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POLYMERPLACE NOTES

A plastics technology newsletter

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FEATURE –

Update from the Medical Design and Manufacturing, Pacific Design and Plastec shows.

POLYMER MARKET TRENDS

- Transportation
  - *AES has now developed a thermoplastic vulcanizate (TPV)* Santoprene 7028 that targets the "boot" that protects the auto transmission's constant velocity joint and contains its grease
- Medical
  - *Teknor Apex* has introduced new film grades of TPEs (Thermoplastic Elastomers) which are processable in conventional blown or cast-film extrusion systems.
  - *Color-coding* of medical instruments can help operating personnel identify surgical instruments quickly
  - *TTIR* (through-transmission infrared welding) has only recently started to make its way into medical applications as manufacturers look for alternatives to PVC
- Packaging/Consumer- plaited fabric made from Cargill Dow's NatureWorksäPLA and cotton performs better than plaited polyester/cotton fabric
- Electronics/business machines Transparent Vu-Stat™ C-37 static dissipative acrylic multipolymer compound from CYRO Industries provides permanent ESD protection to static discharge-sensitive electronic

New Polymer Developments A new grade of NAS styrene acrylic co-polymer specifically designed for medical applications introduced

New Process Developments Mucell microcellular foam process being embraced in injection molding and extrusion applications

- Tooling Product developer Herbst Lazar Bell Inc. recently acquired an operation from Moll Industries Inc

WHAT'S HAPPENING AT POLYMERPLACE.COM?

We are continuing to build the most inclusive supplier/service directory and plastic case study database in the industry. If you haven't already registered go to www.polymerplace.com and do so. Add your application/case histories to our database by emailing us at applications@polymerplace.com.

We want to remind you about our information partnerships with Maro Polymer Online, Hanser-Gardner, Rapra Technology and Technomics). See some recommendations for books and other information products like patent and industry information available through the site. We also feature "Post a Question". Over the last few months, we have received excellent questions and encourage you to challenge us with yours! Our mission is to bring together in one-place resources for

you, the plastic product development professional. We are working with our information partners to develop the best information resources for you. In addition, we continue to build our plastic application/case history database and welcome your input as to what you would like to see on the PolymerPlace site.

PolymerPlace.com is being developed by G.H. Associates a business development firm specializing in polymers, plastics and related industries. With over 20 years experience G.H. Associates offers commercial assessment of plastics technology, product introduction/positioning services including technical literature and case studies, market research and market channel analysis. Click on www.gh-associates.com for more information and to contact us. Learn how we can make your business development programs more effective. Also associated in the development of the site is Franklin International, LLC, a management consulting firm specializing in polymers and plastics.

FEATURE ARTICLE

The Medical Design and Manufacturing Show, Pacific Design and Plastec

January 8-10, 2001

We recently attended the Medical Design and Manufacturing, Pacific Design and Plastec shows held concurrently January 8-10,2001 in Anaheim, CA. The shows are sponsored and organized by Canon Communications. We have been attending this show along with East Coast version for over 5 years. We feel this is an excellent show for anyone involved heavily in products using plastics. It is a showcase for a broad cross-section of technology platforms in Plastics, materials, processing, finishing and decorating. This year a plastics processing show (Plastec) was added.

With 1700 exhibitors and more than 20,000 attendees we are seeing more custom plastic processors and added-value material suppliers participating as exhibitors. Another interesting addition/feature was that pre-registered conference attendees were invited to e-mail the speakers about specific topics they would like to see addressed. This increased the interactivity of speakers and attendees before, during and possibly after the event.

Some of the highlights from a PolymerPlace perspective:

Materials:

- Exxon-Mobil (TX) unveiled a nucleated metallocene polypropylene designed for dimensional accuracy, stability and extremely low extractables. Potential applications include contact lens casting cups, lens packages and diagnostic cuvettes.
- Foster Corporation (CT) introduced low-friction thermoplastic polyurethane compounds.
- Delphi Technologies (MI), the technology subsidiary of Delphi Automotive Systems Corp., is licensing a flame and thermal resistant material for possible aircraft, construction and transportation applications. A blend of high-density polyethylene and chlorinated PE with fire retardants and stabilizers, the material off-gases and forms a ceramic type char, which becomes the thermal barrier.
- Precision Extrusion Inc. (NY) a manufacturer of close tolerance tubing now includes Liquid Crystal Polymer (LCP) tubing. Applications include endoscopic, laproscopic and urological instruments.

- RTP Company displayed a glass-reinforced polyethersulfone for Aladdin Temprite's Insul-Plus™ base-the first of its kind constructed from high-impact thermoplastic for superb performance and durability. The glass fiber reinforced compound meets critical color matches to partner with other food service items. The material has a 410°F heat deflection temperature at 264 psi, plus FDA and NSF approvals.

Secondary processing

- Photon welding machines (Quantum Group-San Diego, CA) can be used with Plastics that are considered difficult to weld including those that are used for food and medical storage and are not amenable to adhesives.
- TTIR- through transmission infrared-welding was exhibited by the Edison Welding Institute- more details under our Medical section.
- Laser Marking Technologies manufactures compact Lasers Sources and Laser Marking Systems. The equipment is designed for OEM and end-users that want to permanently mark plastics without contact.

Tooling

- Rapid prototyper, Polymer Technology Corporation, announced the debut of it's proprietary "X-PCT" Express Plastics Components Technology enabling delivery of low volume prototype injection molded parts within 7-21 days in aluminum or steel tooling.

POLYMER MARKET TRENDS

Transportation

Advanced Elastomer Systems (www.aestpe.com) has now developed a thermoplastic vulcanizate (TPV) Santoprene® 7028 that targets the "boot" that protects
the auto transmission's constant velocity joint and contains its grease.
According to Sajid Shah, an automotive program manager for Advanced Elastomer, a European OEM has picked 7028 for the CVJ boots on its latest 4WD transmission. Traditionally made from thermoset rubbers or copolyesters, CVJ boots require a material with resistance to abrasion, low temperatures, fatigue, and grease. At 40 Shore D, 7028 occupies the hard side of AES' 7000 Series, a family of olefinic thermoplastic elastomers that withstand temperatures as low as -80C with dynamic compression recovery down to -40C. The grade also exhibits excellent compression set values. Santoprene 7028 may also help reduce part weights. AES estimates that 7028 produces CVJ boots that weigh at least 20% less than those made from previous elastomers.

Medical

Color-coding of medical instruments can help operating personnel identify surgical instruments quickly. LNP, a well-known specialty compounder predicts that an increasing number of devices will appear this year in vibrant colors. LNP displayed a collection of surgical instrument handles molded in greens, purples, blues and yellows at the recent MDM West show in Anaheim, CA. Most have been made from polysulfone (PSO), which withstands common sterilization methods. LNP has developed a rainbow of color formulations for the material after over the past year after forming a partnership with PSO supplier BPAmoco Polymers (Alpharetta, GA).

Beyond traditional color technologies, phosphorescent materials, including a new LNP variety that glows for up to 12 hours, will be used in buttons and indicators on

medical devices that are used in dark or limited vision conditions. LNP also reports that some
device manufacturers are looking at thermochromic compounds, which change color when exposed to heat. With safety in mind, one likely application will be a stick that changes color when immersed in a fluid that exceeds body temperature. Another application uses thermochromic materials to provide a visual indication of when an electrical connector on a medical device has become too hot. For more information on Colorcomp engineering thermoplastics, check out http://www.lnp.com.

First developed for automotive applications a decade ago, TTIR (through-transmission infrared welding) has only recently started to make its way into medical applications as manufacturers look for alternatives to PVC, which has traditionally been joined with solvent bonding or radio-frequency welding. TTIR joins plastics by transmitting IR energy through one layer of plastic and absorbing it at the surface of an adjoining layer. Heat generation at the interface melts to the transparent polymer. According to the Edison Welding Institute in Columbus Ohio, the weld strength from TTIR equals that of unfilled parent materials, while welds on filled materials exhibit about 65 to 70% the strength of the parent materials. A number of plastics-including polyolefins, PTFE, and nylons-have the IR transparency that TTIR requires. For more information contact: Ewi@ewi.org.

Teknor Apex has introduced new film grades of TPEs (Thermoplastic Elastomers) which are processable in conventional blown or cast-film extrusion systems. These offer a potentially higher rate of production than latex, which is manufactured from a liquid suspension of thermoset rubber and requires curing or vulcanization. In addition these new TPEs can be colored to virtually any color enabling product differentiation, color-coding, or simply a better, brighter appearance. The compounds are in commercial use for bands and straps used in physical therapy. Other potential applications include gowns, drapes, gloves and liners for hygiene products. For more information contacttpe@teknorapex.com

Consumer/ Packaging

Independent laboratory testing performed by the globally respected Hohenstein research Institute demonstrated that plaited fabric made from Cargill Dow's NatureWorks™PLA and cotton performs better than plaited polyester/cotton fabric. The testing focused on sporting and active wear conditions, and the results concluded that wearers of fabric made from NatureWorks™ and cotton will experience improved physiological comfort versus the polyester/cotton faced fabric. Details from the testing can be found on Cargill Dow's website: www.cdpoly.com. The PLA fiber appears to bridge the gap between natural fibers and synthetic. The fiber allows the creation of products with superior hand and touch, drape, comfort, moisture management, UV resistance and resilience. Cargill Dow is working closely with industry leaders and brand name customers to have products made from NatureWorks fibers available as early as this fall. Applications include apparel fabrics made from 100 percent PLA fiber as well as blends with wool, silk and cotton. Non-apparel applications include carpet tiles, fiberfill, industrial fabrics and home furnishings.

Electronics/business machines

Transparent Vu-Stat™ C-37 static dissipative acrylic multipolymer compound from CYRO Industries provides permanent ESD protection to static discharge-sensitive electronic parts. Vu-Stat C-37 compound was formerly known as CLEARSTAT C-37 electrostatic dissipative acrylic-based multipolymer compound. Specifically developed for injection molded applications, Vu-Stat C-37 compound demonstrates superior ESD characteristics and an excellent balance of mechanical, thermal, and flow properties. The material retains permanent static dissipative protection even after repeated washing and is not dependent on humidity for its excellent ESD characteristics. This transparent compound provides 80 percent light transmittance in standard 1/8-inch thicknesses. Vu-Stat C-37 compound is ideal for use in the packaging and transportation of electronic components as well as computer hard drives, clean room instruments, business machines (rollers and access doors) where it prevents static build-up of dirt particles, and medical applications where electronic discharge around combustible gas is an issue. Available in pellet-form, Vu-Stat C-37 compound processes at typical acrylic multipolymer conditions in all types of injection molding presses.

NEW POLYMER DEVELOPMENTS

A new grade of NAS styrene acrylic co-polymer specifically designed for medical applications was introduced recently by NOVA Chemicals. Designated NAS 90, the new co-polymer has a good balance of physical properties, is more cost effective than acrylic, provides the same sparkling clarity, and demonstrates equivalent resistance to alcohol, blood and lipids.

NAS processes like polystyrene but has strength and clarity similar to acrylic. Nova Chemicals claims that NAS copolymers yield more parts per hour with lower energy costs, due to lower processing temperatures and shorter cycle times.

NAS co-polymers are FDA compliant, meet USP Class VI specifications and can be sterilized by both gamma and ethylene oxide. NAS co-polymers are adaptable to tooling designed for many other resins including acrylic, vinyl and polycarbonate. Possible medical applications include respiratory valves, yankauer suction tubes and urine meters. For more information contact: http://www.novachem.com/.

NEW PROCESS DEVELOPMENTS

In past issues we have reported on the Mucell microcellular foam process being embraced in injection molding and extrusion applications. We have been hoping to share a commercial application; there are now two that we are aware of…

Arburg is using the Mucell process to manufacture a vibration dampener resulting in 25% reduction in cycle time, 27% less material and 25% less warpage in the part. Another case is on a Nylon 6/6 intake manifold gasket. Here Mucell reduced part warpage and reduced weight 26% while retaining 96 % part stiffness and 50% lower cycle time. Trexel, the company who is commercializing the Mucell process, is working on a turnkey program for extrusion blow-molded (high density polyethylene) bottles for packaging shampoo and household, industrial and chemical products. We understand they will be introducing this technology at ANTEC (the annual technical meeting of the Society of Plastics Engineers) in Dallas,TX in May.

Canadian thermoforming equipment manufacturer, G.N.Plastics Co. Ltd. of Chester, Nova Scotia, recently extended its product offering with a deep-drawn, plug-assist thermoforming machine. This new piece of equipment is based on technology recently acquired from a small German manufacturer. The machine is well suited for entry-level thermoformers.

SPECIAL TECHNOLOGY DEVELOPMENTS

Tooling

Product developer Herbst Lazar Bell Inc. recently acquired an operation from Moll Industries Inc. This operation was the West Coast (Lake Forest, CA.) location of Compression Inc., which was acquired by Moll Industries in 1999.

Compression was a product development firm that had grown quickly but ran into financial difficulties. Moll will keep the other two product design and development centers because they are located closer to Moll Industries manufacturing plants.

The California site offers industrial design, rapid prototyping and mechanical engineering. Equipment includes two stereolithography units, a selective laser sintering machine and a three-dimensional laser-digitizing scanner.

Herbst Lazar Bell began prototyping at its Chicago facility in 1964 and extended its capabilities in 1998 when it acquired a rapid prototyping firm, Centerline Models in 1998.

This underscores a theme that we have covered in recent newsletters, i.e. adding value upfront with specialized design and engineering services is becoming increasingly important to the product development process.

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