant grades in other resin families, including Celanex® polybutylene terephthalate (PBT), Celcon® and Hostaform® acetal copolymer (POM), Riteflex® polyester elastomer (TPE-E), Topas® cyclic olefin copolymer (COC), and GUR® ultrahigh molecular weight polyethylene (UHMW-PE).

Additional Information Available 49-(0)18-058-42662 or (EU) +49-(0)69-305-16299. Email: infoservice@ticona.de. Or visit: <http://www.ticonafocus.com> and <http://www.ticona.com>.



POLYMER/PROCESS DEVELOPMENTS

GLS Corporation will be introducing the newest member of the VERSOLLAN™ TPU elastomer alloy product line (made exclusively with BASF urethanes) at NPE 2003 (**Booth #1035 South Hall**). 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.

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 (unlike standard TPUs), a rubbery, tactile feel for grip and overmolding applications; a dull, matte finish; excellent tensile strength and good impact resistance.

Also, 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.

In 2001, the firm formed a strategic alliance with TPR manufacturer DSM. Later, in 2002, GLS entered into another alliance with GE Plastics to market a new line of Softfx™ hard engineering resin/soft TPE overmold combinations. And, in the Fall of 2002, they formed an agreement with BASF Corporation to market specialty rubberized TPU alloys to be sold under the GLS Corporation VERSOLLAN™ trade name. Other GLS products offered for molding and extrusion include KRATON® thermoplastic rubber compounds; DYNAFLEX® thermoplastic elastomer compounds; VERSAFLEX® TPE alloys, and new generation VERSALLOY® elastomer alloys, which exhibit enhanced performance properties. Applications for these materials are found in

medical, sports and leisure, automotive, lawn and garden, appliance, kitchen tool, power tool, personal care and industrial markets, among others.

For more information on the new VERSOLLAN grades of thermoplastic urethanes offering rubbery, soft touch feel, contact: GLS Corporation-McHenry, IL. Telephone: (815) 385-8500 or (800) 457-8777. E-mail: info@glscorp.com Web Site: <http://www.glscorp.com>



Ensinger-Hyde, a division of Ensinger Inc., has introduced the first line of 40 percent glass-reinforced linear polyphenylene sulfide (PPS) rod and plate into North America. These semifinished products, already sold in Europe by Ensinger GmbH, are offered as Ensifide® GF 40 extruded PPS and are the only known PPS stock shapes having glass loadings above 30 percent.

Ensifide® GF-40 rods have diameters ranging from 0.25 to 4 inches (0.6 to 10 cm), while plates in the new line have thicknesses of 0.25 to 2 inches (0.6 to 5 cm). Ensinger makes these extruded shapes using Fortron® PPS, grade 1140L0, from Ticona, the technical polymers unit of Celanese AG.

Products in the Ensifide® GF 40 line offer high performance in demanding applications. They often can be used instead of more expensive polymers at considerable savings, for example, they can replace 30% glass-reinforced polyetheretherketone (PEEK) at approximately one-third the price. Extruded shapes made of Fortron® 1140L0 PPS have more than double the tensile strength at break and more than triple the flexural modulus of unfilled PPS (195 vs. about 90 MPa for tensile strength and 14,500 vs. about 4,200MPa for flexural modulus).

Ensifide® GF 40 rod and plate are used in the aerospace, medical, electrical, electronic, food, packaging and other fields. Typical applications for it include: handles for surgical scissors; electrical and electronic insulators, housings and connectors; polishing rings and etching heads for semiconductor fabrication; and chain guides, pump parts and other industrial components.

PRODUCT DESIGN AND DEVELOPMENT

What is stereolithography?

Stereolithography is a layer additive rapid-prototyping process based on the use of photopolymer liquid resins which solidify when exposed to UV light. A software program transfers the designer's 3-D CAD model into an electronic file for stereolithography machines ('STL' format), composing the information into thin cross sections or layers. A laser beam then traces each layer onto the surface of a vat of photopolymer resin, building the part in repeated layers until a solid replica of the original CAD model is completed.



DSM Somos®, a leading supplier of materials for the prototyping industry is nearing commercialization of **Somos® ProtoComposites™**, liquid materials containing fillers allowing for a broader range of applications. ProtoComposites™ are complex materials in which two or more distinct, complementary substances, especially metals, ceramics, glasses or polymers, combine to produce functional properties not possible using individual components. ProtoComposite materials are a result of spending a significant amount of time and resources investigating the potential for ACT-SL™, Advanced Composite Technology for StereoLithography.

Initially, the Somos® ProtoComposites™ family will consist of two product groups: Somos® ProtoTool™ and Somos® SolidCast™.

Somos® ProtoTool™ is a filled material with high heat resistance providing "best-of-class" tensile strength, flexural strength and modulus plus a high Heat Deflection Temperature (HDT) greater than 517 degrees F at 66 psi. ProtoTool™ has been developed as an answer to the problem represented by current resins that lose significant strength during the thermal cycling necessary to achieve high HDT. In contrast, ProtoTool™ offers high HDT with superior strength. Ideal applications include direct tooling as well as creation of strong, rigid parts.

Somos® SolidCast™, is hollow-spherically-filled material with low density and excellent investment casting pattern properties. SolidCast™ will enable solid investment casting material that eliminates drainage and sealing concerns associated with a honeycomb structure, enhancing accuracy and surface quality. Moreover, this material is characterized by a low density capable of producing large parts without the weight associated with other resins. This is a key response to marketplace demands in that current resins have a density that averages 1.1 g/cm³ which results in formation of large heavy parts, whereas SolidCast has a density of approximately 0.6 g/cm³. SolidCast™ can therefore form large, lightweight parts.

Among the newest ProtoFunctional® materials to be launched is the Raven™ 7600 series which creates dark colored, rigid prototypes with high humidity and mechanical resistance; WaterClear™ 10100 series, the industry's first transparent, tough and durable resins; and the Somos® 9100 series which allows material properties similar to polypropylene, with superior mechanical memory.

Each family of Somos® photopolymer epoxy resins is comprised of materials specially formulated and optimized for the variety of stereolithography platforms commercially available: Somos® XX'00' resins are for use in Argon ion laser systems; Somos® XX'10' for Helium Cadmium laser systems; Somos® XX'20' resins for platforms utilizing Solid State laser systems.

DSM Somos® also offers materials for selective laser sintering and is the first manufacturer of powder elastomeric polymer (Somos® 201) that can be sintered to produce highly flexible parts with "rubber like" characteristics.

Product data sheets for the entire line of DSM Somos® material technologies are available on the company web site <http://www.dsmsomos.com>, under "Downloads, Product Data Sheets".

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Accelerated Technologies of Erlanger, Kentucky has announced the availability of rapid prototypes in a new, ceramic-filled material for stereolithography. ProtoTool™ 20L, from DSM Somos®, is a composite material that blends ceramic filler and photopolymer to yield mechanical and thermal properties that are unmatched by any other stereolithography resin.

Accelerated Technologies offers product development and manufacturing services that include product design, rapid prototyping, tooling, injection molding, printed circuit boards, wire harnesses, manufacturing and assembly. For rapid prototyping services, the company offers stereolithography, selective laser sintering and RTV molding from its Austin, Texas and Erlanger, Kentucky locations.

Accelerated Technologies has used ProtoTool 20L for prototyping applications that required strength, rigidity and thermal resistance that could not be achieved with any other stereolithography resin. ProtoTool 20L offers a heat deflection temperature (HDT) of 216 °F, and with an optional thermal postcure, the HDT reaches an impressive 517 °F. As would be expected from a ceramic material, ProtoTool is extremely rigid with a flexural strength of 20,000 psi. In addition, ProtoTool 20L offers a tensile strength of 11,200 psi.

When compared to the widely used Somos 9100 series resins, ProtoTool 20L has 6 times the flexural strength, 2.5 times the tensile strength and up to 3.5 times the heat deflection temperature. With these properties, Accelerated Technologies believes that ProtoTool will be in demand for functional prototypes like impellers, pump housings, headlight reflectors and wind tunnel test models.

For more information contact Mike Durham, General Manager of Accelerated Technologies, 859-692-2600; website: [http:// www.acceltechinc.com](http://www.acceltechinc.com).

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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