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PolymerPlace Notes

A plastics technology newsletter

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- A new 16-page Engineering Adhesive Solutions Guide
- Laser welding is a viable alternative to more-conventional methods for joining plastics,

What's New at Polymerplace.com

This past month we attended the Plastics News Executive Forum and the MDM West Show in Anaheim. We also attended the SPE (Society of Plastics Engineers) Polyolefins conference in Houston. All three events were well-attended despite a continued slow economy. We think that this improvement in attendance supports our observation that plastics related businesses have done

what they can do to take costs out and now are getting back to focusing on the growth of their businesses.

Please contact us at **info@polymerplace.com** to learn more about how we can help you grow your business in these uncertain times…

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FEATURE STORY

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/exec/obidos/tg/detail/-/1566768837/qid=1040144616/sr=1-17/ref=sr_1_17/002-3995936-1536861?v=glance&s=books.**

We've been showing highlights from each chapter in our monthly newsletters. This issue will cover Chapter Three – *Technologies and Markets Shape How a Business Is Run.* This chapter first describes how the technologies involved with types of materials produced dictate the organization and culture of a company, as do the technologies involved with types and sizes of processing machines. For example, PVC manufacturers need to run their businesses very differently than do PEEK manufacturers, because the scale of these two types of business varies immensely, one from each other. Similarly, processors with 2500 ton clamp molding machines are more likely to be serving automotive markets than are processors with 50 ton clamp machines (who, in turn, are more likely to be serving electrical/electronic markets). Other elements of the use and application of valuable technology include patents, trade secrets, and licenses. How to incorporate environmental and regulatory matters successfully into running a business is described.

Finally, the chapter describes the major markets for plastics and shows how the demands for successfully competing in them differ from one to another. The markets include packaging, construction, automotive, electrical/electronic, consumer goods, industrial components/semi-finished shapes, medical, and aerospace/military.

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One of our information partners, Maro Polymer Notes, regularly reviews patents that have been recently issued and selects those related to polymer developments. This tool is an excellent research tool. You can learn about trends and issues in a specific process, material or market. The following is a cross-section of patents from the 194 Maro selected from the 2968 most recently issues patents.

194. 6,510,059
Conductive resin, electronic module using conductive resin, and method of manufacturing electronic module

190. 6,509,441
Modified polymer and modified polymer membranes

189. 6,509,440
ALIPHATIC COPOLYMER, PRODUCTION PROCESS, ALIPHATIC POLYESTER RESIN COMPOSITION, VARIOUS USES, COATING COMPOSITION, AND AGRICULTURAL OR HORTICULTURAL PARTICULATE COMPOSITION COMPRISING DEGRADABLE COATING FILM

188. 6,509,439
Process for the production of polyamides from dinitriles and diamines

186. 6,509,436
Oxygen scavenging condensation copolymers for bottles and packaging articles

180. 6,509,430
Coating agent composition and composite film

171. 6,509,421
Flame retardant resin compositions

169. 6,509,419
Chemically modified polyethylene oxide compositions with improved environmental stability

162. 6,509,412
Soft gel compatibilized polymer compound for high temperature use

161. 6,509,411
Aqueous electrodeposition coating, the production and use thereof

160. 6,509,410
Aqueous coating composition for golf ball and golf ball using the same

158. 6,509,408
Aqueous cross-linkable binder composition and coating, lacquer or sealing composition comprising such a binder composition

157. 6,509,407
Electrodepositable coating compositions comprising amine salt group-containing polymers prepared by atom transfer radical polymerization

156. 6,509,406
Plastic molding materials which can be detected by X-ray contrast

There are over 20000 patent links on the website.**http://www.maropolymeronline.com**

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POLYMER MARKETS

Medical Devices

An agreement signed this month by Teknor Apex and polyvinyl chloride (PVC) manufacturer VESTOLIT GmbH & Co. KG grants Teknor Apex exclusive worldwide rights to develop and produce vinyl compounds based on new copolymers with blood clot-preventing molecules incorporated directly into the PVC polymer backbone. This development was announced by Teknor Apex, Vinyl Division, during MD&M West.

In tubing, catheters, extracorporeal circuits, and other medical devices, the compounds will provide substantial cost-performance advantages over the anti-clotting (anti-thrombogenic) coatings currently applied to the inner surfaces of such devices.

Unlike standard anti-thrombogenic coatings, the bioactive components in VESTOLIT resins are permanently affixed to the PVC backbone and are non-extractable, according to Peter M. Galland, industry manager for Teknor Apex. "While compounds based on these specialized copolymers will cost more than standard medical-grade vinyl, device manufacturers can minimize costs by co-extruding the compounds onto standard vinyl in thin layers. As a result of limiting the bio-active compound to a thin inner layer and allowing the bulk of the wall of the device to consist of conventional medical PVC, the overall material cost will rise by less than the added cost of current coating methods."

The tendency of blood to clot or coagulate when it contacts foreign objects poses a problem in procedures like open heart surgery, dialysis, platelet collection, wound drainage, and insertion of catheters into arteries and veins. The bioactive components of the copolymers developed by VESTOLIT simulate the anti-thrombogenic messages generated in the lining of blood vessels by the naturally occurring substance heparin.

Under the agreement with VESTOLIT, Teknor Apex has acquired world-wide rights to use the new PVC resins in vinyl compounds and to market them as Teknor Apex products. Teknor Apex expects to have anti-thrombogenic compounds ready for commercialization in about two years.

For more information, call: 1-401-725-8000 or visit the website at **http://www.teknorapex.com**.

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Transportation

Hadady Corporation, a leading supplier to the railroad and mass-transit industries, has introduced a broad line of high-performance nylon railroad components manufactured from Nylatron® shapes.

Railroad trucks, also called bogies and undercarriages, are a niche market for Hadady. The company focuses on providing its customers with one-stop shopping of replacement parts. At present, Hadady markets everything found on truck assemblies, including metal, rubber, and polymer components.

The excellent toughness, low coefficient of friction and good abrasion resistance of Nylatron make it an ideal replacement for a wide variety of materials from metal to rubber. Using Nylatron reduces lubrication requirements, eliminates galling and corrosion, and improves wear-resistance and sound-dampening characteristics. Quadrant's Nylatron has a long history of outstanding service in a multitude of wear applications since its introduction over 50 years ago.

For more information about Hadady or their products, contact Gary Wagner at (708) 596-5168 or **wagnerg@hadadycorp.com**

POLYMER TRENDS AND DEVELOPMENTS

Resin pricing is going up…finally!

Several factors are influencing pricing of resins- the cost of raw materials are dramatically increasing, the threat of a war with Iraq, the oil supply crisis in Venezuela and plant shutdowns are creating an environment where resin producers can increase prices. In the polyolefins, pricing has not been at re-investment levels for three years. HDPE, LDPE and LLDPE have all gone up 5 cents since the beginning of January with another 6 cent price increase announced February 15th and probably another increase in March. Some customers have indicated there has been as much as a 16 cent increase since December of 2002. Experts feel that even if raw material prices stabilize and the Iraqi situation settles, the resin suppliers will not give back the raw material roll backs.

Polypropylene has also seen increases. There was an increase of 3 cents in January and 3 cents in February. Experts feel that there will be another price increase of 5 cents in April. Demand for polypropylene remains strong – some suppliers claim that the third quarter will be important to predict the year's performance. Consumers are losing confidence and there is concern there could be another dip in demand.

Polystyrene has had a 3 cent increase for January, 3 cents for February and 4 cents has been announced for March. Material has been relatively tight since the last quarter. Deltec in Troy Michigan has shutdown a 125 million pound plant which was announced last week. There is concern that there is some hedge buying by customers to get in before the price increases and this could be putting some additional strain on the market.

The engineering resin markets are also seeing efforts to raise prices. There has been an increase announced of 8-10 cents for polycarbonate since the first of the year and suppliers expect to get about half of that. ABS has been tight and raw materials have also seen dramatic increases thus suppliers have been able to pass price increases of about 5-8 cents. Nylon is in an oversupply situation so attempted price increases are not likely to stick.

Starting next month, we will include a resin supply and pricing update by Bill Kulhke of Kuhlke and Associates. Mr. Kuhlke's newsletter is currently available through our site. See:
http://www.polymerplace.com/articles/overviews_kuhlke.htm

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Designers and manufacturers who are looking for the clarity of polycarbonate with the high temperature resistance of polysulfone now have a new option, UDEL P-3700 HC, an extension of Solvay Advanced Polymers' UDEL polysulfone product line.

This near water white polysulfone product will be manufactured at Solvay Advanced Polymers' Marietta, Ohio, facility and available globally through the company's existing distribution channels, beginning March 1, 2003.

Solvay Advanced Polymers introduced UDEL P-3700 HC at two trade shows, PlastecWest, Feb. 19-21, 2003, in Anaheim, Calif., and National Manufacturing Week's National Design Engineering Show, March 3-6, 2003, in Chicago, Ill.

UDEL P-3700 HC offers near-water-white clarity, allowing flexibility in designs that require high clarity, low color, or a range of bright colors that was not possible previously with polysulfone.

Typical applications for this new polysulfone include food and beverage service and tableware, appliance components, dairy equipment, face shields, and lighting components such as lenses and covers for automotive or residential/commercial lighting where temperature requirements approach 300 degrees Fahrenheit (149 degrees Celsius).

UDEL polysulfone is a tough, rigid, high-strength and high-heat thermoplastic that maintains its properties at temperatures from - 150 degrees Fahrenheit to 300 degrees Fahrenheit (-101 degrees Celsius to 149 Celsius). The heat deflection temperature at 264 psi (1.82 MPa) is 345 degrees Fahrenheit (174 degrees Celsius).

Other key features of polysulfone include resistance to hydrolysis by hot water and resistance to acids and bases as well as resistance to a wide range of cleaners and disinfectants. It can be used in injection molding, sheet extrusion, film extrusion and thermoforming as well as blow molding. The resin also works well with post-processing steps such as ultrasonic bonding, spin welding, adhesive bonding and heat staking. In general, this resin complies with U.S. Food and Drug Administration (FDA) and European Economic Community (EEC) regulations concerning the use of plastics in direct food contact.

For further information please see **http://www.solvay.com** or Phone: 800.621.4557 (USA only) or +1.770.772.8200

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PROCESS RELATED DEVELOPMENTS

A new feature on the Metal Powder Industries Federation (MPIF) Web site will introduce you to the powder metal (P/M) story. A new video clip library has 10 short video clips covering various aspects of powder metallurgy, including metal injection molding, hot-isostatic pressing, and powder forging. Several clips are digitized animations that help viewers understand the general limits of the process and the mechanics of the compaction, metal-injection molding, and sintering processes. Click here to visit the library:

http://lists.newsforindustry.com/cgi-bin3/flo/y/ePfL0D46mk0CKg07sz0AC

To learn more about powder metal, visit MPIF's Design Information Center at:http://lists.newsforindustry.com/cgi-bin3/flo/y/ePfL0D46mk0CKg07s10Ax

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A new 16-page Engineering Adhesive Solutions Guide covers a broad range of adhesive chemistries and applications, and is designed to assist engineers specifying adhesives for product assembly.

The guide features adhesive data, including viscosity, gap fill, set times, and temperature ranges. It also includes process-related information, including handling, dispensing, fixturing, curing, and in-line testing, as well as information on specific markets such as medical devices and electric motors.

For a copy, visit Permabond's Web site or contact the company at 10 Finderne Ave., Bridgewater, N.J. 08807, (800) 653-6523, fax: (908) 575-7203.

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Laser welding is a viable alternative to more-conventional methods for joining plastics, and in recent years techniques have been developed to weld even clear materials. Manufacturing advances, including inkjet and tabletop dispensers, now make this a viable alternative in low and high-production applications.

In laser welding, a part absorbs electromagnetic energy and converts it to heat. However, plastics do not absorb near-infrared (NIR) light, so NIR lasers normally pass directly through them. In the past, the most common method to laser-weld polymers had been to disperse carbon black throughout the bottom substrate. It absorbs light near the interface and generates enough heat to produce welds. Unfortunately, this renders the plastic opaque.

The Clearweld process, on the other hand, lets lasers weld clear plastics without opaque colors or additives. The key is a series of virtually colorless materials that absorb NIR radiation. A thin layer of Clearweld liquid on the plastic joint concentrates laser energy at the interface. The material absorbs light, produces a localized melt of the substrates, and creates an instant weld requiring no cure time and with no particulates or visible color. Invented by TWI, a U.K.-based R & D organization, the system is available from **Gentex**, Carbondale, Pa. (**http://www.gentexcorp.com**).

Gentex partnered with several manufacturers to meet these requirements. **EFD**, East Providence, R.I. (**http://www.efd-inc.com**), for example, makes tabletop systems that accurately and repeatedly dispense Clearweld liquids. The machines can be configured to meet a wide range of manufacturing processes.

A dispensing system based on commercial piezoelectric-inkjet printing technology is available from **Xennia**, Royston, Hertfordshire, U.K., (**http://www.xennia.com**). The system integrates into a variety of industrial processes and production lines for higher-volume applications.

Laser welding produces bonds stronger than the parent material, at processing speeds that equal or exceed other joining techniques. The process is suitable for a range of materials, such as ABS, PEEK, polyurethane, and polyester.

Welding dissimilar materials and some thermosets is also possible. Applications include medical products, packaging, automotive components, consumer products, electronics, and textiles.

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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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