May 2024

# PUreview

REPORTING THE WORLD OF POLYURETHANES FOR OUR CUSTOMERS




## Investing in innovation

### New R&D center in Belgium

**Cultivating new ideas for fertilizer coatings**

**Driving forward automotive innovation**

**IROGRAN® products secure bluesign approval**

**First liquid TPU technology**

# Strengthening our innovation capability in Europe

**Tony Hankins, President, Huntsman Polyurethanes**

Welcome to the latest issue of *PU Review*, our bi-annual publication which showcases the latest innovations developed in partnership with our customers.

The main feature (pages 8-12) in this issue provides an insight into our new R&D Innovation Center in Belgium. Kristof Dedecker, our R&D Director for Europe, discusses the recently completed facility in Tienen, near Leuven, which has significantly strengthened our innovation capability. Despite the geopolitical and economic challenges facing Europe, it continues to be a strategically important market for Huntsman, and we remain committed to the region for the long-term. The investment in the new R&D Center reinforces this commitment.

The Innovation Center is home to members of our global research function, in addition to various application development and market product quality teams. Some of these teams are part of our global platform businesses (Automotive and Elastomers), while other work across our EAMEI business, providing support that helps underpin our work in adhesives, coatings, and flex foam markets, as well as insulation and composite wood products. Read how this inspiring new work environment is helping our scientists devise new MDI polyurethane solutions that address our customers' needs, both in Europe and beyond.

Throughout this edition we feature numerous other stories from our global team, which demonstrate the breadth of our innovation. As ever, there is a clear sustainability thread running through our work – with new products containing bio-based and recycled content, and MDI-based systems that are faster and less energy intensive to process.

Highlights include the first liquid thermoplastic polyurethane for the footwear industry, ideal for brands looking to use circular midsole materials and lower the carbon footprint of their manufacturing processes; composite and foam technologies aligned with the automotive sector's drive for more sustainable forms of mobility; and new products for composite wood and flooring applications. You can also read about the first Huntsman Biodegradable Fertilizer Coatings Challenge, in which we've opened new avenues for our innovation engine by bringing in ideas and concepts from outside voices and industries to help tackle a uniquely complex environmental initiative.

As always, I hope you enjoy this issue of *PU Review*. If you have any questions or comments, do email my colleagues who are named at the end of each story.

# GSK Supplier Award for quality and technical support

SUPRASEC®

**Automotive Tier 1 giant GSK recently rewarded Huntsman with a coveted Supplier Award – recognizing the team's reliability, commitment to quality, and willingness to push the boundaries of innovation.**

GSK, which is headquartered in Taiwan, but operates across Asia with a presence in China, Thailand, Malaysia, and Vietnam, specializes in the development and testing of core transport components including car seating, saddles, and steering wheels.

Central to Huntsman's win was the team's ability to think outside of the box and deliver solutions for GSK under pressure. Particular praise was given for the team's contribution to a cushion project for the high-speed rail sector. During this project, GSK faced a major hurdle when its own material system failed to meet the strict comfort specifications. Faced with a tight deadline of just six weeks, GSK turned to Huntsman for support.

The Huntsman team, led by Vincent Huang quickly rose to the challenge, leveraging their expertise to develop a new MDI formula, in record time. The innovative SUPRASEC® material provided surpassed all comfort requirements. It also addressed GSK's plant needs and environmental concerns.

Commenting, Vincent Huang, Technical Manager North East Asia & Vietnam at Huntsman, said: "Our commitment to technical excellence combined with our innovative solutions and our rapid service were a compelling proposition and key to earning this prestigious award. On every project, we try to go the extra mile for our partners – problem solving in partnership to deliver products of the very highest quality. We are grateful to the team at GSK and look forward to working on further joint projects in the future." |

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BIODEGRADABLE FERTILIZER COATING
CHALLENGE

# Global challenge cultivates new ideas for biodegradeable fertilizer coatings

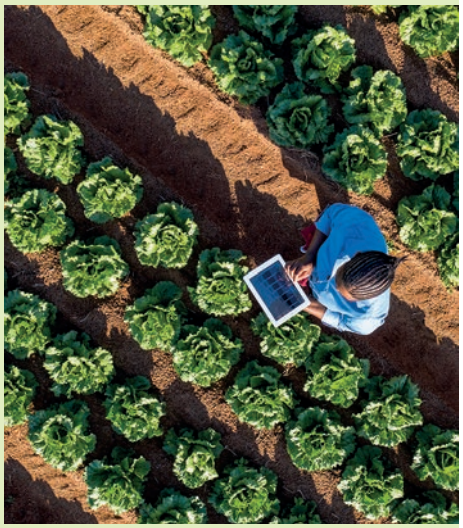
**In late 2023, we proudly launched the Huntsman Biodegradable Fertilizer Coating Challenge. The aim of this global initiative is to encourage innovators to come forward with ideas about how to formulate and manufacture biodegradable polymeric-based coatings for controlled-release fertilizer pellets to support sustainable agriculture and reduce soil microplastic contamination.**

Across agriculture, the use of coated urea fertilizer pallets has been commonplace for some time. These innovative systems slowly release nutrients into the soil – creating just the right conditions for plants to thrive. However, some pellet coatings can leave behind trace elements of substances that can remain in the soil for years to come.

In a bid to overcome this, Huntsman launched its challenge in September – making a scientific prize fund of $75,000 available for up to five laureate teams to help them transform their ideas into market-tailored technologies. The response to the challenge was amazing.

By the January deadline, almost fifty applications had been received with entrants submitting detailed proposals outlining:

- **A description of their solution**
- **How their solution addresses the challenge**
- **Their implementation approach/a development plan to achieve the goal**
- **The maturity of the solution**
- **Intellectual property status and freedom to operate**
- **Past achievements**
- **An overview of the entrant and their organisation**
- **Supporting information and references.**



In March, a shortlist of proposals was selected by the challenge judging panel, which included Achim Dobermann, Chief Scientist at the International Fertilizer Association; Carl Rosen, Professor of Soil Science at the University of Minnesota; David Mitchell, Strategic Marketing Director - Huntsman Polyurethanes Americas; David Cranfill, Technology & Innovation Director at Huntsman Polyurethanes Americas; and Dan Heberer, Senior Technical Manager at Huntsman Polyurethanes Americas.

The shortlisted finalists will now deliver an online pitch to the panel – giving judges a chance to ask applicants questions. Details of the challenge winners will be announced during Q3 2024. Watch this space for more information.

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SHOKLESS™

# New SHOKLESS™ potting systems can help protect EV batteries

**Our automotive team has recently revealed a series of new lightweight, durable, polyurethane foam technologies that have been developed for the potting and fixation of cells mounted in electric vehicle (EV) batteries. The range now also includes products that can be used as a moldable encapsulant in battery modules or packs.**

The new SHOKLESS™ foam systems can offer a flexible choice for helping to safeguard the structural integrity of EV batteries in case of impact or a thermal event. Due to be officially unveiled in June, at the Battery Show Europe in Stuttgart, Germany, the new product family includes a range of low to high density foams that can be used via common polyurethane dispensing processes and can offer a wide processing window for extra handling flexibility.

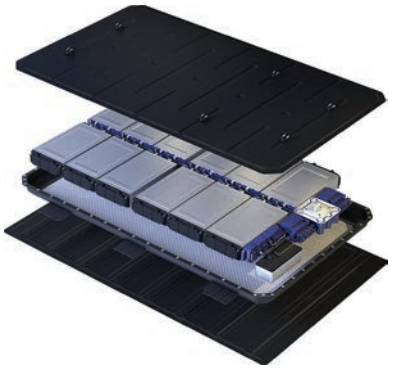
These new solutions can help provide thermal as well as structural protection at a cell, module or pack level combined with fast processability compared to non-PU alternatives. The moldable encapsulant version of the SHOKLESS™ system can further expand design and manufacturing options for EV battery manufacturers and OEMs.

With robust mechanical properties, the new SHOKLESS™ systems can offer very good compression and tensile performance with high elongation to failure. They can remain stable at different operating temperatures ranging from -35°C to 80°C*. They have also been developed to be easy to work with thanks to their low viscosity and ability to cure quickly at low temperatures.

Alex Stepuk, Global Market Segment Leader Automotive at Huntsman, said: “As the drive to create more electric vehicles continues to accelerate, we are applying our know-how to the challenges facing automotive manufacturers and developing new products that help to address clearly identifiable gaps in the market. We are delighted to extend the breadth of our SHOKLESS™ portfolio into the electric vehicle battery sector.” |

** Based on DMA (dynamic mechanical analysis) tests conducted in Huntsman’s R&D laboratory in Tienen, Belgium.*

New solutions can help provide thermal as well as structural protection at a cell, module or pack level.



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# Automotive team plans series of webinars

**Huntsman’s automotive experts are planning a succession of webinars this year looking at opportunities, challenges, and trends in the sector, and how polyurethanes are helping to accelerate the drive to more sustainable forms of mobility.**

The **‘Drive Forward’** webinar series will focus on:

PART 1 ***Exploring Automotive Evolution***
Thursday 16th May

PART 2 ***Polyurethane technologies to advance battery performance and protection in BEVs***
Thursday 27th June

PART 3 ***Improving circularity & reducing the carbon footprint of automotive foams and composites***
Thursday 19th September

All webinars will take place at 9am US Eastern Time/3pm Central European Time.
To register to receive more information, please email: polyurethanes_eu@huntsman.com |

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# New RIMLINE® composite resin system for automotive rear seats

**At JEC World 2024 in early March, we unveiled a new composites portfolio, which features a range of innovative technologies that can support the automotive industry's transition towards electrified vehicles. The portfolio includes novel composite solutions that can help automotive manufacturers and their tier suppliers optimize production processes; reduce environmental impact; and maximize the performance and lifetime of vehicle components as the drive for cleaner, lighter vehicles continues to accelerate.**

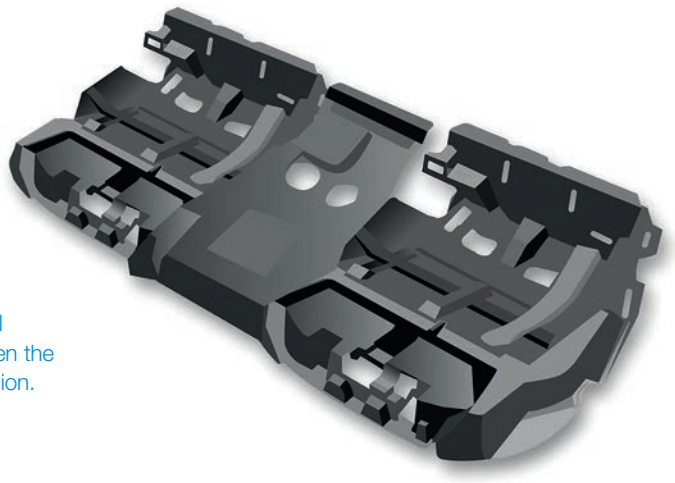
Central to the portfolio is RIMLINE® RSM system – a brand new glass fiber-reinforced, polyurethane composite technology developed for rear seat pan applications.

Seat pans are the structural component that sit between the seat structure and the cushion. Previously, seat pans were made from stamped and welded steel components.

Today, as automotive manufacturers look to make further reductions in vehicle weight, the use of composites structures for this type of application is being considered.

Aligned with the needs of the sector, RIMLINE® RSM system can support compact, lightweight, simplified design configuration requirements and has already been adopted

by a leading global OEM for premium vehicle models in China. Enabling the potential for high part integration capabilities, the technology is applied via reaction spray molding, making it ideal for creating complex geometrical shapes. It can offer very good fiber impregnation for good surface quality. It also cures quickly after spraying and can be demolded fast for an efficient production cycle.



Seat pans are the structural component that sits between the seat structure and the cushion.

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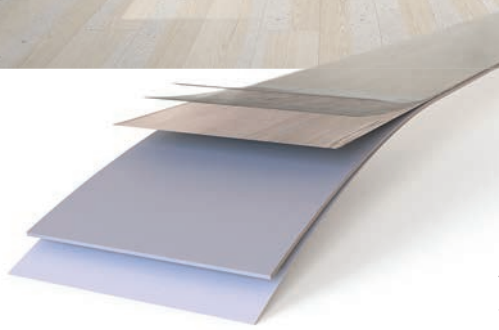
# Reshaping flooring with sustainable TPU

**Huntsman has developed a new thermoplastic polyurethane (TPU) that contains recycled materials, can scale across multiple types of applications, and is fully recyclable. This new TPU is based on Huntsman's leading TEROL® polyol and was developed in conjunction with HMTX Industries for use in the flooring market.**



TEROL® SPECIALTY POLYOLS

Envisioning an alternative to the polyvinyl chloride (PVC) used in luxury tiles, Huntsman and HMTX partnered to address some key challenges with existing PVC related to limited recycling options.

The resulting TPU-based alternative will help facilitate the recycling process as it is designed to be circular. Two plastic bottles* are upcycled into each square foot of SRP TPU flooring, enabling the planks to be upcycled into new SRP flooring post use, while maintaining optimal performance and quality.

HMTX introduced the solution in the second half of 2023 as SRP™ Rigid Core TPU flooring. Each plank consists of multiple layers including a polyethylene terephthalate glycol (PETG) top layer, a rigid TPU core, and an HDPE bottom layer. The new SRP solution was quickly recognized by multiple outlets, resulting in a 2023 Best of NeoCon Sustainability Award in the Flooring category and selection from BuildingGreen as one of the Top 10 Products for 2024.

While the environmental benefits of the new TPU are key drivers to its future success, there are also some key functional advantages including potential for improved locking strength, better sound isolation, and enhanced durability and abrasion resistance. A range of flexibility and softness characteristics helps provide multiple options for hospitality, retail, office, and healthcare settings.

"There's a lot of interest in creating a non-PVC flooring segment within our industry," said HMTX CEO, Harlan Stone. "The opportunity for SRP to be the leader in transparency, sustainability, circularity, and performance using the Huntsman technology is absolutely a winner."

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** Equivalent of 2.14 16oz PET plastic bottles are upcycled into each square foot of SRP TPU Flooring.*

# Huntsman Building Solutions expands reach in Australia


**Huntsman Building Solutions (HBS) is proud to announce that it has entered into a strategic agreement with Pacific Urethanes, establishing them as our official spray foam insulation (SPF) distributor in Australia. This strategic partnership marks a significant step forward in expanding HBS's reach and further solidifies the company's commitment to the Australian market.**

Pacific Urethanes has a wealth of industry expertise and a robust distribution network, encompassing skilled technicians and established connections within the spray foam community. This synergy offers a comprehensive solution for our Australian customers, ensuring exceptional service and product accessibility.

Initially, Pacific Urethanes will focus on distributing two of HBS's leading SPF products:

**Classic LDC-50**
A well-regarded open-cell foam.

**Heatlok ECO**
A sustainable HFO closed-cell foam.

HBS and Pacific Urethanes are united in their vision to revolutionize the Australian insulation market through cutting-edge technology, unwavering customer service, and a shared passion for sustainability. The partnership between the two companies holds immense potential to unlock new possibilities for the industry and drive positive change on an environmental scale.

Commenting, Travis McCallum, General Manager HBS APAC, said: "This partnership represents a significant opportunity for Huntsman to bring our world-class SPF products to the wider Australian market. With the help of AMBA and Pacific our aim is to transform the landscape of the insulation market in the region – offering a one-stop-shop for the industry."

Darren Millar, CEO Pacific Urethanes, echoes this sentiment: "Partnering with Huntsman allows us to offer the latest advancements in sustainable insulation technology. Their impressive ability to upcycle plastic bottles into high-performance spray foam resonates deeply with our commitment to environmental responsibility. We are confident that this collaboration will empower Australian spray foamers with a complete product and service offering, reinforcing our position as a one-stop shop for the industry."

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# New bio-based binder for composite wood panel production

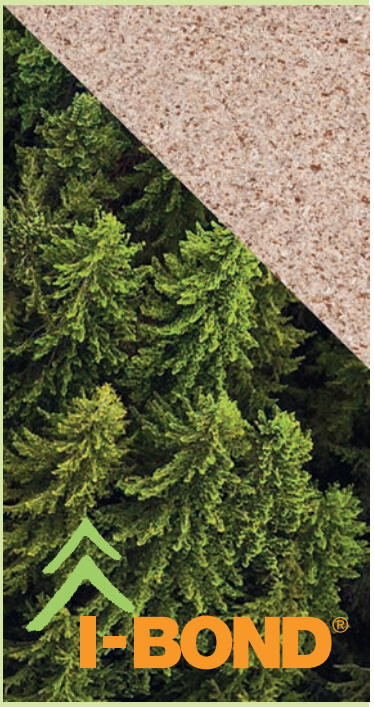
**As a business, we're committed to supporting the composite wood industry as it adopts more sustainable practices in both the manufacture and use of raw materials for panel production. Our work includes the development of resins that incorporate higher levels of bio-based or recycled content without compromising performance or quality.**

One such product is I-BOND® PB BIO 1025 composite wood panel binder. This innovative one component resin contains nearly 25% bio-content; has mechanical and wet properties meeting P2 and P3 standards; and can deliver required production rates without any loss of speeds.

This combination of qualities means that our customers can lower their carbon footprint for composite wood panel production, while retaining the same great performance. I-BOND® PB BIO 1025 system also meets stringent emissions standards.

Dr Servaas Holvoet, Platform Manager for Insulation & CWP Europe at Huntsman Polyurethanes will be delivering a paper about these new generation products at UTECH Europe on Wednesday 24th April at 3pm. You can also find out more by emailing:

catherine_laroche@huntsman.com



# Investing in innovation


**In March, Huntsman opened a new research & development innovation center in Tienen, Belgium. *PU Review* spoke to Kristof Dedecker to find out more about the investment. Kristof, who is R&D Director for Polyurethanes at Huntsman and Site Director at Tienen, spoke in depth about the benefits this new facility brings to Huntsman's customers; the people working there; and the equipment installed in the building. He also explained more about Huntsman's overall approach to innovation and current workstreams, which are helping to advance applications for polyurethanes in line with industry trends including, specifically, sustainability.**

***PU Review (PU R): Thanks for speaking to us Kristof. It's exciting that Huntsman has recently opened a new innovation center in Belgium. What's the reason for this investment and why did the business leave its previous location in Everberg, near Brussels?***

***Kristof Dedecker (KD):*** Like many companies the world over, there was a period of reflection after the pandemic. The economic turbulence that followed COVID-19 led us to reorganize aspects of our business and take stock of our physical footprint in Europe so that we could thrive, not just survive. With lots of staff continuing to work from home, we made the decision to move out of our old R&D and administrative offices in Everberg and find a new location that would better suit our future needs. The site at Tienen, near Leuven, provides just that – enabling us to work in a more agile, flexible way.

***PU R: How big is the site and how many people are based there?***

***KD:*** Our new innovation center provides 9000 square metres of space; the equivalent of about one and a half football pitches. There are more than 100 R&D specialists who work on site. Many of these individuals are focused full time on polyurethanes innovation projects – but the space is also shared with colleagues from Huntsman's Performance Products division. In addition, we've got associates from multiple different business functions using the site on a hotdesking basis.


***PU R: Why did you choose Tienen?***

***KD:*** Once we'd made the decision to move out of Everberg, Tienen was an obvious choice. The building offered the exact space we were looking for – not just in terms of physical size but also in the way it is organized. It's allowed us to create a dedicated laboratory and two machine halls plus flexible working stations for desk-based staff. The location is also convenient and easy to reach. Tienen is a short drive away from the university towns of Leuven and Liege. The site is a short walking distance from the local train station. It's also well connected to a main motorway, which runs straight into Brussels to the West and towards Liege, Maastricht, and the German border in the East.

***PU R: What business functions are based on site?***

***KD:*** Our global research function is present on site alongside our various application development teams. Some of these teams are part of our global platform businesses – Elastomers and Automotive. Other associates are in our regional team, working across our EAMEI business, providing support that helps underpin our work in adhesives, coatings, and flex foam markets. The regional team is also critical to advancing our efforts in polymeric MDI oriented markets e.g., insulation and composite wood products. Over and above research and development, we've got an analytical lab on site, and our physical testing and market product quality teams.

***PU R: From an R&D perspective, what equipment do you have on site?***

***KD:*** Much of the work carried out on site is conducted at lab scale, where various parameters can be screened quickly and efficiently. In our machine halls, we have larger machines, where lab work can be upscaled. These machines enable us to simulate end applications and replicate the manufacturing conditions experienced by our customers. We will also have pilot reactors on site. These will allow us to design new molecules, which can later be manufactured at our production plants. In addition, we have a world scale analytical lab and fully equipped and automated physical testing facilities.

Combined, this equipment gives us the capability to perform the entire innovation journey from the formulation of initial ideas at lab scale through to the manufacture of novel products ready for customers to trial. Our capabilities on site also mean we can make modifications to our existing product portfolio in line with customer needs. This includes exploring the impact of integrating more sustainable content into existing formulations – be that recycled or bio-based. There is also a significant quality benefit, with the team on site able to evaluate any customer feedback we receive about our products.

***PU R: How does Tienen interact with other Huntsman sites worldwide where there is an innovation focus, and how do you foster collaboration and cross-functional teamwork among disparate teams?***

***KD:*** At Tienen we've taken an open approach to the design of our lab set up to help stimulate collaboration and teamwork between different functions on site. In our previous location, all teams were in separate labs, many quite distant from one another. Now, different teams are working side by side. It's early days but we believe this is going to make a big difference to our work and innovation output.

From a global perspective, we've got other innovation centers in the US and APAC, and the team at Tienen is in continuous contact with associates at these sites – exchanging information, ideas, and research findings. Quite often our regional teams end up working to solve similar problems on individual projects – so they regularly share knowledge and learnings to mitigate any silo effect and duplication of effort. We also run global projects where different team members worldwide can collaborate and work towards a common innovation target. Increasingly, these types of projects have a sustainability focus.

***PU R: How do you foster an innovation culture more widely across the business? And what processes do you have in place to support innovation implementation?***

***KD:*** We have strong connections between our innovation teams, which I've already touched upon, which help underpin our innovation culture. However, we also actively encourage innovation across all parts of our business. One way we do this is via our CEO Award for Innovation in Sustainability program, which has been running for more than a decade.

Every year, associates from across the corporation are invited to submit details of projects that have the potential to further strengthen our core mission: enriching lives through innovation. Projects do not have to be limited to innovation in its most conventional sense. The program is designed to highlight the different ways in which our associates are helping to reduce the environmental impacts of our operations. This might be developing products that can help reduce emissions and energy use and save precious natural resources. However, we also get applications for projects where the focus is on improving efficiencies within our own business that can – long-term – have a positive impact on the planet and the bottom line of our company and our customers.

Recently, we've taken this approach a step further – creating an external initiative to stimulate innovation in the agriculture sector. The Huntsman Biodegradable Fertilizer Coating Challenge is a global initiative designed to

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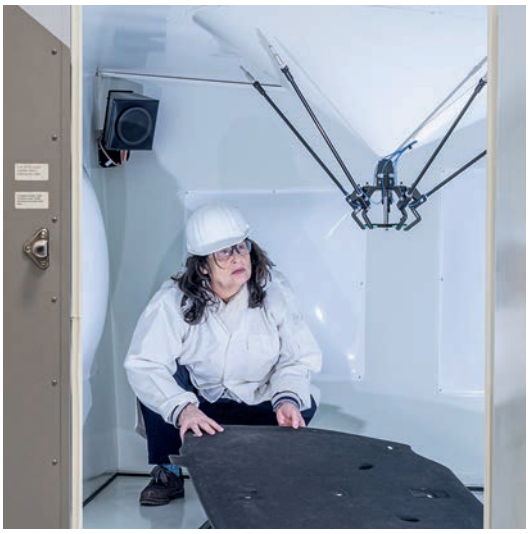

encourage innovators to come forward with thoughts on how to formulate and manufacture biodegradable polymeric-based coatings for controlled-release fertilizer pellets. Read more about this project on page 3.

From a practical, implementation perspective, we have an innovation board, which features stakeholders from our sales, marketing, and innovation functions. This team evaluates new projects before they begin to ensure the innovation is market driven and that all relevant technical, market and customer information has been properly assessed before kicking off a project in the lab. The innovation board also regularly evaluates projects once they are underway, to make sure they are on track to deliver what's required.

***PU R: It's obvious that innovation is central to Huntsman's work. Have you seen a shift in innovation focus in recent years?***

***KD:*** Absolutely, innovation is pivotal to what we do at Huntsman – and always has been. For decades our strapline has been 'Enriching lives through innovation', which perfectly sums up our ambition. In the current economic climate and in times of uncertainty, innovation is more important than ever. Today you must be creative in all aspects of business – but particularly when it comes to generating new ideas and creating new products.
Our customers demand innovation. That was always the case in fast moving consumer markets like footwear. It's now critical across all sectors with the drive to develop more sustainable solutions and adopt cleaner, greener ways of working, which are less resource intense, impacting all aspects of industry.

***PU R: Where do you see the future of innovation and R&D heading in the PU industry? Sustainability, as you've already mentioned, is clearly going to be key.***

***KD:*** Over the last few decades, consistent innovation has enabled polyurethanes to enter an ever-increasing amount of end applications. As the versatility of polyurethane chemistry has opened the door to new areas, our focus has been on adapting and improving our technologies so they deliver the optimum cost to performance ratio and can compete in new fields. This work will undoubtedly continue. However, sustainability will continue to play an increasingly dominant part in the future of our R&D. For some time, we've seen industry trends and regulations initiating a new wave of R&D programs that favour sustainable end uses and are focused on integrating more non-fossil-based raw material streams into our systems.

***PU R: Can you provide us with some specific examples of the kinds of sustainability-focused innovation projects you're involved in?***

***KD:*** There are so many to mention – but I'll give you two obvious examples. Worldwide there is a huge drive to create more environmentally friendly modes of transport. To support this, in the automotive sector, we're developing different polyurethane

materials and systems that can support lightweighting to improve the range of electric vehicles – without compromising performance or safety. This includes potting and encapsulation technologies to protect battery cells in the event of impact or thermal incidents. We're also creating composites for other fuel cell applications – for example in hydrogen pressure vessels.

In the footwear industry, innovation is constant. We recently created the industry's first liquid thermoplastic polyurethane (LTPU), which can be used to rapidly manufacture high-performing midsoles. Easier to use than expanded forms of TPU, this system can be processed in a single step using significantly less water and energy than other methods. At the end of its life, the material can also be recycled and repurposed – supporting the circularity ambitions of big brands (see page 14 for more information).

As well as looking at new specific market trends and opportunities, we're also working more broadly – looking at how best to replace some of our fossil fuel-based feedstocks with bio-based or recycled content; our TEROL® technology being a case in point. As part of this, we monitor upcoming regulatory changes and evaluate business cases to judge where these types of technologies will prove most popular. We're also now offering methylene diphenyl diisocyanate (MDI) that has been manufactured based on mass balance principles, which can help reduce the attributed carbon footprint of customers' products. This is facilitated through our ISCC PLUS certification, which gives us the ability to verify the sustainable inputs we use in our products.

***PU R: Aside from sustainability, what emerging technologies or trends do you believe will have the biggest impact on R&D in the coming years?***

***KD:*** Digitization and artificial intelligence (AI) look set to have a major influence in the future. We are just starting to see how AI can be used across the materials sector to fast-track innovation programs; fill in gaps in material property databases; and ensure that lab work is more efficient and focussed. The time savings that these technologies will bring about in due course will be significant and will help accelerate the speed at which innovative new products can be brought to market. That can only be a good thing – particularly where sustainability is concerned and where there is a pressing environmental problem that needs to be solved.

***PU R: Innovation programs do not always have the intended outcome. How do you measure success and mitigate risk – and is there anything specific you do to capture lessons from projects?***

***KD:*** In my experience, successful projects tend to have two things in common: a well understood and sizeable market need; and a clearly defined future customer. As a result, we tend to measure success through the contribution margin that is generated by products developed over their first five years. This metric allows us to have an objective measure and set new targets for the future.

While no-one wants an innovation project to fail, it's important to remember that you can also learn a huge amount from projects that do not make it through to completion. Naturally, we do all we can to mitigate the risk of project failure. When projects get put on hold or stop, we take the time to review whether our stage gate process picked up any problems early enough. And, if things do go really wrong, we try to think of FAIL as an acronym for '**F**irst **A**ttempt **I**n **L**earning'. There is always something to learn from an innovation project – regardless of the outcome. |

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## The Huntsman innovation process

When it comes to the generation of innovation ideas, Huntsman follows a five-stage process that spans ideation, feasibility, development, scale-up and launch. At every step, checks are performed to ensure that the innovation being developed has a definite, tangible end application and that the final result will not deviate from the original project objectives. These steps also ensure that innovation resources are allocated to the projects that will be most rewarding, and that any development risks are well understood and mitigated where possible. Projects only move to the next stage of the innovation process after careful evaluation.

# IROGRAN® TPU products secure bluesign® APPROVED status


**Ten of our IROGRAN® thermoplastic polyurethane (TPU) products, which are used extensively across the textile and apparel industry, have recently secured bluesign® approval – confirming they meet strict eco and toxicological criteria. The materials in question can be used to enhance the production, performance, and comfort of stitchless, seamless garments including underwear, sportswear, and outdoor and waterproof clothing.**

Recognized worldwide, bluesign® is a leading sustainability solutions provider that ensures that sound environmental practices and products are used at each step of the textile value chain. Chemical products and textile materials carrying the bluesign® APPROVED label are confirmed to meet the stringent ecological and toxicological requirements set out in the bluesign® CRITERIA. For textile and apparel manufacturers, this third-party endorsement can significantly reduce the amount of time and money they need to spend on researching products and testing samples to confirm their environmental credentials.

The ten bluesign® APPROVED products are all part of our IROGRAN® TPU film and sheet range. Helping to enable textile and apparel manufacturers to create stitchless and waterproof garments that are practical and comfortable, yet also stylish, IROGRAN® TPUs developed for barrier and adhesive film applications combine abrasion, friction and mold resistance with elasticity and a soft touch. They also offer strength and temperature flexibility – for a seamless finish that can deliver high performance.

Michael Sabo, Head of Chemical Services at bluesign®, said: “As one of the most respected sustainability solutions providers that chemical companies, brands, and their supply chain partners can work with globally, bluesign® conducts strict on-site assessments of chemical manufacturers – examining the effectiveness of their product stewardship systems and conducting a rigorous assessment of their chemical products to ensure they are non-hazardous and produced sustainably. Huntsman is a trusted bluesign® SYSTEM PARTNER – with an excellent track record, and we are delighted to certify its IROGRAN® TPU products.”

The Huntsman team is now continuing its bluesign® journey and working to qualify other systems for textile and apparel applications.

Huntsman Polyurethanes became an approved bluesign® SYSTEM PARTNER in 2022 following rigorous checks of its facilities and production processes. Achieving bluesign® SYSTEM PARTNER status means a company uses resources responsibly, is continuously committed to improving environmental performance, and operates with the highest level of safety for both people and the environment. To achieve bluesign® SYSTEM PARTNER status, the Huntsman Polyurethanes team had to undergo a series of extensive audits to prove that product stewardship is at the core of its business practices and that processes are in place to help ensure product safety measures are followed.

**Approved products include:**

- IROGRAN® PS443-204
- IROGRAN® PS455-218
- IROGRAN® PS370-206
- IROGRAN® A 95 P 5044 H UV
- IROGRAN® CA116-206
- IROGRAN® PS455-203
- IROGRAN® A 80 P 5039
- IROGRAN® CA117-200
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# First liquid TPU developed for footwear industry


**In a first for the footwear industry, Huntsman has developed a liquid thermoplastic polyurethane (LTPU) that enables the rapid manufacture of high-performing midsoles and is aligned with the circularity ambitions of brands manufacturing sports and athleisure footwear.**

Easier to use than expanded forms of TPU, which require complex procedures such as supercritical foaming and steam chest molding, SMARTLITE® O LTPU system can be processed in a single step that uses significantly less water and energy and generates less waste and carbon emissions. Crucially, Huntsman's SMARTLITE® O LTPU system can also be converted and repurposed into new materials either in its post-industrial or post-consumer form.

To launch this unique, lightweight product, Huntsman joined forces with the framas Group. Ready to partner with brands on sampling and the fulfilment of orders, framas has capacity to produce up to two million soling constructions per annum using the material.

Peter Sterz, Project Manager for SMARTLITE® O at Huntsman, said: "For footwear brands pursuing circularity and looking to lower their carbon footprint, SMARTLITE® O LTPU system provides a very clear pathway. The material stands out from the competition, offering multiple advantages over and above PU, ETPU and EVA. A number of big brands have already expressed considerable interest in the technology, and we look forward to working with framas to bring the material and all its benefits to market."

Andreas Quade, Executive Board Director, Innovation & Technology at framas, said: "Huntsman's SMARTLITE® O LTPU system is incredibly innovative. Helping to enable circular projects, it is a definitive step towards more environmentally friendly practices in the footwear industry. We're excited by the interest the material has already generated and look forward to further discussions about the opportunities it presents." |

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## Key benefits of SMARTLITE® O Liquid TPU

**Easy to process:** Processed on low pressure casting machines, SMARTLITE® O LTPU system is simple to use, scalable and can help streamline shoe manufacturing. With in-situ polymerization, adhesive-free bonding of midsoles to TPU outsoles, and fast demold rates, cycle times for the SMARTLITE® O LTPU system are short.

**High performance:** With a density of 250 kg/m³, Huntsman's SMARTLITE® O LTPU system produces superior, hydrolysis resistant midsoles that offer long-lasting, step-in cushioning comfort with a rebound of more than 50%.

**Circular:** SMARTLITE® O LTPU system is the ideal solution for brands looking to use circular midsole materials and lower the carbon footprint of their manufacturing processes – without compromising performance or quality. Supporting circular economy initiatives, soling units featuring a SMARTLITE® O LTPU midsole and a TPU outsole can be mechanically repurposed – if the correct reprocessing infrastructure is available. For example, manufacturers can mix post-industrial recycled SMARTLITE® O LTPU content with virgin TPU to create new outsoles and cupsoles. Huntsman can also make bio-based versions of the material.

**Freedom of design:** For footwear designers, SMARTLITE® O LTPU system opens up new creative opportunities, delivering enhanced surface definition without silver lines or the popcorn effect. It is also easy to color and create striking fade effects.

# Popularity of premium paint protection film (PPF) solutions expands


**The market for paint protection film (PPF) has expanded significantly over the past few years. As aftermarket applications at automotive body shops and dealerships become more common, there is increasing demand for PPF applications that can deliver a high-quality appearance and premium performance.**

Huntsman has been at the forefront of material innovation for the PPF market for many years with its KRYSTALGRAN® thermoplastic polyurethane (TPU) range, which provides superior visual characteristics and aging performance.

Manufactured in the US, in a state-of-the-art facility in Illinois, KRYSTALGRAN® TPU solutions have a unique formulation that can help PPF manufacturers reduce the risk of small gel defects, which can be a nuisance and impact film quality.

From a performance perspective, PPF solutions based on KRYSTALGRAN® TPU can deliver excellent UV resistance properties and low temperature performance, making them suitable for the wide range of operating conditions that customers experience around the world. Their flexibility and ease of application can also help ensure the right fit and finish.

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## Forthcoming events and technical presentations

### 2024

UTECH Europe – Maastricht, The Netherlands (23-25 April)

The Battery Show Europe 2024 – Stuttgart, Germany (18-20 June)

NPE The Plastics Show – Orlando, Florida, USA (6-10 May)

Green and Energy Efficient Building – Zhengzhou, China (13-15 May)

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# Polyurethanes for a better night's rest.

At Huntsman, we pride ourselves on making polyurethanes that contribute to a better life; polyurethanes that can help you through your day, as well as your night. For bedding and furniture manufacturers, our foam systems enable the production of high quality, comfortable and durable mattresses, pillows, sofas and chairs. Wherever you are, you can rest easy – safe in the knowledge that our polyurethanes are always close by, working hard to make your life better.

POLYURETHANES FOR A BETTER LIFE

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