High technology elastomers – casting a wider net

Resin technology helps win innovation award
Opening the way to a more energy efficient future
PU roof tiles used to battle the elements
Long-lasting bonds in the engineered wood market
Strengthening our differentiated elastomer products offer

Tony Hankins, President, Huntsman Polyurethanes

At Huntsman Polyurethanes we have a strategic focus on building our downstream footprint and capabilities, to better provide the innovative, differentiated products and solutions that our customers need. Our most recent acquisition, Tecnoelastomeri S.r.l., is celebrating its first anniversary as a part of the Huntsman ‘family’ and this issue of PU Review features an interview (pages 6 to 8) with Dr. Alessandro Gramellini, Global Business Director of the Business.

Tecnoelastomeri is a highly regarded manufacturer of MDI-based hot-cast elastomer systems and processing machines that was founded in 1985 by Dr. Gramellini’s father, Ermes, and is based in Modena, Italy. Its high technology elastomer systems – marketed under the TECNOTHANE™ brand – are used to create a wide variety of industrial applications, including bumper pads, coated conveyor belts, gears, rollers and wheels – which are used in the automotive, rail, oil and gas, mining and steel industries, among others.

The addition of Tecnoelastomeri’s highly experienced team to our Polyurethanes business has significantly strengthened our offer to the growing, downstream hot-cast elastomer markets globally. Together with our innovative thermoplastic polyurethane (TPU) product range, we now have the largest portfolio of polyurethane elastomers that are based on MDI technology.

If you’re visiting Utech Asia in Shanghai this August, or the K trade fair in Dusseldorf in October, Huntsman Tecnoelastomeri will be there, together with the rest of our team. So please come visit our booth – we’d love to talk to you!

Huntsman extends cooperation with Azelis

Huntsman has extended the scope of its working relationship with Azelis – one of its distribution partners. Under the terms of a new agreement, Azelis is now supplying key polyurethane products and systems from Huntsman’s adhesives, coatings and elastomers (ACE) range throughout Eastern Europe.

The deal builds on a prior arrangement between the two companies, which covered France, Benelux, Germany and Austria. The new countries added include Poland, Czech Republic, Slovakia, Hungary, Bulgaria, Romania, Croatia, Serbia, Bosnia, Moldavia and Albania.

Previously, Huntsman supplied customers in these countries direct. However, with demand for its ACE chemistries growing in these markets, the team decided it was the right time to hand distribution to a trusted partner. Products covered by the new agreement include some of Huntsman’s core polyurethane chemistries, such as SUPRASEC® MDI, as well as related products and crosslinking technologies for industrial adhesive applications.

Johan Van Tongelen, Commercial Director at Huntsman Polyurethanes, said: “The time is right to grow our ACE business in East Europe, and working with an experienced distributor is the best way to achieve this. We know that many of our customers value the extra flexibility that comes from sourcing products via a third party. One of the main advantages is access to a range of complementary products. We’ve worked with Azelis since 1993 and know this will continue to be a fruitful partnership with benefits for all concerned.”

Azelis has recently made a series of investments at its technical center in Sankt Augustin, Germany – a move that will help companies sourcing Huntsman’s polyurethane products through the business. At the site near Cologne, Azelis has expanded the capabilities of its coatings application laboratory, which contains equipment dedicated to the formulation of coatings and the testing of polyurethanes for thin-layered elastomer applications. Azelis has also hired additional skilled commercial staff to sell the specialty chemicals it distributes.

For formulators purchasing Huntsman products from Azelis, the investment in additional technical equipment will have a number of advantages. With the latest machinery on hand, Azelis will be able to test products and systems on behalf of customers – helping to cut costs, simplify decision-making and reduce time to market. There will also be synergies for suppliers of polyols and additives using MDI-based products from Huntsman to create specialist coatings.

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Resin technology helps Bright Lite Structures win Innovation Award

Huntsman's VITROX® resin technology helped Bright Lite Structures win a prestigious industry award at the 2015 Society of Plastics Engineers (SPE) Automotive Composites Conference & Exhibition (ACCE). The event took place in September in Michigan. Bright Lite Structures took home the ‘Most Innovative Composites Part’ award in the Materials Innovation category for its Zenos E10 sports car chassis.

The chassis is based on a patent-pending, structural carbon fiber composite system that is lighter, more versatile, less expensive and faster to manufacture than conventional composite fibers. The system uses Huntsman’s VITROX resin technology.

The chassis is made from a novel sandwich construction with a thin layer of recycled and virgin carbon fiber and a central core of recycled plastic honeycomb. Huntsman’s VITROX resin system and automotive resin transfer molding (RTM)-grade epoxy are used to form the skins and bond these elements to the plastic honeycomb core.

The chassis manufacturing process is capable of molding complex, deep draw designs in one step. Normally, this would not be possible without complex and expensive pre-forming and a significantly larger capital expenditure. Huntsman’s VITROX resin system has been designed to have a low, stable initial viscosity with minimal viscosity increase; followed by a tunable induction period; and then a full, snap cure. This reaction behaviour enables long working times in the fabrication of large parts for automotive and other applications. At the same time, the VITROX resin system maintains the high physical property performance and impact strength for which polyurethane composite resin systems are renowned.

Antony Dodworth, Chief Technology and Manufacturing Officer at Bright Lite Structures, said: “This award would not have been possible if Huntsman had not supported and encouraged individual staff to work with Bright Lite Structures to develop a better composite fiber solution that addresses many of the drawbacks of conventional carbon fiber.”

This accolade is the second award for Huntsman’s VITROX resin technology, which received the Center for the Polyurethanes Industry’s (CPI) Polyurethane Innovation Award in 2012 for a cure-in-place pipe (CIPP) application.

The mission of SPE ACCE is to inform and update the automotive industry about the increasing significance of thermoset and thermoplastic composites in passenger vehicles, light trucks and other modes of ground transportation.

New web channel for ordering online

Huntsman has launched a new web channel to make it easier for customers to order its polyurethane products and systems online.

ECHO, which stands for Energizing Customers for Huntsman Online, is an e-commerce platform that enables customers to order what they need quickly and efficiently, 24 hours-a-day, seven days-a-week. Customers can use ECHO to place new orders and reorder products; review order history; check invoice details and status; preview and download documents (delivery notes, invoices, certificates of analysis and safety data sheets) and keep up-to-date with the latest Huntsman news.

ECHO was created to give Huntsman customers additional channels and self-service options to use when they want, and during times when Huntsman customer service representative may not be available. ECHO is accessible via an iPad®, iPhone® or other mobile devices.

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Working together, Huntsman, the Shanghai Collodin Material Science & Technology Development Co., Ltd., and Owens Corning, developed TICO PUR Energy-Efficient Window and Door System – an airtight, wind-resistant frame that can reduce heat loss by up to 18% compared to traditional aluminium or PVC models with metal stiffeners.

Designed in response to China’s prioritization of energy efficiency and sustainable development, TICO products are manufactured using an innovative pultrusion continuous molding process, which employs Huntsman’s polyurethane chemistry.

During production, fibers are reinforced through saturation with a liquid polymer resin. They are then carefully formed and pulled through a heated dye. The resin used in the pultrusion process is a two-component system based on Huntsman’s RIMLINE® polyol blend and SUPRASEC® MDI isocyanate. This special combination delivers excellent wetting characteristics, accelerated line speeds and low pull forces. The resulting resin system is well suited for structural profiles in demanding applications where superior strength and durability are required.

Sun Shenggen, President of the Shanghai Collodin Material Science & Technology Development Co. Ltd., said: “In addition to the high material performance and ease of processing delivered by Huntsman's resin system, the technical input and set-up assistance provided by the company was key – enabling us to continuously pultrude the complex, multi-mandrel TICO window lineals.”

Enshan Sheng, Director of Huntsman’s Asia Technology Center in Shanghai, said: “Heat loss through windows and doors accounts for around half of a building’s energy consumption. Chinese authorities estimate that upgrading to more energy efficient models could save around 420 million tons of coal per year – 10% of the nation’s annual output. This would represent a major step forward in China’s efforts to save energy and reduce air pollution. We are honored that our efforts with Shanghai Collodin and Owens Corning have been recognized by Shanghai’s municipal government and its associates.”

The ‘Best Innovation Practices’ awards are part of the Shanghai Municipal Government’s efforts to turn the city into an international science and technology hub. The awards program took place on October 22, 2015, and was sponsored by the Information Office of Shanghai Municipal Government, Shanghai Municipal Commission of Commerce and media outlets Shanghai Daily and EastDay.com.

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Equivalent of nearly one billion plastic bottles recycled into TEROL polyols line

As part of its commitment to sustainability, Huntsman tries to incorporate as much pre-consumer, post-consumer and renewable plastic content as possible into its TEROL aromatic polyester polyols manufacturing line in Houston, Texas.

Latest figures from the business show that in 2015 Huntsman recycled the equivalent of nearly one billion 500ml polyethylene terephthalate (PET) plastic water bottles at the plant.

According to Stanford University it takes, on average, 76% less energy to produce a product from recycled plastic than from raw materials – so using recycled content is a smart business decision, as well as environmentally responsible.

Les Yamato, Business Manager for TEROL Polyls at Huntsman, said: “Wherever possible we try to use polyurethane raw materials that contain recycled and renewable content. By incorporating recycled components into our TEROL polyols line we are doing our bit for the planet and contributing to the creation of more sustainable products. We are also meeting the purchasing protocols of our customers, who want to design their products confident in the knowledge that they contain recycled raw materials.”

PET is one of the world’s most widely produced plastics. It is used in fibers for textiles, bottles for drinks, films for packaging and other industrial and consumer uses. Any form of PET can be used for the manufacture of aromatic polyester polyols via the trans-esterification process. The most common sources are virgin, post-industrial scraps from extrusion applications, and post-consumer scraps from the recycling of bottles obtained from municipal collection.
PU Review (PU R): Thanks for showing us around today. Can you start off by telling the readers of PU Review what Tecnoelastomeri produces here in Modena?
Alessandro Gramellini (AG): Of course. Basically there are two core elements to our business. We produce high technology elastomer systems. From these materials it is possible to create a variety of everyday industrial items, such as wheels, rollers, seals and general technical parts. We also produce a range of CASTECH™ machines that can be used to efficiently cast compact polyurethane elastomers and microcellular elastomer foams from all types of isocyanate and chain extender combinations – including our own systems.
PU R: Where are your elastomers used?
AG: Think of any industrial application and it’s likely that you’ll find a high technology elastomer in use somewhere within it. Typically, our elastomers are used in heavy-duty projects, where there is a need for rugged, durable materials for example, in mining or offshore environments. They are also used in robotic and hydraulic equipment. We also produce materials for the automotive industry, where there is a need for components that are tough enough to withstand extreme under-the-hood conditions, such as the presence of heat, oil, grease and friction. There are many other uses for our hot-cast elastomer systems too. With more than 1,000 different formulation options available there is a solution for almost every kind of polyurethane elastomer project. Our job is to work with individual customers to identify their requirements and then recommend or tailor make a polymer that’s best suited to their needs.
PU R: How long has Tecnoelastomeri been in business?
AG: Tecnoelastomeri has been active in the MDI elastomer market since 1985 when my father founded the company. Initially, our focus was on the development of bespoke polyurethane systems that we marketed under the TECNOTHANE™ brand – but over the years our offering has grown. Today, alongside TECNOTHANE, we also produce CASTECH machines. Together, these elements create a complete technology solution for producing hot-cast elastomers. Our work begins with scientific and technical discussions with customers to agree specific elastomer material requirements. We then move on to cover equipment decisions, plant set up and actual manufacturing.

In June 2015, Huntsman announced the acquisition of its latest system house, Tecnoelastomeri – one of the world’s leading manufacturers and marketers of MDI-based hot-cast elastomer systems and processing machines. For this edition of PU Review, the editorial team travelled to Modena, Italy to find out more about the business. Alessandro Gramellini, who heads up Tecnoelastomeri, took us on a tour of the facility, and explained more about the company and what lays ahead now it is part of a global corporation.
PU R: When did the business start producing CASTECH machines?
AG: We branched out with the development of CASTECH machines in 2002. After many years in the industry, we saw a gap in the market and knew there was an opportunity to create a better kind of casting machine. Using our knowledge of elastomer properties, we designed a piece of equipment that would work in complete harmony with our TECNOTHANE MDI systems – getting the very best out of the material. Naturally, we were careful to also design a solution that would be compatible with TDI, NDI and other polyurethane platform technologies, including technical foam.

PU R: How are your CASTECH machines different to others available?
AG: CASTECH machines were developed using 30 years of chemical and material know-how and as a result are one of the most advanced equipment options available for the efficient manufacture of elastomers. Many things set our machines apart from the competition. First and foremost, there is the flexibility that comes with a machine arm that can extend up to two meters in length. This makes it possible to cast directly in an oven, which can lead to productivity improvements. Then there is the fact that CASTECH machines offer very high levels of accuracy; typically a dosing precision of 0.3%. They also have excellent shot strength – making it possible to single cast high quality elastomers successively and accurately with virtually no waste. Furthermore, our machines are very easy to operate and look after. Less maintenance is required thanks to the unique design of the CASTECH mixing head gasket. In addition, a clever automated system removes the need to recalibrate the machine when the hardness of a material is changed.

PU R: What differentiates your elastomer materials from other solutions available?
AG: In short, it is the breadth of our offering and our business model that are different. Offering expertise in MDI systems, machinery and elastomer parts makes us unique – no one else provides this full end-to-end package.

PU R: How do the elastomer systems that Tecnoelastomeri produces differ from the TPU materials that Huntsman has been manufacturing for many years?
AG: Following the acquisition of Tecnoelastomeri, Huntsman now offers one of largest portfolios of polyurethane elastomers based on MDI technology. The range includes our TECNOTHANE MDI systems and Huntsman’s IROGRAN® TPU. These materials are often sold in the same markets and we have many customers that use both materials – but there are clear differences between the product lines, which are actually complementary.

Customers typically begin new projects with cast MDI systems. The cost of molds and the effectiveness of machines is better when low production numbers are involved. Once a part’s design has been tried and tested, and larger volumes are required, some customers decide to switch to TPU. Between 15,000 and 20,000 pieces, TPU becomes more cost effective. Another important parameter is part size.

Over a certain weight there are clear material decisions to be made. In general, it is always advantageous to create small, thin parts using TPU. Whereas, the manufacture of very big, thick parts is typically more suited to cast MDI systems. Moving forward, we’ve made the decision to offer products from both ranges to our customers. As and when an opportunity arises, and depending on their requirements, the relevant sales teams will liaise with the customer to validate specifics and move the project forwards.

Huntsman now offers one of the largest portfolios of polyurethane elastomers based on MDI technology.
Using high technology elastomer systems it’s possible to create a variety of everyday industrial items.

**PU R:** Is there a big market for high technology elastomers?
**AG:** Yes. At present, the majority of our business originates from central and northern Europe, but there is also a growing market in China and South Korea. As part of Huntsman’s global operations, we are now looking at ways to expand the distribution of our materials and machines in North and South America, in Australia and in other APAC countries, such as Malaysia.

**PU R:** How many CASTECH machines have been produced since 2002? And where are they in use?
**AG:** To date, we’ve produced around 100 machines, which are being used in multiple countries across Europe, as well as in Turkey, Russia, China and South Korea.

**PU R:** What kind of equipment do you have here in Modena?
**AG:** Modena is the home of Tecnoelastomeri and is our technical headquarters. Here, we produce our TECNOTHANE MDI systems using several reactors with up to 12 tes capacity. Our total capacity is around 10ktes per year. In Modena, we also have our CASTECH machine department where we can produce up to twenty machines per year; and our elastomer department, where we can produce any kind of elastomer part. This department has the most direct interaction with customers. Some want small batches of product. Others may come to us for advice on setting up a new production line or developing an elastomer for pre-marketing.

**PU R:** How many people work on site in Modena?
**AG:** At present, around 40 people are employed in Modena – almost half of who have a technical background.

**PU R:** Day to day, what has changed since the business became part of Huntsman?
**AG:** When it comes to the production of our products, very little has changed since Huntsman acquired us. We remain committed to the manufacture of high technology elastomers and we continue to offer end-to-end support to our customers – working with them to explore ideas for new elastomer applications and produce materials for specific projects. The biggest change is that we now have a much bigger network of scientists and polyurethane experts to draw upon. This significantly boosts our capabilities – enabling us to produce our TECNOTHANE polyurethane systems in other parts of the world. There is also a bigger Huntsman networking and sales force to increase awareness of our products and the number of projects we are involved in. Furthermore, we have greater access to raw materials and the economies of scale and buying power that comes from being part of a global corporation.

**PU R:** What lies ahead for the Huntsman Tecnoelastomeri business in 2016?
**AG:** There are some exciting projects in the pipeline in the year ahead including an initiative with RÄDER-VOGEL (see opposite) to create outsize elastomer wheels for use in heavy-duty construction, foundry and mining equipment. In collaboration with Huntsman’s global R&D centers, we are also busy improving MDI system processability to facilitate our customers moving from TDI-Mboca to MDI systems in offshore, mining, automotive and railway applications. There will be more news on these developments at K2016 in October – where we’ll be exhibiting alongside the Huntsman TPU team.
After consulting Huntsman Tecnoelastomeri about the best materials to use to supersize its range, RÄDER-VOGEL is now offering its customers tailor-made wheels with a diameter of more than 1500 mm. The wheels are being offered under RÄDER-VOGEL’s PEVOTEC® brand – an extensive family of wheels and castors designed for use in extreme operating conditions.

PEVOTEC wheels are based on TECNOTHANE hot-cast polyurethane MDI system from Tecnoelastomeri. Characterized by their flexibility, castors and wheels in the PEVOTEC range are renowned for their ability to carry heavy loads, even where mounting space is tight. Well equipped to handle extreme stress and temperature variations, they are ideal for heavy duty tasks. In the metal processing industry for example, they are used to transport hefty, dirty raw materials between heat furnaces and forging units.

The first extra-large PEVOTEC wheels developed by RÄDER-VOGEL are performing well. Customers putting them to good use include Dango & Dienenthal Maschinenbau GmbH – a leading manufacturer of machines for the filtration and processing of raw materials. RÄDER-VOGEL has created wheels for Dango & Dienenthal that have a diameter of 1450mm; a width of 500mm; and a load capacity of more than 50 tons. The wheels are used in forging manipulators. Offering trouble-free transportation, the wheels are coping with extreme stress and temperature challenges – consigning different types of damage, such as cracking or flattening, to the past.

Stefan Buch, Purchasing Manager at Dango & Dienenthal, said: “Thanks to PEVOTEC, we can ensure the highest performance for our machines. This in turn is helping us keep production losses to a minimum and increase customer satisfaction.”

Based on the market’s positive reaction to the launch of its new range of extra-large wheels, RÄDER-VOGEL is expecting further interest from companies across the mining industry and other sectors where the use of heavy duty equipment is essential.

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After years of general wear and tear, the aging PVC roof on Building One was approaching the end of its life. To protect the expensive equipment housed within its laboratories, and to obtain the highest levels of certification from insurers, Huntsman decided to completely replace the existing roof.

To modernize the L-shaped, 70,000-square-foot facility, Huntsman decided to utilize the very latest roofing material. A long-lasting thermoplastic polyolefin, UltraPly™ TPO roofing system from Firestone Building Products was chosen. Firestone is a long-term Huntsman customer and some of the components used in its TPO roof system were developed at HATC.

Peak Roofing Inc., a highly regarded Firestone contractor based in Houston, installed the roof system in 60 days. Throughout the project, Huntsman worked hand-in-hand with commercial property insurer FM Global to ensure the roof system exceeded requirements for wind class, R-value and other key building criteria. Following completion, FM Global awarded Huntsman the ‘Highly Protected Risk’ designation, which is given to facilities with a lower than normal probability of loss. The new energy efficient roof has an expected lifespan exceeding 20 years and has achieved a combined R-value of 21 – exceeding local, state and international energy codes. 

Installation of the new roof at HATC in The Woodlands.

TPO single-ply roofing membranes are among the fastest growing commercial roofing products and have gained broad industry acceptance, mainly for their performance and installation advantages.

**Long lasting and recyclable**

Huntsman was dedicated to selecting a material with a long lifespan, thereby reducing the roof’s environmental impact. TPO single-ply roofing membranes provide resistance to ultraviolet, ozone and chemical exposure, helping to ensure their longevity. In laboratory testing, Firestone UltraPly TPO lasted three times longer than PVC and 12.5% longer than its closest TPO competitor. Furthermore, TPO is recyclable.

**Increased indoor comfort**

The increased level of insulation and the highly reflective white TPO membrane can help lower roof temperatures, leading to greater indoor comfort. Firestone UltraPly TPO is ENERGY STAR® certified and many of the components of this roofing system contribute to points for LEED® certification.

**Low-maintenance**

Huntsman’s new roof is virtually maintenance-free and TPO is also less susceptible to the mold, mildew and discoloration that can affect PVC roofs.

Huntsman celebrated ten years of its Advanced Technology Center (HATC) in The Woodlands, Texas in 2015. To mark this milestone, the business made a number of improvements to the four facilities on campus, including the installation of a brand new polyurethane-based roof on one of its buildings.

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Cedar shake roofs are a hallmark of home design in the Western United States, lending a classic look to new construction projects. However, many municipalities in states, such as Colorado and California, have now outlawed the use of cedar roof tiles on residential properties due to the harsh environmental conditions those areas face.

In 1981, a U.S. Department of Agriculture study concluded that wood shake roofs were the single most influential factor in whether a house, caught in a wildfire, would survive. Fast-forward eight years to 1989, when the Los Angeles City Council outlawed the fitting of new wood-shingled roofs – becoming the first major city to veto this popular roofing material. In 2015, additional cities and counties undertook similar measures following a series of wildfires that wreaked havoc.

Faced with increasingly restrictive building codes, roofing companies across North America are searching for alternatives to traditional wooden tiles. For these organizations, new composite polyurethane materials offer a solution, providing greater durability and fire resistance, without sacrificing the aesthetic appeal of wood.

One company producing just such a substitute is Colorado Roofing Products, LLC., based outside Denver, Colorado. Assisted by Huntsman, the company has developed synthetic CeDUR™ roofing shakes that can stand up to wind, hail, snow, and of course, fire. Indistinguishable from natural cedar, and based on high-strength polyurethane, CeDUR shakes are incredibly durable – combining all the physical properties required for long-term performance with a natural looking elegance.

To create CeDUR shakes, molds are designed from a number of different natural cedar shingle parts. A formulated polyol blend and methylene diphenyl disocyanate (MDI) are then mixed together with a pigment and filler package and subsequently injection molded into the final shape. The resulting product looks like natural cedar, but is far more durable. Colorado Roofing Products offers a 50-year warranty on its synthetic cedar roofing tiles. The cedar composite has also earned a Class A fire rating from the International Code Council (ICC) and does not require a special fire-resistant underlay. Class A is the highest fire resistance rating ICC offers.

Composite shakes also offer a solution for homeowners worried about the impact of hail and wind. Significant hail events can cause less durable roofing materials to crack and give, representing a significant safety and cost risk. ICC has given CeDUR a Class 4 hail resistance rating – meaning it can stand up to the tough storms that often ravage states like Colorado. To achieve this rating – ICC’s highest – a material must be able to withstand damage from a two-inch steel ball being dropped from 20 feet on to multiple surface points. CeDUR shakes are also certified to resist wind speeds of up to 110 mph and absorb a minimal amount of water compared to other roofing materials. These factors give the composite shingles superior freeze/thaw cycle performance.

The response from homeowners to CeDUR shakes has been overwhelmingly positive, as the market for synthetic roof products continues to outpace growth in the overall roofing industry. As the sector evolves, consumers are looking for products that do not look like plastic. CeDUR is the most authentic representation of real cedar wood that is available on the market and comes with the highest toughness ratings in the industry.

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Louisiana-Pacific (LP) Building Products is one such company. A global leader in engineered wood products for framing, panel and siding applications, LP continually develops new solutions to help its customers improve their offering.

For over 30 years, Huntsman and LP have worked together to meet the evolving needs of builders and the construction industry. Supplying LP with RUBINATE® MDI binding systems, Huntsman has played an integral role in helping LP increase the performance of its composite wood products and keep up with building and energy codes, while maintaining the highest levels of product stewardship and sustainability.

From its Geismar manufacturing complex, Huntsman supplies MDI to all 16 LP OSB and siding mills throughout North and South America. Mark Hutnik, Senior Account Manager at Huntsman Polyurethanes, explains more.

Offering engineered wood products for a variety of applications, LP is committed to finding new ways to bring energy efficiency and fire resistance to its core wood strand technologies. Our job is to support these efforts. Over the years, we’ve fostered strong ties with personnel at all levels within LP – and helped create products that fulfill building industry needs. TechShield® is a great example of the innovative forward looking culture that exists at LP.

**Energy efficiency**

In response to market demand and U.S.-based energy codes, LP pioneered the category of radiant barrier sheathing with its TechShield product line. Designed to lower a home’s attic temperature by as much as 30 degrees Fahrenheit, TechShield works by blocking radiant heat in the roof panel. The product is made by laminating a thin piece of aluminum to the underside of OSB sheathing. The OSB found in TechShield uses Huntsman’s MDI (as an adhesive). TechShield sheathing can help residential homes lower Home Energy Rating System (HERS) scores and radiant barrier panels based on the technology have now been installed in more than 1.5 million homes in the United States.

**Fire protection**

Fire protection is another area of building codes that has seen dramatic change. To keep pace, LP has enhanced its wood sheathing technology so that it fits with more restrictive fire codes. LP’s FlameBlock® product line is focused on fire resistance and can be used in single-family, multi-family and commercial buildings. This Class A, flame spread rated, OSB sheathing, combines fire resistance and structural performance in a single panel. FlameBlock OSB sheathing provides a one- to two-hour fire wall assembly component in residential and commercial buildings, and has three times longer burn-through resistance than standard wood sheathing.

**Product stewardship**

While developing novel engineered wood systems, LP and Huntsman always prioritize protecting the environment and maintaining a safe working environment. Huntsman’s product stewardship activities begin well before its products arrive at LP’s manufacturing locations. Delivery vessels are maintained to the highest standards and training of selected carriers is provided. Mill personnel also receive training that encompasses Department of Transportation (DOT) requirements.

**Sustainability**

Sustainability is also important with both companies sharing a commitment to minimizing LP’s environmental footprint, LP is certified to the Sustainable Forestry Initiative® (SFI) Fiber Sourcing Standard which sets mandatory practice requirements for the responsible procurement of all fiber obtained directly from the forest and includes measures to enhance biodiversity. To give back to the environment, LP also invests in reforestation projects and helps landowners manage the acres of land and operations that produce its wood supply.

Ben Skoog, Vice President, Growth and Innovation, LP Building Products, said: “Huntsman works with us to upgrade our products and keep up with what builders want and need. This allows us to stay current in the market but better serve our customers too.”

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Clogs have long been associated with Dutch national identity and remain very popular in The Netherlands; both for work and leisure wear. A pioneer of innovative footwear manufacturing techniques, Gerla has evolved the traditional Dutch wooden clog, creating contemporary versions that comprise a wooden insert, polyurethane sole and leather upper. Gerla has been in business for more than 100 years and its updated take on the classic clog has attracted a loyal customer base, including Dutch royalty.

Gerla’s brief to Huntsman’s footwear team was to investigate how to improve the comfort of its clogs, especially for people wearing them all day. Lighter weight, good grip, shock absorbency and anti-slip properties combined with durability and visual appeal were all key requirements. Gerla was particularly interested in how the use of different soling materials, specifically polyether-based systems, could help achieve added performance benefits, including enhanced resistance to abrasion and water. In addition to Huntsman’s extensive portfolio of specialist polyurethane footwear products, Gerla also wanted to explore the technical support on offer from the chemical company at its European footwear development center in Belgium – including its capacity to manage product performance trials.

**Critiquing clog construction**

Taking a collaborative approach to the project, Huntsman worked closely with Gerla to analyze all aspects of clog construction. Together, they evaluated the design of Gerla’s existing soles to see what improvements would optimize performance – a more in-depth, holistic approach than Gerla had previously experienced. Huntsman’s solution was to develop a tailor made, fully formulated, polyether-based polyurethane product. With a lower density than Gerla’s existing soling material, and a higher level of robustness during manufacture, the material offered very good flow properties when injection molded. This enabled the creation of a seamless sole with no air bubbles that could be joined directly to the wooden part of the clog without the use of an additional adhesive.

Following rigorous tests (managed by Huntsman), Gerla put the solution into production, leading to a number of immediate benefits. As well as enabling the production of lighter, more comfortable clogs, the company boosted its productivity by reducing wastage and scrap rates during manufacture.

Mr. Joost Pijnenburg, Managing Director at Gerla, said: “With a much-loved classic like the Dutch clog, our challenge was to introduce innovative new materials while upholding the shoe’s heritage and tradition. Huntsman did far more than recommend a new soling product. They took a refreshingly holistic approach, meaning we could explore all possibilities to improve our clogs. What’s more, Huntsman’s ability to road test different soling materials under trial conditions gave us complete confidence that choices made in the laboratory would translate to full-scale production. This enabled us to get a better product to market faster and with minimal risk.”

Gerla produces around 600 pairs of clogs a day – all of which now incorporate Huntsman Polyurethanes’ products in the soles. In addition to clogs, Gerla also produces different types of footwear for various markets, most notably safety and work shoes.
Nayati phases out HCFC use with Huntsman’s help

Huntsman’s systems house in Indonesia has become the first in the country to produce a fully blended cyclopentane polyol to support Stage One HCFC phase out across the country.

A successful cooperation between Huntsman and Nayati Indonesia – a leading manufacturer of professional catering equipment – resulted in Huntsman developing and supplying Nayati with DALTOFOAM® MP 52095.

Working with Huntsman, Nayati’s aim was to produce an insulation panel for use in its chiller and refrigerator units without employing an HCFC-141B blowing agent. HCFC blowing agents are being phased out under the Montreal Protocol.

First trialed in February 2015, DALTOFOAM MP 52095 was subsequently refined and commercialized in August 2015. Using DALTOFOAM MP 52095 to create polyurethane insulation, Nayati estimates that it has achieved a 30% reduction in investment costs. It has also reduced the in-house risk of storing cyclopentane; as part of its work, Huntsman delivered a product stewardship presentation that helped to upgrade safety awareness at Nayati prior to product commissioning.

Aldo J Susanto, R&D Manager at Nayati Indonesia, said: “The advantages of using a cyclopentane, such as DALTOFOAM MP 52095 are two-fold: we can deliver a far better service to our customers and we can also give them a quality product that is fully compliant with industry requirements.”

Nayati Indonesia was first established almost 30 years ago, and today is a well-known, international kitchen equipment brand. Key customers include hotel groups, such as Best Western, Sheraton, Grand Aston, Swiss Bell and F&B, plus chain restaurants, such as KFC and McDonalds.

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Forestali uses TPU in composite material for leather goods manufacture

Italian company Industrie Chimiche Forestali S.p.A (Forestali) has developed an innovative composite material for the leather goods industry using one of Huntsman’s special TPU grades. The material, which features a durable layer of TPU, is called TINTORETTO and is designed to improve the structural integrity of high-end leather goods, such as designer handbags and belts.

Forestali is a leading producer of adhesives for the leather goods market, as well as for footwear, sailing and furniture applications. The business also manufactures a wide range of impregnated fabrics and textiles.

After spotting a gap in the leather goods market, Forestali contacted Huntsman. Forestali wanted Huntsman to help develop a durable material that could be wrapped in leather to form structural components for bags, for example, weight-bearing handles and shoulder straps. Specifically, Forestali wanted Huntsman’s advice on a polyurethane-based solution that could be used to coat a non-woven polyester and create inserts that were strong and robust yet incredibly flexible and soft to touch.

Huntsman recommended the use of a polyester-based TPU from its IROGRAN® range. Originally developed for hot melt calendaring applications, the grade in question is also suitable for multilayer extruding. Offering outstanding batch-to-batch consistency, the TPU is low in color and can be easily pigmented. It is also compatible with a variety of adhesives based on natural and synthetic lattices.

Satisfied with Huntsman’s suggestion and supported by the company’s technical team, Forestali developed TINTORETTO. The end result is a material that is easy to produce and can be cut in any direction without compromising dimensional stability. Thanks to IROGRAN TPU, TINTORETTO is also resistant to humidity, heat and cold, and can withstand repeated mechanical actions such as bending.

Emiliano Bozzato, R&D Manager at Forestali, said: “Huntsman quickly understood where we wanted to get to with TINTORETTO and recommended a TPU that was perfect for the task. Using IROGRAN TPU, we’ve created a hardwearing, but flexible product that appeals to decision makers across the global leather goods market.”

TINTORETTO is now available worldwide and is proving particularly popular with Forestali customers in Italy, a country renowned for quality leather goods.

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Across the polyurethanes sector, there is growing pressure to reduce the use of blowing agents that have GWP or ozone depleting potential (ODP). Since the phase out of chlorofluorocarbons (CFCs) in the 1990s, hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs) have been the dominant chemistries used in blowing agent production. However, these compounds are now starting to face scrutiny, so a shift towards hydrofluorolefins (HFOs) is beginning.

Derived from alkenes rather than alkanes, HFOs have much lower GWP than HCFCs and HFCs. They also have zero ozone-depleting effects. Solstice LBA from Honeywell is one such product. Listed as a suitable replacement for Class I and Class II ozone-depleting substances in foam applications, Solstice LBA has a GWP of one; more than two orders of magnitude (99.9%) lower than current HFCs. More important, Solstice LBA has a zero ODP.

Huntsman has become one of the first companies to use a next generation blowing agent from Honeywell in a commercial application. The company’s polyurethanes team in Australia used Honeywell’s Solstice® Liquid Blowing Agent (LBA) technology – which has very low global warming potential (GWP) – in a project with Rheem New Zealand (NZ), part of Rheem USA, one of the largest water heater manufacturers in the world.

Created to help reduce energy costs, the LBA system provides an extra layer of thermal insulation around the water heater. Rheem NZ has a reputation for developing products that ensure long-term reliability, enabling customers to deliver long-term reliability, enabling consumers to reduce heating bill costs. For Rheem NZ, maintaining a market-leading position means maintaining a market-leading position means embracing new technologies as they emerge. When CFC-based blowing agents were phased out, Rheem NZ quickly adopted HCFC alternatives and today it is the same story. With new HCFC legislation timetabled, Rheem NZ wanted to explore the benefits associated with next generation blowing agents.

Together, Huntsman and Rheem NZ discussed the pros and cons of choosing either HFC or HFO-based blowing agents. With HFOs performing better than HFCs for both ODP and GWP, the two companies agreed that adopting a HFO-based system would be the best long-term option – giving the business a significant advantage in the market place. Once the decision was made, a period of refinement followed with Huntsman tailoring Solstice LBA to the needs of Rheem NZ.

A series of new HFO-based formulations were then trialled with great results. Tests showed that the new insulation matched the existing HCFC-based system for energy loss and was stable enough for Rheem NZ to use over its normal manufacturing cycle. With Huntsman’s help, Rheem NZ is now manufacturing all of its water heaters with insulation that employs a HFO-based blowing agent – a move that gives its products a real environmental boost. With one next generation blowing agent project successfully under its belt, Huntsman’s team in Australia is now exploring how the use of HFO-based systems in other market sectors could benefit polyurethane users worldwide.

For more information on the subjects covered in PU Review magazine, please contact the editor:

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Designed and produced by: Chris Pearson creative communications.
At Huntsman Polyurethanes, we believe that working in true collaboration with customers is the only way to solve complex problems and find the solutions that will deliver real innovation. So, we strive with a passion and determination to build the deep understanding of our customers that’s required to get to the heart of their needs and establish lasting partnerships.

Our MDI-based polyurethanes and TPU technologies are used to meet the exacting needs of the major automotive OEMs, providing superior seating comfort and durability, advanced acoustic absorption and high performance components, which optimize weight and enhance safety. Combine our knowledge of polyurethanes systems with your expertise, and we’ll create better cars... together.